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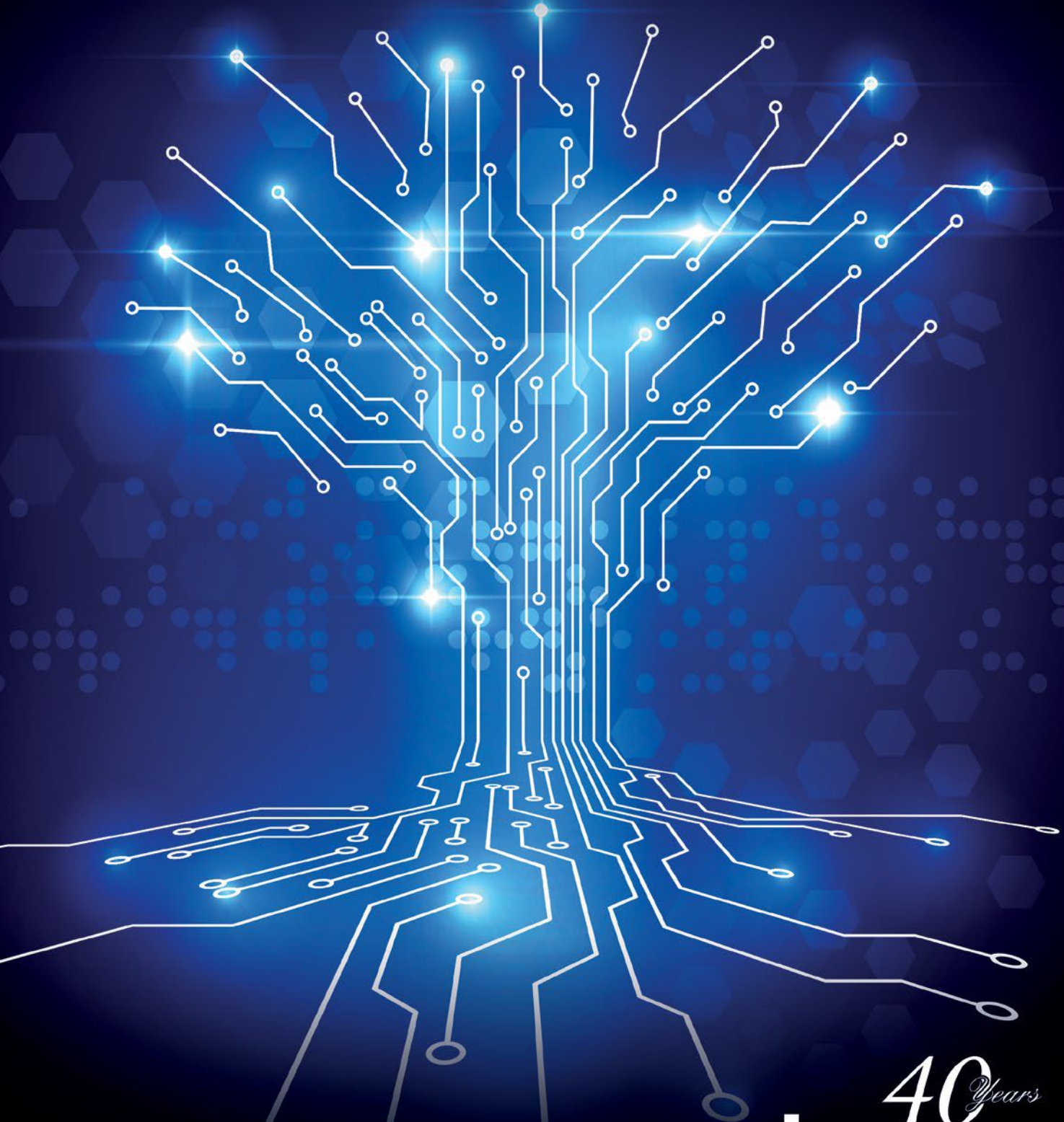
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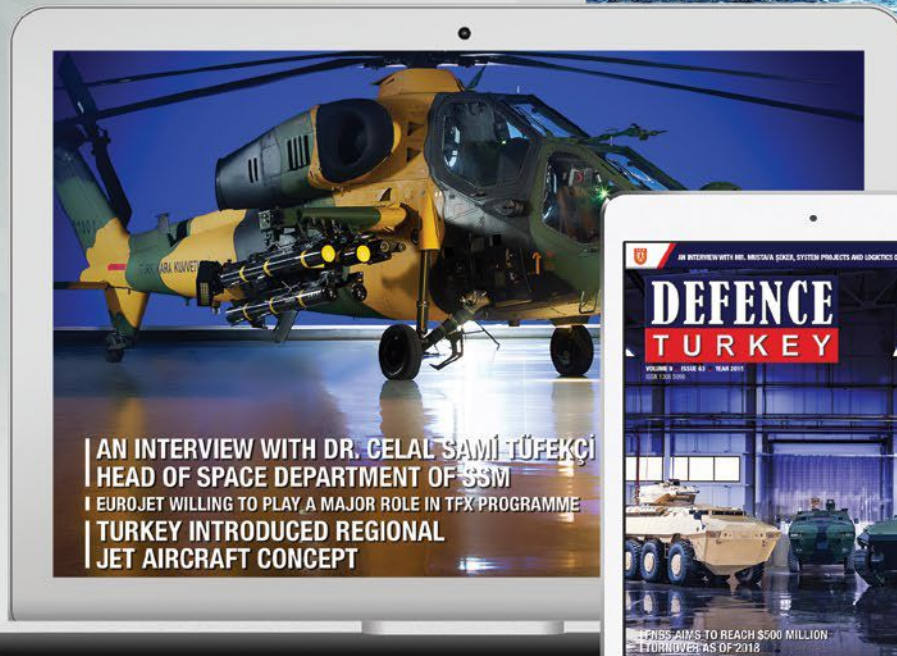
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Turkish Land Systems Gaining Momentum

Ayşe Akalın Evers
Publisher & Editor in Chief

Regarding land platforms, Turkey reached a certain level within the scope of the projects conducted by SSM. Today, with the indigenous products they developed, Turkish land vehicle manufacturers like FNSS, Otokar and Nurol are actively involved in activities in the international markets where the competition is fierce. In the last ten years, many important procurement projects were launched. Hundreds of armored tactical and special vehicles such as Tactical Wheeled Vehicles, Battle Tank Transporter, Mobile Amphibious Assault Bridge, Amphibious Armored Combat Engineer Vehicle are in the Armed Forces inventory and actively utilized within this period.

One of the most important projects on Turkey's agenda is the "Altay" Main Battle Tank Development program. As a result of the studies conducted by the Land Forces Command, an order of 250 MBTs was planned at the first stage within the scope of the "Altay" MBT Mass Production. SSM is still evaluating the proposal from Otokar company which is the Main Contractor of Altay.

Within the scope of the Anti-Tank Vehicle program, it was decided to initiate contract negotiations with the company FNSS at the last Defense Industry Executive Committee (SSIK) meeting for the procurement of a total of 260 Anti-Tank Vehicles composed of 184 tracked and 76 wheeled vehicles. Within the scope of this Project, procurement of Anti-Tank Vehicles in three different configurations composed of Kornet anti-tank system over tracked vehicle, OMTAS system again over tracked vehicles and OMTAS system over wheeled vehicles is planned.

Moreover, SSM also has identified deficiencies especially in sub-systems such as engines and transmissions. However, there are ongoing projects initiated by the Undersecretariat for Defense Industries regarding these sub-systems. It is expected that Turkey's foreign dependence regarding the sub-systems of land platforms will be reduced to the minimum level after these projects are launched.

Near future, the New Generation Armored Vehicles Project will be on Turkey's agenda. As part of this project, the domestic development and procurement of many new generation armored vehicles in various configurations will be explored. Still, detailed studies are being conducted in line with the operation requirements identified by our relevant requiring authorities. Additionally, the procurement activities regarding the Tactical Wheeled Armored Vehicle demands of the Land Forces, Gendarmerie General Command and Turkish National Police will be maintained.

It is obvious that Turkish Land systems capabilities are achieving great impetus under the leadership of the Undersecretariat for Defense Industries; by excelling with this momentum it is reaching towards meeting all of its targets in and around Turkey as a manufacturer and exporter of not only platforms but also sub-systems and critical equipment.

Enjoy this issue...■



A new Strategic Approach for Export and International Cooperation. Turkish Defense Industry Export Momentum Expected to Accelerate

An Interview with Ms. Asuman Vangölü, Head of the International Cooperation Department - Undersecretariat for Defense Industries.

Defence Turkey: Dear Ms. Asuman Vangölü, you have recently been assigned as the Head of the International Cooperation Department of the Undersecretariat for Defense Industries. In this new era starting with your assignment, will there be any restructuring and a new strategy that would elevate the Turkish Defense Industry's exports and enable our products and companies to be heard more in the international arena?

Actually, it has been ten months since my assignment. During this period, together with my colleagues we initiated studies for a new structuring and strategy that would enhance our power in areas of both exports and international cooperation in the upcoming period and that will carry our sector to better grounds in the global market.

We are aiming to accomplish the development of a new Strategic Plan for Export and International Cooperation consistent with our Undersecretariat's Strategic Plan for 2017-2021 at the final quarter of 2016. The points we need to focus on strategically emerged with the participation of the sector's stakeholders, and as such we will be launching a brand new strategic management approach which will put the relevant projects and activities into practice, enable performance monitoring and feedback, and when necessary execute the updates according to the new goals that may appear. Actually, these studies that we have been conducting revealed the need for a new structure in our department. We would be able to accomplish more comprehensive studies through a new unit, which would carry out activities towards the development of international policies and the implementation of new strategies.

Defence Turkey: Taking the export figures of 2015 into consideration, what's your evaluation on the current status of the sales in respect to the years ahead? What would you like to say about the deficiencies on your part and the steps to be taken?



As known, our export accumulated to \$ 1.66 billion in 2015, so it was 0.5% over the amount of the previous year. According to the data provided by the Turkish Exporters Assembly, our sector maintained its existing level in exports in a time when our country's overall exports declined by 8% and it is quite important that our sector was one of the two sectors with positive growth rate. Then again, as the sector our export goal for the ambitious 2023 vision was set at \$ 25 billion. In order to reach this figure, we have to achieve an average yearly increase of around 35% in the upcoming period. Currently, the accomplishment of a boom of that magnitude through existing methods appears quite difficult. At this point, I would like to point out that our crucial deficiency is addressed as a "Strategy on Export and International Cooperation" towards the ambitious 2023 vision which would enable the efficient utilization of our resources. As I mentioned before, we have already launched significant studies in coordination with our stakeholders on this subject, and our analysis is that our companies should display more effort in this area as well. Moreover, I rely on the fact that we need to analyze key issues such as the accomplishment of sales at the "platform" level; doing so would enable massive movement in our exports sales. In addition, the realization of joint venture opportunities with our parties in the upcoming period are of central importance.

Defence Turkey: The International Cooperation Department is planning to release the 'Export and International Cooperation Strategy for 2017-2021' as the Undersecretariat for Defense Industries. What kind of a vision will be revealed through this strategy report? Is there a road map that you determined for the launch of offices abroad or different organization models?

I have to say that our Undersecretariat's Strategic Plan for 2017-2021 will play a critical role in the identification of the vision for the Strategy on Export and International Cooperation. Most of the situation analysis activities of our strategy development project have been finalized. Our department scrutinizes the feedback regarding the obstacles in exports and the steps that need to be taken. As you may recall, the Defense and Aerospace Industry Exporters' Association had organized a "Search Conference" at the end of 2013 in order to abolish the obstacles in exports and to establish suggestions on solutions with the participation of the representatives from the relevant institutions, associations and companies. If you review the conclusion report of that conference, you will be confronted with many problems that are still existing. Within this scope, we aim to prioritize some of the issues that need to be resolved in the upcoming period and to eliminate our deficiencies and enhance our efficiency.

Regarding foreign structuring, we would need to make an assessment on factors such as requirements, regulations, stakeholders' considerations, etc. through a holistic perspective in order to evaluate the alternatives. We observe that disclosing a road map upon completion of a comprehensive analysis, within the scope of the Strategic Plan on Export and International Cooperation, would be a reliable approach.

Defence Turkey: As the Undersecretariat for Defense Industries (SSM), you have inaugurated SSM offices in Belgium, USA, Saudi Arabia and Kazakhstan during the previous period. This has been done in order to improve our country's efficiency in foreign countries regarding the defense industry arena, toward promoting our products more effectively and to be closer to the international markets. What would you like to say on the activities of these offices and their contributions to our industry?

The first of the International Cooperation offices was established in 2011 and they have been providing support to our companies' business development activities and contribute to the promotion of our industry in the regions in which they are located with the motivation of enhancing the opportunities for exports.

From the first day of my assignment, we have been conducting important activities for identifying and increasing the efficiency and effectiveness of our foreign offices. Within the scope of situation analysis activities, we prefer to do data-driven reasoning. We aim to clarify our road map in light of the results of the analysis, as I have mentioned previously.

Defence Turkey: We are monitoring that Turkey is quite active particularly in African and Asian markets in recent years. According to the export figures regarding these regions, and in light of the SaSaD's data of 2014, we realized that the export sales



Roketsan and Lockheed Martin Signed a MoU within the scope of SOM-J program in DSEI 2015

figures increased drastically by 55% in 2014 compared to the previous year. When we considered these figures, we surmised that Turkey's focus was directed to these regions and that Turkey built a close cooperation based on trust with the countries of these two regions. In order to increase our share in the Asian and African markets, are there any studies planned in the near future, in order to increase awareness towards our products and capabilities, such as through active promotion studies in which more companies could participate and at which more products could be displayed?

First of all, I believe that region-specific approaches in exports are not appropriate anymore. Focusing on your question, there are notable countries in Asia and Africa in which we have potential in respect with our activities based on export and defense cooperation. Thriving economic and social relations with the African continent in all areas were initiated with our country's Expansion to Africa Policy in 1998 and cooperation in the defense industry gained momentum in recent years, in parallel with the strengthening of these relations. The Asian region also holds great potential regarding cooperation in the defense industry.

The cuts in defense budgets of developed countries and the maturity of traditional markets

unavoidably pave the way for the need to penetrate into new markets. Turkey has cultural and historic ties with the Asian and African countries and these ties bring us multiple advantages. Turning this potential into alternative types of cooperation is possible. The Turkish defense industry significantly developed its defense industry infrastructure and extended its product range. It is heading towards relevant new markets including Asia and Africa and to increase its effectiveness there is of utmost importance. Within this framework, as the SSM's Department of International Cooperation, we are working out a plan for discovering alternative cooperation opportunities in the defense market and toward increasing our share in this market.

As you know, product development is a serious process. Proper promotion of the developed product, the presentation of the product to the right audience at the right time and places is a whole different process. Within this scope, the participation of our countries in the defense industry fairs held in the Asian and African regions bear great importance. SSM conducts an essential task by the participation of our senior level authorities in the fairs and encouraging the attendance of defense industry companies through "National Participation." Among our priorities in the upcoming



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period is our participation in the major fairs identified, introducing our indigenous products and capabilities, enhancing our cooperation with friendly and allied countries.

Establishing new joint ventures in world markets is another area of opportunity. Turkey has crucial capability and experience in the defense industry arena. Transferring this experience and boosting certain regional markets as part of bilateral and multilateral cooperation are possible. Turkish defense companies already have joint ventures and both Turkey and the relevant foreign party are benefiting from the advantages of these affiliations. Revealing cooperation potential by sharing know-how, experiences and technology will also contribute to the creation of a market with depth in the aforementioned regions. Our companies have significant experience in building joint ventures. We are conducting research on these types of opportunities and we believe that fulfilling the needs in a joint manner will be beneficial for all parties.

Defence Turkey: Regarding Asian and African markets, in order to increase the current export potential, do we need more aggressive defense industry policy and a different strategy that would leave our strong competitors behind, in which transferring certain capabilities through joint investments, joint production methods are applied more efficiently? What is your comment on the studies carried out and on the next actions to be taken?

Today, all countries are struggling to possess outstanding defense technologies in parallel with their capacities, in order to enhance their technological accumulation and reduce their foreign dependency in this area while also raising their export potential level in the defense market. As a consequence, technology transfer between the countries has become a vital tool. We, as the SSM, are providing

our support in the establishment of joint ventures and bilateral and multilateral cooperation in the defense industry arena. As you are aware, our companies have already established successful cooperation in various countries and our determination in this context will continue.

Defence Turkey: What would you like to express on the current status of our existing cooperation with the Arabic countries and Middle East countries? How was the year 2015 for Turkish companies in those regions?

As the products developed and manufactured by our defense industry reached a level sufficient for competing in international markets, quite successful projects were accomplished by our firms with the Middle East and Gulf countries. Many platforms were delivered to these countries within the recent period; primarily Wheeled Armored Vehicles and High Speed Patrol Boats. On the other hand, the Memorandum of Understanding signed between Aselsan and Saudi Arabia's Defense and Security Technologies (DST) Company in November 2015 was materialized through a Company Contract in February 2016. In addition, a protocol on the joint initiation of R&D studies was signed in November 2015 by the SSM and Saudi Arabia's King Abdulaziz City for Science and Technology (KACST) Institution.

Regarding the upcoming period, we are aiming to participate in the defense fairs in the region and planning promotional activities through the participation of our defense industry companies. To this end, with the positive references from the successful projects we accomplished in the Middle East region, we maintain our activities to increase cooperation and export effectiveness in defense and security technologies.

Defence Turkey: Dear Ms. Vangölü, Turkey has been striving to gear up in the Asia-Pacific region in recent years. What type of activities have you

been conducting to increase Turkey's effectiveness and competition in this market? What would you like to say regarding the ongoing programs and co-operations?

Our effectiveness has increased in the Asia-Pacific region in the recent period. We regard this region to be beyond merely a developing market but also as an environment that has sustainable and efficient cooperation potential. We are exerting efforts to establish long-term relations based on mutual trust, which is consistent with the interests of the parties in the region. To this end, we are continuing our dialogues with the countries of the region. We participate nationally in at least one event in the region each year, basing the cooperation we build upon the principle of mutually sharing experiences and know-how.

In the current situation, the leading companies of our sector are carrying out and strengthening their business development activities in the Asia-Pacific region.

Defence Turkey: There are countries such as Thailand, Philippines and Singapore in the Asia-Pacific region where Turkey is not quite active, but intends to increase its activities as well. Do we have an identified strategy for strengthening our cooperation with these aforementioned countries and for selling products to these markets?

Considering this region, we would like to develop our relations in line with our policy as was mentioned previously. In general, and in addition to the contact with the companies within those countries, we believe that intergovernmental contact would encourage relations to gain impetus. We assess that there is ample opportunity for defense industry cooperation with the aforesaid countries. With more frequent visits and contact, besides our attendance and participation in the events held in those countries during the next period, we will try to build-up our relations with these countries.

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Defence Turkey: What are your comments on the market studies for the South American countries such as Peru, Uruguay, Ecuador, Chile, Brazil and Colombia and the existing cooperation? What would you like to say about the priority areas, export opportunities and the potential awaiting our companies especially in the South American region?

In line with our country's versatile foreign policy goals, we have observed that the relations between our country and the Latin American countries have gained momentum in many areas in recent years. From the perspective of defense industry cooperation, our activities with the countries of the region are continuing as well. The aforementioned countries are going through supplier diversity in the procurement process. When the defense industry products export market's volume is examined on a global scale, we see that this region has an undeniable importance and therefore we evaluate that the region has significant cooperation potential with our country.

We hold official talks with many countries of the region toward conducting cooperation negotiations and have hosted numerous delegations from this region in our country. As a result of all these negotiations, we notice that the awareness of the Turkish defense industry has increased in the region. Throughout our contact, we aim to make Latin American countries regard our country as an alternative supplier in addition to their permanent suppliers.

In order to establish cooperation with the Latin American countries, we have to take the unique dynamics of the region into consideration. Our approach for this region is not merely focused on exports; we also aim to build joint production. Within the scope of the cooperation developed with the Latin American countries, the senior defense industry executives of the countries of the region were extended an invitation by

our Undersecretariat for Defense Industries (SSM) to the Efes drill on 30-31 May 2016.

In 2015, with the support of our Undersecretariat, Aselsan has awarded a contract to Chile for the modernization of the Chile's military helicopters. Aselsan's electronic warfare system is being integrated to the Chilean helicopters.

Currently there are export and joint production opportunities on naval, air and ground platforms, air defense systems, platform and system modernizations, simulation systems and security systems in Latin America. As SSM, we aim to further expand our activities in Latin America in the upcoming period. Due to the high cost of marketing activities in the region and because of the distance and language problems, our companies' level of business development activities in the region has not yet reached a desirable level. With our support, our companies would be able to conduct more efficient activities in the region and closely follow the developments in the region.

Defence Turkey: In order to increase its efficiency, the European Defense Agency (EDA) is closely collaborating with various international organizations, European Union Institutions and non-EU member third countries such as Norway, Serbia and Switzerland. Within this scope, is it possible for Turkey to build cooperation with the EDA in a partnership model similar to those three countries?

The European Defense Agency (EDA) is a European Union agency established within the framework of European Union Common Policy on Security and Defense for providing support to member countries and EU Council in developing Europe's defense capacity. It is possible to participate in the projects and programs of the EDA by building a partnership model with the EDA similar to the countries you have mentioned. In my opinion, this type of cooperation would provide advantages to our country. The EDA, as an institution, is one of the most important decision makers in the development of the European Union defense industry policies. Taking part in the EDA will enable us the opportunity to deepen our cooperation with Europe in the main areas of the defense industry.

Defence Turkey: Turkey recently succeeded in having the right to be presented in the executive board of the European Security Organization. Which advantages will be brought to us in the international arena by taking part in this prominent organization?

In my opinion, this development in the European Security Organization is a priceless one on behalf of our country's defense industry. The European Security Organization is a platform based on cooperation, in which Europe's leading defense industry companies mutually exchange their views. Having a representative in the executive level of such an entity and

Ms. Ayşe Akalın
Evers, Editor
in Chief of
Defence Turkey
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met with
Ms. Asuman
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monitoring the activities of the organization are quite meaningful in respect with directly following the activities of the European defense industry and the novelties in Europe. Existence in this organization will help in integrating our defense industry with the European industry, enabling our companies to collaborate with the European companies on multi-national projects, conveying experience and know-how gained in these projects, to our domestic industry. In this respect, it is quite important to have a representative in the decision making position in the European Security Organization and we wish for its continuation in the future.

Defence Turkey: What are the joint projects conducted with NATO at the Undersecretariat level?

NATO has its novel armament system. As we are a NATO member state, Turkey follows all the procedures and is involved in all processes. As the Undersecretariat, we are participating in NATO Armament sub-working committees as well. By attending the activities of the various sub-working groups on logistics, certification and other different armament issues, we are tapping into the know-how and experience of NATO.

Defence Turkey: Ms. Asuman Vangölü, the Efes military exercise was accomplished this year for the first time with the participation of friendly and allied countries in actual scenario. Moreover, an exhibition of defense industry products was held near the selected observer area again for the first time. What are your assessments on this activity from the perspective of defense industry products' promotion?

This year the Efes Drill gained in international dimension with the participation of combatant forces of eight countries, senior military representatives and foreign military attachés resident in Turkey, under the coordination of the Land Forces Command. In line with the demand of our Land Forces Command, a



defense industry exhibition was realized under the coordination of our Undersecretariat as well with the attendance of our 18 companies providing platforms and systems to Turkish Armed Forces (TAF) inventory. Due to the field conditions of the exhibition site, intense infrastructure work was carried out by the TAF and the site was prepared for the exhibition. Our participant companies were selected from the companies whose products were utilized within the scope of the operation scenario and an idea on the domestic participation rate considering our defense industry's fulfillment of TAF demands was thus given to the domestic and international participants.

As it has been the first practice, we will be assessing the lessons learnt with the TAF representatives and our companies in the upcoming period. Regarding the exhibition activity which is planned to be conducted once every two years during the operations with international participation, we will also be evaluating the alternatives to contribute to the Efes Drill which already has a brand value and for enriching the activity.

Defence Turkey: One of your tasks as the Department of International Cooperation is searching for new international programs. Are new cooperation and programs aimed to be built under Turkey's leadership in the new period as part of this task? Will there be a relevant vision?

As you know, considering the large-scale platforms requiring technological superiority, many developed and emerging countries regard fulfilling this type of requirements through taking part within multi-national programs instead of acting alone. It is an affordable, cost-effective, faster and less-risky approach. Turkey is also satisfying a portion of the Turkish Armed Forces' requirements through international cooperation by participating in programs such as F-35 and A400M.

In the upcoming period we consider it essential to attend several international programs and to develop new cooperation programs lead by Turkey. We are seeking out the opportunities for programs, making evaluations with the stakeholders and discussing the potential of cooperation with relevant countries to this end.

Defence Turkey: Finally, do you have any message to convey to our readers?

I would like to express my gratitude to Defense Turkey Magazine for their support in the promotion of our Turkish Defense Industry capabilities and I would like to point out that announcing our international cooperation activities through your magazine provides us motivation and strength. I'd like to take this opportunity to wish you continuous success and pay my respects to all your readers. ■

Naval Platforms **SHIPBUILDING & MODERNIZATION PROJECTS**





Turkey Building up Momentum Abroad with Indigenous Design and Manufacture of Land Vehicles

In a detailed interview with Mr. Hüseyin Avşar, Head of Land Platforms Department of Undersecretariat for Defense Industries, shares insight regarding the progress made in Turkish Defense Industry; Updates on Altay Main Battle Tank Development program, AKKOR Active Protection System program, the domestic development model, procurement program updates, and future plans for the New Generation Armored Vehicles Project.

Defence Turkey: Dear Mr. Avşar, first of all we would like to thank you for your time. You have recently been appointed as the Land Platforms Department Head. How do you assess the capabilities that Turkey reached in respect to Land vehicle platforms, systems and sub-systems? What is your comment on the sector with its pros and cons?

As you know, the Turkish defense industry achieved great progress in recent years in almost all areas. Regarding the platforms, we reached a certain level within the scope of the projects conducted by our Undersecretariat where we could fulfill the demands of our army to a considerable extent through domestic facilities and capabilities. Today, with the indigenous products they developed, our companies are also actively involved in activities in the international markets where the competition is fierce.

The land systems are surely one of the areas in which the aforementioned progress in the Turkish defense industry emerged most apparently. Today as a country, the point we reached regarding the land platforms both in terms of domestic development projects and the achievements of our companies in the international arena is worthy of commendation. In recent years, our country arrived to a point where it could fulfill approximately all its land systems with its own industrial infrastructure. Particularly, in respect to the platforms, we have companies, which are capable of indigenously designing and manufacturing nearly all types of land vehicles that come to mind. As the Undersecretariat for Defense Industries, we have been conducting our studies and activities with our domestic companies through our ongoing procurement projects. Having said that, we aim toward more indigenouslyness regarding the sub-systems as part of our projects and in order to increase the number of qualified sub-contractors, we have been



making an ardent effort to lead our main contractors and potential contractors to this end. Currently, regarding the land vehicle sector, we have identified deficiencies especially in sub-systems such as engines and transmissions. However, there are ongoing projects initiated by our Undersecretariat regarding these sub-systems. We can say that our foreign dependency regarding the sub-systems of the land platforms will be reduced to the minimum level after these projects are realized.

Defence Turkey: Mr. Avşar, during the last ten years, considering the land vehicle procurement programs, we are monitoring many programs were suspended and could not be launched. However, the programs which were suspended in the last 1-2 years were reactivated and we see that many projects are accelerated again. Within this frame of reference, we observe that our sector fails to fully feed our domestic companies in the recent period. Should a procurement process be made, which extends into the years in the upcoming period, enabling our companies to establish a sustainable industry and therefore reflect their efforts to their activities regarding exports? Is there any plan, any model in your agenda on this issue?

Actually, taking the last ten years into consideration, we see that many important procurement projects were launched. Hundreds

of armored tactical and special vehicles such as Tactical Wheeled Vehicles, "Kirpi", Battle Tank Transporter, Mobile Amphibious Assault Bridge, Amphibious Armored Combat Engineer Vehicle are in the Armed Forces inventory and actively utilized by the users within this period. With the know-how acquired in these projects, our companies won the tenders of similar projects abroad as well. There were certain projects initiated during this period that were suspended to a certain extent as a result of the requirement assessments, but as you have mentioned these projects are reactivated and a significant amount of progress was achieved in many of them.

In the current situation, our land vehicles sector is going through one of its most hectic working tempos due to the demands of the different users and a significant increase is seen in the number of projects conducted within this scope. Certain parts of this busy work schedule is without doubt a result of the existing conditions of our country and the need for domestic security that came to the agenda as part of the struggle against terrorism. From this aspect, the intense pace of the sector could at least be qualified as cyclical considering the projects conducted within the scope of the struggle against terrorism. Then again, the long-term large-scale platform projects are those which



we envision to accomplish in the future, continuing extending into future years. Without a doubt, the main factor identifying the demand in the defense industry sector is the user requirements. So, in this respect, periodic fluctuations in the domestic needs are quite normal. Therefore, as the Undersecretariat, considering the sustainability of our land vehicles sector, we support our companies to intently follow especially the export opportunities in addition to the domestic requirements. The fruitful work that our companies achieved abroad are filling us with hope for the future and for the sustainability of our sector.

Defence Turkey: One of the most important projects you have been conducting as the Land Platforms Department is the “Altay” Main Battle Tank Development program. Within the scope of this program, the sector is expecting the launch of the serial production process after the completion of the qualification tests. When will the qualification process be completed? Could you share the next step with us?

First of all, I would like to share the overall framework of our contract setup regarding the prototype qualification process. According to the contract, at the first stage, executions of qualification tests with Altay

Prototypes by Otokar were anticipated. Following the successful completion of these tests, the plans were made for the acceptance tests which will be run by the Undersecretariat for Defense Industries (SSM) / Land Forces Command Acceptance Committee.

Within this scope, the qualification and test procedures to be conducted prior to the Acceptance tests were prepared meticulously for the execution of the tests in line with the international standards and for proving that the Altay tank is capable of fulfilling performance specifications expected from a New Generation Main Battle Tank (MBT). The relevant institutions and companies which are also the parties of the project exerted intensive efforts for these studies as well. As a result of these studies, around 15 procedures were established for testing the various characteristics of the Altay Tank. Upon the approval of these procedures, we launched the qualification and acceptance tests on April 20th, 2015. As segments of the qualification activities, which have been going on for over a year, we accomplished many tests over 3 different Altay Prototypes, in various geographies of our country, under different climate conditions and

quite challenging circumstances. We still have a few ongoing tests.

Hopefully, as a result of the ongoing testing period, we aim to complete the qualification and acceptance activities by the end of 2016. At the end of this period, our vision is to become one of the few countries achieving the ability to indigenously develop the Main Battle Tank which is regarded as the most complicated land platform.

Defence Turkey: What is the planned order volume for the tender regarding the mass production of “Altay” MBT? Moreover, how are the negotiations with the companies proceeding, conducted as part of this mass production tender. Could you please summarize the process?

As a result of the studies conducted by the Land Forces Command, an order of 250 MBTs was planned at the first stage within the scope of the “Altay” MBT Mass Production. As you know, we received a proposal in line with the stipulations of the Contract for the Mass Production of Altay MBT from Otokar company which is the Main Contractor of Altay Period – I and we are continuing our assessment activities in an intensive manner. At this point, our priority is to complete the evaluation of the

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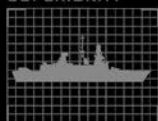
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forementioned proposal as soon as possible.

Defence Turkey: Is it possible to establish a consortium model composed of our leading companies in the production of tracked vehicles within the scope of the mass production tender? Are there any studies conducted on your side in this respect?

Altay Mass Production Project is a comprehensive, massive project in every aspect. At the same time, it is of utmost importance for the future of our sector. Within this context, by taking all the alternatives into consideration, we strive to focus on the solutions which collaborate with the interests of our country at the maximum level. As a result of all these activities, I believe that as the Undersecretariat we will be creating the most convenient solution toward our mission of procuring the advanced technology products through domestic and indigenous

solutions and establishing a sustainable domestic defense industry.

Defence Turkey: Within the AKKOR Active Protection System program, you signed a system development contract with Aselsan at the last quarter of 2015. Could you briefly inform us on the development process and program schedule?

Currently, the system requirement identification studies are being conducted. The data obtained as a result of these studies will provide input for the design of the system, test procedures and finally for the qualification of the system. Following the identification of system requirements, the design stage will be launched. Most of the AKKOR System units will be designed and manufactured by Aselsan. Physical Demolition Material (PDM) will be designed and produced by Aselsan's sub-contractor TÜBİTAK-Sage.

AKKOR Project is composed of 54 months. Currently, the first three-month period has been completed and the studies are continuing. The design studies are planned to be completed in March 2018. In the following period, the system design verification tests, firing tests over fixed and mobile platforms will be executed.

Defence Turkey: Within the scope of the Anti-Tank Vehicle program, it was decided to initiate contract negotiations with the company FNSS at the last Defense Industry Executive Committee (SSIK) meeting for the procurement of a total of 260 Anti-Tank Vehicles composed of 184 tracked and 76 wheeled vehicles. How are the contract negotiations proceeding in this respect? Could you please inform us on the configurations of the tracked and tactical wheeled vehicles to be procured?

We launched the contract negotiations with the company

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FNSS in line with the decision adopted at the Defense Industry Executive Committee meeting on March 9 and our activities within this scope are continuing at full steam. Within the framework of the talks, we are carefully examining all the points subject to the contract and exerting all efforts toward preparing a contract which will serve the completion of the project as early as possible and with the highest performance. Here, we aim to make use of all capabilities acquired by our country through our main contractor FNSS. Following the aforementioned studies, we plan to sign the Contract on the Anti-Tank Vehicles Project hopefully in June.

As known, within the scope of this Project, there is an objective to integrate the medium range anti-tank weapons over tracked and 4x4 wheeled vehicles through remote controlled and enclosed weapon stations. In this respect,

procurement of Anti-Tank Vehicles in three different configurations composed of Kornet anti-tank system over tracked vehicle, OMTAS system again over tracked vehicles and OMTAS system over wheeled vehicles is planned.

Defence Turkey: Could you please share the recent status of the program for the procurement of Special Purpose Tactical Wheeled Armored Vehicles? What would you like to say on the configurations to be procured and on the process?

The Request for Proposal of the Project was issued to FNSS Savunma Sistemleri A.Ş. and Otokar Otomotiv ve Savunma Sanayi A.Ş on September 4th, 2014. The proposals were received on the 7th of September 2015. The project consists of 4 types of vehicles: Command, Radar, Sensor – Reconnaissance and CBRN Reconnaissance Vehicles. The Sensor Reconnaissance and CBRN Reconnaissance Vehicles

are in 8x8 configuration and Command and Radar vehicles are in 6x6 configuration. Currently, the proposals are being evaluated and I can say that we are reaching the end of this evaluation process. Upon the completion of the proposal evaluation studies, the results will be submitted to the Defense Industry Executive Committee (SSIK) for the selection of the winning company.

Defence Turkey: As part of the LHD program, procurement of 22 Amphibious Assault Personnel Vehicles, 3 Amphibious Assault Command Vehicles and 2 Amphibious Recovery Vehicles is planned through domestic development method. Could you please inform us on the recent status of this program? Will this procurement program gain momentum in parallel with the acceleration of the LHD program?

The configuration of the vehicles to be procured within the scope of the Armored Amphibious



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Assault Vehicle Project was updated as 23 personnel vehicles, 2 command vehicles and 2 recovery vehicles as a result of the negotiations conducted with the Naval Forces Command. It was decided to accomplish the Project through a domestic development method. To this end, the best and final proposals were collected from the potential contractor companies and the final stage of the proposal assessment process has been reached. Our activities are continuing in coordination with the LHD project.

Defence Turkey: What kind of activities are being conducted within the scope of the procurement of camouflage systems which will increase the units', weapons' and tactical vehicles' camouflage facilities and capabilities in line with the demands of the Land Forces Command?

As known, we initiated a project named Improved Camouflage Systems. Upon our Undersecretariat's receipt of the demand regarding this issue, we rapidly examined the existing infrastructure and capabilities in our country. Then, in light of the data we obtained as a result of these studies, we set up our project model. The input we collected demonstrates that our country has a quite competent infrastructure on this subject and indicates that our industry is at a very good level, even to compete in international tenders.

Our aim is to fulfill our Armed Forces' requirements with

domestic resources as soon as possible. We are conducting our studies in an accelerated manner in order to issue the Request for Proposal to our relevant companies in May and then to sign the contract after completing the evaluation of the proposals.

Defence Turkey: Could you please wrap up the latest status of the demining system project composed of 50 demining systems, logistic support, training and required documentation through the Domestic Development model?

Within the scope of this project, for building procurement models both for the platform type of the relevant vehicle and for the mine clearance systems to be integrated, comprehensive studies were conducted up until this point, by involving the leading domestic and foreign companies

in the process. As a result of these studies, we agreed that the Altay Tank's hull which we developed indigenously as a Mine Clearance System (MCS) vehicle platform would be a convenient solution. Besides, when taking into considering the point arrived at by the Turkish defense sector, it was observed that our domestic companies would easily develop the mine clearance sub-systems to be integrated to the platforms by utilizing their facilities and capabilities at a maximum level. As may also be understood from the platform selection, the MCS project activities are currently being conducted in parallel with the activities regarding the Altay mass production project.

Defence Turkey: Considering the flexible layered Cage Armor System Project for Armored Vehicles, you published the Request for Proposal in the beginning of this year. How is the assessment of the proposals proceeding? What are your views and comments on the capabilities to be acquired as a result of this program?

We planned the Flexible Layered Cage Armor System Project in two phases. We will be procuring our emergency immediately through the direct procurement model. In this way, we will be covering the part of our Security Forces' and Land Forces' demands. In order to fulfill our requirements in line with the



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project model that we envisaged at the Request for Proposal Document, we will be conducting our domestic development activities simultaneously through our contractor in the next stage. In this respect, the proposal evaluation activities of the project are completed and we anticipate to sign the contract with the Contractor identified by the SSIK within June. Within the scope of the project, in order to increase the survivability of our Tanks and Armored Vehicles, flexible layered armor systems to provide maximum protection against the threats identified by the user, to be installed over all types of Armored Vehicles and Tanks and to be available for utilization under all types of land and climate conditions will be procured.

Defence Turkey: Mr. Avşar, you are not only directing the procurement process of the Armored Personnel Carriers of the Turkish Armed Forces, but also of the Turkish National Police (EGM). Within this context, could you inform us on the procurements made to be utilized in interior security operations and on the ongoing programs?

As you know, through an amendment made in 2011, the emergencies of the Turkish National Police (EGM) were included into the scope of the Law No. 3238 stipulating the establishment and tasks of the SSM. Therefore, we are conducting numerous projects toward fulfilling the requirements of EGM as well. We have procured many Anti-Riot Vehicles (TOMA) and Armored Mine Resistant Ambush Protected Vehicles for EGM until today. We have various ongoing projects for the procurement of different types of armored vehicles, personnel carriers and construction equipment. The aforementioned projects that we have been executing for the EGM cover a significant part in our total project portfolio.

Defence Turkey: Could you please inform us on the new programs planned to be initiated in the upcoming period?



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One of the crucial projects that we plan to put on our agenda is the New Generation Armored Vehicles Project. As part of this project, the domestic development and procurement of many new generation armored vehicles in various configurations will be explored. Still, detailed studies are being conducted in line with the operational requirements identified by our relevant requiring authorities. Additionally, the procurement activities regarding the Tactical Wheeled Armored Vehicle demands of the Land Forces, Gendarmerie General Command and Turkish National Police will be maintained.

Defence Turkey: Lastly, are there any remarks that you would like to convey to the readers of Defence Turkey Magazine?

Land platforms have always been a sector acting as a locomotive of our defense industry in our country. The performance of this sector in both domestic projects and exports is a clear indicator of this fact. As we always do, we will continue to make efforts in order to offer our army and security forces indigenously developed systems based on advanced technology and raise the domestic participation rate in our projects to the highest level possible. Hereby, I would like to thank all my colleagues working for all these studies, taking part in the accomplishment of all these projects and exerting efforts selflessly, and to you for giving me the opportunity to share our opinions regarding the sector. 🇹🇷

Ms. Şebnem Akalın,
International Relations
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National Defense Ministry's 1st Defense Technologies Day Event was Held

The Ministry of National Defense held the 1st "Defense Technologies Day" recently on April 12th at the Bilkent Hotel in Ankara. The event was organized by SaSaD and Defence Turkey magazine, under the coordination of the Ministry of National Defense, with the main theme of R&D and Technology Management within the scope of the defense industry. Numerous distinguished guests from the National Defense Ministry, Service Commands, Defense Industry Companies, Universities and Governmental Institutions and Associations attended the 1st Defense Technologies Day.

The Minister of National Defense of the Republic of Turkey, Mr. Ismet Yılmaz made the opening remark of the panel and stated that Turkey had lacked such an event gathering all the shareholders of the defense industry and he believed that this event would be filling an important gap in this area. Minister Yılmaz said, "We need to gather with our solution partners and make an analysis on where we are and where we should be heading. Which type of a synergy should we create in order to reach our goals? How could we reach our aims through the most rapid and economic solutions? In order to explore all of these questions, we should come together and create a common force and mind. All the institutions, associations and affiliates should take part in these types of events toward enabling Turkey to create a strategy with the help of these participation events".

Turkey is striding forward towards its aims. Minister Yılmaz mentioned that the country covered a lot of ground in the last ten years and added, "Our foreign dependency used to be around the level of 80%. Today we are able to cover 60% of our requirements. We have two notable company brands in the list of the world's greatest 100 companies and a third company will be entering this list in the upcoming period. Our production capacity and sales exceeded \$ 5 billion presently, our exports exceeded \$1.5 billion but this figure is still not deemed enough".

Adding, that the qualified staff employed in the Security and Defense domain should be equipped with superior technologies for the full accomplishment of their tasks, Yılmaz said, "How will we increase



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the technological capacity of our Army, our Security Forces and our National Intelligence Organization? We need to exert the utmost effort to this end. We will be continuing to give all the required support in a determined manner in order to reach the targets".

Gains acquired from the projects will be examined systematically

Undersecretariat for Defense Industries Technology and Coordination Assistant Air Pilot Major General, Şaban Umut, mentioned that the Turkish General Staff, Armed Commands, National Defense Ministry, Universities, Research Institutes and Defense Companies active in the defense industry have gathered with this panel and continued, "We realized that this panel came brought us together in order to offer solution suggestions, for the evaluation and improvement regarding the technology management of activities based on R&D and technology composed of processes such as needs identification, design, prototype production and serial production. Also, the panel gathered to discuss all the propositions for conducting R&D activities in a more efficient and coordinated manner with all the shareholders".

Major General Umut stated that all the gains acquired from the projects on defense, R&D and technology executed within the country and the current status in the world would be brought to the table at the panel and he expressed that long term planning of the Turkish Armed Forces (TAF), R&D studies and the project process executed by the Ministry of National Defense will be shared. He stated that all the shareholders will be informed on the reorganization studies regarding the R&D process of the Turkish Armed Forces, that TÜBİTAK's R&D support will be presented, the research infrastructures regarding the policies of science, technology and innovation

and the novelties brought forth, along with the legal regulations will be introduced. Suggestions considering emphasizing the importance of the cooperation between universities and industry's research centers and for their launch will be taken into consideration throughout the panel.

Following the opening remarks, the first session of the day was entitled Defense R&D Project Process Management. Undersecretariat for Defense Industries Technology and Coordination Assistant Air Pilot Major General, Şaban Umut, was the moderator of the session; various presentations were made on R&D studies in TAF 2033 change and transformation plans, MoD R&D project management principles, SSM R&D technology management, R&D projects on Defense, Research infrastructures in Science, Technology and innovation policies and novelties emerging as a result of legal regulations and R&D from the perspective of the industry and expectations.

During the second session of the event, the panel on Government, Industry and University R&D cooperation was conducted. Throughout this panel, presentations were given on the Distribution of roles in institutional cooperation, Effective and sustainable R&D implementations approach in the defense industry, Innovative approaches in technology management and university contribution.

In the concluding session of the event, the R&D implementations of the NATO/STO and new methodologies in technology were examined. Moderated by Prof. Nafiz Alemdaroğlu from Atılım University, new techniques and holistic views in technology development regarding NATO's organization on Science and Technology, Turkey-NATO STO interactions, future technologies within the scope of NATO STO and R&D activities were discussed.



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A portrait of Mr. Selçuk Yaşar, President & CEO of Roketsan Missiles Industries Inc. He is a middle-aged man with short, graying hair, wearing glasses, a dark suit, a white shirt, and a blue tie with a red pattern. He is standing in front of a blurred background of vertical wooden slats.

All Systems Go – Roketsan is Positioned as a Rising Global Company with the Velocity to Direct the Missile Technologies of the Future

In a detailed interview with Defence Turkey Magazine, Mr. Selçuk Yaşar, President & CEO of Roketsan Missiles Industries Inc. reflects on the company's noteworthy successes, their plans for the future strengthening Roketsan's position as a leading global company, directing missile technologies with its indigenous and high-technology products.

Defence Turkey: Dear Mr.Selçuk Yaşar, first of all we would like to thank you for the interview. Can you provide us with a recap of Roketsan's 2015 performance?

Roketsan's foreign activities, in recent years, have been significantly impacted by the rapidly evolving relations affecting the world financially. We've adopted the principle of avoiding dependence upon a single resource and a single product. As a consequence of conducting our activities based upon this principle, and I can say that these problems have only had a minimal effect on us.

Defence Turkey: Taking into consideration your Company's sales figures for the last five years, how do you assess your growth trend in domestic and foreign sales for the upcoming period? In association with this, what are your expectations for 2016 and the following years?

The boom in the exchange market and the extreme decrease in oil prices will clearly have a negative effect on our foreign sales in the short term. Affordable products with high technology and high precision have been in demand by our sector in recent years. In order to fulfill such expectations, we have been developing our high technology and high precision systems, for 7-8 years now. At this time, 2016 and onwards, we are aiming to cater to the Turkish Armed Forces' requirements and to deliver our products to our clients in foreign markets as a result of our intensive marketing activities.

Defence Turkey: Roketsan products have reached a maturity level that is able to compete head to head with the products of worldwide rival companies. Moreover, the export figures have been increasing each year. Your export performance for 2014 reached \$ 170 million with an increase of %176, compared to the prior year's figures. Is it possible to sustain this type of export growth trend? What type of short and medium term strategies have you established to facilitate the continuation of this increased rate?

Compared with the rate of previous year, our export sales for

2014 increased by 176 %. With this export performance, amongst 61,000 companies in Turkey, our company climbed up to rank 76th in overall exports of Turkey and became the 3rd company in the defense industry sector in general. Focusing on maintaining this outstanding success, we are updating our export goal while increasing our share in the defense market by conducting effective marketing activities worldwide for our products.

Roketsan has already proven the quality it provides in products, design and services in the Middle East. In order to sustain our achievements in exports we will continue our activities in many areas around the world, spanning from America to the Far East and from South Africa to Northern Europe.

Roketsan has gained prominent acquisitions in the last twenty-seven years. With the establishment of a long-term steady technological infrastructure, in order to reduce risks, we will continue our contact extensively with our clients in various geographies. Additionally, we accomplished various strategic studies within this twenty-seven-year period for an organizational structure that is in a simultaneous parallel with the organizational structures of the governmental institutions of the sector.

In my opinion, we owe these achievements to our highly qualified and devoted staff that are deeply attached to national values.

Defence Turkey: In order to attain sustainable growth and a sustainable industry, our defense industry companies at sector events highlight the importance of achieving a balance between domestic and foreign sales. How do you approach this issue, what is your point of view?

To cultivate sustainable growth performance, strategic allocation of technology development and general capital investments in various areas, products and projects is of vital importance. Business enterprises should avoid depending on a single resource or a single product in order to maintain their activities. Roketsan aims to increase its technological and commercial acquisitions in numerous national and international

projects and thus conducts its business accordingly.

Defence Turkey: With the Middle East market that Turkey is very active in, and also considering its focus on markets in African countries, South Africa, Turkic Republics and the South America, what are your thoughts about Roketsan's current status and its future position with the NATO market?

In the 21st century, the Middle East and the Far East are regarded as regions with increasing global importance. Taking their rich natural resources and geopolitical advantages into consideration, all of the countries of these regions are expected to be effective increasingly in terms of political and military developments in the international arena. They will play more active roles within the international system from the second half of the 21st century onwards.

In recent years, defense expenses of countries across the world are experiencing a deceleration trend. However, due to the ongoing conflicts and tensions in the Middle East, the countries of the region and those intending to escalate their dominance in the region are increasing their defense expenditures. On the other hand, the threat perceptions of Russia, Syria, Iraq, Iran, North Korea and China, emerging from their relations with the neighboring countries, have been a catalyst for the increase in defense expenditures in those regions as well. Furthermore, there is still an important market opportunity, although relatively smaller, in Africa, Turkic Republics and South American countries, and Roketsan is quite focused on these areas.

In the realm of NATO countries, the joint utilization of military resources and the strategy of building a common foreign policy, fulfilling the requirements through reduced defense system procurement is on the agenda. Within this scope, Roketsan continues efforts toward participating in activities for concept development, building cooperation with NATO Allied Command Transformation prior to the procurement process, creating awareness and information related

to the priorities of NATO and Turkey as well as areas of interest. Efforts to affect NATO's capacity building continue.

In my opinion, Roketsan's participation in platforms of strategic levels such as the NATO Industry Forum, and its involvement in coordinated activities through NATO's Concept Development and Experimentation, would accelerate technological development, resulting in the acquisition of solutions related to the requirements of NATO allied countries (contributing to capacity development as well), increasing competitiveness and providing benefits. Without a doubt, as a result of such efforts, we expect Roketsan to reach a far better position within the market of NATO countries in the near future.

Defence Turkey: Mr. Yaşar, as Roketsan you assumed a notable role in the development process of the Low and Medium Altitude Air Defense Missile systems "Hisar-A" and "Hisar-O" programs. How are the testing and development processes related to these programs proceeding? Could you please summarize the current situation?

We designed the "Hisar-A" and "Hisar-O" missile systems in two different versions for Low and Medium Altitude in accordance with the requirements of the Turkish Armed Forces. These missile systems stand out amongst their rivals with their performance and technology.

Test firings of Hisar-A's Controlled Test Missile-1 (KTF-1) with autopilot control and Ballistic Test Missile-2 (BTF-2) with a dual pulse solid propellant rocket motor, which itself is a first in Turkey, were successfully accomplished in Aksaray by Roketsan with the participation of the Turkish Land Forces Command, the Undersecretariat for Defense Industries (SSM) and Aselsan in June of 2015.

During the tests, which have now been completed; "Hisar-A" missiles successfully separated from the launcher with the ignition of the first pulse rocket motor, then igniting the second pulse motor in flight to perform programmed maneuvers under the control of on-



board autopilot.

With the successful flight of the first dual pulse motor missile in Turkey, Roketsan proudly took its place amongst the limited number of companies with similar technological capabilities in the world. As a result of these firing tests, another milestone has been reached with the development of the first Indigenous Air and Defense Missile Systems of Turkey.

In the near future we plan to launch the serial production of the "Hisar" missiles, that we have been developing since 2011, in cooperation with the pioneering technology companies of Turkey and the world, under the guidance of Roketsan's technology and experience.

Defence Turkey: Do you think that gaining such capacity would pave the way for Turkey's skipping of a threshold, especially regarding the acquisition of High Altitude Air Defense missile systems?

Differing from other missile systems, the aim of the Air Defense Systems is high-speed with high maneuverability. Due to this characteristic, air defense missiles have to bear different and superior technologies. In order to fulfill the air and defense requirements of the future, "Hisar" missiles, under development, have Imaging Infrared Seeker (IRR), thrust vector control, Mid-course Guidance Via RF data link, and for the first time in worldwide air defense missiles, the dual pulse solid propellant.

Moreover, these missile systems have the potential of smooth integration to various types of

platforms due to their alignment with the existing and future NATO/ military standards. These systems, differing from each other with their ranges, dimensions and weights are being developed as an integrated product family due to their completely similar sub-systems.

In addition to our pride in attaining the prestige of Indigenous Air Defense Missiles for our country, considering the technological acquisitions, it offers design based on family integrity and ease of integration and logistics. "Hisar" missiles are a very significant accumulation for Turkey in reference to the acquisition of High Altitude Air and Defense Missile Systems.

Defence Turkey: After the cancellation of the T-LORAMIDS program, Turkish Defense Industry Companies were selected to be developed for High Altitude Air Defense System by the decision of the Turkish Defense Industry Executive Committee. Defense authorities agree that the system to be developed should fulfill the operational requirements of the next 20-30 years. On the other hand, threats are increasing and rapidly developing as well. Regarding this issue, rather than proceeding with a prototype system that would be launched in the next ten-years, in order to recover the time lost and use resources more efficiently, do you think that launching the more developed "Hisar-U" version of the ongoing "Hisar-O" at the first stage would be a more applicable model for creating an indigenous technological knowledge?

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First of all, I would like to express my appreciation regarding this decision on the development of the High Altitude Air Defense System by the Turkish Defense Industry. Roketsan will successfully fulfill the tasks to be assumed as a result of that crucial decision and we possess the sufficient infrastructure and experience to develop these systems.

Surely, the technology is developing at an unprecedented pace worldwide. As a globally pioneering company, Roketsan has no intention of lagging behind in such developments. As Roketsan, beyond following the technological developments, we are proceeding towards the future as a company that leads technology. Within the scope of the Hisar program, we determined to exceed the technological requirements. Indigenous products were created through this challenge and we attained an important success.

At this very point, I believe it would be better to separate the Ballistic Air Defense – the most important requirement of the High Altitude Air Defense Missile Systems. Regardless of the contributions and advantages that the more improved version of “Hisar-O” system, the “Hisar-U” system would bring, in respect to building a national technological accumulation and rapidly fulfilling the air defense requirements, it should be kept in mind that indigenous technologies are still essential for developing a ballistic missile defense umbrella.

Defence Turkey: Mr. Yaşar, how are the integration activities going for Cirit and “UMTAS” missiles under development for the “Atak” helicopter? Could you please inform us on the process?

Upon the requirements identified during the development period, UMTAS missiles are qualified with two different guidance technologies and two warhead alternatives. In addition to the IIR seeker and insensitive tandem warhead in the development contract, through Roketsan’s own resources, laser seeker and anti-personnel warhead were included in the system configuration. Thus, enabling the armament of the similar platform both with IIR/laser seeker guidance



and depending on the requirement with tandem or anti-personnel warhead. As a result, we offer our users the flexibility required by the operation environment. Both systems’ integration to the Atak helicopter is still ongoing.

Defence Turkey: The 2.75” Laser Guided “Cirit” missile not only features the rotary wing platforms but also has a flexible infrastructure allowing installation to both land and fixed land platforms in addition to the fixed-wing platforms. You’ve recently signed various cooperation agreements with several countries such as Germany and Poland as well as with major defense companies in order to make use of potential opportunities regarding the integration of these systems to existing platforms. What are your immediate expectations regarding these cooperation agreements and the foreign sales of our indigenous systems, namely the “Cirit” and “UMTAS”?

The integration of “Cirit” laser guided system to rotary-wing platforms in particular are currently going on, as well as the fixed-wing

(manned/ unmanned) systems and land platforms. The integration of Cirit missile was completed in 6 different platforms composed of three rotary-wing platforms and 3 fixed-wing platforms. Considering land platforms, this system could be integrated to tracked and tactical wheeled vehicles as well. Within the scope of this concept, our product PMC (Pedestal Mounted Cirit) vehicle was displayed at IDEF 15’ and attracted considerable interest. Moreover, we have applications for fixed or towed platforms.

This product range and flexibility support our efforts to penetrate into foreign markets. We aim to sign new export agreements both for our anti-tank missile systems and for the laser guided “Cirit” missile systems in the near future.

Defence Turkey: Mr. Yaşar, in respect to the “SOM-J” Program, Roketsan signed an agreement with Lockheed Martin Company at the DSEI 2015 Fair. Which type of a model and cooperation are planned regarding the modification integration of “SOM-J” missiles to F-35 JSFs within the scope of this program? What are your remarks on the phases to be established and the identified program schedule?

The system design activities of the SOM-J missile are being conducted successfully in line with the program schedule. Cooperation continues between Lockheed Martin Missiles and Fire Control Unit and Roketsan toward revealing a world-class cutting-edge system.





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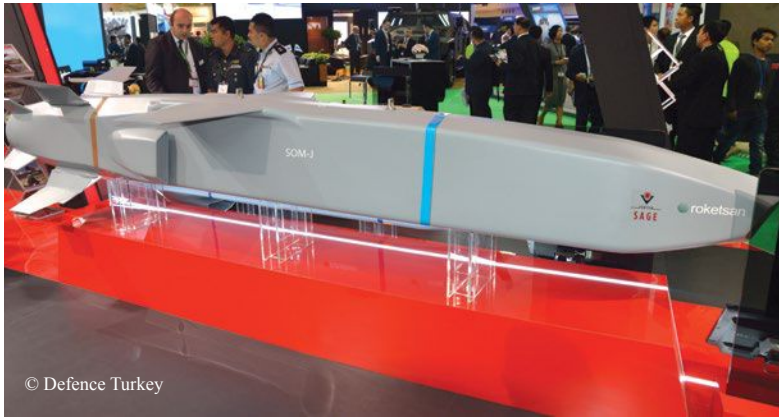
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SOM-J Mock-Up Displayed at DSA 2016

We are planning to launch the SOM-J Design Review Meeting in coming period. The sub-system design and tests will be initiated thereafter.

The flight tests are scheduled to be launched with the Turkish Air Forces' F-16 Block-40 aircrafts in the second quarter of 2017. The development program is expected to be completed in 2018.

As part of the F-35 Integration activities, our studies with LM Aero Company are continuing. We accomplished Phase-I (Feasibility Study) and Phase-IIA (Risk reduction). For the integration activities to be conducted in 2016 and onwards, our negotiations on a two-stage contract model continue.

Defence Turkey: Roketsan signed a MoU on the integration of "SOM" cruise missile to Eurofighter Typhoon aircrafts with the Airbus Defense and Space Company in 2014. Is there any progress regarding this issue? Meanwhile, with the "SOM" missiles brought into use at F-4 2020 and F-16 Block-40 aircrafts in the Turkish Armed Forces inventory, are there any demands coming from allied countries with F-4 and F-16 fleets? Which

countries and which regions do you have contact with regarding this issue?

On SOM missile's integration to Eurofighter Typhoon aircrafts, the content of the activities were discussed and agreed upon in the meetings conducted with the Airbus Defense and Space Company. The documents to be shared to this end were identified and the attempts for the permits for sharing these determined documents reached a final stage. We presume that the permits would be granted in 1-2 months and that the activities with the Airbus Defense and Space will be initiated soon.

Allied countries have demanded the SOM missile. Roketsan has received demands from countries having fleets in classes different than F-16 as well. Permits are required for sharing information with such countries and we are exerting efforts to this end. We believe that these activities would gain momentum as soon as the required permits are granted.

Defence Turkey: Could you briefly apprise us on the activities conducted in relation to the New Generation Laser Guidance Kit "TEBER"?

TEBER system is a new generation INS and GPS aided Laser Guided Kit and it is being developed through Roketsan's own resources. MK-81 and MK-82 general-purpose bombs are transformed into smart ammunition and they are qualified with high precision hitting capability. TEBER is developed with the support of the Ministry of National Defense and the Air Forces Command. It is a laser guided (LAB) kit supported with Inertial Guidance System (INS) and Global Positioning System (GPS) and is capable of performing its tasks successfully under all weather conditions. The ammunition to which TEBER is integrated to has merely INS, INS+GPS, INS+ Laser and INS+ GPS+ Laser configurations. TEBER consists of a semi-active laser seeker (SAL), a (body) strake kit that is located front section. The tail section has aerodynamic control surfaces, inertial guidance system combined with GPS/GNSS receiver, guidance computer, control actuation system and thermal battery. It's a cost-efficient laser guidance kit. TEBER is capable of destroying both fixed and moving targets.

Within the framework of the studies conducted with the Air Forces Command, the certification firings of the TEBER system in F-16 jets are scheduled to be launched in early 2016. In parallel, without making additional investments and using our existing infrastructure, we aim to operate the serial production line in the middle of 2016.

Roketsan unveiled the TEBER Laser Guidance Kit at IDEF 15'. Roketsan showcases TEBER Laser Guided Kit at international fairs. I would like to state that the Turkish Armed Forces and Gulf countries showed great interest in our product.

Defence Turkey: Which capabilities were and will be acquired with the Firing Test and Evaluation Center (ATDM) launched last year in Konya?

The Ministry of National Defense Firing, Test and Evaluation Center (ATDM) was inaugurated by the Prime Minister Prof. Ahmet Davutoğlu in Konya Karapınar on March 24, 2015.

ATDM is a test center established in accordance with



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international standards, and is capable of fulfilling the requirements of both local and international defense industrial entities. The center provides extremely important capacities to our country on critical issues such as, protection of data confidentiality for national projects, duration reduction of R&D processes and improving range safety.

The Modernized Firing Range is equipped with test equipment capable of data measurement, recording and tracking including Multi Sensor Platform, which was designed for the first time in the world with Roketsan's technical coordination, mobile optical systems and mobile Long-Range Tracking Radar Systems, that are capable of instantaneous data transfer, are installed at the center as well.

There are a limited number of high technology Firing, Test and Evaluation Centers in the world. All types of infantry/tank/ artillery ammunition, rocket and missile flight-testing within the range limits can be performed at the Center. The range, direction, position, accuracy, speed, acceleration features of the aforementioned ammunition can be tested precisely at ATDM. Moreover, during the flight tests, command control application, data collection, processing, analysis and archiving of all data at a single site with simultaneous execution of multiple firing tests, video transfer from the target region, and live monitoring of the firing activity from the observation area can all be done in the Modernized Karapınar Firing Range.

We are proud to accomplish the turnkey delivery of the high technology Firing, Test and Evaluation Center, established within NATO standards, with the help of the knowledge and experience gained through the ballistic test activities that we have been conducting for many years.

Defence Turkey: Roketsan is considered to be amongst the important innovation generating institutions in Turkey. You are continuing to act as a pioneer in our country with R&D investments and the technological products that you put forth. Could you please share a bit about the

power and strategy behind this design and engineering know-how? In addition, what are Roketsan's budgeted investments for the coming period?

Developing new technologies, building our products over these acquired technologies and actualizing designs and products that could compete in world markets constitute Roketsan's top strategic aims. To this end, each year, in order to develop the targeted technologies, we allocate a certain portion of our annual turnover to R&D programs and we add new technology areas to our portfolio with the activities that we conduct financed with our equity capital. We adopted the principle of adapting the impetus and experience we gained from R&D based projects with the requirements. In accordance with this principle, we have constantly been developing our product range and thus we have reached a level allowing us to compete with our worldwide rivals today. Our R&D investments and programs will be continuing at full steam. Our budgeted R&D investment for the next three years will be approximately \$ 6,620,000.

Defence Turkey: Could you please inform us about the final status of other domestic and foreign programs conducted under the auspices of Roketsan's departments?

We are extensively executing our programs that will help us to reach both our domestic and international goals. By primarily fulfilling the requirements and modern rocket and missile weapon

systems identified by the Turkish Armed Forces, we are shaping the future of the combat field. Within this scope, in order to immediately fulfill the new requirements and to enable rapid modification and improvements, we are continuing to add new departments and capabilities to our company.

Defence Turkey: In the 2020s, within the scope of the military requirements and doctrines of the Turkish and worldwide Armies, which type of vision did Roketsan identify? Where will Roketsan position itself?

With globalization, high-speed technological changes and new markets emerging in international arena, the competitive environment is becoming more complex than ever and this underlines the importance and the indispensability of strategic management. I believe that strategic management could be achieved through active and successful participation of all layers of the company in addition to a visionary and consistent administrative approach.

In this journey that we started as part of an international Project, as Roketsan, we strive to become the leading company of the country in the future in naval systems, space systems, rocket and missile systems. In accordance with our vision for the future, we aim to create Roketsan as a company that directs missile technologies with its indigenous and high-technology products, remaining in the world's top 50 defense companies with its position in the world market and its sales figures. ■

Ms. Ayşe Akalın
Evers, Editor
in Chief of
Defence Turkey
Magazine met
with Mr. Selçuk
Yaşar, CEO &
President of
Roketsan.



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27th SaSaD Ordinary General Assembly Meeting held in Ankara

27th Ordinary General Assembly of the Defense and Aerospace Industry Manufacturers Association (SASAD) was held in Ankara at the Sheraton Hotel on 27th April 2016 with the participation of National Defense Minister Mr. İsmet Yılmaz.

Undersecretary of the National Defense Ministry Lieutenant General Sezai Bostancı, Undersecretary for Defense Industries Prof. İsmail Demir and deputy undersecretaries of the two undersecretaries as well as heads and directors of the relevant departments, General Director of the Turkish Armed Forces Foundation (TSKGV) (Ret.) Lieutenant General Orhan Akbaş, Chairman of the Board of Defense and Aerospace Industry Exporters' Association Mr. Latif Aliş Aral, Secretary General of the Ankara Chamber of Industry Dr. Yavuz Cabbar and OSTİM Chairman of the Board of Directors Mr. Orhan Aydın and 117 members of SaSaD attended the meeting.

During the first session of the event, the working report of the board of directors 2015, balance and profit – loss account statement and the budget for 2016 were shared with the members. The election of the board members followed these presentations. Instead of the previous open list board member elections, it was decided this time to conduct the election over the candidates determined by the companies and the election was launched after the collection of the applications.

As the counting of the votes continued, the second session of the General Assembly started with



the participation of the National Defence Minister İsmet Yılmaz and the accompanying delegation. SaSaD Chairman of the Board Mr. Nail Kurt made a speech addressing the General Assembly in this session. Nail Kurt stated that as SaSaD members and industrialists they were fully aware of the fact that they should be assuming responsibilities in line with the aims of the country and mentioned the need to make added strides in the upcoming period. Underlining the relative increase in the defense industry exports contrary to the overall decrease in the exports related to all the sectors in 2016 and continued, "There is a pleasing increase, yet it is still not sufficient for reaching the targeted figures. We have been discussing our incapacities and deficiencies in various platforms. Additionally, we have been underlining in every opportunity the need to increase the resources allocated to R&D and direct ourselves towards the utilization of common resources by taking part in international cooperation".

Kurt stated that Middle Eastern countries existed at the top of the list of markets in which Turkey is active and noted that government's increasing friendly relations with these countries would have positive reflections in the increase of export figures and sector growth. Kurt also underlined that in line with the changing world conjuncture, Turkish Armed Forces started to adopt a strategy towards increasing its firepower and mobility instead of intensive manpower and stressed that along with this strategy, all the

shareholders needed to create a more creative and deep cooperation in respect of equipment and hardware and that SaSaD with all its members was ready to achieve this.

National Defence Minister Mr. İsmet Yılmaz made a speech on "The Current Status of the Defense and Aerospace Industry and Assessments on the Near Future". Placing emphasis on the need to equip the staff with the most superior technological products in order to provide the public and security services in an uninterrupted manner, İsmet Yılmaz extended his gratitude to all the shareholders offering services in this area and continued, "Turkey has years of losses as a result of the conflicts in the South East of the country, in Kilis. We are facing a huge loss. We are monitoring our deficiencies and we need to work harder to overcome them. We need to do more than we have achieved today and transform the know-how into an asset by making the most of it".



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Yılmaz mentioned that Turkey aimed to become one of the 10 greatest economies with the ambitious 2023 vision and added, "It is not an easy goal at all but we are able to achieve it. We rely on the fact that we are able to cover a part of the \$500 billion export target through the defense industry".

Yılmaz noted that as a result of the conflict in Syria, Iraq, Yemen and Middle East and the recent tension in the relations with Russia, the export figures of the previous year around \$150 billion decline to the level of \$140 billion in 2016 and stated that despite of all the aforementioned factors among all the sectors only the defense industry maintained its increase trend.

Yılmaz pointed the fact that if Turkey managed to create products capable of competing in foreign markets in price and technology aspects, it would become a preferred country. "During this period, we conducted the sale of our cutting edge technology products to many countries which we have political issues with. This is the best indicator of the present status of our country's level in technology and competition", continued Yılmaz.

Following the speech of the Minister of National Defense, SaSaD Director General Hüseyin Baysak made an overall assessment of the sector and told that except the civil aviation, the world defense industry has been going through a recession since 2011 and added, "The resource Turkey allocates to defense expenses is between the range of \$14-16 billion. Surely this figure does not encompass the expenses of the forces which are not assigned to the NATO. When we include these expenses as well the figure increases to \$18-20 billion according to the reports of SIPRI. Again, in accordance with the 2015 report issued by SIPRI, Turkey is amongst the first 6-armed countries.

Taking into consideration the total sales and total exports figures of the sector achieved this year, we observe that the total export figures are proceeding in the same line with the previous year. On the other hand, there is a partial increase in the Product and Technology Development in comparison with the last year. There was a decrease in product and technology development in 2014. Here we see the increase in the support provided especially by the government".

Upon this assessment on the sector's 2015 performance, Frost & Sullivan analyst Mr. Brad Curran made a presentation on the 'Future of the Defense'.



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After this presentation, an award ceremony was conducted with the successful industrialists in technology development, entrepreneurship and export areas based on their 2012, 2013 and 2014 performance. The performance was evaluated by

the Undersecretariat for Defense Industries based on the financial ratios and TEI was awarded the grand prize, while Alp Havacılık won the second prize in the same category and TAI was given the third prize.

Within the scope of the special awards of 2016, Ermaksan was selected as the best entrepreneur industrialist, Aselsan – Bilkent and TÜBİTAK Sage were awarded in technology development with the "Mercan" project; Aselsan won the export achievement award, conducting export activities to 63 countries and opening the South American market to Turkey by signing the first export contract in Chile; and Kale – Baykar Group won an award in successful product delivery.

Following the vote counts, with the announcement of the Original and Substitute Board Members of 2016 – 2017, and the members elected for the Supervisory and Disciplinary Board the General Assembly ended.

Following usual protocol, as it is at the beginning of each new term, the election of the new Chairman of the Board and Vice Chairmen planned to be held at the first board of directors meeting.

The Original and Substitute lists of persons elected for the Board of Directors for years 2016 and 2017 are as follows:

BOARD OF DIRECTORS - ORIGINAL MEMBERS	VOTES
FNSS- REPRESENTATIVE: K.NAİL KURT	58
ROKETSAN-REPRESENTATIVE: SELÇUK YAŞAR	58
ASELSAN- FAİK EKEN	56
TUSAŞ- MUHARREM DÖRTKAŞLI	54
TEI-REPRESENTATIVE: M.FARUK AKŞİT	51
OSSA- REPRESENTATIVE: MİTHAT ERTUĞ	50
ALP HAVACILIK- REPRESENTATIVE- A.YILMAZ GÜLDOĞAN	47
HAVELSAN- REPRESENTATIVE- SERDAR MÜLDÜR	45
BİTES- UĞUR COŞKUN	42
ODTU TEKNOKENT- İ.MUSTAFA KIZILTAŞ	41
MKEK- REPRESENTATIVE- AKİF AKGÜL	38
NUROL MAKİNA- REPRESENTATIVE- ENGİN AYKOL	38
AYESAŞ- REPRESENTATIVE- AZİZ SİPAHİ	34

BOARD OF DIRECTORS - SUBSTITUTE MEMBERS	VOTES
ALTAY- REPRESENTATIVE: M. MURAD DURAL	23
HUKD- REPRESENTATIVE: A.AZİZ MEYDAN	20
MTU TÜRKİYE- EKREM KURALOĞLU	18
SAVRONİK- KENAN IŞIK	16
OTOKAR – A. SERDAR GÖRGÜÇ	11



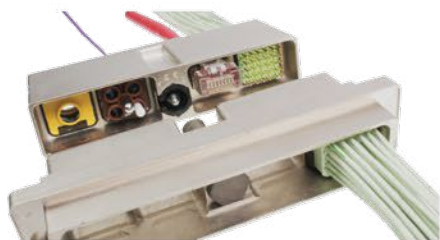
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Turkish Defense Industry, a Formidable Player in the Mid-Tier Market, Ready to Enter Larger Global Markets

Analyst of Aerospace & Defense | Frost & Sullivan, Brad Curran, discusses the “The Future of Defense Revisiting the Cold War While Confronting Terrorism”.

Turkey's mature and proven systems are in demand. Turkey is positioned in a High Market Value and High Growth region.

On 27th April 2016 a presentation was made to SaSaD Ordinary General Assembly Meeting at Sheraton Hotel by Mr. Brad Curran, Aerospace & Defense Industry Analyst with Frost & Sullivan, in Ankara, Turkey. With his vast experience, 26 years of service in the US Marine Corps and close to 10 years with Frost & Sullivan, Mr. Curran specializes in the tracking of global defense spending and C4ISR technologies. At this event he shared insight on global markets and how Frost & Sullivan assesses the future of the defense industry in an environment where major countries are reducing defense spending, in the midst of growing threats and changing technologies. Key topics addressed included the evolving relationships in the defense world, budgets and priorities for this year, industry competition, collaboration and consolidation. In addition, technology priorities, the surging technologies of the future and the defense industry outlook 10 years from now.

Evolving Relationships in the Defense World

Many nations continue to increase their defense technology levels and encourage exports, resulting in increased defense industry competition and margin pressure. Large global defense firms seek to diversify sales away from mature home markets. For example, global firms like Lockheed Martin or Finmeccanica, have saturated markets coupled with shrinking budgets at home. Simultaneously, mid-tier defense industry participants seek to enhance local capability and enter the larger global markets. These



Mr. Brad Curran, Analyst of Aerospace & Defense, Frost & Sullivan

local and regional defense firms often have government support to increase exports while also improving technical operational capability. They are seeking out opportunities to diversify and find new markets in Turkey, South Korea, Egypt and other places around the world. In order to access mid-tier and emerging nations, these firms are pursuing joint ventures, partnerships, and technology transfer opportunities. Concurrently, these mid-tier nations would like access to the larger markets such as the United States, France or Great Britain, with the intent to also gain technology transfer to improve their own capabilities and enhance their own ability to export. Examples of this are demonstrated by partnerships with companies such as Finmeccanica working with Turkish Aerospace Industries or Lockheed Martin working with

Korean Aerospace Industries on aircraft projects. In Turkey, this is also exemplified with shipyards, such as Gölcük Marine Shipyard working with ThyssenKrupp on potential submarines, and in India with TATA working in partnership with Honeywell for C4ISR systems. Large global firms are seeking diversification away from mature home markets. Local and regional defense firms with government support desire to increase exports for technology and economic improvement. For example, the South Korean government is aggressively supporting their defense industry for defense exports. In addition, Brazil, India, Turkey, Ukraine, Taiwan, South Africa, Israel, and most importantly now Japan will pursue new business. Japan, a nation of great industrial and technological power is at the cusp of entering into this

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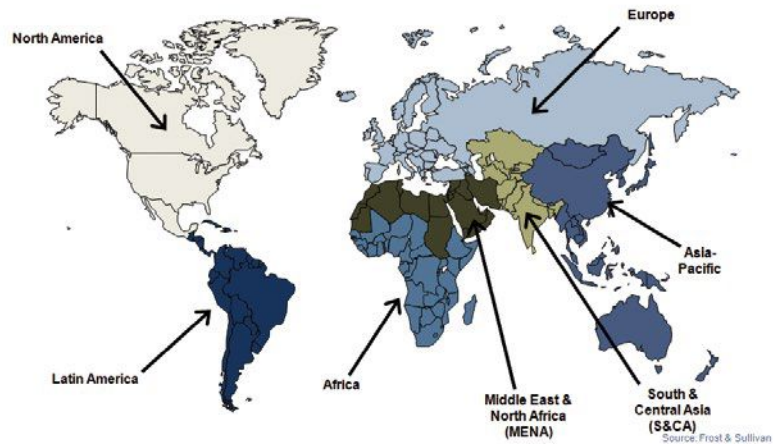
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market. In an era of shrinking and saturated markets, the environment has become very difficult, also with increased competition. The global defense market is crowded, competition is intense, and margins are tight. Countries such as Turkey and South Korea are in a very good position. Nations such as Saudi Arabia and Indonesia are seeking to limit their dependence on traditional technology suppliers such as the US and Russia, while also building an indigenous capability to manufacture basic defense products. It has become a dilemma for nations to be completely dependent on the US, Russia and in some cases China, because of inevitable political changes, and dynamic technology changes. Nations traditionally aligned economically and militarily with large nations such as the United States or Russia seek to limit their dependence on these technology suppliers. By reaching out to new sources, countries can often gain price and services advantages while also building an indigenous capability to manufacture defense products. Therefore, they aim to diversify their sources of industry, and build their indigenous capability as well.

Defense Budgets and Priorities in 2016 - Key Market Drivers and Restraints

Perceived threats from renewed "cold war" era-like aircraft and ship deployments, aggressive territorial claims, the introduction of advanced weapons systems, refugee movement, and terrorist attacks are driving nations in all regions of the world to respond with expansion and upgrades of border security and military capability. For example, perceived threats from North Korea, China, Russia, Iran, and ISIS. A variety of areas are causing concern across the world and are driving markets forward. For example, the increased Russian patrols of submarines, ships and aircraft. The Increase of blue water Naval capability and the occupation The Senkaku Islands by the Chinese. Also the activity with Iranian missiles and North Korean missiles. The on-going problems with Iraq, Syria, refugees from North Africa, and the Mexican border in North America. The NATO countries that border Russia, including the

Defense Budgets and Priorities in 2016-Regional Segmentation



Black Sea, bordering China, North Korea and Syria and parts of Libya, are causing concern with border control and C4ISR capabilities.

Another driver for the market is the fact that platform service life, especially for western nations, is nearing the end, making deferred maintenance and some new builds a priority for a variety of ships, aircraft, and ground vehicles. Incremental upgrades to proven designs and technologies are desired. Proven designs and technologies are desired. Many nations around the world, including the largest nations, must address the issue of wear and tear of ships, aircraft, ground vehicles, tanks, and combat vehicles. These fleets are worn out, maintenance has been deferred and they need to be replaced. However, when they are replaced, it will be in fewer

numbers, as a result of increased C4ISR technology capabilities, enabling the capacity to mass fires instead of massing troops and platforms.

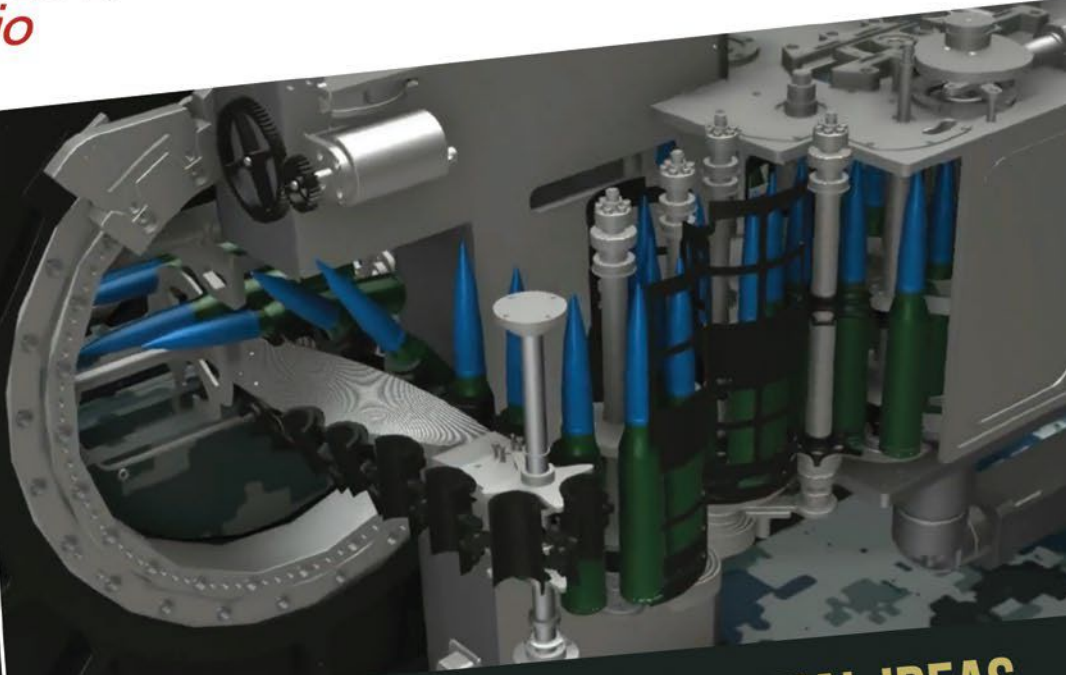
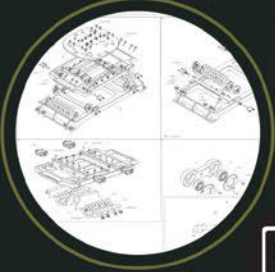
Economic uncertainty among western nations and oil and natural gas producers restrains military procurement. Weapons sharing plans among regional security partners in Northern Europe and the Middle East along with reduced troop levels overall lower the number of platforms required. Defense industry overcapacity will result in some consolidation and lower margins both for domestic and exporting firms. For example, China is increasing their defense spending, however they are achieving this by drastically reducing the size of their army. They are going to have fewer platforms and fewer troops and use their financial resources

Defense Budgets and Priorities in 2016-Procurement Forecast by Region

Procurement Forecast by Region, Global, 2014-2019

Year	Africa (\$ Billion)	Asia-Pacific (\$ Billion)	Europe (\$ Billion)	Latin America (\$ Billion)	MENA (\$ Billion)	North America (\$ Billion)	S&CA (\$ Billion)
2014	6.47	136.39	115.94	19.41	64.70	278.21	25.88
2015	6.50	144.00	117.00	21.00	65.00	279.00	26.00
2016	6.60	150.00	119.00	21.00	70.00	275.00	26.00
2017	6.70	165.00	120.00	21.10	75.00	275.00	27.00
2018	6.75	170.00	121.00	19.90	76.00	275.00	27.30
2019	6.80	174.00	122.00	20.40	78.60	280.00	28.60
Total	39.82	939.39	714.94	122.81	429.30	1,662.21	160.78
CAGR (%)	1.0	5.0	1.0	1.0	4.0	0.1	2.0

Total global procurement in 2014 was about \$647.00 billion.
 Total global procurement for 2016 is expected to be about \$667.60 billion.
 Total global procurement for 2019 is expected to be about \$710.40 billion.
 Cumulative global procurement from 2014 to 2019 is expected to be about \$4,069.25 billion.



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- Product Release

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RELEASE**

**PRODUCTION
ASSISTANCE**



to upgrade their capabilities. The trend of weapons-sharing plans, among regional security partners, reduces the number of expensive platforms required overall. Countries like Sweden, Norway and other NORDEFCO countries (Nordic Defence Cooperation) are pooling resources. Another example is the sharing of aircraft carriers between France and Great Britain. The UAE and Saudi Arabia and possibly others are sharing assets in the Middle East. Japan, the US and Australia as well could follow this approach.

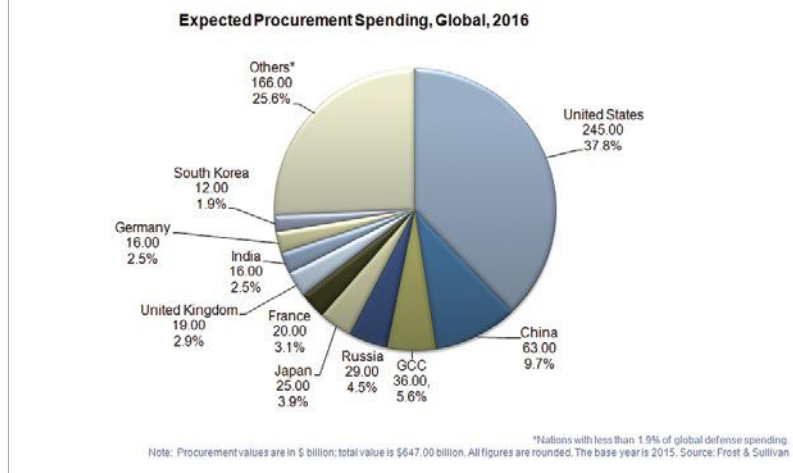
Defense Procurement Forecasts by Region

Total global defense procurement for 2016 is expected to be about \$ 668 billion. North America has the highest market value, but will have low growth. The most attractive regions for global exporters through 2020 are Asia Pacific, Middle East North Africa, and Northern and Eastern Europe. North American defense procurement, led by the US is about \$ 275 billion in 2016. The market is stable, but growth is expected to be flat through 2020. The Asia Pacific region, led by China, Japan, and South Korea, will grow at about 5% a year, with anticipated procurement spending of \$ 174 billion in 2020. The Middle East North Africa region will also have good growth, \$ 70 billion in 2016, growing at 4% a year to reach \$ 80 billion in 2020. Saudi Arabia, UAE, Israel, and Egypt are actively increasing their defense capability. The best mix of market growth and market value is Asia Pacific and Middle East North Africa, and Turkey is located in this region...an advantageous position for the Turkish Defense Industry.

Defense Industry Competition and Global Leaders

The top 3 global defense firms are Lockheed Martin, Boeing, and BAE Systems. Lockheed Martin continues to be the largest defense company in the world. Typically, BAE has ranked #2, however last year Boeing caught up and secured the #2 ranking because of large aircraft sales, Chinook helicopters, Apache Attack helicopters, MMA aircraft with India and others. These companies produce a variety of advanced defense

Defense Budgets and Priorities in 2016- Procurement Spending Share by Nation

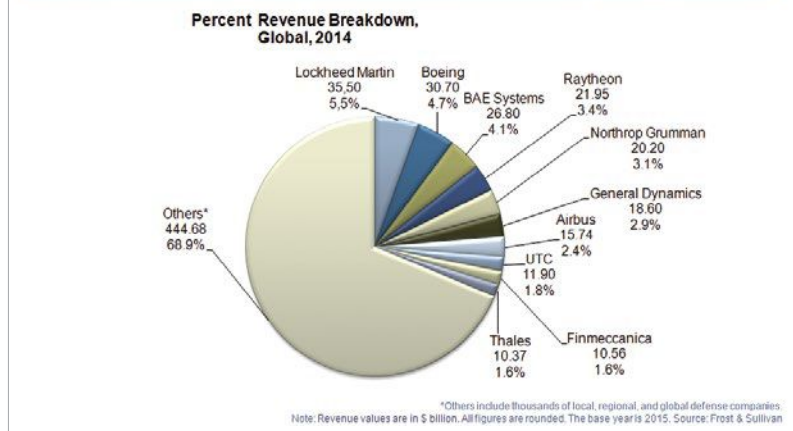


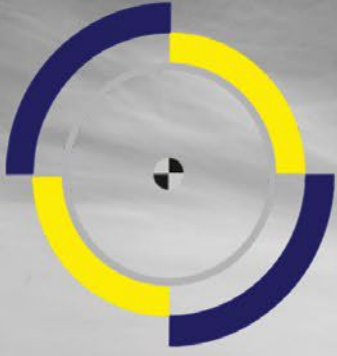
products and services for US, UK, and global customers. Other prominent industry leaders include Raytheon, Northrop Grumman, General Dynamics, Airbus, United Technologies, Leonardo-Finmeccanica, and Thales. All of these aerospace, defense, and security firms seek to leverage their "dual-use" products and services and increase exposure to the more general non-defense markets, while integrating mature commercially developed technologies, products, and services. There are a variety of examples of companies that are already partnering and have expressed continued interest in Turkish Defense companies. The ongoing theme continues, major companies are very interested in what is transpiring in Turkey, South Korea, Egypt, and India. Though market data is difficult to obtain,

Russian and Chinese defense firms, most owned or heavily influenced by the state, remain very important global defense industry participants and competitors. Defense exporters of both nations have adequate and cost effective military equipment, with long experience and broad exposure to a variety of key market segments and customers. Regional defense firms are also important suppliers of platforms, systems, and key technologies for local defense needs and export. Aselsan, Havelsan, FNSS, Embraer, IAI, Denel, Tata, Samsung, and Mitsubishi are a few examples of successful regional firms that provide vital defense products and services for both domestic and international customers. The market in Africa is not a good one, but of note, Denel is doing something interesting with the building of

Industry Competition, Collaboration, and Consolidation- Global Leaders

Key Takeaway: Expect mergers in 2016 to address manufacturing overcapacity.





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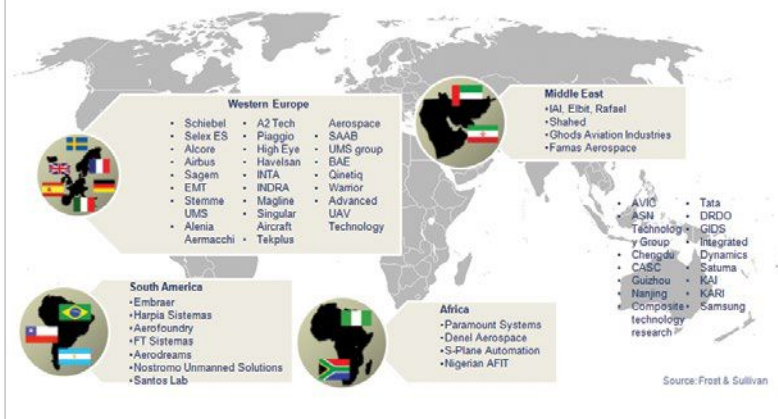
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Industry Competition, Collaboration, and Consolidation- Representative Regional Firms



an ammunition factory in Saudi Arabia, producing everything from 9MM, 155 artillery rounds, which can be described as a soup-to-nuts turnkey operation. In South America, Embraer is most certainly a company of interest that has been described as a potential partner for Turkish Industry; they have built successful relationships with many Israeli companies and are getting technology transfers. The influence and market share of these regional firms will continue to increase as commercial and defense industries converge, technology levels increase, and partnerships become essential.

Changes have started now in the Middle East. Particularly with Saudi Arabia and UAE it is observed that they are seeking to diversify their economy away from just an oil economy; and also the US is disengaging from the Persian Gulf, expecting them to take on more of

their own defense responsibility. They are seeking better capability to both produce basic defense products and to learn more tactics, techniques and procedures. This poses a significant opportunity for Turkey, to help these nations.

Procurement Spending Share by Nation – South Korea is Turkey's future Defense Industry competitor

The US has approximately 40% of the expected procurement spending, followed by China and Russia. It is not often realized that Japan has robust defense spending, very capable and advanced defenses, and like Turkey and other NATO members, Japan trains regularly with the US on techniques and procedures. The spending ratios for France, Germany and the UK are stable. Data indicates that

India's spending is growing. An interesting surprise to note is that South Korea reached the top 10 this year. They are certainly anticipated to be the main competition for Turkey; in the next 10 years South Korea intends to be the leading mid to upper tier supplier for defense technology.

Defense Technology Priorities by Segment

Command and Control, Communications, Computers, Intelligence, Surveillance & Reconnaissance (C4ISR) technologies has the largest market share of about \$110 billion in 2016, or about 16% with expected growth of 2% a year through 2020. Border security, counter-terrorism, collaboration, and improved weapons sensors drive improvements in this segment. It has been observed, for example, that with the Russian activity in Ukraine, Ukrainians were overwhelmed by Russian electronic warfare and cyber-attacks. Operationally, this is a point of weakness within NATO that definitely needs to be addressed. The Turkish defense industry has an opportunity to look at this high interest area to try to solve some of these problems, dealing with the rising barrage of massive electronic warfare attacks and cyber security attacks.

Military unmanned systems will have the fastest growth rate, 4% a year, reaching about \$13 billion by 2020 as more nations build and deploy unmanned aerial, ground, and sea vehicles to improve situational awareness and operational decision-making. This area has come a long way in the last 10 years. Many nations, including Turkey, will increase their airborne assets. This area is expected to grow in the next 10 years much as unmanned aerial grew in the previous 10 years. The challenge ahead is for sensors to get smaller, missiles need to get smaller, the assets need to cross-queue each other and collaborate similar to a flock of birds. In order to operate alongside manned aircraft, safety issues and autonomous navigation must be addressed. These are technology gaps that the large companies have not solved and are most certainly opportunity areas to be exploited.

Technology Priorities-Forecast

Procurement Forecast by Technology, Global, 2014–2019

Technology	2014 (\$ Billion)	2019 (\$ Billion)	CAGR (%)	Spending Share (%)	Example Country	Example Contracts-Products
C4ISR/EW/IO	106.00	118.50	2.3	16.3	Saudi Arabia	Boeing AWACS upgrades
CBRNE	12.00	12.60	1.0	1.8	US	Smiths Detection: Agent Detectors
CSSE	38.00	42.20	2.1	5.8	UK	Leidos: Submarine Logistics
Fixed Wing Aircraft	98.00	102.80	1.0	15.1	Norway	Lockheed Martin: F-35 Fighters
Missiles & Rockets	72.00	79.50	2.0	11.1	China	Rosoboronexport: S-400s
Ordnance	40.00	43.00	1.5	6.2	Russia	Tula Arms Plant
Rotary Wing Aircraft	60.00	70.20	3.2	9.3	Turkey	UTC Sikorsky: T70 Blackhawk
Ships	101.00	111.30	2.0	15.7	Italy	Finnmeccanica: Patrol Vessels
Tactical Vehicles	50.00	53.80	1.5	7.8	Malaysia	Denel: IFV Turrets
Training & Simulation	26.00	28.70	2.0	4.0	Afghanistan	DynCorp: Tactical Training
Unmanned Systems	10.00	12.15	4.0	1.5	Netherlands	General Atomics: MQ9
Weapons	34.00	35.65	1.0	5.3	Poland	Samsung: K9 Howitzers
Total	647.00	710.40	1.9	100		

Note: All figures are rounded. The base year is 2015. Source: Frost & Sullivan

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Other well-funded technology areas with good growth rates include rotary wing aircraft, combat service and support equipment/services, and ships. Fixed wing aircraft, missiles & rockets, and ground vehicles are well funded, as nations seek to replace and upgrade older platforms. Looking farther out, advanced nations with strong research & development programs have begun work on next generation technologies and operational concepts that may change warfare. Railguns, laser weapons, systems to counter unmanned aerial vehicles, missiles, and artillery, hypersonic missiles, holographic training & simulation, anti-satellite missiles and electronic warfare, cyber-attack, and nano and graphene technologies are all being researched for future military applications.

Industry Convergence: A Cross-Pollination of OT, IT and Telecommunication

Times have changed. In the past there was a distinction between the defense industry and the commercial industry. The current landscape of the defense industry is one that is vitally dependent upon the innovative and agile commercial industry for wireless technologies, cloud computing, big data, cyber security, computing, technology, and satellites. For example, 70% of US traffic goes over commercial satellite transponders, and even more than that overseas. Defense companies, defense industries and even governments themselves are pursuing avenues to save money. There is an ardent effort underway to increase the technology refresh and to increase competition. If there are mature commercial technologies available, especially for communications and surveillance and reconnaissance, they are going to be in demand. Technologies of the future, that are being developed in the fast-paced commercial world, will be applied to ever evolving defense problems. It is essential for defense companies to keep an eye on commercial developments and to partner with these commercial companies as well, leveraging these cutting-edge technologies.

The Defense Industry in 2026

Large global firms will continue to dominate spending for the defense industry in 2026, but current mid-tier firms will provide more platforms and technology, leaving only the most advanced concepts to nations with large military and industrial facilities

The Future of Defense Industry, Global, 2016–2026

	2016	2020	2023	2026
R&D	Research done by large nations, defense companies, universities, private firms	Basic and practical research shifting to private IT and materials firms	Global research for commercial products will dominate among military applications	<ul style="list-style-type: none"> Market share of basic defense technology will grow for Brazil, India, Israel, Japan, South Africa, South Korea, Taiwan, and Turkey Australian, German, Italian, Norwegian, Spanish, and Swedish manufacturers will lose market share The US, UK, and France will maintain technical and operational leadership Russia and China will continue to provide adequate defense platforms and systems to nations with political or financial restrictions
Procurement	Major programs awarded to large systems integrators with established supply chains	Program awards to multiple teams to encourage competition and technology advancement	Mid and lower tier spending nations will skip technology generations to field a variety of advanced C4ISR and lethal weapons	
Services	Maintenance, repair, overhaul, training, engineering, integration work performed by platform manufacturers	Local services firms gain additional expertise from joint venture experience to carry out most routine work	All routine services and basic upgrades will be conducted locally except for the most advanced sensors and IT systems	

Source Frost & Sullivan

The Global Defense Industry in 2026

Large global firms will continue to have the dominant share of defense industry spending in 2026. Current mid-tier regional and local firms will provide more platforms and technology, leaving only the most advanced concepts to the few nations with large military and industrial facilities. Basic research & development with military applications that is currently done by governments, defense companies, universities, and private firms will shift more to private information technology and materials firms. By 2026, commercial research will take the lead for new technologies. Procurement programs awarded to large systems integrators with established supply chains will give way to multiple short term awards to encourage competition and enable faster technology refresh. Mid and lower tier nations will skip technology generations and field a variety of advanced C4ISR technologies and state-of-the-art weapons.

Services such as maintenance, repair, overhaul, training, engineering, integration, and logistics currently done by platform manufacturers is increasingly taken on by local service firms. 10 years from now more of these activities will be routine services completed by countries like Turkey, South Korea and others, performing maintenance for countries across the board from small to large. These companies gain additional expertise

from joint ventures and carry out routine work and basic upgrades. Only the most advanced sensors and IT systems, that may still have some proprietary components, will require on-site services by the manufacturer.

Market share for basic defense technology platforms outfitted with some very advanced systems will grow for nations such as Turkey, Brazil, India, Israel, Japan, and South Korea; at the expense of current high-tech defense product manufacturers from countries like Germany, Italy, Spain, and Sweden. The US, UK, and France will retain a technical and operational leadership role, while Russia and China will continue to provide capable defense platforms and systems to nations with political or financial restrictions.

Mature and proven systems that are moderately priced will gain market share. Turkey, for example has a wide variety of mature and proven systems, and companies will seek to utilize these systems. The Turkish Armed Forces are among the most professional and best equipped in the world, an excellent spotlight and selling point for the Turkish Defense Industries. Global Defense industry participants will continue to face overcapacity with limited and selective procurements. Expect mergers and local partnerships with firms producing dual use technologies. Turkey is positioned to be a formidable competitor in the race to close technology gaps in the global market.

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L-3 Communication Systems-East actively Promoting Capabilities, Uncovering Opportunities and Potential Areas of Collaboration with Turkish Defense Companies

The Turkish defense industry is one of the fastest growing markets in the world and has key influence in the Middle East and Asian regions. In a detailed interview with Mr. Patrick Holub, Director, International Business Development L-3 Communication Systems East, he shares details about the products, services and future vision of L-3 Communications. Specializing in the design, development and production of integrated communication systems supporting space, ground, air and naval operations – L-3 Communication System East (a division of L-3 Communications) is looking to grow its business base.

Defence Turkey: First of all, thank you for your time. Could you please inform us about the structure and capabilities of L-3 Communication Systems East?

Based in Camden, NJ, L-3 Communication Systems-East (CS-East), a division of L-3 Communications, specializes in the design, development and production of integrated communication systems supporting space, ground, air and maritime operations. We are currently organized into two business areas:

- › Cyber Defense and Intelligence, Surveillance and Reconnaissance (ISR) for secure communications and ruggedized storage & server systems
- › C4ISR for tactical maritime platforms and land-based command and operations centers. Our focus remains on Integrated and Automated Communications Systems for all domains -- sea, air, space, and land.

L-3 CS-East offers affordable, low-risk, and high-performance systems. Our experience reduces integration risk, equipment footprint and reduced manpower. The benefits include reducing equipment, installation, and operational costs, with improved operator efficiency, increased situational awareness and mission effectiveness.

Our capabilities also include a product line that includes our Tactical Unattended Ground Sensors (UGS), which provides force protection and intelligence gathering, and Signals Intelligence solutions for government agencies.

Defence Turkey: L-3 Communication Systems East was awarded a contract for the Canberra Class LHD Integrated Communications System for the Australian Navy. The L-3 team has successfully completed several significant performance milestones in the program. Could you please enlighten us about the program and L-3's role?

L-3 CS-East was selected in a competitive bidding process by BAE Systems as the Integrated Communication System (ICS) Supplier with the ability to meet the requirements of the program as



specified by the Commonwealth of Australia. The scope for L-3 CS-East was design and delivery of all Interior and Exterior Communication Systems, all networks associated with the ICS, and all interfaces to other major systems such as MASTIS. This integrated system included the MarCom Communication Switching System and Symphony management software, which is trusted on numerous platforms world-wide; exterior systems such as HF, UHF, VHF, satellite communications (SATCOM), Data Links and Global Maritime Distress and Safety system (GMDSS) Systems; and Interior Systems such as Wireless, Broadcast and Alarms, Sound-Powered telephones, Entertainment and Training, closed circuit television (CCTV) and the private automatic branch exchange (PABX). In addition, L-3 CS-East provided all networks, including the Maritime Tactical Wide Area Network (MTWAN), with all Systems meeting or exceeding the demanding requirements of the LHD Program.

The L-3 CS-East team, which includes a strong in-country team that is supported by a large team in the U.S., met and completed all major milestones from system design reviews to CAT 3 requirements (Final Acceptance Test and Verification). L-3 CS-East also provided both land-based and on-ship support to help BAE Systems pass Harbor and Sea Trials with the Royal Australian Navy. Both LHDs (Canberra and Adelaide) have been delivered to the RAN and L-3 CS-East and

BAE Systems expect successful completion of the program by the end of 2016.

For large programs like this, L-3 CS-East views itself as a long-term partner rather than a subcontractor and as such, we stay active in the program long after the equipment is delivered. This partnering allows for the shipbuilder to concentrate on other aspects of the ship, as L-3 is trusted to perform as contracted on the Communication Systems.

Defence Turkey: It is well known that, thanks to its secured communication systems, L-3 CS-East is the network security and communication provider of the US Government. Can you elaborate on your capabilities and integrated fields within this respect?

L-3 CS-East provides security architecture, systems and solutions to protect data-in-transit across networks and communication systems and data-at-rest for various processing systems. We are experts in system level accreditation, key and mission management, cryptography and integration of security into systems we design. Our capabilities span many domains to include fixed infrastructure, airborne, ground, surface/subsurface maritime forces and space systems. Our customers comprise both U.S. and international military and intelligence organizations. We've also engaged in developing solutions for domestic applications. Whether the mission requires secure voice or data communications, we have the expertise to meet our customers' needs with the confidence that their information is protected to the

highest level of security standards and performance necessary to ensure their success.

Defence Turkey: How do you assess the technological competence of your integrated and automated C4 products “Marcom” and “Symphony”?

Our MarCom Integrated Communications and Symphony Resource Manager work in conjunction with one another to enable efficient and secure information sharing. While mission performance is enhanced, significant reductions in required staffing and training result in major operational cost savings. Both MarCom and Symphony are mature products that benefit from ongoing investment and sustainment programs, which continually evolve and expand these integration products while keeping them technically refreshed and producible. The strength of both product families results from two specific factors:

- › a) They were designed to serve customers in tactical environments;
- › b) They were designed to be modular, scalable and adaptable based on the customer's applications.

These solutions offer great advantages in the areas of security and performance over commercial products. They also drive affordability, due to a reduction in the expertise required to operate and maintain them, combined with the ability to fit all customer needs.

Defence Turkey: It is clear that L-3 Communication Systems East has made several achievements,



more than 150 programs in 5 countries as well as the home market in the US. Would you enlighten us about your local and global programs?

L-3 CS-East has a rich heritage in providing turnkey mission system solutions for the U.S. Department of Defense and Intelligence Community. We have earned over 100 Top Secret and Below (TSAB) certifications and produced over 800,000 TSAB end cryptographic units over the past 65 years. Our multiple security domain networks and integrated systems have been accredited and deployed on a multitude of strategic and tactical platforms. This expertise in information assurance enables us to design security into your system architecture from program inception.

Today, L-3 CS-East is among the world's leading integrators of C4ISR systems for customers around the globe. Our systems support submarine and surface platforms, ship and shore installations, U.S. Navy and Coast Guard, and international customers. Some of our platform integration experience includes:

U.S. Navy

- › Aegis Cruisers and Destroyers
- › Nimitz-Class Aircraft Carriers
- › LPD 17-Class Amphibious Ships
- › Littoral Combat Ship #2 and #4
- › Ship-to-Shore Connector
- › Ohio-Class Submarines
- › Los Angeles-Class Submarines
- › Virginia-Class Submarines
- › Ohio Replacement-Class Submarines

U.S. Coast Guard

- › Legend-Class National Security Cutters
- › Sentinel-Class Fast Response Cutters
- › Offshore Patrol Craft
- › Communication Stations
- › Command Centers

Royal Australian Navy

- › Canberra-Class Amphibious Ships
- › Fleet Tanker
- › Special Forces ADRHIB

Egyptian Navy

- › Egypt's Fast Missile Craft (Ambassador Class)

Royal Malaysian Navy

- › Kasturi-Class Corvettes

Royal New Zealand Navy

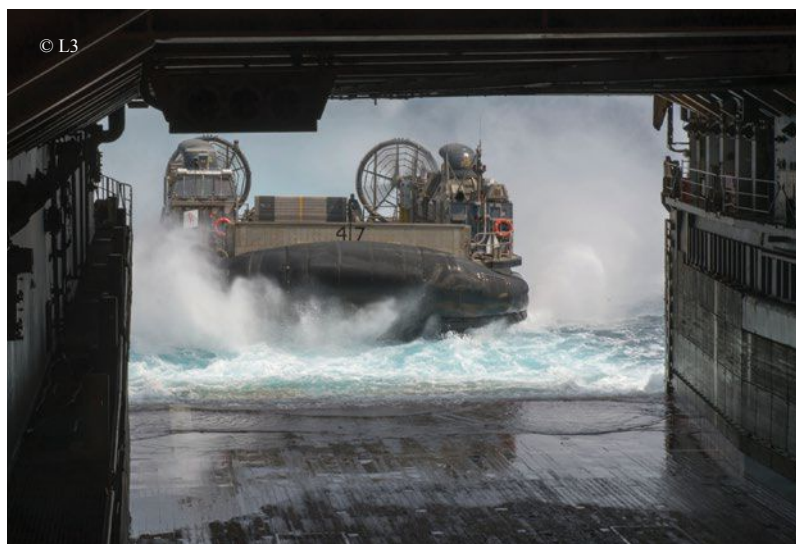
- › ANZAC-Class Frigates

Royal Canadian Navy

- › Arctic Offshore Patrol Ships

Defence Turkey: What are your activities in Turkey? What do you see as your opportunities with the Turkish government and Turkish companies?

L-3 CS-East is looking to grow its business base and the international market provides us with a path to expand our influence on those areas where we have expertise. We have been meeting with various defense companies in Turkey to promote our capabilities and to uncover opportunities and areas where we can collaborate. The Turkish defense industry is one of the fastest growing markets in the world and has key influence in the Middle East and Asian regions. We have also met with five of the largest military shipyards in the Istanbul area. With two decades of leadership in the maritime communications industry, L-3 CS-East can provide Turkish shipyards with a cost-efficient and capable solution for their C4ISR, which will allow them to aggressively compete for projects in Turkey and internationally. We believe that a Turkish built ship combined with a U.S. C4ISR solution is a great model.



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TCSG "Yaşam" Turkish Coast Guard Search and Rescue Vessel

With the accelerated schedule for the building and delivery of the Turkish LHD Anadolu, L-3 CS-East's experience on the Royal Australian Navy's Canberra Class could be useful in a collaborative partnership, which would facilitate the sharing of our knowledge and experience with the shipbuilder SEDEF and two of the contractors, Aselsan and Havelsan in order to reduce risk, cost, and ensure the new timeline is met. As a former naval officer, I can tell you that we are focused on providing the best capability to the Anadolu, as it will be a key platform, for not only the Turkish Navy but also for NATO. We owe that to the Sailors that will crew the ship but also to the pilots that will be operating from the Anadolu. At the end of the day, it is about maximizing the operational effectiveness of the ship.

Finally, when you look at our international portfolio, it is focused on providing C4ISR and integrated communications on maritime platforms. As the Turkish Coast Guard continues to grow and modernize, L-3 CS-East has a proven track record with the US Coast Guard that would assist in ensuring operational success for the Turkish Coast Guard. As the missions they are tasked with continue to grow and become more challenging, our experience in providing similar capabilities to the U.S. Coast Guard would provide a cost-effective solution to meet these increased demands. I don't have to tell you that they have a tough job in the Mediterranean Sea today and we all want to make sure that they have the most capable platforms available.

Defence Turkey: As you are aware, Turkish companies have a significant presence in some markets. Do you have any intention of collaborating with Turkish companies in other markets?

Turkish companies are some of the most respected exporters of defense articles in the world and we would be honored to work with them in the international market. The relationships that Turkish companies have developed in the Middle East, Caspian Region and Asia are indicative of the respect that the international community has for the defense industrial base of Turkey. L-3 CS-East admires the customer-focused view of many Turkish companies. Clearly, it demonstrates they believe in the long-term commitment to ensuring that their products are maintained and that the customer is getting the best capability at the best value for their platforms. If you look at the international market for Offshore Patrol Vessels, patrol boats, and corvettes, it is an

area in which we at L-3 CS-East are interested in expanding our influence. With Turkey being one of the top shipbuilding countries in the world, we want to collaborate on projects to assist them in winning projects globally but also to grow L-3 CS-East as a global company. After reaching a peak in 2008, the Turkish shipbuilding business contracted but has been recovering since 2012 and we believe will continue to grow. The shipbuilding industry is important to the Turkish economy and we want to provide that extra support on international projects that will be a discriminator to assist Turkish shipyards capture international business.

Defence Turkey: Finally, would you like to add a message to our readers?

L-3 CS-East sees Turkey as a key NATO partner and a major contributor to the alliance, while viewing their defense industry as a key partner to facilitate our company's growth around the globe. Turkey is a country that can bring East and West together and we would like to see if their shipyards and defense industry can bring L-3 CS-East to the Middle East, Asia, the Caspian Region and Africa. We have key partners in the U.S. that we are working with to grow internationally and we see the Turkish defense industry as a perfect complement to them. We are fortunate to have good partners and hope that the Turkish defense industry views us the same way. 🇹🇷

Mr. Patrick Holub, Director, International Business Development L-3 Communication Systems East met with Ms. Şebnem Akalin, International Relations Director of Defence Turkey Magazine at DIMDEX 2016



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TAI Supply Chain Development Conference in Aerospace

Within the scope of developing the Aerospace and Aviation Systems, with the "Industrialization in Aerospace and Space Conference" held at Turkey's Technology Center TAI facilities on 26 April 2016, the relevant industrialists and representatives of governmental institutions and private associations gathered in order to make an assessment of the current developments and share the ideas for further growth with the sub-industry. Representatives from the Ministry of Economy, Undersecretariat for Defense Industries, Industry Clusters and Sub-Industry as well as Boeing and Airbus officials attended the conference-taking place at TAI facilities.

In his opening remark, TAI President and CEO Muharrem Dörtkaşı stated that the volume of work transferred to the sub-industry was increasing each day in parallel with TAI's development throughout the years and the products it delivered and added, "As TAI, presently we are sharing over 2 million hours of workload with our sub-industry. During the negotiations conducted in 2004 for the sale of TAI shares, in order to identify the value of the company as an asset, we envisioned that we would be executing the distribution of a workload consisting of 1.7 million hours and the value of the company was based on this estimation. I believe that we expanded our company by enjoying the growth power and potential of civil aviation since that day". Noting that the growth of civil aviation was approximately 5% Dörtkaşı said, "I assume that the fleet growth of Turkish Airlines would be at the level of 15%. Including the projects conducted with Airbus and Boeing,



Mr. Muharrem Dörtkaşı, President and CEO of TAI

our growth remains around 24%. Therefore, I believe that we are doing our business well and in my opinion we are quite competitive. But is this enough? No it is not and we have to continue our progress in this path by increasing our achievements. Turkey has an export target of \$ 500 billion set for the ambitious 2023 vision. I think that as the aerospace industry, we will be making important contributions toward this goal. For increasing our export volume to \$ 500 billion within 7 – 8 years, which is currently at the level of \$150 – 160 billion, we have to increase the exports per kilogram from \$1.5 to \$3. Only by this way, we would be able to achieve the \$ 500 billion target.

Muharrem Dörtkaşı also stressed that throughout the business packages and negotiations conducted with Boeing and Airbus, they always took initiatives with their belief in the sub-industry and continued, "There is a severe competition amongst the OEMs. Everybody is striving to increase his own profits. We are not confronting any problems with respect to quality and timely delivery. Yet, we need to be more competitive in pricing and make improvements. We expect from you to improve your processes as we do in this respect. I believe

that only this way would we be able to bring a major and qualified aerospace business package to our country and make our mark with the projects we will accomplish".

In his speech, Deputy Undersecretary for Defense Industries and TAI Vice President of the Executive Board Celal Sami Tüfekçi stated that as the Undersecretariat while assigning works to the main contractors in indigenous projects, they encouraged collaboration with the sub-industry companies and SMEs that fulfill the quality standards and underlined the severe importance of their taking part in the production and in domestic production's gaining depth and added, "We will continue to encourage private sector's participation in our projects in a more aggressive manner. Within the scope of the contracts we currently conduct, the contracts to be signed as part of the effective industry participation and off-set directive and defense industry projects to be executed by the Undersecretariat, domestic participation rate of 70% is demanded from the companies as an off-set commitment. Surely we aim to increase this rate to 100%. Turkey is proceeding towards this aim. Within the scope of the proposals submitted for the tenders, utilization of sub-industry and SMEs is encouraged for increasing the participation of domestic industry and gaining depth to the sector. In this respect, for extending the defense industry, our Undersecretariat stipulated main contractor companies' cooperation with sub-industry companies and SMEs. Defense industry sector is known for its requirement of high quality production standards and utilization of advanced technologies.



Dr. Celal Sami Tüfekçi, Deputy Undersecretary for Defense Industries

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Although, we face budgetary restraints from time to time, we still observe that the companies in this sector are not quite affected by the global financial crisis. The companies which focus merely in the domestic market may fail to last in the sector. One of the most essential factors in achieving sustainability in the defense industry sector is through building close cooperation with the global companies of this sector, civil sector being in the first place. Therefore, the sub-industry companies and SMEs aiming to make their mark and last in the defense industry sector have to achieve the expected levels of quality standards. Within this framework, as our main contractor companies in the sector determine the sub-industry companies they consider the institutional infrastructure, quality system, production and material tracking systems, employment and sustainability of qualified personnel, certification sustainability, measuring – testing and documentation capability, certification of facility security. Last but not least the activities for increasing the quality as part of the sustained improvement are regarded during the selection. Our companies are going through quite tough evaluation processes and actually these processes help the SMEs increasing their technology level. For this reason, sub-industry companies' conception of the significance of sustainability and patience while aiming to proceed in the long-lasting indigenous projects of this sector bear great importance of our sector. Turkish defense and aerospace industry continues its development and strengthening with an increasing momentum. On our path towards industrialization in this new era, we are fully aware that the SMEs are the pioneering dynamic forces which would achieve the extension of the sector from their position at the lower part of the industrialization pyramid. As an



Mr. Türker Kocamiş Trade Representative of the Ministry of Economy

indicator of the importance we attach to the SMEs, we are establishing an aerospace and space specialized organized industrial zone in Kazan district nearby our major main contractor TAI. This zone will be built in a concept far different than the existing organized industrial zones in Turkey, in a concept targeting advanced technology. Our expectation from our small-scaled industrialists is to focus on high-technology in line with these targets without losing any time”.

Foreign Trade Representative of the Ministry of Economy Mr. Türker Kocamiş shared the incentive system of the Ministry of Economy with the participants. Kocamiş noted that the incentive system was put into effect in line with the Decree no. 3305 in 2012 and added that they had 4 main goals as part of this system. Kocamiş said, “We have four main targets as the Ministry. Promoting the strategic investments, increasing the efficiency of regional incentive implementation, raising the development level of the less developed regions and identifying and then providing more support to the primary investment areas. Moreover, our investment promotion program is composed of 5 main subjects such as promotion of regional investments, promotion of primary investments, promotion of large-scaled investments, promotion of strategic investments and overall promotion system”. Kocamiş shared the incentive components applied within this scope with the participants as well and mentioned the following details:

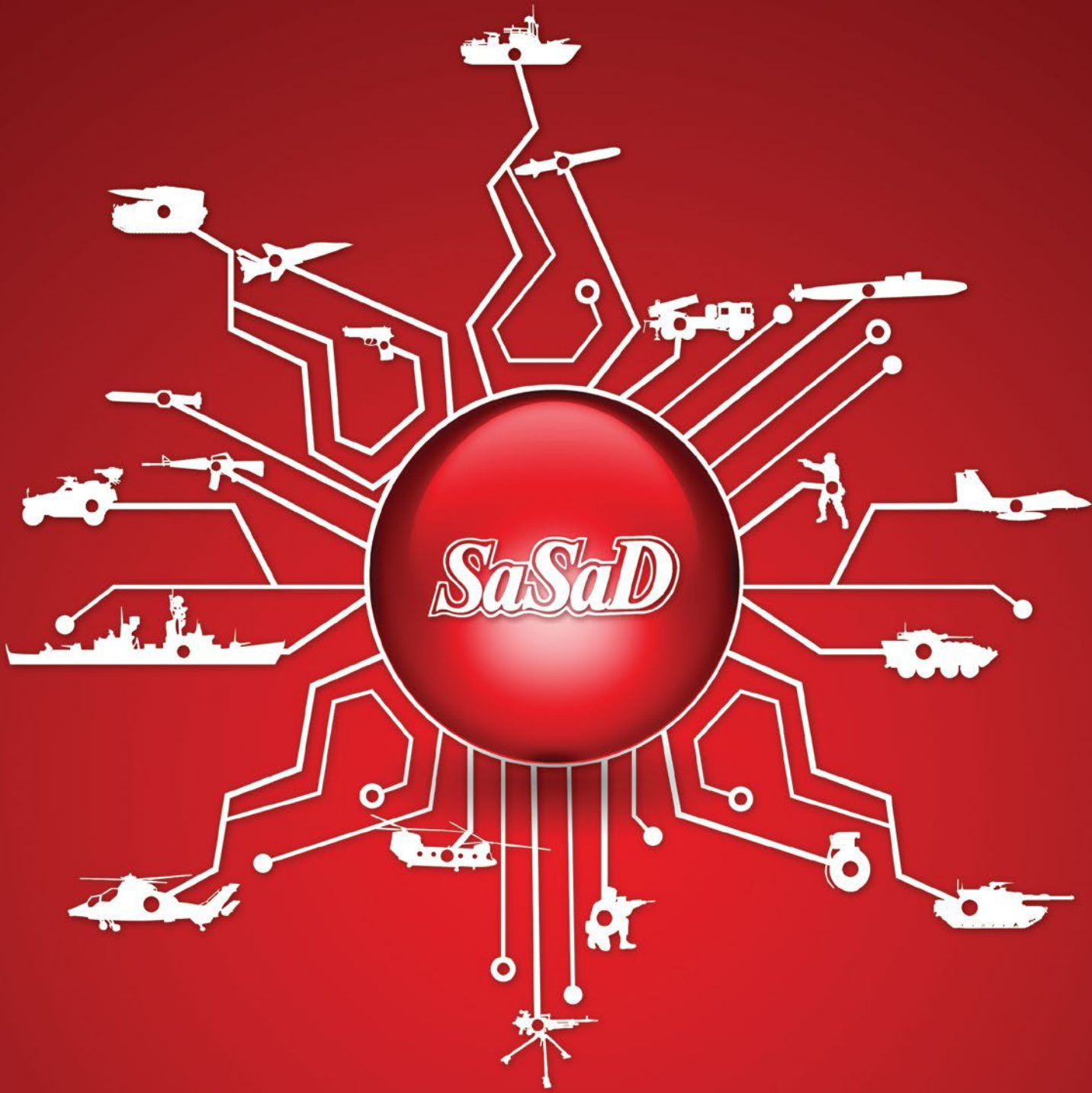
- › VAT exemption (not paying any taxes for a domestic good)
- › Customs duty exemption (not paying the customs duty for an investment good purchased abroad),
- › Tax reduction (application of the income tax or corporation tax in reduced manner until the projected amount of the investment is built)
- › Insurance premium incentive
- › Investment space assignment (assigning a specific investment area to the investor in line with the procedures and principles identified by the Ministry of Finance)
- › Interest promotion (Regarding loans with at least one-year maturity used as part of the investment promotion region, Ministry's financing the certain interest of the loans of which the investment amount up to 70% is paid),
- › Income tax withholding incentive

Mentioning that the incentive components applied varied based on the subject, size and location of the investment, Kocamiş emphasized that through this they aimed to decrease the differences in the level of development. Kocamiş continued, “Turkey is divided into six regions. As the development level decreases from 1 to 6, the rate of incentives increases. The priority investments for defense industry are amongst the most essential subjects. In respect of the priority investments, you benefit from the 5th Region incentives, regardless of the location of your investment. The investments with projects in defense area approved by the Undersecretariat for Defense Industries enjoy the 5th Region incentives. There are no minimum limits here. For Regions 1,2,3,4 and 5, the limit is 500 thousand TL and 1 million TL for the 6th Region. Manufacturing of the Aerospace and Space vehicles and their parts are promoted as part of the priority investments as the production process requires high technology. Besides, if you have an R&D project also supported by the Ministry of Science, Industry and Technology, KOSGEB and TÜBİTAK and if you are to invest in a product created as a result of this R&D activity, then you can benefit from the advantages offered as part of the priority investments”.

Kocamiş stated that the associations wishing to make an investment of minimum 50 million TL in Aerospace and Space vehicles or discrete manufacturing could also apply for an incentive within



Mr. Bekir Ata Yılmaz, Head of TAI Aerostructure Group



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the scope of the Large-Scaled investments and added, "We also have strategic investments besides these. For enjoying this incentive package implemented in order to reduce the imports and increase the domestic production in areas with total production capacity less than imports, our companies have to fulfill four criteria. Initially, the minimum amount of investment should be over 50 million TL, the total domestic production capacity should be less than imports, added value should be at least 40%, and the total import amount regarding the product you wish to manufacture actualized during the last one-year period should be over 50 million US\$. You can benefit from the strategic investment incentive if you fulfill these conditions".

TAI Aerostructure Group Head Mr. Bekir Ata Yılmaz stated that the number of civil aircrafts was identified as 20 thousand in 2015, adding that these aircrafts' lifetime would be expiring in 2034 and that this figure would be reduced to 5 thousand. Yılmaz said, "These aircrafts need to be replaced. 15 thousand aircrafts would be renewed. Besides, the aerospace markets of Far East and China are growing. Demand for 20 thousand aircrafts is being identified in that region and if we include this demand as well, a requirement for 40 thousand aircrafts emerges. Excluding the 5 thousand aircrafts remaining in the inventory in 2034 from this estimation, 35 thousand new aircrafts will be manufactured and the value of this is in the world economy is \$ 5 trillion in today's figures".

At the second part of his presentation Yılmaz shared information on the OEMs and the commitments assumed by the suppliers in the new era. Yılmaz said, "In 1990 and the years before the OEMs used to undertake the most important part of the work. Yet, a new trend emerged and developed between 1990 and 2010. Aircraft manufacturers started to reduce the workload at their factories and assign more work to the sub-industry. The works outsourced to 1st level suppliers were assigned to 2nd or even to 3rd level suppliers by the 1st supplier. As a result, certain issues emerged in the timely delivery and quality of the works assigned. As the customer's expected level of efficiency could not be achieved, after 2010 instead of distributing

work to any given supplier, the works were assigned to a limited number of reliable suppliers. In line with this new trend, the expectations of the OEMs, competitive and reasonable prices, high-quality delivery performance and sufficient capacity concepts gained priority. As TAI, we function as the 1st level supplier. Sufficient financial capacity, accomplishment of active sub-contract management, achieving contribution to the creation of value-added works and having skills for assuming risks with the OEM are expected from the 1st level supplier. As TAI, we believe that we carried this task to a certain level as a 1st level supplier. Within this scope, we wish to walk on this path together with the sub-industry companies. If there is a capability which would contribute to the works assumed by our industry, we prefer to benefit from our sub-industry's infrastructure instead of investing in that area. We are able to expand our business volume in this respect. We can conduct qualified export activities".

OSTIM President Mr. Orhan Aydın, Airbus Head of Supply Chain Quality Dr. Lars-Andre Scheimann and Boeing Central Asia, Europe and Africa Director Mr. Paul C. Anderson gave speeches during the event as well.

Upon the completion of the opening remarks, program continued with the following panels; "Supply Chain Development Panel" moderated by Roketsan Board Member Prof. Ziya Burhanettin Güvenç and "Supply Chain Development Applications Panel" moderated by İstanbul University Head of Supply Chain Sciences Prof. Murat Erdal. After these panels, the TAI Sub-Industry award ceremony was held.

TAI cooperates with 90 suppliers in 11 cities in Turkey within the scope of the indigenous projects and the collaborations with major

aerospace companies of the world. TAI collaborates with the sub-industry in component design and production, machining, cable harness manufacturing, surface treatments, tempering, sheet metal forming, composite parts production and sub-assembly areas. TAI procures 2.2 million parts per year from the sub-industry and therefore provides an employment opportunity of 2.2 million man/hours. Within this scope, the awards were given by TUSAŞ Chairman of the Board Mr. Nejat Bilgin and TAI President and CEO Mr. Muharrem Dörtkaşlı to the representatives of the sub-industry companies successfully accomplishing the timely delivery, delivery in accordance with the quality requirements, increasing capacity through new investments and capability acquisition in 2015.

Mikron Engineering Company was selected as the sub-industry company with the highest delivery performance in 2015 and Küçükpazarlı Kardeşler Company was the one with the highest quality performance where components and apparatus designer and manufacturer MKF Company was granted with the award of the sub-industry company with the highest performance in both quality and delivery.

Moreover, during the ceremony, among the sub-industry companies supplying products to TAI and making new investments and improving their capabilities were given awards; ME-GE Teknik Company completing its investment and qualification on cabling metal winding, Hezarfen Company accomplishing its investments and qualification training on sub-assembly, Yepsan Savunma ve Havacılık Company completing sheet metal forming investments and qualification and Gür Metal Company concluding its aluminum precision casting investment and qualification.



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Grup Impeks – Providing Innovative Products and a Competitive Edge in the Energy Market and Defense Industry Market



Defence Turkey: First of all, we would like to thank you for your time. As Grup Impeks, you are conducting business in a wide spectrum of areas, Energy, Ballistics, Equipment's with Textile and Food being in the first place. Could you please briefly inform us on your capabilities, investments and structuring?

Grup Impeks is a full-fledged foreign trade company, rendering services with its expert and experienced staff to all markets in terms of procurement and logistics. Regarding procurement aspect, initially the domestic and foreign procurements – domestic ones are prioritized- are conducted in a way that best fulfill our customer's demands and thereafter the service is completed with customs & monitoring.

Defence Turkey: In addition to the activities you conduct in the commercial arena, you are developing many products and solutions for the utilization of various armies of the world in the military realm. What would you like to say on your areas of activity, capabilities and products?

Regarding the military arena, our main expertise is in textiles, and in addition to the uniforms and sports equipment of the armies and troops, their outdoor accessories, vehicles and equipment to be used in the field, mobile installations and solutions, technical sophisticated products with advanced technology and various dry food demands we are exerting efforts to provide all logistic requirements that an army possibly requires in the shortest term possible with all the installation and services.

Defence Turkey: It is obvious that you are active in the regions

of international markets where the demand is more intensive rather than the domestic market in respect to the military arena. What are your assessments on the markets you are active in and on the programs you have been conducting?

The markets that we are active in are mostly the ones of African and Middle Eastern countries, and while we fulfill the demands of the countries and military troops of these regions, we also seize the opportunity to generate and implement innovative projects and different utilization alternatives that may cover the demands specific to the region. These activities and the experience that we acquire specific to these regions increases the service quality we are able to offer to our customers in the long run and also it gives us the opportunity to continuously renew and improve our product groups and execute innovative activities for our products.

Defence Turkey: Military Textiles is one of your competencies and within this scope, you are offering various solutions that you develop and produce particularly in many regions with urgent requirements for utilization by world armies. Could you briefly inform us on your structuring regarding the design and production processes and on the investments you made as part of the R&D stage?

We are closely following the developments in the defense sector at home and abroad. In this sense; we endeavor to offer services to military and police forces by rapidly analyzing their demands. When we receive an order, in line with the conditions



of the country, at times we need to guide our customers regarding the fabric options, the models to be used or the new activities acquired through R&D. Thanks to our knowledge and expertise, we strive to provide the most favorable product with the best balance of benefit/price or benefit/technology.

Defence Turkey: In respect to the ballistic solutions you offer which complement the Military Textile area, you also cover the requirements of the Military and Security forces. With which of your qualities do you think you stand out, considering all of your rivals? What are your comments on the innovative approaches and technologies that you put forth in this area?



In the current status of the world, various security problems are occurring in many regions and therefore there is a huge demand for ballistic products. So, as Grup Impeks, we have been working on ballistic products for the last four years and focusing more on our investments. Regarding the procurement of ballistic material, we are collaborating with partner companies which are most recognized in these areas, with great references, using the state – of – the – art – technology. We deliver the most suitable solutions to our end customer by combining one – to – one studies of our R&D department and the demands of our customers, then conducting the technical improvements and usage improvements which we deem appropriate. Currently we have a production facility project, the establishment of which is still underway. We will use this facility merely for the manufacturing of ballistic products. Within the scope of the facility's projection, we aim to transform our R&D department with our own test laboratory into a reference center in which international studies can be conducted. When the facility launches its services, the execution of R&D studies in parallel with production will be more indicative for us in respect to the type and size of the investment. The ballistic sector is our most prestigious product group which requires the latest innovation and continuous and reliable services in technology and R&D aspects.

Defence Turkey: You offer various solutions in the area of convenient food and dry food for use by the military. What are the differences between the military convenient and dry food and regular ones? Which type of products do you develop in this area and moreover could you please inform us on your projections on the rate of increase of usage in this area in the world, as well as the requirements that may emerge in the upcoming period?

Regarding convenient and dry food, although it seems



completely different, considering that our main sector is military textile, actually our customer group is totally the same. Our activities on the uniform side, our services and our dreams are fully similar for our customers, but it is harder to change the habits in the food group. Although, the developments achieved in this area and the studies and



activities conducted are directly focused on service quality, as the technological developments adopted are not visual or tactual, habits can be limited merely with the traditional product group. Then again, with cost/benefit balance in mind, the dry legumes, powder food products and canned goods which are the classic product group always hold their place. Our actual aim is to bring our customers together with products containing more nutrition, with extended use; food product groups which are effective, easy to carry and store, available for recycling and innovative. These types of innovative product groups are currently being used in numerous developed markets and for various sectors. They will be compulsory for our market region and customer profile, more than a habit in the very near future. We are conducting the necessary preparations and trying to update the services that we can offer to meet these demands.

Defence Turkey: In the past, Grup Imeks didn't participate very often in national and international defense and security events. Yet, we observe that with the IDEF event that took place last year in Turkey, your company promotions are gradually increasing. In this context, are we able to see that you are gaining more exposure in the national and international activities with your innovative products and your wide market network?

We haven't conducted any marketing or promotion activities as a principle since our establishment. And today, we attend the events where our customers wish to see and meet us. Demands and requirements of our customers have always been our priority,

and they will also be indicative for us in the future.

Defence Turkey: You are going to attend one of Europe's greatest events –the Eurosatory exhibition which will take place in Paris this year. Which of your capabilities and solutions will you display at this event? What are your expectations from this event?

As Eurosatory 2016 is our very first European event experience, we believe that it will always remain an experience with which we will remember with excitement. We hope this excitement will have positive reflections on our sector, in which we strive to develop and improve by creating new solutions, and also for our company and customers as well as the potential groups for receiving our services. Our priority and excitement is mainly focused on our products in ballistic groups, yet our textile group which carried our company to its current stance will remain as the apple of our eye.

Defence Turkey: Lastly, is there any message that you would like to convey to the readers of Defence Turkey Magazine?

Our company will be happy to offer its high quality services to our existing and potential customers in the military and defense industry sector, textile and uniforms group, from technical textiles to mobile field solutions, from traditional and innovative food supplies to turnkey mobile and fixed construction and energy projects, vehicle, equipment and spare parts to be used in the field and internationally to infrastructure solutions and finally in installation, operation, logistics and transportation. The development and growth of our sector and each investment made to this end will be a source of pride for us on behalf of our customers. ■

MİLLİ ÇÖZÜMLER, GÜVENİLİR KORUMA



- Kurumsal Destek Hizmetler,
- Güvenlik Operasyonları Merkezi (SOC/ CDC),
- Siber Güvenlik Laboratuvarı,
- Ar-Ge ve Ürün Geliştirme,
- Eğitim Merkezi

Three Major Strategic Facility Investments by TÜBİTAK-Sage and Uzay – Charging Forward in the Race to Create High Value Added Products for the World

TÜBİTAK Uzay Optical Systems Research and Implementation Laboratory's (OPMER) ground-breaking ceremony and opening ceremonies for TÜBİTAK Sage Advanced Integration Technologies, Mobile Flight Infrastructure (MFI) and Remote Test Monitoring Infrastructure were held with the participation of the Minister of Science, Industry and Technology, Mr. Fikri Işık, the Minister of National Defense İsmet Yılmaz, TÜBİTAK President Prof. A. Arif Ergin and numerous invitees.

In his speech at the ceremony, the Minister of Science, Industry and Technology, Mr. Fikri Işık noted that within the scope of the advanced integration technologies established at the TÜBİTAK Sage campus; critical activities such as laminated production, perforation, tempering, 3 dimensional laser cut, laser welding, coating and brazing would be conducted and added that the rapid, high-quality and indigenous production of high pressure tanks and missiles' fuel tanks would be accomplished while missile trunks and high – strength steels could also be welded at once and in high quality.



Işık drew attention to the fact that two main functions could be executed with the help of the Mobile Flight Test Infrastructure and said, "Firstly, through telemetry system, real time data will be collected from flying ammunition and these data will be used for improving the design of that ammunition. The second function of this infrastructure -the flight termination system- will be terminating the flight of ammunition launched from orbit without giving harm to the environment. With the investments we will make throughout this

Project, all the tests - from the initial flight stage to the end product - of all the national ammunition fulfilling the requirement of 'Long Range Missile' and 'Multiple Target Tracing' will be executed in Turkey through domestic resources".

"We no longer leave our destiny in the hands of other countries"

Extending information on the soon to be established TÜBİTAK Uzay Optical Systems Center, Işık stated that the optical systems are a high value added area, such as is the case with energy, defense, space and medicine. Işık pointed out that Turkey was limited in infrastructure and qualified human resources aspects in this area and expressed that almost all the lenses, prisms and mirrors used in the imaging systems currently being developed in the country were being imported. Işık also stated that certain difficulties arose in the procurement of these products from time to time and continued, "A few days ago, the missiles of Roketsan installed into our unmanned air vehicle Bayraktar



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fired to the target which was 8 kilometers away with hundred percent precision. In the past, let alone the ones with destructive power, they did not even agree to sell the UAVs for observation purposes to Turkey. So what did we do? Firstly, we developed our unmanned air vehicles and now we have gained capability to fire missiles from these UAVs. We are no longer leaving our destiny in the hands of other countries. With the Optical Systems Center, we are aiming to accumulate know-how on the optical components, and nationalize the infrastructure and workforce. In this way, we will be able to develop the optical products we utilized in the indigenous projects through domestic facilities, and we will support Turkish industry's leap in the optical products with high added value".

Fikri Işık emphasized that they attach great importance to areas such as optics, space, aviation, biotechnology, medicine, advance material and nanotechnology, expressing that they will be conducting activities based on products that will advance the country forward, gaining high technology products in such areas while they would focus on the sector's acquisition of R&D and production skills in these critical technologies.

"Our defense industry transformed into a national structure"

Minister Işık drew the attention of the audience to the changes Turkey has undergone in the last 14 years, stating that great change and

developments were accomplished in all areas. Işık informed that in 2002, a defense industry with 80 percent foreign dependence in the monopoly of international weapon companies existed, today 60 percent of the defense requirements were being fulfilled through indigenous production. Işık mentioned the advantages of the studies and activities conducted in defense industry and noted that the level of imports was reduced with the fulfillment of army's and security forces' demands through indigenous production. Işık stressed that the burden caused by importation was gradually reduced with the help of the domestic projects and stated that the utilization of national technologies increased the deterrent force of the army.

Minister Işık pointed out that two Turkish Companies existed among the list of the World's 100 greatest defense companies and continued, "With the participation of more than a thousand companies, SMEs, research institutes and universities, today our defense industry has a national structure. If the period between 2002 – 2015 is taken into consideration, the number of projects conducted increased from 66 to 416, the total amount of the managed projects increased from \$ 5 billion to \$ 31 billion, the defense industry sector's turnover increased from 1 billion US\$ to 5 billion US\$, and finally the defense and aerospace exports increased to \$1.6 billion from \$ 250 million. Currently our defense industry is spending \$ 1 billion annually for R&D expenses, and this falls to 15 percent of our total R&D

expenditure". Işık also mentioned the Internet of things and pointed out the need to increase the talks between the institutions. Işık stated that they have been conducting very serious studies regarding security technologies and emphasized the need of shortening project durations.

İsmet Yılmaz: "We will not leave space alone"

Regarding the studies and activities on the defense industry, Minister of National Defence İsmet Yılmaz said, "Within the scope of national mobilization we will exist on the land, on the seas and in the sky, and also we will not leave space empty".

In his remark at the groundbreaking ceremony of TÜBİTAK- Uzay Optical Systems Research and Implementation Laboratory (OPMER) and opening ceremonies of the TÜBİTAK-Sage- Advanced Integration Technologies, Mobile Flight Infrastructure, Minister Yılmaz stated that they were satisfied with the achievements and endeavors of TÜBİTAK- Sage and underlined that the production of the SOM missile was alone a good reason for this satisfaction.

Yılmaz emphasized that the most important public service was security and continued, "If you cannot establish security, you cannot provide healthcare services, you cannot furnish the right for education, you cannot bestow the right of freedom of speech, nor grant freedom of religion. Security services are the essential precursor to all public services. We need security in order to fully exercise all of our rights".

Yılmaz mentioned that TÜBİTAK was working night and day in order to maximize the security services and added, "As part of the national mobilization, we will leave our mark on the land, on the seas and in the sky and we will not leave space empty. We launched the Göktürk-2 Satellite. Göktürk-1's tests are being conducted at TAI. From now on, both TÜBİTAK- Uzay and TAI will be used for satellites to be utilized either for communication or for intelligence purposes. Two



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of them will cooperate hand in hand. We trust our institutions, our companies and Turkey's future because we trust our citizens".

Yılmaz underlined the decrease in Turkey's foreign dependency and made the following assessment:

"If we follow this path, we have a target of rendering Turkey one of the ten greatest economies in the world. For this, we need to reach our export target of 500 billion US\$. It is not easy at all, but we can achieve it if we believe in it. If we could produce high value added products based on know-how, for example, if we export the "Atak" Helicopter, a product valued at \$1.5 per kilogram, instead we would gain thousands of US\$ per kilogram if we build a satellite similar to Göktürk-2 satellite, then we will gain 200 thousand US\$ per kilogram, if we produce and export gallium nitrate based chip then it will be 10 thousand US\$ per kilogram. If we produce and export such products with high added value, without a doubt we will reach the export target of \$ 500 billion and then we will become one of the ten greatest economies of the world. Turkey is now manufacturing its own helicopters, training aircrafts and unmanned air vehicles. We can build whatever Turkey requires. What do they ask for? They ask for a certain amount of time. Because regardless of how hard you work, in the defense industry it is not possible to produce a product

within a few days. A certain amount of time is essential, say 3 years, 5 years or 10 years. Some of these durations may seem too late for us, but they will be quite early for our children. Therefore, there is no time to stop and wait, we will work, and we will work harder. We will work to compensate the times we have lost in the past".

Studies to be conducted in the laboratories

Scientific And Technological Research Council of Turkey (TÜBİTAK) President Arif Ergin stated that as the institution, they were happy to realize the projects for the development of the platforms and systems which will gain the country technologic superiority.

Ergin underlined that in order to reach its targets, Turkey has to attain the technology base required in nanotechnology areas and social sciences, material, aviation and space, information and communication, defense technologies including biotechnology while gaining a systematic dimension to the technology acquisition studies. Ergin stated that the adoption of a product based technology management understanding and conducting studies to this end are also required for reaching the targets.

Ergin mentioned that within the

body of TÜBİTAK-Uzay, activities for the passage into domestic production will be accomplished and an Optical Systems Research and Implementation Laboratory sufficiently qualified to contribute to the sector will be established. Ergin also said that activities such as the structural forming of large scaled optical components required by satellites, astronomy and critical systems, optical features, adding optical features, surface treatment, functional coating, integration of tests, analysis and systems will be conducted at the laboratory.

Ergin expressed that upon the completion of the TÜBİTAK-Uzay Optical Systems Research and Implementation Laboratory, important achievements planned will be reached, such as projects regarding the development of high resolution satellite cameras, domestic astronomic telescopic systems, high powered laser optics and airspace warning system optics.

Following the speeches, Minister Işık and Minister of National Defense İsmet Yılmaz and Undersecretary for Defense Industries İsmail Demir pushed the button and laid the foundation of the laboratory. Later, Minister of Science, Industry and Technology Fikri Işık, Minister of National Defense İsmet Yılmaz, TÜBİTAK President Prof. A. Arif Ergin and the accompanying delegation realized the opening of the TÜBİTAK-Sage Advanced Integration Technologies, Mobile Flight Test Infrastructure and Remote Test Monitoring Infrastructure.

Defense Industries Research and Development Institute (Sage) is an affiliate of The Scientific and Technical Research Council of Turkey (TUBITAK). The main function of TUBITAK-Sage (Defense Industries Research and Development Institute) is to perform research and development activities for defense systems including engineering and prototype production, starting with their fundamental research and conceptual design. Most of the projects are performed in coordination with related defense institutions.



Mr. A. Arif Ergin, TÜBİTAK President

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Havelsan's Cyber Defense Technology Center - Hastening the Development of Products with Indigenous Technology

Havelsan's Cyber Defense Technology Center (SİSATEM) was opened with an official ceremony on March 23, 2016. Havelsan, aiming to become a center of excellence of Turkey, has reached another milestone through this inauguration. The Minister of Transport, Maritime Affairs, Mr. Binali Yıldırım, Minister of National Defense Mr. İsmet Yılmaz, Undersecretary for Defense Industries Prof. İsmail Demir, Senior Executives of Havelsan and many military and defense representatives attended the opening ceremony of the Cyber Defense Technology Center (SİSATEM) located at the Central Premises of Havelsan.

In his opening remark at the ceremony, Havelsan's Chairman of the Executive Board Mr. Yüksel Öztekin stated that the countries' perception of threats towards their security changed transiently and continued, "Today, many countries are exposed to cyber threats capable of collapsing all the systems of a country in addition to the casualties caused by conventional weaponry. With the help of the intense cooperation of our foundation companies and institutions, today we are launching this center bearing vital importance for our country's security. We will continue to make significant investments such as this center in the upcoming period for fulfilling the requirements of our country. We initiated the activities for the establishment of an Urban Warfare Training Center. We aim to introduce a well-equipped simulation center for the urban warfare training to the service of our armed forces. We are conducting our studies at full steam".



Havelsan General Manager and CEO Mr. Ahmet Hamdi Atalay underlined that the scope of cyber security has expanded and became more complicated, adding that technology, human resources and applications were the three main components of cyber security. Atalay continued, "Nowadays, cyber security is of

critical importance for countries. According to the analysis of the cyber security unit, considering the size of its destructive effects, strategic cyber warfare followed nuclear war. The entire world is reinforcing and reorganizing armed forces in accordance with the scope of cyber threats now. According to the data of 2005, the financial dimension of cyber threats exceeded \$500 billion and Turkey unfortunately is one of the countries most affected by cyber-attacks. Our country takes part in the top ten in all statistics in this regard. We are ranked ninth in cyber-crimes and third in cyber-attacks in the world ranking. At this point, I would like to strike this issue. Systematic cyber-attacks to foreign countries are conducted by hackers and illegal organizations over slave computers in Turkey. And as these crimes are carried out via the devices with IP addresses in Turkey, a false perception that Turkey assumed an active role in cyber threats emerges. As a result, as you appear to be at the side of the attacking party, then naturally you are exposed to the counter attacks".



Mr. Yüksel Öztekin, Chairman of the Board of Havelsan

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*Mr. Ahmet Hamdi Atalay:
“97% of Cyber Security
products are procured
from foreign countries.”*

Stating that the size of the cyber security market in Turkey reached \$ 300 million, Atalay added that Turkey was importing products in order to cover its cyber security gap and underlined that the foreign companies presently dominated 97% of the Turkish market. Atalay continued, “When we analyze the breakdown of these products, we see that 55% of the products are imported from Israel and 35% is composed of products with American origin. Here, we need to stress this point. Turkey now has to reveal indigenous products. It is not possible to guarantee cyber security by importing products from foreign countries. The sectors we refer to as critical infrastructure such as energy, transportation, communication and finance, must adopt absolute indigenous solutions. As a company generating software based technological solutions, we aim to focus on more specific areas by raising this capability to prominence through this center. We possess an extensive perspective regarding cyber security from training facilities to national security. We plan to initiate an important project for the security of the pipelines of BOTAŞ with Aselsan within this context soon”.

Atalay underlined that Havelsan’s embedded cyber security functions were being used in many products under service and continued, “As Havelsan we are amending our concept. We are exerting utmost efforts to transform these products into separate products instead of embedded ones. With the products we will have as a result of these efforts, we are willing to cater to the requirements of all the institutions and associations”.

Atalay conveyed that the Cyber Security Center was actualized in accordance with the guidance and strategies of the Turkish Armed Forces Foundation and the Undersecretariat for

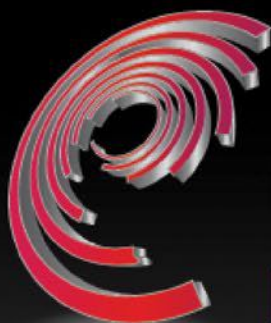


Mr. Ahmet Hamdi Atalay, General Manager
& CEO of Havelsan

Defense Industries, adding that numerous precedent products would be naturalized through a multi-functional R&D center. Atalay said, “We are conducting studies to build an indigenous attack detection system which is imported from foreign countries. Moreover, we are developing cloud technologies expected to boom in the upcoming period through national resources again at this center. We are establishing firewalls for web applications. Besides, we are also executing activities on the technology launched as the new generation firewall. Meanwhile, the secure communication issue has become crucial recently. A communication technology which allows correspondence requiring special security is among the projects we have been developing as well”.

Mentioning that the Cyber Security Center would also be functioning as a test and verification center Atalay continued: “Is there any harmful code or a backdoor within a procured product? Are there any security flaws? We will be able to examine these aforementioned issues at this center. Additionally, we will be carrying out the expert training required by the institutions again in this center. We attach great importance to training. Statistically, currently there is a 1.5 million cyber security expert deficiency in the world. Turkey needs to employ at least 15 thousand cyber security experts under current conditions. Yet, it is quite difficult to achieve this with the existing systems and resources. Besides, training a cyber-security expert is not an easy task. Therefore, we need to efficiently utilize the existing staff. We will be training qualified experts for the institutions in this center while establishing a structure in which the institutions feel secure without employing any additional experts through the services we will offer. Our functions such as incident monitoring and intervention will serve the institutions at our operation center. I would like to

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draw attention to another ongoing study. Currently, we are searching for the experts and researchers all over the world and working on ways of including the competent names to our eco-system. We will be hosting 70 scientists that we identified, in Ankara soon, and we will be assessing the contributions we will be making together.”

Minister of National Defense Mr. İsmet Yılmaz: “The Cyber Security Instruments will be produced indigenously with the help of SISATEM”

Minister of National Defense wished SISATEM a bright future both for Havelsan and Turkey and said, “We will be generating indigenous solutions, conducting training, offering protection services, developing national software and thus enabling the emergence of a cyber-awareness in Turkey. The traditional warfare conducted on land, at sea or in the air is being replaced by cyber wars and space wars. I especially brought this discussion to the agenda at the NATO meeting and emphasized that the cyber-attack should also be considered as a motive for war. Cyber wars are causing more damage to dozens of countries each day, more than the damages caused by nuclear war. Therefore, I believe that it is more dangerous and harmful than the nuclear war. The attacks are made through cheap and less

risky instruments and thus the same damage caused by nuclear war could be created through cyber-attacks nowadays. Without doubt Turkey required such a facility. I hope that Turkey would not only use this center for its own security purposes but also for it to be open to the idea of helping each country in the Balkans, Middle East and Caucasasia, those demanding its expertise in this area. The cyber technologies center of Turkey will assume an important mission for training the required human resources in this area and it will help the country to become a worldwide brand”.

Mr. Binali Yıldırım, Minister of Transport, Maritime Affairs and Communications announced that according to their estimations, approximately 2 million slave computers existed in the world presently and added, “We do not know yet how much of this figure exists in our country but we have to rapidly generate indigenous hardware and software in order to increase the cyber-security and respond to the attacks”. Yıldırım reminded the participants that they established the National Cyber Security Center (USOM) in 2013 and stated that the staff at the center monitored the worldwide traffic 7/24 and closely tracked each development that may create a cyber-threat instantly. Yıldırım expressed that starting from 2012 up until now, Turkey accomplished three cyber security operations at the national

level and one in international level and added that as the USOM center they detected nearly 20 thousand threats and over 300 harmful software.

Following the speeches, Minister of National Defense Mr. İsmet Yılmaz and Minister of Transport, Maritime Affairs and Communications, Mr. Binali Yıldırım and the accompanying delegation closely examined the studies and activities conducted at the center.

SISATEM Cyber Security Center

Within the scope of the Cyber Security Technology Center, as an extension of the technology and know-how developed by Havelsan for many years, Technology and Product Development, Test – Analysis and Simulation, Manageable Security Services, Institutional Support Services and Training Services will be offered.

The objective of the center is to hasten the development of products with indigenous technology in order to abolish foreign dependency on technologies developed in cyber security and the license obligations. In addition, at the Cyber Defense Center, in the most dynamic unit of SISATEM, the teams will be on task 24/7, performing counter-measure functions to thwart cyber-attacks.

Cyber Defense Center is equipped with the capabilities that could register all the attacks towards a system, classify them and eventually react after an evaluation. This Cyber Defence Center is composed of the following functions: Cyber-attack early warning, cyber threat intelligence, cyber-attack detection, cyber-attack analysis and response to cyber incidents.

There is also a training center in which operations and training will be conducted with the test and analysis laboratories within the body of SISATEM. Institutional support service will be offered to the comprehensive institutions by SISATEM.



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“What Do You Mean: A Foundation Company?” Remembering the Early Days of Turkish Ground Forces Foundation and Aselsan



By Kaya Yazgan

At these pages of Defence Turkey, I try to write on issues of science and technology and share my observations in the defence industry. I had started to write on a similar subject when was shocked by the news about passing away of my dear friend, my big brother Necip Berkman (past General Manager of Aselsan and STM, past General Secretary of SaSaD – Defence and Aerospace Industries Manufacturers Association). I remembered our venture at first years of Aselsan/Turkish Ground Forces Foundation and suddenly realized that we must write about the atmosphere of defence industry in mid-70's, a period which is very important in the history of Turkish defence industry. Ret. Gen. Turhan Olcaytu was the Chairman of Turkish Ground Forces Foundation; Mr. Hacim Kamoy the General Manager of Aselsan and we were a handful of young engineers, all graduates of Middle East Technical University. In this issue of Defence Turkey, I say “verba volant, scripta manent - spoken words fly away, written words remain” and try to describe this atmosphere.

40 years ago, the defence industry in Turkey was very different from today's scene. Defence industry consisted of a government owned arsenal type of weapon/ammunition producer, MKEK and some naval shipyards. United States was the dominant source for high technology products such as communication, electronic warfare equipment, radars, tanks and rockets/missiles etc. Then came the Cyprus affair in 1974 with resulting embargo on various technologies/components/equipment. On the other hand military operations in Cyprus proved the importance of a reliable communication and triggered developments in Turkish defence sector.

Turkish Ground Forces Foundation was established in 1974 to provide financial source and a company (Aselsan) was established to design and produce military electronic equipment. (Later on Turkish Ground Forces Foundation united with foundations established for other

forces forming Turkish Armed Forces Foundation of today. The number of “foundation” companies increased to include TAI, Havelsan, Roketsan... About 10 years later we witnessed another milestone in Turkish defence industry with the establishment of Undersecretary of Defence Industry-SSM which led to much wider spread of the industry. But these are not in the period I try to articulate here.)

If we return to mid-70's the major financial source of Turkish Ground Forces Foundation was donations from ordinary people. Our foreign colleagues frequently asked about this interesting foundation. In many countries we are familiar with some charity foundations supported by public donations. But it was really difficult to understand the reason for donations from common people to establish a company in defence industry.

To understand the foundation concept first we must glance its cultural roots. We can see a modest foundation for a midsize mosque in a small Anatolian town. In addition to the mosque, the foundation owns a few shops. The income from shops is used for current costs and maintenance of the mosque. Hence with this self-sustained structure mosques have served the community for centuries.

Secondly we must review the public psychology in mid-70's in Turkey after the Cyprus affair and embargo. I can mention a few cases we witnessed:

- As Aselsan managers we used to cooperate very closely with experts in Foundation and passed most of our time in their flat. One day I noticed a small needy boy in the corridor. When I asked who he was, they replied, “He is a street peddler of simit. Each weekend he comes and donates a few TL which is a portion of his week's income”. I remember kissing his cheeks with tears in my eyes.
- Similarly I remember meeting a farmer. He came with some maps and two sons. Showed agricultural land he owned on a map and said “I have two sons. I want to divide my land into three equal parcels and give one to

Foundation.” Today the incident seems very super natural. But we set around a table, worked on the map and tried to divide the land into three equal shares.

- A frequent visitor of Foundation used to bring some biscuits and chocolates every time. When I thanked him and expressed that I was a bit shamed because of this gratis behaviour, my colloquies told “This is nothing. He provided baklava to all sailors in landing ships preparing for landing to Northern shores of Cyprus.”
 - The other aspect of the same phenomenon was prevailing at Aselsan. We were under a heavy embargo pressure for a number of electronic components. Many foreign companies were not answering our messages and telephone calls. The list of embargo items was very long and detailed. But many companies exaggerated even this long list. The following examples will clarify what I mean by “exaggeration”:
 - According to the technical specifications of man-pack military radios, the fabric bag of the radio should be infra-red repellent. For the first production batch of radios we imported cotton from Egypt; sent to a company in Europe which produced and painted thread with infrared-repellent paint; we imported the thread and gave it to a bag manufacturer in Ankara.
 - Because of “military” in our name (in those years Aselsan logo was accompanied with label: “Askeri Elektronik - Military Electronics”) we had difficulty to import common electronic laboratory equipment such as oscilloscopes, frequency counters etc.
 - In our machine shop we had to produce our screws-nuts, punch and corrugate aluminium sheets. The first investment casted steel part in Turkey was produced for us.
- I don't wish anybody to experience such difficulties from now on, but I flashback and utter the opening lines of A Tale of Two Cities by Charles Dickens:
- “It was the best of times, it was the worst of times, ... it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us ...”

First Steel Cut for Turkish LHD L-400 “Anadolu” – Magnificent Vessel, Pride of the Turkish Naval Forces

The first steel cut for the Multi-Purpose Amphibious Assault Ship TCG “Anadolu” was accomplished on April 30th, 2016 with the participation of President Recep Tayyip Erdoğan.

In addition to President Recep Tayyip Erdoğan, Turkish Parliamentary Speaker İsmail Kahraman, Minister of National Defence İsmet Yılmaz, Minister of Transportation, Maritime Affairs and Communication Binali Yıldırım, Minister of Youth and Sports Çağatay Kılıç, Minister of Labor and Social Security Süleyman Soylu, Commander of Turkish Armed Forces Hulusi Akar, Commander of Naval Forces Full Admiral Bülent Bostanoğlu and many invitees attended the ceremony held at the Sedef Shipyard's campus in Istanbul.

President Erdoğan addressed the participants at the ceremony and said, “I would like to thank everyone who will contribute to the manufacturing of this ship to which fighter jets such as the F-35, capable of vertical take – off and landing, could be deployed. This ship, on which even the greatest and heaviest helicopters could land and take-off from, will allow us to conduct military and humanitarian operations all over the world when required. The strengthened and developed Turkey has to make its presence felt actively across its borders. I regard this step as a late one in this era in which the threats towards our country are growing while we are obliged to become more present in the international area. This nation has to take matters into their own hands. We have to accelerate the preparations suitable for our country's new position in respect to threats and opportunities while we sensitively follow the existing projects in defense industry”.

Commander of the Naval Forces Full Admiral Bülent Bostanoğlu stated that they gathered to realize the dream which they have been enthusiastically expecting for a



long time and continued, “With the construction to be initiated soon, the very first step on the path to the realization of a dream will be taken. “ANADOLU” which will become the greatest assault ship of the Republic's Navy will not only bring to fruition the dreams of the Turkish Naval Forces, but also the dreams of the entire Turkish Nation. As known, battle ships are not merely considered as an indicator of military power. They are also the symbols of prestige, displaying all the national power components of a state. Therefore the navies have been regarded as an active foreign policy instrument since the peace era by all governments. Currently, with its medium-scaled force transfer capability and land impact capacity, our Naval Forces are amongst the first fifteen naval forces in 162 naval forces existing in the world. It is obvious that the Turkish Naval Forces will advance in this ranking with the launch of this glorious platform after the 2020s”.

Full Admiral Bostanoğlu stated that the ship was named “Anadolu” as it will be keeping the Turkish flag flying with honor by carrying it to all seas and representing the magnificence of the country's land. It will be gaining many new capabilities to our Naval Forces with its dock and flight deck and he added, “With this platform which is planned to be put into service in 2021, our army will be able to transfer its forces to any place in the world, it will be able to perform

operations at overseas geographies for long periods without requiring the support of a main base, it will be able to deploy 1 naval infantry battalion within the scope of an Amphibious Operation, it will be able to perform Ship-to-Shore Maneuver with the landing vehicles it will carry on its well deck, and conduct Ship-to-Target Maneuvers with the help of the transport and attack helicopters that it will deploy. It will be able to assume the role of an aircraft carrier with the F-35B strike fighters capable of “Short Take-Off and Vertical Landing”, it will be able to conduct the task of NATO High Readiness Force Naval Headquarters, which is currently executed by a limited number of NATO member countries. It will be able to act as a Hospital Ship when necessary and will have the capabilities to strongly support diplomacy with its active function in non-combatant operations; primarily with the Evacuation of Non-Combatants and Natural Disaster Aid.”

Photos were taken and the first steel cut and breeding of the ship was conducted following the speeches.

LPD platform transformed into LHD through design modifications

The Multi-Purpose Amphibious Assault Ship (LPD) Project on the procurement of 1 Multi-Purpose Amphibious Assault Ship (LHD),

4 Landing Crafts Mechanized, 2 Landing Craft Vehicles for Personnel, 2 rigid hull inflatable boats (RHIB) and 1 commander boat for guidance was signed on June 1st, 2015 by the Undersecretariat for Defense Industries and Sedef Gemi İnşaat A.Ş. and the contract entered into effect on September 18th, 2015.

During the contract negotiations that started after Navantia – Sedef Shipyard partnership won the tender, the ship was initially identified as an LPD but the Naval Forces requested certain design modifications over the ship in order to fulfill the operation requirements. With the ongoing and completed modifications, the ship was transformed into an LHD platform from an LPD platform and as part of the Defense Industry Executive Committee's resolution dated March 9th, 2016, the decision was made to designate the ship as an LHD.

A flight deck allowing the landing of more helicopters was formed with the retrofits conducted in the configuration. On the other hand, though it was not stipulated in the contract, a "Ski-Jump" inclined 12 degrees enabling the landing and take-off of the aircrafts was included in the contract as well. An elevator was added to the bow and an electronic infrastructure supporting the approach of air vehicles to the ship was included into the contract as well.

Turkey can become a Base in the Open Seas with TCG "Anadolu"

Multi – Purpose Amphibious Assault Ship - "Landing Helicopter Deck" (LHD) can be utilized in the operation areas at the Aegean, Black Sea and Mediterranean and if required at the Indian Ocean (north of the Arabian Peninsula and west of India) and at the Atlantic Ocean (west of Europe, northwest of Africa). TCG "Anadolu" will be able to deploy a single Amphibious Battalion and all the required combat and supporting equipment to the crises regions without the support of a main base, join landing operations with the landing equipment which is carried at its pool. It will have a flight deck allowing the night and day operation of air vehicles such as rotor V-22 Osprey and, the bulkiest



The Commander of Turkish Naval Forces
Admiral Bülent Bostanoğlu

of NATO helicopters in the inventory. Moreover, Turkey aims to convert its regional force deployment capability into a medium – scaled global force deployment with the TCG Anadolu; due to the 12 degrees inclined ski-jump the ship allows the positioning of tactical aircrafts capable of vertical take-off and landing, such as the F-35B which Turkey aims to procure in the upcoming term and which is already included in the inventory of NATO member countries.

Promising a superior air force it the operation areas in the Open Seas, L-400 bow numbered TCG "Anadolu"s air vehicle capacity has been recently updated. According to the modifications displayed over the mock-up at the International Naval Force and Security Symposium held on April 13th, 2016, by the Naval Military Academy; six F-35Bs, 4 Atak helicopters, 8 Medium Transport Helicopters, 2 Seahawk general purpose helicopters and 2 UAVs could be positioned. The Amphibious capacity of the ship is composed of 13 Altay Main Battle Tanks, 27 ZAHA (Armored Amphibious Assault Vehicles), 6 Armored Personnel Carriers and 48 miscellaneous vehicles of various classes. Furthermore, on-board will be equipped with 5x25 mm Aselsan STOP, 2 x Mk – 15 Block 1B Baseline 2 Phalanx CIWS and 1 x RIM-1169 Block 2 RAM CIWS weapon systems.

GENESIS ADVENT Combat Management System will be used on TCG "Anadolu"

With the help of the Multi – Purpose Amphibious Assault Ship GENESIS ADVENT Combat Management System, the control of the weapon and sensors and the ship will be defended while

the task force command control and amphibious operation support are provided. The Land Forces, Air Forces and Amphibious Troop Command Control Systems, NATO War Headquarters will be positioned on the ship according to the task prior to the operation. In addition to the Combat Management System network, TSK-Net, Internet, NATO network, Message Operation System and Ship Administration local networks will exist within the Ship Information Systems infrastructure. The TCG Anadolu will have a dispensary/hospital with a 30 bed capacity with a surgery room, x-ray machines, dental care units, intensive care rooms, infection rooms and act as a Hospital Ship in humanitarian aid operations as well.

TCG "Anadolu" to be included in the inventory in 2021

The Spanish Company, Navantia, will provide the design support within the scope of the project and the design, building and system integration, performance and delivery of the ship will be executed by Sedef Shipyard. On the other hand, regarding the system and sub-system procurement; many systems and sub-systems will be conducted indigenously by domestic sub-contractor companies. In parallel with the aforementioned, systems such as the Combat Management System Integration and Operation Software Genesis – Advent, Electronic Warfare Suite containing Radar Electronic Attack and Counter Measures, Infrared Tracking System, Electro Optic Director, Torpedo Counter Deception Systems are aimed to be indigenously covered by the Aselsan – Havelsan Business Partnership.

The Multi – Purpose Amphibious Assault Ship TCG Anadolu is planned to be built in with a weight of 27,436 tons in fully loaded displacement and it will be 231 meters long. As the greatest naval platform in the Turkish Armed Forces inventory, the ship is planned to be delivered to the Turkish Naval Forces Command in 2021. Moreover, the activities for the procurement of a second ship, in the same class, is said to have been conducted within the context of the demands of the Turkish Naval Forces for the upcoming period.

STM Announced the Report on Public Security and Emergency Communication Systems

The Scope of Indigenous and Secure Communication System Expanding

STM announced the sector report it prepared on the public security and emergency communication systems in Turkey. According to the report, the systems, relating to a wide range of areas from security to health, developed by the domestic players, are becoming progressively widespread. The increase in the popularity of secure communication systems developed by domestic manufacturers in Turkey was underlined in the report as well.

“Communication Technologies are coming into the forefront as the prerequisite of rapid, effective, integrated and efficient execution of services conducted by law enforcement such as the police and gendarmerie, fire department, ambulance, search and rescue teams in order to maintain public security and emergency aid. In this report; the existing status of the communication systems which could also be named as mission critical in the world and in our country were examined” said General Manager of STM, Mr. Davut Yılmaz.

A New System is being established for Public Security

According to the report, the Ministry of Transportation, Maritime Affairs and Communication were assigned to fulfill the establishment of the Public Security and Emergency Communication System, and it was stated that new frequencies were allocated in the aftermath for both; sound and narrow band data communication and wide band communication systems by the Information and Communication Technologies Institution (BTK). The procurement of the new system's infrastructure



Mr. Davut Yılmaz, General Manager of STM

will be covered by the Ministry of National Defense and the Undersecretariat for Defense Industries.

As per the evaluations made in the report, the APCO-25 narrow band digital communication system, developed by Aselsan, is currently one of the most popular systems utilized in Turkey. The Gendarmerie General Command is utilizing this system in 50 cities in Turkey. This system is also available for the utilization of the Provincial Health Directorates and has reached 63 percent geographically while covering the 78 percent of the population. 18 additional cities will be included in the system within two years. The Coast Guard Command is also using the same technology covering all the coastal strips. The Digital Mobile Radio (DMR) system, enabling the crypto communication within law enforcement, is currently used in 15 cities. DMR will be established

in seven more cities within the next two years.

The Public Systems will possibly Endure Problems in Emergency Cases

In STM's report, the issues that may arise in public systems were examined under a separate title. According to the assessments made, by taking into account the criteria of the TETRA Critical Communications Association (TCCA), founded for the promotion of TETRA also known as the digital radio standards, one of the most important concerns is the collapse of the public system and subsequent failure to render services during emergency cases. During such cases, the prioritization for the utilization of communication needs cannot be conducted in a rapid and desired manner and the individuals and institutions in need of such services cannot not

receive the required service. From the perspective of information security, the public services dependence on the operators that own them may not always be a solicited situation. On the other hand, the public services were not actually developed for critical mission implementations.

ULAK Project is important for public security

Evaluations made on wide band data services were mentioned in the report as well. According to these evaluations, certain difficulties may emerge during the passage to wide band data services. These difficulties may be summarized as the identification of additional spectrum requirement; clear determination of user demands and planned allocated mobile

data networks. Considering the capabilities that may be acquired as part of the wide band data services, namely the audio, conference, short message service, status messaging the following suggestions were made in the report, "With the ULAK Project conducted by the Undersecretariat for Defense Industries (SSM), the acquisition of 4.5G LTE Advanced Technologies and utilization of this capability initially in the communication systems for public security and emergency aid tasks are foreseen. In addition to these, the wide band service options that will be required regarding public security and emergency aid tasks should be evaluated in a detailed manner by the institutions which will use the services and the investments should be planned in this regard".

Turkey is more advantageous

The report underlined the fact that Turkey's status in respect to the wide band communication services was different than the USA and other countries and it was stated that user demands in Turkey were different than the users of other countries. It was also mentioned by the report that the system being newly utilized in Turkey in mobile communications, known as 4.5G, was more advantageous than the system utilized in the US in respect to the alignment with land conditions. It was also stressed in the report that in case where the communication systems for public security and emergency aid tasks are supported by different standards, a need for enabling the interoperability of these standards would arise.



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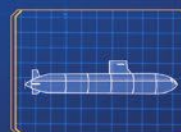
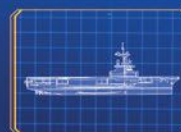
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One Company “Leonardo” A Conduit for Greater Efficiency, Effectiveness and Operational Flexibility

Mr. Lorenzo Mariani, Land & Naval Defense Electronics Managing Director, talks with Defence Turkey Magazine about how the company will improve its competitiveness in global markets and reinforce the position of subsidiaries; Leadership in technology and products is strengthened by being part of a single large international industrial group.

Leonardo is here. If you haven't already heard, Leonardo is the new name to know. The winds of change and opportunity have already given rise to the new name of Italian genius. Italy's leading manufacturer in the high technology sector, Leonardo-Finmeccanica (formerly Finmeccanica) has officially started using their new name, as of May 1, 2016. The process to immediately familiarize the world with the new brand name and to begin name change acclimatization will ensure that adequate time is given toward enabling continuity, specifically for relationships with foreign countries. The name Leonardo-Finmeccanica will be used until December 31, 2016, and with full rebranding as of January 1, 2017, it will then change to Leonardo.

Following the 'One Company' launch, January 1, 2016, Finmeccanica became a single company operating in aerospace, defense and security, and it is now organized into four sectors and seven divisions.

Sectors: Aeronautics, Electronics, Defense & Security Systems, Space, Helicopters.

Divisions: Aircraft, Security & Information Systems, Airborne & Space Systems, Defense Systems, Aerostructures, Land & Naval Defense Electronics, Helicopters. With the new governance and operating model, Leonardo-Finmeccanica has replaced the previous model of being a holding company of separately controlled businesses and consolidated its competitive position in the ever-



increasing complexity of the global aerospace, defense and security market.

Mr. Lorenzo Mariani, Land & Naval Defense Electronics Managing Director, Leonardo-Finmeccanica, (formerly part of Selex ES S.p.A., a Finmeccanica Company) recently met face to face with Defence Turkey Magazine: "We are One Company now, with very delegated authority – in my view, it has given a lot of capability to the divisions and now we have to deliver."

Mr. Mariani discussed the new integrated and customer oriented approach, pointing out how leadership in technology and products is strengthened by being part of a single large international industrial group.

End to end capability – Land and Naval Defense Electronics

Mr. Lorenzo Mariani's Land and Naval division includes all systems for all land applications, typical command and control radars for armies and navies, and they are proudly capable of delivering entire combat systems for ships – integrating their radars, electronics, communications and systems of third parties such as MBDA, for example.

Crucial Legacy in Turkey

Leonardo-Finmeccanica's position in Turkey is based on an important legacy. This is one case where the one company approach is very beneficial for the company, as they have an important historical presence in the country as provider partners of helicopters, communication equipment, electronics and radars. Previously, Finmeccanica under different divisions has been able to establish partnerships in the past and provide products for the full spectrum of the systems in their portfolio. Mr. Mariani said, "I think it is helping us a lot now that we have a one company approach. Let me give you an example. We have a company, Selex Turkey, which is well established in the country, and through Selex Turkey we provide software radio



capabilities and components (HF transmitter radio components) that are then sold to Aselsan. We are able to integrate with a unique approach benefiting the reference company in Turkey and the final customer, with the key technologies, to be delivered to a system integrator that is a local system integrator in Turkey."

Gradual Spin-off of Technology and Logistic Support to Reinforce Position of Subsidiaries

When asked about any plans to improve their position, to strengthen the presence in Turkey, perhaps through a reinvestment or plans for expansion, Mr. Mariani replied that "the key aspect is that first we have a key role in the subsidiary in terms of technologies, we are gradually making the company capable of providing a real interface on key technologies that are originally developed in Italy but then will be transferred completely to Turkish industry. This is the case with the HF transmitter, software radio components. We are going to do that acting through two different lines, one is the gradual

spin-off of the technology to Turkey. The second is via logistic support, because it is also that through logistic support that we will reinforce the position of our subsidiary in the country. With Aselsan, for example, a primary partner for Land and Naval and other divisions, we can have a direct relationship, a partnership in Turkey and abroad. Any products that we develop together with Turkish industry we also want to sell abroad first of all. Not just Turkey and Italy. We have some key products and systems targeting an integrated solution for third countries. We are trying to build on the solutions that have already been experienced and tested by Turkish industry, such as with ADIK shipyard – the SAS infrared search system, and also to build wider systems that can be proposed together with third countries. Currently there are some third countries with which we are cooperating."

Turkish Factory as a Point of Interface – not necessarily a hub for exports

Mr. Mariani clarified that he does not think the Turkish factory

will be designed as an export hub “we want to create a hub capability, a point to interface. I think when we deal together with third countries, it’s not so important for the model to have operations in Turkey, the important thing is that we agree with the Turkish partner regarding what we do and what they do and how we commercially interface with the customer.”

Cooperative Relationships in Turkey - Ready to Collaborate for 3rd Markets

“We decided to concentrate on 3 – 4 key technologies. The infrared search system SASS has been successfully accepted and now could be the basis for other opportunities. In the communication field, software radio, HF, is a key technology where Italy has invested a lot and we are eager to share some of these capabilities with Turkish industry and then use them in the Turkish market or export. We are ready to collaborate for third markets.” Leonardo-Finmeccanica is developing a full set of new products, as a result of new investments made by their domestic customer, namely the Navy. Mr. Mariani elaborated, “the entire fleet is being completely renewed and we are providing them with new communication systems, new radar technology, new infrared search and track,

and a new combat management system. We know that with many of these elements there is already a capability in Turkey and we know that there are many third countries that are looking to us to meet their needs. What we offer is to study joint solutions, joint approaches to markets based on what we are doing in Italy.”

Air Traffic Control – Strengthening ATC capabilities across Turkish airspace

Leonardo - Finmeccanica, through its Security & Information Systems Division, has delivered a new Air Traffic Control (ATC) system for Turkey and it has been brought into fully operational service. The system strengthens ATC capabilities across the entire national airspace. The ATC system’s introduction into service is a key milestone in Turkey’s SMART project (Systematic Modernization of ATM Resources Turkey), which is aimed at enhancing the country’s ATC infrastructure and services. This is the world’s first system to provide seamless air traffic control backup, transferring operations between the main center in Ankara and an auxiliary facility in Istanbul. Advanced functions are available in line with the European SESAR (Single European Sky ATM Research) project. Mr. Mariani said on the topic of Air Traffic Control

“Turkey has always been a target partner for us. This system, when we sold it in the last decade, has been a visionary approach, with a completely different architecture, that is fully compliant with new air traffic control rules; it was challenging to develop but now that it is in service we trust that it will be the best for Turkey, for all the people who fly and the best for us. We are pleased to be able to mention such an important reference.”

The new name, Leonardo is Recognizable – Emulating the Venerable Leonardo da Vinci - Reflecting Innovation, Creativity and Technology

Mr. Mariani provided some insight regarding the company name change that has now been approved by the board of directors and shareholders. He said that the previous name Finmeccanica was derived from the meaning in Italian of Financial and Mechanical, which are two aspects that are not currently at the company’s core. “Leonardo is technology, products, Italian genius, that’s the message that we would like to convey, and to this the name Leonardo is taken from Leonardo da Vinci, which reminds us of the importance of technology, invention, the inventing of new products and systems.”

Capitalizing on the Turkish Market

Leonardo - Finmeccanica is poised and positioned to maintain its efforts in 2016 to keep its business healthy, in order to ensure the continued development of its core activities and related performance. Mr. Mariani candidly shared with Defence Turkey Magazine that “it is always good to exploit collaborations where an important legacy exists. It is really important to continue to be present together in this market and in the related markets in Italy and Turkey. I think we will continue on this track.”



Mrs. Ayşe Akalin Evers, Editor in Chief of Defence Turkey Magazine met with Mr. Lorenzo Mariani, Land & Naval Defense Electronics Managing Director of Leonardo-Finmeccanica at DIMDEX 2016

Hexagon Studio: Indigenous Solutions for Transportation and Defense Industry

Hexagon Studio was established in 2006 with the vision of “becoming one of Europe’s most significant engineering and design centers” and with a mission of creating indigenous designs with high product value. Presently, with its dynamic staff of over 250 employees, Hexagon Studio offers smart engineering solutions covering conceptual design, engineering development, prototype production and design verification steps for automotive, defense, agricultural machinery and maritime sectors. The company is the largest independently owned design and engineering company in Turkey.

Since its establishment, Hexagon Studio has assumed tasks in various design and development projects regarding the defense industry such as ammunition transfer mechanisms for weapon systems, shock dampener plates for electro-optical systems, target indicator set, turret base for antisubmarine warfare and ramp design for armored personnel carriers.

The Company is creating synergy by utilizing dual use of its engineering know-how accumulated through different sectors and via various projects it completed. It aims to contribute to the Turkish Defense Industry and reduce the foreign dependency in technology through R&D methodologies it developed through its own resources and by generating indigenous engineering solutions. The following examples can be given as examples of such synergetic projects.

The first example was a project where the company established engineering simulation models regarding the adoption of the design measures taken for prevention of potential deformations that may arise during operation by identifying the critical regions which may cause deformation in composite vessels.

Another important study is on



the optimization of the stack gas distribution in order to reduce the IR invisibility feature of the surface battle platforms and decrease temperature levels causing a “stall” in the helicopter engine due to the hot temperature zones it forms along the landing strip during

consortium of “DirectSpare” project within the scope of the European Union 7th Framework Program during 2009-2012. Currently, Hexagon Studio is proud to represent Turkey in WEEVIL project as of 2014 in Horizon 2020.

Hexagon Studio has 3 registered patents, 30 patents pending and 1 registered utility model. The company protects the design concepts it develops through design patent registrations. It has 36 design patent applications, 15 of which were registered in Turkey, European Union and the USA.

Hexagon Studio is an active member of European Automotive Research Partners Association (EARPA) and European Green Vehicles Initiative (EGVI) and fulfills its responsibilities in the corresponding task forces. At the national level, the company is a member of Defense and Aerospace Industry Manufacturers Association (SASAD), OSTIM Defense and Aviation Cluster (OSSA), and Association of Automotive Parts & Components Manufacturers (TAYSAD).



helicopter operations.

Another critical topic that Hexagon Studio focused on was the geometric form of vessel superstructure that affects helicopter operations regarding the effects of wind and wake turbulence over the landing platform.

The company is investing heavily on research and development projects, 26 of which were financed by governmental funds in the last six years. Moreover, Hexagon Studio was a partner in the project

3rd High-Tech Port by MUSIAD launched in Ankara

The launching reception for the High Tech Port by MÜSİAD took place recently in Ankara. This is Turkey's most effective business development platform and it will be participating in the CNR Expo Fair Center in Istanbul on November 9th -12th, 2016. Undersecretary for Defense Industries Prof. İsmail Demir, MÜSİAD President Mr. Nail Olpak, officials from the Undersecretariat for Defense Industries, representatives from the companies performing activities within the defense industry and many local and foreign invitees attended the reception in Ankara.

Different from conventional defense fairs, having both a demonstration area and a business development platform, the 3rd High Tech Port by MÜSİAD will take place at the CNR Expo Fair Center on November 9th – 12th, 2016 under the auspices of President Recep Tayyip Erdoğan and will be offering international business development opportunities, access to target and focus markets and international competition advantages to the Turkish defense and aerospace industry. Delegations from over 20 countries will attend the fair.

Prof. İsmail Demir:
"Turkish Defense Industry Gained Momentum"

Speaking at the 3rd High Tech Port launching reception, Undersecretary of Defense Industries Prof. İsmail Demir stated that the defense industry was the riveting force of high technology all around

the world and added, "Regarding the defense industry, Turkey has gained momentum in recent years. With this leap, high technology needs to be demonstrated in the defense industry. Therefore, we will be organizing the third fair this year". Touching upon the reliability of the High Tech Port, Prof. Demir continued, "This fair will be drawing more and more interest as it is repeated. In a few years, High Tech Port will become a worldwide event offering many advantages to all its participants".

Demir stated that sub-sectors came to the forefront as well as the demonstrated products and continued, "Various sub-sectors come to the mind when we speak of the High Tech Port. We particularly emphasize that we do not only intend to market products within the scope of the defense industry. We rather wish to share technology with numerous countries as well. We aim to reach a synergy during the contacts with various friendly countries and wish to proceed further with them. Information propagates when shared. I believe this should be the mentality of High Tech Port".

MUSIAD President Mr. Nail Olpak: "We are waiting for the 4th Industrial Revolution"

In his speech at the launching reception for the 3rd High Tech Port by MÜSİAD, in Ankara, MÜSİAD President Nail Olpak noted that throughout history, three important paradigms determined the existing conditions in respect to technology and industry and spoke of the three industrial revolutions starting from the end of 18th century affecting the daily lives, social lives and production processes. Olpak said, "Currently we are facing a new paradigm. We are discussing a future in which the 4th Industrial Revolution emerges, machines intercommunicate and become active in production processes".

Olpak: "High Tech Port is the Compass of Turkey for the Future"



Prof. İsmail Demir, Undersecretary for Defense Industries; Mr. Nail Olpak, MÜSİAD President

Mentioning that the Defense and Aerospace Industry is composed of sectors with strategic importance in respect to both advanced technology and national security, Olpak reminded the audience, paraphrasing the Chinese strategist Sun Tzu, saying "Tactics without strategy is the noise before defeat." and continued, "As MÜSİAD, our aim is to transform these sectors into strategic ones in respect with the national economy in addition to national security with the participation of you and the support of our Undersecretariat for Defense Industries. In this new paradigm, in other words, during the fourth Industrial Revolution, we aim to transform our countries to those that become ones that export technology with added value, rather than merely importing technology. To this end we designed the High Tech Port and it is actually a display project expressing Turkey's powerful market and the country's investments in high technology, R&D and innovation in the last ten years as well as the distance covered regarding the aerospace and defense industry. High Tech Port is the future compass showing the destination of Turkey as a vessel".

Nail Olpak continued, "In order to avoid undesired conclusions and in order to shape our future collaboratively, we need to prepare from this point forward. Here, the importance of the 'vision' concept emerges. There is this beautiful expression 'we may not determine the direction of the wind but we



Prof. İsmail Demir, Undersecretary for Defense Industries

may change the direction of the ship accordingly'. In order to understand the direction of the wind, we need to have a vision and use the eye in our brain. As MÜSİAD, we took action as soon as we identified the direction of the wind".

Nail Olpak: "Over 650 Business Negotiations Conducted"

"We accomplished the first High Tech Port under the auspices and with the participation of our esteemed President Recep Tayyip Erdoğan on November 26th – 30th, 2014 in Istanbul during our 15th MÜSİAD fair. We were in Qatar the following year. We realized the second organization of this important project, again with our Undersecretariat for Defense Industries, under the auspices of Qatari Emeer Sheikh Tamim Bin Hamad Al Tani and Qatari Prime Minister Sheikh Abdullah bin Nasir bin Halife Al Sani's participation and with the support of Qatari Ambassador Salem Mubarak Al-Shafi in Doha on October 6th – 8th, 2015. Civilian and military participants from Turkey and Qatar seized the opportunity to develop their businesses in Doha, in an environment where companies of two countries were paired. 67 companies from Turkey, Qatari governmental institutions and private sector representatives conducted over 650 business negotiations throughout the event. While reinforcing the relations and strategic cooperation between the two countries, they discussed the recent developments and the future of the aerospace and defense industry sector".

Addressing the mission representatives in the reception Nail Olpak said, "As MÜSİAD we express the need to increase the products with added value in every platform. It is obvious that we have to focus on R&D and innovation and technology intensive products which bear engineering knowledge for achieving this. High technology is on the top of MÜSİAD's list of missions, initiating its actions with the motto of "High Morality, High Technology".

Nail Olpak: "High Tech Port is the Most Efficient Business Development Platform"

"We will be organizing the 3rd High Tech Port High Technology



and Aerospace Fair under the auspices and with the participation of our esteemed President and Prime Minister with the partnership of our Undersecretariat for Defense Industries and with the support of our commendable representatives and industrialists. The fair will not only be displaying technological novelties but also Turkey's vision to the world".

"High Tech Port is the most well-directed point for establishing new partnerships with the companies active in the Turkish Defense and Aerospace Industry and high technology. It is the most convenient address for accomplishing technology transfer in the relevant sectors, making civil or military investments, finding new suppliers and business partners. Turkey's already sufficiently big and growing market, OEM representatives' attendance to our fair and the point Turkey arrived to in respect of the aerospace industry, render High Tech Port the most efficient business development platform in this area. The 3rd High Tech Port will hopefully make its mark as an important leap in our country's defense and aerospace industry and technology with the developments it will breed", continued Olpak.

The Fair is preparing to host many novelties as well

Additionally, providing technical information on the Third High-Tech Port by MÜSİAD, Nail Olpak concluded his speech: "Our 16th International Fair, covering an entirety of eight halls at the Istanbul CNR Fair Center will be included in the MÜSİAD EXPO. We will be examining the "Innovation Economy and Prosperity" topic with the panels and forums at our 18th International

Business Forum IBF which we will be actualizing at the same time. Many new platforms produced by Turkey will also be displayed at our fair this year. Our estimable foundation companies and private sector companies will be demonstrating the platforms developed by Turkey and presenting their know-how to our distinguished guests and together they will be searching for new business development models. We will be building special meeting venues at our fair location for military representatives and delegations from our friendly and allied nations. Again, by establishing display areas for the certified products developed so far by our aerospace industry, we will be presenting these products to the appraisal of OEM representatives. Moreover, we will be breaking a new ground this year as we will be sharing with the public, the Turkish Defense Industry Global Press Awards at the Premiere Night of our Fair".

Hakan Kurt: "Diplomacy may stop from time to time but Trade always finds a way"

High Tech Port by MÜSİAD's General Coordinator Mr. Hakan Kurt stated that High Tech Port was a global civilization project and added, "We aim to create global forces with our main philosophy and our national capabilities. Diplomacy may pause from time to time, but trade always finds a way and directs the diplomacy. We will be happy to see the representatives from our friendly and allied nations at the 3rd High Tech Port".

Aiming to create a platform for business development to the sector, the 3rd High Tech Port by MÜSİAD will be held at the Istanbul CNR Expo on November 9th – 12th, 2016 with the theme of "Global Power in Defense and Aerospace".

EnviScreen - Strengthening Relationship with the Turkish Defense Industry

In a candid interview, Mr. Ahti Luukkonen, Vice President of Sales and Marketing at Environics, discusses the company's CBRN products - the only CBRN dedicated situational awareness software in the market - and activities with Turkish partners.

Defence Turkey: Mr. Ahti Luukkonen, first of all thank you for the interview. Could you please inform us about Environics's core capabilities, technologies, and products?

First of all thank you Defence Turkey for giving me this opportunity for this interview.

I appreciate this highly.

Environics is the world-leading supplier of CBRN detectors and integrated CBRN systems.

Our core capabilities are chemical and biological sensor technologies, as well as

Software for radiation and nuclear identification products and software for CBRN dedicated situational awareness applications.

Our chemical detection is based on orthogonal approach including Ion Mobility Spectrometry (IMS) and numerous other sensors. This approach guarantees reliable and sensitive detection of CWA and TICs as well as extremely good selectivity.

Our product categories covers Personal Protection Equipment



(PPE), Field Deployable-, Mobile (i.e. naval, and vehicle) and Fixed integrated CBRN Systems.

Our product names ChemPro, BioScout, Gossamer, RanidPro and EnviScreen are well known.

Defence Turkey: Environics provides CBRN reconnaissance vehicle solutions for the

requirements of world-armies, Could you please tell us more your product?

Environics provides complete solutions for CBRN reconnaissance vehicles. Our solution consist of CBRN detectors with sampling lines for air, ground and liquid samples. We also may integrate CBRN analyzers, weather sensors, and safety glove boxes etc. as part of our solution.

All CBRN detectors and other sensors are integrated to work together with EnviScreen Operix situational awareness software. In addition to real time monitoring of sensors, EnviScreen Operix also provides ATP 45 reporting tools and options to calculate hazardous areas.

In our CBRN reconnaissance vehicle solutions we use our own state-of art detectors, and numerous products from our OEM partners. All individual products





in our solution represents the best available technology in their category. The complete CBRN reconnaissance system solution is well tested and already field proven by many nations.

Defence Turkey: In which areas are EnviScreen most effective and can we talk about the cost effectiveness?

We have developed EnviScreen software more than 10 years to meet our different customer requirements. EnviScreen is the only CBRN dedicated situational awareness software in the market.



EnviScreen is widely used by our customers for the following integrated applications:

- › Area monitoring
- › Critical infrastructure
- › Naval applications
- › CBRN reconnaissance vehicles

For all applications where the customer need to monitor several detectors, and especially from several different locations, EnviScreen is very effective tool.



Defence Turkey: What are your activities in Turkey? Could you please enlighten us about your strategy and plans with Turkish Defense industry companies?

We already do have a strong position with ChemPro100i Handheld Detectors within AFAD organization around Turkey. We obviously look forward to developing our collaboration with AFAD in terms of new devices, solutions and CBRN training.

We are in a good position providing complete CBRN hazmat training, not only our own product training.

We are very keen to develop our collaboration with Turkish Defense industry companies; and not only for the Turkish market, but for the export market as well.

We already collaborate with the major Turkish military vehicle suppliers for Turkish projects such as the Special Purpose Tactical Wheeled Armored Vehicles Procurement project. We obviously hope that our CBRN detectors will be selected for this project.

We also have an on-going CBRN reconnaissance system deliveries to one Turkish special vehicle supplier for their export projects. This is already a remarkable project for us.

There are number of other negotiations on-going with local shipyards and other Turkish system level integrators. We hope to find more and even deeper partnership with the Turkish Defense Industry. I believe that both parties can benefit many ways from this kind of collaboration.

In cases where the business is developing positively, we certainly consider carefully the option of local maintenance and repair services for our products.

Defence Turkey: Finally, Would you like to add a message to our readers?

I want encourage the Turkish Defense Industry to contact us. Please, do not hesitate to contact us if you feel that there's any possibilities to collaborate with us. ■



Foreign Winds: International Players in Turkey

By Global Business Reports

The presence of multinational companies is crucial in bolstering developing economies' technological know-how all over the world. In its efforts to build indigenous capabilities, Turkey too has subscribed to coproduction and technology transfer policies. Such directives are especially necessary in the highly specialized and technical aerospace and defense (A&D) industry, and have been fuelled by the government's strategic offset requirements and investment incentive schemes.

"During the process of the establishment of the domestic defense industry infrastructure, for the production of military weapons, vehicles, and ammunition, Turkey preferred to cooperate and coproduce with countries and companies that were seen as the leaders in this sector. This enabled many defense projects like MILGEM (the Turkish warship program), the ALTAY main battle tank, attack helicopter program, ATAK, and several unmanned aerial vehicle (UAV) projects to be successfully executed by our national defense industry," said Investment Support and Promotion Agency of Turkey (ISPAT) president Arda Ermut.

Major players including Boeing, Airbus, BAE Systems, General Electric (GE), Sikorsky Aircraft, Fokker Elmo, PFW Pratt and Whitney, Rolls Royce, Honeywell and Bodycote have all penetrated the Turkish market, resulting in a dynamic local industry. Many of these international players benefit from Turkey's export-oriented incentives such as VAT exemption, custom-duty exemption, and corporate-tax reduction, as well as social security-premium and interest rate support.

Turkey's most notable international partners include both the world's largest original equipment manufacturers (OEMs), Airbus and Boeing, whose presence has a tremendous impact on the local supply chain.

"Turkey is a huge market for both Airbus and Boeing, who are both selling a large number of aircrafts to the local industry. As Airbus and Boeing cannot simply sell aircraft and have to provide work to the local industry through offsets, local companies will strengthen their positions as aircraft sales increase," said managing director of PFW Aerospace Werner Kuntze.

Both OEMs have developed longstanding relationships with Turkey, resulting in greater business volumes for local and international companies in the country. German company and subsidiary of Airbus, PFW Aerospace, for example, has grown its presence in Turkey by threefold in the last three years due in part to the extensive work it does with Airbus. Boeing too has maintained an important relationship with Turkey since the mid-1940s, and over the years built its network of local suppliers and partners up to 2,500 people, generating a business volume of more than 1.2 billion USD.

Another strong multinational partnership with Turkey's A&D sector dates back to 1985, when GE made a strategic investment in the country. The world's renowned engine manufacturer entered the Turkish market through a joint venture with local contractor Turkish Aerospace Industries, Inc. (TAI), the Turkish Armed Forces Foundation and the Turkish Aeronautical Association in Eskisehir. The resulting company is known today as Tusaş Engine Industries Inc. (TEI).

"GE Aviation made its first investment in the 1980s in establishing TEI and continued with TTC in 2000. Today TEI is a world class aviation company manufacturing over 700 high-tech, complex parts for 39 military and commercial engine programs and also provides MRO and AIT services for certain military engines regionally. TTC is focused on promoting aviation-related research

& development and innovation for our aircraft, marine and industrial engines throughout their lifecycle with over 350 highly skilled Turkish engineers," said GE Aviation's regional general manager Ismail Sami Özdemir.

GE has announced a \$900-million commitment to Turkey, \$500 million of which has already been invested. The engine giant has also established its eighth Innovation Center in Turkey, as well as an aviation engineering technology center. Most recently, GE worked together with its local partner TEI on the development of its new LEAP engine, helping to grow Turkey's local knowledge base.

Engine rival Rolls Royce has also made significant strides in Turkey, today holding close to 10% of the total local defense market share. The British power systems manufacturer supplies aero engines to the Turkish Armed Forces, power plants for the A400M and ATAK helicopters, and soon the engine for Turkey's Light Utility Helicopter program. But aside from their commercial endeavors, the firm is investing heavily in Turkey's research and development capabilities. Late last year, Rolls Royce signed a memorandum of understanding with the scientific and technological research council of Turkey, TÜBİTAK, to establish an Advanced Manufacturing Technology Center (AMTC). The initiative is part of its broader strategy for Turkey that includes building relationships through involvement in Turkey's indigenous programs as well as developing strong local technological capabilities.

"To the extent we are able to, we aim for a designed-in-Turkey, built-in-Turkey approach, focusing on high-localization content and as much of knowledge transfer as possible," said president of Rolls-Royce Turkey and Central Asia, Patrick Regis.

In a similar manner, international aerospace pillar Fokker Elmo has contributed its unique electrical wiring expertise to the Turkish market. The Dutch firm has established itself firmly within the Turkish A&D ecosystem, boasting a quarter century old relationship with the country.

"We are continuously adding more capabilities to our Turkish facility and by doing so introducing responsibilities and programs that otherwise would not have the 'made-in-Turkey' sign on it, and will further evolve to be able to serve customers directly without assistance of our parent company," said general manager Mischa Baert.

Fokker Elmo performs specialized development and production of electrical wiring integration systems for various defense projects including the Airbus A400M, Boeing P-8A, Lockheed Martin F35 and AgustaWestland AW 159 and AW 101 helicopters. On the commercial side, the firm is beginning work on the Bombardier Cseries and Airbus A330neo.

As Turkey continues to invest in the development of its defense industry in line with its 2023 vision, international A&D players will continue to play a crucial role in its strategy. Having recognized the opportunities the country offers, many multinationals have already been drawn to its borders. "We are by far the largest economy in the region with a huge domestic market, a highly qualified labor pool and an advanced infrastructure. With these traits, Turkey is an excellent location as a manufacturing hub as well as a regional headquarters for international investors looking for new growth markets to tap into or manage their current regional operations," said Ermut.

Moreover, Turkey's offset policies and status as a NATO member serve as further incentives for foreign firms to consider entering the market. These factors can promote a favorable mutual exchange for investors and Turks, and help the republic realize its ambitious 2023 vision.

A Saab Gripen E fighter jet is shown in two views. The top image is a side profile of the aircraft, which is white with dark grey accents and the number '198' on the nose. It is equipped with various missiles and sensors. The bottom image is a front-facing view of the same aircraft, highlighting its canards and delta-wing configuration. Both images are set against a dark background with spotlights illuminating the plane.

SAAB Rolls-out the First Gripen E

The defense and security company, SAAB, will take the next step in the evolution of the Gripen fighter system in mid-May 2016, with the unveiling of the first test aircraft of the next generation, Gripen E.

The unveiling of the first Gripen E test aircraft will take place at Saab's facilities in Linköping. On stage, Major General Mats Helgesson - Swedish Air Force Chief of Staff; Tenente Brigadeiro-do-Ar, Nivaldo Luiz Rossato - Chief of Brazilian Air Force, Ulf Nilsson - head of Saab Aeronautics; Daniela Ivanic - systems engineer Saab Aeronautics and Matti Olsson - head of production strategy Saab Aeronautics and others will share their views on Gripen E.

The event will be live streamed on their website making it possible for people around the world to take part "There is huge global interest in the Gripen fighter system and we are now ready to present the first Gripen E. We look forward to sharing this important event with both guests and viewers," says Ulf Nilsson, head of Saab business area Aeronautics.

"This key milestone is proof

of our ability to build world-class fighters on time and on budget and it brings us one step closer to first flight and delivery to our customer", says Ulf Nilsson.

Bigger and Stronger an Impressive Aircraft

The New Generation Gripen-E is slightly bigger than previous versions. Gripen E has an overall length of 15.2m, wingspan of 8.6m, and maximum takeoff weight of 16,500kg. It can reach Mach 2 (1,522 mph, 2,450 km/h) at high altitude.

The aircraft features a stronger engine and updated radar systems as well as more weapons capability. Gripen E is equipped with a highly integrated and sophisticated sensor suite including an Active Electronically Scanned Array (AESA) radar, Infra Red Search and Track (IRST), Electronic Warfare (EW) suite, and data link technology.

The Gripen E prototype will conduct its maiden flight by the end of 2016. The Swedish Air Force expects to receive its first batch of Gripen NGs by 2023.



Opportunity for Joint Development of Sensors Systems and Sensor Swarms with Turkish Counterparts

Mr. Erdem Kazaklı, Business Development Manager, Airborne Sensors of Microflown AVISA, The leading acoustic R&D firm and well known for its main AMMS product (3D acoustic situational awareness), shares new product details, capabilities and new developments such as the clip on Acoustic Pointer, a game-changing device for hand-launched UAVs.

Defence Turkey: Could you please inform us about the structure of Microflown AVISA, an expert on 3D Acoustic Situational Awareness?

The Microflown sensor was invented in 1994. It is the world's only true acoustic particle velocity sensor designed to operate in air.

From around 2004, the sensor has become widely accepted, primarily in the automotive industry. Microflown Technologies was founded and the technology was used to improve the interior sound quality of the products of almost all major car manufacturers.

Microflown AVISA was founded in 2011 for adapting the Microflown Sensor to defense applications. It is a Dutch based company using the same cutting-edge technology, operating under Microflown Holding which also owns Microflown Technologies B.V. that provides the same technology for the commercial (mostly automotive) market needs.

Microflown AVISA develops highly accurate and reliable acoustic gunshot and artillery localization systems, based on its world-wide unique and extremely small Acoustic Particle Velocity Sensor technology. The core product is the Acoustic Multi-Mission Sensor (AMMS).

Microflown AVISA provides complete. Our mission is detecting, localizing, and classifying (tracking) all sorts of audible threats including small arms fire, mortars and aerial platforms. We are developing this detection capability from different platforms: vehicles,



Figure 1 Microflown AVISA fielded its vehicle mounted V-AMMS in Dutch Army's Mali mission beginning January 2015

UAVs, helicopters and unattended ground sensors.

Defence Turkey: Could you please inform us about your capabilities and products?

Microflown AVISA's products are based on The Microflown sensor. Microflown sensor consists of two wires which are heated to 200°C above the ambient temperature. As air flows across the sensor, the upstream wire cools down and gives off some heat to the passing air. Hence, the downstream wire cools down less due to the warmer air. This difference in temperature is measured electrically, making it possible to measure the acoustic particle velocity directly.

Based on this technology, Microflown AVISA's main product is the AMMS, namely acoustic multi-mission sensor.

An AMMS is a low SWaP(size, weight and power), the AMMS provides a true multi-threat localisation capability, enabling



the end user to locate Small Arms Fire (SAF), Rockets, Artillery and Mortars (RAM) and tonal sources with an outstanding directional accuracy of down to 1.5 degrees.

AMMS measures acoustic particle velocity which has directionality, instead of the sound pressure which is a scalar parameter. Vehicle and ground based AMMS has been fielded with the Dutch Armed Forces and has proven outstanding results, as confirmed by the world's leading army research institutes. It outperforms the traditional sound pressure measuring systems in terms of reliability, detection range and miss distance.

AMMS is low size weight and power. Unattended sensors can stay in the mission area for very long periods of time and provide acoustic ISR to the end-user.

As the AMMS does not have any membrane/resonating part it is a very broad-banded and reliable sensor as experienced by

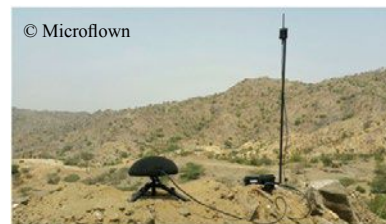


Figure 2 AMMS Sensor Post Installation with Battery and Antenna

the end-users so far.

Depending on the application and user needs, Microflown AVISA provides a single AMMS or a network of AMMS for detecting acoustic events and providing acoustic situational awareness in a designated area of interest.

Our main products are Compound Protection, RAM-SCORE, UAV / Acoustic Pointer and V-AMMS.

Compound Protection system detects gunshots and mortars/artillery to protect a compound area. It uses a typical network of 5 AMMS. It triggers an audio alarm for watch keepers/duty officers. It is the only system out on the market that reliably detects both gunshots and mortars. This functionality is enabled by the multi-mission-capable nature of the sensor. The system can also be integrated with a PTZ camera or field surveillance radar to cue these sensors to acoustic events in real-time.

RAM-SCORE is an acoustic detection system for training (target practicing)/ ammunition tests. It uses a typical network of 8 AMMS. The system triggers audio alarms for defined safety areas. The system generates firing table data automatically in real time and has the capability to provide Point of Impact (or airburst) and Point of Origin.

RAM-SCORE calculates Time of Flight, attained range and azimuth for each shell.

V-AMMS is the name we give to the vehicle mounted AMMS systems. It enables acoustic detection against gunshots. The system uses single AMMS for each vehicle. System triggers audio alarms and shows the gunshot location and direction in real-time to the driver and gunner.

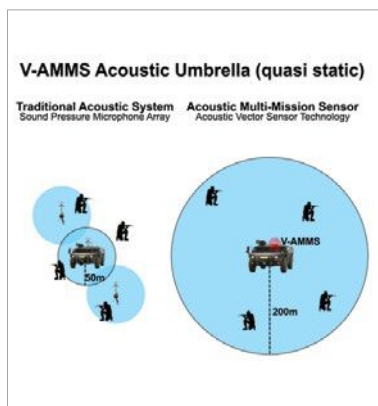


Figure 3 V-AMMS Acoustic Umbrella against incoming Fire

Acoustic Pointer is our latest development to integrate on hand-launched UAVs. It is the next generation of AMMS system for detection of RAM and SAF from the air. It has a smaller footprint and a more complex packaging that contains Geo-location, Datalink and power. This stand-alone package is easily integrated without complex integration processes. If required by the end-user, the system can also be integrated with on-board sensors to cue them in real-time to acoustic events.

Defence Turkey: What are technological competences and specifications of Microflown's "Clip on Acoustic Pointer for Mini UAVs"?

Microflown AVISA developed the acoustic pointer for small, hand-launched UAVs to relieve the UAV operators from 'looking from a straw' situation.

We first talked to small UAV operators. They had complaints about having a hard time to detect and identify ground movements and events with small cameras

that have limited range and limited field of regard. They had trouble identifying snipers and artillery locations which are especially on the move and changing locations frequently.

To overcome this situation, we are now offering our Acoustic Pointer that detect gunshots, artillery shots and other vehicles, providing 360 degrees situational awareness to the operators.

This unique localisation system is considered to be a "game changer" for the battlefield by the Netherlands Armed Forces, which has funded the development of this technology, giving ears to UAVs.

To eliminate the need for complex integrations and long lead-times, Microflown AVISA offers a stand-alone product. Acoustic Pointer has its own Geo-location, Datalink and Power which enables easy integration and reduces the long integration project scheduling.

Defence Turkey: Over the years, what activities have you performed in Turkey and what are your future plans for Turkey?

Microflown AVISA has been active in Turkey for a long time now. We have been in IDEF 2013 and 2015. Turkey has an apparent need for gunshot localisation systems for various applications and Microflown AVISA has been working with Turkish counterparts to provide this much-needed capability to Turkey.

Personally, I know that Turkey has the capacity to help develop this sensor technology. Therefore, we are also looking for joint development of sensors systems and sensor swarms with Turkish counterparts.

Defence Turkey: Could you please share details with us about your R&D activities on new platforms and new technologies?

Microflown AVISA is a leading acoustic R&D firm. We approach problems with an out of the box view and have a fast development capability. As Microflown AVISA we are involved in many European and NATO studies for sensor

development and applications.

Our latest developments are SKYSENTRY system that acoustically detects UAVs, we are trying to miniaturize our technology and apply man-portable acoustic sensors. We are also developing gunshot detection systems from helicopters.

SKYSENTRY; is a Dutch government funded project to detect the emerging threat of small UAVs.

SKYSENTRY is an acoustic vector sensor array that uses the commercially available AMMS sensors technology to distinguish between tonal sound sources, broad-banded sound sources and background noise to classify each source and identify possible flying objects. When an aerial vehicle is detected the system reports possible incoming UAVs and other aerial vehicles.

SKYSENTRY system has been tested and displayed in real-time scenarios tracking and identifying very small (less than 2kg) UAVs.

ACHOFILO:

Together with the Dutch Armed Forces on June the 7th 2013 extensive Small Arms Fire tests were performed with the acoustic vector sensor (AVS) from a Dutch Cougar helicopter platform.

During the tests the Acoustic Vector Sensor have proven to function successfully as an Acoustic Hostile Fire Indicator (ACHOFILO)

Built on this experience, now Microflown AVISA is developing hostile fire indicators for helicopters to add the additional situational awareness needed for low-flying helicopters.

Defence Turkey: Finally would you like to add some information for our readers?

We would like to thank Defence-Turkey for this opportunity.

In general, we are very pleased with the interest from Turkey and would like to see Turkey as a key partner.

We are inviting every interested party to Eurosatory exhibition held in Paris in June 2016 to see and discuss our products at booth B390, hall 6. ■



Figure 4 Acoustic Pointer Integrated on Hand-launched UAV

AKSA, The First Turkish tried-and-true “Run Flat Systems” OEM

The first Turkish Original Equipment Manufacturer, AKSA, established in 2011, designs, builds and delivers Run Flat Systems and also provides logistics support. Its customers around the world are both prime contractor and merchant suppliers. Their main products are Run Flat Systems and assembly equipment's for wheeled armored vehicles. In addition, customized Run Flat Systems are also supplied for Police and for the commercial market, such as ambulances, buses and private (VIP) vehicles.



AKSA has implemented more than ten (10) different systems and thus holds the status of being a major local and world class Run Flat Systems supplier. Most of the systems can be assembled without need of additional complicated machinery or with just small apparatus or specific tools. Due to the fact that their products are not made of only rubber material, there is no need large sized machines to remove the Run Flat system from inside of tire. They are all designed with 2 or 3 parts and as such; the ease of assembly and disassembly is possible with regular or custom designed fasteners.

The most critical point for a company is to be sustainable, not just in today's market but also into the future. AKSA has anticipated this considerable issue and has planned all activities in line with this logic. Therefore, R&D and

test departments are deliberately organized. For example, a test device that is simulating the specific physical characteristics of an armored vehicle is designed and customized according to the vehicles' characteristics and new Run Flat Systems are thoroughly tested on it.

The governmental standpoint is also very critical. AKSA's talent and their products were evaluated by the Undersecretariat for Defense Industries (SSM) and were deemed to be worthy of support. In this context; some machines, apparatus and equipment's are supplied by the



SSM in order to strengthen design and production infrastructure. The fact that the most important Turkish Government Agency for defense is backing AKSA as a local company is a solid endorsement of their talent and their product, a true source of pride.

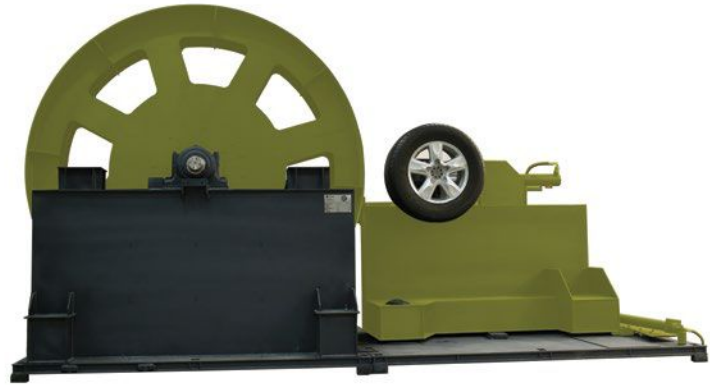
With the affirmation of having their product supported by the UDI, the list of satisfied local armored vehicle producer has

increased.

A variety of companies have worked with AKSA in Turkey are stated below:

- › Anadolu Isuzu (Isuzu Armored Bus),
- › Best Grup(Loader, Ford Ranger, Toyota Land Cruiser, Toyota Hilux, Mercedes Vito).
- › BMC(TOMA(Intervention Vehicle to Social Events)),
- › Katmerciler Araç Üstü Ekipman Sanayi ve Ticaret A.Ş.(TOMA(Anti-Riot Vehicle) Backhoe Loader)
- › Nuroi Makina- TOMA (Anti-Riot Vehicle)
- › Otokar (URAL)
- › Turkish Gendarme (Shortland),
- › Turkish Police Headquarters (Toyota Hilux, Shortland, TOMA, Toyota Land Cruiser, Backhoe Loader, Ejder Toma),

In the future, AKSA aims to continue building upon their success, aspiring to export their tried-and-true Run Flat Systems to the Middle East, Asia, Africa, Northern Europe and America.



The world's first Lightweight Airborne Surveillance Radar, Providing a 360-degree Field of View with no Moving Parts

Analysis by Defence Turkey

5 years ahead of competitors, Leonardo Finmeccanica introduces the state-of-the-art Osprey surveillance radar - A Compliment to a long-standing Successful family of Airborne Surveillance Radars.

A first look at the Osprey radar was given to members of the press at the product launch in London, England, on May 3rd, 2016, by Fabrizio Boggiani, Marketing & Sales Lead for the Leonardo Airborne & Space Systems Division and Brendan Nolan, Vice President Sales - Radar & Advanced Targeting for the Leonardo Airborne & Space Systems Division. Defence Turkey Magazine presented in the press event.

Leonardo, previously known as Finmeccanica, recently celebrated the launch of new radar from the Airborne & Space Systems division. The company made significant investments in the e-scan market approximately 10 years ago with the Seaspray - Active Electronically Scanned Array (AESA) products, which have resulted in a substantial step forward in technology that now provides radars with the ability to be more versatile. Sales have increased across the globe, from previously having been fitted on a few helicopters and a few



fixed wings, to everything now from large and small aircrafts, aerostats and even unmanned platforms. The success of e-scan and the opportunities gained with electronically scanned radars are significant; resulting in not having pressurized wave guides, eliminating some of the technical challenges related to the installation of radars. These radars can be mounted much more easily. They are certainly a bit more expensive than m-scan, however the list of benefitting

options and gained advantages are well worth it.

Superior Reliability And Operational Availability

At the core of the AESA radar design is the ability to tolerate individual element failure. Component failures within the array result in graceful performance degradation rather than complete system failure, delivering high operational availability when compared with conventional radar systems. Its high reliability and availability result in a reduced maintenance requirement and provides the option to reduce spares holding, resulting in significant cost benefits over the life of the system.

Multi-Mode Surveillance Radar

In order to meet the challenges of the 21st century, Osprey MM multi-mode surveillance radar provides second-generation Active Electronically Scanned



Array (AESA) surveillance capability as the primary sensor on airborne assets. Osprey MM AESA radars are at a high technology readiness level (TRL) and are in production for fixed and rotary wing applications. Osprey MM's forerunners, the mechanically scanned (M-Scan) and first generation AESA Seaspray radars have been delivering a high performance surveillance capability to armed forces and paramilitary users for more than 45 years. Osprey MM brings together wide azimuth and elevation electronically scanned (E-Scan) fixed antenna(s) with a compact, state-of-the-art Processor and multi-channel Receiver. Each array covers an azimuth sector of 120 degrees, with purely electronic scanning in azimuth and elevation. The handover from array to array is achieved via seamless automation. Modes are adapted to fully exploit e-scan capabilities, resulting in greater flexibility in scan rates and revisit times. There are increased interleaving options within modes, with additional interleaving now possible on a sector-to-sector basis.

Key Benefits

Class-leading maritime surveillance capability, AESA-enabled small target mode (STM), very high resolution, wide swath SAR Mapping, small radar cross section (RCS), low minimum detectable velocity (MDV), multi-channel moving target indication (MTI), Air-to-Air surveillance, track and intercept capability, instantaneous multiple mode interleaving, difficult target detection from high altitude, high reliability for persistent operations, flexible configuration, installation and integration. The system is reconfigurable to suit installation demands; the system can be configured to run with up to four arrays with the flexibility to install arrays at convenient points around the platform, providing maintained coverage with minimal platform impact. Benefits also include multiple fixed antennas,

Mr. Brendan Nolan, Vice President Sales - Radar & Advanced Targeting for the Leonardo Airborne & Space Systems Division met with Ms. Ayşe Akalin Evers, Editor in Chief of Defence Turkey Magazine



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choice of antenna sizes, belly-free, obscuration-free 360° coverage, open standards interfaces, and compact, lightweight LRUs.

Key Features - Ideally Suited to Mixed Environment Operations

Osprey MM provides a genuine multi-domain capability, with high performance sea surveillance, notably against 'difficult targets', land surveillance with wide swath and very high resolution ground mapping and small and low speed ground target indication, high performance air-to-air surveillance, tracking and intercept. These capabilities, combined with the radar's ability to rapidly interleave modes and provide scan-independent beam steering, make Osprey MM ideally suited to mixed environment operations, such as in the littoral. Osprey MM is a low size, weight and power (SWaP) radar system, offered with a range of antenna sizes that may include up to four

fixed antennas, depending on the azimuth coverage requirement, and which leave the belly of the aircraft free for operation to and from unprepared surfaces; or for other antennas, sensors or weapon systems.

Osprey absolutely perfect for high-end maritime surveillance tasks

Looking for a periscope in a moving sea state has been described as a very difficult task, to say the least. On a manually scanned radar (m-scan) it tries discriminate the periscope from the clutter, by spinning very quickly to get as many hits as it can, in an attempt to eliminate the noise so that it gets a constant return. An m-scan radar operator will most certainly say that the scan needs to be done with a very high spin rate. The Seaspray brought in the ability, while spinning, to be able to electronically scan multiple times



© Leonardo-Finmeccanica



inside of that dwell period within that spin, while in the field of regard of the target. Now, with the Osprey the e-scan can occur all of the time.

Osprey Radar Evolutionary Design

Osprey is a product that compliments the Seaspray in the fact that it utilizes modes gained through years of investment and the subsequent acquired technology, understanding and experience. Of interest as well is the fact that some of the algorithms that were developed through the Vixen fire control range have been put into the Osprey as well. Modern processing technology, the increased processing power, along with the fixed plate array, has enabled the company to bring some air-to-air technology into a surveillance radar. In addition, modes have been taken from the PicoSAR, the overland battlefield surveillance radar, and placed into Osprey, making it a true multi-mode radar, able to prosecute the mission both overland and oversea with some basic air to air capabilities which gives end users a tremendous amount of flexibility when they are using a radar system.

The modes are fully exploited for e-scan. With one central

processor, there is no need to have three separate radars. The 3 antennas which are feeding a separate processor, allows the aircraft an instantaneous view, the ability to look where ever it needs to look simultaneously. For example, synthetic aperture imaging can be conducted in one part of the field of view, while conducting air-to-air somewhere else and maritime surveillance in yet another field of view, that's the true advantage of the Osprey.

Norwegian All Weather Search and Rescue Helicopter (NAWSRH) Program

The Norwegian requirement was an opportunity for Leonardo to shine, exceeding expectations. The environment that Norwegian helicopters operate in required a different design. Leonardo-Finmeccanica announced that the launch customer for the radar will be Norway, which has purchased Osprey as part of the country's acquisition of 16 Leonardo-Finmeccanica Helicopters AW101s for the NAWSARH programme (Norway All Weather Search

And Rescue Helicopter). Leonardo Airborne & Space Systems Division was able to far exceed the requirements by offering the real value add of being able to take the radar off the under

belly, to give them 360-degrees. One of their missions was to do Search and Rescue up in the narrow fjords, with the high cliff faces on either side; this radar with the AESA technology was able to offer processing capability much closer in to the aircraft itself, providing a useful radar picture within 10's or 100's of meters of the body of the aircraft. On a helicopter, such as the Norwegian Search and Rescue helicopter, which could be landing in snow and unpredictable terrain, the risk to damage or destroy underbelly radar was high. The design provides much more essential flexibility to the operators and the OEMs.

The Edinburgh Product Portfolio – Extensive History

The company has been at the forefront of the airborne radar market since the 1950s when the AI23 radar became the world's first high power monopulse radar to enter squadron service. Maintaining their leading position in the market, they have been developing AESA technology since the early 1990s and now offer a world-leading range of AESA radar products that meet the requirements of the airborne radar market. Within their radar Centre of Excellence, they have designed, developed and

supported radar systems for more than 65 years. Their software development capability meets the requirements of CMM Level 5. More than 3000 radar systems have been supplied for manned and unmanned fixed and rotary wing aircraft in surveillance, fire control and ground attack roles. They have extensive experience with surveillance radars and have produced more than 800 systems. Osprey MM is the latest addition to the portfolio of AESA surveillance radars, which includes Seaspray 5000E, Seaspray 7000E, and Seaspray 7500E, and PicoSAR.

The Seaspray family of m-scan radars has been successful on the AugustaWestland Lynx platform and more laterally the Blue Kestrel radar onto the Merlin. Significant partnerships have been established with many of the most important European programs, such as Typhoon for example – of which 60% of the avionics of the entire aircraft are provided by the Airborne & Space Systems division of Leonardo. Adding to Captor's success on Typhoon, Captor-E is going on to the new Typhoon. Also Raven which is on Gripen, and Vixen which is smaller, have some customers in the US and around the world as well.

Airborne & Space Systems division - a significant player converting manned aircraft into an unmanned solution.

The Airborne & Space Systems division of Leonardo division is 55% based in the UK and 45% in Italy. In addition to Fixed and Rotary Wing platforms, the avionics (cockpit, computing, communication, navigation and identification) Sensors and Radars, they also are significantly involved in EW and Intelligence. The two main areas are related to the protection of platforms through specialized equipment and intelligence, typically onboard ISR platform both manned and unmanned. They also have an integrated missions system for

ISR ISTAR missions. The division carries out significant activities in UAVs, unmanned solutions. They have their own platform, the UAV family called Falco, that consists of two different versions, one for one for shorter missions and one for longer persistent missions, which typically requires more than 18 hours of endurance. These platforms are significantly equipped with their own sensors and their own avionics. The division is the partner of Piaggio Aerospace for the P.1HH HammerHead for the conversion of the former P.180 from a manned aircraft into an unmanned solution. The division is responsible for sensors and mission systems on board and on the ground, including all of the avionics. In addition, target drones have been sold in 40 countries around the world.

This division works actively for the Italian space agency and the European space agency. There has been significant press attention regarding what they have accomplished for the Rosetta program, and also with what they have accomplished with ExoMars for the drillers, lunar drillers. They are very specialized in payload both for power supply onboard satellites and special robotic missions onboard satellites. Airborne & Space Systems works in cross-pollination with the other divisions of Leonardo. However, their division is also working independently in the market, serving and partnering with many platforms, manufacturers and system integration onboard airborne. Their identity and strategy is to be 'platform agnostic' in providing their solutions in avionic equipment and specialized mission sensors.

Future Prospects - Scalable product

The vision to achieve a fully populated flat pan array by utilizing existing technologies from Seaspray, combined with technologies from fire control radars was met with great success. The result is a concept

that can be applied across a number of different areas. The company indicated that it would be relatively easy to scale up this product, however they are not currently investing in this at the moment. It is most definitely a feasible option for a customer to approach them with a specific requirement for a bigger antenna. These elements are being discussed at the moment, but it is not a product that they will have in their brochures, however company experts stated that it's clearly something that's easy to do.

Prior to product launch, 3 sales have been made behind the scenes – More on the horizon

At the product launch event, Leonardo Airborne & Space Systems Division shared that they have already sold this product to 3 customers. The one sale that is in the public domain is through the Leonardo helicopters division for the NAWSARH program. The other 2 customers for fixed wing products are in the US; further details were not disclosed during the product launch Q & A session due to non-disclosure agreements, however the company stated that they will be able to make an announcement soon. In addition, there is a bid for a 2 panel version in the US, awaiting a decision for Rotary Wing in the next 4 – 6 weeks. With company investments and the internal zeal to advance design and technology, the company estimates to be at least 5 years ahead of any of their competitors. They took the initiative and did not wait for government contracts. As a company they clearly recognize and appreciate that this type of technology is hugely important both to end users, who want the operation advantages of e-scan, and also aircraft manufacturers who want a simple, clean installation, with no moving parts, no wave guide, and that is electronically controlled. The Osprey excellently compliments the existing portfolio of radars.

Katmerciler on Stage at Eurosatory Displaying Impressive Range of Products

The new strength of the Turkish defense industry, Katmerciler, will exhibit their Anti-Riot Vehicle TOMA featuring ballistic reinforcement and their high-security Armored Personnel Carrier Khan.D which were both developed within NATO standards, while concurrently exploring the possibilities of new business opportunities and avenues of international cooperation at the upcoming Eurosatory 2016.

Katmerciler has advanced into the forefront, becoming the new force of the Turkish defense industry. In order to promote the portfolio of vehicles for the defense industry and to delve further into the commercial prospects emerging within the industry, the company will participate in Eurosatory 2016 – Defense and Security International Exhibition held in Paris, between June 13th – 17th, 2016 with the opening address to be given by the French Defense Minister. In addition, they also participated in the Defense Services Asia Exhibition and Conference 2016 in the Malaysian capital of Kuala Lumpur, on April 2016.

Katmerciler, initially founded in 1985, is the Turkish leader and the largest exporter in the On-Board Equipment sector, with a history spanning more than 30 years. In 2010, the company began publicly trading shares on the Istanbul Stock Exchange (BIST). With the most powerful R & D Center of the Industry, Katmerciler doesn't just limit itself just to activity in Turkey; it is a substantial company that develops products for the requirements of the entire international defense industry.

Katmerciler will welcome visitors at the 5th hall, Turkey pavilion Booth B -707 at the Eurosatory 2016 exhibition. The company will be promoting solutions for the defense industry with its Anti-Riot Vehicle protected against ballistic threat (TOMA) and their armored personnel carrier Khan.D. The Company's portfolio of defense vehicles, in terms of ballistic armored personnel carriers, armored construction



Kangal MRAP

equipment and riot control shields are all reinforced within NATO standards.

4x4 Armored Personnel Carriers: Khan.D and Kangal

Developed within NATO standards, Katmerciler's two different 4x4 armored personnel carriers provide high security against mines and improvised explosives.

The 4x4 Armored Personnel Carrier Khan D, developed by Katmerciler in line with NATO standards, is capable of transporting eight personnel. The carrier's length is 5210 mm, it is 2330 mm high and its width is measured at 2050 mm. The vehicle's curb weight is 4930 kg and its payload capacity is

1.000 kg. The Armored Personnel Carrier with 286 horsepower is capable of reaching a maximum of 130 km p/h. The vehicle is able to climb a 60% steep gradient and is capable of maneuvering at a 30% side slope. A fuel tank with a 138-liter capacity and ballistic protection is mounted over the vehicle.

Katmerciler's outstanding Armored Personnel Carrier Vehicle, "Kangal" Mine Resistant Ambush Protected Vehicle has a length of 5480 mm, height 2450 mm, width 2540 mm. The 375-horsepower vehicle can reach a speed of 100 kilometers per hour, with the capacity of 10 personnel. The vehicle is able to climb a 60% steep gradient and is capable of maneuvering at a 30% side slope. The combat



vehicle weight can reach up to 15 tons with a payload capacity of up to 2,500 kg. The vehicle has a fording depth of 1.5 meters.

TOMA (Anti-Riot Vehicle)

Katmerciler has been fulfilling most of the Anti-Riot Vehicle demands of the Turkish National Police and Gendarmerie General Command in the last five years. The Anti-Riot Vehicles with ballistic reinforcement, which are constantly developed through R&D studies, have been

successfully exported to many countries around the world. The Anti-Riot Vehicle with its 5.000-liter water tank, 80-liter foam tank, 60-liter dye tank, 60-liter gas tank and superior maneuverability capability is regarded as one of the most outstanding vehicles in its segment.

Armored Construction Equipment

The Loader is a 4x4 wheel drive with 4 tires powered with

a Hydraulic steering system and “Crab” walk system. The operator chair is adjustable, versatile and with suspension. The Cabin is Air Conditioned with Cooling and Heating system. There is an air conditioning system in the cabinet for heating and cooling the paint used on the equipment, is fire retardant and anti-flame and provides heat insulation. Automatic folding windshield protection design, so that going out the vehicle is not necessary. Lights, front and rear fog-lamps and side mirrors are protected against debris and objects such as stones and sticks.



TOMA Anti-Riot Vehicle

Riot Control Shield

It provides protection for up to 36 staff with its shields and weapons. Direct firing ports have been designed especially for use in disposing of non-lethal weapons. It can be used as a gate for the transfer of quick response forces with the lifting feature up to 3 meters. During the drive, it can absorb impact on harsh terrain and it can be placed on location without any person to serve as barrier. It has a guarded elevation platform and can be equipped with a ballistic guard.

Yavaşçalar to Take Part in Eurosatory Exhibition with Yavex Products

In preparation to attend the Eurosatory Defense and Security International Exhibition, which will take place in Paris on June 13th – 17th 2016, the Chairman of the Board of Yavaşçalar, Mr. Emrah Yavaşca noted, “Within the scope of this exhibition, which will gather all the major players of the world defense industry, our aim is to gain access new markets in order to enhance our export figures”.

Yavaşçalar has evolved into a worldwide brand by conducting business in the global market through its sales of hunting equipment, from a small shop in Balıkesir. The company is now preparing to take part in the Paris Eurosatory 2016 Exhibition on June 13th – 17th with the Yavex branded products it manufactures. During the exhibition, Yavaşçalar will be demonstrating small arms ammunition of the Yavex brand, Yavex branded Non – Lethal military tactical and operational equipment, Yavex industrial explosives for commercial uses, Wet Blank cartridge bullets, teargas, and in addition to the fog and tactical cartridges, the Yavex – Defense production 9x19 bullets will be displayed at the exhibition for the first time.

Emrah Yavaşca: “Yavaşçalar exports one third of its production”

Mentioning their expectations for the Eurosatory 2016 Exhibition and evaluating the current status of the Turkish Defense Industry, Yavaşçalar Chairman of the Board Emrah Yavaşca emphasized that the defense industry has an export target of \$ 25 billion as part of Turkey's vision for 2023 and added, “Within the scope of the Turkish Defense Industry, our domestic participation rate is over the level of 50 percent. We also observe that our exports exceeded \$ 1.5 billion the export figures of the industry are increasing day by day. As Yavaşçalar, we are increasing our exports each year. We are now exporting one third of our total production with our company growing through our intensive R&D activities and technology



investments. In this context, the exhibition in Paris bears great importance for our company. We believe that we could reach new markets, especially countries of the Far East and Africa, and with the help of this exhibition it will also help us to enhance our export figures”.

Yavaşca underlined that with the support of the National Defense Ministry and Undersecretariat for Defense Industries, Turkey's giant enterprises such as Aselsan, Roketsan and Havelsan, many private sector companies will be displaying their products and capabilities at this event and stated that the Eurosatory exhibition was also important for show-casing the level of competency that Turkey has reached in respect to the Defense Industry and technology, adding that



the reflections of the cooperation to be built throughout the event will be essential. Yavaşca said, “More than fifty percent of the participant companies of the Eurosatory International Defense and Security Exhibition are represented by the CEOs and Presidents. The importance attached to security and defense is increasing every day as a result of the rapidly changing political conjuncture and the growing conflict atmosphere of the world. As a consequence, initially for establishing a peaceful environment and securing their land and citizens, the countries are requiring defense systems with advanced technology. This results in the further increase of the cooperation among the countries as well. In this respect, we believe that the Eurosatory and similar events will enable many opportunities for entrepreneurs like us toward rebuilding the security of the world”. Yavaşçalar Chairman of the Board Emrah Yavaşca stated that during the exhibition, they would also be attending meetings and workshop activities organized by the Think Tanks in addition to displaying their products and capabilities.

Revolutionary Weapon Testing and Training Instrumentation

Trident Research has designed, developed, and sustained advanced instrumentation systems for the

U.S. military since its founding in 2001. In the area of acoustic-based weapon testing and training products, Trident's systems are unsurpassed in performance and affordability. Highly portable distributed sensors provide accurate location of any detonating or impacting direct or indirect fire munition – on land or at sea. And unlike shock wave acoustic systems where functionality and performance are determined by how close a supersonic munition passes the sensor, Trident's technology creates an invisible 2D or 3D region where any direct or indirect fire munition event can be located and/or scored.

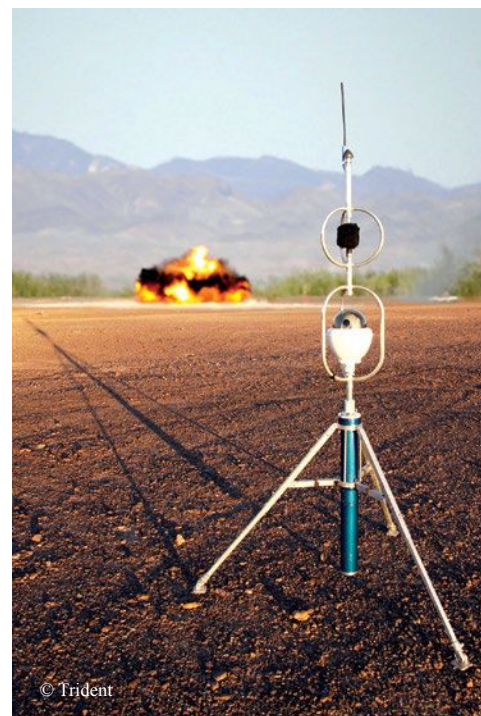
Acoustic-Based Weapon Testing and Training

Trident has perfected acoustic-based technologies to serve as a cost-effective and more accurate, reliable, flexible, and simpler means of weapon testing and training. The key is precise timing. The evolution of digital Global Positioning System (GPS) technology has produced miniature GPS receivers capable of cm-level positioning and nanosecond level timing. This provides Trident's distributed

sensors with an accurate and common time and position reference. When a munition detonates in the vicinity of one of the sensors, the impulsive acoustic energy that is released is identified and stamped with a GPS time mark that is accurate to 25 microseconds. The positions and times from each sensor in hearing range of the detonation are radioed to a central location and combined to triangulate the location of the detonation.

Trident's audio sensors have approximately 100 dB of dynamic range. This means each sensor can accurately capture full signature details with precise timing from a faint detonation from as far away as 6 km, or from a large explosion from as close as 500 m. This level of sensitivity means even inert rounds striking the earth or water may be positioned, as long as the amount of acoustic energy released can be heard by several sensors. If known targeted coordinates are entered, then miss distance or "score" information is displayed to the operator.

The omnidirectional nature of acoustic based localization also means a direct strike into the center of the target area is not necessary. If the artillery round or aircraft released bomb lands outside the test area, it can still be located and reported in near realtime, unlike with optics



and radar systems, which must have a clear line-of-sight (LOS) to the object to determine location. This also makes acoustics more applicable for training and testing areas in rough terrain and heavy foliage.

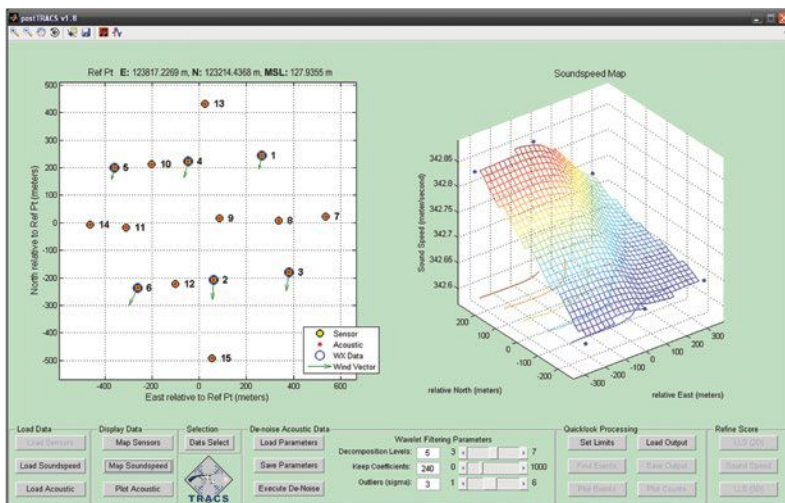
Application and Benefits

Suitable for land or naval gunnery training, forward observer or spotter assessment and training, and weapon testing, Trident's technology has been deployed for all types of platforms, from crew sized mortars and artillery to rotary and fixed wing aircraft. Trident's technology can also support multiple direct and indirect fire shooters and targets in a single instrumented range, making it highly affordable for complex training scenarios.

*"Train as You Fight,
Fight as You Train"*

Trident's acoustic technology is ideally suited to provide munition detonation and inert impact scoring for combat units.





Simple single person deployment and realtime automated result displays provide near instantaneous results for in field training. If you can hear it, you can score it. Visual inspection and battery charging are all that's required to prepare and deploy a highly accurate scoring network in any operational or forward training area. Real time quantifiable results provide an accurate assessment of detonation location or miss distance for training gun crews and support personnel under real world combat conditions.

Tactical Realism

The highly portable sensors can be placed in any topological environment and in desert, arctic, or tropical conditions. Trident's acoustic sensor technology can also be utilized in the presence of smoke, dust and debris, environments that are challenging

for optics or radar-based technologies. Further, Trident's technology does not require pointing or tracking of objects or explosive events to produce an



accurate localization, every firing platform and targeted object can be scored in near realtime, providing quantitative time and position data for every player on

the complex training battlefield.

All Weather

Using precision acoustics with sophisticated signal processing, Trident's technology can localize a munition detonation or impact event in any weather condition, day or night, rain or fog. And unlike radar and optics based technologies, Trident's acoustic technology is not hampered by moisture or ground reflection, making it ideally suited for real world combat conditions.

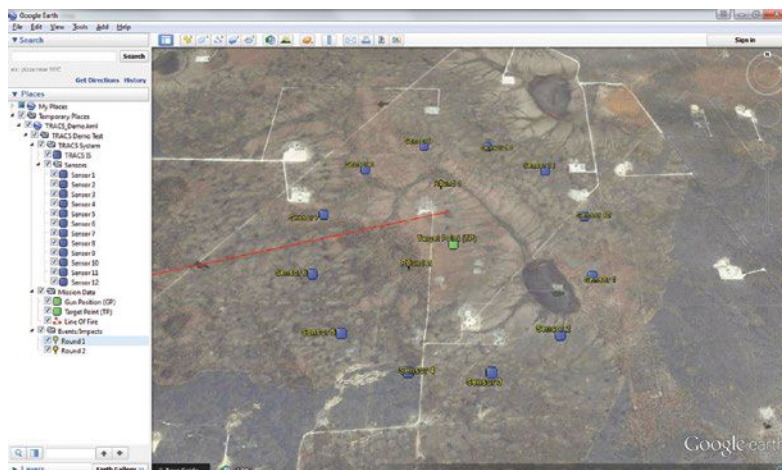
Simple to Operate

Trident's remote sensors are light weight, self-surveying, have an onboard digital compass for orientation, and communicate in an ad-hoc radio network

configuration, so the operator simply needs to activate the sensor and place in a desired location. No calibration, surveying, pointing, or precise placement is required. A 10 square kilometer test or training area can be established by vehicle or vessel in 3 hours (land) by a crew of two people or less than 1 hour (sea).

Automated Display Results

Real time communications between the distributed sensors and the central processing unit notifies the operator of status and condition of the training or test area. Single detonation or inert impact events separated by more than one second are automatically scored and



displayed in five seconds. For multi-round munition scoring, such as for dispensed munitions, 30 mm cannon, small rocket firing, or multiple firing platforms, each detonation is automatically scored in minutes. Results are distributed via Keyhole Markup Language (KML) in any standard or custom coordinate frame and viewable in Google Earth™ or your custom or proprietary digital mapping system.

Accurate

For single round munition scoring, real time signal processing provides automated +/- 1-2 meter accurate results in seconds and post-mission data processing and analysis tools can provide sub-meter accurate results in minutes. For multi-round munition scoring, such as for dispensed munitions or multiple firing platforms, these same accuracies are achievable by adding the High Speed GPU Module to the command and control system.

Affordable

Complete turn-key systems suitable for 8 square kilometer land or sea ranges can be provided for under

\$900,000 USD. Training or testing areas up to 50 square kilometers can be accommodated with additional remote sensors and portable communication repeaters. For weapon testers, advanced Mission Planning and Post-Mission Processing software suites are available to plan and extract sub-meter accurate results in minutes.

Adaptable

Trident Research scientists and engineers have over 20 years of experience designing, developing, fielding, and sustaining specialized, one-of-a-kind military test instrumentation systems. With a proven systems engineering process based on U.S. DOD guidance and a quality system fully compliant with ISO



9001:2008 standards, Trident can augment or adapt the acoustic technology-based system to any land or sea range, platform, or communications environment.

A summary table of benefits

over manual spotters and optics and radar technologies are provided in the tables below.

In use by the U.S. military since 2009, Trident's acoustic technology is the most accurate automated scoring capability in the world.

ITAR Certified

Export of Trident's acoustic technology requires licensing by the U.S. Government per the Arms Export Control Act, including the International Traffic in Arms Regulation (ITAR) and the Export Administration Regulation (EAR). Export can only be provided to authorized foreign government agencies through direct or Foreign Military Sales (FMS).

ACOUSTIC POSITIONING	MANUAL SPOTTER
Accurately measured miss distance to ~1 meter	General and subjective "hit or miss"
Accurate for high explosive (HE) rounds	HE round may eliminate target
A significant miss of the target is still scored	A significant miss of the target produces no result
Same accuracy day or night and in all weather conditions	Degraded performance at night and in poor weather
Same accuracy in dust, debris, or fog	Significantly degraded performance in dust, debris, or fog
Provides a detailed count and location of in-air and dispersed weapons	Advanced weapons (simultaneous sub-munitions) cannot all be scored

FEATURE	ACOUSTICS	RADAR	OPTICS
Functional in all terrains (portable)	YES	NO	NO
Fully functional in heavy precipitation	YES	NO	NO
Fully functional for inert ground impacts (Ground Clutter)	YES	NO	
(Must See Impact)	LIMITED		
Accurate for air burst rounds (Pointing Required)	YES	LIMITED	
(Pointing Required)	LIMITED		
Accurate for multiple HE rounds (Fragment Cloud)	YES	NO	
(Fragment Cloud)	NO		
Operable in an ocean operation (Large Ship Required)	YES	NO	
(Large Ship Required)	LIMITED		
Simple to operate	YES	NO	NO
Low cost	YES	NO	YES

ESG: the Partner of Choice for Complex, Frequently Security-Relevant, Electronic and IT Systems and Sophisticated Services and Solutions

50 years of experience, comprehensive and in-depth knowledge and technology transfer across all industries make

ESG Elektroniksystem- und Logistik-GmbH (ESG) one of Germany's leading companies for the development, integration and operation of complex, frequently security-relevant, electronic and IT systems for the military, public authorities and companies. Independent process and technology consultancy is one of ESG's key areas of expertise. Among ESG's customers are companies in the automobile, aerospace and defence industries and from the areas of industrial goods and commercial vehicles.

As a special systems company for mission avionics, simulation and training, as well as special operations systems, ESG offers customised solutions. ESG is also a certified aviation company for the aviation equipment of the Bundeswehr and an aviation engineering company in line with EASA Parts 21J/G and Part 145.

ESG: Reliable partner of security forces for protection against micro - drones. Commercially available unmanned aircrafts, also referred to as drones, are enjoying ever greater popularity. Due to their continuously reducing purchase price, they are accessible to a growing circle of users. Furthermore, they have more modern technology that enables virtually anyone to control them. At present, an end to this trend is not in sight.

This new technology opens a variety of beneficial options for



application that up to the present could only be implemented using expensive manned aircrafts. However, for thoughtless or intentional criminal use, drones could present a great risk. The possible misuse can be very varied and can extend from illicit recording of videos and photography, through the carrying and deploying of forbidden objects, up to attacks on property or persons using explosives. Due to their compact construction and high agility, it is impossible for perimeter protection systems at present to detect these unmanned aircrafts, and therefore they are unable to deploy countermeasures. In order to effectively counteract these risks, a complete systems approach is required. The drones and, as necessary, also the controller, must be detected and verified as an actual risk. This information must be made

available to the security forces. Subsequently, depending on the scenario, countermeasures can be initiated. Because an individual type of sensor cannot fulfil these requirements, ESG has developed a modular all-round system that can be scaled as required.

At the G7 summit at Elmau, Germany, in 2015, ESG successfully operationally deployed the overall system for detection, identification and defence of drones, together with leading technology partners. For this, using the ESG information distribution system, TARANIS, different sensors and effectors were networked and the operator was provided with a clear and constant up-to-date picture of the position - in the operations centre, on Smartphones or as input into existing position systems of the security forces. In addition to the large number of types of sensors already integrated,

it is also possible to integrate the customer's own sensors. Through this approach, the up-to-date picture can be extended by customer specific information for the individual user. This is made possible by the very flexible and adaptable design of the interface. In addition to the sensors, the system enables integration of different effectors and organizational countermeasures.

Using the existing system as such, the complete operating sequence of detection, verification, information and intervention can be carried out within an optimized working environment.

In addition to the successful protection of the G7 summit in 2015 at Elmau, Germany, ESG could already excite other national and international customers for the drone defence system. Cooperation was hereby formed in the military research and development sector, in the sector of national and public security, as well as for large industrial partners, as for example, leading automobile manufacturers and airport operators.

TARANIS: ESG's capable position display and command system

TARANIS Mobile is a flexible position display and command system to network operational forces and organizations with

security tasks, e.g. police, rescue services, fire service and civil protection services. Stationary operation, in control centres and operational headquarters, as well as highly-mobile in vehicles or application on foot is possible.

Once deployed, all operational forces have access to a common and continually up-to-date picture using TARANIS Mobile. And that within a secure, private sector. The data transmission is selectively carried out coded via the public mobile radio network, on Smartphones or other communication means, e.g. digital radio.

Position display

Using TARANIS Mobile, all participants – up to and including the commander of the operation – have an overview of the positions of all the forces involved in the mission on detailed maps. All events and activities of an operation of each participant can be brought together in the digital position map using simple symbols or tactical signs. These symbols are practically simultaneously presented on the display of every other participant, where it is processed, relocated or deleted, or can be displayed for further detailed information. The position map is also used to indicate objects detected in real time, e.g. infiltrating drones, to refer operation forces and

for tracking. Detailed status information can also be visualized on all sensors and effectors.

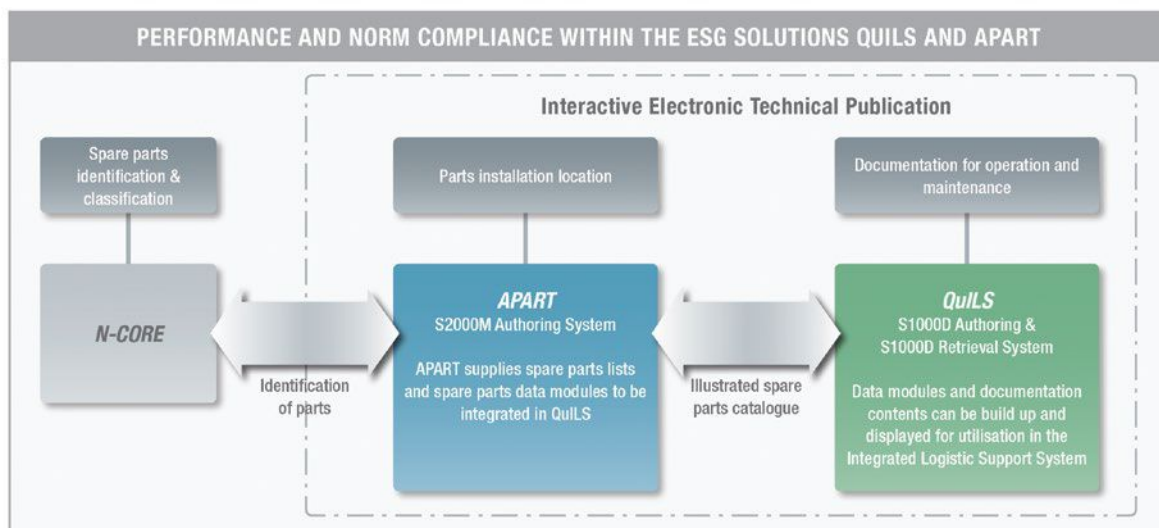
Intuitive & easy to use

Thanks to its intuitive user interface, with large buttons and clear display elements, TARANIS Mobile is particularly suited for use in stressful situations where time is of critical importance. All functions can be operated by touch (even with gloves) or for example, as an alternative, the system can also be operated using a mouse and keyboard. The intuitive operating concept also enables less technically experienced users to independently operate and safely control the TARANIS Mobile after a short instruction period.

ESG's standardised logistics solutions reduce costs

Many armed forces are modernising their logistics and increasingly using electronic documentation as the basis for upkeep. Standardised processes and powerful software solutions are the key to reducing costs, especially for multinational defence projects.

It all started with the Tornado combat aircraft. As West Germany, Italy and Great Britain were laying the groundwork for the joint development of this combat aircraft at the end



ESG's logistics solutions reduce costs: QuILS, APART and N-CORE

of the 1960s, they hoped their cooperation would result not

only in technological, industrial, and military advantages, but mostly in reduced costs. This did not just refer to the cost of developing the fighter-bomber. The nations involved recognised early on that there was enormous potential for savings in the area of technical support, such as the supply of spare parts, during the service life of the aircraft. This made the Tornado the first earnest attempt to utilise the economic advantages of standardised logistics supply. A common path was found to unify the 'descriptive documentation' and 'spare parts catalogue' logistical service packages for all nations involved. This trend of developing weapon systems through multinational cooperation has continued. The logistics approach used at the time has since been developed further and expanded to include nonaerial weapon systems. This is why, under the auspices of the AeroSpace and Defence Industries Association of Europe (ASD), the defence industry and armed forces have worked closely together to develop the ASD S-Series in

Europe. This is increasingly becoming the basis in Europe for logistical planning when developing new weapon systems. Both specifications, ASD/AIA S1000D (Technical Publications) and ASD S2000M (Material Management) have been in use for decades for aircraft, ground vehicles, ships, and their accessories. Other specifications have been and are being developed, such as:

- › ASD S3000L (Logistics Support Analysis)
- › ASD S4000P (Preventive Maintenance)
- › ASD S5000F (In Service Data Feedback)
- › ASD S6000T (Training)
- › ASD SX000i (Integrated Logistics Support)

NATO manual ACodP-1 on the codification of items of

supply is also observed. With these, the ASD S-Series forms an extensive regulatory space for the entire area of logistical planning, also known as integrated logistics support. This allows for standardised processes and interfaces between armed forces, as purchaser, and the defence industry, as supplier. Many armed forces have recognised the need for standardisation and thus resort to these specifications when modernising their logistics processes. Even the Dutch armed forces have taken this path.

Sophisticated software tools: ESG's QuILS, APART, N-CORE

With QuILS (S1000D, Technical Documentation), APART (S2000M, Spare Parts Management) and N-CORE (ACodP-

1, NATO Codification), they have consistently chosen ESG software products. These are equally suited both in the defence industry for data generation and in armed forces for data validation.

All spare parts for a weapon system are grouped together by the defence industry into what are referred to as initial provisioning lists. Armed forces require this information as early as the development stage to review and plan subsequent spare parts supply during the in-service phase. Any comments can be sent back to the defence industry and factored in. This spare parts data is then used as the basis for material management, e.g., in SAP. Whether generating, managing, validating or exchanging spare parts data, APART allows the S2000M specifications to be applied to their fullest extent. APART is also the market leader in the German defence industry.

All military spare parts used by NATO require a NATO stock number. This procedure is called codification and must be completed by each responsible NATO member state. This system currently comprises more than 32 million spare parts data records NATO-wide. In order to complete

the many codification tasks, numerous NATO member states use the established ESG product N-CORE NG.

Technical publications are generated at the same time as spare parts data. These include user manuals, maintenance instructions, spare parts catalogues, failure charts, maintenance schedules, and wiring diagrams. This documentation is generated by the defence industry as standardised data modules and submitted to armed forces for review.

Comments by armed forces are also usually added and factored in by the defence industry. The final product is finished documentation that also contains information on spare parts. All of this is possible with the QuILS-Author software by ESG. This software makes it possible to manage any number of publications, while also allowing important parameters to be set on a project basis. This makes QuILS-Author a suitable S1000D platform both for armed forces and the defence industry. As such, QuILS-Author is the new S1000D platform for the German armed forces and continues to establish itself in the defence industry.

Lastly, with QuILS-Web Retrieval, finished publications can be viewed by maintenance personnel directly on mobile devices.

Consistently applying ASD specifications in conjunction with the ESG software range has been proven valuable in the Dutch armed forces and in other multinational defence projects. Comprehensive logistics processes based on international standards and software products from a single source form the basis for effective defence logistics management and reduced development costs.

Note: TARANIS® is a registered Community trademark of ESG Elektroniksystem- und Logistik-GmbH

Spotter RF - Area, Environment and Drone Security Radar

The smallest, most rapidly deployed system available - tough to defeat

With its low energy consumption, the portable SpotterRF is the world's smallest radar which can detect 20 different motions per second under all weather conditions, night and day.

Capable of monitoring an area of hundreds of acres and drone activities in the air simultaneously, SpotterRF features quite obvious advantages compared to its rotating turret rivals that weigh 20 kilograms and over. The following features are considered among the advantages:

- › As it has moveable parts there is a low level of breakdown/maintenance and repair.
- › Its power consumption is significantly lower than all of its rivals.
- › It is quite advanced compared to its rivals with its aspects of lightness and endurance.
- › Easy installation and if required portable usage in the field.
- › Ease in Training, Command and Control.
- › provides a secure Web-based user interface compatible with PCs, Android tablets and smart phones. Easy to use plug and play design.
- › Real time data transfer, wireless usage advantages and it has a power supplying feature through solar panels.
- › Smooth and effective utilization comfort under all types of weather conditions.
- › With the help of its multiple radars, automatic command/control



Field Installation

opportunity from a single point through a single network via all types of cameras connected to these radars, as well as its feature of monitoring/alarming/firing in relation to the threats detected.

- › Its apparent low cost compared to its competitors.

The coordinate information of the moving target detected by Spotter RF radars is transmitted to the opted command/control software and the target is automatically tracked by the camera closest to the target. As shown in Figure- 1, it is combined with Google Earth or any tactical interface and it is capable of displaying the moving targets over the map in real time speed and with coordinate information. With the opted command/control software, numerous radars and cameras are



Drone detection capability

capable of functioning over a single interface and this really facilitates the realization of security operations.

The system also offers filtering features for assisting user's establishment of his security strategy such as active/passive region, speed and action direction, alarm periods, etc.

Integrated with various camera brands such as Axis, Bosch, Cohu, Flir, Pelco, Samsung, Hikvision, etc. it provides 7/24 security of the facilities around different regions of the world. The targets that cannot be seen through night vision binoculars are detected by the RF Spotter from as far as 2000 meters, with the capability to send tracked and audio and visual alarms to the operators. If desired, it can be integrated with mobile phones and controlled from the telephone network. Spotter RF can be easily integrated with the opted security



Spotter RF User Interfaces

management software.

Spotter RF is widely used in providing security for facilities such as nuclear and power plants, airports, dams and bridges, ports and marinas, oil and natural gas platforms, border patrols, etc. In addition to the fixed installation applications, it is utilized in the operations by the special task forces and various military troops. The total system equipment weight is 4 kilograms and it can be packed into a single backpack. Thanks to its low power consumption, Spotter RF is a life – saver.

Against the increasing Drone threats of our times, the Spotter RF is the most economic and effective method currently used in the world. By forming a security cloud over and around the facilities requiring protection, the Spotter RF with the help of its integrated system simultaneously detects drones from as far as 800 away and warns operators in the case that they exist within that range and warns security command control components and automatically launches tracking through cameras. If required, it also activates air defense components.



Facility Installation

BMC Staging 2 World Premieres at the Eurosatory 2016

BMC, one of the biggest commercial and military vehicle producers, founded in Izmir Turkey, with a background of more than 50 years, will be at the Eurosatory Defense & Security International Exhibition 2016 that will take place in Paris on the 13th-17th of June. Creating solutions in every realm of commercial and military vehicle production within its integrated 250.000 square meters manufacturing facility, BMC will stage 2 World Premieres in Paris - Multi-Purpose Armored Vehicle "Vuran 4x4" and two different types of facelift "Kirpi" models.

Having contributed \$10 billion to the Turkish economy with its vehicle production, exceeding 300,000 pieces since its beginnings, BMC continues to work towards the achievement of a renewed goal to become a worldwide-recognized brand. In this regard, BMC is attending with 3 new vehicles at the Eurosatory Defense & Security International Exhibition.

BMC sets the stage for the World Premiere of Vuran 4x4 Multi-Purpose Armored Vehicle at Eurosatory 2016. Due to its monocoque type armored cabin and windows, shock absorbing seats, V-shaped underbelly, gun ports and emergency exit hatch, Vuran 4x4 is part of a family which includes the multipurpose armored vehicles. It provides its passengers with ballistic protection and mine. The front rear view camera, automatic fire extinguishing system, remote

controlled weapon station, run-flat tire inserts and A/C with heating and cooling functions are among the outstanding features of Vuran.

Kirpi, a prominent member of BMC's Multi-Purpose Armored Vehicle Family, will also be

hook, transportability on railway, optional rear-view camera and an automatic fire extinguishing system are the other distinctive features of Kirpi.

Demonstrating an ability to develop dynamic and innovative approaches with research-development and design activities, producing both passenger transportation and military vehicles, BMC will be launching the renewed front faces of its new multi-purpose armored vehicle "Vuran 4x4" and two different types of "Kirpi" at Eurosatory 2016. The Eurosatory Defense & Security International Exhibition is an exhibition occurring biannually, gathering over 1,500 exhibitors from 58 different countries to discuss all of the aspects of the Land and Air land Defense industry.

presented at Eurosatory 2016 by BMC with its two distinct facelift models. "Kirpi 4x4 Ambulance" and "Kirpi 6x6" have the same cabin features as Vuran. Monocoque type armored cabin and windows, shock absorbing seats; V-shaped underbelly, gun ports and emergency exit hatch are prominent common features of BMC's Multi Purpose Armored Vehicle Family.

The discriminating qualities of Kirpi vehicles are as follows: Armored, manual 3600 rotatable turret together with electrical and air connectors for towing and being towed. Blackout and camouflage lighting, NATO towing



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Turkish Defense Industry Showed off Capabilities at DIMDEX 2016

The 9th DIMDEX event was held this year and approximately 9,000 visitors from 60 countries and 180 participating companies were welcomed in the Qatari capital of Doha from the 29th – 31st of March. The Qatari Royal Family and VIP delegations from the countries in the region were deeply interested in the event that resulted in a series of memorandums of understanding, valued around \$ 983 million, that were signed throughout the fair as well.

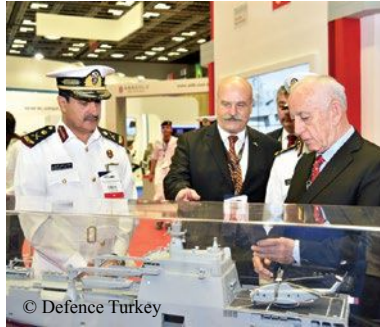
A short distance away from the exhibition, a total of 8 warships docked at Doha Commercial Port and were open to VIPs, trade professionals and visitors as part of DIMDEX 2016's organized program.

Turkey participated nationally in the event under the coordination of the Undersecretariat for Defense Industries and a total of 24 institutions and associations such as Aselsan, Havelsan, Roketsan, MKEK, STM, BMC Turkish Defense Alliance, ADIK Shipyard, Ares Shipyard, Yonca-Onuk J.V, Onur Engineering, Esen System Integration, TrJET, Aspilsan, Öztekin, Sur International Investment Co.LTD, CTech, Bites, AVS Saraciye Textile, Femsan Electronics Motors and Teknokrat, attended DIMDEX 2016.

On the first day of the 3 day event, Minister of National Defense Mr. İsmet Yılmaz, Undersecretary for Defense Industries Prof. İsmail Demir, Commander of the Turkish Coast Guard Rear Admiral Hakan Üstem, Commander of the Second Army of the Turkish Army General



Adem Huduti visited the Turkish stands and were informed on the products and capabilities by company representatives. Moreover, various delegations from Malaysia,



Nigeria, Saudi Arabia, Thailand and Tunisia visited the Turkish stands.

STM presented its Through-Wall Radar and Underwater Optical Communication Systems for the first time at the event while ADIK

Shipyard unveiled the mock-ups of its Landing Helicopter Deck, Off-Shore Patrol Boat, Emergency Rescue and Diver Support Vessel and Training Ship designs for the first time as well.

Ares Shipyard demonstrated the mock-ups of 17 Hercules Fast Intervention Boats that were sold to Qatari Coast Guard Command and also introduced the Multi Role Patrol Craft 125 FAMB to the participants.

Aselsan put mainly the Naval Systems into the forefront at its stand and displayed the SARP turret at the Qatari Armed Forces stand installed over the 6x6 Tactical Wheeled Armored Vehicle. Havelsan conducted various bilateral negotiations with the Qatari officials on the simulation and training centers and cyber security solutions.

Furthermore, on the 3rd day of the event, a contract worth € 41 million was signed between Yonca-Onuk Company and Qatari Naval Forces Command. According to this contract, 6 MRTP 20 (high speed patrol boats) will be delivered to the Qatari Naval Forces Command. Moreover, within the scope of the contract, the weapon systems of the platforms will be covered through the 13,7 mm stabilized machine gun platforms (STAMP) manufactured by Aselsan.





Kuwait Signs Contract for the Delivery of 28 Eurofighter Typhoons

The contract signature for 22 single-seat and six twin-seat follows the announcement of an agreement between the State of Kuwait and the Italian Government for the procurement of the aircraft on 11th September 2015. The aircraft will be of Tranche 3 standard and will be equipped with the E-Scan radar.

The contract confirms the State of Kuwait as the eighth customer in the program and as the third customer in the Gulf Region next to the Kingdom of Saudi Arabia and the Sultanate of Oman.

Speaking on behalf of the consortium and its Eurofighter Partner Companies (EPC) the CEO of Eurofighter, Volker Paltzo, said: "We are delighted to officially welcome the State of Kuwait as a new member of the Eurofighter family.

"The confirmation of this order is further testament of the growing interest in the Eurofighter Typhoon in the Gulf Region. It will enable Kuwait to benefit from the critical mass being developed in the Gulf and the many advantages that it brings to an Air Force in terms of interoperability, training and in-service support."

Since entry into service of the first Eurofighter Typhoon at the end of 2003, more than 470 aircraft have been delivered to six nations: Germany, the United Kingdom, Italy, Spain, Austria and Saudi Arabia. The Kuwait order follows an order by Oman in December 2012 for twelve aircraft. Eurofighter Typhoon is currently in service at 22 operational units and up to now; the whole fleet has completed more than 330,000 flying hours worldwide.

Hürkuş-A Configuration Passed EASA Flight Test



The Turkish New Generation Trainer Aircraft "Hürkuş-A" developed and manufactured by TAI Engineers, has accomplished EASA Flight Test between 22th-25th of March at the TAI facility.

A European Aviation Safety Agency (EASA) flight-test pilot and a flight test engineer completed a total of six sorties for certification compliance with the Hurkus prototypes HUR01 and HUR02.

Tests consisted of verification of the general flight and handling characteristics of the aircraft's stability and control, of its stall; spin; maneuvers and aerobatic capability, of its navigation and night flying capability, the man-machine interface, the emergency procedures and the overall system characteristics. The EASA's test flight pilot and engineer "did not find any incompatibility" for certification, the TAI announced.



Turkish Airlines Pilots to Complete Training with Havelsan's Simulators

Havelsan, combining its experience in the areas of simulator design, production, integration and maintenance in military, with the rapidly developing and growing civil aerospace sector, will be developing a Full Flight Simulator with the international D level certification for Turkish Airlines' Boeing 737NG type aircrafts.

Within the scope of this cooperation, Havelsan will be manufacturing the very first indigenous simulator to be used in the training of pilots for worldwide aerospace giant Turkish Airlines' Boeing 737NG aircrafts. This simulator, which will provide both low cost and safe training facilities, will at the same time be Havelsan's first civil aircraft simulator.

This cooperation became official April 19, 2016, following the signature ceremony accomplished with the participation of the Undersecretary for Defence Industries Prof. İsmail Demir, Deputy Undersecretaries of SSM, Turkish Airlines Chairman of the Board and the Executive Committee M. İlker Aycı and Havelsan Chairman of the Board of Directors Mr. Yüksel Öztekin at Turkish Airlines' Flight Training Center in Florya, Istanbul.

Commenting on the cooperation, Turkish Airlines Chairman of the Board and Executive Committee M. İlker Aycı said, "Today, two prominent figures of our country's aviation; Havelsan and Turkish Airlines are launching a process which will absolutely be a significant part of our civil aviation history. The very first indigenously produced passenger aircraft simulator which we will receive from Havelsan represents the start of this process. We are extremely proud to be using a completely Turkish made device during the simulator training that is the most important component of the flight training. Within the scope of the project, which will be reducing the level of our foreign dependency, the factor that also prevents the flow of an important resource to foreign countries is making us happy and motivated. Considering the fact that the test flights of a newly manufactured aircraft are being conducted initially through the simulators, we can even now claim



that this simulator from Havelsan will be one of the milestones of the Turkish aircraft industry".

Havelsan Chairman Mr. Yüksel Öztekin said, "We are proud to take our very first step towards the civil aircraft simulators market with the B737NG Full Flight Simulator Project in collaboration with the Turkish Airlines conducting flights to most destinations around the world. We have full faith in this cooperation's growth within an atmosphere full of trust and solidarity. From now on, we aspire to fulfill all simulator and training system requirements of the Turkish Airlines as well. By this meaning that the flight simulators and training systems requirements covered by the foreign resources will be directed to domestic resources and at the same time as a result of this cooperation we've made with the Turkish Airlines, we will have the opportunity to export civil simulators to the world civil simulator market".

Turkish Airlines, having 10 simulators available, made a tender for 4 Full Flight Simulators on 3 June 2015 and Havelsan participated in the tender along with the leading simulator manufacturers of the world and won the task of developing one of the four simulators. At the end of the tender process, it was decided to procure one Full Flight Simulator with Boeing 737NG international D level certification from Havelsan that is to be put into service on 31st October 2016. In this way, until the end of 2016, the number of Full Flight Simulators at the Turkish Airlines Flight Training Center will increase to 14 and an indigenous civilian passenger aircraft simulator will be included to this figure for the first time.

The EASA D level certificated Full Flight Simulator will enable the execution of the orientation, advanced

and renewal training of the Turkish Airlines pilots' with lower costs and in a lifelike environment. The simulator will be delivered directly to Turkish Airlines upon its production.

These simulators are one of the most important components for increasing the training quality of the pilots. Following the ground courses, the types of aircrafts of the pilots are identified and the courses at the simulators begin accordingly. The training hours vary on the type of the aircraft and the experience of the pilot and upon the completion of the training, the pilots move onto the actual aircraft. Then again, as per the civilian aviation rules, in order to renew their know-how, pilots conduct flights at the simulators once every six months. During this training, pilots also receive emergency training under all types of environmental and weather conditions. In this way, as the potential risks are being reduced the education level is increased and therefore reducing the costs of training.

As a result of this cooperation, Havelsan assumes an important role in fulfilling the pilot training demands of the leading airline; an airline which is well known, having one of the most active profiles in the aviation sector that has gained such obvious momentum in the last ten years. In addition to its achievements in the military area, Havelsan aims to become a notable figure in the civilian simulator field and this prestigious project bears great importance to this end as it is a demonstration of the company's determination to enter the civil aviation sector. The production of the Boeing 737NG type simulators is aimed to serve as a starter of the future simulators to be manufactured for the Turkish Airlines.

Turkish Defense Industry in Romania: Setting Sail with Business in Mind and Tender on the Itinerary of Annual Naval Exercise

The Turkish Defense Industry under the leadership of STM aims to be involved in Romania's frigate modernization programs.

The Turkish defense industry, under the leadership of Savunma Teknolojileri Mühendislik ve Ticaret A.Ş. (STM), made a business trip to Romania as part of the Turkish Navy's annual exercise, sea star 2016. The battle ships of Turkish Naval Forces visited the Romanian Port of Constanta on April 3-4 and the delegation, led by STM, presented the preparations conducted for assuming the modernization of Romanian frigates.

The maritime sector, gaining impetus particularly with the MILGEM (Indigenous Corvette) Project, continues its activities for gaining new markets in friendly and allied countries by utilizing its indigenous design, engineering and integration capabilities guided by STM. To this end, the vessels of the Turkish Naval Forces visited the Port of Constanta toward strengthening the cooperation between Turkey and Romania.

Within the scope of the visit, joint participation took place between the governmental and private sector; Turkey's achievements in this area were presented to the representatives of Romania's Ministry of Defense and Naval Forces by the delegation led by STM.



Commander of the Naval Forces Rear Admiral Alexandru Mirsu, Head of the Defense Committee Senator Ion Mocioalca, senior military officers, representatives of the governmental and private sector and a large group of press members attended the event from the host country. Under the presidency of the Deputy Minister of Defense Mr. Şuay Alpay, Deputy Undersecretary for the

of two frigates of the Romanian Naval Forces were explained. An international tender was initiated by Romania for fulfilling the requirements for the renewal of the two British, Type-22 class frigates sold after the removal of the combat systems in years 2004 – 2005. The major companies of the Turkish Defense Industry, led by STM, presented their preparations to the Romanian authorities in order to participate in this tender.



Defense Industries Dr. Celal Sami Tüfekçi, STM's General Manager Mr. Davut Yılmaz and other senior executives represented Turkey.

It was stated that the aim to establish cooperation between Turkey and Romania in the military area would contribute to the regional stability especially in the Black Sea region.

During the event-taking place on April 4, the studies regarding the tender for the modernization

In addition to the aforementioned modernization Project, the facilities and capabilities of the TCG F-511 Heybeliada Corvette were also introduced to the representatives of the Romanian Naval Forces and Defense Industry at sea (this was the first vessel of the National Ship (MILGEM) Project manufactured through indigenous resources and engineering, a source of pride and significance for Turkey.)

The signing of the Project Group Cooperation Agreement, actualized by the participation of Havelsan and Aselsan from Turkey under the leadership of STM and Romanian CSR Company, constituted another major step in promotion activities.

DowAksa Global Composites Center Boosts Turkey's Aerospace Capabilities

SSM Investment in Prepreg Technology Fosters Strategic Development Partnership Between TAI and DowAksa

DowAksa welcomed officials on Friday, May 13th from the Undersecretariat of Defense Industries (SSM) and Turkish Aerospace Industries (TAI) to jointly open The DowAksa Global Composites Center. The high technology facility is designed to advance Turkey's carbon fiber and other reinforcement composites manufacturing mainly for aerospace applications in both defense and commercial aviation, also targeting the infrastructure, marine, wind energy and transportation sectors. DowAksa is a 50/50 joint venture between The Dow Chemical Company and Aksa Akrilik Kimya Sanayii A.Ş.

As a new investment at DowAksa's global carbon fiber and composites production campus in Yalova, Turkey, the new Global Composites Center is partially funded by SSM under the IPEK Project, which aims to develop innovative carbon fiber and other reinforcement based pre-impregnated materials that will be domestically produced for military and commercial aircraft. As a result of the project, DowAksa will offer Turkish innovations in prepreg



materials and process technology to both domestic and global aerospace customers.

The Undersecretary for Defense Industries, Prof. İsmail Demir said, "Composites are among the most important group of materials in aviation. The reason for why they have become the most important group of materials in aviation can be explained by the developments they went through in the past 30 years and their wide variety of applications in military and commercial aviation. Composite technology and its most important constituent, carbon fiber technology, play an important role not only in aviation, but also in satellite platforms and access to outer space. Public support, dynamic power of the private sector and guiding policies of the government are critical in creating a composites industry in our country. This project is a product of nativization, nationalization and technology development policies of our Undersecretariat. Activities and partnerships such as these are a source of pride for our country. I hope that we see other facilities like this one in the future."

Undersecretary Prof. Demir joined TAI Deputy General Manager Mr. Naki Polat, DowAksa Deputy Chairman Mr. Mehmet Ali Berkman and DowAksa CEO Mr.

Douglas Parks for the opening ceremony of the 2,600 m² Center. After the ceremony, dignitaries and other distinguished guests from government, industry and universities took a tour of the new facilities' world-class laboratories and manufacturing equipment, including fiber weaving and multi-axial prepreg machines.

According to DowAksa Deputy Chairman Mr. Berkman, "Turkish companies are developing, producing and exporting more advanced technology products than ever before, and DowAksa is proud



Prof. İsmail Demir, Undersecretary for Defense Industry



Mr. Mehmet Ali Berkman, Deputy Chairman of DowAksa



Mr. Naki Polat, Deputy General Manager of TAI

that our domestically-made carbon fiber solutions will use market-driven innovations to benefit our Government's national security, energy and trade goals all contributing to economic growth."

Carbon fiber prepregs are highly important to the global aviation industry, and the product advancements offered by the IPEK Project will provide the benefits of new technology to advance Turkish aerospace objectives. The material will be manufactured to world-class aviation standards and is initially intended to be used in domestic unmanned vehicles and trainer aircraft such as TF-X, Hürkuş and Anka.

TAI Deputy General Manager Mr. Naki Polat said: "We are opening the first facility that we will use to supply a raw material by our own means. The usage of this material in both defense and aviation is now above 50%. Right now, composite usage in the new generation Boeing 787 and A350 is above 50

percent. Composites have become essential both in military and civilian aircraft. Their usage is also on the rise in sectors outside defense and industry. The center being opened today will create big opportunities for our country and our defense and aviation industries."

DowAksa CEO Mr. Douglas Parks praised SSM for funding the IPEK Project, while noting the strong collaboration that has emerged with project partner TAI: "SSM understands very precisely the strategic value of developing new composite capabilities for defense and commercial aerospace applications that can integrate the value of high-strength, lightweight composites into its domestic capabilities, and with their expertise and know-how, TAI provides our team the guidance to successfully start up a facility that will deliver continuous innovation improvements."

Ipek Project

In 2014, SSM initiated "Ipek Project", a 3-year initiative to manufacture the first domestic carbon fiber and glass fiber-based prepreg materials. The materials manufactured by DowAksa will be used in TAI's unique applications, focused on material advancements for Turkish aviation for both the defense and commercial sectors. The final project deliverables are due to SSM in early 2017.



Turkish Aviation and Space Workshop Accomplished

The Turkish Aviation and Space Workshop lasting for two days were launched with the opening remarks of the Minister of Science, Industry and Technology Fikri Işık and TÜBİTAK Vice President Dr. Orkun Hasekioğlu and ended with the assessment of TÜBİTAK President Prof. A. Arif Ergin.

In his speech at the Turkish Aviation and Space Workshop, Prof. A. Arif Ergin stated that space technologies were composed of a wide area covering the design, launch, placing into orbit and useful data transfer of the space vehicles serving to all types of purposes such as communication, defence, navigation and astronomy and added, "Those who have a say in such areas will have a say in the world. We also wish to elevate our aviation and space industries to the level where they are able to compete with the world and we are exerting all efforts to realize this dream".

Underlining that while realizing the projects in this area TÜBİTAK aimed to own the capability of indigenously researching, developing, producing and directing the systems and technologies fulfilling the national security requirements; Ergin emphasized the need for worldwide competition, cooperation or mutual dependency regarding systems and technologies.

Ergin touched upon the fact that the space studies have been progressing at full steam since the 2000s and turned into a worldwide competition area and continued, "USA being in the first place, Europe, countries such as Russia, China, Japan, India, Canada and Brazil are forming a resource for space studies reaching to a total of 200 billion US\$. Within the scope of the studies aiming the year 2050, manned space travels to other planets and detailed planet examinations are planned. That being said, we have to join our forces, knowledge and experience".

Mentioning that Turkey had to establish a sustainable national space and aviation strategy infrastructure, Ergin continued, "This could merely be achieved through supporting the functioning of the supply chain, smoothing shareholders' access to existing resources, increasing R&D investments and extending their scope, identification of new R&D projects, creation of comprehensive road maps within the scope of technologic area, preventing repetition and researching the dual-use potential of civilian-military technologies. In the conclusion, our gains in space and aviation areas will create a series of advantages in a wide variety of areas from disaster management to agriculture, from meteorology to urban planning, from defence to country's welfare".

At the Workshop; Air Forces personnel presented five declarations and the academicians participating from various universities presented seven declarations.

Prof. Aziz Sancar Owner of the Nobel Prize in Chemistry Meets TAI Employees

Filling our country with pride with the Nobel Prize he won, scientist Prof. Aziz Sancar paid a visit to the TAI facilities and met the engineers, technicians and administrative personnel of the company. Prof. Sancar was informed on the indigenous development programs conducted by TAI and other programs during his visit on 16 May 2016.

Throughout his tour at the facilities, Prof. Sancar examined the T129 ATAK Helicopter, Unmanned Air Vehicle ANKA, New Generation Training Aircraft Hürkuş designed and developed by Turkish engineers and met the young engineers working on the Indigenous Helicopter Development Project at their worksite.

Prof. Sancar gathered with the TAI members following his examinations and stated that he was quite impressed and proud with the studies conducted and said, "Thank you for all the services you have given for our country!"

The gathering was hosted by TAI President and CEO Muharrem Dörtkaşlı and in his



speech Dörtkaşlı expressed that Prof. Sancar's achievements would provide an insight for TAI's young engineers and technicians and that they would be further motivated and finally extended his gratitude for his visit to the company.

In order to be displayed at the Turkish House at the USA, TAI President & CEO Dörtkaşlı presented the Turkish hand crafts miniatures and mock-ups of TAI's indigenous products such as ATAK helicopter to Prof. Aziz Sancar.



Magnetic Particle Imaging Project 2+2 Turkish- German Cooperative Program

Aselsan Research Center with its academic partner Bilkent University applied for the call of 2+2 Turkish-German Cooperative Program organized by the German Federal Ministry of Education and Research (BMBF) in 2015 with the project "Real-time Imaging Methods for Interventional Magnetic Particle Imaging".

Total of 130 R&D project applications were made to 2+2 Turkish-German Cooperative Program. 9 of the projects out of 130 were announced to be eligible for providing support after evaluated by TÜBİTAK and BMBF, and the related support was provided accordingly.

Aselsan was ranked number three and entitled for funding the "Real-time Imaging Methods for Interventional Magnetic Particle Imaging" project. Besides, within the scope of the program, nearly 1 million TL worth fund will be transferred to the Aselsan Research Center in order to be used for R&D activities at this field which involves advanced technology. Aselsan Research Center will initiate the related activities within the scope of the project in May 2016 and the related studies are expected to be finalized within three years.

For the German side, University of Luebeck and Nano4Imaging GmbH will participate as partners of the program. ASELSAN aims to reduce the calibration and data acquisition time by using compressive sensing techniques, enable the design of hardware and software meeting clinical requirements, and develop an image formation unit.

The market size for Magnetic Particle Imaging devices is expected to grow significantly in the following years, up to 50 Million Euros yearly by 2020 and 700 Million Euros yearly by 2025.

Sikorsky Conducts Combat Rescue Helicopter (CRH) Air Vehicle Preliminary Design Review (PDR)

Lockheed Martin (NYSE: LMT) announced on May 2, 2016, the successful execution of the Combat Rescue Helicopter Program (CRH) Air Vehicle Preliminary Design Review (PDR). This important review signals that the CRH program is proceeding with detailed design activities for the HH-60W Air Vehicle and Logistics system. In addition, the team will continue toward the CRH Training Systems Preliminary Design Review in August, three months ahead of schedule.

Sikorsky, a Lockheed Martin Company, and the United States Air Force (USAF) hosted a five-day meeting in April to gather stakeholders and key collaborators from government and industry for an in-depth review that demonstrated that the overall design meets the systems requirements setting the stage for the next phase of the program. Review participants included members of the Office of the Secretary of Defense, both the USAF acquisition team and representatives of the USAF operational combat rescue community, as well as the Sikorsky and Lockheed Martin industry team and several other key suppliers.

"The successful Air Vehicle PDR confirms the program is on the right track and marks a significant step for the CRH program," said Tim Healy, Sikorsky, CRH Program Director. "Sikorsky and the USAF are well aligned in this collaboration effort and this successful PDR moves us closer to bringing this vital aircraft to the warfighter. Specifically, I am very proud of our team. They are

not only operating to an accelerated schedule, but the preliminary design that we have achieved here has well prepared us for detailed aircraft design and subsequent production. Our Training team is also executing extremely well and will be conducting the PDR for the Training System three months earlier than originally scheduled. This will further reduce our risk to achieving the USAF accelerated schedule for CRH and delivering this critical capability to the AF rescue crews faster. We are keenly aware that they are in combat every day, and that every day we can accelerate getting the HH-60W into their hands reduces the risks that they face on our nation's behalf."

The U.S. Air Force awarded Sikorsky the Combat Rescue Helicopter contract in June 2014.

The \$1.2 billion Engineering Manufacturing & Development (EMD) contract includes development and integration of the next generation combat rescue helicopter and mission systems, including delivery of four HH-60W helicopters, as well as six aircrew and maintenance training systems. The training suite includes devices that span full motion simulators and discrete aircraft systems used for training, such as hoist and landing gear.

The USAF Program of Record calls for 112 helicopters to replace the Air Force's rapidly aging HH-60G Pave Hawk helicopters, which perform critical combat search and rescue and personnel recovery operations for all U.S. military services.

The HH-60W is an advanced variant of the UH-60M Black Hawk helicopter design and features increased internal fuel capability, allowing for greater range, and an increase in cabin space. The CRH aircraft will feature GE T700-701D engines, composite wide-cord main rotor blades and fatigue and corrosion-resistant machined aero-structures to sustain maneuverability at high-density altitudes. The design includes an advanced Tactical Mission Kit integrating multiple sensors, data links, defensive systems, and other sources of intelligence information for use by combat rescue aircrews.

In 2015, the CRH program conducted the Training System Requirements Review (SRR) and System Functional Review (SFR) as well as the Air Vehicle SFR and SRR.

J. David Schairbaum, USAF, System Program Manager, CRH, said, "Achieving the Air Vehicle PDR milestone is pivotal for our program. Successful execution of the CRH program is essential to meet the continued demanding personnel recovery mission in today's challenging operational environment. We are working closely with Sikorsky to assure this newly designed aircraft is delivered to the warfighter on schedule and within cost."

Lockheed Martin will outfit the aircraft with its mission planning system, defensive systems, data links, mission computers, adverse weather sensors and system integration of all CRH-unique subsystems.

Nurol Land Vehicles to be Equipped with SARP Weapon Systems

Aselsan has made a public announcement regarding an agreement on the sale of the SARP Remote Controlled Gun System

to meet the needs of the Turkish National Police. This agreement is valued at an estimated €29 million, between Aselsan and Nurol Makina

ve Sanayi A.Ş. and was signed on April 27th. Within the context of the agreement, the deliveries will be completed in 2016.



Military Attaches Briefed on “SOM-J” by SSM

The Undersecretariat for Defense Industries (SSM), in a pioneering approach to promote the Turkish defense industry, invited Military Attaches of Allied countries to a detailed briefing given regarding the SOM-J precision cruise missile.

The Military Attaches of Allied Nations were hosted by Undersecretariat for Defense Industries officials to gain up-to-date information about the SOM-J cruise missile program, that will be utilized by the F-35 Joint Strike Fighter aircraft developed in Turkey. The Military attaches of the allied nations showed tremendous interest.

Prior to his speech at the briefing, Dr.Celal Sami Tüfekçi, the Deputy Undersecretary for the Undersecretariat for Defense Industries, with asseveration stated that “the Defense Industry has the capacity to not only cater to the needs of the Turkish Security Forces, but also to meet the requirements of Allied countries as well,” noting to the foreign representatives in attendance, that pronounced strides have been made in recent years in this regard.

SOM-J's Impressive Capabilities

Dr.Celal Sami Tüfekçi, the Deputy Undersecretary for the Undersecretariat for Defense Industries said that the design, development and prototype demonstration of “SOM-J” cruise missile are constantly maintained by the parties involved and stating, “The Stand-off Missile will be addressed in relation to the needs identified by the cruise missile requirements for the Turkish Air Force’s F-35 JSF program. Within the scope of program, as the SOM Configurations are currently fitted in our Turkish Air Force fleet, modification integration of SOM missile is currently being carried out to fit into the internal weapons bay of the F-35 aircraft.” Dr. Tüfekçi continued “SOM-J development activities commenced upon the signing of the contract with the Undersecretariat for

Defense Industries and Roketsan in the beginning of 2014 with TUBITAK-Sage as the subcontractor. Roketsan and TUBITAK-Sage have teamed up with Lockheed Martin in the development phase of the SOM-J program. SOM-J first flight demonstration is scheduled for the second quarter of 2017. Block-4 configuration of the Turkish F-35s will be equipped with the SOM-J Cruise Missile.”

SOM-J Features ASuW Capabilities

The SOM-J is a high precision, all weather, air-to-surface and anti-surface next generation cruise missile to be used against highly defended, anti-access, stationary and moving land/surface (ASuW) targets. SOM-J missile design stands out in theater with its modular design to support operational flexibility. The SOM-J missile uses Global Positioning System as its primary guidance and is aided by inertial, terrain-referenced and image-based navigation systems, as well as an imaging infrared seeker. Due to changes in target positioning, it is capable of in flight re-targeting as well. Changes such as altitude during approach and angle of target impact can be made in-flight. SOM-J is developed and outfitted with measures to withstand standoff jammer systems. The missile is expected to gain the lacking ASuW capability of F-35 fleets.



Raytheon Ramps up Deliveries of Small Unmanned Air Systems

Responding to growing war fighter demand, Raytheon has increased deliveries of its small unmanned aircraft systems. The company has also formed a new UAS directorate within the Advanced Missile Systems product line in Tucson, Arizona, that combines expertise in small UAS airframe and integration, with mission payload, command and control, and technology from across the company.

"Demand for our UAS platforms continues to grow as we deliver innovative unmanned solutions to a wide range of customers," said Dr. Thomas R. Bussing, vice president of Raytheon's Advanced Missile Systems product line. "This new directorate links company talents in aerodynamic design, propulsion systems, ground stations and a variety of mission payloads into one team that will enable us to deliver even better solutions to our customers."

Raytheon produces the Coyote and SilverFox UAS platforms

Designed to be a low-cost, expendable solution, the Coyote UAS is tube-launched and can be



deployed from aircraft at altitude, the deck of a ship, or from the ground. It is ideal for performing intelligence, surveillance and

reconnaissance (ISR) missions, while the host craft remains at a safe distance.

The Silver Fox is an expeditionary UAS that is a cost-effective solution for small footprint, tactical mobile operations. Deployed around the world, it has consistently proven to be a highly effective ISR platform.

"We are focused on tactical, expeditionary systems providing users with cost-effective, affordable solutions that can be operated organically with a very minimal logistics footprint," said Pete Mangelsdorf, Raytheon Unmanned Aircraft Systems director. "We are heavily engaged in UAS autonomy and MUM-T, or manned-unmanned teaming, as we continue to expand in this market space."



F-35 2B and 3i Software Final Configuration Completed

The F-35 Joint Program Office (JPO) has completed development of the software the U.S. Air Force will use to declare Initial Operational Capability this year. The Block 3i software provides F-35s with initial war fighting capability on upgraded computer hardware.

As of 1 May, the F-35 program has flown more than 100 flight hours with the 3i software and it has shown approximately twice the level of stability as the previously fielded Block 2B software and three times better stability than the original 3i software. The JPO will begin to upgrade the F-35 fleet (LRIP 6, 7, and 8 aircraft) with 3i software the week of 9 May. The same stability and mission effectiveness enhancements

have also been incorporated into a new version of Block 2B software, for the benefit of earlier fleet aircraft. The new version of 2B software will be used to start upgrading LRIP 2-5 aircraft by the end of May. The entire fleet of fielded F-35 aircraft will eventually be upgraded to these two new software versions by the end of calendar year 2016.

Concluding Block 2B and 3i development and testing now

allows the F-35 program to focus on completing Block 3F – the Full War fighting Capability software. The improvements to Block 2B and 3i have been transferred to Block 3F, and all developmental test aircraft and labs have been upgraded to Block 3F. This will allow the entire enterprise to focus their development and testing on the final Block 3F capability, moving us closer to ending the SDD program.

Lockheed Martin Build-up Miniature Hit-to Kill Interceptor for RAM Targets

A Lockheed Martin built Miniature Hit-to-Kill (MHTK) interceptor was successfully launched from a Multi-Mission Launcher (MML) in an engineering demonstration on April 4 at White Sands Missile Range, New Mexico.

The launch demonstrated the agility and aerodynamic capability of the MHTK missile, which is designed to defeat rocket, artillery and mortar (RAM) targets at ranges greatly exceeding those of current and interim systems. Today's launch advances the program, increasing the level of MHTK integration maturity with the MML.

"Today's global security environment demands agile, close-range solutions that protect soldiers and citizens from enemy rockets, artillery and mortars," said Hal Stuart, Lockheed Martin's MHTK Program Manager. "This test is a

critical milestone demonstrating the interceptor's maturity, and we look forward to continuing to build on this success using key data gathered from today's launch."

The MHTK interceptor was designed to be small in size while retaining the range, lethality and reliability of other Hit-to-Kill interceptors. MHTK is just over two feet (61 cm) in length and weighs five pounds (2.2 kg) at launch. The compact footprint of the MHTK allows multiple rounds to be packaged in a single MML tube.

The MML is a key component of the Army's Indirect Fire Protection Capability Increment 2 - Intercept program. The program is designed to provide Army forces protection from cruise missiles, unmanned aircraft systems and RAM threats. The MML is designed to carry and launch a variety of missiles from a



single launcher.

The MHTK uses Hit-to-Kill technology, which destroys threats through kinetic energy in body-to-body contact. Hit-to-Kill technology removes the risk of collateral damage seen in traditional blast-fragmentation interceptors. The MHTK interceptor complements other Lockheed Martin Hit-to-Kill missile interceptors by delivering close range lethality with proven success for a true-layered defence.

Australian Government Selects DCNS for the SEA 1000 Future Submarine Program

The Australian Government has selected DCNS as its preferred international partner for the design of 12 future submarines for the Royal Australian Navy.

The announcement was made by the Australian Prime Minister the Hon. Malcolm Turnbull, the Minister for Defense, Senator the Hon. Marise Payne, The Minister for Industry, Innovation and Science, the Hon. Christopher Pyne and The Chief of Navy, Vice Admiral Tim Barrett.

The Australian Government stated: "The decision was driven by DCNS's ability to best meet all of the Australian Government's requirements. These included superior sensor performance and stealth characteristics, as well as range and endurance similar to the Collins Class submarine.

The Government's considerations also included cost, schedule, program execution, through-life



support and Australian industry involvement."

"This success has been made possible thanks to the strong teamwork between the French Authorities, DCNS and our industrial partners," said DCNS Chairman and CEO, Mr Herve Guillou.

"France and Australia have been allies for more than 100 years and we look forward to further strengthening this time honored relationship and honoring the trust

the Australian Commonwealth

Government is placing in us for this ground breaking project," Mr Guillou said.

Subject to discussions on commercial matters, the design of the Future Submarine with DCNS will begin this year.

The SEA 1000 program is the largest acquisition project in the history of Australian defense, representing an investment of around 34 billion euros.



The Royal Thai Navy Selects Thales to Modernize its Naval Capabilities

Thales has announced two significant contracts for the supply of a full spectrum of Above-water and Underwater solutions for the Royal Thai Navy (RTN). Thales will modernize the Bang Rachan Class Mine hunters and supply the combat, navigation and communication suite onboard the newly ordered Krabi Class Offshore Patrol Vessel.

Thales is the prime contractor for the modernization of the Bang Rachan Class Mine hunters.

Thales has been a partner to the Royal Thai armed forces since the late 90's and has provided the Royal Thai Navy with numerous solutions from sensors to integrated combat systems for various vessels of the fleet. Building on the success of its collaboration with the RTN, Thales has been awarded the role of prime contractor for an extensive upgrade of two Bang Rachan Class mine hunters built in the late 80's (HTMS Bang Rachan and HTMS Nong Sarai). This marks Thales's first success in the underwater systems and sonars market in Thailand.

As prime contractor, Thales will be responsible for the revised vessel design, repairs and modernization, the procurement of equipment and the platform integration. The upgraded ship will be equipped with new solutions, including a machinery control system, navigation systems, upgraded communications capabilities, Sonar TSM 2022 MkIII with M-CUBE command and control (C2) and a multi-influence

signature range to manage RTN ships' signatures.

Thales will work hand in hand with the local industry to manage the works. The Group will also provide training and Integrated Logistic Support (ILS) for the RTN to enjoy the best operational use of the vessels in the coming years.

Thales' solution extends the operational life of these ships by over 15 years.

Thales onboard the second Krabi Class Offshore Patrol Vessel

In 2009, Thales was chosen to supply the combat, navigation and communication suite for the HTMS Krabi. The ship was commissioned in 2013 and has already completed more than 1,000 days at sea.

In 2015, the RTN decided to launch a second vessel of the

Krabi Class. The vessel, to be built by Bangkok Dock, will be equipped with a Thales integrated solution that includes the TACTICOS combat management system and an integrated bridge and navigation suite.

The sensors to be delivered are the VARIANT surveillance radar, STIR 1.2 EO Mk2 fire control radar and VIGILE Electronic Support Measures with SKWS chaff launcher. Furthermore, Thales will supply the Tactical Data Links Link RTN and LINK-Y Mk2 and all internal and external communication systems. Thales will be responsible for all integration activities, including the 76 mm gun, 2x 30mm gun and HARPOON SSM.

The ship is expected to be commissioned in the second half of 2018.

By working together with its naval key industrial partner, Thales will be able to provide the best level of local training and service to the RTN and support Thailand's goal of strengthening high end local industrial capabilities.



The new RENK Multifunctional Test Facility for Propulsion Systems and Components was Launched

In the beginning of 2016 one of the biggest and most modern test facilities in Europe for gear units was put into operation at the RENK AG headquarters in Augsburg. Whether for the shipbuilding, automobile or industrial sector: The multifunctional test facility is especially suitable for the testing of prototypes or special equipment. The 40 x 60m building with a height of 20m was never destined to be used for testing only the special gearboxes and propulsion systems produced by RENK. It is also available for external producers of propulsion systems or propulsion components. The test facility offers the highest performance: It allows for example for a power capacity of up to 12 megawatt at 10 revolutions per minute and can take a torque of up to 11 million Nm. Around 100,000 liters of oil are available for testing the equipment. The cooling system contains about 300,000 liters of water. The pumping capacity alone is 1,450m³/h. There are 10 motors integrated into the test facility which can be used as generators and in a bidirectional way as well. Due to their variable configuration they can be used in testing combinations. The smart mechanical facilities allow for the testing even of complex and high volume propulsion systems with short installation or set-up times.

The test facility is built as a multifunctional test bed and designed to test a multitude of parameters on different loads. The testing installations are set up in a way so that propulsion systems can be tested. Testing of the complete ship propulsion systems including power switching station, frequency converter, compensation plant, motor, gearbox at low or medium voltage in every configuration can be easily handled.

Maximized functionality-precise configurations

The equipment of the test facility allows a variety of tests: From functional and capacity tests to measurement of process parameters and acoustic behavior of structure- and airborne noise. The 1,250 square meter test area is subdivided into 2 large and 2 smaller testbeds in different rooms of the building. The two large ones measure 37 x 15 m and 37 x 13 m, the small ones have a size of 15 x 6 m and 20 x 6 m. This area is covered with 30 cm thick slabs and is anchored to a reinforced concrete foundation up to 3 m thick for loads of up to 1,000 tons. The cranes in place can lift weights of up to 200 tons.

To be used for motors and generators in arbitrary combinations

The multi-functional test facilities deliver top performance in terms of other parameters as well. They have the option of a power intake of 12 MW at 10 rpm (e.g. a wind turbine gearbox in back-to-back- operation) which results in an operating torque of 11 million Nm.

With the aid of intermediate gears, test specimens can be subjected to torques of up to 500,000 Nm and maximum speeds of up to 20,000 rpm under load of up to 12 MW.

For this purpose there are five AC motors with an output of 6 MW each and five DC motors with outputs of 1 MW and 600 KW. Each motor can also be used as a generator, thus feeding the braking energy back into the system. Hence, load tests of 12 MW simply consume the actual losses caused by the tested objects and are therefore highly efficient.

Less input, maximum results

The test facility is adapted to the specific needs of manufacturers of complete drive and propulsion systems as well as their components such as motors, brakes, compressors, gears and, for every sector—marine, automotive or industrial. The multifunctional test facility is especially suited for testing prototypes and pre-production assemblies. In this way manufacturers save the time and costs that would be caused by setting up the test equipment themselves.

Cost and time savings are particularly high whenever complete marine propulsion systems need to be tested. By outsourcing such work, contractors have the possibility of thoroughly testing the propulsion system in its entirety before the commissioning stage and not having to wait for it to be installed onboard. This translates into significant savings in time and costs otherwise involved in onboard testing.

Another advantage: the systems are installed in the test field completely with including all electrical infrastructure. This means that the signals and interfaces can also be tested. Such an all-inclusive test set-up provides a high level of validation reliability even before commissioning.

Close to the action yet safe

The Augsburg multifunctional test facility is one of the few worldwide to allow customers to personally experience the testing in close proximity of drive systems and their components while safely protected from potential hazards. To make this possible they provide observation rooms in a gallery around the test fields. There they can follow the testing

of their products in every detail, either on a monitor and through camera installations safe from noise or live from the viewing platforms.

The four pillars of the RENK test facility

The following four pillars neatly sum up the testing procedures and options available on the four test beds of the multi-functional test facility.

Asset „Oil“

In order to have the right amount of oil available throughout operation, each of the four test beds has an integrated lubricating oil system for closed loop lubrication. The oil volume of each is 14,000 liters, and they can each deliver up to 4,500 liters/min during which the incoming oil passes through a filter with a nominal mesh size of 10 µm. For the purpose of heat discharge, four oil heat exchangers (3 x 1,000 kW, 1 x 600 kW) are available per oil unit.

There are two oil filling units for test specimens which have their own oil reservoir with a capacity of 24,000 liters each. In total RENK stores about 100,000 liters of oil at its test facility.

Asset „water“

The cooling systems require vast volumes of water. At present, the available cooling capacity is 8 MW which, if and when needed, can be raised to 12 MW. Added to this are three refrigeration units with a capacity of 600 KW each, by means of which the oil temperature of the hydraulic systems can be lowered all year round for special tests. The complete cooling system contains around 300,000 liters of water, distributed by 30 pumps along various circuits for cooling the test specimens, oil units, and other components. The aggregate pumping capacity is 1,450 m³/h.

Asset „Electric power“

Another essential element of a test facility is the electrical system. The RENK facility has 10 motors in total which also work as (bi-directional) generators. Configured adjustably, they can also operate in test combinations.

The five 6-MW AC motors run at maximum speed of up to 2,400 rpm and develop a torque of 38,000 Nm each, while the five 1-MW DC motors run at 2,100 rpm and develop a torque of just under 12,000 Nm. In each case, two motors can be connected in series. This way two 6-MW AC motors can be combined into a 12-MW power package with two additional motors acting as brake generators. This means that high-load test cycles are possible without extensive set-up preparations.

All our motors are adapted to the high requirements placed on the test specimens in terms of airborne and structure-borne sound emissions. Therefore the five AC motors each feature additional stiffening elements and special insulation. They also have a connecting flange at either end as well as low-noise water coolers underneath.

With the aid of matching transformers, various levels of voltage ranging from 690 V (4 MVA) to 11 kV (8 MVA) can be provided for the test beds. These are used, for example, during the testing of complete propulsion systems. With the aid of a motor-generator set, these voltage levels can also be used with frequencies varying between 5 and 80 Hz, for example, when testing motors. Thanks to the perfect sinusoidal current created, motors to be supplied both by frequency-converter and mains can be tested at various voltages, speeds and power levels.

Asset „Mechanics“

From high torque to high-speed transmission: covering an area of 1,250 m², the test beds feature state-of-the-art mechanical equipment throughout to allow the testing of even complex and bulky drive and propulsion systems, with very little assembly and set-up time required and equally uncomplicated dismantling of the system elements. Crane capacities of 200 t make sure that assembly/dismantling work can be carried out quickly from start to finish.

Orbital ATK Awarded \$16 Million International Contract for DSU-33D/B Proximity Sensor

Sensor Can Detect Height Above the Target for Maximum Weapon System Effectiveness

A global leader in aerospace and defense technologies announced today that it has received a \$16 million order for its state-of-the-art DSU-33D/B proximity sensors. The order was placed through Direct Commercial Sales with an international customer, with delivery of the fuses expected to begin in mid-2016.

The DSU-33D/B is an all-weather, active, radio-frequency ranging sensor that has the capability to sense the height of a weapon above the target zone to maximize its effectiveness. Orbital ATK is the leader in fusing systems, delivering more than 155,000 sensors to the U.S. Air Force (USAF), Navy and allied nations since 1999.

“Orbital ATK is proud to be a valued partner in developing, producing, and supporting advanced sensors and related solutions for the United States and its allies,” said Pat Nolan, Vice President and General Manager of Orbital ATK’s Missile Products division of the Defense Systems Group. “The DSU-33 sensor has been a key part of U.S. and allied arsenals for well over a decade.”

Orbital ATK supplies numerous fuses to the U.S. military and has recently begun production on the Hard Target Void Sensing Fuse for the USAF and is in development on the next generation all-purpose bomb fuse.

Orbital ATK Defense Systems Group is an industry leader in providing innovative and affordable ammunition, precision and strike weapons, electronic warfare systems, and missile components across air-, sea-, and land-based systems.

Bell Helicopter Completes Successful V-280 Valor Wing and Fuselage Mate

Next generation tilt rotor progressing, on track for 2017 first flight

Bell Helicopter, a Textron Inc. company, has successfully joined the V-280 Joint Multi Role Technology Demonstrator (JMR-TD) wing and nacelles to the aircraft fuselage. The milestone occurred at the company's aircraft assembly center in Amarillo, Texas on May.

"The V-280 wing, nacelles and fuselage are now assembled into the aircraft we've designed as the next generation tilt rotor," said Lisa Atherton, executive vice president of Military Business Development for Bell Helicopter. "This is a major milestone. The attention to detail from our employees, our suppliers and from all of Team Valor, today and throughout this entire process, has been astounding. Their efforts have resulted in an aircraft that is coming together quickly and according to schedule. We are excited and counting down to the first flight in 2017."

The V-280 Valor is a next-generation tilt rotor that is designed to provide unmatched agility, speed, range, and payload capabilities at an affordable cost. The V-280's tilt rotor technology converts vertical take-off and landing (VTOL) capability into a tactical, operational and strategic advantage. The revolutionary aircraft capitalizes on the more than 300,000 V-22 fleet flight hours, and leverages Bell



Helicopter's decades of tilt rotor experience.

Once the aircraft achieves a successful first flight in September 2017, program leaders are confident Bell Helicopter will have the data required to go into the full scale Engineering, Manufacturing and Development (EMD) phase.

"The V-280 tilt rotor is designed with technology advancements that significantly reduce risk and cost, allowing the Department of Defense to field Future Vertical Lift (FVL) to the warfighter far earlier than previously anticipated. We have improved the manufacturing processes to arrive at a revolutionary aircraft with reduced sustainment costs and simplified maintenance procedures. This technology will

provide the Department of Defense with the overmatch requirements to win in a complex world," said Atherton.

The V-280 has an anticipated cruise speed of 280 KTAS, with a 500-800 nm combat range and 11 to 14 operators. The Valor benefits from a flexible design, matching multi-mission versatility with exceptional 6K/95 hover performance. Tilt rotor is the only vertical lift technology which can rapidly self-deploy to any theater, and can cover more than five times the area of current MEDEVAC platforms. The V-280 provides the low-speed hover agility of a helicopter with fixed wing range and efficiencies.

In the coming weeks and months work on the V-280 will involve preparing for verification work leading to a tethered power-up at the Bell Helicopter facility in Amarillo in the first half of 2017. Development continues in the company's flight control systems lab in Ft. Worth. The lab integrates pilot inputs with flight control computers and flight controls, providing data for software that works with the hardware controlling flight loads and hydraulic performance. The T64-GE-419 engines and gearboxes are expected to be installed in the nacelles this November.





YALÇIN 4x4



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INDIGENOUS DESIGN

OPERATIONAL EFFICIENCY

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