Thoughts on the *Journal of Guidance, Control, and Dynamics* Application Orientation

FROM its beginnings, this Journal has encouraged and actively sought the submittal of application-oriented papers. The research community has strong motivations to publish its work, but we know that there is a great wealth of remarkable accomplishment in the guidance, control, and dynamics field that has never been described in the archival literature. Indeed, an improved literature base for the actual technology state of the art should help ameliorate some causes of the often discussed disparity between theory and practice.

One can visualize volumes of valuable application literature that could be cultivated by probing into the current operational or emerging state of the art in guidance, navigation, control, and dynamics. Systems in major new aircraft, spacecraft, and launch vehicles are certainly of great interest to our readers. What concepts were used and what was the design rationale? Did flight experience verify performance or were there unanticipated problems? How were the problems solved and what lessons were learned? It is recognized that some of this information may be sensitive or proprietary, but there are certainly many applications where the dissemination of information on significant technical accomplishments would not be restricted. Following are examples which come to mind.

1) Real world application of filters and estimators to navigation or parameter estimation problems with actual performance results compared to theoretical predictions.

2) Descriptions of fly-by-wire and other flight critical system redundancy management mechanizations delineating experience with fault detection/isolation/reconfiguration strategies.

3) Techniques used to mechanize trajectory optimization and guidance algorithms in contemporary aircraft flight management systems and space vehicles. These could describe, for example, computer organization, computation resources required, and performance achieved vs theoretical prediction.

4) Control laws used in contemporary aerospace vehicle flight controls, including the rationale for design approach, performance obtained, robustness criteria and verification, and computer resources required. A particularly interesting category would be the application of modern control theory in systems which have been flight tested.

5) Aerospace applications of artificial intelligence, for example in real time planning, operator/pilot assist, fault isolation, or in support of system maintenance.

6) Flight validation of models of sensors, aircraft and spacecraft dynamics, flexible mode interactions with control systems, handling qualities, etc.

7) Results from application of special perturbations, integration algorithms, and orbit determination techniques to real missions, including comparisons between flight results and premission simulation.

These are exciting times in both the space and aircraft worlds. A new generation of wide-body aircraft has just entered service. The guidance, control, and navigation systems in these are indeed a significant step forward over the previous generation. In the F16 and the F18, the Air Force and Navy have deployed fly-by-wire systems with all of the associated modern avionics improvements that can go with them. The Space Shuttle is operational. Applications papers from it and the many interesting payloads it is carrying to space should be of interest. The NASA and many corporations are busily performing preliminary analyses and tradeoffs for the space station. Many of these would make intesting applications papers. The Galileo program should be a source of outstanding orbit determination techniques of the most advanced kind. Surely these applications and more like them should be ideal sources for the type of paper that many of our readers would like to see more of. I encourage those of you who are working in these areas to write up your work and submit it to us. If discussing a potential paper would be helpful to you, feel free to call any of the Associate Editors, any of the Applications Advisory Board Members, or me. We would be happy to assist you in any way we can.

I am pleased to announce that during the coming year we intend to begin a Book Announcement Section as a service to our readers. Professor David G. Hull of the University of Texas at Austin will be the Book Editor. We will publish information regarding recently published books in areas that are within the scope of the Journal. If any of you have such material or wish to offer suggestions on the content of such a section, please contact Professor Hull or me.

Before closing, it gives me great pleasure to call your attention to the following list of names. These are our reviewers for the period November 1983 through October 1984. Without the patience and cooperation of these people, we could not have published this Journal. Upon their efforts is based the essence of the peer review process which makes this Journal and others like it an archival publication. I thank them for their efforts in our behalf.

Donald C. Fraser
Editor-in-Chief