

TU3D-1

Microwave Technology and Industry Dynamics from WWII to 1970

Dean A. Watkins of Watkins-Johnson

Abstract: Useful applications of microwaves (all military) were first developed in the East during World War II. Some of the principal pioneers in that work came (or came back) to the Bay Area following the war to establish research programs at Stanford and at the University of California-Berkeley and to found new enterprises such as Varian Associates and Litton Industries. Hewlett-Packard, which was housed in a small wooden building on Page Mill road near the Southern Pacific tracks, began to add microwave test instruments to its product line. This presentation traces the work of the Bay Area pioneers and their offspring from the beginning to about 1970 when solid-state microwave devices and strip lines began to replace microwave tubes and waveguides at low power levels.

TU3D-2

Early History of Radar and Countermeasures

Bill B. May of Argo Systems, Inc.

Abstract: Applications of microwaves to the World War II effort will be traced from the inception of radar prior to the war through the expansion to higher frequencies and broader bandwidths during the war. System considerations that drove these changes will be discussed including countermeasures and counter-countermeasures. Further sophistications of these techniques after the war will show the extent that military applications were key to new developments in microwave components and systems. Observations will be made on the impact of data processing on microwave systems in more recent years as well as the diminishing influence of military procurement relative to commercial uses.

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TU3D-3

Microwave Satellite Communications/Navigation Contributions in the San Francisco Bay Area – A Historical Perspective

J. J. Spilker, Jr. of Stanford Telecom

Abstract: Microwave satellite communications and GPS satellite navigation are proving to be of great value. Much of the new advancements in wireless digital communications being made now had their foundations years ago in digital satellite communication for the military. Likewise, probably the most important commercial product of the Cold War is the US GPS navigation system.

Engineers in the San Francisco Bay Area contributed heavily to all of these developments. Much of the microwave satellite tracking and control systems were designed and built here. The first military communications satellites called IDCSP, which were launched 8 at a time, were built here. More recently, the most complex communication satellite, Milstar, was also built here. The Bay Area has also been playing key roles in the developments of new personal communications systems using low and medium altitude satellites called Globalstar, Odyssey and Iridium. Finally, engineers in the Bay Area also contributed heavily to the original design and architecture of the Navstar Global Position System some 22 years ago, and the Bay Area continues to be a major contributor to GPS technology to this day.