- Chapter One -
- The Gemini Digital Computer: First Machine in Orbit -

The impact of the Gemini digital computer

The Gemini Digital Computer was a transitional machine. Dale F. Bachman of IBM characterized it as the "last of a dying breed. It was an airborne computer, ruggedized, special purpose, and slow" [47]. Nonetheless, its designers claim an impressive list of firsts:

- The first digital computer on a manned spacecraft.
- The first use of core memory with nondestructive readout. The machine was designed in an era of rotating drum memories, its designers considered it a step forward [48] .
- IBM's first completely silicon semiconductor computer [49].
- The first to use glass delay lines as registers [50].
- Technologically advanced in the area of packaging density [51].
- The first airborne or spaceborne computer to use an auxiliary memory [52].

Development of the Gemini computer helped IBM in significant ways. It contributed more than anything else to the hardware and software of the 4Pi series of computers[53]. This series eventually produced the computer used on Skylab and the AP101 used in the Shuttle. It also helped to develop IBM's reputation for delivering reliable and durable spaceborne hardware and software[54] . One Gemini computer restarted successfully after being soaked in salt water for 2 [26] weeks. Another used system went on to NASA's Electronics Research Laboratory in Boston for use on vertical and short takeoff and landing projects[55]. Coupled with IBM's involvement in the real-time computing centers used to monitor Mercury and Gemini missions, the company established itself as a major contributor to America's space program as it had been to the military research and development effort. Out of early military work came computer systems such as the Harvard Mark I, the 701, and SAGE computers used in air defense. However, even though identification with the space program has been maintained through several highvisibility projects, no significant commercial hardware products resulted as spinoffs.

For NASA, Gemini and its on-board computer proved that a reliable guidance and navigation system could be based on digital computers. It was a valuable test bed for Apollo techniques, especially in rendezvous. However, the Gemini digital computer itself was totally unlike the machines used in Apollo. With its Auxiliary Tape Memory and core memory, the Gemini computer was more like the Skylab and Shuttle general purpose computers. It is in those systems where its impact is most apparent.