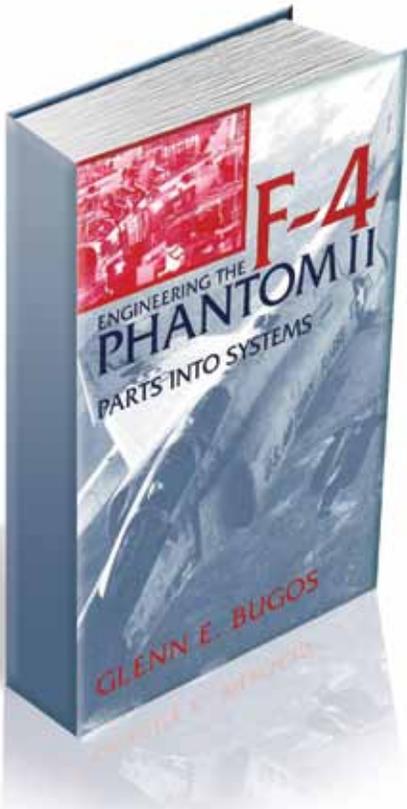


PROFESSIONAL READING LIST

The Defense Acquisition Professional Reading List is intended to enrich the knowledge and understanding of the civilian, military, contractor, and industrial workforce who participate in the entire defense acquisition enterprise. These book reviews/recommendations are designed to complement the education and training that are vital to developing the essential competencies and skills required of the Defense Acquisition Workforce. Each issue of the *Defense Acquisition Research Journal (ARJ)* will contain one or more reviews of suggested books, with more available on the *Defense ARJ* Web site.

We encourage *Defense ARJ* readers to submit reviews of books they believe should be required reading for the defense acquisition professional. The reviews should be 400 words or fewer, describe the book and its major ideas, and explain its relevance to defense acquisition. Please send your reviews to the Managing Editor, *Defense Acquisition Research Journal*: norene.fagan-blanch@dau.mil.



Featured Book

Engineering the F-4 Phantom II: Parts into Systems

Author:

Glenn E. Bugos

Publisher:

Annapolis, MD: Naval Institute Press

Copyright Date:

1996

Hard/Softcover/Digital:

Hardcover, 258 pages, <http://www.amazon.com/Engineering-F-4-Phantom-II-Systems/dp/1557500894>

Reviewed by:

Lee Vinsel, Program on Science and Technology Studies, Stevens Institute of Technology

Review:

How can system designers work together and coordinate action across organizational boundaries—often including firms, governments, and universities—and still ensure the resulting product is of the highest quality? It's a question that has plagued systems engineering from the very beginning. In his great book *Engineering the F-4 Phantom II: Parts into Systems*, the historian Glenn E. Bugos draws our attention to this issue and shows how systems engineers have worked to resolve it. No doubt, many readers of this journal will need no introduction to the F-4 Phantom II, a fighter jet produced by McDonnell Douglas. It entered production in 1954 and, within the United States, was retired from service in 1996, ironically the same year that Bugos's book was released.

Production of the jet was complicated, involving the military and several firms, including McDonnell Douglas, General Electric, Raytheon, Westinghouse, Collins Radio, and Lear Instrument. The number of individuals and organizations involved made coordination extraordinarily difficult. Moreover, the Phantom II was re-made several times throughout its long career. As Bugos writes, "The Phantom was built by integrating parts into systems, then disaggregating these systems into smaller parts, and reintegrating them again in different ways." This making, remaking, and rearranging was true not just for the technologies, but also for the organizations involved, many of which went through significant transformations during the technology's lifespan.

Bugos brings the best aspects of the field of science and technology studies to bear on his subject. While he spends a great deal of time and energy spelling out the formal organizational structures that were built to manage the Phantom II, he points out that, really, the most important resource was trust. This focus is probably Bugos's greatest contribution to the literature on systems engineering. Interorganizational cooperation could sometimes break down, leading to hostility and competition. But teams involved in designing and managing the Phantom II created testing practices, verification routines, and other mechanical or quantitative systems of trust-building, which assured that everyone was on the same page and that systems would operate. In practical terms then, Bugos reminds systems engineers that, if they want to be truly successful, they must spend as much care creating healthy interpersonal and interorganizational ties as they do attending to the technical dimensions of their work. It's a lesson worth remembering.