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Sydney Camm and the Hurricane: Perspectives or, the Master Fighter Designer and His Finest Achievement

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weapons while minimizing acquisition risks, but only if a sequential policy is followed: delaying production decisions until actual flight tests have been conducted and required modifications worked out. The time compression claimed for concurrency has seldom been achieved in practice.

Why, then, have Air Force and civilian decision makers shown such a strong bias in favor of concurrency? Brown points out that once heavy expenditures are made for production as well as for development, a program gains a momentum that is difficult to stop. Because bomber projects can sometimes run seven or eight years or longer, they can extend beyond the term of an administration or a Congress friendly to defense into an era of lean budgets and reluctant leaders. In such periods, the sunk costs make it extremely difficult politically to cancel a program outright. On the other hand, where programs are only modestly beyond the state of the art, concurrency can hasten the day of deployment in quantity, with no more than minimal risk.

The author urges a greater use of prototyping and a sharply limited resort to concurrency, but he concludes on a doleful note. Keeping in mind the fate of Deputy Secretary of Defense David Packard's attempt to reintroduce "fly before buy" in the early 1970s, Brown suggests that we should not be sanguine about the prospect for significant reforms in the weapons acquisition process, inasmuch as the "institutional forces at

work in the Pentagon are both powerful and durable."

In a brief note on sources, the author asserts that he has consulted some three thousand pages of documents in Air Force and industry archives. However, scrutiny of his footnotes suggests that much, if not most, of his source material (other than those documents reproduced by air-arm and industry historians in their own studies) was not the actual working papers of the decision makers but was obtained from monographs and histories. Given the excellence of this monograph, one must conclude that the official historians on whom Brown has relied have turned out many fine studies.

This book is marred by a number of annoying flaws. For example, the B-17 never mounted *five* turrets. More seriously, the author ignores the addition of an electronic warfare crew-member to the B-52, giving the bomber an additional offensive weapon in its electronic counter-measure capability. Also, the inadequate index has no entry whatever for electronics or avionics. Fortunately, neither these nor other nits undermine the central thesis.

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Fozard, John W. *Sydney Camm and the Hurricane: Perspectives on the Master Fighter Designer and His Finest Achievement*. Washington, D.C.:

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Smithsonian Institution Press,
1991. 258pp. (No price given)

This book is a collection of essays by Mr. Fozard, many given as commemorative addresses, in honor of Sydney Camm, one of England's most memorable aircraft designers. Camm is credited with creating the Hawker Hurricane, the aircraft most responsible for winning the Battle of Britain in 1940. Camm began his thirty years as Hawker's chief designer in 1925, at the age of thirty-two. The son of a carpenter, he had little formal education (seven years total) but an extraordinary sense of design, a passion for detail, and an abiding interest in aircraft. One senses that technology ultimately challenged his limited education, particularly after the war, with the arrival of jet aircraft, supersonic flight, and air compressibility. In his senior position as design team leader, Camm insisted on a well-educated engineering staff, which he directed with penetrating insight if not detailed knowledge.

Reading about Camm reminds one of Ed Heinemann of Douglas Aircraft. Both have demonstrated that (at least in the middle of this century) talented nonconformists with very little education could make the grade.

Though the Hurricane was an advanced design for its time (1935), it was built conservatively; initially it was largely fabric covered. Sir Tom Sopwith, head of the Hawker company, gambled the company's resources on the British government's eventual decision to buy the Hurricane. By preparing for full

production, he was able to deliver the first aircraft in 1937. As a result of this bold move, there were over five hundred Hurricanes available for the Battle of Britain. They made the difference, stopping more German aircraft than all other defenses combined, including the vaunted Spitfire. Not until 1944 was the last of some 14,400 Hurricanes produced.

Despite this book's title, Fozard discusses not only Sydney Camm but also his successor, Ralph S. Hooper. The author served as an aircraft designer under both men. As a result, the last chapters cover the development of aircraft concepts that eventually led to the current Harrier series, which, flown by the U.S. Marines, did so well during Desert Storm. The reader is left with the impression that although work on the Harrier started during Camm's reign at Hawker in the 1950s, this was not his kind of aircraft. His favorites, for which he received much acclaim, were the Hart biplane fighter of the late 1920s, the postwar Hunter jet, and, of course, the Hurricane.

This book is about the English aircraft design process as it was developed initially by Camm's Hawker team and thereafter by its organizational successors. Written as it is by a senior English aircraft design engineer, it is meant primarily for the aircraft historian who is not averse to plowing through speeches and fuzzy group photographs of people important (and that only to each other) largely because they

formed a team capable of repeated remarkable achievement.

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Arnett, Eric H. *Sea-Launched Cruise Missiles and U.S. Security*. New York: Praeger, 1991. 224pp. \$45

This book is a comprehensive examination of one of the more arcane aspects of strategic warfare and of the maneuvering done to gain the advantage in arms control negotiations. As one digs through the uses proposed for sea-launched cruise missiles—American Tomahawks and their Soviet navy counterparts, the Sampson (nuclear), Styx, Sunburn, and Starbright—one wonders how much influence military considerations had on the political scientists who composed the scenarios. Dr. Arnett sheds light on some of the technological misconceptions that abound in the claims and counterclaims of the “cruise missile lobby.”

Eric Arnett holds a doctorate in engineering and public policy from Carnegie-Mellon University and is an associate at the Program on Science and International Security of the American Association for the Advancement of Science. He is therefore well qualified to discuss the issues surrounding the debate on the potential roles of sea-launched cruise missiles in the American and Russian force structures. In his discussions of the intersection of technology, strategy, and public policy, it is refreshing (and

essential) that attention is paid to technological facts and to the limitations technology imposes, as well as the opportunities it confers, on offense and defense.

Despite the use of submarine-launched Tomahawks in the Gulf War, the whole subject of sea-launched cruise missiles has been relegated to an inconspicuous place in the current debates about force structure, build-down, and arms control. Perhaps that relegation is premature. Arnett points out that the sea-launched cruise missile with a conventional explosive warhead represents an attempt by technology to provide conventional weapons for “strategic” missions. Fanciful mission scenarios such as “decapitations,” minimum-warning attacks, and so forth must be viewed in the context of attempts by each side to retain a strategic advantage even as reliance shifts away from the nuclear arsenal. Although Arnett uses a clear, unemotional style to detail mission possibilities, it is easy to imagine the fervor with which the advocates can press their cases.

The author’s technical knowledge comes into play when he convincingly demonstrates that sea-launched cruise missile technology today, and for the foreseeable future, is not equal to the demands of the missions. It is apparent that Arnett has more than a cursory familiarity with the relevant technical details of warheads, guidance systems, and missile countermeasures. He does not dismiss the performance shortcomings as