PRICE PRESSURE (P^2) AND THE EMERGING TECHNOLOGIES (ET)

By

FREDERICK H. BARNES

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Today I would like to talk about fighter aircraft, although my observations will be equally applicable to other items of major military hardware, such as ships and tanks.

Pick up any one of the military trade journals such as Aviation Week, The Armed Forces Journal, Defense and Foreign Affairs, Interavia or International Defense Review, and you are as likely as not to find two interesting articles in the same issue. The first article describes the next generation fighter aircraft. It could be the USAF (ATF), the USN (ATA), the European (EFA) or Grumman's X-29. The article describes in great detail the aircraft's new high technology features, such as the use of new composite materials or exotic metals, as well as more powerful radars, greater thrust engines, and systems integration of all the controls. The new emerging technologies (ET) are well represented in the designs of these aircraft.

Turning to the second article, we are confronted with a description of the spiraling costs of today's hardware and attempts to control them. Often this article centers around a congressional budget hearing, and includes profound observations about such items as program cutbacks, reduced quantities, postponements, and cancellations.

We often pass over these two articles as if they were totally unrelated, having no direct connection. However, I contend there is a direct relationship that deals with the high cost of the new emerging technologies (ETs) and its effect on programs. This subject I choose to call Price Pressure (P^2). I like to think of this P^2 as that combination of rising costs and reduced budgets that causes programs to be cut back, postponed, or cancelled.

The problem was clearly identified in the 1970's by the "Bucy Report"[1] which stated that technology advances at a constantly accelerating rate. As applied to military hardware, each technological advance is accompanied by a quantum jump in price. Thus, to keep abreast of any potential adversary, nations are locked into a cycle of constantly procuring newer technology arms, accompanied by higher and higher prices.

For example, in the 1960's, a first line fighter aircraft had a unit price tag of approximately $4.0M. Today's first line fighter aircraft such as the F-16 or F-18 has a current unit price in the $20.0M bracket. Looking into the future, the FY 87 projected flyaway unit cost for the F-14 is to be approximately $40.0M.[2] The implications of these skyrocketing prices is so mind boggling that it leads one to enter the fantasy world of Norman Augustine and his laws, wherein he states, "In the year 2054, the entire

defense budget will purchase just one tactical aircraft."[3] No doubt written with tongue in cheek, it contains a basic element of truth.

These rising costs are often associated with shifting national priorities. This combination leads to shrinking military budgets, which in turn leads to:

- Stretched out programs having less than optimal procurement rates
- Reduced quantities with increasing unit costs
- Less money for R&D
- Postponed or cancelled programs

Thus, nations find themselves caught in a vicious cycle, getting less and less for their defense money, which at the same time, due to budget restrictions, getting less and less money for defense.

This means that few nations, if any, will be able individually to afford the next generation aircraft. As one authority points out, "To summarize the problem, as time goes by, NATO nations are going to be progressively less able and willing to foot the bills for their military programs in being, and hence for the upkeep of the alliance apparatus for deterrence and defense as presently conceived and organized."[4]

Some nations, in order to meet their defense requirements, are turning to refurbished and modernized aircraft.

- The Republic of Singapore Air Force has been actively engaged in updating A-4 Skyhawks with new under wing store stations, a 30 MM cannon, and new avionics.[5]

- Starting in 1981, the Portuguese Air Force began receiving A-7P aircraft from the Vought Overhaul and Modernization Center. These aircraft are essentially factory new, having a reconditioned airframe, new avionics, and higher performance engines. The company estimates that a squadron of these International Corsair IIs would cost only one third that of F-16s.[6]

- Dassault has modernization contracts for Mirage 5s with Pakistan, Peru, and Egypt.

Many nations still suffering from depressed economic conditions are turning to multinational arms coproduction as a means of stretching their scarce military dollars. As viewed from an overall macro level, this has many advantages both militarily, politically, industrially, and perhaps most importantly, economically. From an economic viewpoint, each country gains by sharing the R&D costs and realizing savings in production through economies of scale. Just as important, each country could get an advanced weapon system that it could not afford if it were forced to go it alone. At the North Atlantic Assembly meeting last year in Brussels, it was brought out that "Western nations are wasting at least $25 billion a year in R&D funds through their failure to coordinate R&D efforts. This lack of coordination has caused at least 45% of all technical R&D in one nation to be duplicated in laboratories in another North Atlantic Treaty Organization nation." According to Peter Emery, a conservative member of the British Parliament, "If we could cut the

duplication in half, we could have real expansion of at least 20% in the amount of R&D we could do, without spending any more."[7]

From an industrial viewpoint, each nation's industrial technological capability is updated, and sustained high technology employment is created. This point has been proven by actual experience in the F-16 European Producing Group (EPG) program. As defined in a memorandum of understanding between the United States and the EPG countries (Belgium, Denmark, The Netherlands and Norway), industrial contracts for production and assembly were to be placed with the EPG nations in the amount of 58% of the procurement value of their 348 EPG aircraft. In the case of the F-18 aircraft, industrial participation with Australia has created work for 21 Australian companies with 2000 employees, having an offset program which alone is worth at least $600M. The Tornado is a good example of the European NATO nations of the Federal Republic of Germany, the United Kingdom, and Italy successfully collaborating in the design and production of this aircraft, providing each country with high technology employment.

It is understandable that these types of programs requiring cooperation between political, military, and economic spheres from each nation, are viewed with mixed opinions. For example, a defense marketing services symposium this year in Brussels concluded that "Inter-European and Trans-Atlantic industrial cooperation are vital if NATO nations are to produce weapons without wasteful duplication of research and development." One speaker, Lt Gen G.W. Boerman, Director of General Material in the Netherlands, is reported as holding "a rather dim view" of the possibilities, even though much had been said and written about trans-Atlantic cooperation. Despite the problems, he was reported to be "cautiously optimistic," pointing out that the economic case for arms cooperation and standardization was increasing. "The cost of defense equipment is soaring, while it is getting more and more difficult to obtain increases in defense budgets, to keep pace with the threat."[8]

The main barriers to trans-Atlantic defense cooperation seem to lie mainly in two general areas:

- Traffic on the "two way street"
- Transfer of technology

Our European allies see the traffic on the "two way street," as an indicator of the magnitude of trans-Atlantic procurements, and as being grossly unbalanced in favor of the United States. They view European arms procured from the united States as being on a super highway, while United States arms procured from Europe are represented as being on a single lane road. The traffic ratio has been calculated over the last five years as being anywhere from 16 : 1 to 1.6 : 1, depending on who does the calculations and what is included. Our European allies, it seems, will not be satisfied unless the ration is 1 : 1, failing to realize, however, that as long as the United States maintains the lead in R&D efforts, the majority of the traffic will be from the United States to Europe.

Perhaps more important, Dr. Thomas A. Callaghan, Jr., holds that there is less than optimal traffic on the street simply because the "two way street" has never been built. That is, until the United States and European allies

formally state their intent to pursue their policy of trans-Atlantic cooperation, there will always be problems. He says, "Everybody talks about a 'two way street,' but neither side has ever taken the time to build the street. Experience has shown that governments cannot push traffic through a political wilderness."[9]

Much has been said recently about technology transfer, much of it bad. Most of the discussions have been centered on leaks of high technology data to the Soviet bloc of nations. We have accused our NATO allies of leaking data to the Soviets, and they, in turn, have accused us of the same thing. These accusations have tended to sour the relationships between the NATO allies. In addition, this almost total preoccupation with data leaks to the Soviets has had the effect of obscuring the good points of technology transfer. As long as we are dealing with scientific state of the art weapons, there will necessarily be technology transfer in NATO cooperative programs. This transfer tends to reduce the overall costs of arms by eliminating redundant R&D efforts, as previously mentioned. A lot of activity on both sides of the Atlantic has recently taken place to resolve these problems, but a lot more needs to be accomplished. Industry frustrations with the subject--after all it is industry that must implement these programs--was recently voiced by Mr. Tom Campobasso, Vice President, Corporate International Export Marketing, for the Rockwell International Corporation, when he wrote, "On the one hand, our government strongly encourages us to enter into cooperative arrangements with our NATO partners in an effort to improve the overall combat effectiveness of the alliance. Yet, on the other hand, we are constrained in making available the very technology needed for this purpose, the governmental fear being that the hardware or data might end up in the Soviet bloc."[10] The problem, as I see it, is not the transfer of technology, because transfer there will be, but the control of the transfer mechanism delivering the information only where we want it to go.

In summary, the relentless pressure of high costs and shrinking military budgets, that I call Price Pressure (P^2), steadily forces the United States and its allies into multinational cooperative arms programs, in an effort to contain costs by sharing the defense burden. Today, many multinational arms programs are being implemented, but these programs are mostly "small" items such as guns, bombs, mortars, and missiles. The real cost saving arms, however, such as fighter aircraft, are not included in these lists: they should be.

Today, on both sides of the Atlantic, plans are being formulated for the next generation fighter aircraft, the costs of which will be much, much higher than today's aircraft. These costs will no doubt put a severe strain on any military budget. The European NATO nations recognizing this point, are actively collaborating in the development of the EFA aircraft. On this side of the Atlantic, both the USAF and the USN are separately developing their own next generation fighters. In order to avoid the penalties imposed by price pressures (P^2), active steps should be encouraged in joining forces in this area.

The story is told concerning Roman history and returning heroes. A returning conquering general was given a large celebration, climaxing in a great parade on the Appian Way. However, as the general led the parade in

his chariot, a slave stood by his side saying over and over again, "Remember man thou art mortal." Perhaps we ought to adopt something like that. Every time someone gets up and extols the wonders of the new high technology weapons, there should be a financial officer at his side saying over and over again, "Yes, but can we afford it, can we afford it?"

ENDNOTES

1. "An Analysis of Export Control of U.S. Technology - A DOD Perspective", A Report of the Defense Science Board Task Force on Export of U.S. Technology, February 4, 1976, p. 11.

2. "Fighter Costs", Aerospace Daily, February 11, 1985, p. 226.

3. Norman R. Augustine, Augustine's Laws and Major System Development Programs, p. 48.

4. David Greenwood, "Rising Costs, Shrinking Budgets" Defense Minister and Chief of Staff, October, 1983, p. 9.

5. "Singapore: Waiting in the Wings" Defense Minister and Chief of Staff, November 1, 1984, p. 22.

6. "Modernized A-7 Corsair Offers Proven Performance" Military Technology, Miltech, March , 1985, p. 74.

7. Michael Feazel "North Atlantic Assembly Seeks Coordinated R&D Efforts", Aviation Week & Space Technology, November 26, 1984, p. 27.

8. "Industry Voices Collaboration Doubts", Flight International, May 4, 1985, p. 9.

9. Thomas A Callaghan, Jr., "The Unbuilt Street, Defense Industrial Cooperation with the Alliance," NATO's Fifteen Nations, October-November, 1982, p. 26.

10. Tom Campobasso, "Trans-Atlantic Defense Cooperation, Industrial Perspective," Government Executive, April, 1983, p. 10.

ABOUT THE AUTHOR

Mr. Frederick H. Barnes is employed in the F-18 Project Manager's Office, Naval Air Systems Command, Washington D.C. He has had 15 years experience in the FMS management of USN aircraft, and is a specialist in the area of multinational coproduction. Mr. Barnes has a B.A. degree (Public Administration) from the University of Upper Iowa.