

What Affordability Means to FMS Customers

By

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The *affordability* of any system involves acquisition costs and something we call *ownership costs*. From newspaper reports, if from no other source, we are becoming more and more aware of the need to include ownership costs in our decisions when we purchase new weapon systems. Affordability, reduced to its lowest common denominators, is mostly reliability and maintainability. We in the security assistance program often hear from our foreign purchasers about their need for reliable and maintainable weapon systems to be placed in their inventories. At the price of modern weapons they unanimously agree that these systems should work when they are needed.

What makes a weapon system affordable to a foreign government? At present there are several external factors outside the acquisition cost and ownership costs of the system which affect the total cost for foreign purchasers. The strength of the dollar abroad affects the ability of foreign purchasers to buy American equipment since payment must be made in U.S. dollars. Secondly, the oil producing states currently face reduced revenues due to the world oil glut, creating greater competition for these states' monies. Military budgets must now compete with economic development budgets due to these reduced revenues. Further, many oil *importing* countries are having to restructure their debts because of the escalation of oil prices during the past decade. In 1980, for example, developing states paid \$50 to \$60 billion for their oil imports. In addition, another \$50 to \$60 billion has been drained from their economies by trade deficits. Discussions on affordability must reflect these new realities.

After our foreign customers get over these hurdles and acquire new systems, they next face those inexorable ownership costs of reliability and maintainability (R&M). The United States Air Force (USAF) defines *reliability* as the probability that an item will perform a required function under specific conditions for a specified period of time or at a given point in time (AFLCP/AFSCP 800-34, Chapter 14). Similarly, *maintainability* is defined as the relative ease and economy with which the system and equipment can be retained in or restored to an effective usable condition. Affordability thus is largely a matter of reliability and maintainability (AFLCP/AFSCP 800-34, Chapter 14).

The U.S. Air Force recognizes that the true cost of a weapon system includes operating and maintaining the system, that is, the life cycle cost of a system's development, acquisition, initial support, and all follow-on support for the rest of that system's life. The U.S. Air Force experience is that operations and maintenance (O&M) generally represent the greatest share of life cycle costs. Research and development, as well as procurement costs, add to the total weapon system expense: even including those elements, about 60 percent of life cycle cost goes for O&M.

In fact, it is often affordability, not simply tactical effectiveness, that drives old systems out of the air force inventory. The cost of maintaining older, selected aircraft is a prime example. The average annual cost of maintaining a fleet of 22 F-101F aircraft in the USAF inventory from FY 1977 to FY 1984 (measured in FY 1986 dollars) was about \$65 million. The cost of maintaining a fleet of F-4E (monthly average of 433 aircraft in service) in inventory in 1984 was about \$950 million. The cost for maintaining a fleet of F-16A (monthly average of 543 aircraft in service) in the same year was \$750 million. With such high maintenance and acquisition costs, we must have more economical use over the life of our weapon systems without affecting our missions.

We have succeeded in improving the rates between maintenance and flying time. For example with respect to the A-10A aircraft, we seem to have attained an average 5 hours of flying time before maintenance. Similarly, the F111D aircraft was getting only about 1 hour of flight before maintenance in April 1984. Two years later, we are getting about 1.5 hours of flying time before maintenance. You can see where we're going. We're on the right track, but we still have a long way to go. New system designs will have to have quantum jumps in these numbers. The current policy in the Air Force today is that we must treat R&M on a par with acquisition cost, schedule, and performance of the weapon systems we are developing or modifying.

The U.S. Air Force has begun to look at reliability and maintainability as essential criteria in our design parameters as well as in decisions of which weapon system to purchase. Air Force Chief of Staff, General Larry D. Welch, has stated that the R&M 2000 action plan established the foundation for realizing dramatic improvements in five goal areas: Warfighting capability, support survivability, mobility, manpower, and costs. R&M improvement must remain a primary consideration for both our new and fielded weapon systems.

R&M may soon become the dominant criteria on which rests our own as well as our friends' and allies' decisions to purchase a new weapon system. If we could create a system with very low maintenance, we could reduce expenditures for depot and intermediate level maintenance and for many other support aspects. While there are truly five criteria which make up affordability, it is becoming clearer to us in the logistics arena that in the context of affordability the key elements are reliability and maintainability.

The essential components found in reliability and maintainability are break rate and fix rate: how often does it break, and how long does it take to fix it? In economic terms, the basic measurement is how many manhours are needed to maintain a system for each hour of operation, and how much does it cost. In military terms, the basic condition for operation is under what environment (i.e., under what critical or stressful conditions) does the system have to operate. The environment puts limitations on us. It is a *given*. Since we cannot change the environment, we must work with what is given to us. If the environment is hot, dry, and dust-laden, will old style hangers and facilities suffice for our more complex weapon systems? If the ratio to maintain and support a tactical fighter is disproportionate to the time we are able to fly, the system isn't affordable at any price.

Therefore, another element of affordability which is often overlooked is the development of the infrastructure required to support a newly purchased weapon system. Such elements have not always had priority in the discussion of systems costs in the past. Indeed, rarely was infrastructure viewed as an associated weapon system cost. Briefly, infrastructure involves the following principal considerations:

- Civil engineering and warehousing facilities
- Software support (operational and intermediate level support)
- Supply
- Transportation
- Communications
- Support Equipment
- Precision measurement equipment laboratories
- Software labs (depot level support)
- Engine testing capabilities
- Automatic data processing equipment

Add to this, skill variety, tech data, and modification kits, and you begin to get the picture. Infrastructure limitations are often the biggest problems for many of our security assistance participants

who purchase or receive high technology weapon systems from the United States. Prime examples of these limitations include:

- The lack of reliable interbase communications and transportation systems.
- Procedures which are not standardized. Items are ordered only when needed and thus become immediate, critical fills.
- Bases operate independently and are concerned only with their assigned aircraft.
- And, with some notable exceptions, there is little emphasis on common logistics problems between bases within a country and even less so between countries within a region.

Infrastructure improvements represent major investments for the foreign purchaser. These are a sunk cost as they must remain stationary and are otherwise non-transferable. Infrastructure also includes other wrap around costs, such as depot level maintenance and supply facilities, including hanger and engine repair facilities. The key is you can't legislate elimination of this infrastructure dependence.

Wrap around costs are not just large capital investments up front, but also include lost service time and excessive demands on skilled technicians which are more often than not in short supply, even in relatively well developed countries.

Lost service time for a weapon system affects a country's defense posture. Many security assistance customers have small air forces. If four of 20 F-5 aircraft are down for maintenance, the defense posture of that system is reduced by 20 percent. Small numbers of aircraft affect maintenance scheduling more so than in an air force having larger numbers of aircraft, as in the U.S. Air Force. We would certainly never tolerate the major noncommission status of a weapon system. Many of our foreign customers routinely face this situation, and worse, and have little recourse. The resultant frustrations can significantly detract from the benefits of the U.S. security assistance program. It doesn't help the image of U.S. manufacturers either. In addition, excessive requirements for depot level maintenance put a similar excessive demand on the limited number of people with technical skills available in the country. Finally, there is a double cost to the country since the time to repair represents time taken away from other essential functions. For example, if there is a recurring problem in a defective valve on an aircraft, repeated repair efforts occupy the technician's time, time which may have been used for preventive maintenance, such as corrosion control.

Wrap around costs may involve some things we take for granted in the U.S. and which are often overlooked in the planning stages for operations in foreign countries, such as stable and adequate electrical power or even potable water. If pure water is required for cleaning titanium parts on sophisticated weapon systems and none is available at the site of deployment, pure water becomes essential to the successful operation and support of the system. A source of pure water thus becomes a wrap around cost and must be part of our considerations regarding affordability.

Presently in the U.S. Air Force, we are committed to getting reliability and maintainability built into the initial design of a weapon system. There are few tactical systems in the U.S. Air Force inventory that are not subject to transfer to foreign governments, now or in the future, under the security assistance program. If affordability for the U.S. Air Force in terms of life cycle costs is a consideration for dropping a given system from our inventory, we know that the service cost of this now non-standard system for our foreign customers will escalate rapidly. (As a system grows older, support cost always increases.)

In summary, affordability in the specialized arena of international logistics means we must overcome previously accepted concepts of conventional support requirements. We must look at unconventional support requirements in the special environment in which friendly and allied governments operate their systems in coalition with U.S. forces. When we learn to put proposed

weapon systems through a total operational/environmental study, we will know what is and what is not affordable, as well as what the requirements for security really are. If we plan for acquisition and deployment in isolation, or only with a U.S./European geographic preception without realizing the need to adapt systems to worldwide environments, we risk military effectiveness.

We do not enhance regional security by transferring obsolete equipment or systems to our friends and allies. If it costs us too much to support our old system, it will cost security assistance customers even more as a system which has become non-standard to our own inventory grows older and more out-dated. Our efforts to acquire reliable, maintainable, and affordable weapon systems must be undertaken with a view of how that system will function in worldwide environments, and the degree of affordability the system has for security assistance program participants as well as ourselves.

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