

The Five Myths of a Non-Developmental Item (NDI) Acquisition Program and Implications for the T-X Program

After 45 years of Government and Industry experience in the operations, acquisition and sustainment of military weapons systems, I have gained an appreciation for the realities associated with the term “Non-Developmental Item”(NDI) and what that term means to an operator, to an acquisition professional, and to those serving in the sustainment specialties. First, it must be said that to each of those career specialties, the term NDI often connotes a different meaning and often, those meanings are not consistent.

For purposes of the this article, I will use the term “NDI” to mean an item already in use by an organization other than the prospective DOD customer and that DOD customer could put it to valuable use in accomplishing its mission with only minor modification. To put a finer touch to the term “minor modification” I would say that an NDI should be able to enter the acquisition process at nearly the Milestone C level. The Air Force’s acquisition of the T-1 Jayhawk Airlift Tanker Trainer in the early 90s is an example of a successful major NDI acquisition program and will be addressed in more detail below.

On the other hand, there are numerous examples where the NDI concept for a major acquisition program morphed along the way to something that more resembled a program at the Milestone A or B level. That morphing often occurred when the government selected the most desirable capabilities from each of the potential platforms as they demonstrated their flying and sustainment qualities. Hence as the final requirements document evolved, it began to move from a “what is needed” to a “what could be achieved” document. As a result, the various offerors presented platforms with significant modifications for which the government was only equipped with limited processes and analysis tools to accurately assess their cost, schedule and risk implications.

Many of those cases have been well documented in Acquisition Case Studies used by acquisition students and the DAU as examples of how to deal with the NDI concept when developing a new program’s acquisition strategy. As a result, I have outlined below what I’ll call the Five Myths of an NDI Acquisition Program; and then I will take a stab at the implications of not understanding those myths with regard to the current USAF T-X program. History is very clear that the appealing veneer of an NDI platform acquisition has not always shown itself to be true in execution.

Myth One: There are commercially available products that can be used to fulfill many of the requirements for military weapons and training systems with little or no modification.

Although it is true that many commercially available products can be used by military organizations to meet their local needs, when their global deployability or more intense military training missions are factored in along with the required availability, reliability and sustainability rates, it turns out that there are few systems that can be purchased and used without some, and in some cases significant, modification.

A case in point deals with the Air Force's more than thirty year focus on moving its undergraduate pilot training aircraft from the T-37 and T-38 to the T-6, T-1 and T-X. In the early 80s both the DOD and the Air Force recognized the Air Force needed to replace the T-37 and the T-38. After some fits and starts, to include the T-46 prototype as a T-37 replacement which was cancelled due budget reductions beginning in 1985, the Air Force began a serious look at an NDI approach focused on replacing the T-37 first and then the T-38. As a part of the SON/ORD process, an operations validation team began meeting with the potential OEMs and flying their aircraft to better understand the capabilities of their systems to meet the emerging requirements for a new primary trainer.

In the same timeframe, the Air Force chose to initiate its Specialized UPT program into a Fighter/Bomber track and an Airlift/Tanker track. So, in addition to replacing the T-37 to be used by both tracks as the primary trainer, and the T-38 for the Fighter/Bomber track, it also needed to acquire a new and different advanced trainer for the Airlift/Tanker track. As this effort evolved, the Air Force continued to define its primary aircraft training concept into what became known as the Joint Primary Aircraft Training System (JPATS). It also surveyed the civilian and military market for a platform to be used very quickly for the Airlift Tanker track students, and with Congressional direction it took a "SLEP now, replace later," approach for the T-38 system.

With regard to the Airlift/Tanker Trainer, the Air Force announced its intention to procure an Advanced Airlift and Tanker Trainer aircraft in February of 1990 and selected an existing Beech Aircraft to deliver 148 T-1 aircraft. The first delivery was January of 1992. The program ultimately grew to 180 aircraft, which were all delivered by 1997. Minimal changes were made to the commercial design and the aircraft are still in service.

On the other hand, the Joint Primary Aircraft Training System (JPATS) now known as the T-6 "Texan II," is a different story. The requirements and acquisition strategy was to find a currently flying platform that could meet the needs of both the Air Force and Navy. The RFP and source selection process took six more years beyond the T-1 contract award process even though all competing aircraft except one had been flown by the operations validation team eight years earlier. When the contract was awarded in February 1996, the selected airframe, the Swiss Pilatus PC-9, was a relatively mature and operationally effective trainer. Nonetheless, extensive modifications were needed (i.e. fuselage, wing, engine, engine cowling and canopy) to meet AF & Navy requirements. The first operational aircraft delivery was in May 2000—or about eight years after the first operational T-1.

The Reality: Normally the NDI product will need to be modified to meet USG requirements and more often than not, those modifications will greatly exceed the initial cost and schedule expectations.

Myth Two: Having prototype or demonstration vehicles enables the "fly before buy" concept, which eliminates or greatly decreases the EMD phase, reducing risk, cost, and accelerating the fielding of new capability.

I believe the T-1 Jayhawk delivery is a valid example of that premise, but the modifications to the aircraft required by the Air Force were very minor (e.g. add an internal fuel tank to increase range, beef up the

windscreen structure to prevent catastrophic bird strikes, add insulation to reduce noise in the cabin for instructor/student discussions, restructure the seating arrangement to facilitate instruction, etc.).

On the other hand, just as described earlier, the JPATS development program, which really began in 1986 with the operational validation team effort, took until 2000 to deliver the first operationally suitable aircraft, requiring major modifications, significant schedule slips, and growth in the aircraft's per unit cost. The perception that using an NDI platform would dramatically lower schedule and development risk proved to be invalid for JPATS.

The Reality: Even with flying prototypes or production representative test articles, typically, there are modification requirements that will both delay the start and extend the length of EMD development, spread out the fielding of the new system, and significantly increase the total program cost.

Myth Three: When choosing an NDI approach in fielding a new weapons system, the requirements development process will tailor its needs to the realities of the commercially available systems.

Even in the T-1 case, modifications were generated by requirements that were not typically inherent in any of the available commercially available aircraft due the operational environment in which the Air Force variant would be flown. And of course as already stated, they became even more pronounced in the JPATS program.

Reality: Operational requirements typically will not be artificially constrained as a result of commercial product limitations. Rather, as best of breed capabilities are learned and understood, they often become additional threshold requirements which ultimately increase EMD schedule and cost.

Myth Four: Once a sub-system is proven, its ability to roll forward into the next higher performance system becomes a relatively simple integration effort.

Although there are several very successful examples, (e.g. engine rollovers into the T-38, KC-135R and the C-5M, and avionics rollovers to the C-17, MC-130, MH-53 and B-52), there are many cases where the rollovers have been plagued by significant developmental and integration challenges (e.g. F-35 engine, JSTARS re-engining, JPATS engine, KC-10 AMP and C-130 AMP).

Reality: More often than not, the NDI sub-system will need to be modified to meet the technical, operational, and environmental demands of the new system. Form, Fit, and Function is typically not easy and clean when pulling "proven" sub-systems into a new major system.

Myth Five: An NDI platform will have a well-established supply chain and major repair and overhaul (MRO) infrastructure to the support the fielding and sustainment of a new weapons system.

Initially, that premise makes sense if the IT and Knowledge Management systems are clearly defined, and the processes used by industry match the processes used by the military. But as the military modifies the NDI platform to meet military requirements, and as the military and industry users field updates and modifications at different rates, the more divergent the Supply Chain and MRO operations and procedures will become.

Reality: Just because there is a commercial support system in place, there are generally cost and schedule challenges translating that support system into USG purposes. And further, the more modifications and unique articles required for military operations, the less likely the current commercial structure and existing spares will mirror the system required to support military operations.

What are the implications of these Five Myths for the evolving T-X program?

First, it must be said that the T-X program, as it began to take shape as a result of the T-38 Replacement Analysis of Alternatives and initial release of its requirement document in 2012, has seen a significant amount of instability and uncertainty with regards to the T-X schedule. This uncertainty has been due to the incredible turbulence associated with the budget environment and the on-going conflicts in Afghanistan, Iraq and Mid-East in general.

With that in mind, both the Air Force and industry have been whip-sawed with regard to what was initially envisioned as an NDI effort - where the Air Force might be able to execute an acquisition strategy much like the T-1 effort discussed earlier - to the idea with some industry partners that with composites, additive manufacturing and greatly improved design and engineering tools, a clean sheet design could accelerate the process of developing, testing, fielding and operating a T-X aircraft to be used by the Air Force for the next 50 years while greatly reducing both per unit costs and long term operating and sustainment costs.

Recent feedback indicates the Air Force is re-looking its acquisition strategy because what looked good five to six years ago, when the Air Force worked with the potential OEM competitors and flew their systems, has actually morphed their more recent discussions on the next draft requirements document, due out in the next month, in a way that actually confirms "the reality" related to Myth 3 requirements processes outlined above.

Along that line, we have seen that with the 2012 release of an initial draft requirements document, there were three existing platforms and one clean sheet design that might have been competitive. As the program slowed and surged over the next three years, two industry teams began, on their own dime, clean sheet designs, which were encouraged by the Air Force. When the Air Force released its next draft requirements document in March of 2015, one of the initial three existing systems and the initial clean sheet design dropped out of the competition due to performance requirements that exceeded their known capabilities.

Interestingly with the release of that draft, both remaining existing platform teams and Clean Sheet design teams were encouraged by the "Threshold and Objective" criteria because it seemed to allow each approach significant "trade space" in either modifying or designing their final offering. Now recent discussions indicate the Air Force will likely not use the "objective" criteria unless there is a tie at the end of the source selection

process. Such a decision will take the incentive out of any effort to deliver an aircraft that could actually exceed the Air Force's basic needs or perhaps even be useful in other missions in the years ahead.

Further, other current discussions have indicated the Air Force will require only recently revealed flight data performing specified maneuvers as a part of each competitor's proposal. That kind of data could only be provided by a mature platform, which will likely eliminate the two clean sheet designs before the final RFP is issued, perhaps by the end of 2016.

This all leads me to concern that the T-X program may be headed towards an "NDI-like" solution that ignores the lessons related to the five myths presented above.

Today there are at least two competitive NDI platforms and two competitive clean sheet designs. The existing platform teams will bet they can beat the odds described in the 5 Myths above and deliver a platform and training system, based on 30 year old designs that will meet the Air Force's threshold requirements. Although the clean sheet design teams may not be able to "demonstrate" NDI-like performance out of the starting gate with their demo jets, they are best positioned to deliver designs, manufacturing plans, and advanced material technologies that can exceed the AF's threshold requirements, cost significantly less to operate, and achieve the Secretary of the Air Force's objectives in "Bending the Cost Curve" for which the T-X was designated as one of the three initial pilot programs to validate the concept.

An honest review and application of the 5 myths to the T-X program will argue for an RFP that incentivizes all four...and maybe some other unannounced offerors...to compete. An NDI approach in 2010 may have been the best, especially if it followed the T-1 model, but now six years later a modified approach may offer the Air Force a much improved competition with potential future growth and sustainment capabilities not possible back then. This approach could provide the best path ahead to ensure the Air Force gets their best value for a T-X aircraft serving many generations of pilots to come.

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