Commercial or Non-Developmental Item Acquisition Strategy

A Look at Benefits vs. Risks

P A U L   D .   G U T I E R R E Z

Throughout the Department of Defense (DoD), Operations and Support costs are rising, with fewer and fewer dollars available for research, test and evaluation, and procurement of new systems. To save scarce resources and minimize the dollars spent on seemingly unnecessary test and evaluation, DoD is increasingly turning to three categories of procurement for needed products, services, and systems: Commercial Item (CI), Non-Developmental Item (NDI), and Commercial Off-the-Shelf (COTS). This article examines the wisdom of that strategy and its ramifications.

First, let's examine exactly what the three categories represent to the prospective government buyer.

CI

On June 26, 2000, the Office of the Secretary of Defense (OSD) defined a Commercial Item in their report, *Commercial Item Acquisition: Considerations and Lessons Learned,* as one customarily used for non-government purposes that has been or will be sold, leased, or licensed (or offered for sale, lease, or license) to the general public. An item that includes modifications customarily available in the commercial marketplace or minor modifications made to meet Federal Government requirements is still a Commercial Item.

In addition, services such as installation, maintenance, repair, and training that are procured for support of an item, as described here, are considered Com-
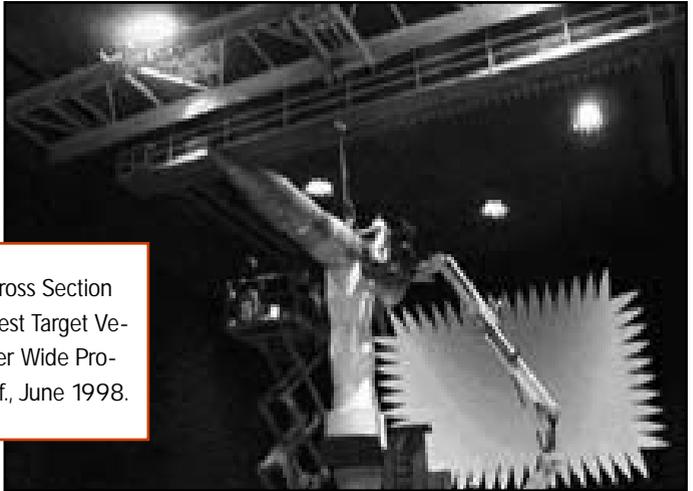
Performing Radar Cross Section Measurements for Test Target Vehicle-3, Navy Theater Wide Program, Pt. Mugu, Calif., June 1998.

mercial Items if they are offered to the public under similar terms and conditions or sold competitively in substantial quantities based on established catalog or market prices.

NDI

A Non-Developmental Item is any previously developed item of supply used exclusively for government purposes by a Federal Agency, a state or local government, or a foreign government with which the United States has a mutual defense cooperation agreement; and any item described here that requires only minor modifications or modifications of the type customarily available in the commercial marketplace in order to meet the requirements of the processing department or agency.

COTS

In the same June 2000 report, OSD defined a COTS item as one that is sold, leased, or licensed to the general pub-

lic; offered by a vendor trying to profit from it; supported and evolved by the vendor who retains the intellectual property rights; available in multiple, identical copies; and used without modification of the internals.

Why the Shift to CI, NDI, and COTS?

With fewer dollars available for research, test and evaluation, and procurement of new systems, an important advantage of many CI and NDI acquisitions is the reduced acquisition cycle time. This reduction results primarily from decreased design and engineering time, but is partially achieved through decreased testing requirements—a situation made possible only because of previous testing and general acceptance of the product in the commercial marketplace or in a previous military application.

The general guidance for CI and NDI acquisitions is to conduct testing only

Gutierrez is a professional engineer and is currently assigned as the Sea Based Mid-Course (SBMC) Mission Manager, Space and Missile Defense Command, Huntsville, Ala.

when existing data (contractor or other) is insufficient. Likewise, Developmental Test and Evaluation—which is Test and Evaluation conducted throughout the life cycle to identify potential operational and technological capabilities and limitations—is conducted only if specific information that cannot be satisfied by existing data is needed.

Involve the Experts Early
Important to the health of any program or project is obtaining assistance from the developmental testing experts—*early* in the life cycle. Early participation by each Service's independent Operational Test Agency is equally important. Together, these testers can verify existing test data and plan for additional tests if required. Since the product is already developed, most testing of CIs is Operational Test and Evaluation, which involves the field test, under realistic conditions, of any item (or key component) of weapons, equipment, systems, or munitions for the purpose of determining its effectiveness and suitability.

Counting the Cost
While most technology decision makers hail DoD's move toward using COTS components in advanced weapon systems, a wary and experienced minority in the defense community is warning that using commercial products can be expensive and inefficient. The acquisition cost savings are not being realized to the extent anticipated because of many factors not included when the product was procured.

Early Warning
In September 1997, the Department of Defense Office of the Inspector General (DoDIG) issued Audit Report No. 97-219, "Lessons Learned from Acquisitions of Modified Commercial Items and Non-Developmental Items." Detailing lessons learned from the acquisition of modified CIs and NDIs, the report went on to cite 37 DoD programs that acquired modified CIs and NDIs in anticipation of substantial cost savings.

Also in the report, the DoDIG noted that to remain competitive, commercial suppliers often retained proprietary rights

While most technology decision makers hail DoD's move toward using Commercial Off-the-Shelf (COTS) components in advanced weapon systems, a wary and experienced minority in the defense community is warning that using the commercial products can be expensive and inefficient.

to technical data that affect or describe product performance, quality, and logistical support. Program Offices were attempting to side-step testing in order to save funds, but subsequently discovered that they had to go back and test the items anyway.

Ultimately, the Program Management Offices (PMO) found that they could not avoid component and integration testing just because the item was commercial. In fact, in cases where PMOs elected to procure CIs, such items now raised eyebrows and the users wanted more testing because the items were being used by the military in environments for which the commercial producers had not intended.

Invariably, we in the test community have found that contractors, vendors, and suppliers have in fact done very little testing of such items. For purposes of this article, a contractor is a company or institution that is under contract to the government and from whom a program manager expects to receive a delivered system as specified in a contract.

A contractor may also be a vendor. A vendor is a commercial enterprise whose purpose in producing a product is to offer it for sale in the marketplace, and not in response to specific program needs. The vendor may also be a contractor or subcontractor who is under contract to modify a CI in response to unique program requirements.

COTS Solutions Not Always the *Best* Solutions
Let me recount a partial list of problems encountered by NASA's Jet Propulsion Lab, as documented by Advanced Program Management Course student Wilson Dizard III, in his September 2001 "COTS Skeptics Cite Risks in Commercial Software."

NASA purchased COTS items as a quick and inexpensive design solution, but their experience has shown that commercial vendors do not bend to the demands of their military customers. From their experiences emerged the following misconceptions about COTS and COTS vendors—misconceptions that those responsible for procurement may be harboring to their detriment:

- COTS package solutions are less risky.
- Buying and Modifying a COTS package is faster than developing a new item, system, or technology.
- A COTS package is already available for my application.
- A COTS package will work because copies abound in other organizations.
- The vendor will keep the COTS package current.
- Vendor literature is always factual and true.

NASA eventually found that they were buying "black boxes" with little information. Lesson Learned: Not *all,* but definitely *some* COTS packages are questionable and can create problems for one or more of the following reasons:

- Vendors overcommit themselves.
- Vendors don't supply all services.
- The software may not meet the requirements.
- The software may not be easy to modify.

• The purchaser has very little control over vendor quality and schedule.

Because of these five discrepancies, the PMO organization may have to change to accommodate the COTS package. NASA experienced increased support costs for modifications that were as high as 20 percent of the cost of the modification per year.

CIs/NDIs Also Not Without Problems

CIs and NDIs are also fraught with potential problems for PMs. While they are encouraged to purchase CIs and NDIs in today's acquisition environment of streamlining and Milspec Reform, PMs may not fully realize that much testing remains to be done prior to any proposed military application.

Early qualification testing will probably be required in the operational and maintenance environment. Pre-production qualification testing will be required if early qualification testing leads to modification of the original item. Ideally, PMs should perform market research prior to purchasing, and put the item in users' hands early to determine if the users can work with the items in their operational environments.

COTS Testing Without Full Disclosure

How do we test COTS if the vendor does not release information? It's true we can buy a COTS package more quickly than developing it, but we may not get all the literature with the package. The COTS package is difficult to modify. If it's not "plug and play," the PMO may wind up spending huge sums to test the package and ultimately get it to work.

Cases are known, where small vendors might not support revisions that are even four releases old. DoD must then keep purchasing upgrades and retesting. The result: our configuration becomes unstable. Trapped by contradictory conditions, a Catch-22 situation is the likely result as the PMO starts spending more money in an attempt to keep up with all the releases. The user becomes unhappy if the COTS is not tested, we find

The use of CIs frequently meant embracing commercial business practices that are embedded in the CI. As a result, the vendor may not have full knowledge of how the item works.

interface problems, and it is difficult if not impossible to modify the items.

To be effective, the PMO must choose the correct standards and the correct components. Can the PMO later change from one vendor's components to a second vendor's components? Perhaps the interfaces could be incorrect, rendering it impossible to make such a change. And if we do change, it could be very costly as well as time consuming to the program.

The pitfalls that beset COTS may also hold true for CIs and NDIs. The bottom line is that PMs must continue to test CIs and NDIs, even though they are commercial items. The big push is to accept the items "as is" and avoid testing them, but we now have DoDIG and NASA reports highlighting the fact that CIs may require extensive testing.

Let's Not Forget Developmental Test and Evaluation

The use of CI, COTS, and NDI acquisitions was intended to reap huge savings for the government; however, the PMOs cannot afford to forget another important aspect of such acquisition—Developmental Test and Evaluation. The use of CIs frequently meant embracing commercial business practices that are embedded in the CI. As a result, the vendor may not have full knowledge of how the item works. The concept of operation; interface and data standards; ar-

chitecture and design; and the characteristics of form, fit, and function—all can generate additional problems.

Equally important are the vendor's business practices and strategies in areas such as development, maintenance, distribution updates, and availability of spare parts. To maximize the item's effectiveness in meeting program needs, many DoD requirements must be adjusted to accommodate both the vendor's anticipated uses of the CI and the vendor's business practices.

To summarize the points I make in this article, let me provide a few test and evaluation recommendations that I hope would merit any PM's earnest consideration:

• Buying organizations should thoroughly analyze known deficiencies of commercial equipment, NDI, and COTS before purchasing the items.
• PMOs should plan the conduct of operational testing as early as possible. This will identify problems early and allow resolution as soon as possible.
• PMOs have to recognize that test and evaluation of commercial components is important when commercial suppliers are modifying a commercial system. Vendors do not test their items in military environments.
• Buying organizations should develop a sensible test program using previous manufacturing and government test results.
• PMOs should tailor their testing to address program risk areas.
• Test organizations should maintain on-site representation during test execution to ensure test requirements are met and the test results are understood. PMs cannot totally avoid testing just because they have purchased CI for military use.
• PMs can still realize cost savings using CIs if they use common sense about testing the items.