

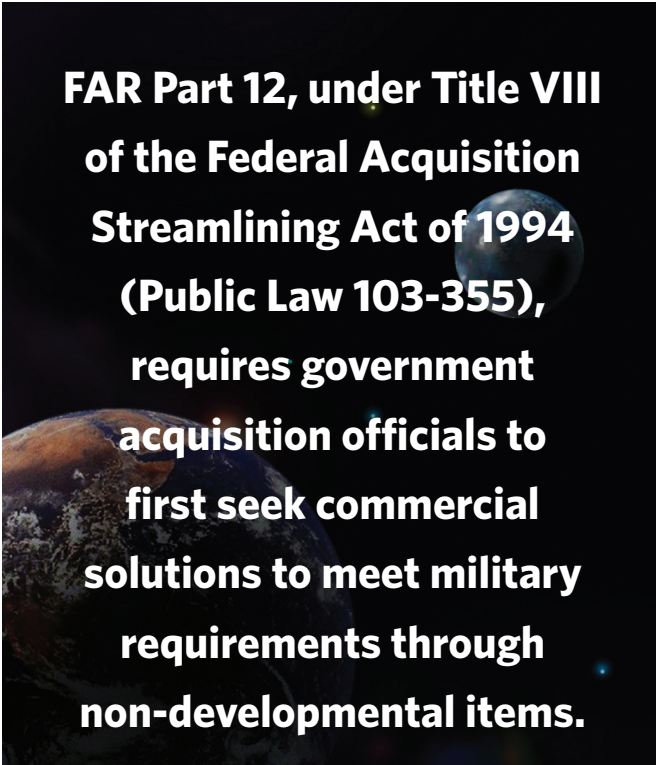
Commercial Acquisition Demystified

How Commercial Satellite Acquisition Conforms to FAR Part 12

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Initiatives announced by Department of Defense Secretary Robert Gates in August 2010 to reduce overhead costs by more than \$100 billion over the next five years will challenge the imagination, courage, and persistence of the nation's government-industry acquisition team to do its required share. What if, however, ways already existed to reduce cost but were not well understood? This article examines ways to decrease costs in commercial satellite acquisition and discusses five widely held myths regarding commercial satellite acquisition and manufacturing practices.





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While the space domain is the focus, the information and approaches presented in this article apply to a wider range of acquisitions, where a reputable commercial industrial base exists as an alternative. The article also compares a typical commercial satellite contract with a contract based on the requirements of Federal Acquisition Regulation Part 12, "Acquisition of Commercial Items," and identifies the similarities as well as several differences that can be accommodated with the tailoring approach recommended by FAR Part 12. All of that is important to understanding the realities of commercial space acquisition and how readily commercial practices can be successfully adapted to meet required government FAR requirements.

The Increasing Need for Space-Based Capabilities

According to an *Aerospace Power Journal* article by Air Force Col. Edward Mann, Desert Storm was the first information, or space, war. Since that conflict, space capabilities have taken on even greater importance in the battle to find and fight an elusive enemy. Focusing just on the satellite communications aspect of space, increased warfighter demand for higher-quality pictures, video, and responsiveness has led to a large demand for greater bandwidth and quality of service while, at the same time, acquisition budgets are forcing necessary compromises. The cancellation of the Transformational Satellite Communications System in 2009 left a significant hole in DoD's future communications architecture. It is likely that other acquisition domains (for example, cyber and unmanned aerial vehicles), are facing a similar situation where demand is fast outpacing current delivery capability.

Three general acquisition strategies could be used to fill the gap between bandwidth requirements and existing satellite assets. The first is a FAR Part 15 acquisition from a defense industrial base partner to purchase a satellite system; the second is to lease commercial satellite bandwidth; and the third is to purchase a satellite system from the commercial industrial base using a FAR Part 12 acquisition. The government has traditionally used the first and is already using the second by relying on commercial satellites to meet the rapidly growing need for communication with the battlefield. According to industry research firm Futron, the Defense Information Systems Agency leases as much as 80 percent of DoD's bandwidth in some geographic regions from commercial satellite operators.

The next step is the intelligent leveraging of commercial satellite production capability. It should be noted that in the president's National Space Policy of the United States of America, released in June 2010, the second foundational principle encourages a growing commercial space sector:

A robust and competitive commercial space sector is vital to continued progress in space. The United States is committed to encouraging and facilitating the growth of a U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship.

That principle emphasizes the commercial industry as a source for meeting future DoD communications requirements. A commercial approach to augment the communications satellite programs of record remaining after the Transformational Satellite Communications System cancellation has an important place in the "more effective, efficient, cost-conscious way of doing business" articulated by Secretary Gates. Such an approach is entirely consistent with the existing FAR, specifically Part 12, which, under Title VIII of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355), requires government acquisition officials to first seek commercial solutions to meet military requirements through non-developmental items. Because commercial acquisition is part of the law governing DoD acquisitions, we should better understand what the commercial satellite industry offers within that context, and, for those in other product domains, what commercial acquisition opportunities are applicable.

Five Commercial Satellite Acquisition Myths

To understand the real opportunities offered by the commercial satellite industry in meeting government needs, it is important to correct a few commonly held myths about commercial satellite acquisition practices.

Myth 1: Commercial satellite acquisition processes do not require documentation deliverables.

False. Just like government procurement agencies, commercial satellite owner/operators need to have high confidence that the quality and capability of their systems will meet mis-

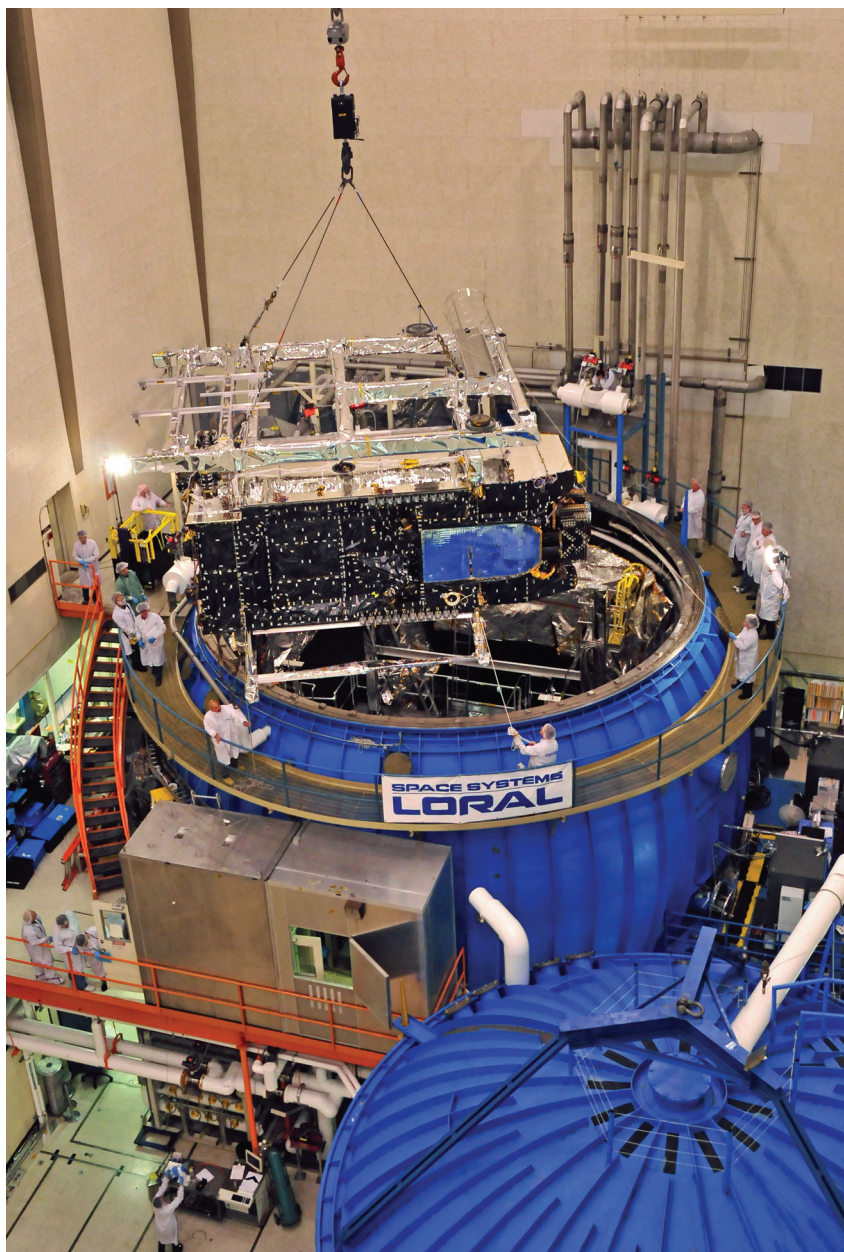
sion requirements. Commercial acquisition/program management practices originally evolved from government acquisition practices and typically include comprehensive design reviews, detailed analyses, and extensive qualification and testing programs. Those are established, implemented, and controlled in conjunction with the customer and include extensive documentation regimes.

A typical commercial satellite contractor data requirements list shows 38 data items, of which 14 require customer approval. Examples of the items requiring customer approval are minutes and action items from the program readiness review, preliminary design review (PDR) and critical design review (CDR), satellite simulator specifications, in-orbit test reports, Class I waivers, deviations, and engineering change proposals. Such items demonstrate how closely the commercial contractor data requirements list mirrors those found in traditional FAR Part 15 acquisitions. A notional commercial contractor data requirements list, a reference to typical commercial contract terms and definitions, and an abbreviation and acronym list can be found at http://ssloral.com/html/dau/reference_material.html.

Myth 2: Commercial acquisition does not give the customer sufficient insight into program activities at the factory.

False. Commercial acquisition and mission success are highly dependent on a collaborative relationship between the manufacturer and the customer, which begins at the pre-acquisition solicitation phase and continues throughout the satellite's active life on orbit. Immediately after contract award, a full-time customer program office is established at the contractor's manufacturing facility and will last for the duration of the program. Commercial programs typically run from 24 to 36 months. (Please note that the length of a program from contract award to launch depends on the amount of design development required; the amount and availability of hardware; and the complexity of assembly, integration, and test.)

Onsite program office teams vary in size from several to a couple of dozen engineers and managers, depending on the customer's familiarity with the manufacturer and the number of satellites concurrently under construction for them at the facility. The onsite teams have complete access to program data and facilities; and visibility into, and approval of, program activities. The onsite program office team reviews all documentation; is involved in all program reviews; and is included



ViaSat-1 is a broadband satellite that will provide more than 100 Gbps throughput. It is shown here being lifted into the thermal vacuum chamber at Space Systems/Loral.

Photographer: Brian Webber, Space Systems/Loral

in all contractual buy-off events, including equipment qualification status reviews and part, material, and process activities. Important characteristics of the members of the onsite teams are their experience, knowledge, and authority to make decisions for their company so that critical programmatic schedules can be met.

Myth 3: Commercial satellite acquisition programs do not include PDRs or CDRs.

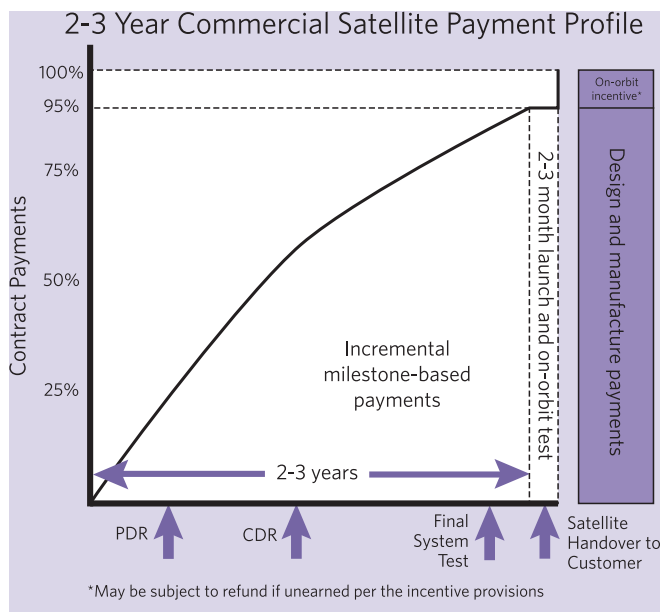
False. The standard practice of holding PDRs and CDRs in the commercial satellite industry is very consistent with gov-

ernment practices. A PDR is always held to establish the design feasibility of the satellite and its subsystems, including the payload and all associated ground control hardware and software. The manufacturer proceeds with detailed design activities once the customer approves PDR completion. The next major review is a CDR, which is conducted with the purpose of confirming and providing customer confidence that the satellite design, including all associated subsystems and equipment, meets the requirements of the technical specification. Upon the customer's approval of successful CDR completion, the contractor can proceed with the satellite manufacturing, assembly, integration, and testing activities.

Commercial design review requirements, as well as other practices, have evolved directly from government acquisition practices, and many of the professionals active in the commercial satellite industry today received their satellite program training and experience while working on government satellite acquisition programs. Assurance of mission success for the typical 15-year life of today's commercial communications satellites is not left to "trust me" metrics—the impressive record of commercial on-orbit performance bears witness to this.

Myth 4: Commercial satellite acquisition practices require customers to pay the full contract price at contract award, thereby losing any financial leverage with the manufacturer.

False. Even with the significantly shorter schedules and lower prices associated with commercial satellite procurements, full payment in advance would be extremely unusual. Commercial satellite manufacturers develop program payment plans that attempt to maintain a cash positive/neutral position throughout the satellite design/build cycle. Because commercial satellite contracting involves, in almost all cases, fixed-price contracting, a milestone payment plan is typically incorporated



Typical Commercial Contract Milestones and Payment Plan Profile

into each contract. Unlike a calendar-based payment plan, a milestone plan requires fixed payments to be made upon successful completion of program events. The figure illustrates a few representative milestones that occur over the life cycle of a commercial satellite design and production cycle.

The customer and contractor agree on the program payment events and associated payments at the time the contract is signed. It is typical for there to be one or more payment milestones identified in every planned month of the program. Milestones that demonstrate significant progress being made toward program completion are usually selected. Examples include:

- Completion of CDR
- Start of panel integration
- Start of thermal vacuum testing.

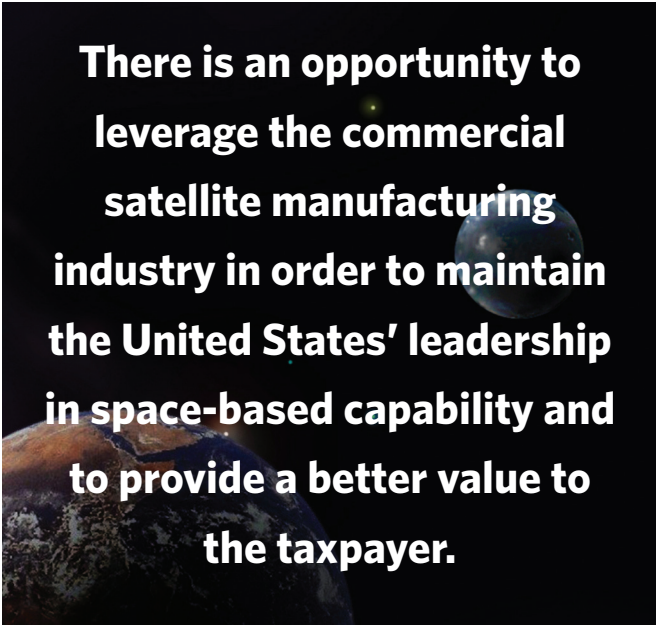
Invoicing is done no more than once per month, and only for the amounts associated with the payment milestones completed during the month. Time-phasing of program funding needs can vary because of factors such as amount of qualification required, availability of equipment and supply sources, complexity of the configuration, etc. As shown in the figure, however, it is not uncommon for 60 percent or more of the costs that are incurred on a commercial satellite program to be spent or committed within the first 12 to 15 months of the program.

Myth 5: Commercial satellite manufacturing means inferior quality.

False. Competition in today's commercial satellite market demands the highest-quality products and services, and billions of people depend on the performance of the satellites every day. Globally, multi-billion dollar industries depend upon reliable commercial satellite performance, and decades of actual experience shows that commercial satellite manufacturers are building high-quality, reliable satellites that are meeting these needs.

Communications service providers buying commercial satellites expect greater than 99 percent availability, and the marketplace punishes poor performance and poor reliability. Failures reduce revenue and customer base, and they increase insurance premiums or result in insurance coverage exclusion. As a result, rigorous quality assurance policies, programs, and practices are instituted at all levels of the commercial satellite manufacturing enterprise to ensure best practices are implemented, maintained, and validated.

Satellites, even when they take maximum advantage of proven heritage designs and equipment, are still very sophisticated systems that demand extensive and effective control processes. Like their government contractor counterparts, commercial manufacturers maintain certified quality assurance programs, which are documented, staffed, and audited.



There is an opportunity to leverage the commercial satellite manufacturing industry in order to maintain the United States' leadership in space-based capability and to provide a better value to the taxpayer.

Other effective levers available to commercial customers to ensure the success of the satellite mission include the use of financial incentives. Typically, commercial customers incentivize success by requiring a portion of the satellite price, in the range of 10 percent, to be earned during the on-orbit operation of the satellite, so that earnings correlate to the performance of the satellite. The incentive can be paid as earned, or pre-paid at acceptance and then refunded if unearned because of poor on-orbit performance. The earnings are dependent upon the satellite's meeting very specific operational performance criteria, usually transponder availability. This concept is also reflected in the figure.

Commercial Contracts and FAR Part 12

With such common myths dispelled, FAR Part 12 can be used to enter into a productive partnership with a commercial industrial base partner. It is possible to make some very specific comparisons between FAR Part 12 and commercial satellite contracting.

Though the wording of required FAR terms may differ slightly from those contained in typical commercial satellite contracts (many of which are available for review through government Federal Communications Commission/Security and Exchange Commission databases) significant parallels exist between the two and a minor amount of tailoring is required to bridge any differences. A detailed table with specific tailoring provisions is available for review at http://ssloral.com/html/dau/reference_material.html.

Regarding the inspection and acceptance:

- Pre-intentional ignition—Acceptance testing will be done to government-approved test plans at the contractor's facility to demonstrate compliance with specification requirements, followed by a test review. Approval of acceptance testing by the government is a prerequisite for

authorization to ship the satellite to the launch site; any discrepancies identified during acceptance testing/review must be corrected at the contractor's expense or waived by the government.

- Post-intentional ignition—Irrevocable acceptance of the satellite occurs at the conclusion of on-orbit testing; there is no right of rejection of the satellite after intentional ignition. For non-conformances discovered after intentional ignition, the remedies are limited to analysis of failure, software patches, revisions to operating procedures, loss of any incentives tied to post-intentional ignition performance, or insurance recovery.

Regarding warranties:

- Prior to intentional ignition, the contractor is responsible for correcting all non-conformances at no cost; after intentional ignition, the remedies are more limited.

Intentional ignition refers to the point in time when the satellite is integrated onto the launch vehicle and the command signal is sent to start the ignition sequence of the launch vehicle.

Leveraging Commercial Satellite Manufacturing

Some of the most common myths regarding commercial contracting, at least commercial satellite contracting, are proven false by an examination of the facts and decades of experience with commercial systems. Commercially contracted satellite manufacturing offers a way for the government to reduce costs and close capability gaps. It already has a place in FAR Part 12, and the government is already filling much of its satellite needs through commercial satellite leases.

There is an opportunity to leverage the commercial satellite manufacturing industry in order to maintain the United States' leadership in space-based capability and to provide a better value to the taxpayer. It is likely that acquisition professionals from product domains other than space can also leverage the ideas in this article to reduce costs and close capability gaps. As Under Secretary of Defense Dr. Ashton B. Carter stated in a June 28, 2010, memo to DoD acquisition professionals: "We must therefore abandon inefficient practices accumulated during a period of budget growth and learn to manage defense dollars ... [within a] framework for restoring affordability to defense."

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