**DEFENSE ACQUISITION GUIDEBOOK  
Chapter 4 -- Systems Engineering**

[**4.3.18.4. Commercial-Off-the-Shelf**](https://acc.dau.mil/dag4.3.18.4#4.3.18.4)

**4.3.18.4. Commercial-Off-the-Shelf**

The use of commercial-off-the-shelf (COTS) items, including Non-Developmental Items, can provide significant opportunities for efficiencies during system development but also can introduce certain issues that should be considered and mitigated if the program is to realize the expected benefits. Investigation of COTS product use is required by [DoDI 5000.02](https://acc.dau.mil/dodi5000.02" \o "DoDI 5000.02" \t "_blank), Enclosure 2.

The primary benefits of using COTS components in system design are to:

* Reduce development time
* Allow faster insertion of new technology
* Lower life-cycle costs by taking advantage of the more readily available and up-to-date commercial industrial base

However, regardless of the extent to which a system is made up of commercial items, the Program Manager still engineers, develops, integrates, tests, evaluates, delivers, sustains, and manages the overall system.

Among concerns with using COTS products are:

* Subtle differences in product use can significantly affect system effectiveness, ESOH, reliability, and durability
* If integration requires a "modified COTS product," meaning that a COTS product may not be designed for many military environments (which, by definition, is not a COTS product under [section 403 of title 41, United States Code](http://uscode.house.gov/search/criteria.shtml), but is allowed under [section 431 of title 41, United States Code](http://uscode.house.gov/search/criteria.shtml)), then the program may lose the ability to use the vendor’s subsequent product upgrades or to find a suitable replacement for the product from other commercial sources
* The vendors can embed proprietary functions into COTS, limiting supply sources
* Vendors do not have to provide design information and often restrict purchasers from reverse engineering their intellectual property
* Licensing agreements vary and can be very restrictive while limiting the vendors liability for merchantability for intended purposes
* Supply chain risk management of COTS items is limited by the vendor, who is under no obligation to the purchaser to provide such information
* Incorporating COTS products places constraints on the rest of the design and reduces trade space; functionality, interfaces, and reliability and maintainability characteristics are embedded in the choice of a COTS system element
* Difficulty in finding suitable replacements and/or alternate items if the COTS vendor stops manufacturing the product or changes the configuration drastically, requiring the need to maintain different configurations of a single product
* The program needs to understand the “pedigree” or the qualified vendors for the COTS product
* The graphical user interface (GUI) design may not completely support user tasks, which can cause inefficient workarounds and improper use of the system by the user

The marketplace drives COTS product definition, application, and evolution. COTS products presume a flexible architecture and often depend on product releases that are designed to be used “as is” to meet general business needs and not a specific organization's needs. The commercial product life cycle is usually much shorter than the equivalent military product life cycle. Programs should consider the potential availability of suitable replacement and/or alternative items throughout the longer, military life cycle, and should monitor the commercial marketplace through market research activities and ongoing alignment of business and technical processes. This necessary activity imposes additional cost, schedule, and performance risks that the acquisition community should plan for. COTS products should be evaluated to meet all performance and reliability requirements during all environmental conditions and service life requirements specified by the intended application requirements documents.

The [Federal Acquisition Streamlining Act (FASA) of 1994 (Public Law 103-355)](http://thomas.loc.gov/cgi-bin/bdquery/z?d103:S1587:) and the [Clinger-Cohen Act (Public Law 104-106)](http://www.gpo.gov/fdsys/pkg/PLAW-104publ106/content-detail.html)both endorse the use of COTS products by the Federal Government but have slightly different definitions, with the latter allowing for modifications to COTS.

The Systems Engineer should ensure open system design, identification and mitigation of Environment, Safety, and Occupational Health (ESOH) and security risks, survivable technology insertion, or refresh throughout the projected system life cycle.

The Program Manager and Systems Engineer should consider the following when evaluating use of COTS products:

* The intended product use environment and the extent to which this environment differs from (or is similar to) the commercial use environment
* Integration, documentation, security, Human System Integration, ESOH, hardware/software integrity, reliability risk, operational environment, and corrosion susceptibility/risk, etc.
* Planning for life-cycle activities (including sustainment, supply chain risks, obsolescence, and disposal)
* Developing relationships with vendors, Foreign Ownership Control, and Influence (FOCI) (see [Defense Security Service](http://www.dss.mil/isp/foci/foci_info.html) for the latest policy regarding COTS from FOCI sources)
* Supportability, if vendor or marketplace changes occur
* Test and evaluation of COTS items (including early identification of screening, functionality testing and usability assessments) (See [DAG Chapter 9 Test and Evaluation](https://acc.dau.mil/dag9), Chief Development Tester)
* Protecting intellectual property rights by being aware of pertinent intellectual property right issues associated with commercial items acquisitions, especially with the acquisition of commercial software products. When acquiring Intellectual Property (IP) license rights, the acquisition community should consider the core principles described in the [DoD guide: “Intellectual Property: Navigating through Commercial Waters.”](http://www.dtic.mil/dtic/tr/fulltext/u2/a400207.pdf" \o "DoD Guide: \"Intellectual Property: Navigating through Commercial Waters\"" \t "_blank)
* Ability to modify or interface COTS software with other software even if Government generated or owned
* Ability to have insight into configuration management, and the features and functions of upgrades and changes
* Ability to instrument and/or test aspects of COTS products