

Module 6 - Acquisition Approaches and Development Paradigms

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Introduction

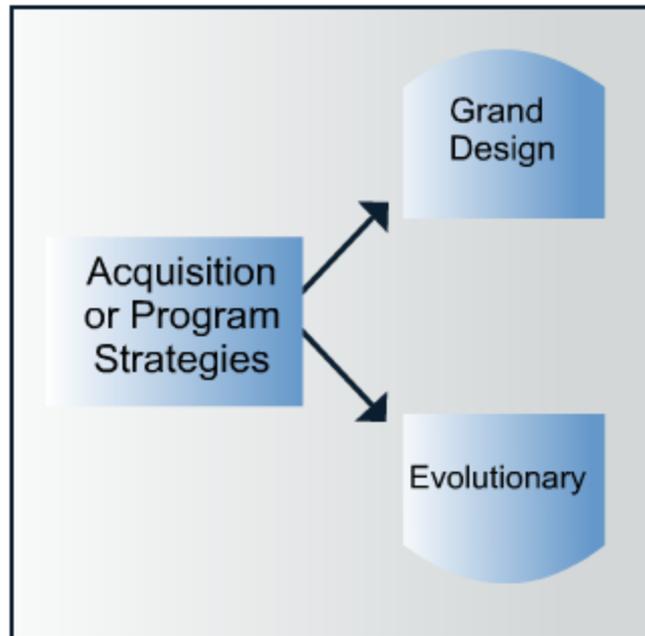
Acquisition approaches, chosen by the acquirer and formally documented in the system's Acquisition Strategy, determine how a total system (hardware, software, people, and facilities) is "put together".

The acquisition strategy defines the program structure used to achieve full capability.

Two acquisition approaches commonly used within the DoD for information and software-intensive programs include:

- Single Step (or Grand Design)
- Evolutionary (the preferred approach)

While evolutionary is the preferred approach for many types of DoD programs, Single Step is appropriate in some circumstances.

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Lesson Objectives

After completing this lesson, you will be able to:

- Select appropriate system-level acquisition approaches and software development paradigms.
- Define the most common systems-level acquisition approaches.
- Identify the strengths and weaknesses of acquisition approaches.
- Relate acquisition approaches to risks.
- Identify acquisition models used to acquire software systems in the DoD.

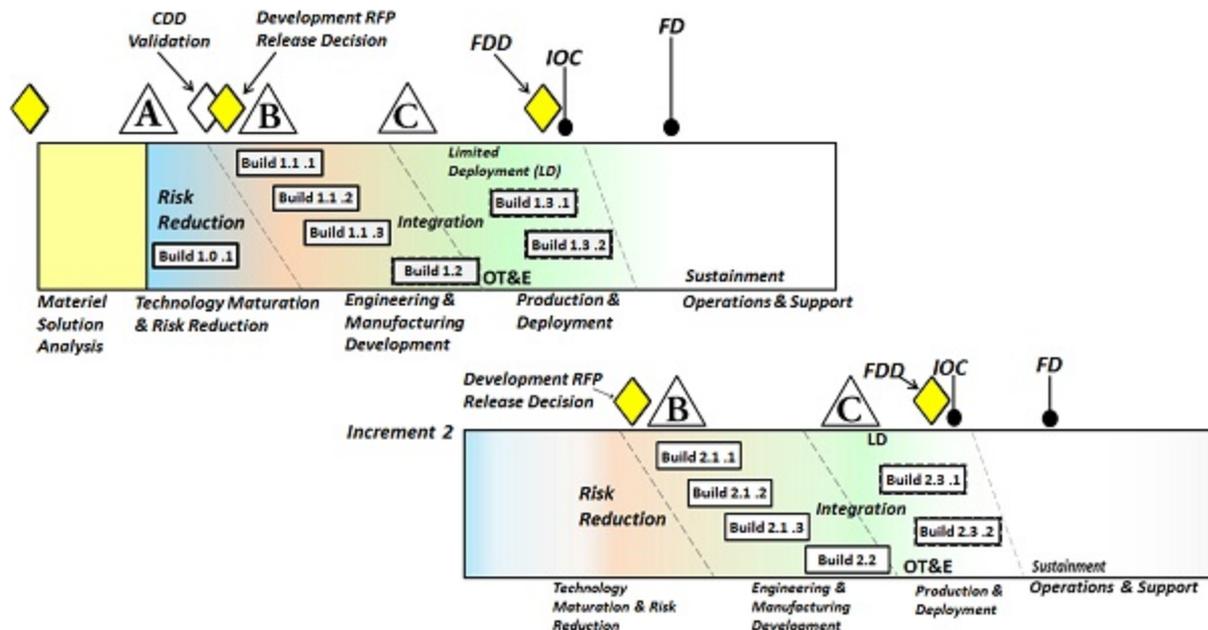


Objectives

Management System Overview: Defense Acquisition Management System

The DoDI 5000.02 establishes a simplified and flexible process for managing all acquisition programs. This process, referred to as the Defense Acquisition Management System, is a continuum of activities that represents or describes defense acquisition programs. The system is represented below.

There is no one best way to accomplish the objectives of the Defense Acquisition Management System. Decision-makers and Program Managers tailor acquisition strategies to fit the particular program. Not all programs need to follow the entire process.



Acquisition Strategy

The DoDI 5000.02 states that each Program Manager (PM) must prepare an acquisition strategy.

The acquisition strategy guides program execution from initiation through re-procurement of systems, subsystems, components, spares, and services beyond the initial production contract award and during post-production support.

The acquisition strategy evolves through an iterative process and becomes increasingly more definitive in describing the relationship of the essential elements of a program.

A primary goal of the strategy is to minimize the time and cost it takes, consistent with common sense and sound business practices, to satisfy identified, validated needs for technologies, products, and services, and to maximize affordability throughout a program's useful life cycle.



Department of Defense INSTRUCTION

NUMBER 5000.02
January 7, 2015

USD(AT&L)

SUBJECT: Operation of the Defense Acquisition System

References: See References

1. **PURPOSE.** This instruction:

- a. In accordance with the authority in DoD Directive 5000.01 (Reference (a)), revises the interim DoD Instruction 5000.02 (Reference (b)) to update established policy for the management of all acquisition programs in accordance with Reference (a), the guidelines of Office of Management and Budget Circular A-11 (Reference (c)), and References (d) through (ee).
- b. Authorizes Milestone Decision Authorities (MDAs) to tailor the regulatory requirements and acquisition procedures in this instruction to more efficiently achieve program objectives, consistent with statutory requirements and Reference (a).

2. **APPLICABILITY.** This instruction applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this instruction as the "DoD Components").

3. **POLICY.** The overarching management principles and mandatory policies that govern the Defense Acquisition System are described in Reference (a). This instruction provides the detailed procedures that guide the operation of the system.

4. **RESPONSIBILITIES**

- a. **Defense Acquisition Executive (DAE).** The DAE is the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)). The DAE will act as the MDA for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) programs. In accordance with Table 1 in Enclosure 1 of this instruction, the DAE may

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Acquisition Strategy Approaches

The acquisition (ACQ) strategy defines the program structure used to achieve full capability and the approach to be followed.

There are two approaches, Single Step to full capability and Evolutionary which is the preferred approach.

Select each approach to learn more.

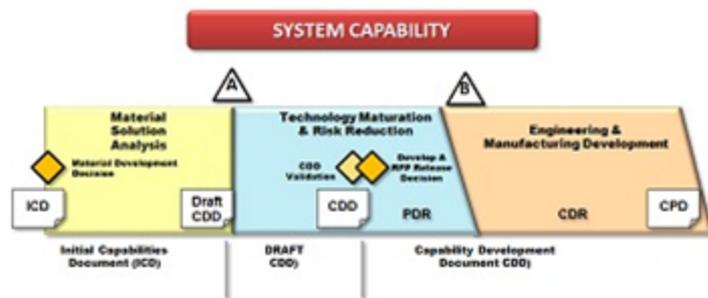


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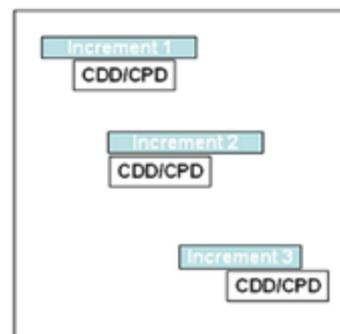
Which Approach to Use

So which approach should be used, Step or Evolutionary? The acquisition strategy approach to be followed depends on the:

- Availability of time-phased capability needs in the Capability Development Document (CDD)/ Capability Production Document (CPD)
- Maturity of technologies
- Relative costs and benefits of executing the program in evolutionary increments versus a single step



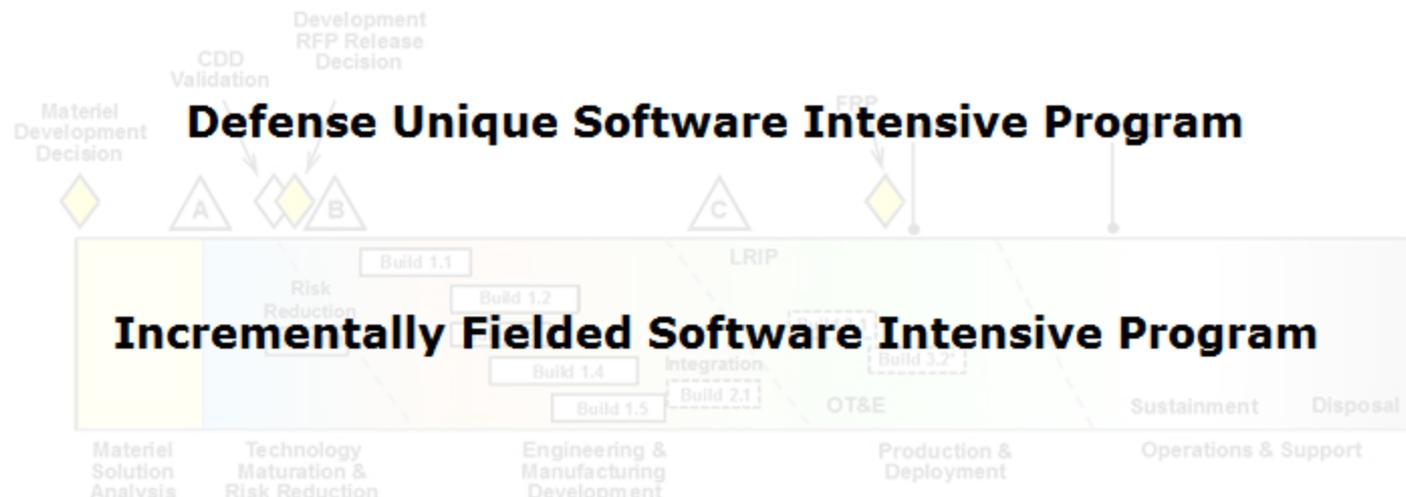
OR



Acquisition Models

There are several models acquirers use for fielding software systems. These models include the Defense Unique Software Intensive Program, Incrementally Fielded Software Intensive Program and the Hybrid Acquisition Programs models.

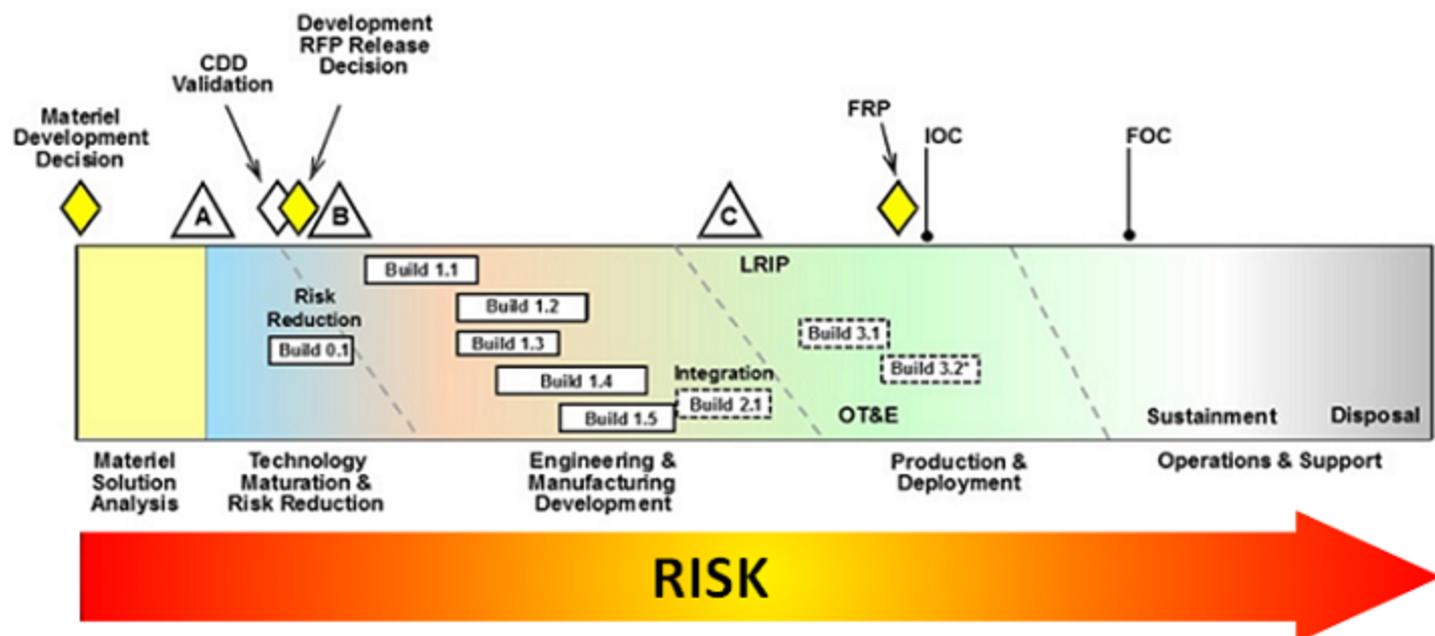
Select each model to learn more.



Hybrid Acquisition Programs (Hardware Dominant and Software Dominant)

Risk Management in Hybrid Acquisition Models

Highly integrated complex software and hardware development poses special risks to program cost and schedule performance. Technical, cost, and schedule risks associated with hardware and software development must be managed throughout the program's life cycle and will be a topic of special interest at all decision points and milestones.



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Knowledge Review

Ms. McMann, the IT leader, has been requested to pinpoint the best acquisition model for software systems that work well with commercial off-the-shelf software. Select the best recommendation:

- Hybrid Acquisition Programs
- Defense Unique Software Intensive Program
- Incrementally Fielded Software Intensive Program

Check Answer

LRATS IPT: Evolutionary Acquisition Issues

Select each acquisition team member to learn more about the issues surrounding Evolutionary Acquisition as it relates to Contracting and Testing.

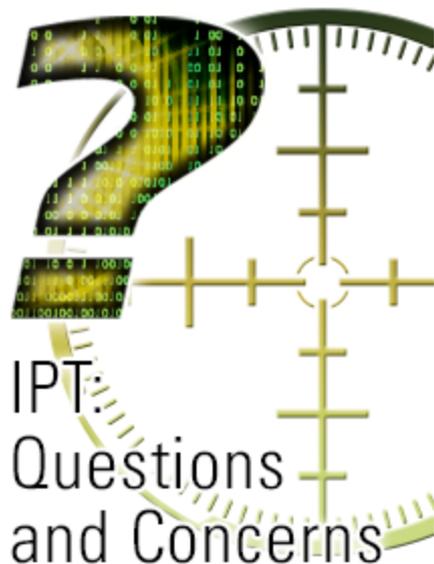


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Knowledge Review

The acquisition approach for the LRATS Mission Operational Planning and Targeted Intelligence System (MOPTIS) specifies the use of an Evolutionary acquisition approach. This choice was likely made because:

- The requirements of the operational user are clearly defined and cost estimates appear to be fairly accurate. However, funding streams are such that the desired system cannot be completely developed prior to desired Initial Operating Capability (IOC).
- The operational user has provided you with a detailed, well-thought-out set of requirements and has validated them several times with actual field users. Funding baselines are consistent with existing cost estimates.
- The ultimate capability delivered to the user is divided into two or more increments with increasing levels of capability.

[Check Answer](#)

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Summary

There are two system acquisition approaches commonly used within the DoD for information and software programs:

- Single Step (or Grand Design)
- Evolutionary

The acquisition approach used for a program is selected by the acquirer, and documented in the systems Acquisition Strategy. In addition there are three common models used to acquire software systems in the DoD. These models include:

- Defense Unique Software Intensive Program
- Incrementally Fielded Software Intensive Program
- Hybrid Acquisition Programs (e.g., Hardware dominant and Software dominant)



Summary

Lesson Completion

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To continue, select another lesson from the Table of Contents on the left.

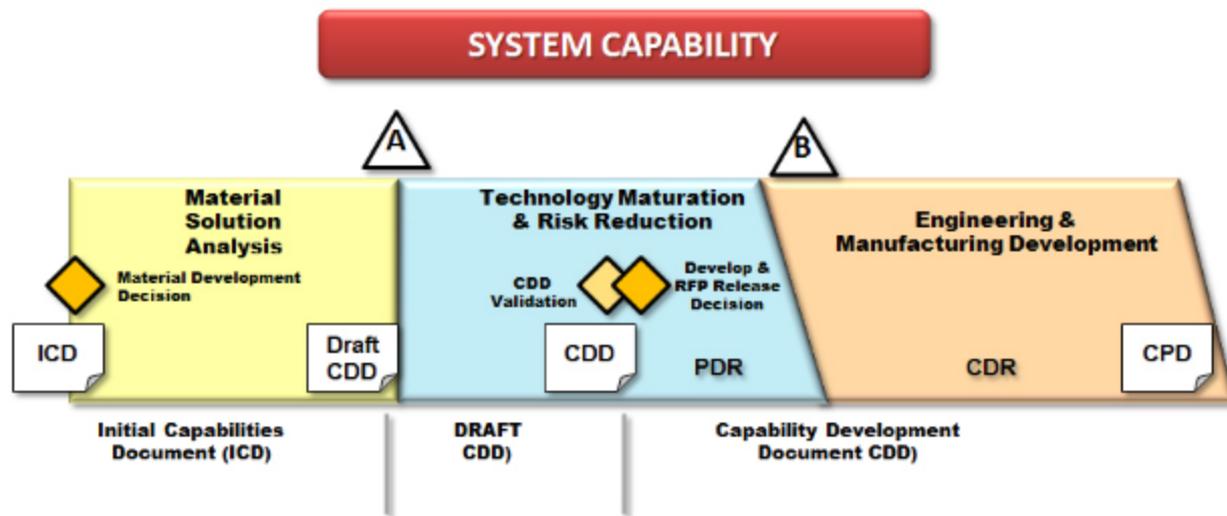
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Single Step Approach

Single Step to Full Capability (sometimes referred to as a 'Once-Through' or 'Grand Design' strategy) program approaches are characterized by acquisition, development, and deployment of the total functional capability of the system in a single, sometimes very massive effort.

Single Step to full capability may be appropriate if:

- Requirements are understood, defined, supported by precedent, and stable
- Assessment of other considerations (e.g., funding, schedule, size) indicates that a phased approach is not required



Knowledge Review

A Single Step to full capability acquisition approach is being used for the E-SENTINEL missile system, which is part of the LRATS. Single Step was most likely selected because:

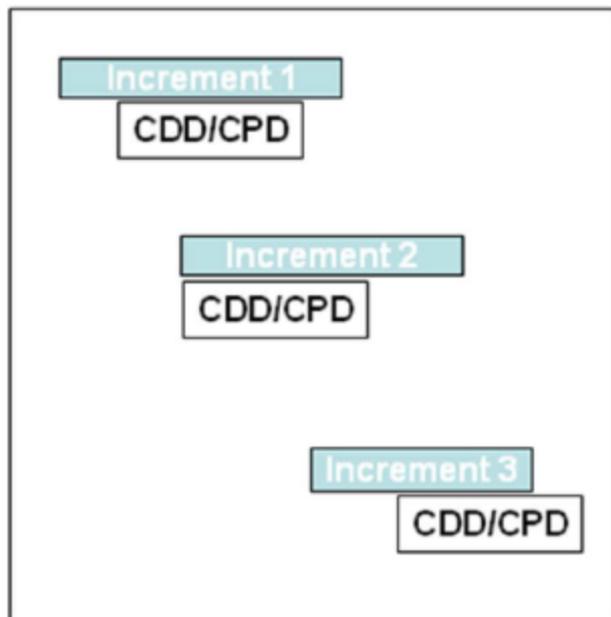
- The user was still uncertain about some critical requirements and cost estimates for implementing the remaining requirements, which varied widely.
- Requirements are stable. The operational user, based on extensive prototype testing and evaluation, had firmly established a clear system specification calling for the use of existing proven technology. In addition, cost estimates fall within available funding thresholds.
- The only way the stated user requirements can be met is to develop a new system whose features have never been built before. A variety of new state-of-the-art technologies are required. Cost estimates from interested contractors are all within published funding limits.

Check Answer

Evolutionary Approach

Evolutionary is an acquisition approach that is encouraged by Defense Acquisition Systems policies and requires collaboration among the user, tester and developer. Evolutionary Acquisition (EA) is a strategy in which:

- A needed operational capability is met over time by developing several increments, each dependent on available mature technology.
- Each increment is a militarily useful and supportable operational capability that can be developed, produced, deployed and sustained.
- Each increment will have its own set of threshold and objective requirement values. An initial core capability is fielded.
- A modular and robust system architecture is used.
- The ultimate capability delivered to the user is divided into two or more increments with increasing levels of capability.
- Provisions in the system architecture are made so that subsequent, timely system upgrades can be made as requirements evolve.



Evolutionary Acquisition, Cont.

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Evolutionary acquisition is a good approach for systems where the availability of time-phased capabilities cannot be delivered in a cost-effective manner in a single increment or where technology maturity is rapidly changing.

For example, it is difficult to completely define a full set of requirements for unprecedented software-dominated, decision-support systems such as C4I systems. As these systems are used in their operational environment, ways of doing business change. This results in new requirements evolving from a fielded system.



Knowledge Review

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The Single Step (Grand Design) defines all requirements first.

True

False

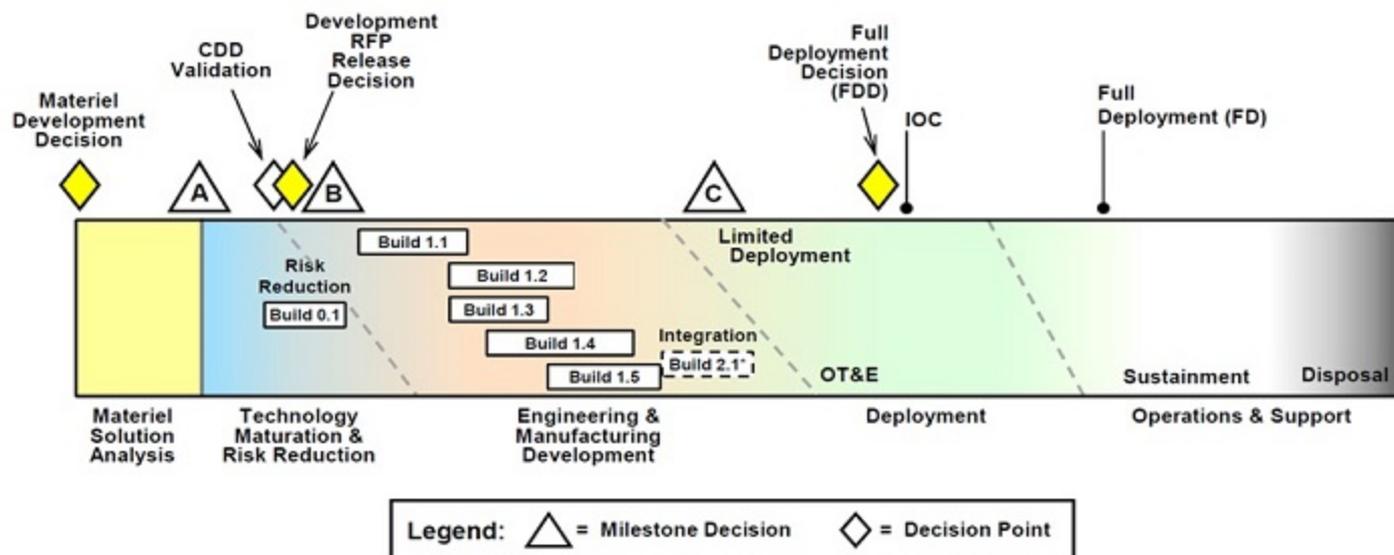
Check Answer



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Model 2: Defense Unique Software Intensive Program

The [Model 2: Defense Unique Software Intensive Program](#) is a model of a program that is dominated by the need to develop a complex, usually defense unique, software program that will not be deployed until several software builds have been completed. The central feature of this model is the [planned software builds](#) which together (with clearly defined decision criteria) ensure adequate progress is being made before fully committing to subsequent builds.

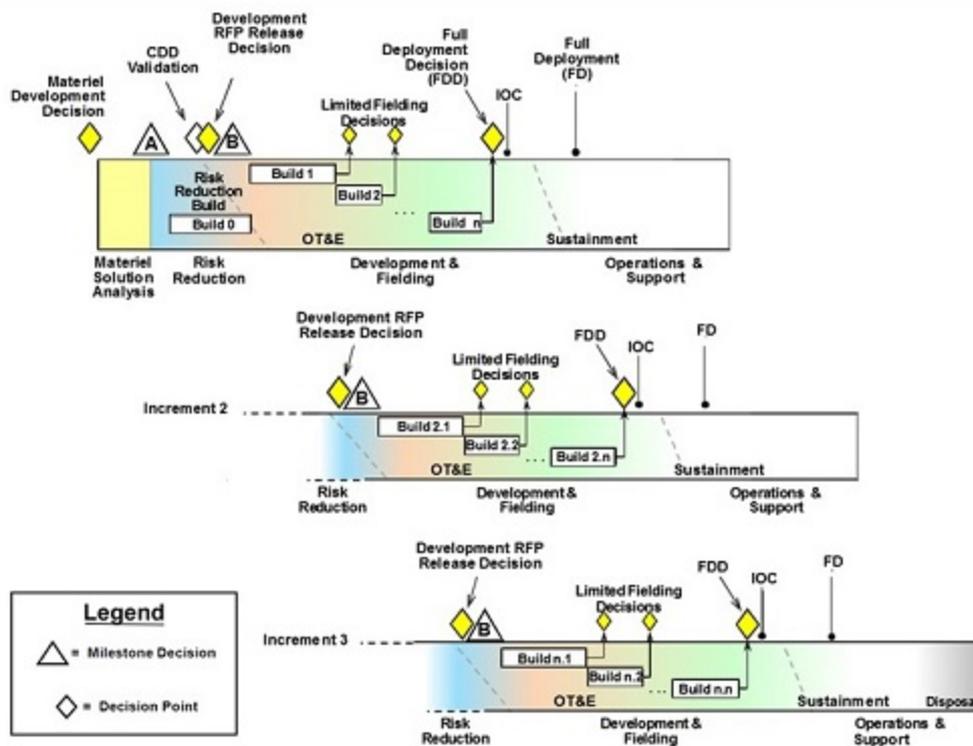


* The actual number and type of builds during the program will depend on system type.

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Model 3: Incrementally Fielded Software Intensive Program

The Model 3: Incrementally Fielded Software Intensive Program is a model that has been adopted for many Defense Business Systems (DBS). It also applies to upgrades to some command and control systems or weapon systems software where fielding will occur in multiple increments as new capability is developed and delivered, nominally in 1- to 2-year cycles. **Select the image to enlarge.**



Model 3: Incrementally Fielded Software Intensive Program, Cont.

Unlike Model 2: Defense Unique Software Intensive Program model, Model 3: Incrementally Fielded Software Intensive program model focuses on rapid delivery of capability through several limited fieldings in lieu of single Milestones B and C and a single full deployment.

Each limited fielding results from a specific build, and provides the user with mature and tested sub-elements of the overall capability. Several builds and fieldings will typically be necessary to satisfy approved requirements for an increment of capability. The identification and development of technical solutions necessary for follow-on capabilities have some degree of concurrency, allowing subsequent increments to be initiated and executed more rapidly.

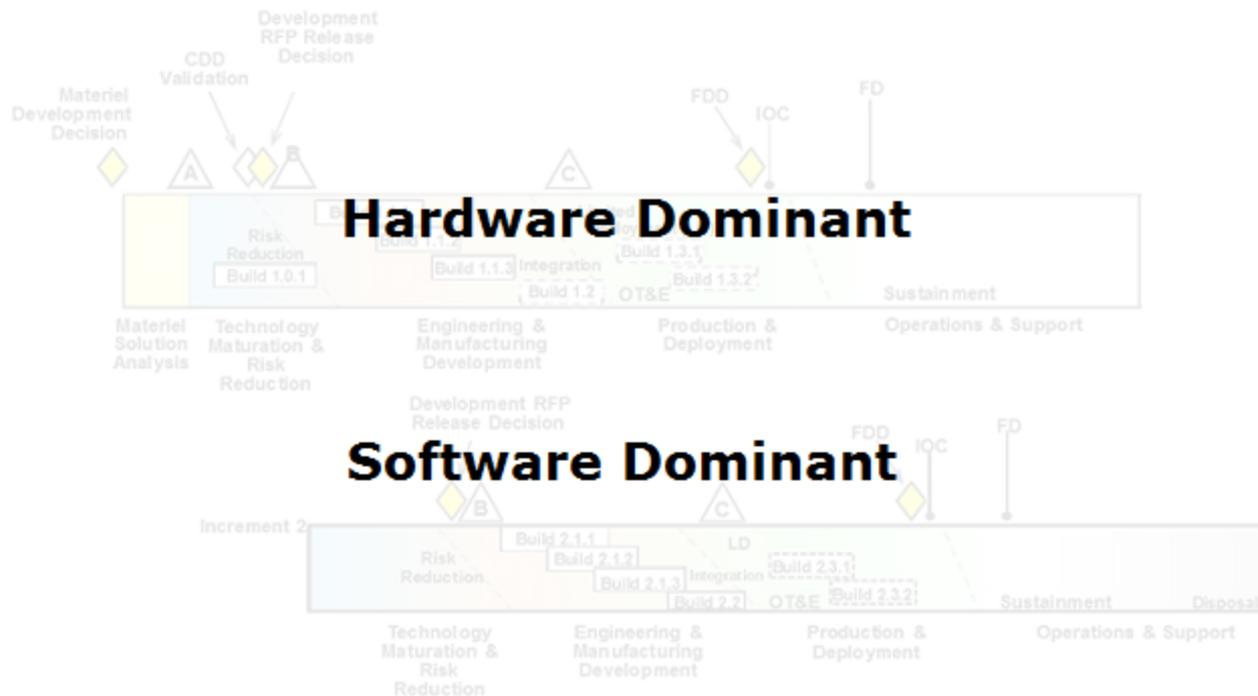
This model will apply in cases where commercial off-the-shelf software (e.g. commercial business systems with multiple modular capabilities) are acquired and adapted for DoD applications.

An important caution in using this model is that it can be structured so that the program is overwhelmed with frequent milestone or fielding decision points and associated approval reviews. To avoid this, multiple activities or build phases may be approved at any given milestone or decision point, subject to adequate planning, well-defined exit criteria, and demonstrated progress. An early decision to select the content for each follow-on increment (2 through N) will permit initiation of activity associated with those increments. Several increments will typically be necessary to achieve the required capability.

Hybrid Acquisition Models

Hybrids also make up the list of acquisition models. Two hybrid models are characterized as being Hardware Dominant or Software Dominant.

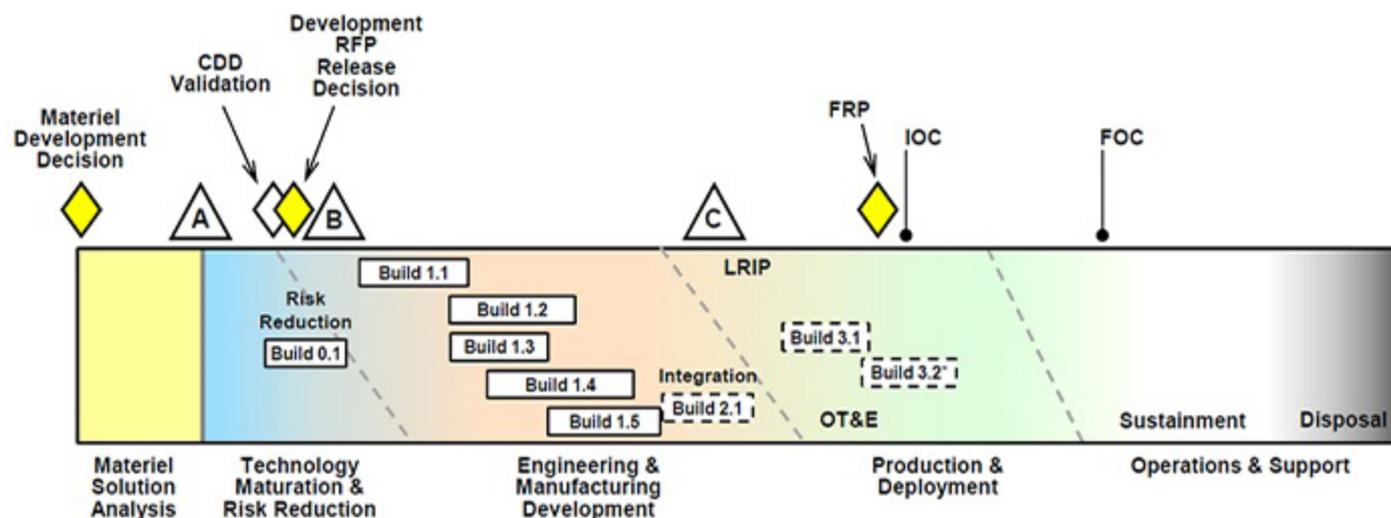
Select each model to learn more.



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Model 5: Hybrid Program A (Hardware Dominant)

The Model 5: Hybrid Program A (Hardware Dominant) acquisition model depicts how a major weapons system combines hardware development as the basic structure with a software intensive development that is occurring simultaneously with the hardware development program.



Legend: = Milestone Decision = Decision Point

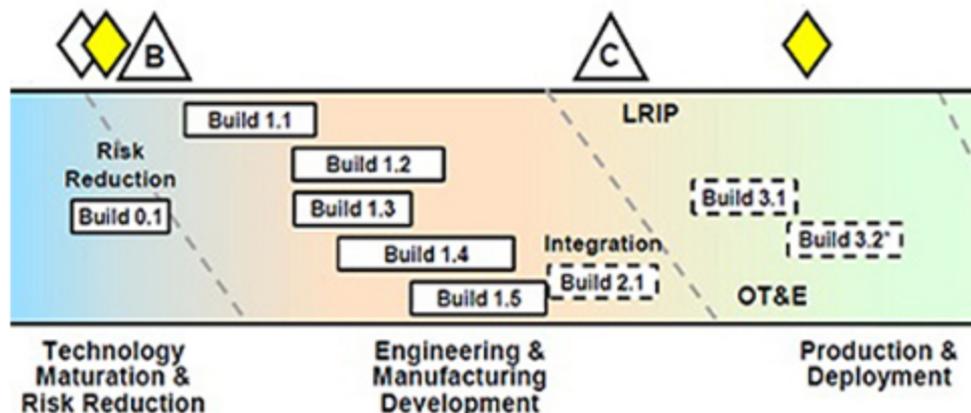
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Model 5: Hybrid Program A (Hardware Dominant), Cont.

In a hardware intensive development, the design, fabrication, and testing of physical prototypes may determine overall schedule, decision points, and milestones, but software development will often dictate the pace of program execution and must be tightly integrated and coordinated with hardware development decision points.

In this hybrid model, software development should be organized into a series of testable software builds. These builds should lead up to the full capability needed to satisfy program requirements and Initial Operational Capability (IOC). Software builds should be structured so that the timing of content delivery is synchronized with the need for integration, developmental and operational testing in hardware prototypes.

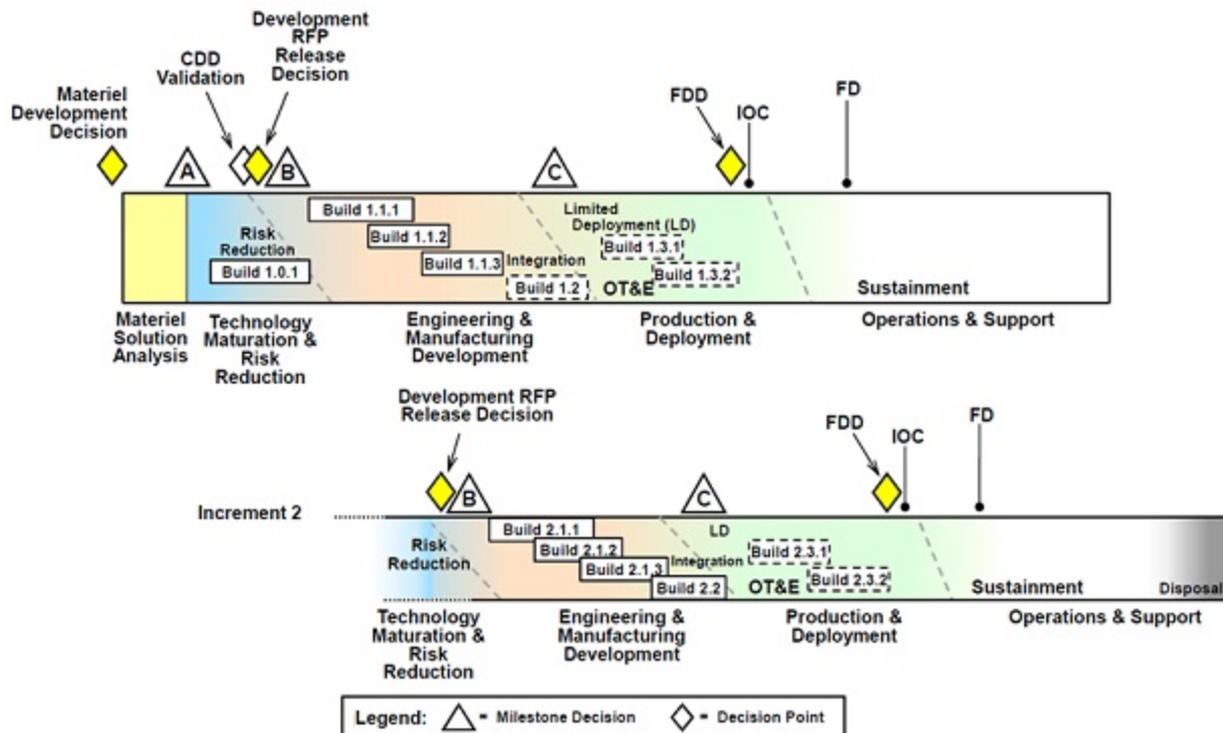
The Milestone B decision to enter EMD and the Milestone C decision to enter Production and Deployment should include software functional capability development maturity criteria as well as demonstrated technical performance exit criteria



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Model 6: Hybrid Program B (Software Dominant)

Model 6: Hybrid Program B (Software Dominant) is a software intensive product development that adds a mix of incrementally fielded software products or releases that include intermediate software builds. This is a complex model to plan and execute successfully, but depending on the product it may be the most logical way to structure the acquisition program.



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