OPEN SYSTEMS
(System Level)
“Definitions, Underlying Concepts” & DCMC
Mission

Http://www.acq.osd.mil/osjtf

Based upon Documents By
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OPEN SYSTEMS - JOINT TASK FORCE
Here's why open systems are so important...

DoD cannot afford a 15-year acquisition cycle

Electronics Industry Systems Cycle Time is 1.5 to 2 Years

Major DoD Systems Cycle Time 8-15 Years

Commercial market incorporates new technology 4 to 8 times faster
Majority of Life Cycle Costs in Production and O&S

Life Cycle Cost

Operation and Support

System Acquisition

Production

System Research, Development, Test and Evaluation

10%

30%

60%

Years

Milestones

0 I II III

DSMC Systems Engineering Management Guide
Objectives:

- Reduced Cycle Times
- Lower Costs
- Acquisition Reform

Cost as an Independent Variable
Trade Performance and Schedule for Lower Costs

Clear Accountability in Design
Government Controls Performance -- Contractor Designs the Solutions.

Performance Specs
State requirements in terms of needs, not designs

Non-Developmental and Commercial Items
Use Existing Technology and Products, If Applicable

Horizontal Technology Insertion

Evolutionary Acquisition

Modernization Through Spares

Open Systems & Acquisition Reform

OPEN SYSTEMS IS AN ENABLER
A system - is a collection of interacting...

...subsystems - which are collections of interacting...

...components - either hardware, software, or human, etc.

that are connected by interfaces - to support the interchange of information, activity, or material essential to the functioning of the system.
Open Systems Concept - Atomic Level

- Producer controls design, interfaces and implementation
- No further interface or functional definition by User
- Expect no repair by User
- Level may change over time

Define for each system, based on planned repair and support levels.

ATOMIC LEVEL ...
Open Systems is all about managing interfaces!

DoD focus is on the Interfaces

Producers choose the Implementations
What is a Reference Model

Abstract Framework to ...
- Promote common understanding
- Identify critical interfaces
- Apply standards
- Determine an atomic level
- Incorporate planned components

Represents types and kinds of
- functions, interfaces and features
to be addressed by the type of system.

The Reference Model is not a Product or System Description!
Move To Open Systems

- Standards Base
  - Private
    - Widely Used
      - Popular Proprietary Products
    - Narrowly Used
      - Unique Designs, Optimized Performance
  - Public
    - Consensus Standards With No Products

Open Systems:
- Many Suppliers
- Many Customers
- Long Life Architecture
- Technology Upgrades

Move To Open Systems
“A system that implements sufficient open specifications for interfaces, services and supporting formats to enable properly engineered components to be utilized across a wide range of systems with minimal changes,...”
“An open system is characterized by the following:
- Well defined, widely used, preferably non-proprietary interfaces/protocols and
- Use of standards which are developed/adopted by recognized standards bodies or the commercial market place, and
- Definition of all aspects of system interfaces to facilitate new or additional systems capabilities for a wide range of applications, and
- Explicit provision for expansion or upgrade through the incorporation of additional or higher performance elements with minimal impact on the system.”
What is an Open Systems Approach?

- An integrated technical & business strategy
- Modular design of hardware and software
- Applying commercial, widely used interface standards in weapon systems
- To buy rather than develop system components
Open Systems Principles

• Systems should be designed using a standards-based architecture
  - Reference Model
  - Rules

Use standards to define interfaces
Open Systems - Systems Engineering Process

• Engineering for open systems focuses on interface management
• Design emphasizes the selection of interfaces which
  - considers life cycle support requirements
  - permits evolution with advances in technology
  - anticipates technology obsolescence
  - supports technology insertion
Possible Risks

- Government becomes a consumer instead of the designer - less control over outcomes
- Open Systems may not provide the optimum design for modules, components, subsystems and short-term solutions
- Building Open Systems takes time for
  - Market analysis
  - Prototyping
  - Standards Selection
- The standards selection process has risks
- Open Interface *extensions* may cause problems later in the life cycle
- Supportability Risks
FOR LEGACY SYSTEMS ...

When? Apply open systems when working changes (ECPs)

How? Adapt non-conforming components into the architecture as program matures - allowing modernization through spares

Why? Apply the concept of **Flexible Sustaintment**
To drive lower life cycle costs,
Using F^3I and Interface management instead of Technical Data Packages to insert new technology,
And improve reliability and performance
Open Systems (System Level)

• DCMC Engineering Role
  - Review contracts for Open System requirements
  - Review ECPs for Open System consideration
  - Ensure contractor policies address Open Systems
  - Ensure contractor has capability to implement Open Systems
  - Ensure the contractor has an Open Systems process.