Lesson 7: The Requirements Generation System

Requirements Generation System

By analyzing their mission, users identify deficiencies in their operations as well as opportunities for greater efficiency. The Requirements Generation System is the process used to translate analysis of identified deficiencies into requirements forming the basis of all acquisition programs. The Requirements Generation System is "owned" and operated by the users of the developed systems/warfighters.

The Requirements Generation System has four separate phases:

- Definition
- Documentation
- Validation
- Approval

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Definition Phase

The Definition Phase defines, describes and justifies a mission need that will satisfy a deficiency in the user's capability or exploit a technological opportunity. This phase has two fundamental steps: the Mission Area Analysis (MAA) and the examination of solutions to any deficiency identified in the MAA.

- Mission Area
- Mission Area Analysis (MAA)
- Solution to Deficiency
- Threat versus Capability
- Future Threats
- Current and Projected Capabilities
- Opportunities for Change
- Advanced Technology
- Policy Changes
- Cost Reduction Opportunities
- Deficiencies or Opportunities
- Possible Solution to Deficiencies

Mission Area

A mission area is a segment of the defense mission as established by the Secretary of Defense. Each DOD component has mission areas (e.g., Navy—antisubmarine warfare, Army—ground combat) for which it must equip its forces.

Mission Area Analysis (MAA)

MAA is the process by which warfighting deficiencies are determined, technological opportunities for

increased system effectiveness and/or cost reduction are assessed, and mission needs are identified.

Solution to Deficiency

Mission Needs identified in the Mission Area Analysis are examined to determine if they can be satisfied through non-materiel solutions such as changes in doctrine, tactics, training, or organization. If this is not feasible, then materiel solutions may be considered, and the need will be documented in a Mission Need Statement.

A non-materiel solution is preferred over the materiel solution, since it is usually less expensive, and usually can be implemented in less time. Once it has been identified that a materiel solution is required to satisfy the user's need, then that need must be documented using the next phase of the Requirements Generation System, the Documentation Phase.

Threat versus Capability

By comparing the projected threats with current and projected military capability, users identify mission deficiencies or needs.

Future Threats

Future threats are the sum of the potential strengths, capabilities, and strategic objectives of any adversary that can limit or negate U.S. mission accomplishment or reduce force, system, or equipment effectiveness.

Examples we face today include:

- Terrorism
- Ethnic/Religious Conflicts
- Rogue Nations
- Narcotics Traffic
- Military Operations in Urban Terrain
- Information Warfare
- Technology Transfer

Current and Projected Capabilities

Current and projected capabilities are the ability of the user's forces today and in the future to accomplish the mission.

Examples include:

- F-22 Advanced Tactical Fighter
- MV-22-Osprey Joint Advanced Vertical Lift Aircraft
- Joint Strike Fighter
- NSSN-New Attack Submarine
- FMTV-Family of Medium Tactical Vehicles

Opportunities for Change

By looking at emerging technologies, changes in policies, or ways to reduce cost, users can identify ways of performing the mission more effectively or efficiently.

Advanced Technology

Advanced Technology results from advancements in science, technology, and engineering that provide breakthrough opportunities for future systems. Examples include:

- Stealth Materials and Techniques
- Advanced Sensor Materials
- Manufacturing Methods
- Information Processing Architectures
- High Strength Materials

Policy Changes

Policy changes are top-level redirection on how the user's forces are to be employed.

Examples include:

- Drug Interdiction
- Peacekeeping Operations such as Haiti and Bosnia
- Adoption of the Strategic Arms Reduction Treaties (START)

Cost Reduction Opportunities

Cost reduction opportunities are strategies that will significantly reduce the cost of operations or ownership of a fielded system.

Examples include:

- Modernizing the engine on the KC-135
- MINUTEMAN III GRP-Guidance Replacement Program
- F/A-18
- Joint Direct Attack Munitions

Deficiencies or Opportunities

A deficiency or opportunity is a result of a Mission Area Analysis which revealed that a new way of accomplishing the mission was needed or possible.

Possible Solutions to Deficiencies

Once a warfighting deficiency or technology is identified, the following question needs to be asked:

> Is this deficiency or opportunity within the user's capability to address by making changes in training, organization, tactics, or doctrine?

If the answer to this question is **yes**—the user can solve the problem by changes in training, organization, tactics, or doctrine—then a non-materiel solution has been found.

If the answer to this question is **no**—the problem cannot be solved through a non-materiel solution—then a materiel solution is needed and the acquisition world gets involved.

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Documentation Phase

Once it has been decided that a materiel solution is required to satisfy the need, it must be

documented. The Documentation Phase of the Requirements Generation System involves the formal preparation and initial review of the Mission Need Statement.

Mission Need Statement (MNS)

The MNS is prepared by the user to document an operational deficiency or technological opportunity that requires a materiel solution. The MNS:

- Is generic, not system specific.
- Describes the need in broad operational terms.
- Is limited to five pages.
- For ACAT I programs, shall identify linkage to the DOD Strategic Plan.
- Is prepared and staffed in accordance with CJCSI 3170.01.

Chairman of the Joint Chiefs of Staff Instruction 3170.01

Formerly known as MOP 77, this CJCS Instruction provides policies and procedures for developing, reviewing, validating, and approving the user's requirement in support of DODD 5000.1 and DOD 5000.2-R and the acquisition process.

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Validation Phase

- Validation Authority
- ACAT I Validation Authority: Joint Requirements Oversight Council (JROC)
- ACAT IA (M or C) Validation Authority
- OSD Principal Staff Assistants (PSAs)
- Validation Responsibility for ACAT II and II Programs

Validation is a formal review of the requirements document by an operational authority other than the user. At a minimum, the validation authority will:

- Confirm the existence of an identified need and operational requirement.
- Verify that non-materiel solutions are not feasible.
- Assess joint service potential.
- Verify interoperability requirement.

Validation Authority

The person or agency who validates the mission need depends on the Acquisition Category (ACAT) and the service or agency involved.

ACAT I Validation Authority: Joint Requirements Oversight Council (JROC)

The JROC validates all requirements documents if the materiel solution could result in an ACAT I (D or C) program. The JROC members are:

- Vice Chairman of the Joint Chiefs of Staff
- Vice-Chief of each Service:
    - Vice Chief of Staff, Air Force
    - Vice Chief of Staff, Army
    - Vice Chief of Naval Operations
    - Assistant Commandant of the Marine Corps

ACAT IA (M or C) Validation Authority

If the materiel solution could result in a new ACAT IA (M or C) Automated Information System (AIS), then the JROC will evaluate the program to determine if JROC oversight is appropriate or desired and validates the requirement as required.

If JROC oversight is not appropriate or desired, and the materiel solution could result in a new ACAT IA (M or C) Automated Information System, then the appropriate Principal Staff Assistant (PSA) validates the requirement.

OSD Principal Staff Assistants (PSAs)

Principal Staff Assistants are the heads of OSD organizations who report directly to the Secretary of Defense or the Deputy Secretary of Defense. PSAs represent the user community in the functional area under their direction on acquisition and requirements matters.

Validation Responsibility for ACAT II and III Programs

This table identifies who is responsible within each service for validating the requirement of ACAT II and III programs.

Service	Validation Authority
Army	Chief of Staff
Navy	Chief of Naval Operations
Air Force	Chief of Staff
Marine Corps	Commandant of the Marine Corps
Other DOD Agencies	DOD Agencies have similar processes

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Approval Phase

Approval is the formal or official sanction of the identified needs described in the requirements document. The approval authority for all potential ACAT I MNSs is the JROC. The approval authority for all potential ACAT IA MNSs is the PSA or JROC. For potential ACAT II or III MNSs, the service chief or designated authority is the approval authority. After the appropriate authority approves the Mission Need Statement, it comes to the acquisition community for Milestone 0 Review. Each Milestone 0 decision-maker must consider value and affordability factors.

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Concept Exploration Phase

- Concept Exploration (CE) Phase Supporting Activities
- Analysis of Alternatives (AoA)
- The Operational Requirements Document (ORD)
- ORD Thresholds and Objectives
- Key Performance Parameters (KPPs)

The acquisition community holds a formal Milestone 0 Review to accept the Mission Need Statement for study and to determine what minimum alternatives should be considered. A formal memo is written, called an Acquisition Decision Memorandum, to document approval to proceed to the next phase of the acquisition life cycle, the Concept Exploration Phase.

Concept Exploration (CE) Phase Supporting Activities

Following Milestone 0 approval, the program enters the Concept Exploration (CE) Phase. During the CE Phase, the Requirements Generation System continues. Users refine requirements and support various CE activities that culminate with a Milestone I decision on whether to initiate a new acquisition program.

Analysis of Alternatives (AoA)

The AoA assesses the value of the alternatives being considered. During the Concept Exploration Phase, the user produces the AoA, usually with assistance from the developer. The developer, or Developing Activity/Agency (DA), is the command responsible for research and development (R&D) and production of a new item. The AoA, which is part of the Cost As an Independent Variable (CAIV) process, examines alternatives to identify the preferred system to satisfy a mission deficiency, weighs the cost of a system against its operational effectiveness, and provides a basis for comparing alternatives.

The AoA has two objectives: (1) it aids and documents the decisionmaking process by illuminating the risks, uncertainty, and relative advantages and disadvantages of the alternatives being considered; and (2) it fosters joint ownership and affords a better understanding of subsequent decisions by early identification and discussion of reasonable alternatives among the decisionmakers and staff at all levels.

The Operational Requirements Document (ORD)

The ORD is published by the user and further refines the MNS. The ORD:

- Identifies performance parameters to satisfy a mission need.
- Is system specific.
- Is first prepared during the Concept Exploration Phase for use at Milestone I.
- Is updated for and refined prior to each subsequent milestone.
- Is prepared and staffed in accordance with CJCSI 3170.01 and DOD 5000.2-R, Appendix II.

ORD Thresholds and Objectives

The ORD identifies system-specific performance parameters. It does so by identifying two key values, the threshold and objective for each parameter.

The "threshold" is the minimum acceptable value, supported by analysis, to the user for a system capability. Anything less than this may not satisfy the mission need.

The "objective" is the desired value better than the threshold which results in an operationally meaningful, cost-effective, and affordable improvement in capability.

The two values bound the design of the system, yet provide the Program Manager with flexibility to design the system according to the user’s needs.

Thresholds and objective performance values in the ORD shall be CAIV-based, considering the results of the AoA and the impact of affordability constraints.

Key Performance Parameters (KPPs)

Some critical system characteristics may also be Key Performance Parameters (KPPs). KPPs are those capabilities or characteristics so significant that failure to meet the threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated. KPPs are extracted from the ORD, and included in the APB. KPPs are validated by the JROC for ACAT I programs.

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Cost As an Independent Variable (CAIV)

Cost, schedule, and performance should be considered when deciding on a system.

In the past, performance and schedule drove the costs of our systems. However, in today's era of ever-tightening budgets, cost has become a much more important factor in acquiring and operating our systems.

CAIV is a process that helps arrive at cost objectives (including life-cycle costs) and helps the requirements community set performance objectives. The CAIV process shall be used to develop an acquisition strategy for acquiring and operating affordable DOD systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Cost objectives shall also be set to balance mission needs with projected out-year resources, taking into account anticipated process improvement in both DOD and defense industries.

The Milestone Decision Authority establishes CAIV objectives that drive the performance and schedule limits of the system. The CAIV objectives often become key design drivers. Managers should establish aggressive but realistic cost objectives for all programs and follow through by trading off performance and schedule, beginning early in the program, to achieve a balanced set of goals based on MDA guidance.

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Interoperability Requirements

Approval of a requirement also ensures each C4I system contains a requirement for interoperability. "Interoperability" refers to the ability of systems, units, or forces to provide services to or accept services from other systems, units, or forces and to use the services so exchanged to operate effectively together. The term also refers to conditions achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users.

Joint warfighting interoperability is a C4I/AIS requirement mandated by OSD Policy. This requirement is not a user option. For a program to receive Interoperability Certification, it must first prove its interoperability on paper, via the Requirements Certification Process.

Later the program's interoperability must be tested in the field during its operational testing phase.

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