



Employing a Repeatable Systems Approach for Developing Performance- based Requirements for Policy Implementation, Acquisition for Services, and Product Development

Wednesday, October 29, 2014

2:40 – 3:15 PM

Agenda

- Learning Objectives
- Systems Thinking Primer
- Common Systems Approach Description and Examples
 - Product Development
 - Acquisition for Services
 - Policy Implementation
- Summary

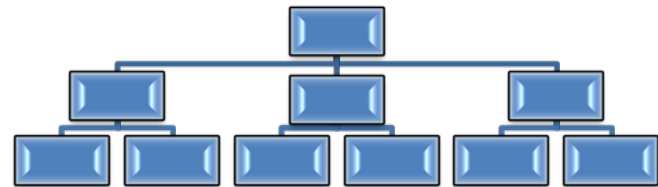


Learning Objectives

- Employ systems approach for:
 - Product Development
 - Acquisition for Services
 - Vehicle/Aircraft Maintenance Services
 - IT Back Office Support
 - Policy Implementation
- Hierarchical decomposition
 - Large and unmanageable into smaller manageable pieces
 - Top-level bounded scope traces down to measureable outcomes
 - Measureable outcomes provide measured data to feed performance dashboards
 - Performance information used by decision-makers to make timely course corrections in order to arrive at the desired end-state

Systems Thinking Primer

- Recognizes the interconnectedness and interdependencies of systems
 - No such thing as a small change to a complex system
- Hierarchical depiction provides means to deal with complexity by breaking down a large and unmanageable problem into smaller manageable pieces
 - Decompose
 - Allocate
 - Bi-traceability
- Methodology provides consistency and repeatability; thereby attaining greater efficiencies and effectiveness



The Methodology



Derive, allocate, & trace



Performance dashboards to monitor and control



Mission Accomplished



Measurable outcomes generate measurable data

Feedback loop

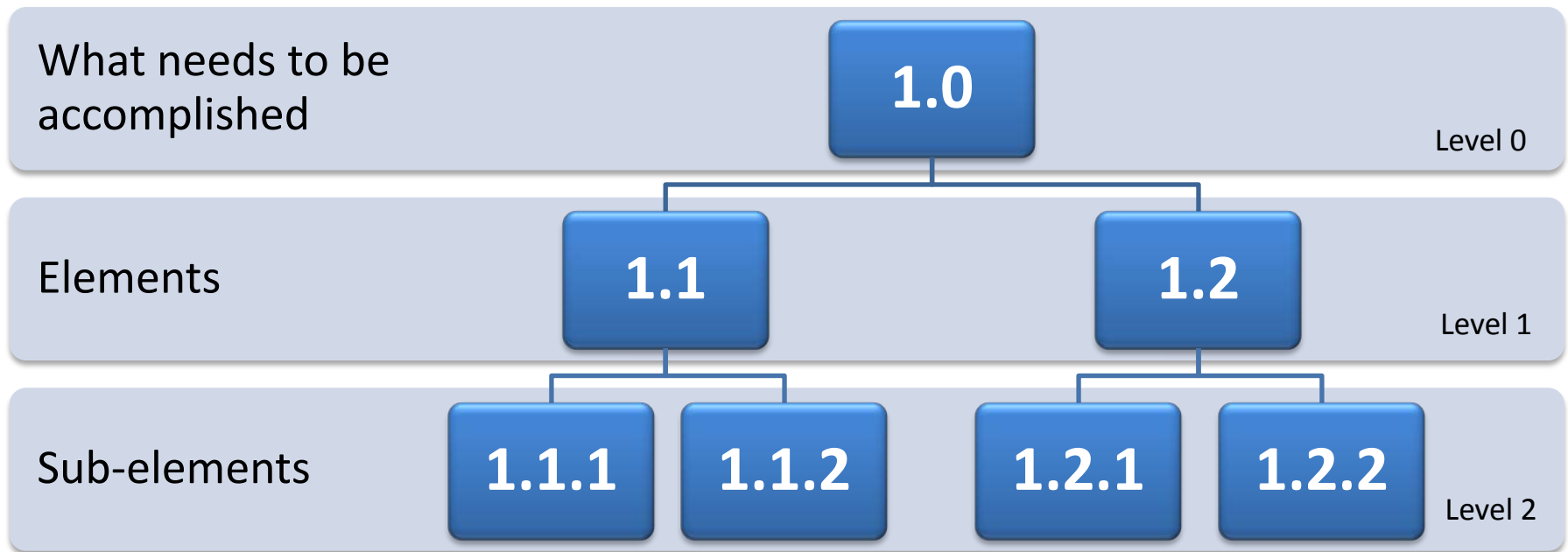


Validated Need

- Begin with the end in mind...
 - What do you want to accomplish?
 - What do you need to be accomplished?
 - Do we know and understand what is needed?
 - How do you know when reached the desired end state?
- Scope the need – bound the problem
 - Cost
 - Schedule
 - Performance
 - Risk
 - Complexity
 - Criticality



Start with simple hierarchy



- Decomposition stops at level when a specific sub-element cannot be decomposed any further
- Sub-element should perform a series of time-phased activities in order to satisfy the sub-element goal or outcome
- Time-phased activities correlate with measurable outcomes

Defining Information Requirements

Information is needed to support the decision-making process



1. Need a home
2. Scope the needed home
3. Award contract primarily based on:
 - Scope
 - Cost (spend plan)
 - Schedule (progress)



4. Track status of actuals vs. planned
5. Analyze trends
6. Monitor and control risks

Time



Measurable Data

The "Material Solution"

Performance Dashboard

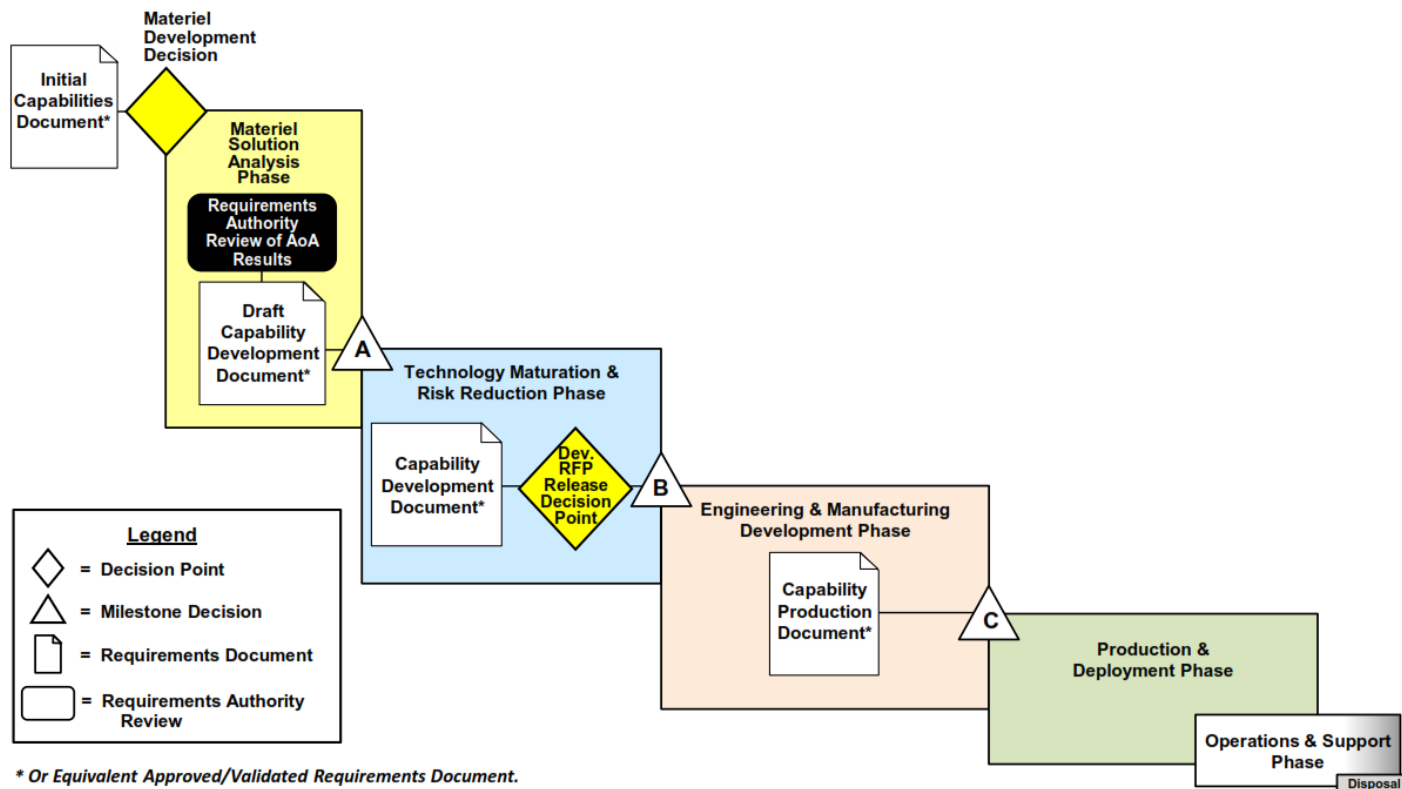


Feedback Loop

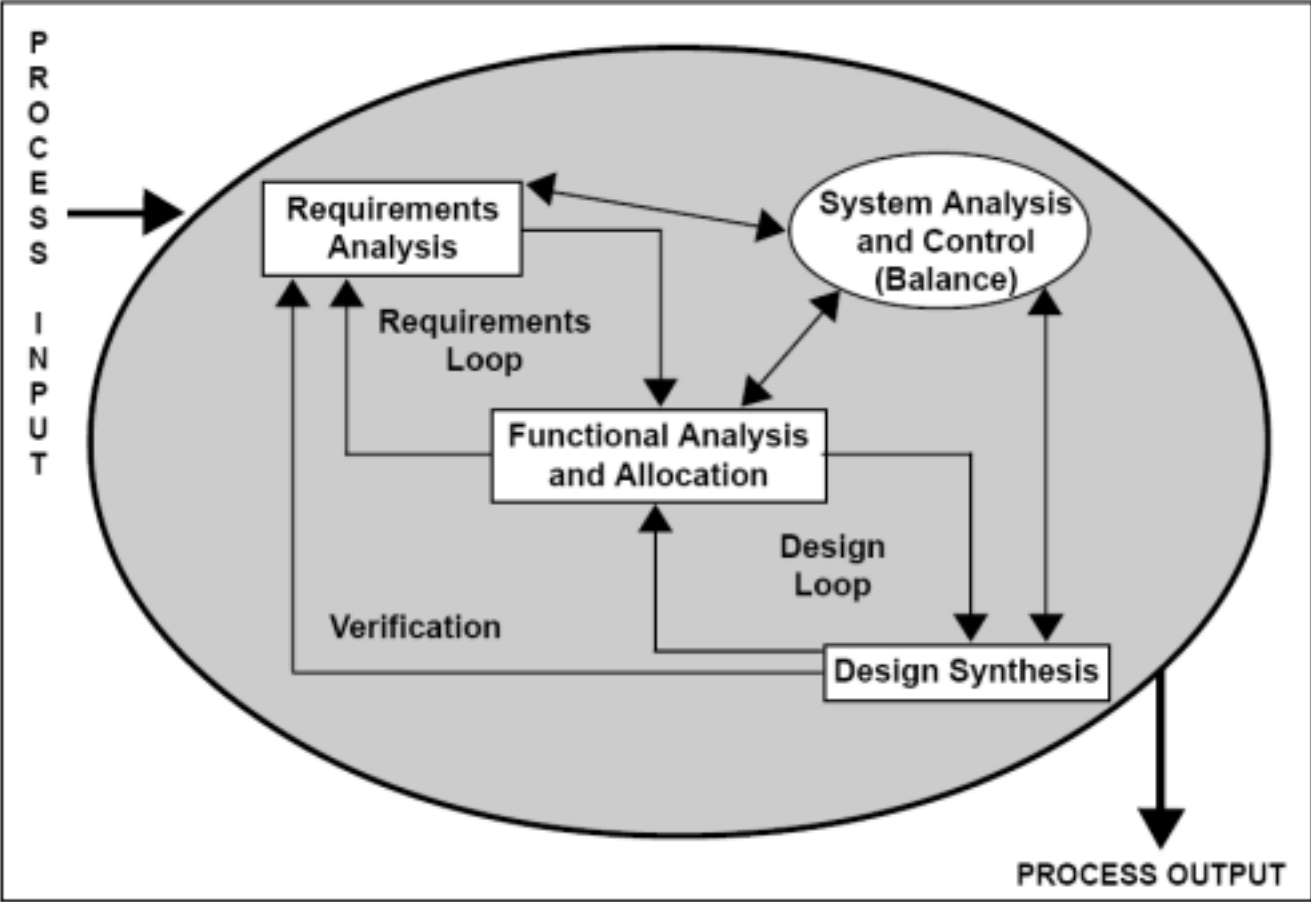
PRODUCT DEVELOPMENT

DoD Product Development

- Capability Requirements Process and Acquisition Process Interaction



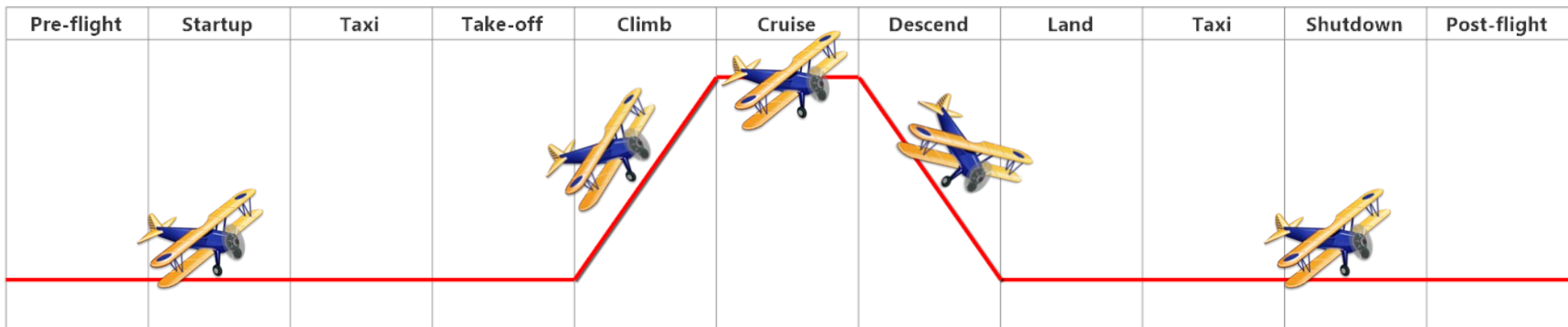
Systems Engineering Process



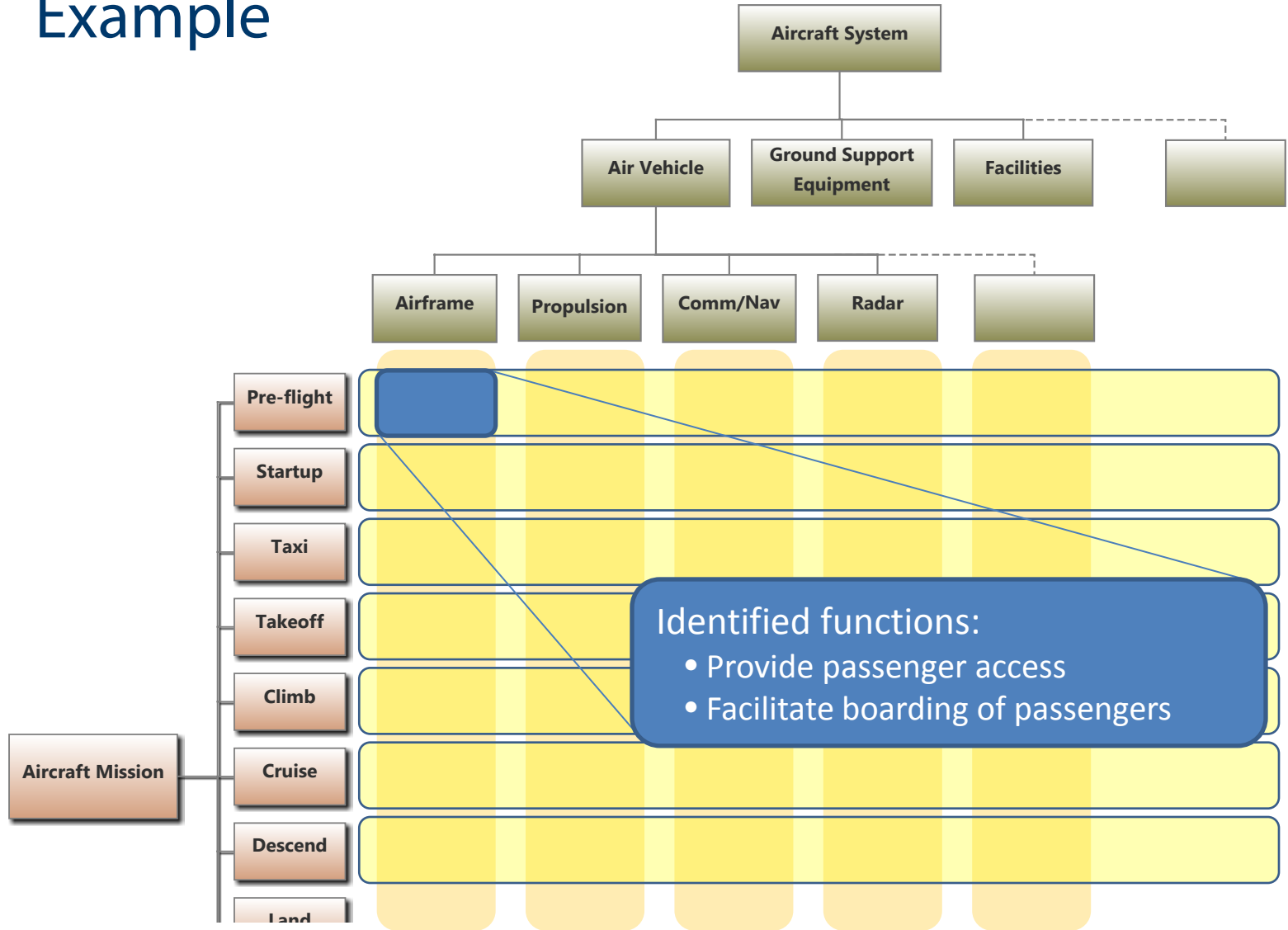
Reference: Systems Engineering Fundamentals – DoD Systems Management College, 2001

Mission Profile Breakdown

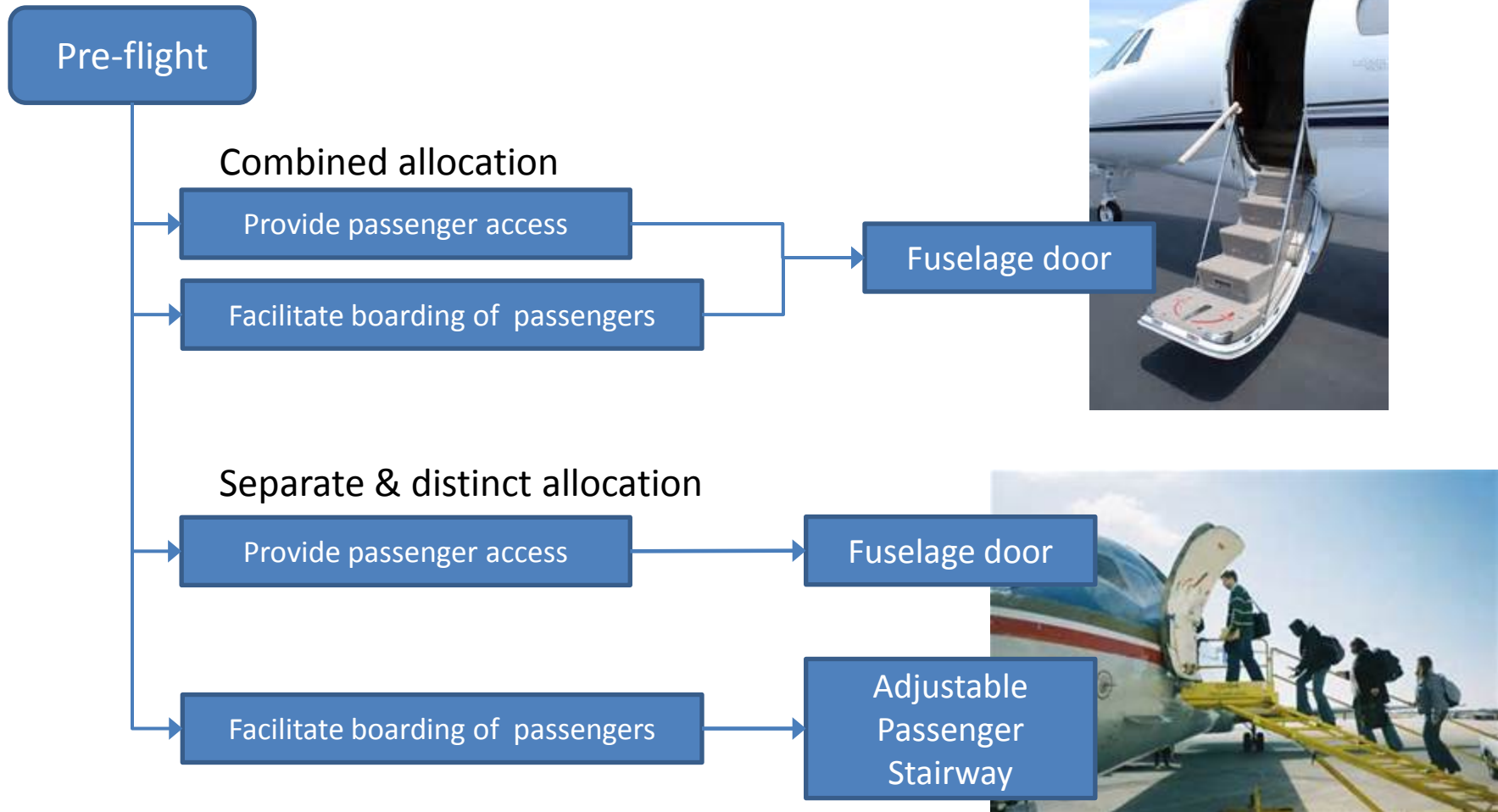
- Validated operational need to transport passengers and cargo
- Need a material solution to conduct an assigned mission
- Develop a mission profile in order to translate operational requirements into system-level technical requirements



Requirement Analysis Example



Functional Allocation



Next step: Developing performance requirements that include measurable outcomes

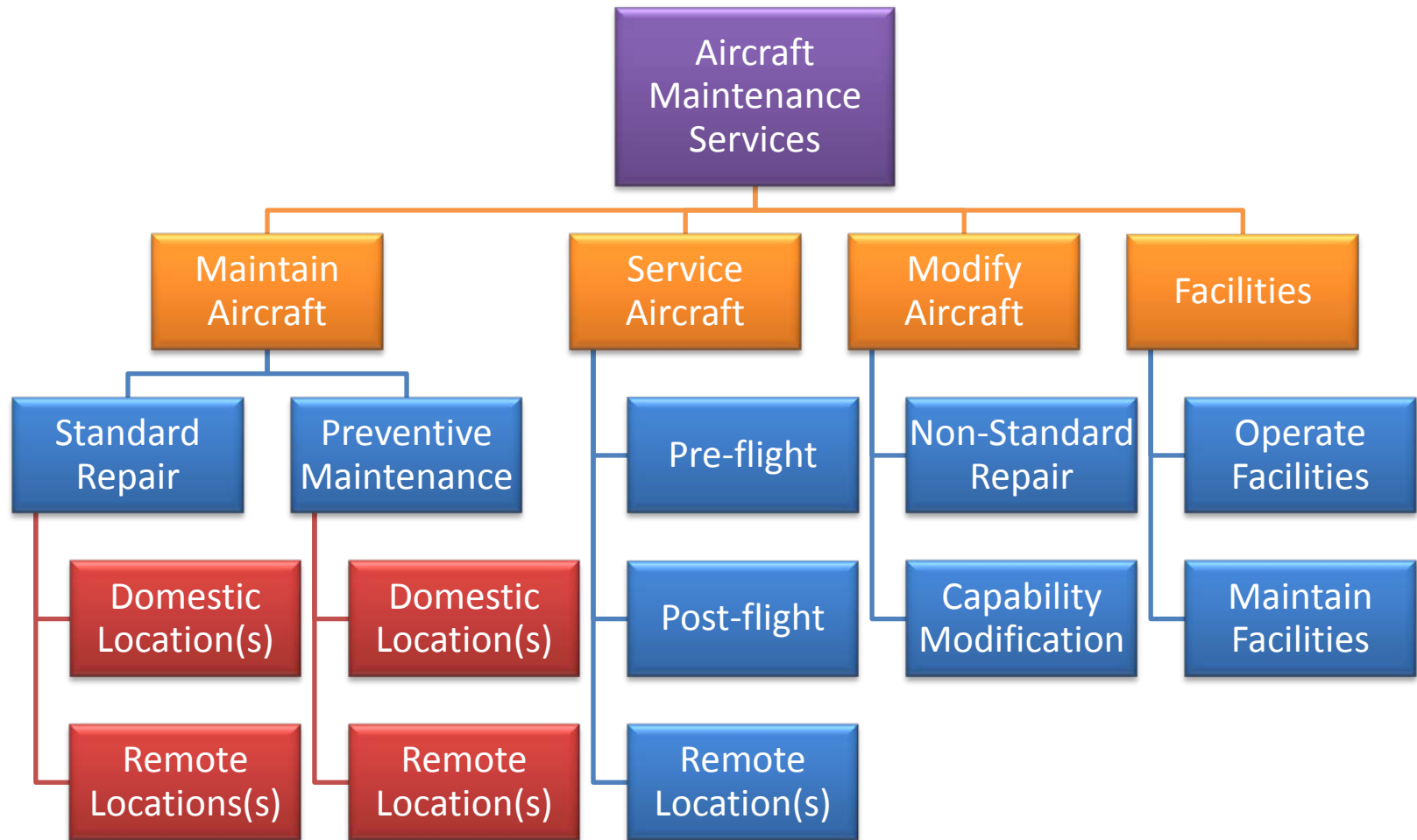
ACQUISITION FOR SERVICES



Acquisition for Services

- Validated need to acquire Aircraft Maintenance Services
 - Goal is to ensure sufficient number of aircraft available to fulfill mission requirements
- Performance-Based Logistics (PBL)
 - Operational Availability (A_o)

Aircraft Maintenance Services



Aircraft Maintenance Services

LEVEL 0

Accomplishment Criteria:

Need sufficient number of aircraft to support mission requirements

Aircraft Sustainment
Key Performance Parameter (KPP)

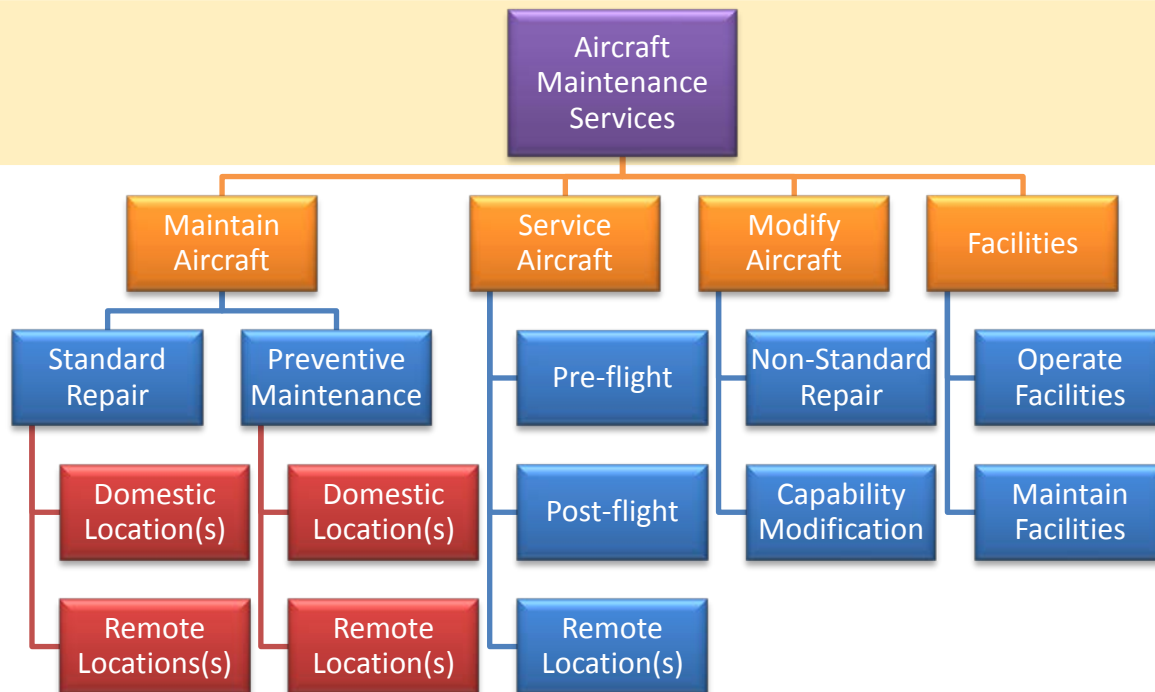
A_o – Operational Availability

$$A_o = \text{MTBM} \div (\text{MTBM} + \text{MMT} + \text{MLDT})$$

Mean Logistics Delay Time (MLDT)

Mean Maintenance Time (MMT)

Mean Time Between Maintenance (MTBM)



Aircraft Maintenance Services

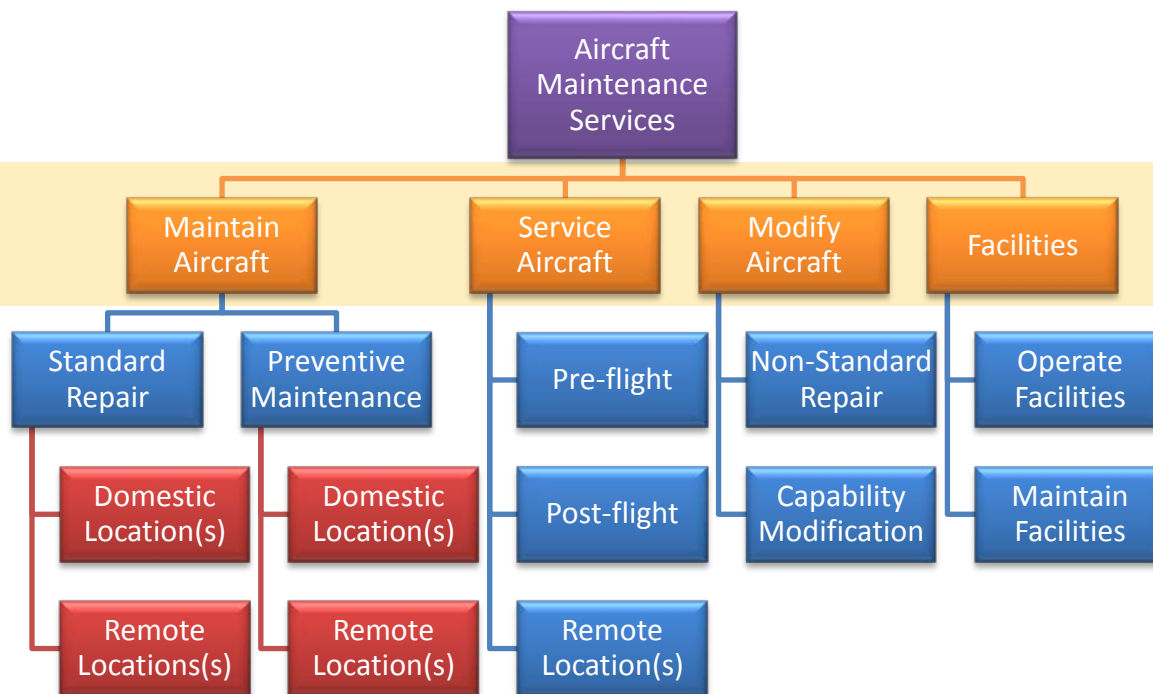
LEVEL 1

Performance Criteria:

Sufficient number of aircraft to support mission requirements?

Key Performance Indicators (KPIs)

- Collectively track and manage to ensure accomplishment criteria will be satisfied
- Positive KPI performance will positively impact Operational Availability, A_o

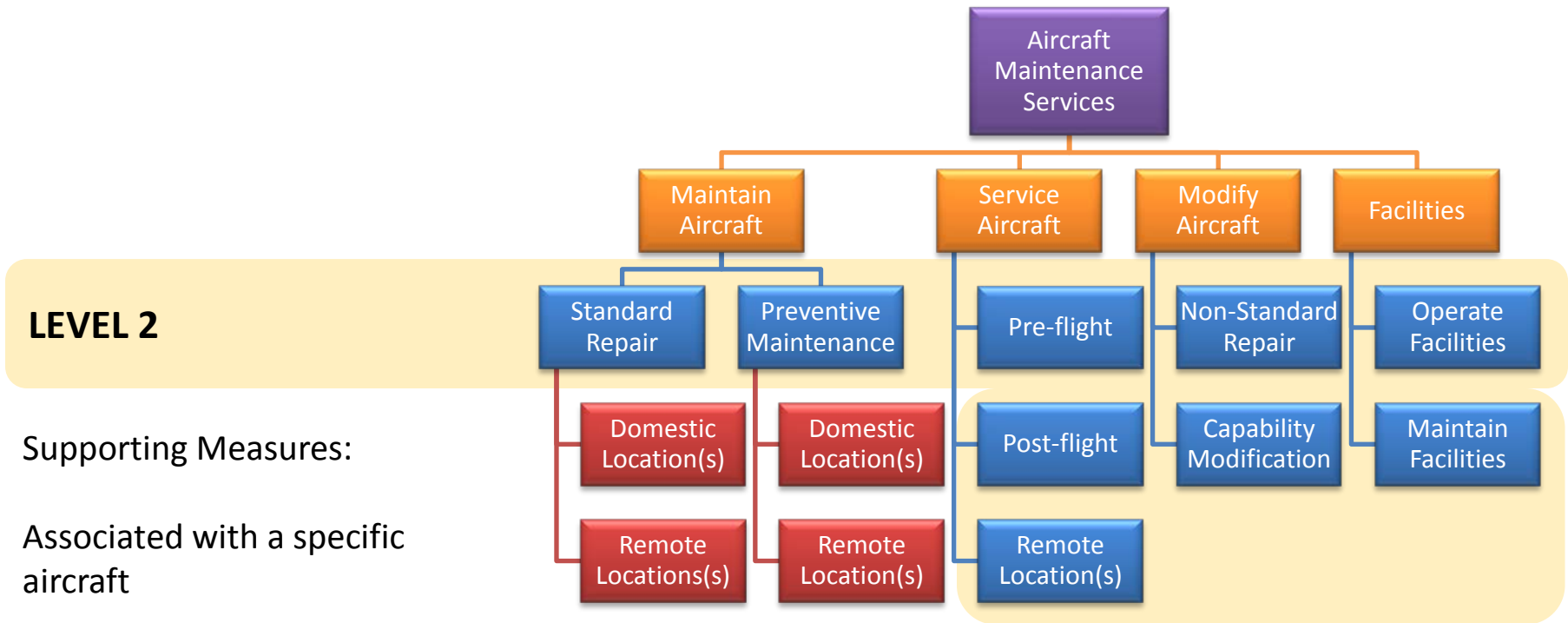


Establish contractual KPIs to reduce fleet-wide:

Mean Maintenance Time (MMT)

Mean Logistics Delay Time (MLDT)

Aircraft Maintenance Services



Supporting Measures:

Associated with a specific aircraft

Process improvement opportunities:

- Lean Six Sigma
- Business Process Management (BPM)

Incentive for Contractor for each aircraft to:

Reduce Maintenance Time (MT)

Reduce Logistics Delay Time (LDT)

Increase Time Between Maintenance (TBM)

Achieving Operational Availability (A_o)

$$A_o = \text{MTBM} \div (\text{MTBM} + \text{MMT} + \text{MLDT})$$

Scenario #1

MTBM #1	200
MTBM #2	220
MTBM #3	230
MTBM #4	215
MTBM #5	248
Avg. MTBM	222.6

MMT #1	86
MMT #2	108
MMT #3	115
MMT #4	130
MMT #5	125
Avg. MMT	112.8

MLDT #1	94
MLDT #2	121
MLDT #3	89
MLDT #4	112
MLDT #5	87
Avg. MLDT	100.6

MTBM	222.6
MMT	112.8
MLDT	100.6
Ao	0.51055

$$A_o = 51\%$$

Scenario #2

MTBM #1	410
MTBM #2	480
MTBM #3	550
MTBM #4	458
MTBM #5	446
Avg. MTBM	468.8

MMT #1	42
MMT #2	38
MMT #3	62
MMT #4	47
MMT #5	56
Avg. MMT	49

MLDT #1	53
MLDT #2	64
MLDT #3	55
MLDT #4	58
MLDT #5	61
Avg. MLDT	58.2

MTBM	468.8
MMT	49
MLDT	58.2
Ao	0.813889

$$A_o = 81\%$$

POLICY IMPLEMENTATION



DoD Issuances

DoD Policy

- A set of principles and associated guidelines to direct and limit DoD actions in pursuit of objectives, operations, and plans.

DoD Instructions

- A DoDI that **implements** policy established in a DoDD or a policy DoDI by providing general, overarching procedures for carrying out that policy.

Management Plans

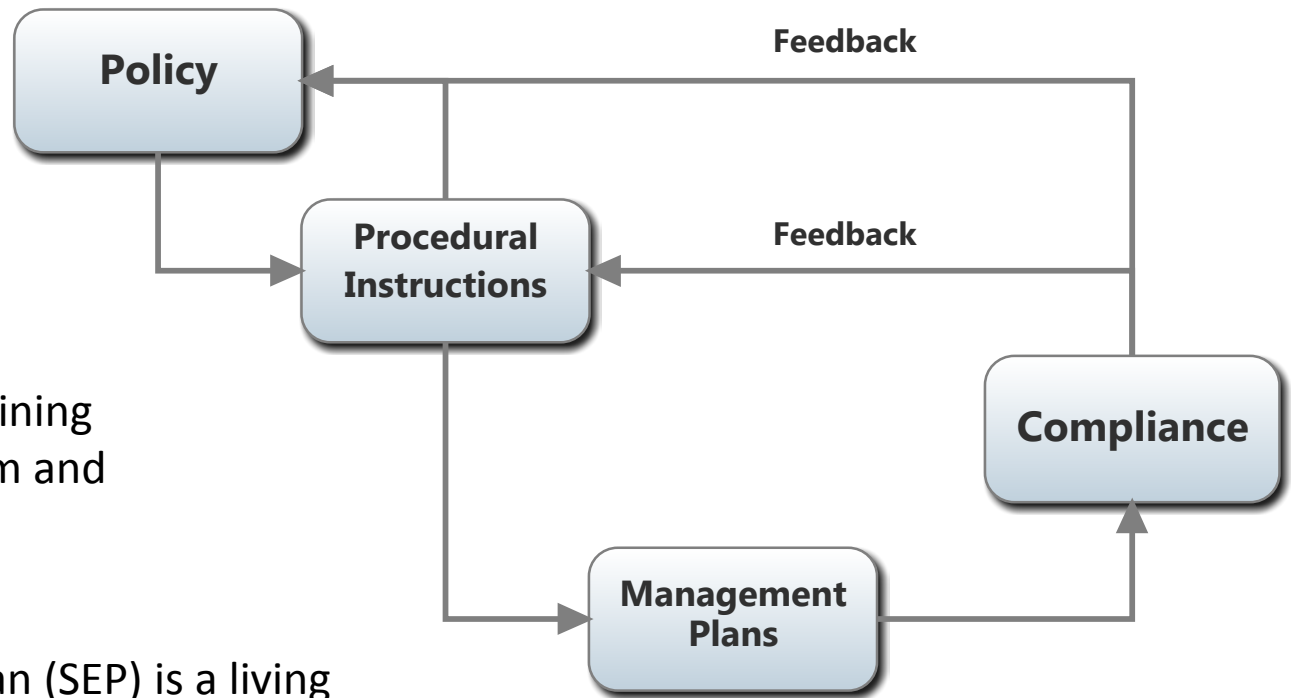
- Implements DoDI procedural requirements to define how a program/project is initiated, planned, executed, monitored & controlled, and closed. Extent of content is based on the scope of program/project.

Policy Implementation Summary

Policy is established to apply systems engineering across the product life cycle.

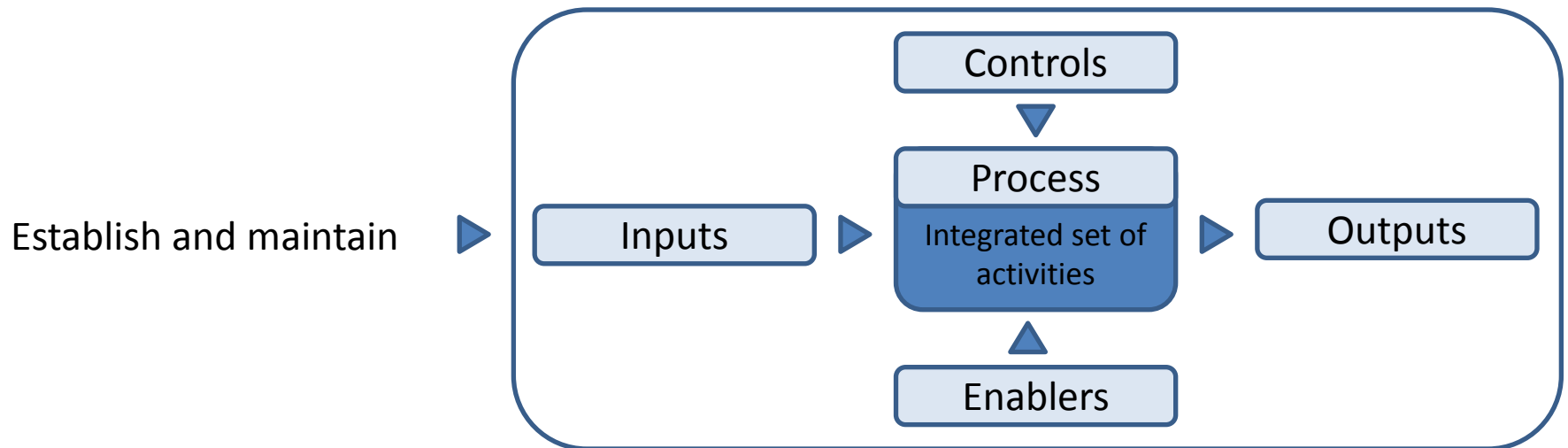
Procedural Instructions designate the OPR for establishing and maintaining the capability to perform and execute SE processes

Systems Engineering Plan (SEP) is a living document that describes how the SE process will be applied and tailored to meet the objectives for each product development life-cycle phase. Process, product, and progress measures will be used to support the decision-making process.

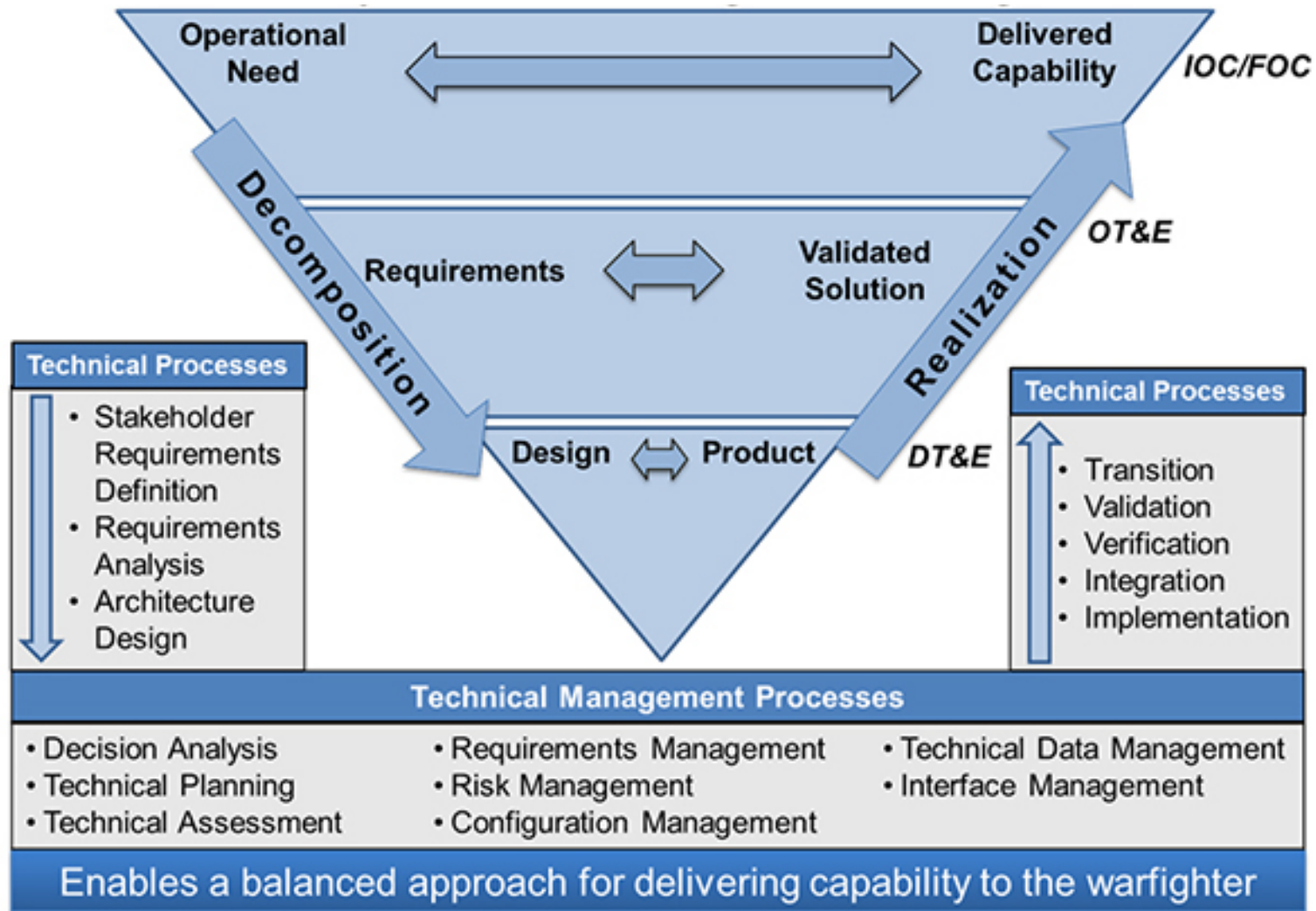


Definitions – “Establish and maintain”

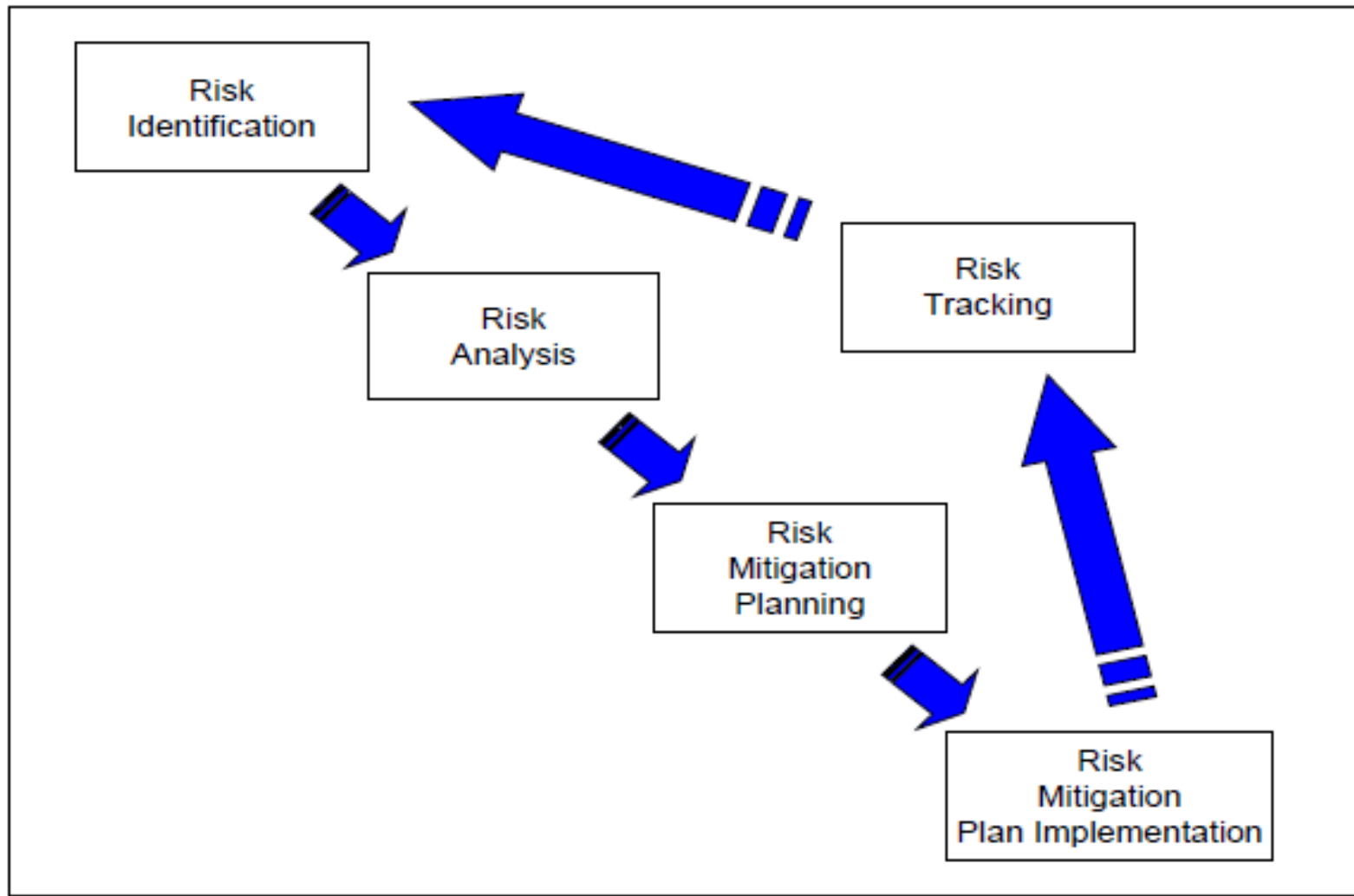
- **Establish:** Develop policy, work instructions, or procedures to implement process activities
- **Maintain:** Planning the process, providing the resources, assigning responsibilities, training people, managing configurations, identifying and involving stakeholders, and monitoring process effectiveness



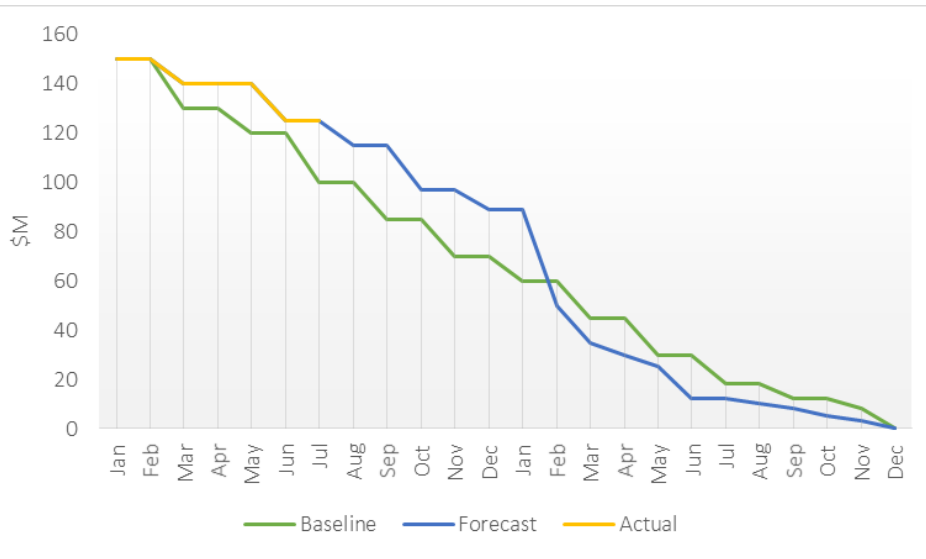
DoD Systems Engineering Process



DoD Risk Management Process



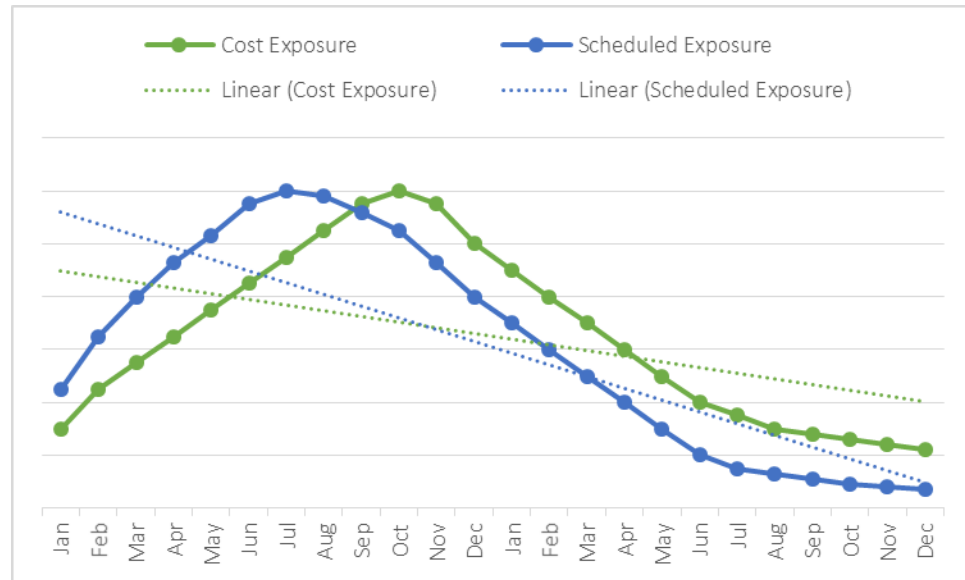
Risk Burn-down Metric



Status & Analysis Report



Risk Exposure Indicator



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 - Measureable outcomes provide measured data to feed “infographic” performance dashboards
 - Performance information used by decision-makers to make timely course corrections in order to arrive at the desired end-state

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