Critical Thinking & Life Cycle Sustainment Planning

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Persistent Maritime UAS Overview

Current ops: BAMS-D

- **Originally planned 6-month demonstration**
  - **Now used operationally for more than 7 years**
- **~18,000 flight hours**
- **Average of 15 flights per month**
- **Informing decisions on Triton to provide even greater capability to fleet commanders**
  - **Design**
  - **Operational CONOPS**
  - **Capabilities**

Future ops: Triton

- **Complementary capability for maritime patrol mission**
  - **Long-endurance surveillance**
  - **360 degree multi-int sensor suite**
  - **Tactical support for operational commander**
- **Fly at altitudes above 50,000 feet, covering vast areas of ocean in single mission**

OSD AT&L

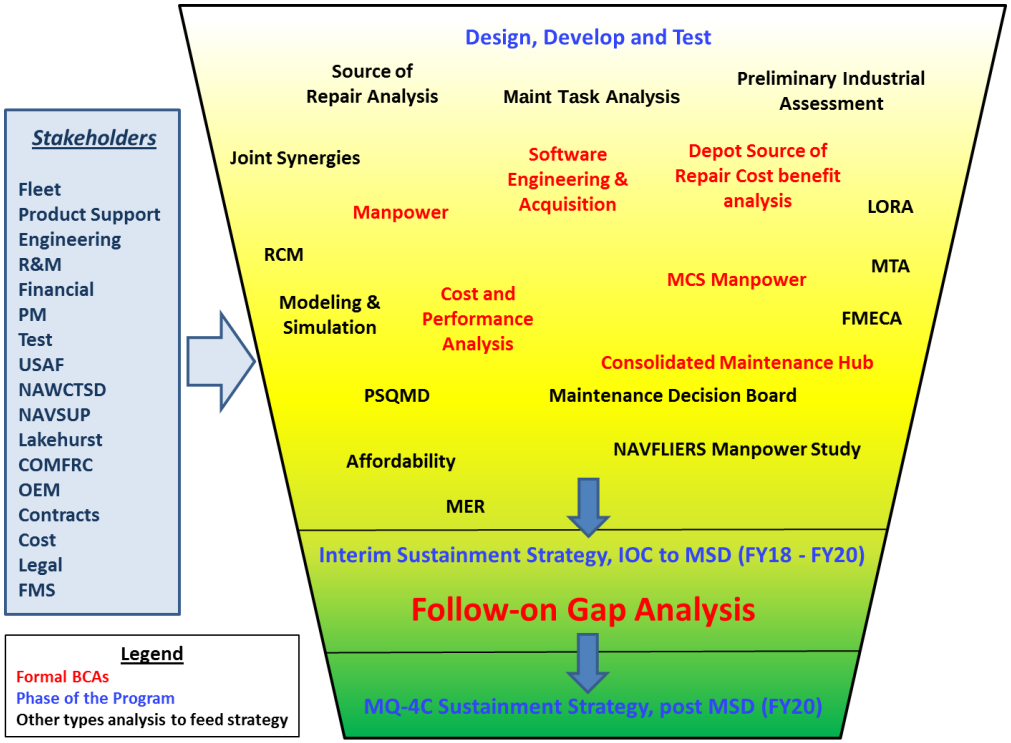
"Professionalism was emphasized …….. and third because nothing is more important to our success than our professional ability to understand, **think critically, and make sound decisions** about the complex and often highly technical matters defense acquisition confronts."

– *The Honorable Frank Kendall, Under Secretary of Defense Acquisition, Technology and Logistics - Better Buying Power 3.0*

Critical Thinking

- **What is Critical Thinking?**
  - Defined as "disciplined thinking that is clear, rational, open-minded, and *informed by evidence for decision making"*
- **How Does Critical Thinking Apply to Sustainment Planning?**
  - Used to ensure sound decision making principles drive the team
    - *Right decisions*
    - *Right time*
    - *Best value O&S cost and readiness outcomes*
  - Facilitates decision making process prioritization
  - Minimizes amount of re-assessment needed

Series of Cost Benefit Analyses Used vice a Single Life-Cycle BCA



Creating the Environment for Critical Thinking

- **Keys to success for enabling the program team**
  - **Program Leadership**
    - *Nurture an environment* where critical thinking and data driven decisions are expected
    - *Resource the process* with the right skill mix of team members
    - *Empower the team to make final decisions and resource the solutions*
  - **Credible Team**
    - Include all *stakeholders and experts* across the organization
  - **Framework**
    - A structure to ensure *elements of support flow down and resources* are allocated in the support planning process
  - **Process**
    - *Sufficient detail to assess* and rank the data elements
    - Analysis tool

Credible Team

- **How do teams gain credibility?**
  - Gain *buy-in from all stakeholders* by involving them in the process
  - *Employ experts* across the organization
  - Making *data driven, joint decisions*
  - Follow through with a *resourced implementation plan*
  - *Track and report progress*

Utilizing the Framework

- **The *Life-Cycle Sustainment Plan* (LCSP) provides a *framework* for support element requirements**
  - Use of the LCSP ensures each *support element* is considered during program logistics and analysis planning
  - Ensures support requirements are *allocated* and identified for funding
  - Documents the *decision making process*
  - Documents the *results of the analysis* and the "plan/resource - to" strategy

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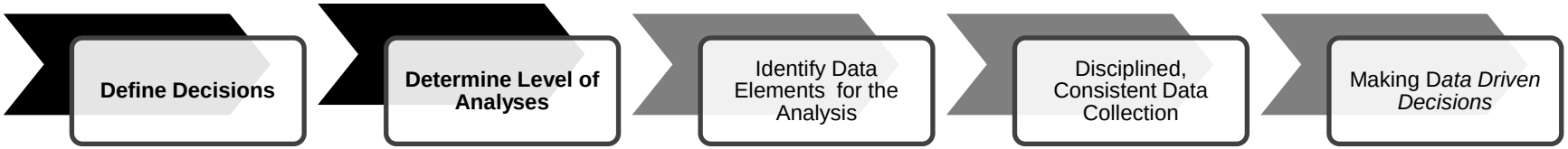
Implementing an Analysis Process

- **How does the team implement the analysis process?**
  - **Define the decisions that need to be made**
  - **Determine the level of analysis to be conducted**
  - **Identify *data elements t*o be analyzed**
    - Capacity, Capability, Costs, Skill Availability, Risk
  - **Develop a disciplined, consistent means for collecting data**
    - Requests for Information, Observation, Data Systems
  - **Conduct analysis and make data driven decisions**



Decisions Required / Level of Analysis

Sub-system	Depot Stand-up Cost	Complexity	UAS Commonality	Data Rights Assertion	Analysis Type
Airframe	Medium	Low	Moderate	Y	3 → 2
Engine *	High	High	High	Y	N/A
MFAS	High	High	None	Y	3
EO/IR *	Medium	High	Moderate	Y	N/A
ESM	Medium	Medium	None	Y	2
AIS	Low	[illegible]	[illegible]	Y	1
MOB MCS	Low	[illegible]	[illegible]	Y	1

Only perform the level of analysis that is necessary to make the best value decision

Analysis Type

1 = AIR 6.7 DSOR Evaluation and Scoring Worksheet
2 = Cost Benefit Analysis
3 = Business Case Analysis (BCA)

* DSOR Decision Complete

Evaluation Factors

Cost (stand-up): Low (<$1M), Medium ($1 to $10M), High (>$10M)
Complexity (of repair): Low, Medium, High
Commonality (Group 5 UAS): None, Low, Moderate, High
Data Rights (Govt. Purpose Rights or greater): Yes, No

28 Total Sub-systems

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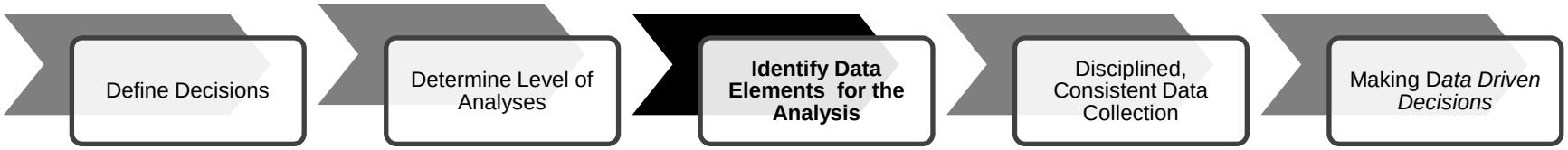


Qualitative Assessment Individual Voting Card

PHASE III

fill in gray areas

I: MQ-4C Triton UAS Depot Source of Repair Risk Analysis for

LANDING GEAR SUB-SYSTEM

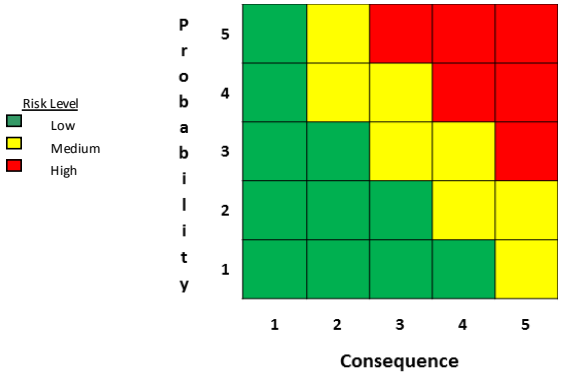
Capability: ability to perform work

Capacity: ability to absorb work

Operational Impact: ability to meet operational optempo

Test Equipment: availability of required test equipment

Airspace Access: ability to fly air vehicle(s) to planned work location



MQ-4C Triton UAS (USN)

Complete by adding probability x consequence; and highlighting box with appropriate color. Then, 'sum' risks to an overall assessment under 'Risk Assessment'

Alternative	Risk Assessment	Capability	Capacity	Operational Impact	Test Equipment	Airspace Access	Other?
Opt 1							
Opt 2							

MQ-4C Triton UAS & RQ-4 Global Hawk (USAF)

Alternative	Risk Assessment	Capability	Capacity	Operational Impact	T
Opt 1					
Opt 2					

Data element required to assess risk – tied to "Request for Information"

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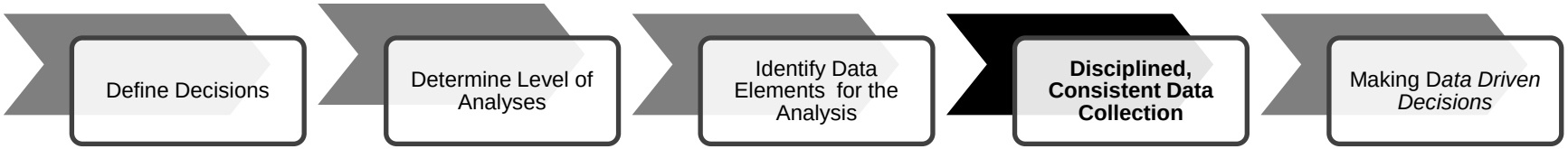

Qualitative Assessment Weighting

PHASE II *fill in gray areas*

F: MQ-4C Triton UAS Depot Source of Repair Qualitative Data for LANDING GEAR SUB-SYSTEM

- **Proficiency**: refers to the *skill level* of the maintainers, and the suitability of the task to the personnel assigned
- **Responsiveness**: refers to the capability to support changes in operations / *respond to mission requirements*
- **Scalability**: refers to the capability to readily adjust the *size and/or composition* of the force based on change in operational requirements
- **Like and Similar**: refers to how comparable MQ-4C / RQ-4 subsystem work is to current depot work at specific site / organization
- **Capacity**: refers to the ability for depot site / organization to absorb MQ-4C / RQ-4 workload without additional cost / risk

Weighting Factors: Is Proficiency more important than Responsiveness? Is Responsiveness more important than Scalability? And by how much (%)

Qualitative Description	RFI Response Information Source	Priority	Weighting
Proficiency	Part E Question 1 through 4	1	30%
Responsiveness	Part E Question 1 through 4	3	14%
Scalability	Part H Question 5	5	13%
Like and Similar	Part H Question 4	2	30%
Capacity	Part F Question 1 through 6	4	13%
check			100%

"Request for Information" sent to each candidate depot.

Weighting

Proficiency > Like and Similar > Responsiveness >

Capacity > Scalability

Assessment Factors (Scale) 1 through 7

1. Unsatisfactory
2. Poor
3. Less than Average
4. Average
5. Good
6. Excellent
7. Outstanding

For Sensitivity Analysis;
If a Depot location/organization WRA maintenance is
less expensive and/or possesses faster
Turn-Around Time than it's closest alternative,then an option exists
to send this WRA to a Depot location/organization other than the primary
Depot location / organization

Implementing an Analysis Process

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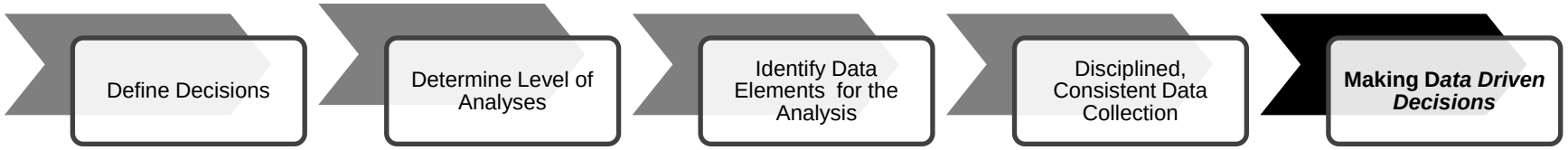
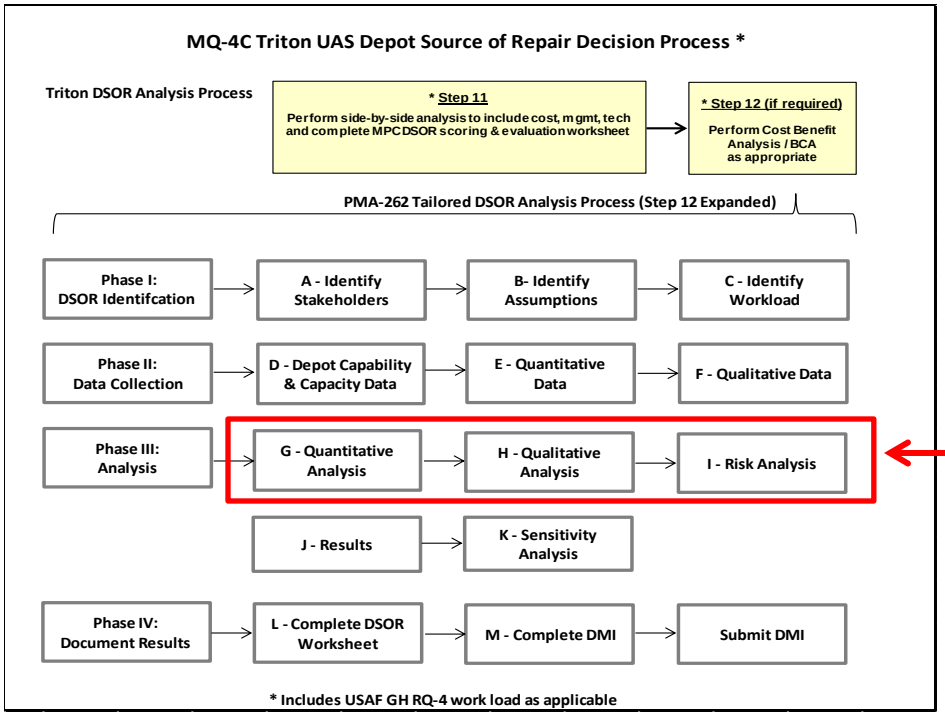


Depot Source of Repair Analysis Process

Landing Gear

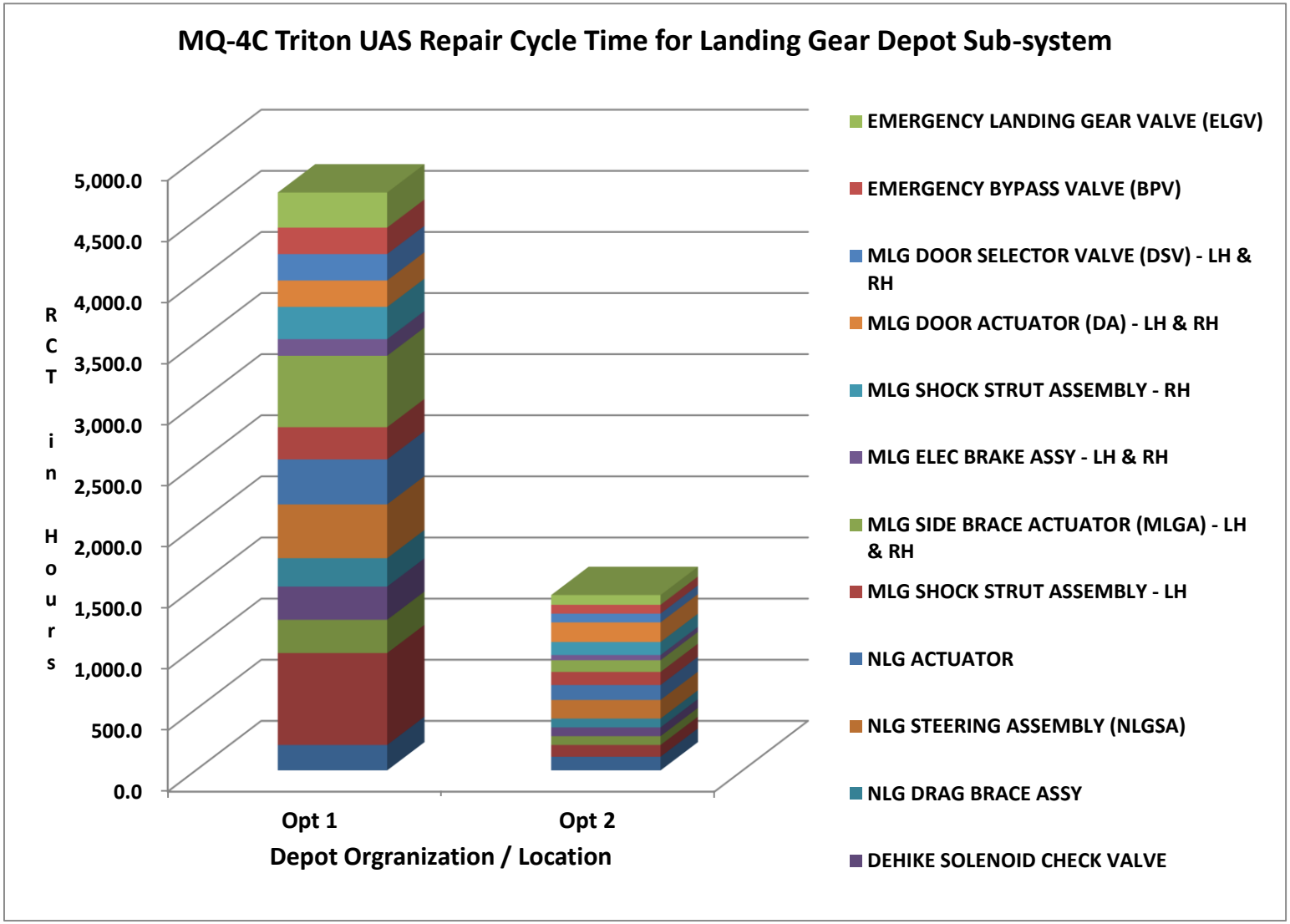


- **Opt 1 was slightly lower for standup costs**
- **Repair Cycle time at Opt 2 was significantly lower**
- **Faster "repair cycle time" results in improved readiness with less spares**

#	Alternative	Depot Cost NPV ($M)	Repair Cycle Time Hrs	Risk Summary	Capability	Capacity	Op. Impact	Test Equipment	Airspace
1	Opt 1	$ 6,890,170.61	315.2						
2	Opt 2	$ 7,933,056.13	106.5						

MQ-4C Triton UAS & GH Common WRAs

Landing Gear – Repair Cycle Time



Life-Cycle Sustainment Planning
Take-Aways

- **Program Leadership**
  - *Nurture an environment* where critical thinking and data driven decisions are expected
- **Framework**
  - Structure for sustainment planning
- **Credible Team**
  - Include *stakeholders and experts*
- **Process**
  - *Consistent, credible process*

Questions