T&E Executive Panel

The Proper Role of T&E and the Testing Community in Defense System Requirements

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Panel Participants

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- **Rear Admiral William McCarthy, USN (Ret)**

Deputy Commander, Operational Test and Evaluation Force

- **Brigadier General Richard (Scott) Stapp**

Deputy Director for Requirements, Joint Staff J-8

T&E Responsibility in Defense Acquisition

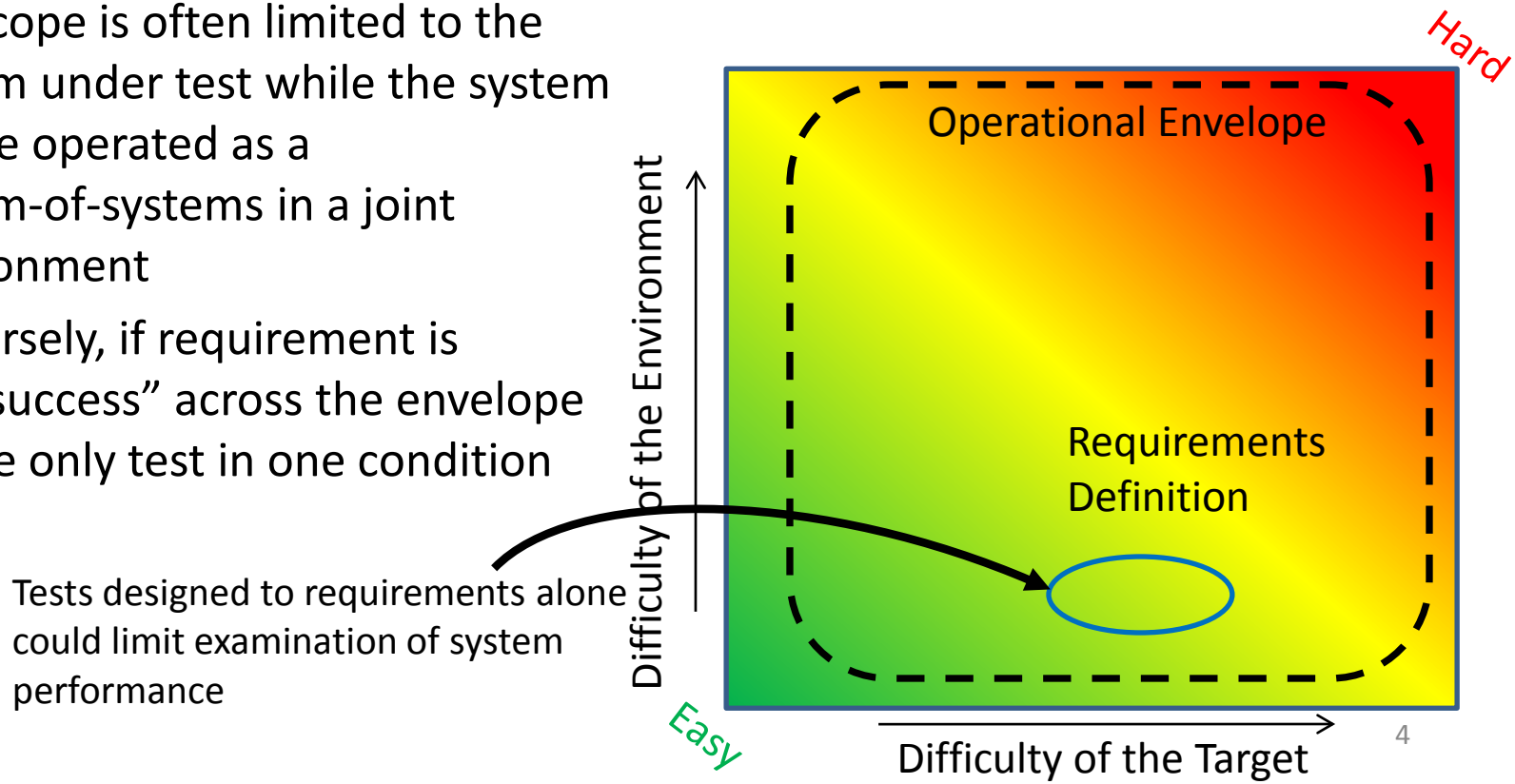
- **Two recent independent assessments of T&E in defense programs (DOT&E and USD(AT&L)) identified issues with requirements:**
  - Weak linkage amongst Requirements, Program, and Test Communities
  - Issues with Requirements Setting and Management
  - Requirements *change* is frequently seen as a symptom (not a cause) of program delay

- **Army Acquisition review of the Army's failure rate of new development programs also identified issues with requirements:**
  - Unconstrained requirements
  - Weak trade studies
  - Erosion of requirements and acquisition workforce

- **Testing and test requirements do not cause major program delays**
  - The results of testing rather than the testing itself has caused delays
  - Provided with insight into weapon system true performance, decision makers can restructure, cancel or give more resources to programs

Mismatch of Requirements and Evaluation

- Evaluation of systems against specific requirements versus performance across the operational envelope
  - Often requirements are narrowly-focused, don't cover the envelope
  - Static in time and do not keep pace with evolving threat
  - Test scope is often limited to the system under test while the system will be operated as a system-of-systems in a joint environment
  - Conversely, if requirement is "xx% success" across the envelope but we only test in one condition



T&E Community Contributions:

- T&E has knowledge of current and legacy system performance; can provide input at early requirements development
  - Unrealistic, unaffordable, untestable, and/or not technically feasible
  - Current operational threat environment and what investments will be needed in test resources and infrastructure

- Testers need to understand the rationale or the *so-what* factor of the requirement, e.g.:
  - User wants 90% probability of completing a 6-hour mission (translates to approx 60 hours MTBOMF)
  - If system demonstrates 40 hours MTBOMF, this translates to 86% probably of completing a 6-hour mission – is this acceptable?
  - Emphasis should be on completing the mission, not the mean time between failures

Key Performance Parameters (KPPs)

Def'n: *A quantitative system attribute that the warfighter considers critical to the development of an effective military capability*

- DOT&E has seen many recent examples of KPPs that are not informative about Mission Accomplishment:
  - Systems that did not meet KPPs but were found operationally effective
  - Systems that do meet all KPPs but gave no operational value to the unit
- Ideally, the KPPs should provide a determination of mission accomplishment, lend well to good experimental design, and encapsulate the reasons for procuring the system
- Mandatory KPPs such as "Net Ready" are not very informative
  - Threshold is always 100% Information Exchange Requirements
  - In many cases testing reveals low percentage of IERs met but no operational impact is observed

Requirements Implications to T&E

- Binomial vs Continuous response variables
  - Use of binomial (e.g., hit/miss) metrics leads to large sample sizes in order to have a reasonable inferential ability in the results; often a significant increase (at least 50% or more) over a continuous metric (miss distance)
  - Serious effort should be expended to find and use a continuous metric for test design even when KPP is binomial probability such as P_{hit}

- Difficulty to test
  - Very high requirements are difficult to test with confidence; must consider cost implications to design and test
  - Software intensive hardware reliability requirements?
  - Shouldn't eliminate a requirement simply because it is difficult to test, but need to understand implications

Questions for Panelists

- How can the requirements, acquisition/budget, and test communities more rapidly adapt to emerging facts and be less resistant to change?

- How can the requirements process produce better defined and testable requirements?
  - What roles should CAPE and DOT&E play in this process?
  - Could this compromise their role as independent evaluators?

- How can the T&E community use their knowledge base to help implement realistic expectations at requirements definition?
  - Can T&E strategy be developed on draft requirements to inform sponsor or resource needs?

- What type of workforce development/training could be implemented for the Service requirements community?
  - Are the required DAU courses sufficient?

- How can we develop more mission oriented Key Performance Parameters?