Model Path Analysis as a Basis for Evaluating Command and Control (C2) Workflow

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Maritime Operations Center Vision & Capability

❑ **CNO Vision:** Establish a global network of Maritime Headquarters with Maritime Operations Centers to deliver global maritime capabilities throughout the full range of military operations.

❑ **Capability:** MHQ with MOC enhances the Navy's capability to command forces at the operational level of war (OLW)

- ❑ with consistency via headquarters manned by individuals fully qualified in joint OLW staff processes
- ❑ and enabled by globally interoperable C4I systems to deliver organizational capacity and flexibility to transition between various command roles and enhance global networking among Navy-maritime organizations

MOC facilitates more effective joint, interagency, and coalition integration

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Operational-Level Capability Gaps

Shortfalls Today:

- Insufficient expertise in operational-level assessment, planning and execution

- Limited Navy doctrine for operational-level warfare

- Operational-level processes vary

- C4I installations vary within operational-level commands

- Deployable, distributed operations capabilities vary across NCC and numbered fleet HQs

- Lack of agility to quickly form and deploy a JTF HQ

- No enterprise-wide mechanism to achieve and maintain JTF HQ and JFMCC certifications

- No Senior Mentor Program

Uniform and agile operational-level commands will enhance joint integration and global effectiveness

Maritime Operations Center
Sponsor Critical Challenges – APL Role
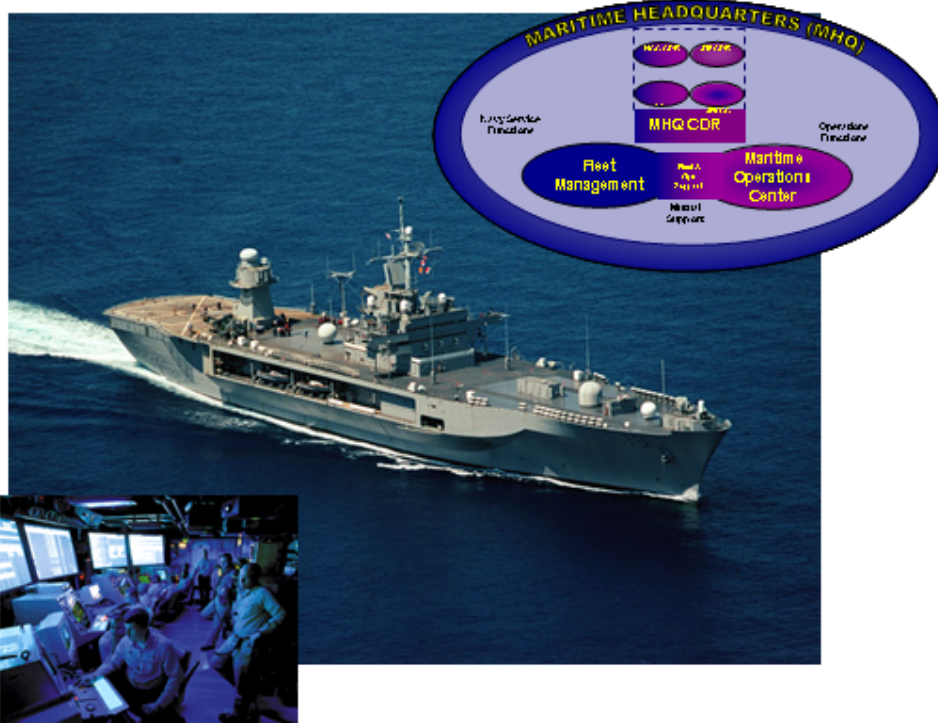
Description

❑ Navy's #1 priority for improving planning and execution at the Operational Level of War.

Highlights

❑ Identify and close Operational-level capability gaps

❑ Organize, train, and equip for globally connected Maritime Operation Centers

❑ Organizing around JCA

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❑ MOC Project Team Lead for Force Application (Fires) Warfighting Functional Area

❑ Model way ahead for MOC-after-next

❑ Develop model and prototype improvements to Force Application workflow continuum

Customer

❑ Navy – USFF/C2F, NWDC

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Maritime and Joint Fires Problem Statement

❑ Problem Statement: The Maritime/Joint Force requires the capability to dynamically command and control integrated maritime fires (horizontally and vertically) for coordination of asset allocation, fires execution, and effects assessment in a joint environment

❑ Areas of focus include: Joint Capability Areas; Maritime/Littoral Fires; Synchronize/Monitor/Assess

❑ APL is Exploring the Requirements

- What is the organizational structure, processes, and toolsets for a standardized operational-level maritime fires organization?

- What are the requirements for operational level maritime fires Command and Control (C2) to ensure compatibility with other Service/Joint components?

- What are the technical system interface requirements that will provide cross service system compatibility and synchronization of fires?

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FA/Fires C2 Workflow Project Overview

Vision and Scope of Project

❑ Examine the specific processes, tasks and procedures for support of timely operational planning and engagements throughout the battle space and more specifically the C2 required between FOPS/COPS/FIRES/ISR/INTEL of the MOC/JFMCC, COCOM components, and the Fires asset (CSG/ESG/TLAM).

❑ Identify and construct core SOA components for a prototype Force Application Collaborative Information Environment (CIE) that will benefit the Joint/Maritime Force Commander at the OLW.

❑ Develop a conceptual design for a CIE prototype that will improve information flow in the current process.

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MOC Coordinate Operational Fires

5. Coordinate Operational Fires

Coordinate Operational Fires

The MOC is the operational focal point for the maritime environment and conducts force allocation and platform-mission pairing. Planners allocate forces, ISR assets, and munitions to specific targets/aim points, develop force packages and assign missions to supporting forces.

Targeting personnel develop and prioritize recommendations for munitions delivery systems/assets for specific targets/aim points and may also specify delivery parameters, weapons fusing, axis of attack, and assessment criteria. The function of matching available forces, systems and ISR assets of other Services to the approved targets prioritized on the Joint Integrated Prioritized Target List (JIPTL) is an important part of force allocation. Distributed targeting conducted by subordinate maritime CDR staffs (and others, as appropriate) is a potential and likely capability, which could enable a faster, more nimble force allocation/ mission-platform pairing targeting process.

The FOPs planners use the force allocations and platform-mission pairings to resolve timing, sequencing, geospatial and deconfliction issues that may arise when these outputs are combined with other attack plans and the ATO. The final result is mission-timing data, which is incorporated into the Force Allocation. FOPS must develop tasking orders once the attack plan is approved. Tasking orders to the assigned combat, intelligence and support forces are prepared and issued, providing direction for tactical forces to conduct mission planning and execution.

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Model Analysis Approach

❑ Divide model into data area, organizational swim lanes, and F2T2EA functional areas

❑ Develop a set of workflow processes, decisions, and data flows that accomplish the work of dynamic targeting across those swim lanes involving those data sources

❑ Develop a set of workflow "paths" through the model that accomplish the work of dynamic targeting for a given target type, e.g. TST, MDT, CCT, which was detected in either the Subordinate Tactical Command (STC) or Other Component (OC) swim lane

❑ Working with SMEs and Fleet Operators – analyze each path for accuracy, timing, and resource utilization

❑ Develop and analyze the set of paths that represent approximately 80% of the likely paths to be taken during the actual conduct of dynamic targeting

❑ Later, apply the same approach to Deliberate Targeting as well as other non-targeting functional areas

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Advantages to Use of Modeling

Modeling

❑ Facilitates the establishment of a process baseline or "as-is" version of an area to be investigated

❑ Allows structured "what-if" analysis to evaluate recommended changes to that baseline, e.g. how best to reduce kill chain time by a factor of X

❑ Supports incorporation of the best of "what-if" changes into a new "to-be" model and a new set of corresponding workflow processes and TTPs

❑ The "to-be" model can be used to evaluate the performance of the new workflow processes and TTPs during experimentation

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Maritime Fires Dynamic Targeting Model

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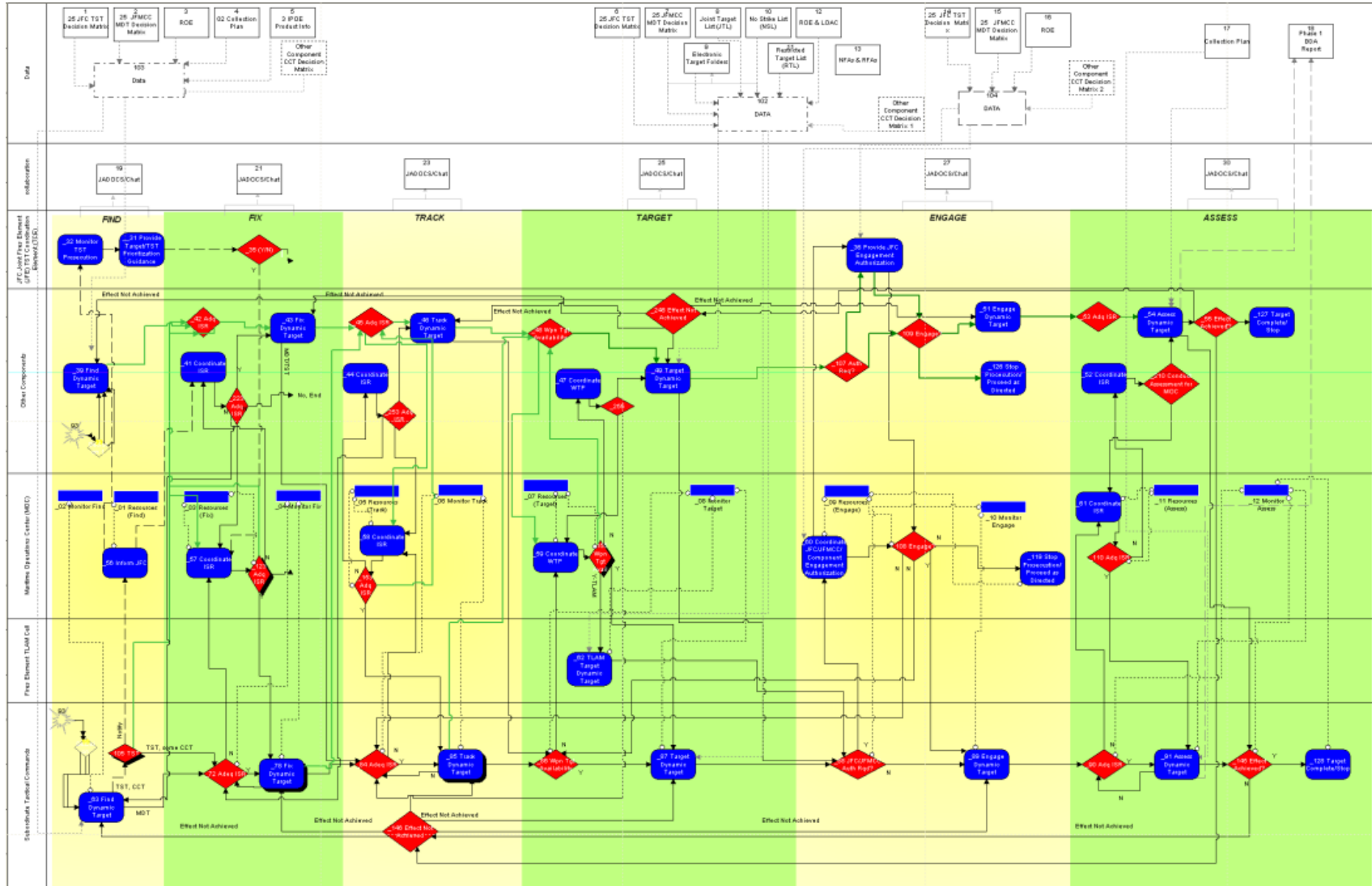
Develop Workflow Path Pattern Library

Dynamic Targeting Model
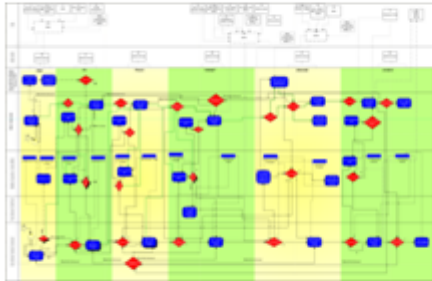
MDT via STC+MOC Path 1
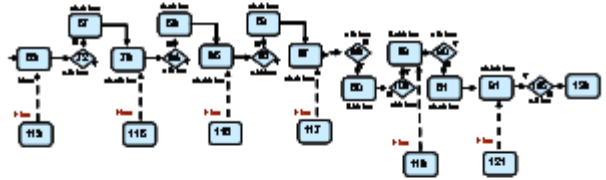
TST via STC+MOC+OC Path 2
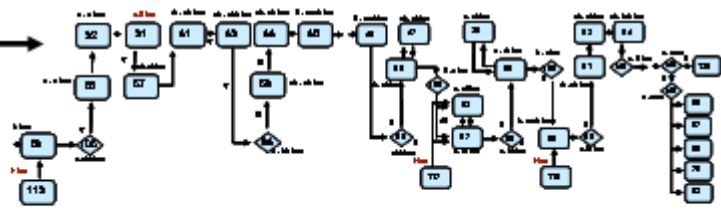
Path n

Dynamic Targeting Workflow Path Pattern Library

Path 1
Path 2
Path 3
Path 4
Path n

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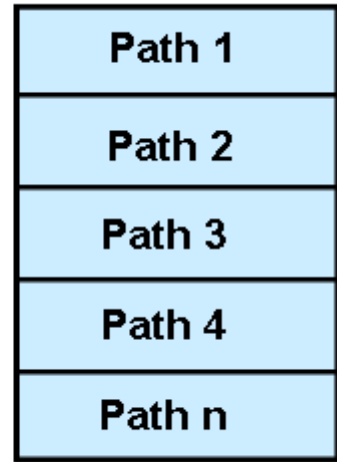
Workflow Path During F2T2EA Execution
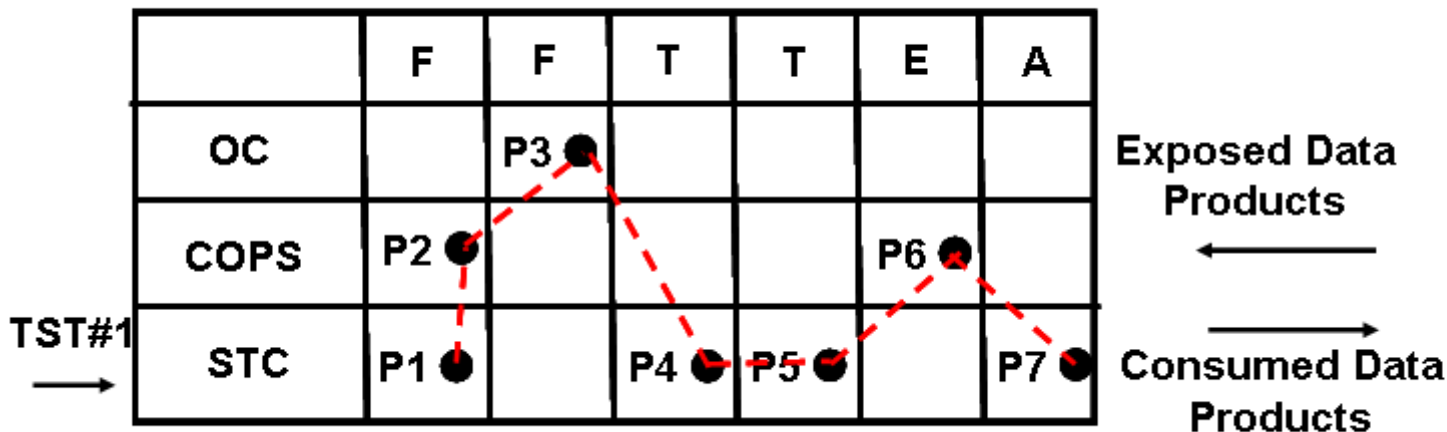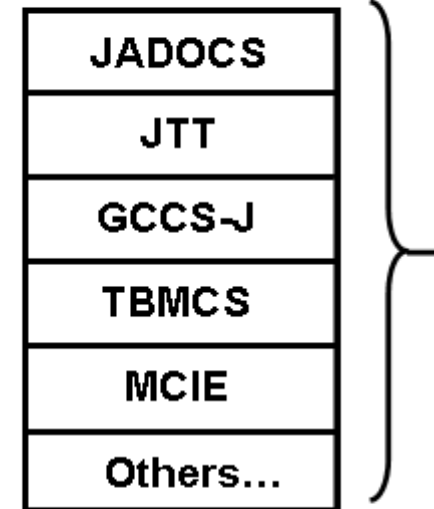
		F	F	T	T	E	A
OC			P3				
COPS		P2				P6	
STC		P1		P4	P5		P7

TST#1

Exposed Data Products ←

Consumed Data Products →

Supporting Systems

| JADOCS |
| JTT |
| GCCS-J |
| TBMCS |
| MCIE |
| Others... |

Dynamic Targeting Workflow Path Pattern Library

| Path 1 |
| Path 2 |
| Path 3 |
| Path 4 |
| Path n |

Target & System Tracking Agent (TSTA)

- Monitors workflow products & systems
- Builds workflow path for each target
- Compares each path to Path Library
- Generates performance statistics
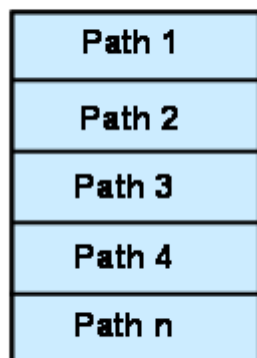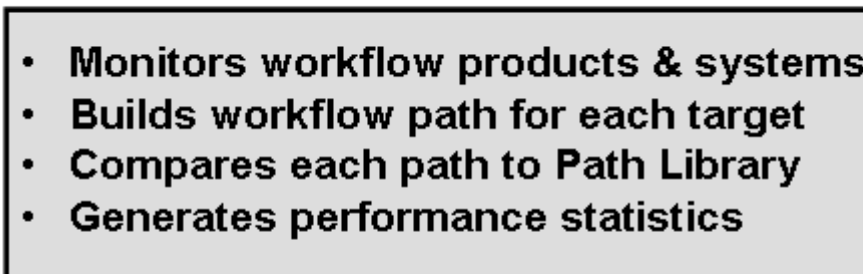
Targeting & Systems Performance Statistics

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Notional MOC Fires Dashboard

Supporting Networks

SIPRNET
JWICS
NIPRNET
Others…

Network Tracking Agent (NTA)

Network Statistics

- Monitors network status
- Monitors network loading
- Generates performance statistics
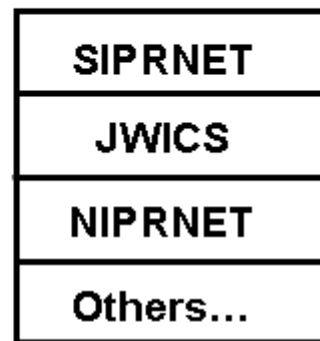
MOC Fires Targeting Dashboard
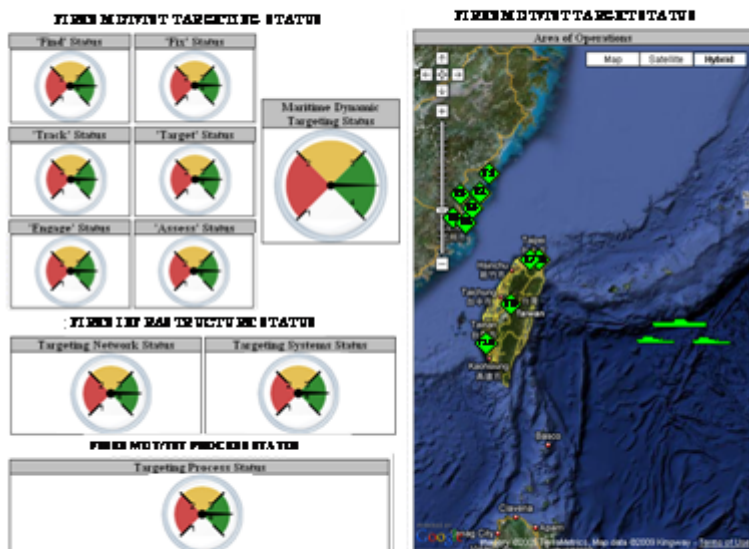
Target & System Tracking Agent (TSTA)

- Monitors workflow products & systems
- Builds workflow path for each target
- Compares each path to Path Library
- Generates performance statistics

Targeting Statistics
Systems Statistics

Web-enabled/Net-Centric Collaborative Planning & Execution Monitoring

Integrated Strategic Planning & Analysis Network (ISPAN) 2008 delivers:

☐ **Collaborative Information Environment (CIE):** Web enabled Adaptive Planning, rapid distributed Course of Action (COA) development and Global Situational Awareness Tool supporting both contingency and crisis planners

- **Enables rapid decision making by Senior Leaders**

- **Structured collaboration spaces for contingency and crisis action planning**

- **Strategic/Operational COA development, approval and execution**

- **Global views of live information feeds (from the authoritative source) for situational awareness and synchronization**

- **Sharing real-time information in across multiple security enclaves - thin client on SIPR & JWICS**

- **Facilitates planning collaboration for both kinetic & non-kinetic options with Interagency and Allied Planners**

- **Accessible at any connectivity point to the Global Information Grid (ground, air, or at sea)…access anywhere-any time**

Collaborative Information Environment (CIE)
COA Selection Brief

COA Development & COA Comparison Tool

Global Situational Awareness Tool (GSAT)

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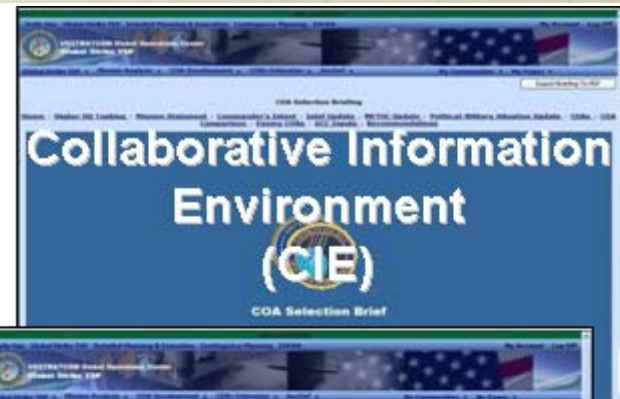
Notional Dashboard in Maritime CIE

Dashboard Drill Down Example
MOC Targeting Process Status: Green

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Dashboard Drill Down Example
MOC Targeting Process Status: Yellow

MOC Targeting Process Status Intermediate Drill Down Example
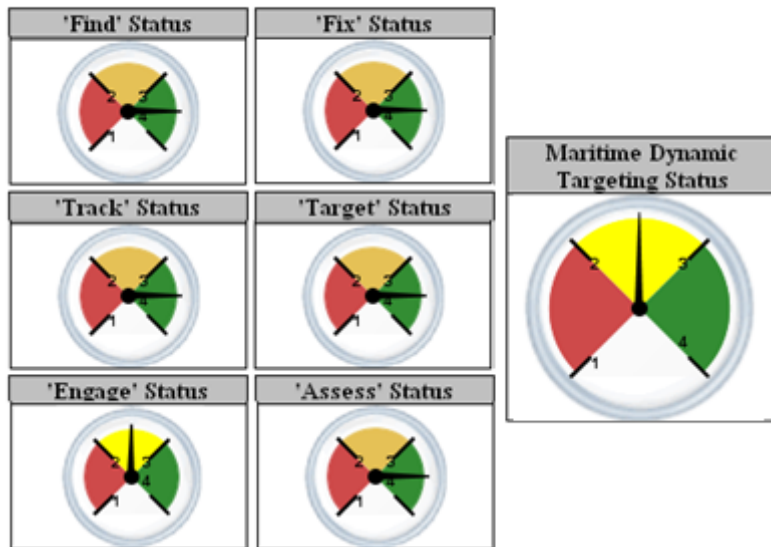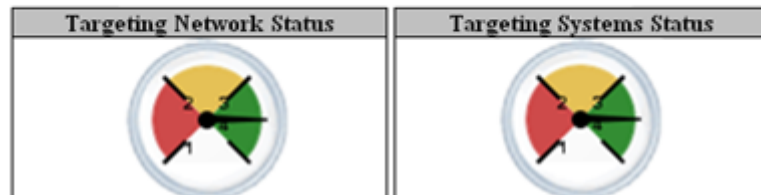
FIRES MDT/TST PROCESS STATUS

MOC Targeting Process Status Detailed Drill Down Example
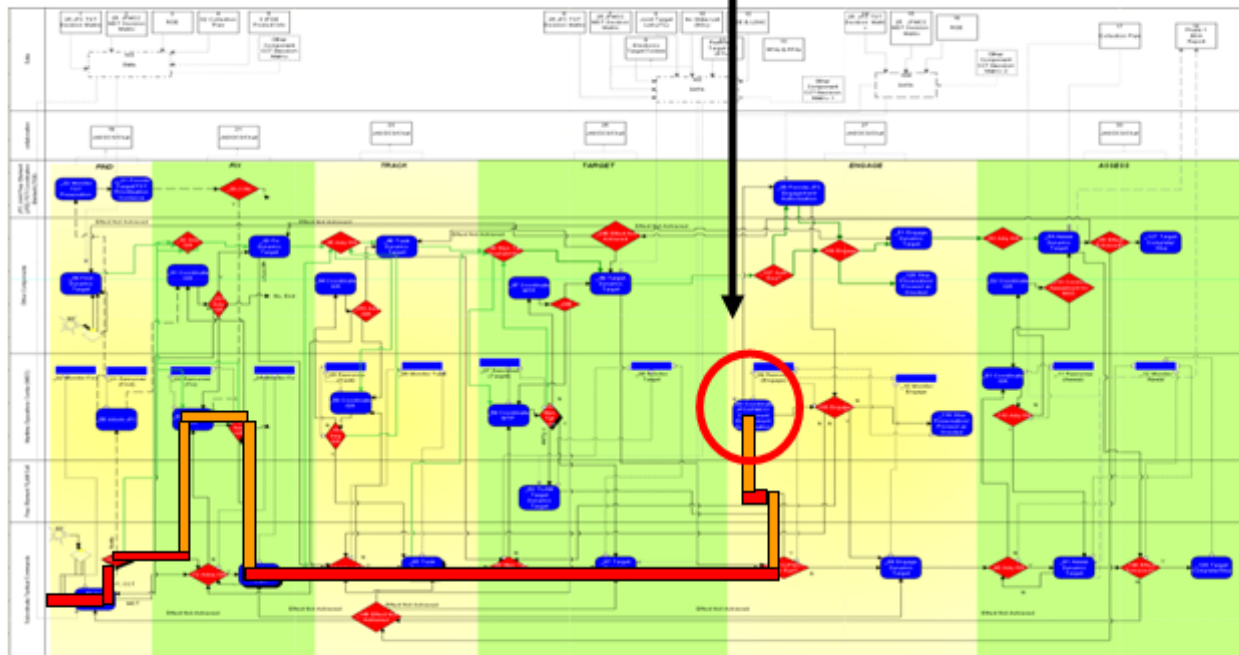
Summary

- Simulating the MOC core processes identifies opportunities for improving operational efficiency
  - Bottlenecks can be identified
  - Alternative TTPs can be vetted through simulation before being field tested
  - Potential technological impacts can be modeled and evaluated within the dynamic environment of the MOC
- Future instrumentation of the MOC systems and processes will provide data for improving the fidelity of the MOC simulation
- Future instrumentation of the MOC systems and processes will allow commanders to monitor the MOC's current operational capabilities and performance

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