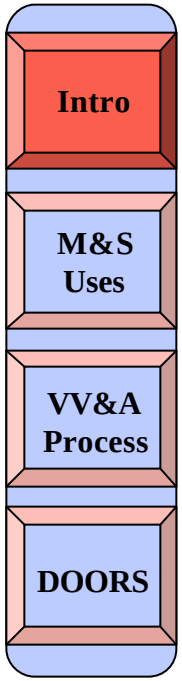
VV&A Requirements Traceability

- Introduction
- M&S Uses
- VV&A Process
- DOORS Requirements Tool

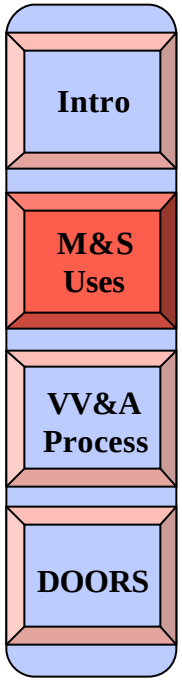
VV&A Requirements Traceability



- Purpose - To document the relationships of M&S requirements to system requirements and VV&A activities.

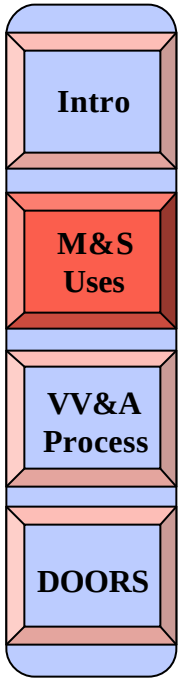
- Robust Traceability Supports:
  - Tracking the VV&A effort status
  - Tracking the impact of M&S VV&A on System Development & Test
  - Controlling VV&A results for future VV&A

Typical M&S Intended Uses



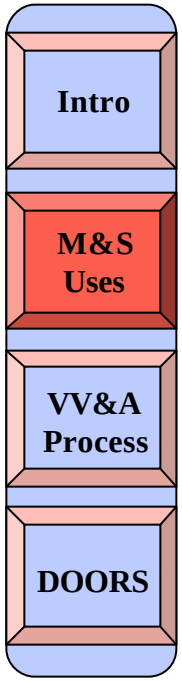
- System Development
  - System Requirements Document (SRD)
    - Architecture Development
    - Design Development
  - System / Subsystem Specification (SSS) - Element level testing
- Developmental Test & Evaluation (DT&E)
  - Evaluation of Critical Technical Issues (CTIs)
    - Used to measure performance during DT
    - Derived from the ORD by Analysts
  - MOEs / MOPs Defined for each CTI
    - Describe how a specific parameter / objective will be measured
    - Threshold and Objective values assigned for CTPs / KPPs
- Operational Test & Evaluation (OT&E)
  - Evaluation of Critical Operational Issues (COIs)
    - Derived from the ORD by COMOPTEVFOR
  - Evaluation of additional requirements for supplementing live test.

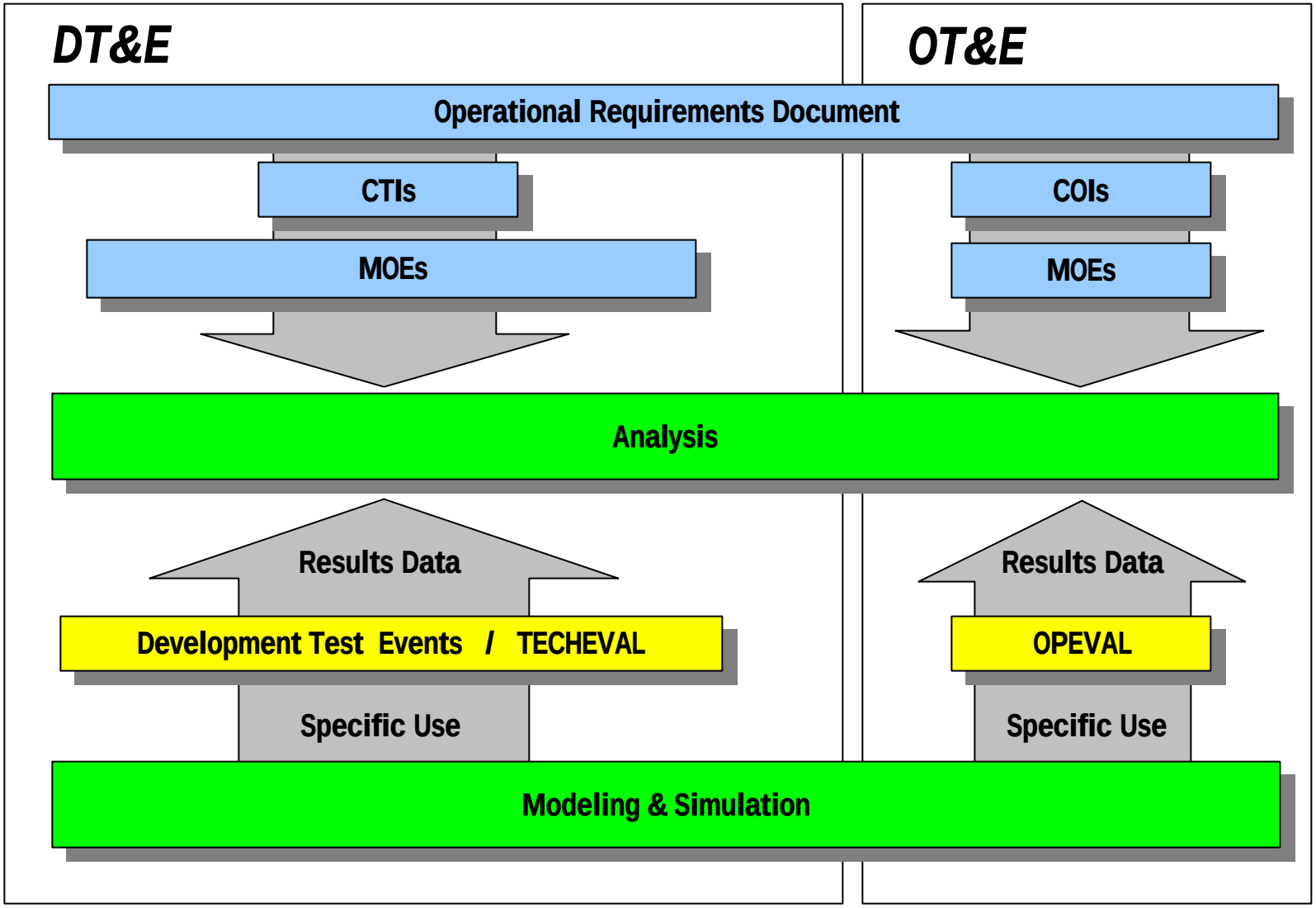
COI / CTI Resolution Strategy



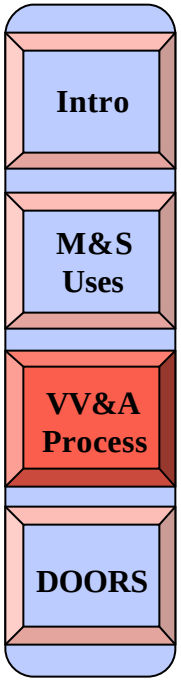
- Test Methods are determined for each MOE
- Live Testing
  - May not provide Adequate Environmental Conditions
  - May not provide Statistical Significance To Fully Evaluate Performance
  - Test Conditions Cannot Always Be Controlled In A Live Environment
- M&S
  - Provides Repeatable And Controllable Testing Environment
  - Provides Special Test and Environmental Conditions Required for Resolution of Performance

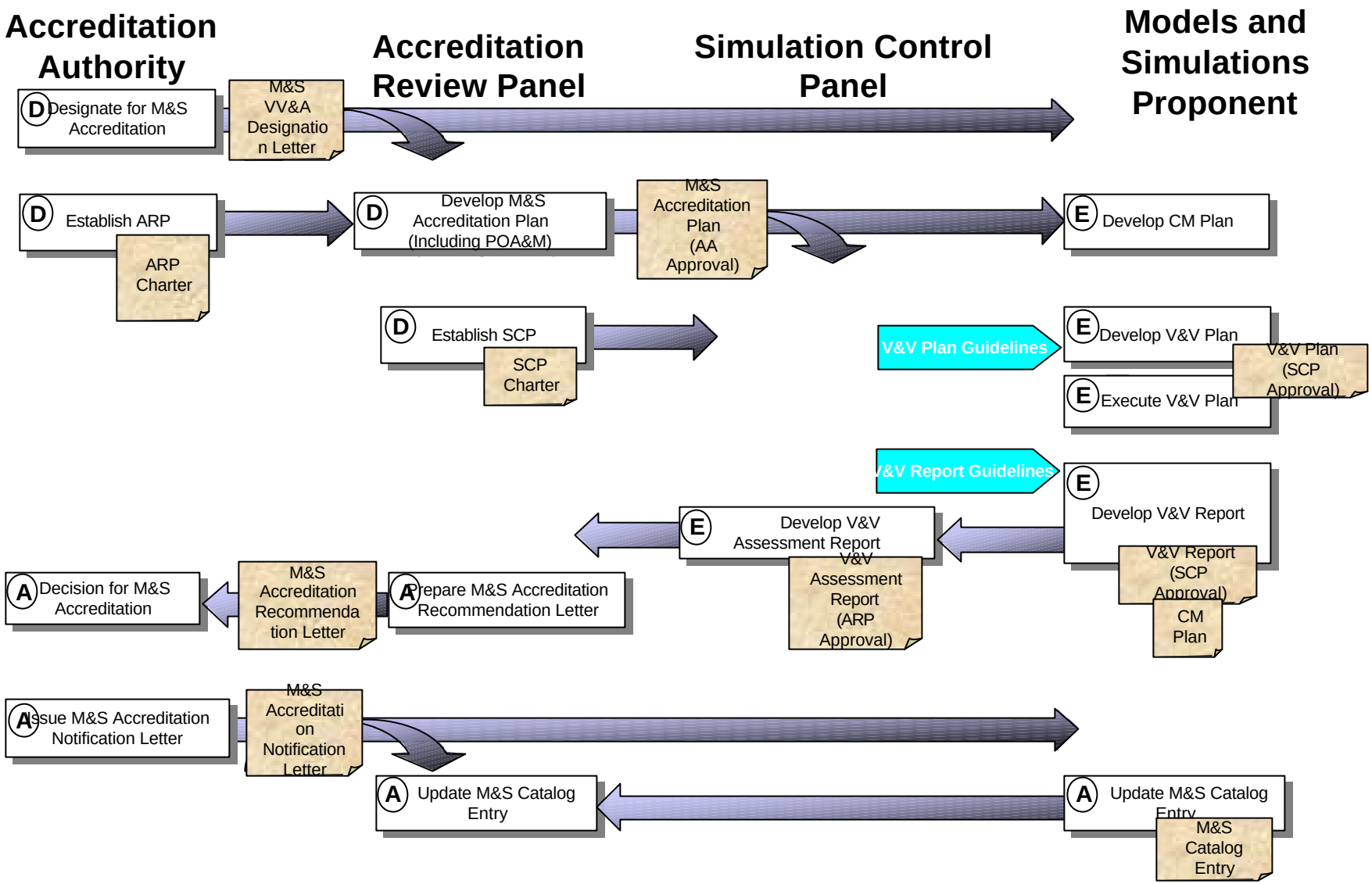
M&S Use Context





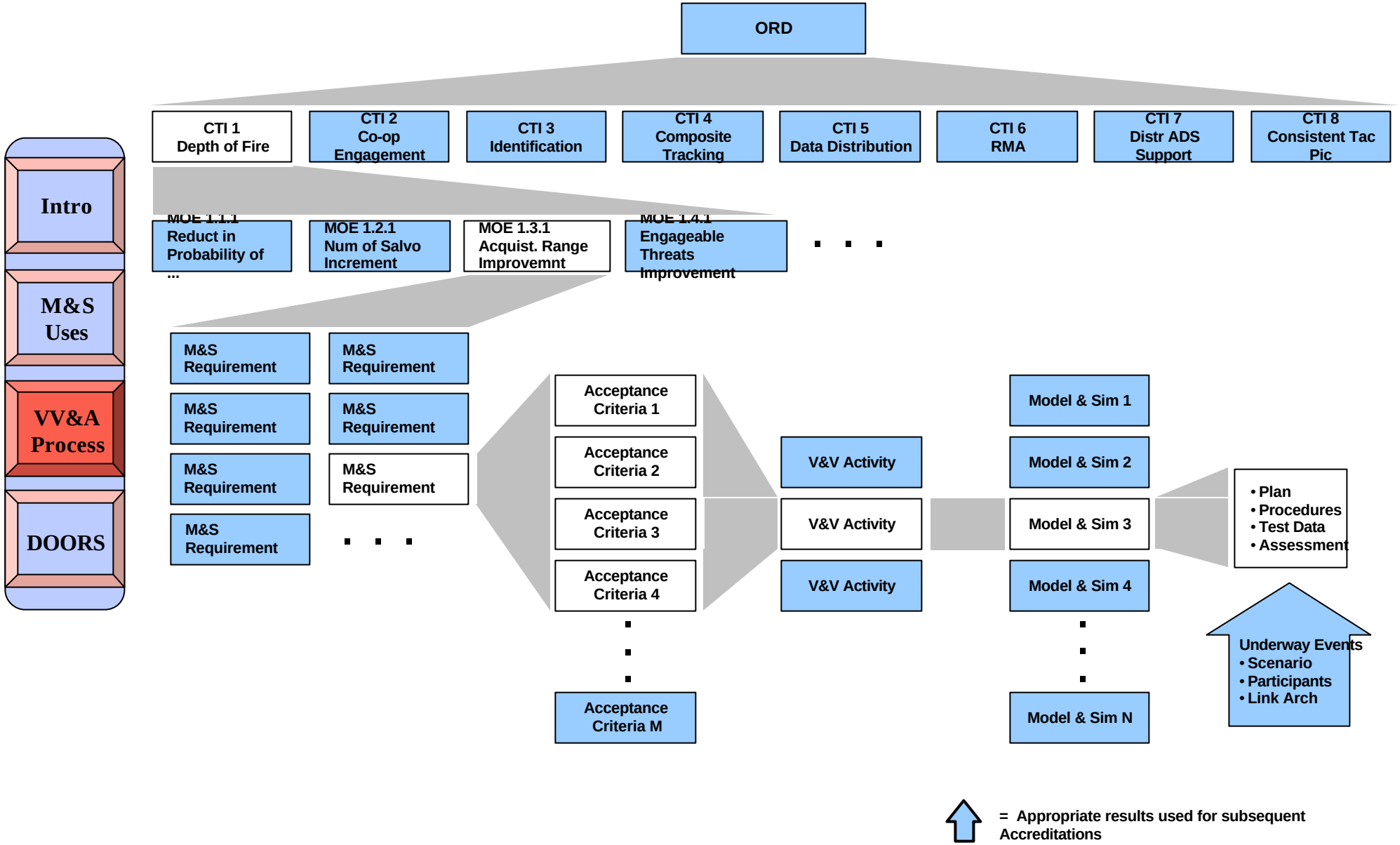
VV&A Process



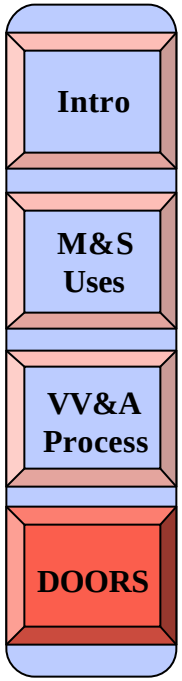


D = Designation Phase E = Execution Phase A = Accreditation Phase

Traceability Structure

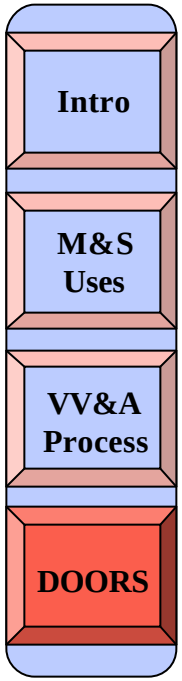


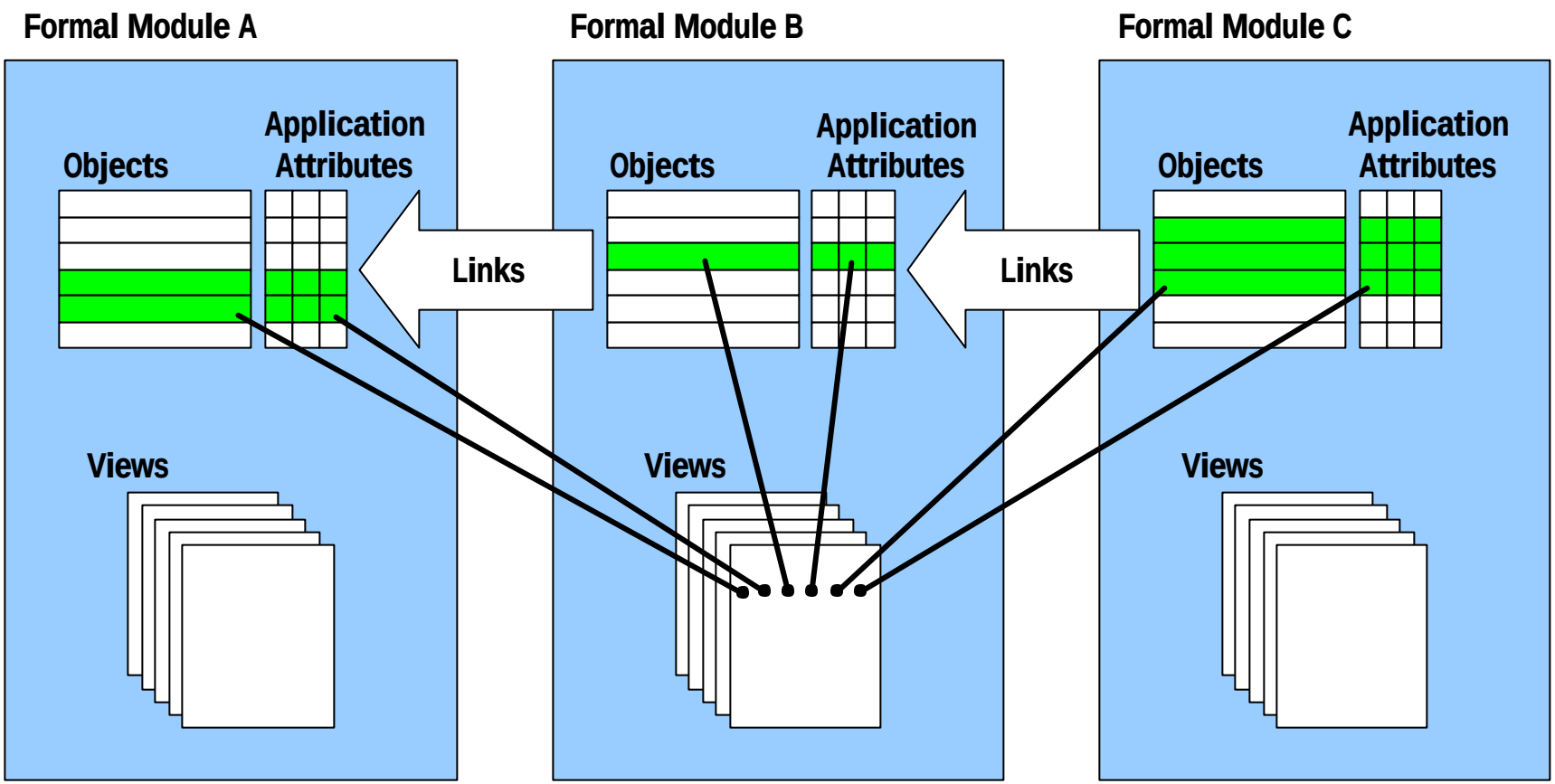
DOORS Requirements Tool



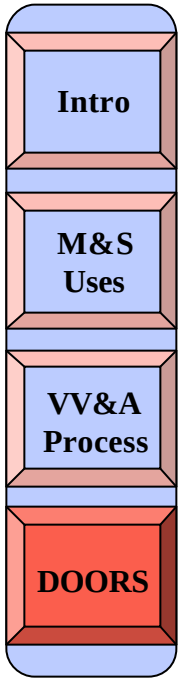
- DOORS - Dynamic Object Oriented Requirements System
- Requirements Management Tool
  - Requirements Definition, Tracking, Maintenance
  - Data View and Report Format Definition
- Enterprise-Wide Support
  - Multi-User Access to Central Database
  - DOORSNet Add-On Provides Web Access for Review, Comment, Reporting

DOORS Trace Features



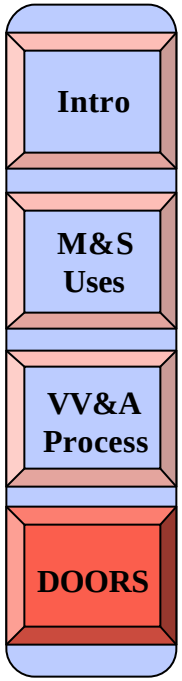


CTI / MOEs Cross Ref



Critical Technical Items	MOEs
Depth of Fire	MOE 1.1.1 Reduction in Probability of Taking a Hit MOP 1.2.1 Number of Salvo Increment MOE 1.3.1 Acquisition Range Improvement MOE 1.3.2 Sensor Acquisition Time Improvement MOE 1.4.1 Engageable Threats Improvement MOE 1.4.2 Time Available to Engage Improvement
Cooperative Engagement	MOE 2.1.1 Retention of AEGIS Engagement Capability MOE 2.1.2 Retention of NSSMS Engagement Capability MOE 2.2.1 Support of Engagements with Remote Data MOE 2.2.2 Support of Simulated Engagements with Remote Data MOE 2.2.3 Overall CEC Engagement Support MOE 2.3.1 Remote Sensor Update Rate (High Data Rate)
Identification	MOE 3.1.1 Network Doctrine Activation MOE 3.1.2 Doctrine Distribution MOE 3.1.3 Probability of Successful ID MOE 3.1.4 Composite ID Recommendation MOE 3.2.1 Probability of IFF Assignment (M1-M4)
Composite Tracking	MOE 4.1.1 Track Data Base Size MOE 4.1.2 Track Measurement Update Rate MOE 4.1.3 Automatic Gridlock MOE 4.1.4 Probability of Maintaining Dual Tracks MOE 4.2.1 Track Life Improvement MOE 4.2.2 Track Maintenance Improvement MOE 4.3.1 Composite Track Maintenance MOE 4.4.1 Target Resolution (NSSMS) Ratio

MOE / M&S Reqs Cross Ref



Number	CTI Measures of Effectiveness and Performance	M&S Requirements
MOE 4.1.1	**Track Data Base Size**	6.2 Position and Velocity 6.1 Threat Modeling 7.5 CEP Maximum Track Capacity 9.1 Phantom CEPs
MOE 4.1.2	**Track Measurement Update Rate**	6.2 Position and Velocity 6.1 Threat Modeling 7.9 CEP Update Message Output 9.1 Phantom CEPs 10.1 Contact Processing Rates
MOE 4.1.3	**Automatic Gridlock**	
MOE 4.1.4	**Probability of Maintaining Dual Tracks**	6.1 Threat Modeling 6.2 Position and Velocity 6.3 RF Signature Data and RCS 9.1 Phantom CEPs
MOE 4.3.1	**Composite Track Maintenance**	6.4 Threat Maneuvering 6.3 RF Signature Data and RCS 6.2 Position and Velocity 6.1 Threat Modeling 7.6 Track Maximum Parameters 7.7 Track Breaks 7.8 Track Maneuver Magnitude 9.1 Phantom CEPs