DIICE

Digital Innovation & Integration Center of Excellence

Mission Summary

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DIGITAL INNOVATION & INTEGRATION CENTER OF EXCELLENCE

FOUR LINES OF EFFORT

LOE's aligned to AFMC's Digital Materiel Management priorities

AFITs LOEs	Structure & Secure Data	Provide Access to DMM Tools	Train Our Digital Workforce	Instill a Digital-First Culture	Develop Digital Strategies	Modernize IT Infrastructure
LOE 1: Educational Excellence	●	●	●	●	●	●
LOE 2: Research and Technology Transfer	●	●	●	●	●	●
LOE 3: Consulting	●	●	●	●	●	●
LOE 4: Best Practices	●	●	●	●	●	●

● = Directly creating and shaping outcomes ● = Influencing outcomes

AFIT Organized – AFMC Funded

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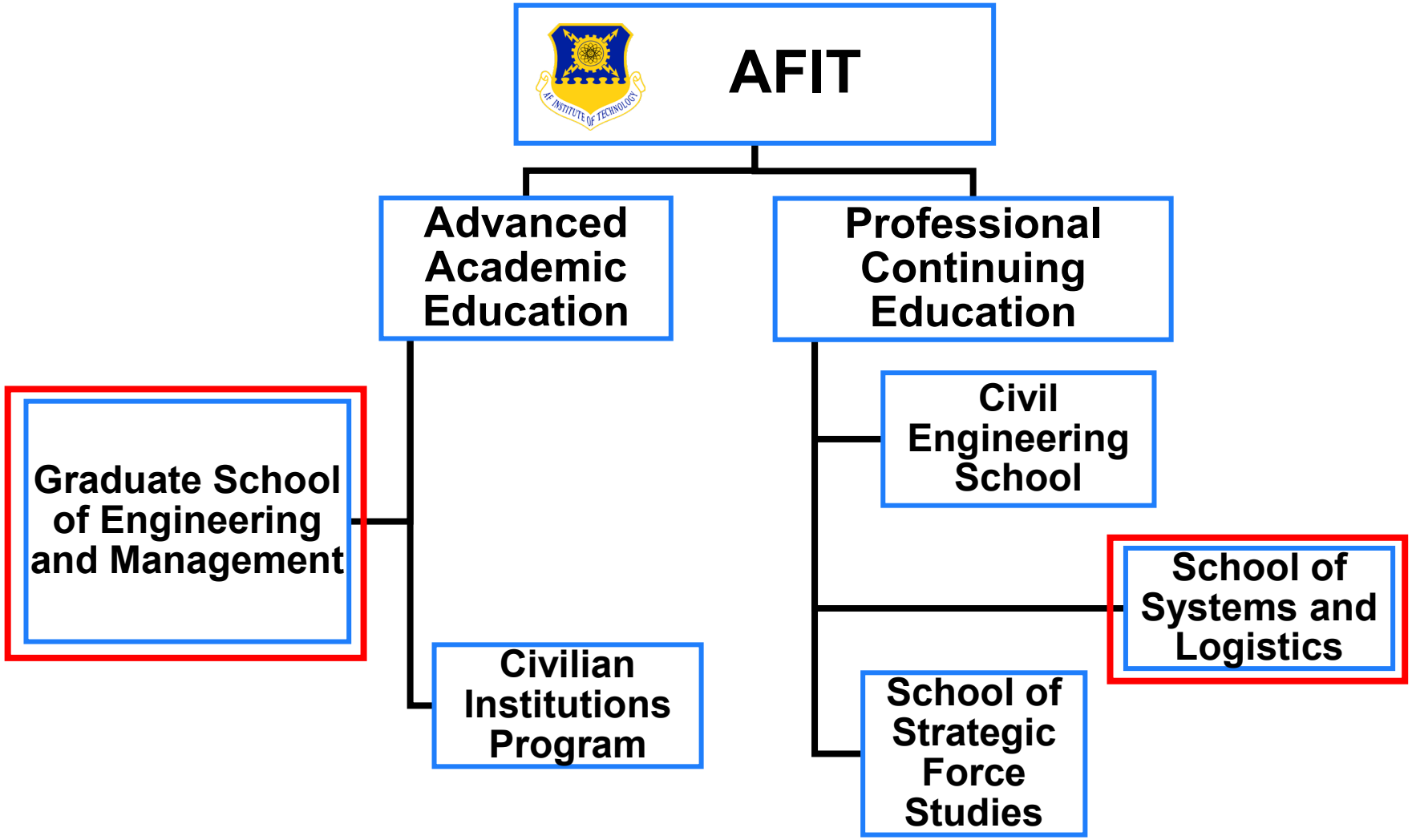

AFIT
Advanced Academic Education
Professional Continuing Education
Graduate School of Engineering and Management
Civilian Institutions Program
Civil Engineering School
School of Systems and Logistics
School of Strategic Force Studies

DIICE Objectives & Business Model

- Support **cross-functional** digital **strategy adoption** through **process digitization** & **education**
- Facilitate **DMM tool adoption** through **process optimization**
- Enable **process automation** through **data structure development & adoption**

(1) Consult on process

- Identify required certification
- Model and create workflow
- Link required artifacts
- Link potential tools
- Establish sustainment costs for process implementation (e.g., tool selection, etc.)

(2) Train in DMM Academy

- Teaching: Implement certification through pedagogical example case
- Practical Application: IPT implementation using program data in classroom

DIICE aims to *demonstrate tactical outcomes of strategic DMM initiatives* positioned for enterprise adoption through process improvements, impacting cross-org education

LOE 1: Education Excellence

WHEN
MQ-9 - Summer '24
KC-46 – Ongoing
F-16 – Late Spring '25

Digital Materiel Management Academy (DMMA)

WHY

- **Digitally Literate Force** - Need for immersive curriculum producing digitally literate multi-functional AFMC graduates
- **Digital Twin Generation** - Integrates education, tool training, & exercises to produce program digital artifacts
- **Digital Thread Generation** - Modeling towards answering program and technical milestone reviews

WHAT

WDMMA 001
Research and Early System Development

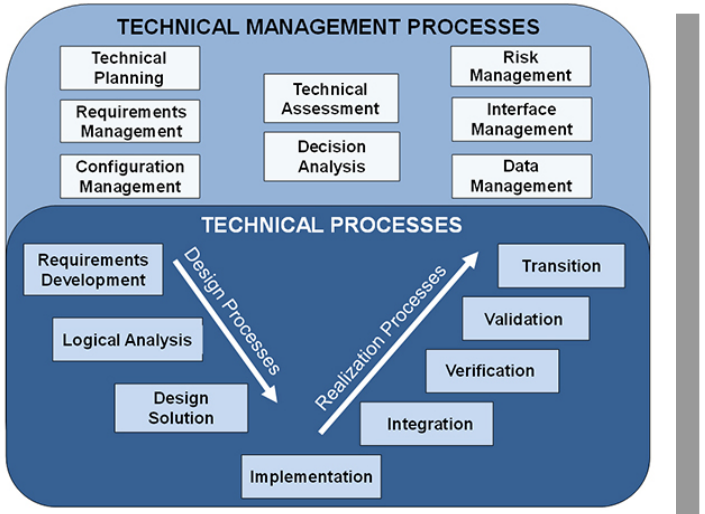
Pre Milestone-A through ~SRR

WDMMA 002
System Acquisition

~SRR through ~CDR/Fielding

WDMMA 003
System Acquisition

Fielding through Service Life

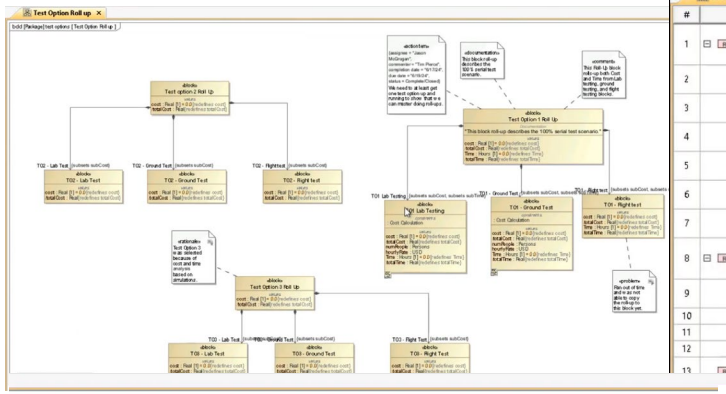


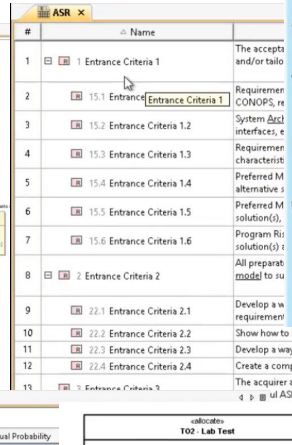
HOW

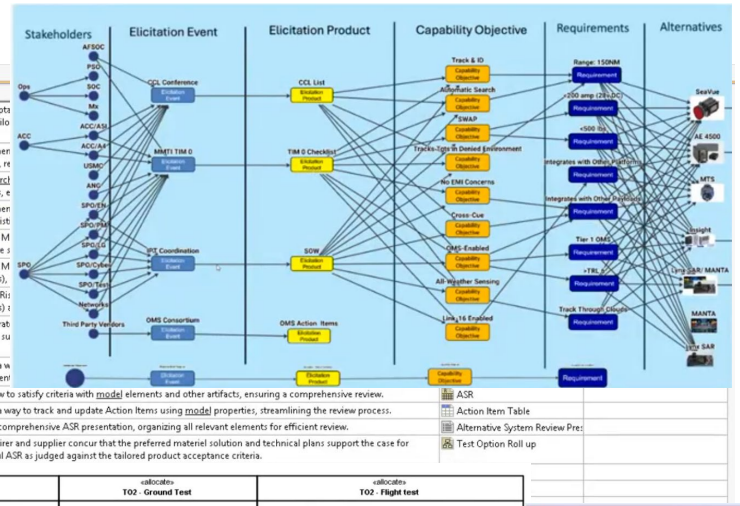
- Delivered in an environment programs have access to – LAUNCHPAD
- Integrated product team focused curriculum, working through tool/data/IDE interoperability
- Asynchronous theoretical content delivery coupled with instructor-led "lab" time working toward program relevant application
- Pre-attendance DIICE consulting aligns data, artifacts, and objectives for participants and aids in expediting learning curve

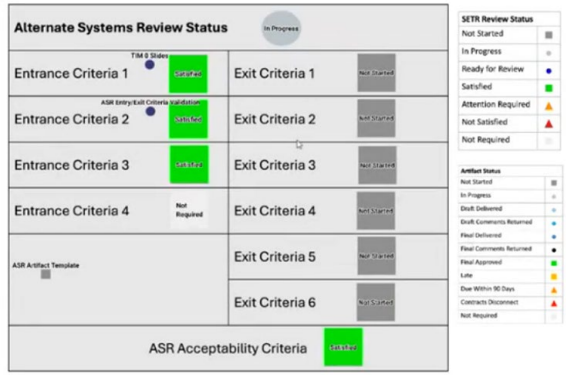
DMMA Alpha Cohort Project Summaries

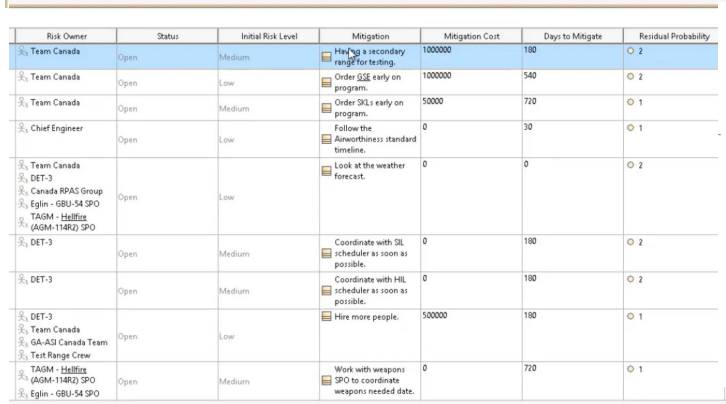
- Cohort divided into 2 Team Projects
  - Project 1: Configuration, Integration, and Interface Requirements
  - Project 2: System Performance Requirement Traceability and Verification

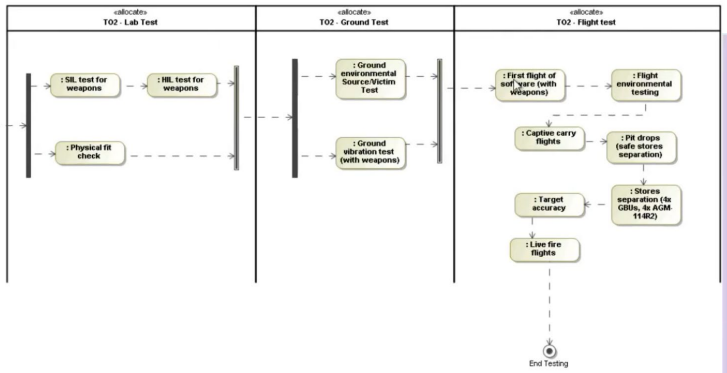


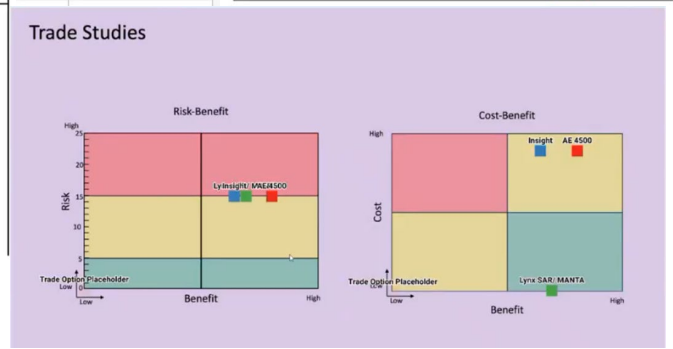








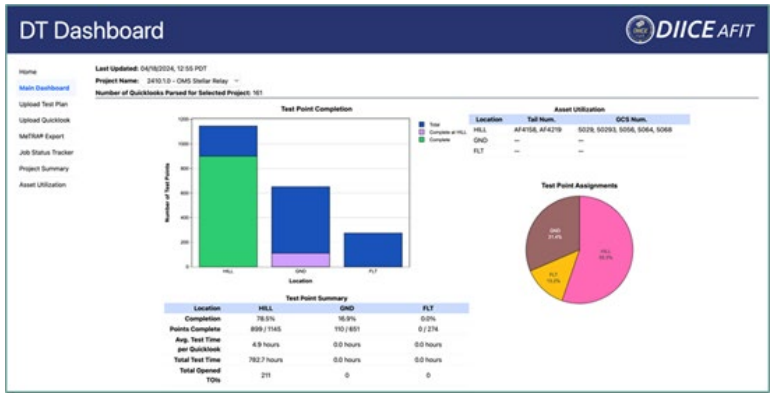




LOE 3: Consulting Highlights

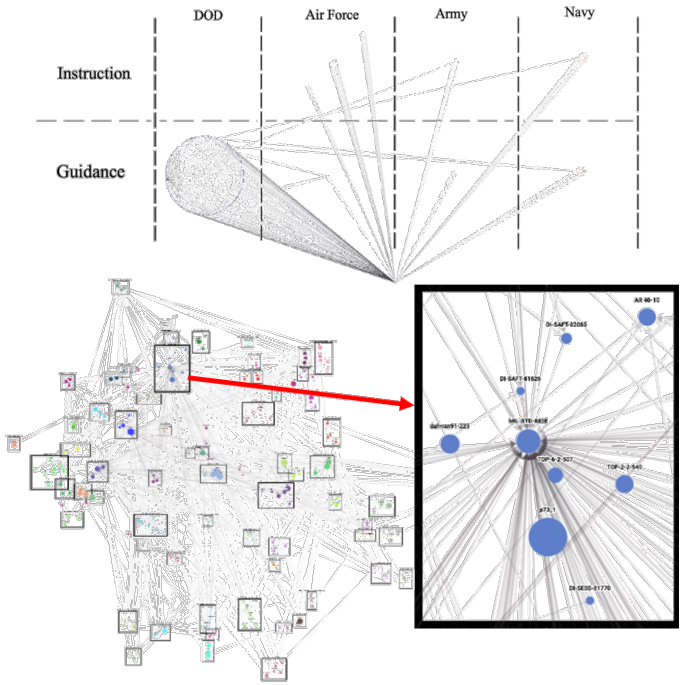
Test Dashboard

- AFLCMC/WII Detachment 3
- Effectively plan, measure, and report critical test objectives supporting execution and strategic planning
- Saved ~150-man hours/test program, ~4 FTEs annually, doubling with similar operational test load



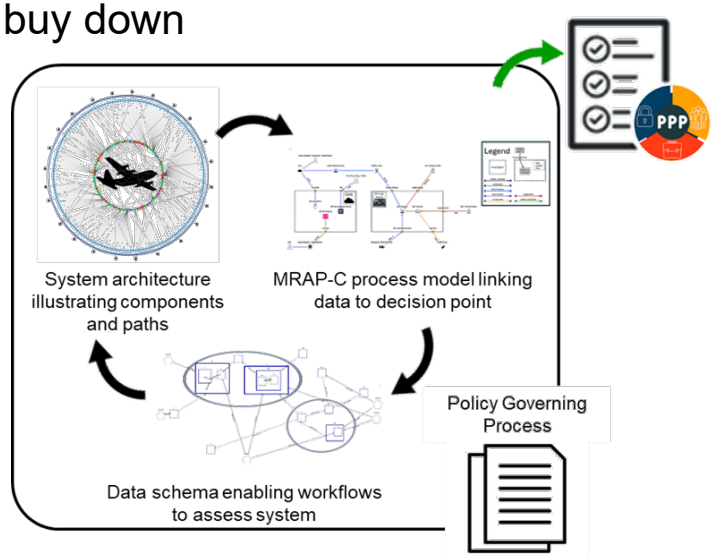
Policy Models

- SAF/AQR
- Map policy, standards, and related documentation to program points of interest
- **Reduced policy mapping from weeks down to hours**



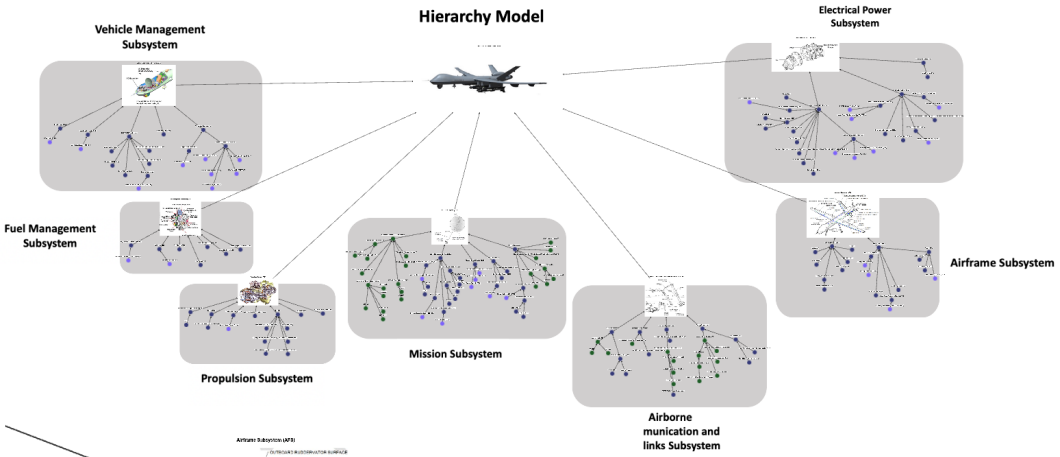
MRAP-C Automation

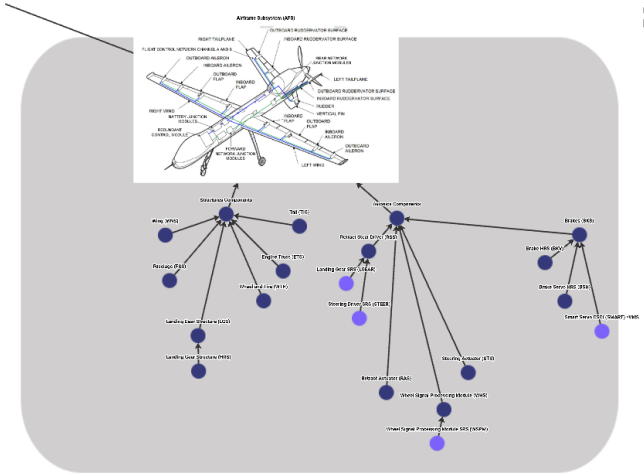
- AFLCMC/WA
- Support development of a data structure capable of linking cyber assessment tools together to perform automated cyber assessment based on system config
- Will enable broader analysis and better prioritization for program risk buy down



LOE 3: Consulting Examples

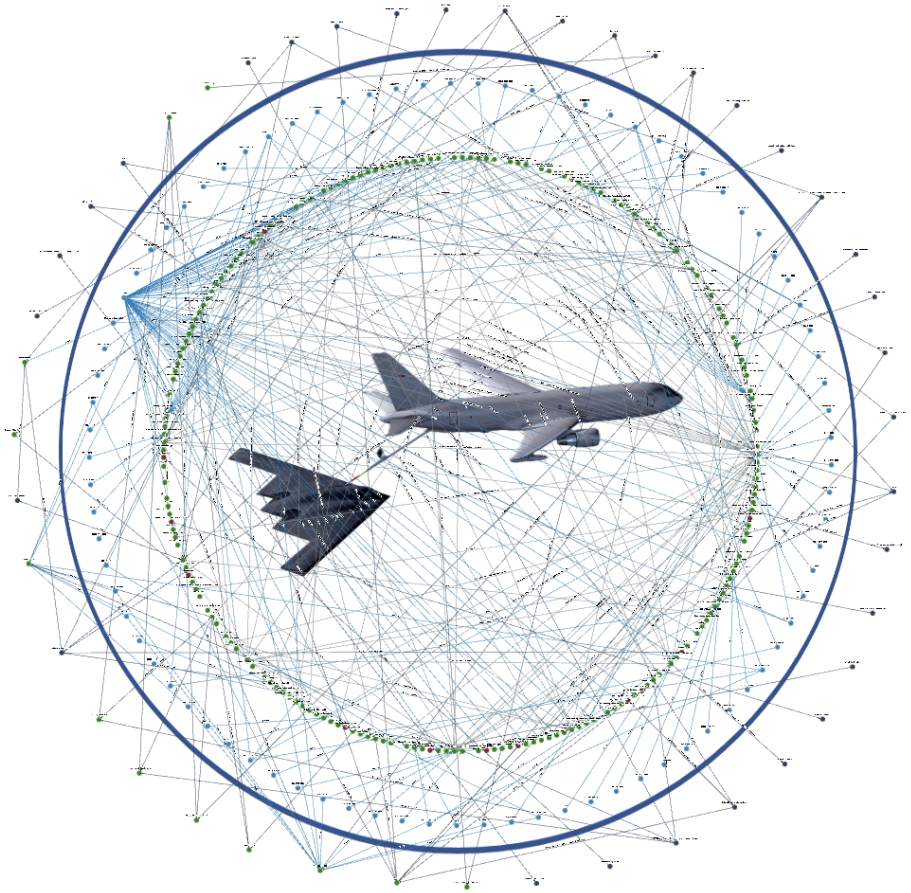
MQ-9





A high-level overview model built from the AAR, showing how components interact within and outside the aircraft.

KC-46



KC-46 model built from the AAR in ~2 weeks for communication and navigation upgrade project

Submit your Research Question!

Take AFIT courses!

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Train your Team in our Academy!

Questions?

Send inquiries to: AFIT.CZ.DIICE@us.af.mil

https://www.afit.edu/DIICE

How the DMMA Works

- All IPT Functions Invited
- Asynchronous Education
- Synchronous Exercises

Instructors will help you build your Gov't Reference Model for your system that your program can use after participating

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Alpha Cohort Lessons Learned

AFLCMC/WII Medium Altitude UAS
- 22 students – 2 PM, 3 LG, 17 EN
- 136 hours of content – 28 hours self study, 108 as IPT in virtual classroom

Culminating Event 1 – FMS Project

Student Feedback

- "…having chance to execute actions to **create a model** was very helpful."
- "…robustly applying complex SysML and **Cameo processes** was new and effective."
- "…rolling up your sleeves and doing it on your project where it **might not be so neat** and fit perfectly, that is where the real learning and problem solving comes."

Instructor Feedback

- Building models **forces engagement** in discussions about **strategies and performance**
- **PM/EN/LG able to work in common environment** contributing individual insights
- Modeling concepts and capability harnessed without expert guidance
- Future cohort delivery should **occur over longer engagement period** providing more opportunity for **self guided exploration**

DIICE Feedback

- Cohort successfully implemented aspects of DMM, *primarily focused on individual program office objectives*
- Month post Alpha Cohort follow up indicated **participants still utilizing tools** and **applying practices within their office**
- Maximizing scalability requires adjustment to consulting practices prior to cohort attendance

First cohort successful, shifted cultural inertia toward digital practices.

BUT…

If consulting efforts focus on workflow digitization & optimization, products from become scalable enterprise wide, maximizing ROI and transferability between acquisition offices.

Sample DMMA Exercise

- **Building a Requirements Management Powerhouse: Integrating Stakeholder Inputs, Change Management, and System Requirements**
- Using concepts learned in Lessons 3 and 4, create a comprehensive model that showcases a robust requirements management process.
  - Develop change management workflows
  - Elicit and model stakeholder inputs using MBSE tools
  - Evaluate and resolve conflicting requirements to ensure system integrity
  - Generate system requirements that meet stakeholder needs
  - Document and execute all activities and workflows to ensure transparency and repeatability
- **By the end of this model build, you will have a functional model that demonstrates your mastery of requirements management, change management, and stakeholder input integration. You will be able to showcase your model as a best practice example of how to effectively manage requirements and drive system development success.**

Some (DMMA) things to know…

- Supportive leadership makes all the difference
- Time to properly consult before DMMA start is crucial to ensure max value for each cohort
- Functionals need to level-set with individual training before DMMA
- There's a balance between IPT class time and time away from class
- Your team will not be experts in MBSE when DMMA is complete
- Bring all your functionals, but they may not need to be there all the time
- We measure success by whether or not the cohort continues to use the tools a month or more after they're DMMA complete

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Do you have a Research Question?

Send to: AFIT.CZ.DIICE@us.af.mil

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STUDENT RESEARCH INITIATIVE FORM

Research options/timelines:

There are 4 different research options and timelines available to meet research needs as outlined below. after reviewing, please answer the questions following on timelines of deliverables.

Option 1: Term paper level of research – Multiple students addressing a question or issue with readily available data over a 3-month-or-less period with instructor guidance

Option 2: Capstone Project – Students on a 12-month AFIT graduation timeline using more readily available data with instructor guidance

Option 3: Thesis Research – Generally more experienced students on an 18-month AFIT graduation timeline that can do more in-depth research with guidance from multiple instructors

Option 4: PhD or ongoing research – Our most experienced students on a 36-month AFIT graduation timeline that can cover multiple related research questions with more in-depth research and guidance from multiple instructors

1. What is the resolution timeline?
2. Are there immediate deliverables?
3. If so, what is the timeline for those deliverables?
4. What is the deadline/milestone for a completed product/deliverable?

Data:

Is there data readily available for the student to start/complete the research?
If so, please provide as much information as possible below:

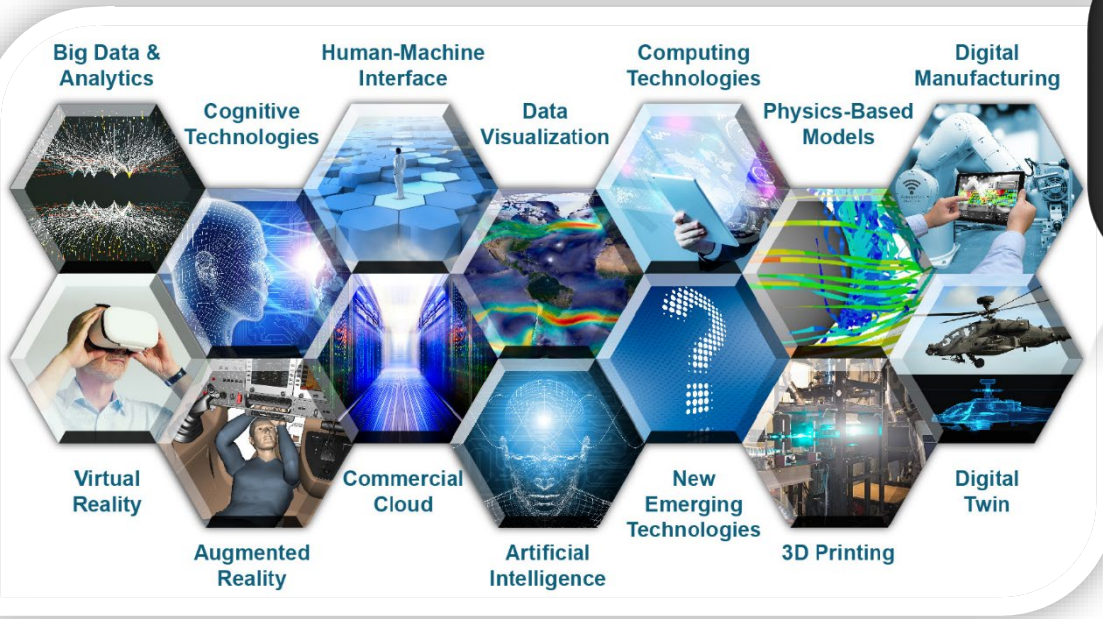
1. What is the format of the data?
2. How many (estimate) observations are included? (e.g., rows of data in a spreadsheet)
3. How many (estimate) variables are included? (e.g., columns in a spreadsheet)

STUDENT RESEARCH INITIATIVE DIICE & AFIT/EN

AFIT LSS: Numerous & Diverse Topics

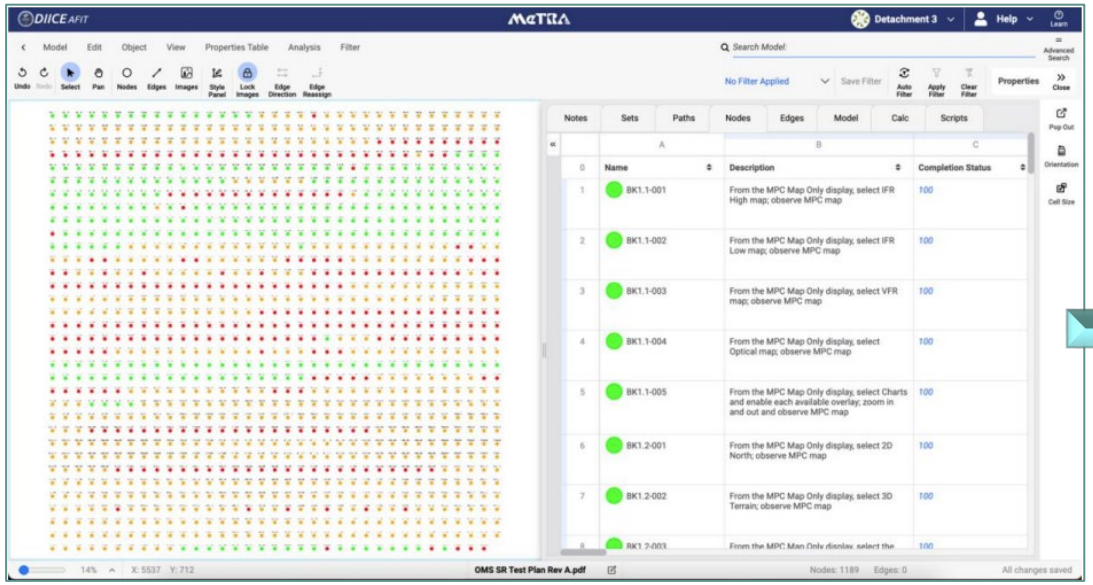
- Systems & Digital Engr, MBSE
- Test & Evaluation
- Reliability and Reliability Growth
- Science of Test, Design of Exprmt
- Software Development & Mgmt
- Architectures

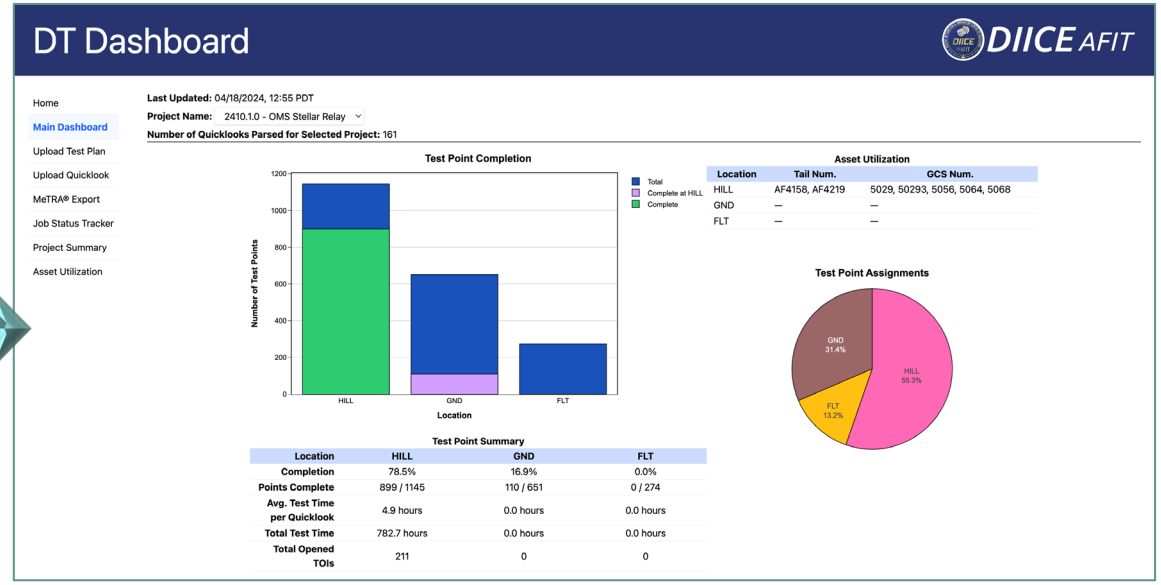
- Intelligence Analysis & Acquisit'n
- Risk Management
- Manufacturing Assessment
- Human Systems Integration
- Airworthiness Certification
- Cybersecurity



Det 3 Development & Test Reporting Process

- Automated document ingestion, providing engineers a way to view status & metrics – **Supports Digital Thread Generation**
- Adopted data structure improves searchability & linkages, drives dashboard visualizations – **Supports Digital Thread Generation**
- Dynamic dashboard update based on uploaded structure data improves prioritization – **Supports Improved Decision Making**





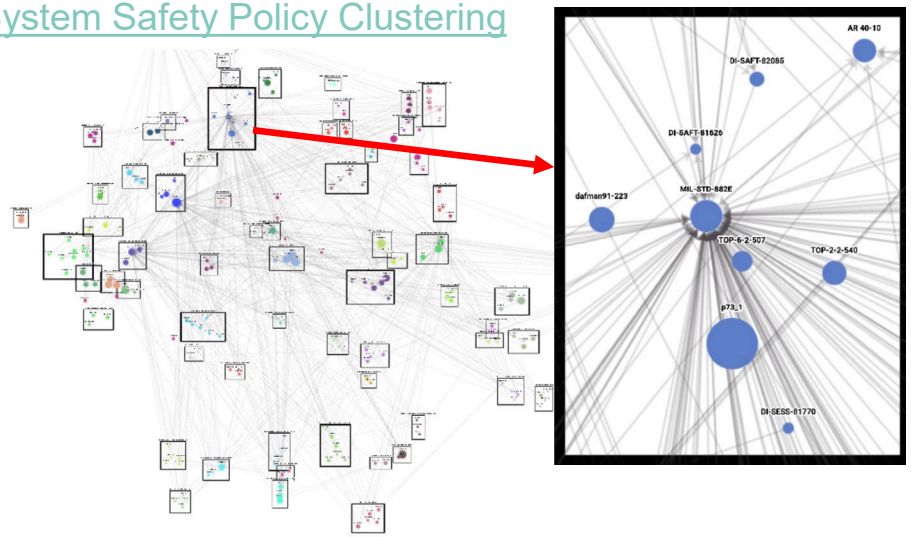
- Impact: Det 3 implementation saved approximately 150-man hours/test program, totally 4,350 hours across 29 development test programs – **Yields 4 FTEs saved annually, doubling with similar operational test load**
- Scale: If implemented across 12 detachments, potential savings reach >48 FTE annually
- Status: Deployed & in use at Det 3, demonstrated at the AFTC DMM Summit last month yielding high interest & engagement w/
  - 96th OG Wing, 47th CTS, 46th TS, 771 TS – actively work transition path with each group

Policy Standardization – Use Cases

Policy Author – Joint Force Alignment

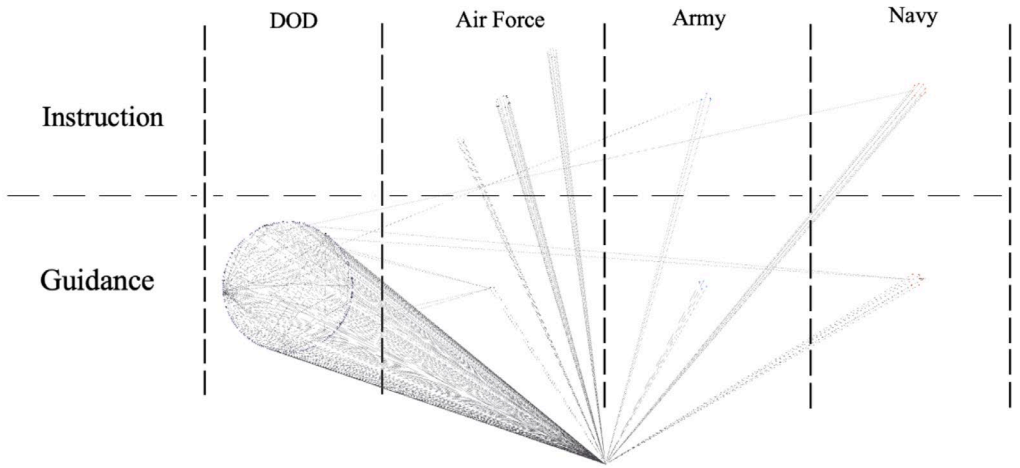
- Consistent language supports unified certification strategies
- Crowd source feedback mechanism

System Safety Policy Clustering



Autogenerated clustering of topics across Joint Force policy

MIL-STD-882 Swim Lanes



References of MIL-STD-882 by all documents in ASSIST, EPUBS, Army Pubs, & SECNAV Pubs viewed by Force categorization

ML agents applied to knowledge graphs enhance author capability to align Joint Force/Cross Service policy language/intent.

Business Model Example: MRAP-C

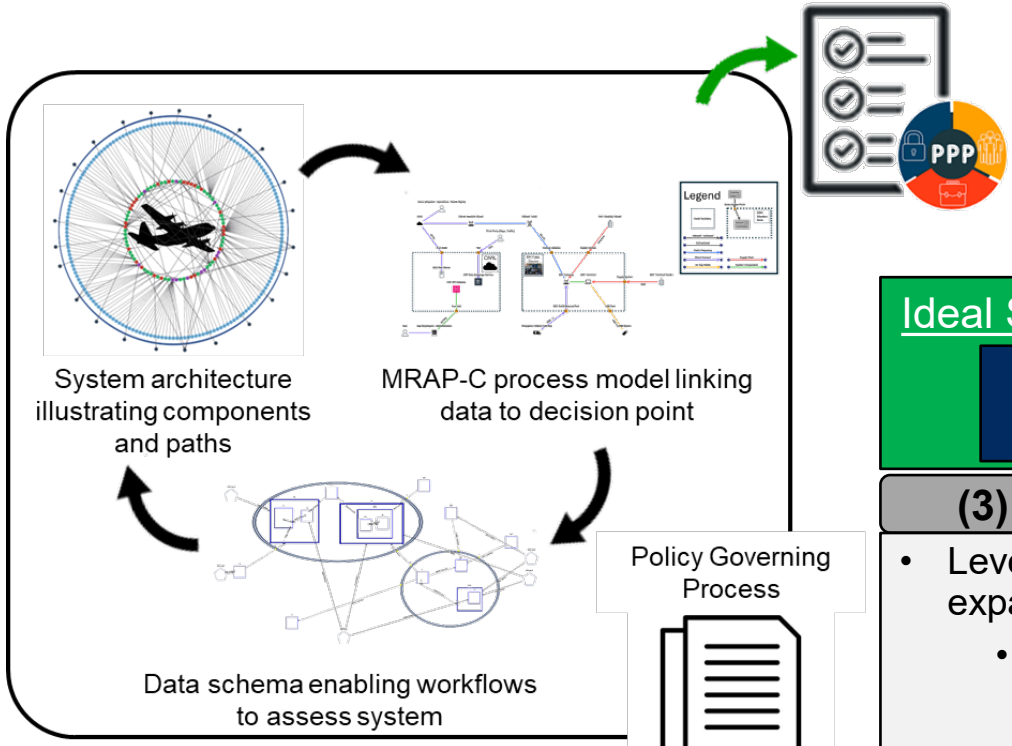
(1) Consult on process

- Identify required certification
- Model and create workflow
- Link required artifacts
- Link potential tools
- Establish sustainment costs for process implementation (e.g., tool selection, etc.)

(2) Train in DMM Academy

- Teaching: Implement certification through pedagogical example case
- Practical Application: IPT implementation using program data in classroom

Extended DIICE Impact – Don't stop with just the process…



Ideal State: Unified Certification

Application of high interest to SAF/AQR

(3) Scope Future Efforts

- Leverage consulting efforts to expand process impacts
  - e.g., combine data structures, system models, and process models to accelerate Program Protection Plan generation

Leads to generating additional workflows

DIICE Business Model

Product:
Process digitization & workflow optimization

Value Proposition:
Our workflow digitization & optimization solutions empower streamlined, efficient, and automated acquisition processes.

Customers:
Core: AFMC
Synergistic: OSD, Joint Force,…

Key Benefits:
- Increase accuracy
- Enhanced efficiency
- Cost Savings
- Scalability
- Improved decision making
- Enhanced collaboration

Deliver models to office, implement strategy through the Digital Materiel Management Academy

LOE 3: Consulting Highlights & Lessons Learned

Customer	Project	Impact	Lesson Learned
• AFLCMC/WI Det 3	• Test Dashboard	• Saved ~150-man hours/test program, totally 4,350 hours across 29 development test programs – **Yields 4 FTEs saved annually, doubling with similar operational test load**	• Identify sustainment path ahead of development • Identify additional adopters during development
• SAF/AQRE	• Policy Standardization & Unified Certification	• Established policy trace capability, reducing policy author efforts from **weeks to hours**	• Automated compliance likely not achievable • Mapping policy to product/process provides author ability to construct precise language resulting in most intentional change
• AFLCMC/WA	• Cyber Data Schema	• Illuminate siloed data structure for adoption across AFLCMC, AFIT, and OSD • Enabled automated workflow in support of rapid CCA deliverable assessment **(potential to reduce from weeks to days)**	• Data structure significantly impacts process automation opportunities • An open, accessible data structure requires maintenance, facilitation, and refinement for broadest impact • Mandating compatibility does not require structure adoption • Places translation requirement on vendor averting government requirement generation & cost increase
• AFLCMC	• Air Vehicle GRA	• Create first of its kind air vehicle functional reference architecture • **Transition to AFLMC for adoption**	• Some efforts span silos, promoting digital strategy adoption, shifting cultural inertia