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RESPONSIBLE AI AS A MODERNIZATION ACCELERATOR

Beyond Automation: Responsible AI Strategies for AF Legacy System Modernization

PRESENTING ORGANIZATION

ITC FEDERAL, LLC

Enterprise Technology Consulting · DevSecOps & Cloud Migration · AI-Enabled Federal Modernization

FORMAT: 45 Minute Presentation + Q&A | **AUDIENCE:** PMs, Architects, CIOs, DevSecOps | **CLEARANCE:** Unclassified/FOUO

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SPEAKER PROFILE



SIVA SIVARAJ, ITC VP OF TECHNOLOGY & INNOVATION

- Leads the design and delivery of innovative, mission-focused solutions that drive cloud modernization, digital transformation, and enterprise architecture initiatives across ITC's federal customer portfolio.
- 20 years of experience leading large-scale transformation programs, aligning technology strategies to customer missions for agencies and Fortune 500 companies.

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AGENDA

DAFITC 2026

AIR FORCE IT & CYBERPOWER CONFERENCE

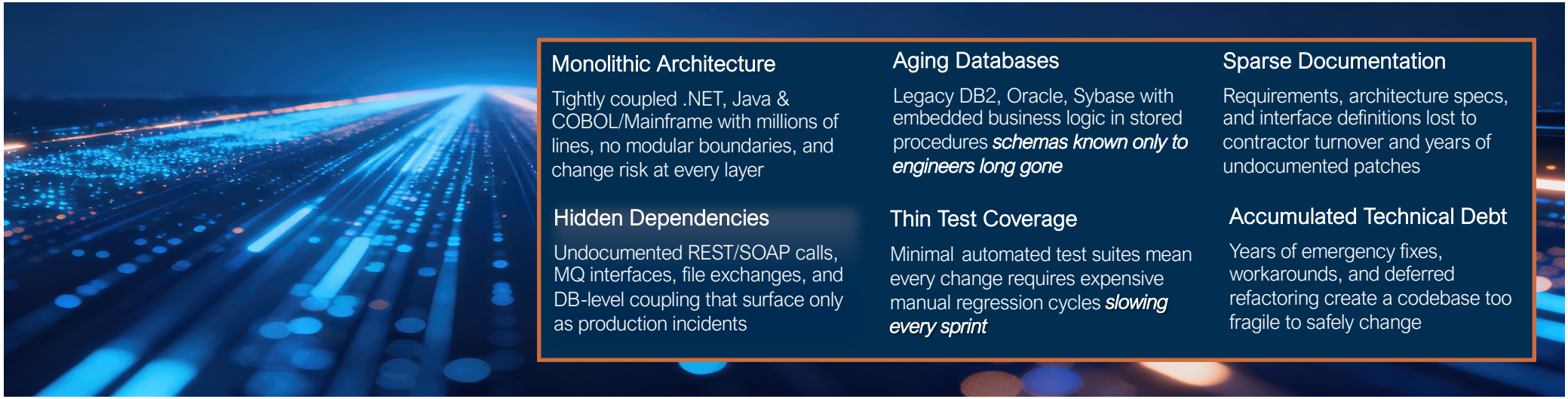
TRANSFORMING LEGACY AIR FORCE SYSTEMS FOR MISSION READINESS



THE LEGACY MODERNIZATION CHALLENGE	AI-DRIVEN CODE DISCOVERY & DEPENDENCY MAPPING	AI-ASSISTED REFACTORING & TECHNICAL DEBT ANALYSIS	TEST GENERATION, CONTAINERIZATION & CLOUD MIGRATION	RESPONSIBLE AI GOVERNANCE MODEL	ITC FEDERAL CAPABILITIES	PATH FORWARD
Understanding the BES portfolio problem - monoliths, missing docs, hidden dependencies, and accumulated tech debt	How AI ingests .NET, Java, and Mainframe sources to build call graphs, surface undocumented interfaces, and reconstruct architecture	Decomposing monoliths into microservices, scoring debt by mission impact, and generating requirements from code	AI-synthesized test suites, Dockerfile/IaC generation, and DevSecOps pipeline acceleration across IL2-IL5	Human-in-the-loop authority, DoD AI Ethics alignment, audit traceability, and TEVV/ATO support	ITC capabilities to include AI and automation, DevSecOps and Cloud, and AI Commitment	Responsible AI propels team forward to meet Air Force goals

THE CHALLENGE

COMMON TRAITS OF LEGACY BES APPLICATIONS



Monolithic Architecture

Tightly coupled .NET, Java & COBOL/Mainframe with millions of lines, no modular boundaries, and change risk at every layer

Aging Databases

Legacy DB2, Oracle, Sybase with embedded business logic in stored procedures ***schemas known only to engineers long gone***

Sparse Documentation

Requirements, architecture specs, and interface definitions lost to contractor turnover and years of undocumented patches

Hidden Dependencies

Undocumented REST/SOAP calls, MQ interfaces, file exchanges, and DB-level coupling that surface only as production incidents

Thin Test Coverage

Minimal automated test suites mean every change requires expensive manual regression cycles ***slowing every sprint***

Accumulated Technical Debt

Years of emergency fixes, workarounds, and deferred refactoring create a codebase too fragile to safely change

80%
of the DoD IT budget is spent sustaining legacy systems

60%+
of BES codebase is undocumented or orphaned

3-5x
higher change failure rate vs. modern apps

12+ years
the average age of AF BES applications

Sources: GAO-25-107795 (Feb 2025), federal IT O&M share; other figures are ITC Federal estimates.

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THE AI MODERNIZATION FRAMEWORK

SIX AI CAPABILITY AREAS ACROSS THE MODERNIZATION LIFECYCLE



1) Code Discovery & Dependency Mapping

AI builds complete call graphs, module inventories, and dependency matrices from .NET, Java, and Mainframe source in hours, not months.

2) Requirements Reconstruction

LLMs extract implicit business rules from variable names, comments, and logic flows which regenerates lost functional specs from code.

3) Technical Debt Identification

AI scores security vulnerabilities (CVSS), complexity, deprecated API usage, and duplicate code producing a PM-consumable risk roadmap.

4) AI-Assisted Refactoring

Domain clustering and LLMs propose microservice boundaries, generate service stubs, and guide Strangler Fig migration sequencing.

5) Test Case Generation

AI synthesizes unit, integration, and regression suites from code paths and production traces, which dramatically increases coverage.

6) Containerization & Cloud Acceleration

AI generates Dockerfiles, Helm charts, Terraform, and CI/CD pipelines, compressing IL2–IL5 cloud onboarding by 40–60%.

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AUTOMATED CODE DISCOVERY & DEPENDENCY MAPPING

(From Months to Hours)

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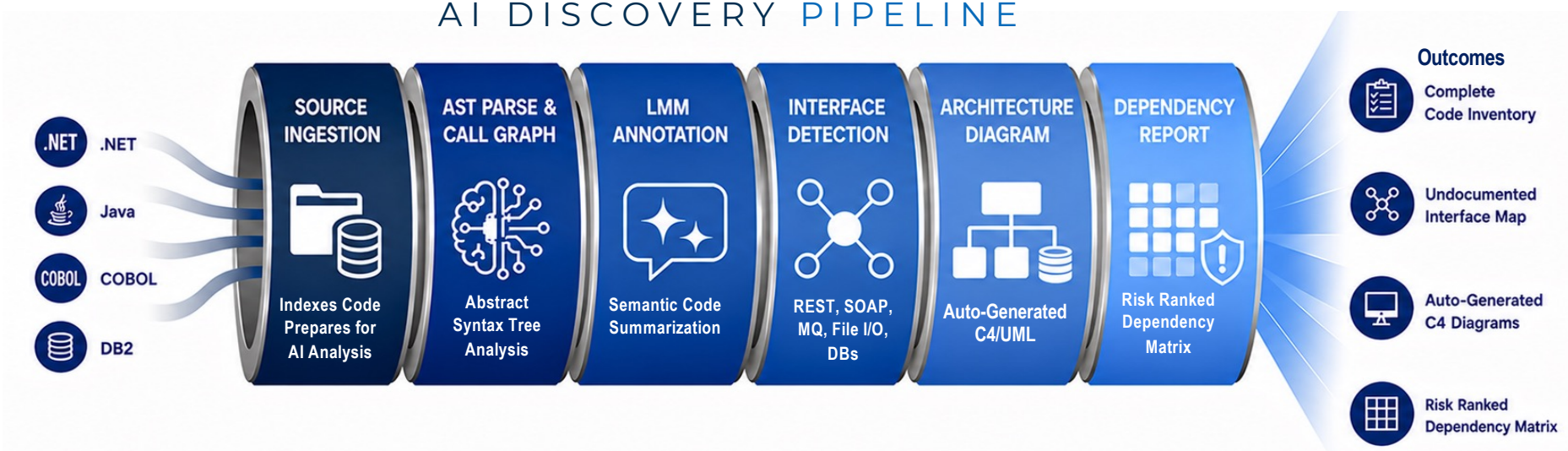
AI DISCOVERY PIPELINE



Key Outputs for the BES Programs

Complete Code Inventory
Every class, function, module, and stored procedure cataloged with AI plain-language summaries, navigable by any team member.

Undocumented Interface Map
AI surfaces REST/SOAP calls, MQ patterns, file exchanges, and DB integrations that exist nowhere in documentation.

Auto-Generated C4 Diagrams
Architecture diagrams produced directly from code validating or replacing missing artifacts without reverse-engineering workshops.

Risk-Ranked Dependency Matrix
Downstream impact analysis for every proposed change preventing unplanned outages during migration sprints.

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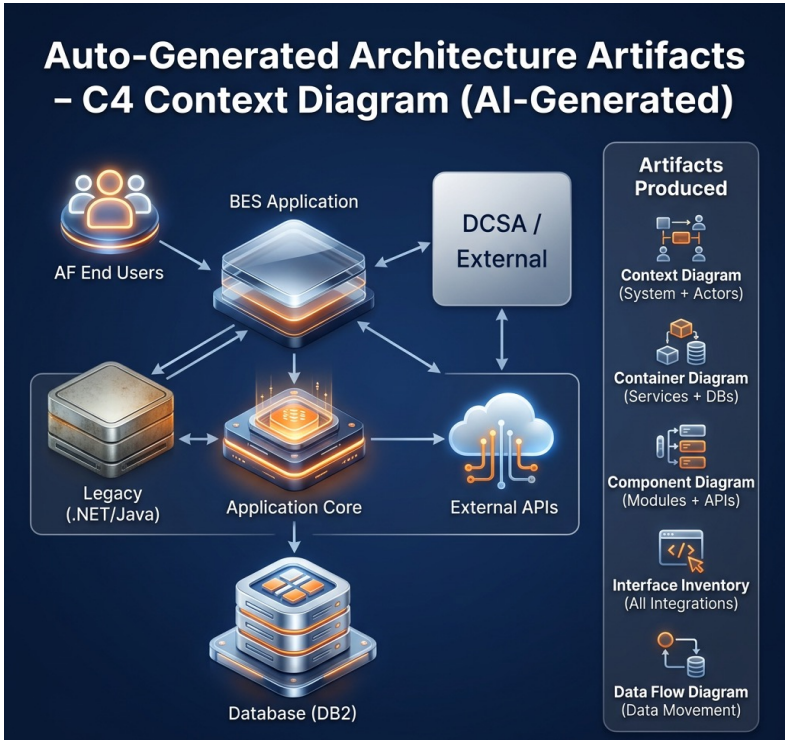
HOW AI RECONSTRUCTS REQUIREMENTS

- **Variable & Function Naming Analysis:** LLMs infer domain concepts and business intent from identifier names, even in terse legacy code styles.
- **Conditional Logic Extraction:** Complex if/else trees and switch statements are parsed into plain-English business rules and decision tables.
- **Comment & Annotation Mining:** Inline comments, JavaDoc, XML doc, and COBOL remarks are extracted and contextualized into requirements language.
- **Database Schema Reverse Engineering:** Table structures, column names, constraints, and stored procedure logic are translated into data requirements.
- **Test Case Mining:** Existing unit tests, where present, are analyzed to infer expected behaviors and acceptance criteria.



⚠ **THE PROBLEM -** In most legacy BES programs, the original requirements documents (if they existed) have not kept pace with years of patches and workarounds. The code IS the specification. AI reads it to create the artifacts.

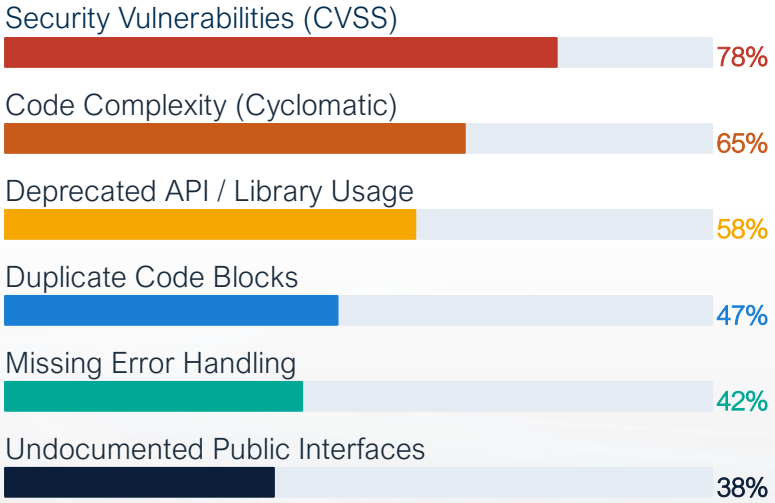
TECHNICAL DEBT IDENTIFICATION VIA AI CODE ANALYSIS

Risk-Ranked Evidence

"AI prioritizes remediation using CVSS scores, mission criticality, and effort-to-fix ratios. This analysis converts subjective estimates into an objective, scored roadmap that gives program managers a defensible sequence of actions based on mission impact rather than technical preference."

AI-SCORED DEBT CATEGORIES

Scored across .NET, Java & Mainframe codebases



WHAT THE AI DELIVERS TO PMs

Risk-Ranked Remediation Backlog

Every debt item is scored by severity × mission impact × effort-to-fix, enabling sprint planning.

Security Vulnerability Report

CVE-mapped findings with CVSS scores, affected components, and recommended remediation, which is ATO-ready evidence.

Modernization Sequencing Guide

AI recommends the order to address debt: lowest-risk, highest-mission-value changes first, with dependency awareness.

Trend & Progress Dashboard

Debt score tracked over sprint cycles, giving leadership objective evidence of modernization progress over time.

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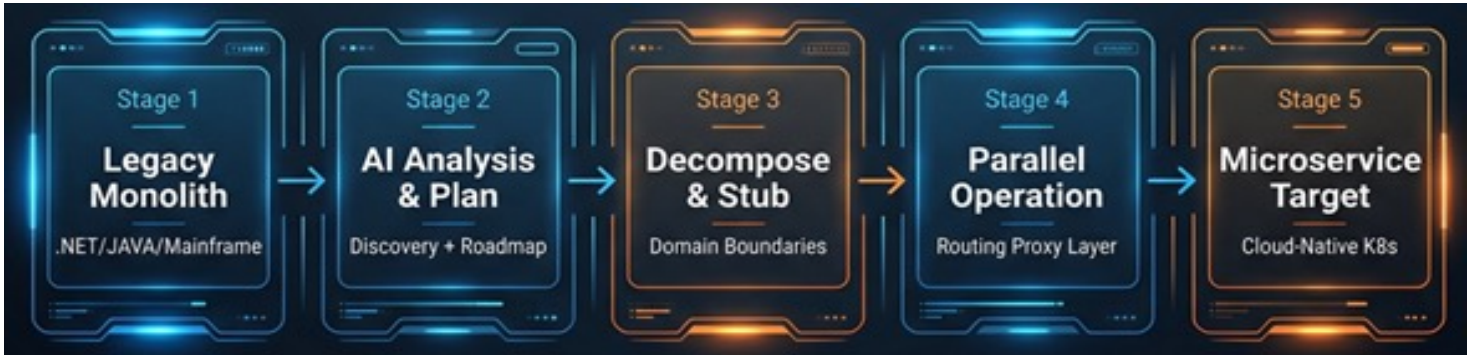
AI-ASSISTED REFACTORING: MONOLITH TO MICROSERVICES

THE STRANGLER FIG PATTERN - AI-GUIDED



AI Decomposition Analysis

- LLM + clustering identifies cohesive domain boundaries within the monolith
- Proposes bounded contexts aligned to AF business capabilities
- Generates dependency heatmap showing coupling between candidate services
- Outputs microservice decomposition proposal for architect review

AI Microservice Generation

- Scaffolds Spring Boot /.NET Minimal API service skeletons
- Infers API contracts and generates OpenAPI/Swagger specifications
- Creates data contract definitions from existing database schemas
- Produces Strangler Fig routing layer configuration

Human Review & Validation

- Architect reviews and approves every AI-proposed boundary
- Mission Experts validate operational impact and workflow continuity
- Security team reviews data contracts for classification handling
- PM approves sequencing and sprint planning before cut-over

"Every AI recommendation is a proposal, architects and mission experts approve, validate, and retain full authority over what gets built.

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TEST GENERATION, CONTAINERIZATION & CLOUD MIGRATION

AI TEST CASE GENERATION & COVERAGE ACCELERATION

Unit Test Synthesis:
AI generates unit tests from function signatures, logic branches, and boundary conditions.

Integration Test Packs:
End-to-end test scenarios are synthesized from actual production execution traces, reflecting real Air Force user workflows.

Coverage Enforcement:
Coverage targets are embedded in pipeline gates, and automated enforcement prevents regression as modernization proceeds.

Regression Suite Build:
AI assembles regression packs from existing sparse tests and synthesized cases, enabling CI/CD gate enforcement.

CONTAINERIZATION & CLOUD MIGRATION ACCELERATION

AI-Generated Dockerfiles & Helm Charts
AI analyzes runtime dependencies and generates production-ready container definitions, eliminating weeks of hand-crafted infrastructure work.

Terraform / IaC Scaffolding
Infrastructure-as-Code modules generated from application architecture analysis, deployable to IL2, IL4, and IL5 DoD cloud environments.

CI/CD Pipeline Generation
GitHub Actions / Azure DevOps pipelines with SAST/DAST scanning, container image signing, and automated rollback logic built in from day one.

DoD Compliance Gap Analysis
AI maps application behavior against CC SRG and NIST 800-53 controls, flagging gaps and generating POA&M inputs before ATO submission.

Migration Timeline Compression
AI acceleration compresses cloud onboarding timelines in IL2–IL5 environments by an estimated 40–60%, measured against a manual baseline.

Rollback & Risk Decision Support
Live traffic analysis during Strangler Fig cut-over provides AI-assisted rollback decision support, reducing unplanned outage risk.

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RESPONSIBLE AI: HUMAN AUTHORITY AT EVERY STEP



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RESPONSIBLE AI: HUMAN AUTHORITY AT EVERY STEP

A governed workflow that combines AI recommendations with human expertise, validation, and auditable compliance.



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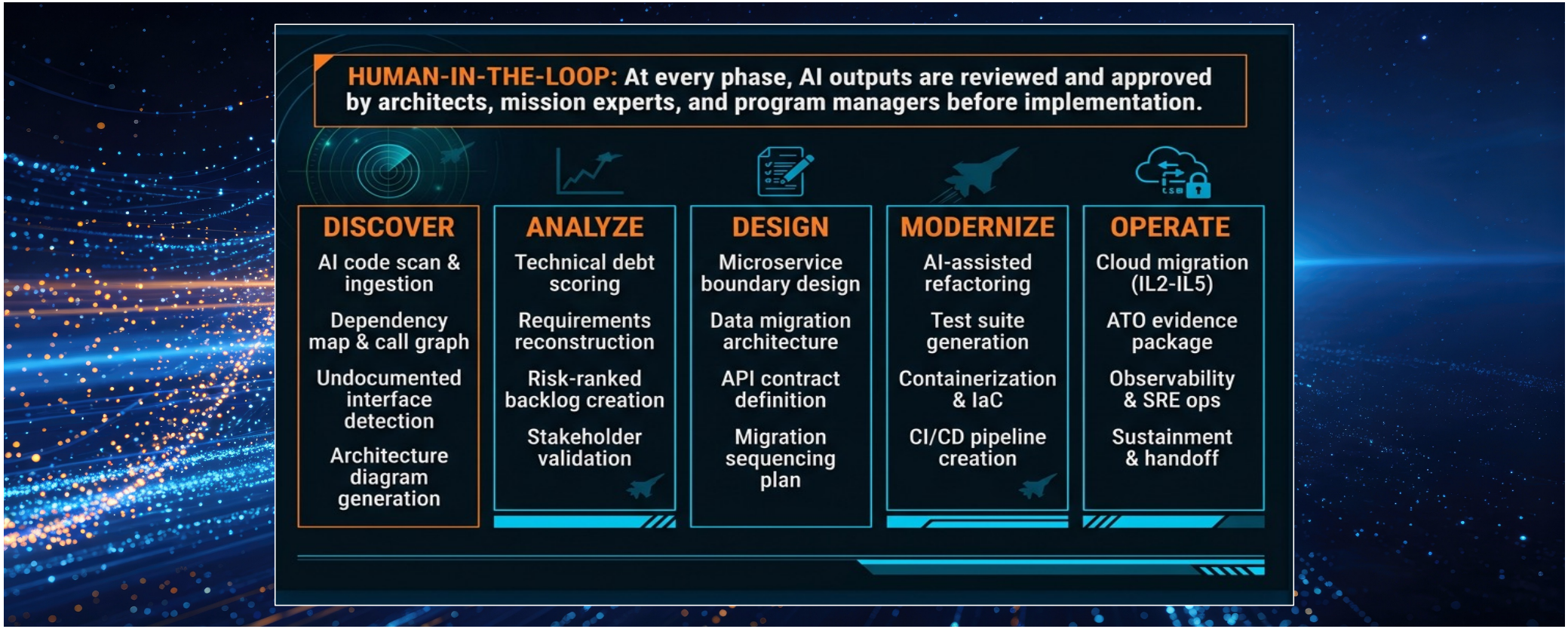
ITC FEDERAL: AI-ACCELERATED MODERNIZATION APPROACH



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DAFITC 2026 THEME ALIGNMENT

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ACCELERATING MISSION READINESS THROUGH TECHNOLOGY

AI compresses legacy modernization analysis from 6-12 months to hours, directly accelerating the program delivery schedules that determine mission readiness. Programs that couldn't justify modernization can now start.

MODERNIZING THE AIR FORCE ENTERPRISE

The framework presented is generic and replicable across the entire BES portfolio, applicable to any .NET, Java, or Mainframe application regardless of program office or command. This is enterprise-scale change, not one-off modernization.

RESPONSIBLE AI INTEGRATION IN GOVERNMENT IT

Every AI capability demonstrated operates under a DoD AI Ethics-aligned governance model that ensures human authority, explainability, and audit traceability, demonstrating how Responsible AI translates from policy into engineering practice.

DEVSECOPS AND CLOUD ADOPTION AT SCALE

AI-generated IaC, Dockerfiles, CI/CD pipelines with SAST/DAST gates, and DoD compliance gap analysis operationalize DevSecOps for programs that have never had automated delivery, removing the toolchain barrier to cloud adoption.

WORKFORCE UPSKILLING FOR AI-AUGMENTED DEVELOPMENT

Attendees leave with practical AI tool literacy, specific techniques, toolchain guidance, and governance patterns applicable immediately to their programs. This is hands-on learning, not conceptual AI awareness training.

This session was designed specifically to address the DAFITC 2026 priority themes; each topic covered maps directly to a conference objective.

SESSION LEARNING OBJECTIVES



01

IDENTIFY

AI-appropriate modernization touchpoints within legacy .NET, Java, and Mainframe BES application portfolios and articulate the business case to program leadership

PROGRAM MANAGERS AND PROGRAM EXECUTIVES

02

APPLY

AI-driven code discovery and dependency mapping to produce complete architecture diagrams and interface inventories without relying on existing documentation.

FOR ENTERPRISE ARCHITECTS AND TECHNICAL LEADS

03

USE

AI-assisted refactoring and test generation techniques to reduce migration risk when decomposing monolithic systems into microservices.

FOR DEVSECOPS ENGINEERS AND DEVELOPERS

04

EVALUATE

And score technical debt using AI code analysis tools, translating findings into a risk-ranked, PM-consumable modernization roadmap with mission-impact prioritization.

FOR PROGRAM MANAGERS, ARCHITECTS, AND CIOS

05

APPLY

A responsible AI governance model ensuring human oversight, full audit traceability, and alignment with DoD AI Ethics Principles throughout the modernization lifecycle

FOR ALL ROLES

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ITC FEDERAL CAPABILITIES



PROVEN EXPERIENCE. RESPONSIBLE AI. MISSION FOCUS.

AI & Automation Practice	DevSecOps & Cloud (IL2–IL5)	Responsible AI Commitment
Established AI/ML practice with active deployment of LLM-assisted code analysis, test generation, and IaC scaffolding in live federal mission environments.	Cloud migration delivery across DoD Impact Levels 2–5, including CI/CD pipeline implementation, ATO evidence package development, and containerization.	Organizational policies and delivery framework aligned to DoD AI Ethics Principles. All AI tools operate with human oversight and full audit traceability.

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THE PATH FORWARD



RESPONSIBLE AI DOESN'T REPLACE THE MODERNIZATION TEAM; IT MULTIPLIES ITS EFFECTIVENESS.

DISCOVER FASTER

AI compresses months of code archaeology into hours, giving teams the blueprint before the first sprint begins.

DESIGN SMARTER

AI-recommended decomposition and architecture validated by human experts.

DELIVER SAFER

AI test suites and impact prediction reduce deployment risk across .NET, Java, and Mainframe portfolios.

MOVE TO CLOUD FASTER

IaC, Dockerfile, and CI/CD generation compress IL2–IL5 cloud onboarding from months to weeks.

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