

AI driven Software FMEA for SAE 1025 AIAG VDA Compliance

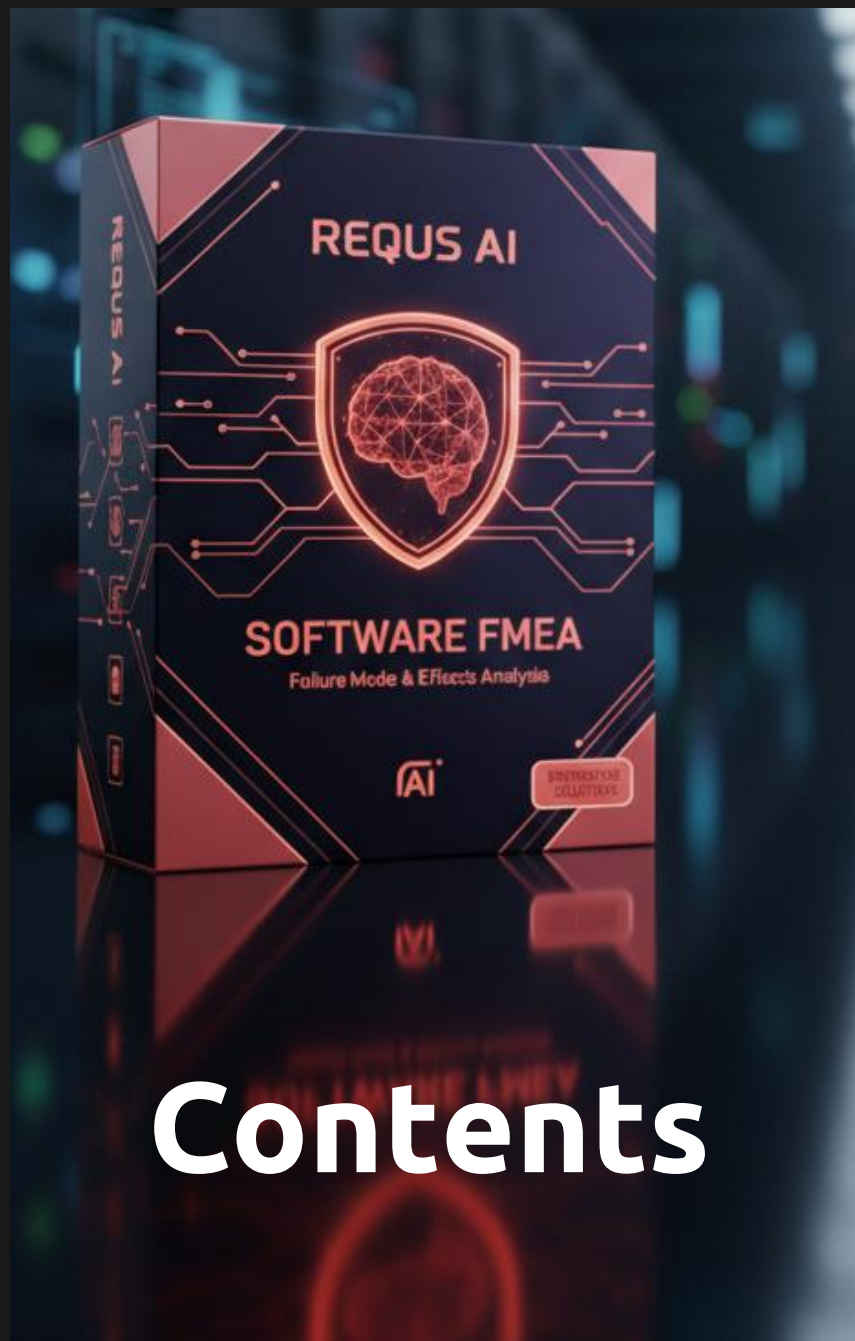
Effective software FMEA designed for an Agile environment for mission-critical systems.

Mission Ready Software

<https://missionreadysoftware.com>

sales@missionreadysoftware.com





01. Challenges

Other defect discovery methods are necessary but not sufficient.
Traditional FMEA approaches fail for software development projects.

02. Facts

Where the defects that cause failures really originate.
Software doesn't fail in a silo.

03. The 6D CDE FMEA process

The steps and the CDEs

04. Requs Ai Core Value and ROI

Requs does the heavy lifting in an Agile environment. Plus, MBSE integration and optional prepackaged FMEAs.

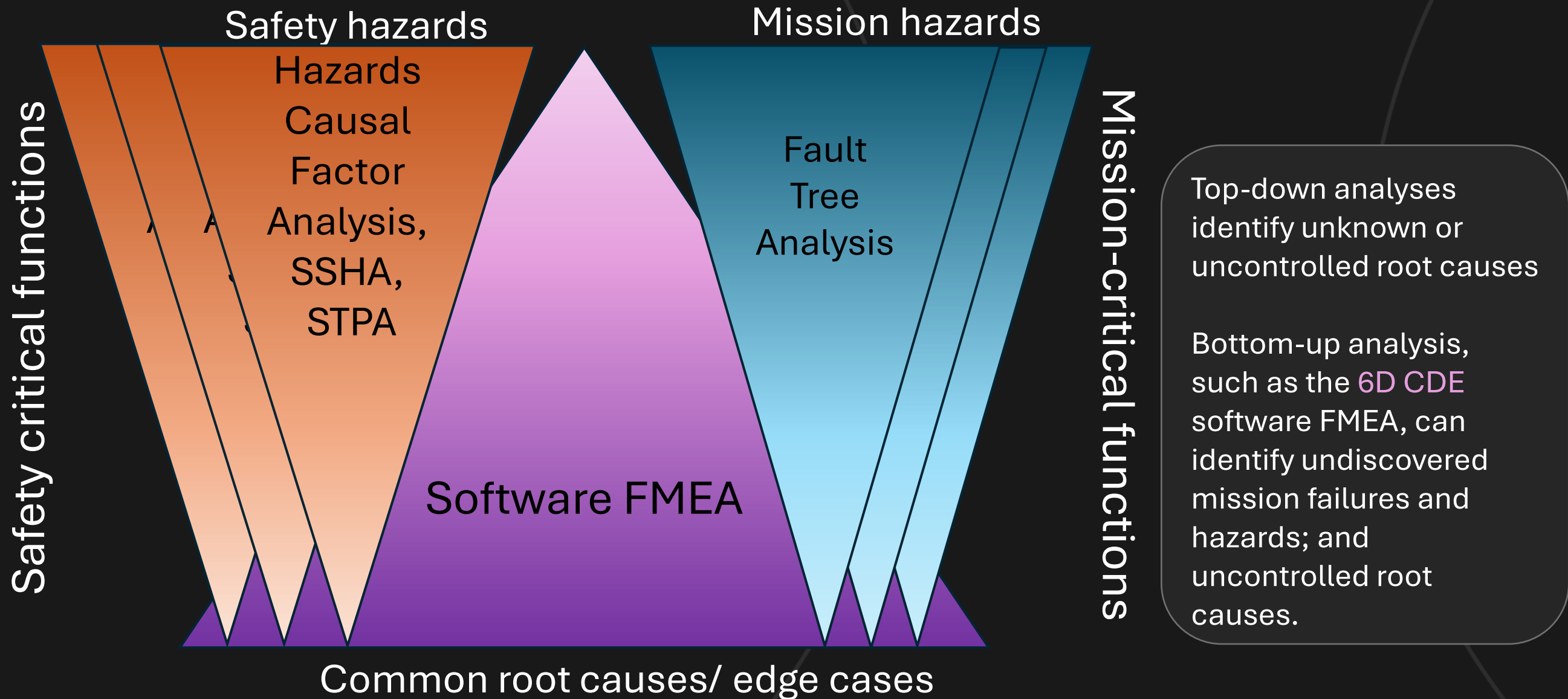
05. Target users

Safety and reliability engineers, software and test engineers

06. Solution demo and next steps

How to get started Requs AI Software FMEA.

Challenge: Other defect discovery methods are necessary but not sufficient



Challenge: Traditional FMEA Fail When Applied to Software

Inefficient and ineffective

Traditional FMEA approaches aren't efficient or effective

Code Focus

Inefficiently focuses on code implementation details
Failures actually originate in design phase
Wastes significant time without finding root causes

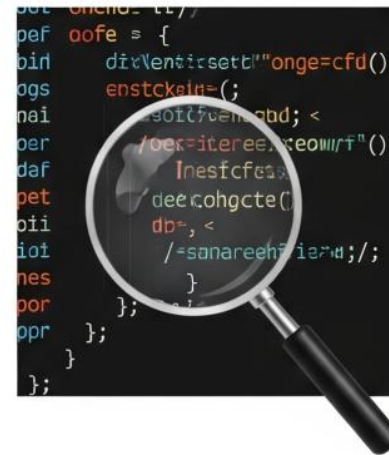
"Shall" Statement Focus

Analyzing every requirement individually overlooks critical interaction failures. INCOSE tools find problems with shall statements better.

Hardware-Centric Approach

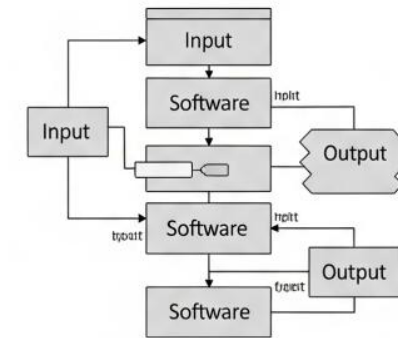
- Black box analysis fails for software
- Misses critical software-specific failure modes
- Probabilistic risk assessment wastes time. High resolution doesn't mean high accuracy. Objective relative measures are better.

Line-by-Line Source Code
(Ineffective for Software Defects)



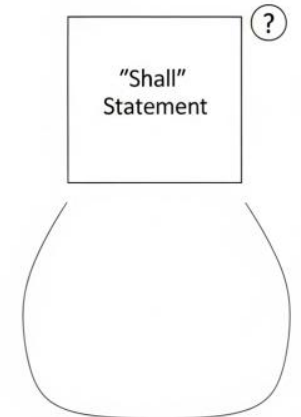
Misses interdependencies
and system-level issues

CSCI (Hardware-Centric Approach)



Ignores software logic
and complexity

Requirement "Shall" Statements
(Isolated View)



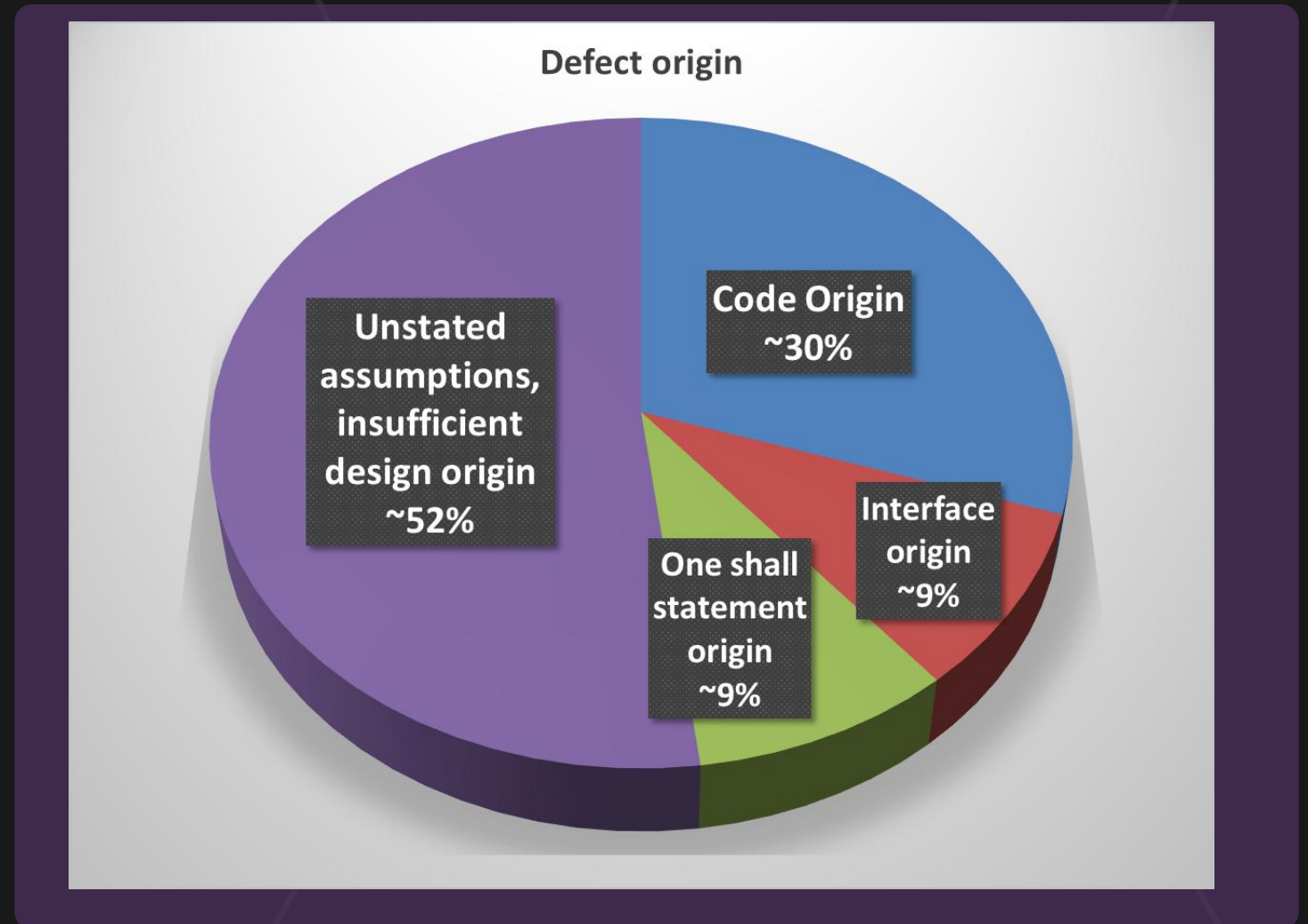
Lacks context and full
system understanding

Facts: Where The Defects That Cause Failures Actually Originate

The Critical Insight

We developed the Common Defect Enumeration from pre-coding origins, representing 70% of the defects

The 6D CDE was designed to find the root causes that other methods and tools miss.



As per largest database of software failures analyzed by root cause

Facts: Software doesn't work or fail in a vacuum

The 6 Dimensions of Failure

1D – Unanticipated Behavior

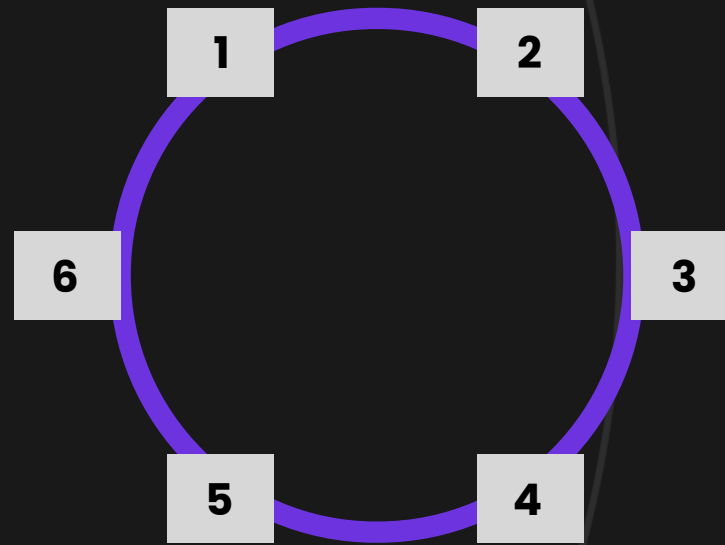
Executing functions at wrong time,
sequence, data, calculations

6D – Environment Effects

Software behavior affected by
unanticipated environment

5D – Mission Degradation

Software behavior changing from
start to end of mission



2D – Sensor/Electronics Interface

Software behaving incorrectly when
interfacing with hardware

3D – System Integration

Software behaving incorrectly when
integrated with subsystems

4D – User Interaction

Software behavior causing users to
instigate failure

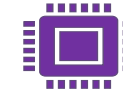
Key Insight: Software is the brains of the system and must work with electronics, system interfaces, user, and environment for the entire mission.

REQUIS Ai 6D CDE SOFTWARE FMEA WORKFLOW

COMMON DEFECT ENUMERATIONS (CDEs)



Software



Electronics



System



Users

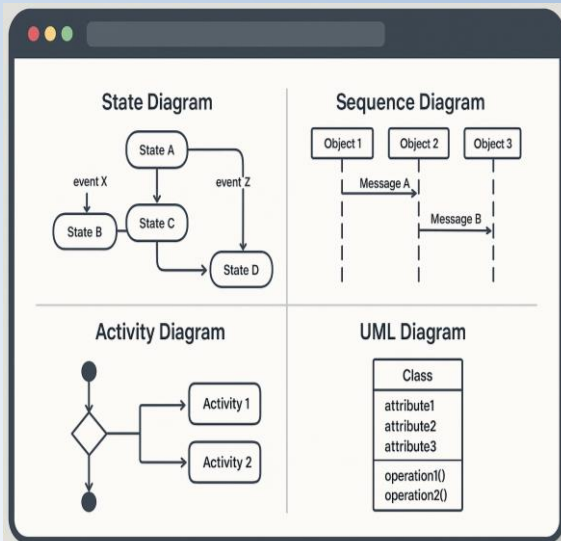


Mission Time



Environment

1. USER DESCRIBES PRODUCT CHARACTERISTICS AND MBSE MODELS



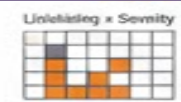
2. REQUIS AI EXTRACTS SPECIFIC EDGE CASES BASED ON YOUR PRODUCT AND MODELS

3. REQUIS AI RECOMMENDS MITIGATIONS, CONTROLS AND TEST STRATEGY



Integrate
with
automated
test suites

4. REQUIS Ai CALCULATES OCCURRENCE OBJECTIVELY



5. USER CONNECTS THE DOTS BETWEEN CDE AND MISSION FAILURES (FDSC) AND/OR SAFETY HAZARDS (PHA)

6. REQUIS Ai GENERATES CRITICAL ITEM LIST AND SSHA WORKSHEETS



The 6D CDE Framework

10 common defect types across 6 system dimensions. Each has specific controls and test cases.

Defect Type	Count	Failure Modes	Root Cause
State Management	17	Loss of state management	Prohibited transitions, stuck states, etc.
Error Handling	32	Undetected system failures	Hardware/software/comms faults ignored
Functionality	9	Software does wrong thing	Unwritten assumptions, extra/ missing functions
Processing	10	Can't execute entire mission	Peak loading or endurance limits exceeded
Timing	9	Real-time requirement not met	Scheduling, race conditions, etc.
Usability	12	Doesn't support users needs	Interface causes critical mistakes
Data	10	Conflicts with data	Unit, scale, type, or missing data mismatches
Sequences	2	Out-of-order functions	Dependencies not enforced
Algorithms	9	Insufficient algorithms	Wrong or incomplete algorithms
ML Models	21	Wrong predictions	Population, process, or model errors

Requs Ai Core Features

Model based

Focuses on the most overlooked areas

Supports MBSE integration

Systematic process for unraveling root causes based on what's missing or conflicting in your models

AI Automation

You answer questions; it predicts applicable edge cases allowing focus on effects analysis.

- Predicts likelihood occurrence of each CDE
- Determines which CDEs are relevant to your product and which are not

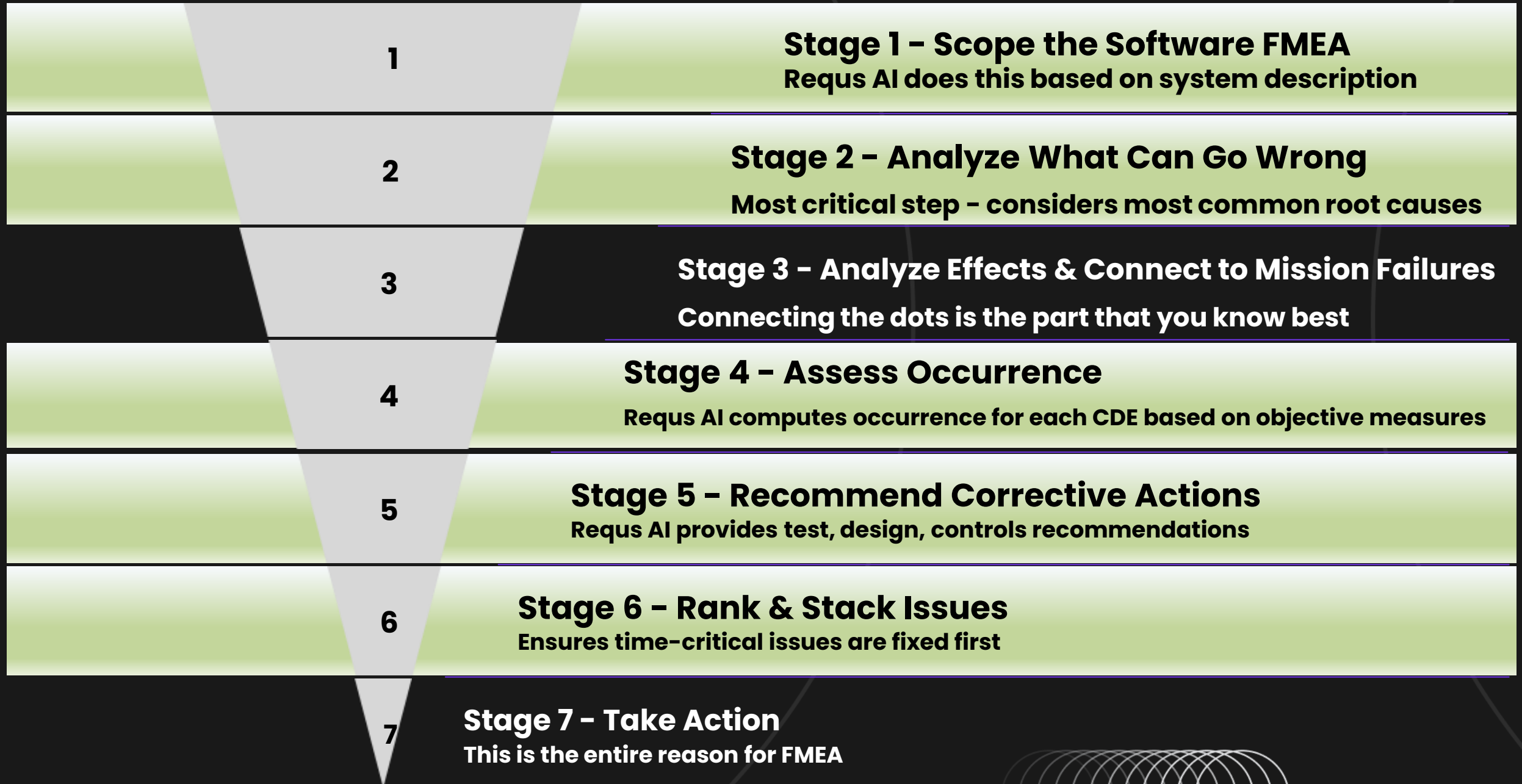
Agile Speed

Generate effective FMEA **in under 2 weeks** to match agile development cycles.

- Rapid setup and configuration process
- **Requs Ai Blueprint speeds it up even more**

Return on Investment – Weeks instead of months

Requs AI does the most time-consuming and error-prone tasks, so you can focus on stages 3 and 7



 Requs AI ML-powered	 Relyence Reliability analysis	 Siemens Polarion ALM platform	 Visure Solutions Requirements mgmt	 Ansys medini Safety analysis
SOFTWARE-SPECIFIC DESIGN				
Yes	No	No	No	No
PRE-CODE ANALYSIS				
Yes	No	Yes	Yes	Yes
AI/ML PREDICTION				
Yes	No	Limited	No	No
ROOT CAUSE LIBRARY				
Yes (CDE)	No	No	No	No
LIKELIHOOD PREDICTION				
Yes	No	No	No	No

There's no comparison.



Requs AI Blueprint

Prepackaged edge cases and failure modes

Optional add-on for Requs Ai Software

Provide **public release** info about your smart devices such as thermostats, HVAC, lighting, etc.

We preload the Requs Ai Software with edge cases, test cases, and design controls, all tagged to safety requirements and critical failure modes

Requs AI identifies vulnerabilities at the 'Step 0' design phase. By analyzing the Logical Skeleton—the timing dependencies, state transitions – we identify the structural flaws.

- We don't need your control algorithms.
- We don't need your sensor fusion recipes.
- We don't need your source code.

We evaluate the integrity of the architecture itself, ensuring the foundation is sound before the first line of code is ever written

Target users of Requs Ai Software FMEA



Reliability Engineers

Get a seat at the table with an effective FMEA tool

Avoid falling behind schedule in Agile environment

Maintain project timelines with efficient methodology



Safety Engineers

- Use Requs AI Software FMEA as starting point for hazards analysis
- Cover both safety and availability failures efficiently
- Integrate with existing safety management systems



Software Engineers & Testers

- Find design issues early in development cycle
- Use CDEs to improve design and reduce technical debt
- Develop better test procedures for fault injection

Get Started: Licensing and Trial Options



Flexible Licensing

Dedicated and floating license options available

Yearly subscription or perpetual licensing models

Cloud and enterprise deployment configurations supported



Schedule Demo

- **See your hidden defect risks today with a personalized demonstration session**
- **Contact sales@missionreadysoftware.com for scheduling**
- **Personalized demonstration of your specific use case**
- **Discover hidden defect risks in your projects**



Start Trial

- **Get hands-on experience with desktop version or try the cloud trial immediately**
- **Desktop trial version available for download**
- **Cloud trial at <https://requisaipredict.com> instantly accessible**
- **Experience full functionality with sample projects**

Hit the Ground Running



Hands on Training Options

- **Virtual self-guided: \$1,450/student**
- **Virtual instructor-led: \$5,000-\$7,000/day**
- **On-site: By request**
- **Add customization for \$2,500**

**Ready to conduct an effective
software FMEA?**

**Contact us at
sales@missionreadysoftware.com for a
demo or trial today.**

Thank You

