The Coming Swarm

Prepared for the OMG Cybersecurity Workshop

LCDR Rollie Wicks, USN
SECNAV Naval Innovation Advisory Council (NIAC) Associate Advisor

Presented 21 Mar. 2017

<u>This Brief is:</u>
UNCLASSIFIED

Key Themes

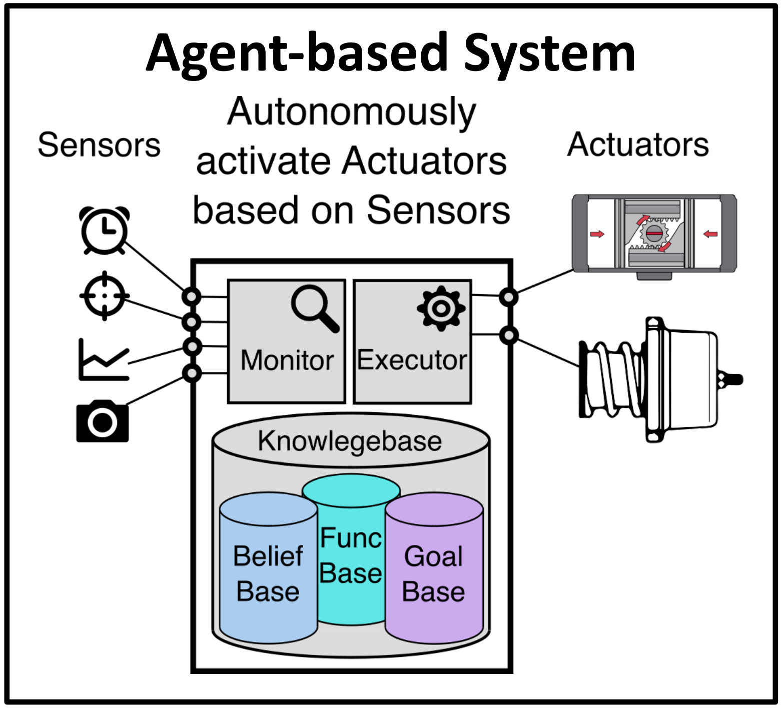
- Why Standards?
- Key OMG Standards Used by My Team
- Autonomy Strategy Timeline
- Cybersecurity in the Age of Autonomous Systems
- Cybersecurity Transformation
- Opportunities

Why Standards?

- Rapid Development & Testing
- Complexity Management
- Cost Reduction
- Rapid Integration
- Reliability
- Cybersecurity

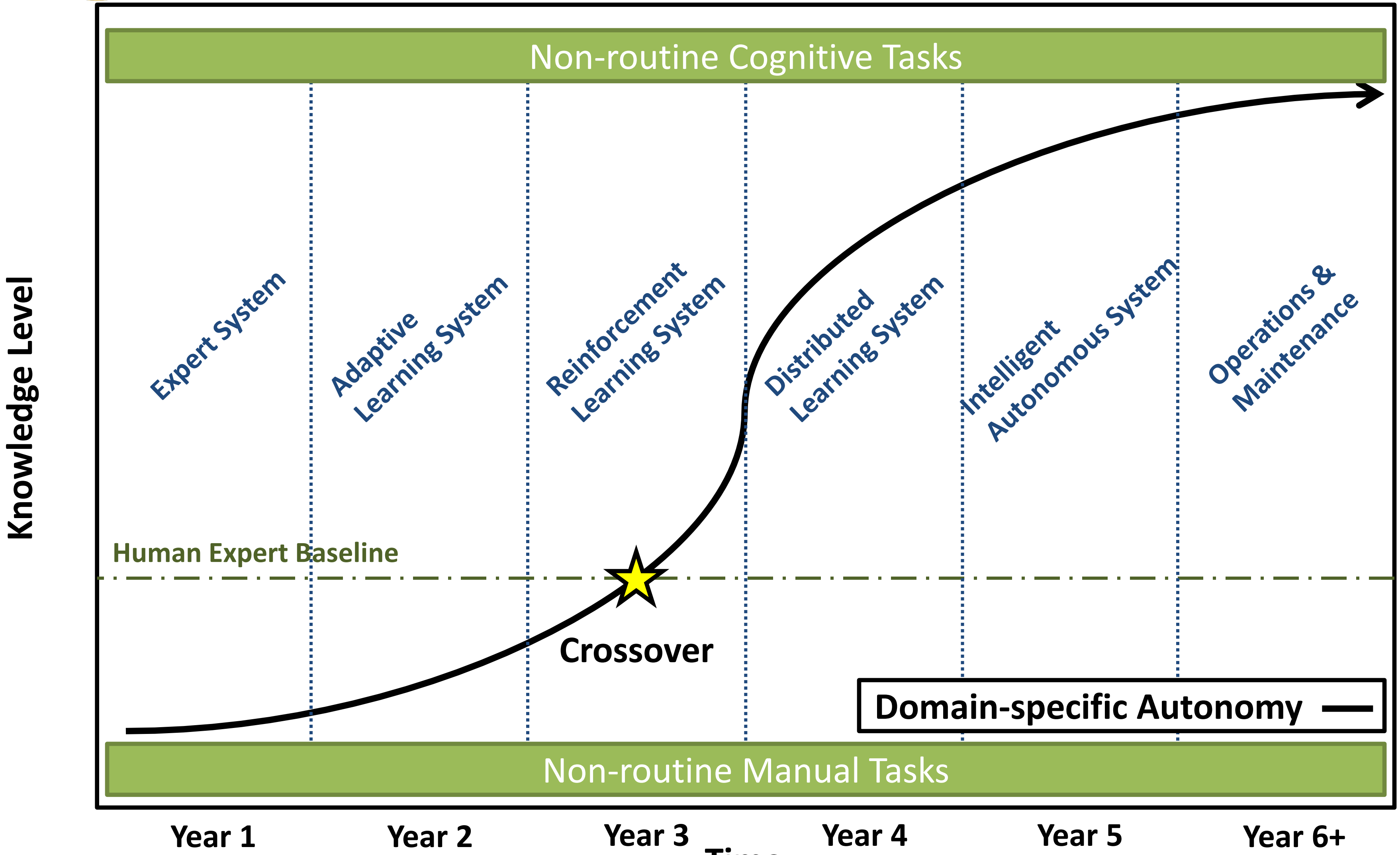
Key OMG Standards Used by My Development Team

- **Setting the Foundation for Autonomous Systems**
  - Data Distribution Service
  - Ontology Standards
  - Archetype Modeling Language
  - MOF to RDF
  - Interaction Flow Modeling Language
  - Knowledge Discovery Model
  - Operational Threat & Risk Model

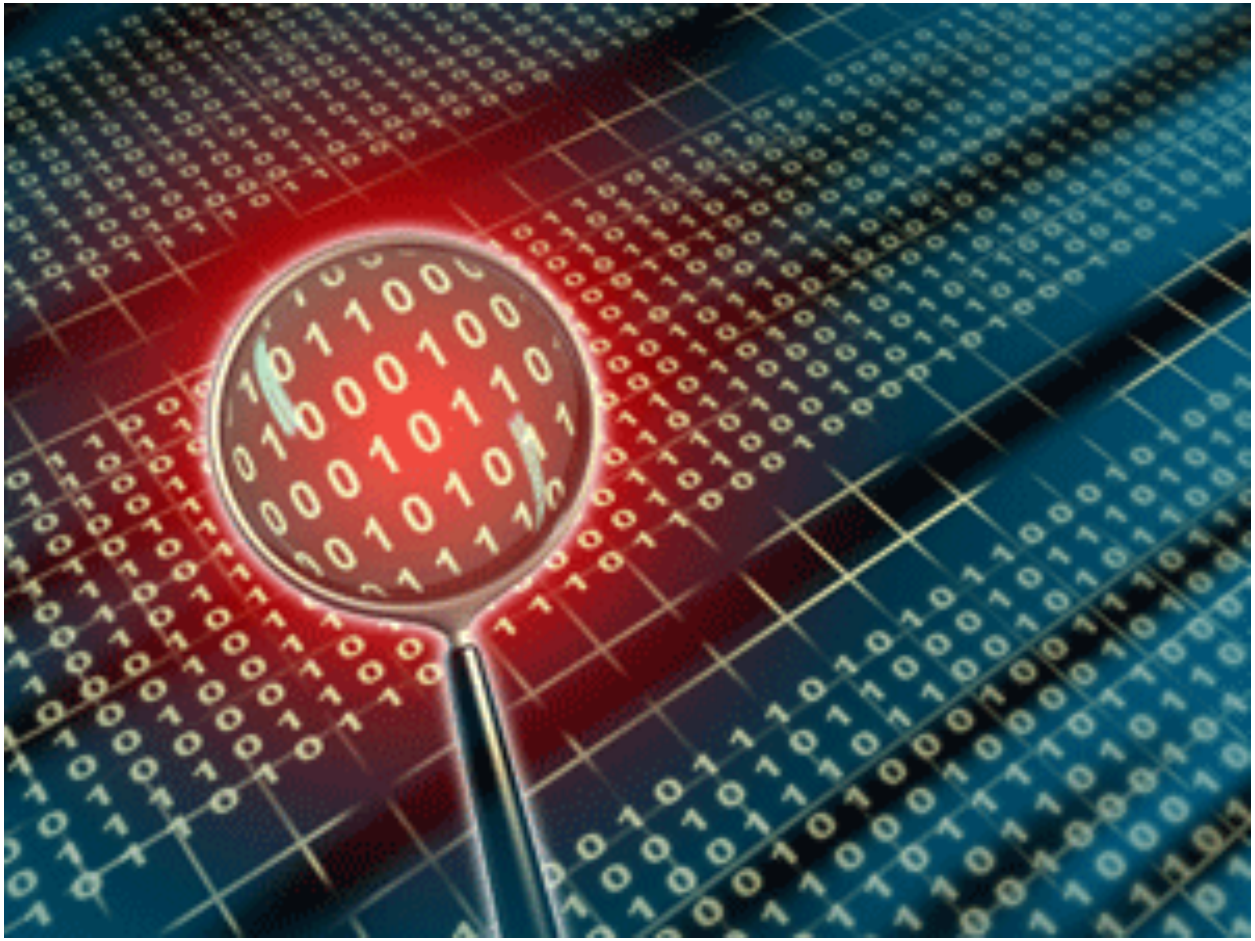


- **Changing the Game**
  - Executable UML Suite of Standards
  - Agent and Event Metamodel

Autonomy Strategy Timeline



Cybersecurity in the Age of Autonomous Systems

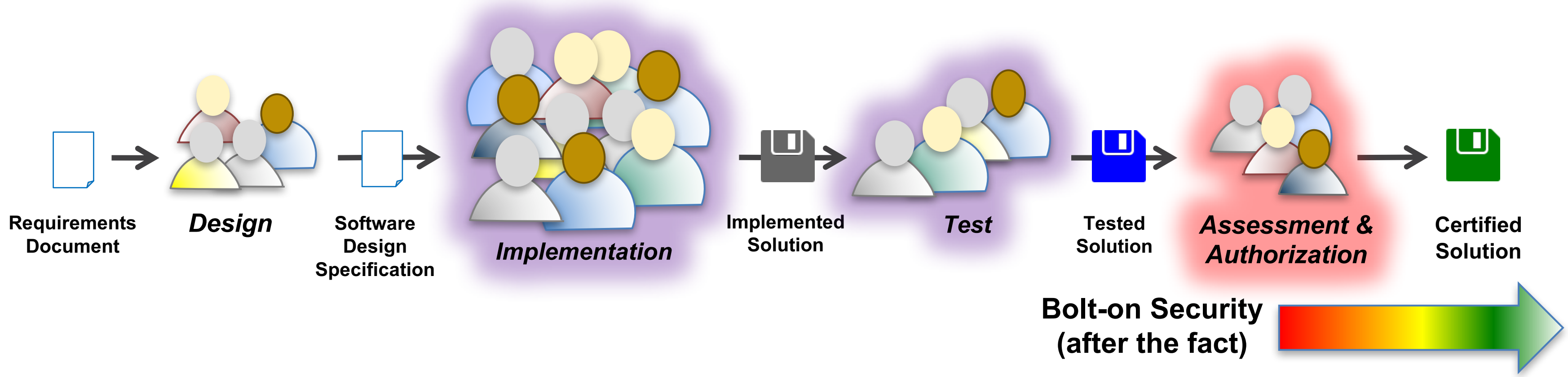


Next generation cybersecurity systems need to be smarter, orders of magnitude faster, and able to evolve against real-time threats

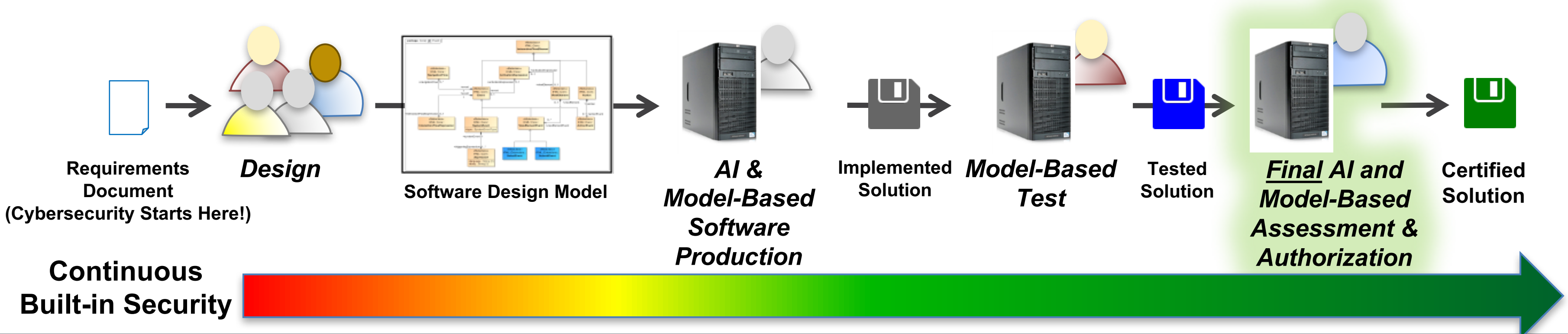
The Challenge

Cybersecurity Transformation

State-of-the-Art Software Development Process — "Human *in* the Loop"



Proposed Model-Driven Software Development Process with AI — "Human *on* the Loop"



Artificial Intelligence (AI) and model-based methods will significantly improve software quality and security, and decrease software transition timelines and cost

DISTRIBUTION A. Approved for public release: distribution unlimited.

Opportunities

- **Industry Organization and Collaboration**
- **Standards**
  - Knowledge Model (UML-3?)
  - Knowledge Base (Hypergraphs)

- **Tools**
  - Designed for Agent-based Systems
  - Intuitive and easy to use
  - Less buttons and more autonomy
  - Less time from concept to deployment
  - Secure solutions from the start!

Together, we can create a better future with broad positive impacts to National Defense and the quality of life for the public