

# Adaptive Test Strategies Using PATFrame

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## Motivation

*"A battle plan seldom survives first contact with the enemy.  
Strategy is a system of expedients"*

-Helmuth von Moltke the Elder  
German Generalfeldmarschall



Like a battle plan, a test plan is predicated on incomplete information. We don't know what failures our testing will uncover, so even the best test plan can be "overcome by events" at any time.

Embracing the second part of von Moltke's famous quote, we realize that the best "strategy" for T&E is adaptation. We propose a Prescriptive and Adaptive Testing Framework (PATFrame) that enables testers to address the rapidly evolving needs of Unmanned and Autonomous Systems Test (UAST).

## The PATFrame Team



## What is PATFrame?

### PATFrame is a Decision Support System Addressing Questions Posed by the Test Community:

- How much testing is enough?
- How long will testing take? How much will it cost?
- How do I test effectively given the compressed schedule of a "Rapid Acquisition" program?
- How do I measure the quality of my tests?
- What are the most valuable tests for my system?
- How should I prioritize my tests?
- How do I make sure my tests are representative of the operational environment?
- How do I get more knowledge for my dollar?
- What are the unique challenges in testing UAS's and Systems of Systems (SoS's)?
- How do I test a SoS without explicit requirements?
- How does my system affect the SoS in which it operates?
- What are the most valuable tests for my SoS?

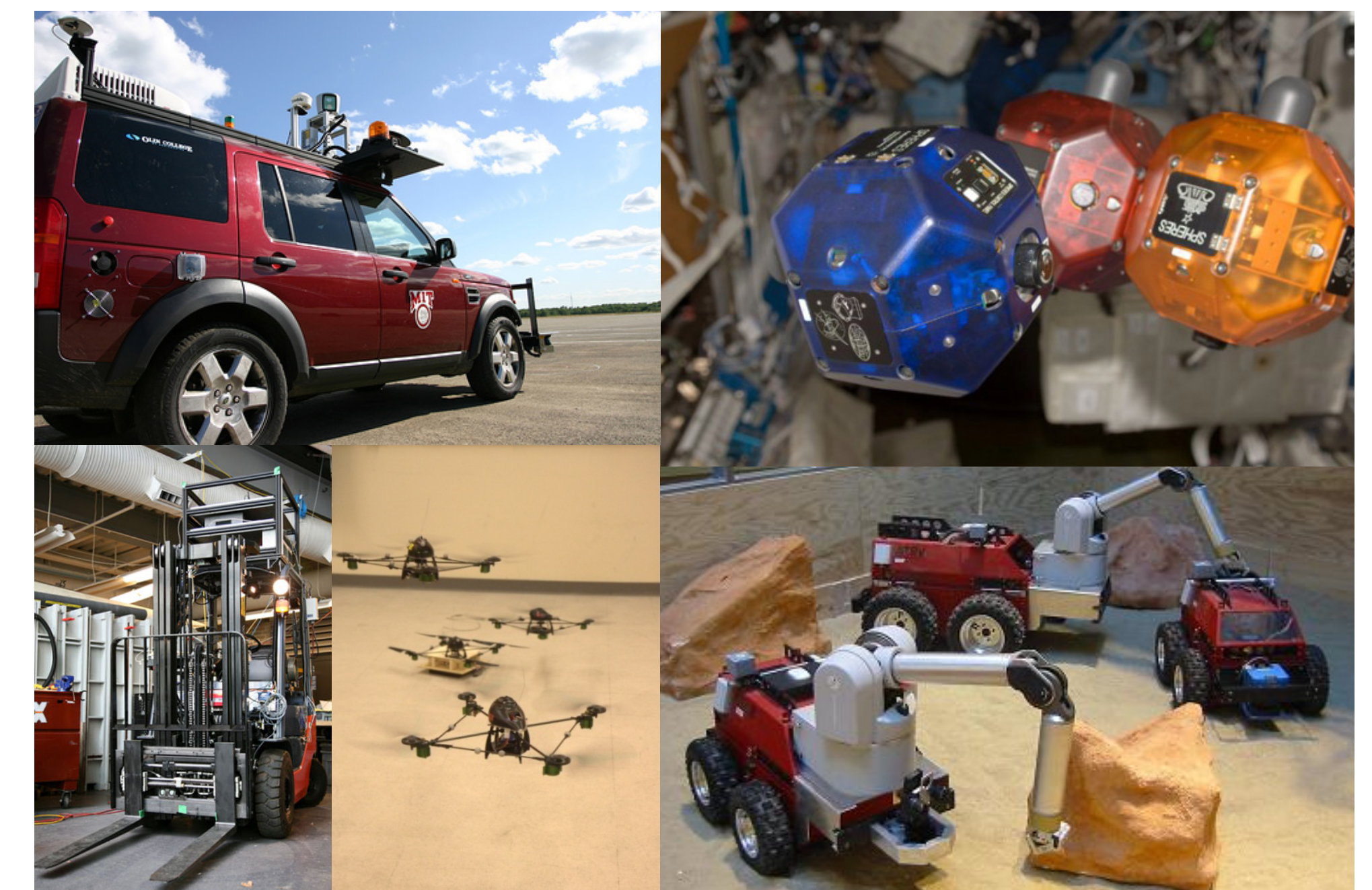
## Sponsors and Transition Partners



## Methodologies Leveraged

- Design of Experiments
- Defect Modeling
- Simulation
- Real Options
- Decision Theory
- Ontologies
- Value Based Testing
- Cost Modeling
- Exploratory Testing
- Evolutionary Testing
- Mission Based Test and Evaluation
- Bayesian Probability
- System Dynamics

## Unmanned Systems from MIT



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