Test & Evaluation, Verification & Validation

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Test and Evaluation, Validation and Verification Acquisition and System Development View

Goals:

Verifiable requirements specifications:
- Verifiable autonomous behaviors and a functional and traceable requirements language for describing them.

Arguments for dependable autonomy:
- Integration of safety, security, and reliability cases based on virtual and physical evidence.

Instrumented and measured autonomy:
- Autonomous systems instrumented for evaluation and methods of measuring human-machine interaction.

Safe development:
- Methods of protecting life and property for agile development with safety critical systems.

Resources & tools for T&E and V&V of autonomy:
- Virtual environments, adversarial testing, robust run-time monitoring, V&V for machine learning data.

Dynamic assurance for adaptive systems:
- Methods for safely deploying adaptive systems.

Central Technical Challenge:

Cradle-to-grave TEV&V involvement to support efficient and effective development, fielding, and sustainment of dependable autonomous systems

Some image

?Lead for Science: TRL 1-4
?Lead for Systems: TRL 4+
?Lead for T&E: Works in T&E, part of AAIT
?3rd Service

Test and Evaluation, Validation and Verification Science & Technology View

Goals:

Verifiable Behaviors:
- Verifiable algorithms for perception, understanding, and planning, capable of online learning, with known performance in different domains.

Design for Assured Autonomy:
- Assured autonomous systems developed by compositional verification, robust run-time monitoring, and methods for assessing overall system assurance.

Autonomy and AI Test Technology:
- Combining virtual and physical experimentation to provide instrumentation and testing of autonomous systems and AI.

Dynamic Assurance for Adaptive Autonomy:
- System assurance updated as the system adapts or as the domain changes.

Central Technical Challenge:

Cradle-to-grave TEV&V involvement to support efficient and effective development, fielding, and sustainment of dependable autonomous systems

Some image

?Lead for Science:
?Lead for Systems:
?Lead for T&E: (works with AAIT)?
?3rd Service

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High Risk. Significant gaps remain
Addressing technical challenges, risk capability
Likely capability will be achieved

Hard Problems:

To be updated

Verifiable requirements specifications.
- A
- B
- C

Arguments for dependable autonomy.
- A
- B
- C

Instrumented and measured autonomy.
- A
- B
- C

Safe development.
- A
- B
- C

Resources & tools for T&E and V&V of autonomy.
- A
- B
- C

Dynamic assurance for adaptive systems.
- A
- B
- C