Situational Awareness Fusion Enhancement Aid (SAFE-Aid) "DEMONSTRATION OVERVIEW"

DEMONSTRATION OBJECTIVE

U.S. Army Aviation Soldiers continue to support full spectrum operations across the globe from stability and support operations to preparation for Major Combat Operations while confronting an ever increasing challenge of information systems overload. To aid the Army aviator with this flood of mission and system data, Applied Systems Intelligence, Inc. (ASI) created an innovative software capability called the Situational Awareness Fusion Enhancement Aid (SAFE-Aid) to improve aircrew situational awareness and decision-making. This software aiding system is referred to as an *Associate,* which is a human-centered intelligent system built from the start to be an intelligent team member for its human counterparts. More than just an assistant, an Associate is made to have a deep understanding of its human team mates, as well as their missions, their systems and their environment. ***The SAFE-Aid system provides intelligent situation assessment, planning, procedure assistance and intelligent management of the multi-function cockpit displays***.

WHAT IS AN INTELLIGENT AGENT?

Associates are intelligent agent-based decision aids that assist human operators in complex environments requiring high cognitive load. Associates have been shown to be effective integrating three basic activities: (1) perception, (2) decision making, and (3) performing courses of action. An intelligent agent emulates the behavior and decisions of a human, whether in battle field operations, a medical diagnosis, or the complex environment of an Army aviator. Intelligent Agents obtain their behavior characteristics through knowledge extraction of domain specific plans and goals associated within Army aviation doctrine.

WHY IS THIS IMPORTANT?

A continuing challenge for Army Aviation is the understanding the enemy and friendly situation and deposition in each area of operation. Currently this understanding is generally done with the use of radio communications from the ground commander to the lead aircraft in formation. The Army has recognized that cognitive decision aiding tools provide the Army aviator with more situational awareness of the ground combat environment, thereby improving combat effectiveness without degrading the safety of the platform or its occupants.

WHAT WILL YOU SEE?

The demonstration provides an inside view of the knowledge processing of SAFE-Aid that allows the viewer to see how SAFE-Aid recognizes signals from the UH-60 Blackhawk avionics in terms of its situation model and how it produces dynamic plans and procedure execution to fulfill mission responses. The demonstration displays the automatic route planner that responds correctly to both unexpected missile and AAA threats, and aircraft system faults while still completing its mission.

HOW DOES IT WORK?

The SAFE-Aid system integrates the full Observe-Orient-Decide-Act Loop (OODA Loop) first defined by the legendary Col. John Boyd. The SAFE-Aid system software suite provides integrated, intelligent pilot aiding for:

- **Situation Assessment - *Observe, and Orient***: Combining and understanding data from systems, sensors, and network messages into a unified situation model that is automatically monitored for relevant events.

- **Dynamic Planning - *Decide***: The pursuit of multiple concurrent goals by specializing and recommending pre-defined plan segments that fit the situation; the monitoring of plan success or failure and goal accomplishment.

- **Procedure Execution Assistance - *Act***: Assist the pilot with the performance of procedures if pre-authorized by the pilot; allow the pilot to perform any steps he wishes.

- **Information Management**: Bring the information that the pilot needs to the proper display surface at the right time, minimizing head-down time and bezel button presses. Avoid spurious alerts or distractions in the cockpit during critical tasks.
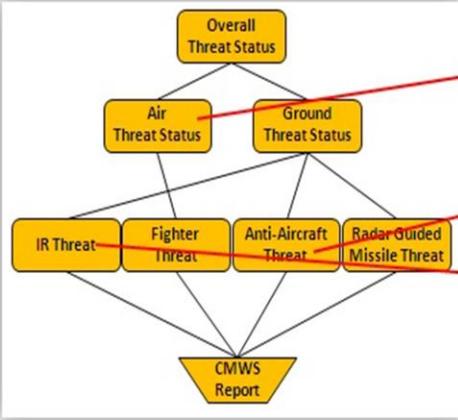
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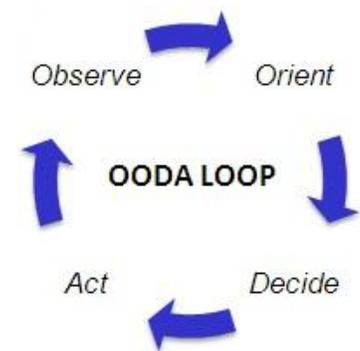
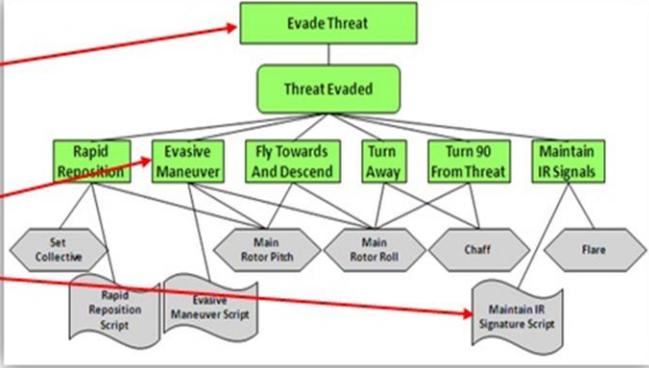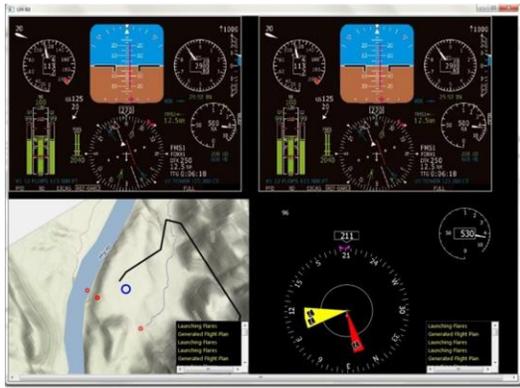# SAFE-AID - HOW IT IS BUILT, HOW IT WORKS
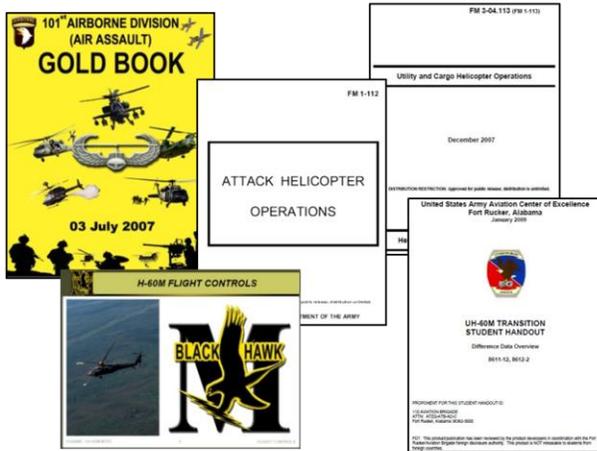
US Army Aviation Knowledge Base
- FM3-04.103 Utility & Cargo Operations
- FM 1-112 Attack Helicopter Operations
- Air Assault Gold Book
- UH-60M Flight Controls
- US Army Aviation Subject Matter Experts

SAFE-Aid Concept Graph
"Observe-Orient"

SAFE-Aid Plan Goal Graph
"Decide-Act"

SAFE-Aid System Integration
- Situation Assessment - *"Observe"* & *"Orient"*
- Dynamic Planning - *"Decide"*
- Procedure Execution Assistance – *"Act"*
- Information Management – *"At the Right Time"*

Applied Systems Intelligence, Inc.: **Dr. Tony Bagdonis** • Program Manager for Aviation • 770.518.4228 ext 272 • tbagdonis@asinc.com
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