In-Time Terminal Area Risk Management

National Aeronautics and Space Administration

NASA's System-Wide Safety project seeks to explore, understand, and overcome technical challenges associated with assuring the safety of future aviation operations.

In-Time Aviation Safety Management System (IASMS) for Commercial Operations

Developing methods to Improve risk management and safety assurance processes by proactively identifying risks and causal factors before an accident/incident occurs.

- Develop and demonstrate integrated risk assessment capabilities to monitor and assess terminal area operations based on advanced data analytics methods and predictive model development
- Develop tools for:
  - ✓ Identifying and characterizing operational risks prior to incident occurrence
  - ✓ Monitoring a variety of data and integrating them for analysis
  - ✓ Evaluating risk mitigation strategies to proactively assure safety of operations
  - ✓ Determining causal and contributing factors to identify risks


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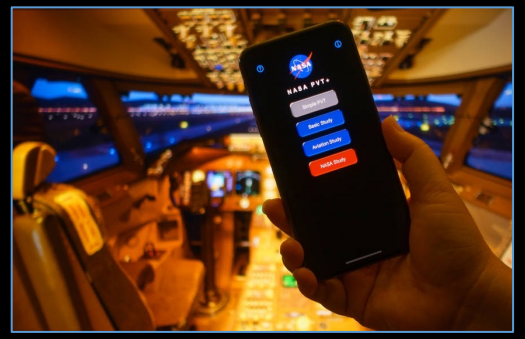


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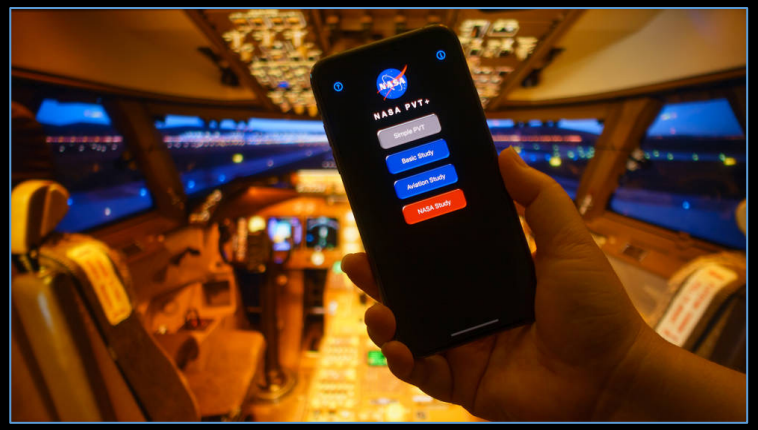
System-Wide Safety: In-Time Terminal Area Risk Management

Develop and demonstrate integrated risk assessment capabilities to monitor terminal area operations based on data analytics and predictive models.

Overview

Operations within the National Airspace System (NAS) continue to grow in scale and complexity. As a result, the causal factors of risks and hazards have also grown increasingly complex, driving the need to transform the way risk management and safety assurance is conducted. To achieve this, researchers seek to develop new technologies that identify emerging risks *before* an accident occurs, not after. These technologies can be used to augment the safety management system in use today to become increasingly proactive and timely to assure safety of the NAS. This is achieved through the development of prognostic and predictive risk assessment algorithms that will allow emerging risks to be identified and addressed much sooner than they are today. Many challenges exist, including differing time scales and integrating dissimilar types of data into a common format that is compatible with both existing and future operational systems.

NASA SWS Human Contributions to Safety (HC2S) researchers are working together with Boeing and airlines partners to understand how commercial aviation flight crews maintain and enable safe operations.



NASA developed application for pilots to monitor their level of alertness.

Research Conducted

Current research augments existing safety management systems through the development of proactive risk identification and characterization

The Process

- Monitor and integrate data from multiple sources related to operations
- Develop methods to assess integrated data sets and implement efficient risk analytics approaches
- Deploy new monitoring and assessment capabilities into increasingly real-time operations to inform safety assurance actions

These capabilities seek to augment existing safety management systems to become increasingly proactive when managing risk and assuring safety of operations.

Key Attributes

- Develop tools for fusing multiple types of operational and related data.
- Demonstrate methods to monitor system state, detect precursors, and identify lead indicators to emerging risks, using integrated datasets from multiple sources, to enable a more comprehensive understanding.
- Implement predictive and prognostic algorithms to assess potential risk mitigation strategies to proactively assure safety of operations.

Key Collaborators

NASA Missions – Solutions support the NASA Aeronautics Research Mission Directorate (ARMD) Strategic Thrust 5: "In-Time System-Wide Safety Assurance"; the Advanced Air Mobility Mission by transferring technologies focused on transforming the existing systems that manage risks and assure safety; as well as ready current day operations for inclusion of new entrants into the National Air Space.

Government Agencies – Federal Aviation Administration (FAA)

Organizations and Industry Partners – The Commercial Aviation Safety Team (CAST), Aviation Safety Reporting System (ASRS), MITRE, International Air Transport Association (IATA), Aviation Safety Information Analysis and Sharing (ASIAS), Flight Safety Foundation (FSF)

Airlines – American Airlines, Delta, Fed Ex, SWISS, EasyJet, Airline Pilots Association (ALPA), Air Traffic Control Association (ATCA), Allied Pilots Association (APA)

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