

Propulsion Control and Diagnostics Research for Autonomy

Discussion

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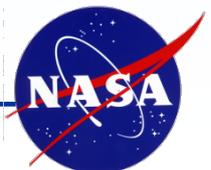
Intelligent Control and Autonomy Branch

at Lewis Field



Background

- **Assured Autonomy for Aviation Transformation** is Thrust No. 6
 - Develop high impact aviation autonomy applications
- ARMD has established teams to develop Roadmaps for each thrust including Autonomy
 - A sub-team established to address “Vehicle Autonomy”
- Overall responsibility for Autonomy Roadmap lies with Program Director for Airspace Operations and Safety Program (AOSP)
 - Advanced Air Vehicle Program (AAVP) responsible for Vehicle Autonomy roadmap and technology development
- AAVP has set aside some funds in FY16 for “Quick Start” research efforts in Vehicle Autonomy
 - GRC proposal funded: “Intelligent Propulsion System Control Architecture to Enable More Autonomous Vehicle Operation”



What are the key propulsion control and diagnostics technology needs to enable safe increased autonomous operation of commercial aircraft in National Airspace?

Participant Response:

- Much of the discussion focused on needs to address off-nominal propulsion situations with the pilot removed.
 - May need to replace the tactile feel that is lost when the pilot is removed.
 - What are the flight deck effects today that a pilot looks for? Sensors may be needed to replace these sensory cues that are lost.
- It was expressed that it is hard to train or develop an autonomous system to respond to the unpredictable. Unpredictable events are scenarios that a human is very good at, but it is difficult to develop an autonomous system with that level of cognitive reasoning. Defining under what conditions and how best to transfer control from an autonomous system to a human being will be critical.
- It is expected that increased system reliability may be necessary
- Autonomous propulsion system should provide actionable knowledge to flight control.
- Provide real-time risk assessment.
- Does autonomy allow you new flexibility that was not there before? Instead of “autonomous” system designed to just do what the pilot does – is there a “better” way to use autonomy?

