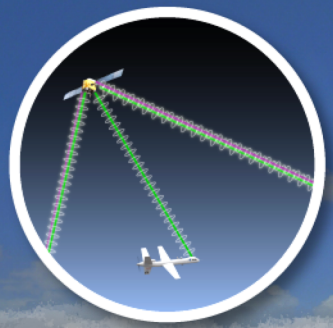
2nd Workshop of Human-Automation Interaction Considerations for UAS Integration

Robert J. Shively

NASA's Unmanned Aircraft Systems (UAS) Integration in the National Airspace System (NAS) Project (UAS-NAS) and the UAS Executive Committee (EXCOM) Science and Research Panel (SARP) invite you to attend the 2nd Workshop on Human-Automation Interaction Considerations for UAS Integration. A follow on to the workshop hosted by the National Academies of Science, Engineering and Medicine, this two-day workshop aims to tackle two critical issues for UAS integration in the NAS being addressed by NASA and the SARP: control of multiple UAS by a single, or multiple, operators (multi-UAS), and automatic collision avoidance (auto-CA). Attendees will be asked to generate real human-automation architecture and human machine interface solutions for these problems during interactive breakout sessions. Attendance is limited to select government and academia invitees only. This presentation is outlines the objectives of the workshop.



2nd Workshop of Human-Automation Interaction Considerations for UAS Integration

Jay Shively

Sub-Project Manager, Detect and Avoid

Welcome !!

- Thanks for coming…..
- Introductions

Objectives

- Follow-on to Workshop 1
  - Ellen Bass
  - January, 2018
    - Washington, D.C.
    - National Academies
  - General Issues

Issues

- Calibrated Trust and Transparency
- Common understanding and shared perception
- Human-Agent communications/Interaction
- Collaboration
- Shared Mental Models
- Joint Decision making
- Roles and Responsibilities
- Communication

Objectives # 2

- Specific Use Cases –
- Teamed with SARP (Ted)
- Multiple UAS Control
  - M to N
- Auto Collision Avoidance

Specific Objectives

- HSI Architecture(s)
- Issues
- Feasibility
-

Primitive Building Blocks (if you want to use...)

Human Operator

Intelligent / Cognitive Agent

Automated Tools

Communication Only

Supervisory Relationship

Cooperative Relationship

Both imply ***bi-directional information flow,*** *usually using automated tools*

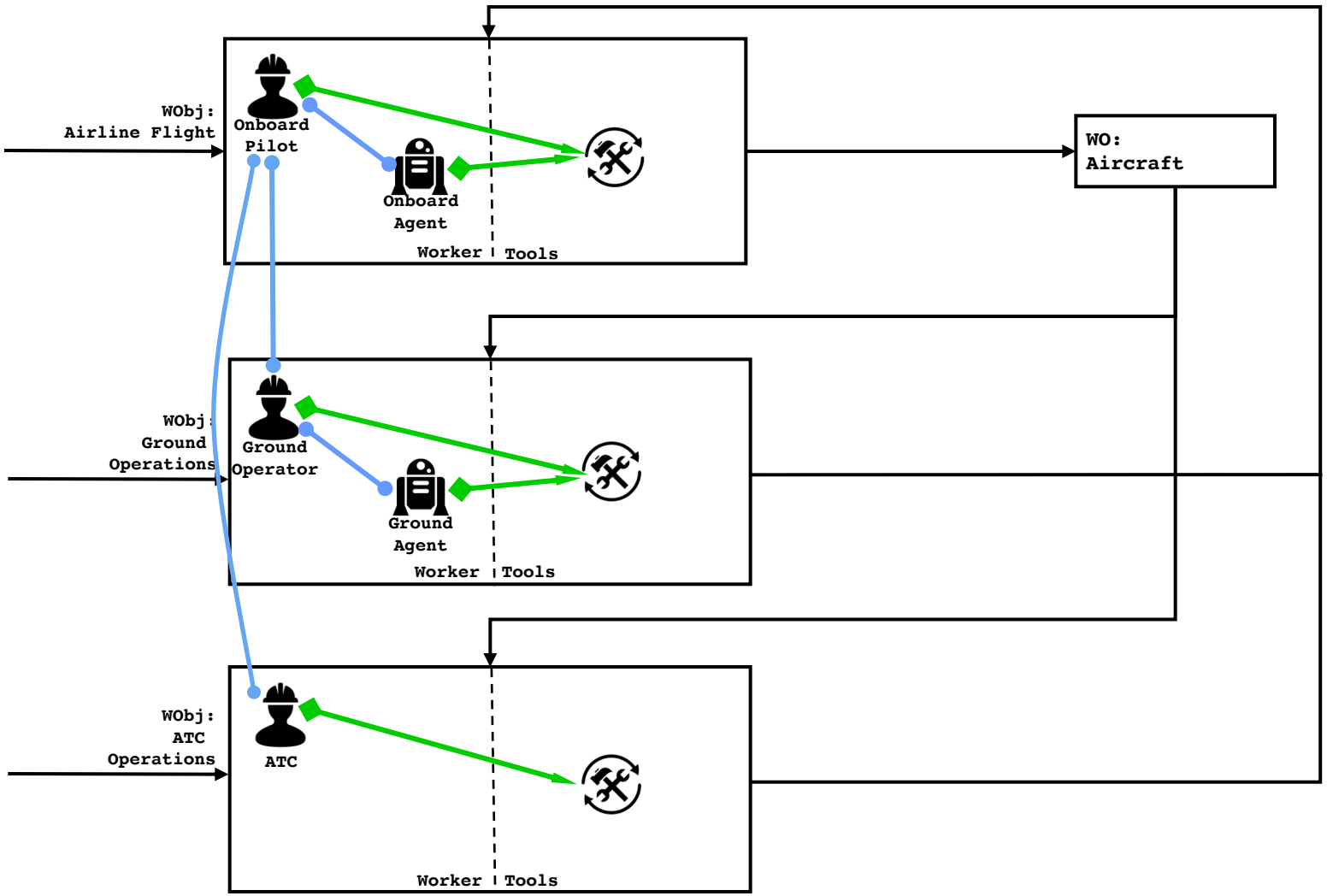
Co-location *(e.g., onboard an airplane, in ground station)*

RCO Use-Case

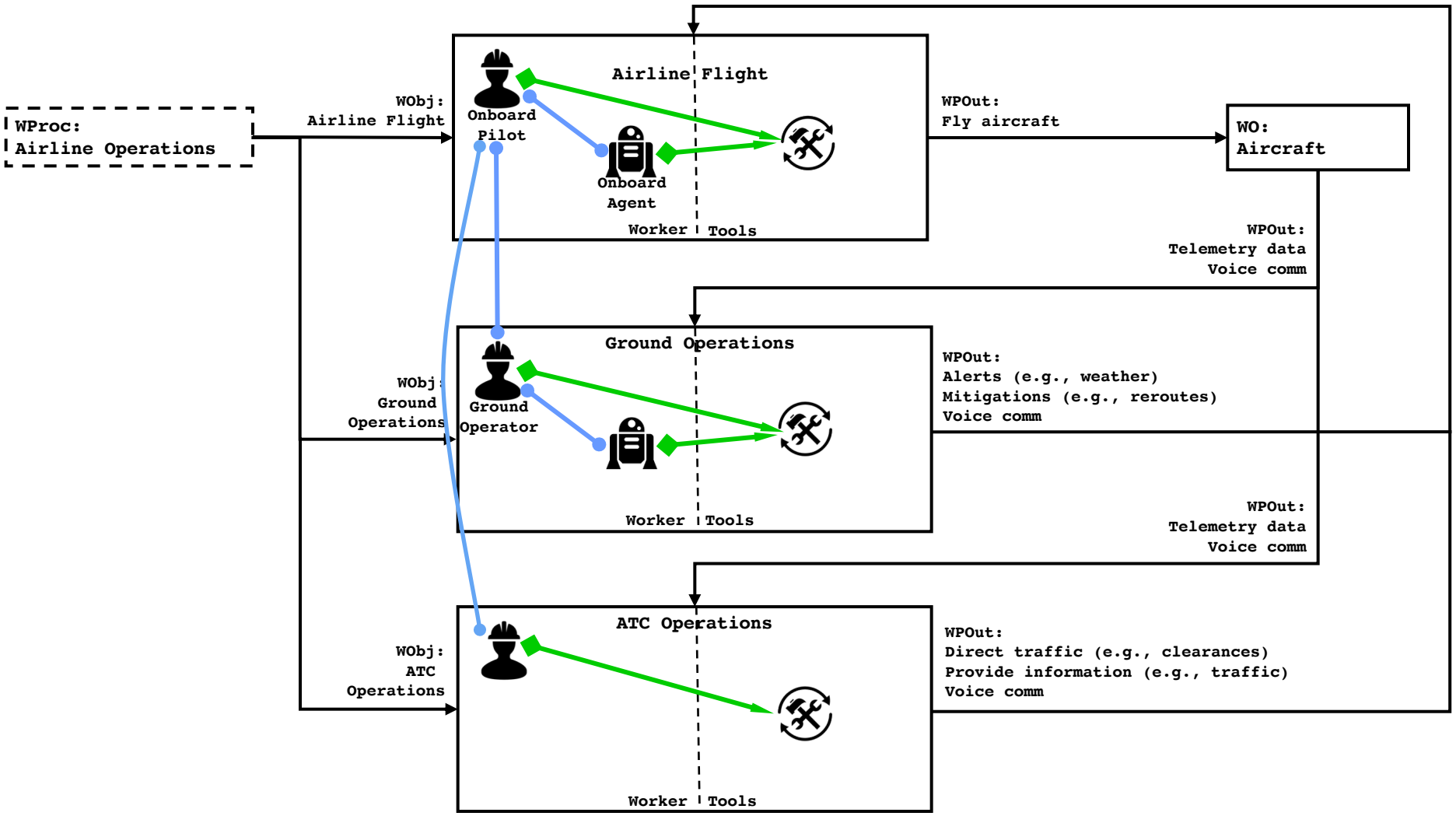
FLYSKY12 is en route from SFO to BOS. There is one POB and a dispatcher flight following.

- Onboard automation detects fuel imbalance and alerts POB and dispatcher.
- POB requests automation diagnose fuel imbalance. Automation reports to POB a leak in left tank.
- POB requests that agent manage fuel. Agent opens the cross feed and turns off the pumps in the right side to draw fuel from the left.
- POB contacts dispatch about need to divert.
- Dispatcher requests divert planning from dispatch automation.
- Dispatcher uplinks flight plan to POB. POB inspects the flight plan and agrees.
- POB requests agent coordinate divert with ATC. Agent reports divert is approved. POB tells agent to execute.

Top-Level Actor Relationships



Top-Level System Work



Summary

- Thanks !
- Have Fun !
- Be Creative !