

# Meeting of Experts UAS Integration in the NAS

# General

- Excited that NASA is addressing this issue
- Is effort addressing key issues.
- Should address civil UAS
- Small low capability UAS are important.
  - Be clear on intent regarding small UAS
- Address level of autonomy as it relates to communication assumptions
- Time frame 2015-2025
  - Research needs to keep pace with industry
- Review background docs
  - RTCA -OSED, Access 5, DO 304, 320, ...

# General

- Small UAS is only area with defined cert path
  - NASA input would be useful
  - Low hanging fruit, safety data to support FAA decisions (eg night ops)
- Message framing (tone)
  - Not just use of stimulus money, real problem defined
  - Clarify NASA role not driver (eg con-ops)
- Partnerships government focused, consider more industry involvement
  - FCC and NTSB as partners?
- Poor job on presenting background and assumptions
- Need to be more out of the box and dealing with future issues rather than existing capabilities
- Limited by current tool set
- Consider SATS experience
- Effort may be spread too thin
  - Prioritize and focus (eg 4 deliverables)
  - Involve community in prioritization

# Con-Ops

- Need to leverage existing con-ops
- Multiple con-ops likely
- Need to be explicit on assumptions
  - Vehicle size, airspace, mission
- Is routine access defined
- Too deterministic
- Approach to systems analysis and con-ops integration, fuzzy, vague
- Not clear what the prioritization scheme is
- NASA is recovering from it's dormant period
- Has RTCA OSED document been reviewed (don't reinvent the wheel)

# Separation Assurance and Collision Avoidance

- Separate separation assurance from non-nominal
- Non-nominal more useful
- Sep assurance good area but need to frame the research questions
  - Using the FAA, DOD frameworks
- Vague
- “No use doing what was being presented in separation assurance”
  - Need to come up to speed on DOD experience
- Unclear which vehicles are being considered
- Unclear assumptions, eg airspace
- Plan assumes a solution of another safety layer
  - Not clear that this is correct
- Terminology issues
  - Some elements have been done
- Review other efforts (eg Smart Skies)

# Pilot Aircraft Interface

- Terminology (HSI?)
- In the loop vs on the loop
  - In the loop will be the exception in the future
- Didn't discuss ATC controller interface

# Communications

- Spectrum critical near term issue
  - WRC 12 (only command and control)
- Best use of spectrum bucket
- Think of out of the box approaches to bandwidth
  - Leverage space experience
- Consider NEXTGEN as default baseline
- System trades com vs level of autonomy
- Some of current planned deliverables already exist

# Certification

- Should operational regulatory issues be out of scope?
- Inclusion of operational mitigations in cert process will be critical
- Support approach
  - Focus on automation
- 1309 approach good, SMS and other approaches are not discussed.
- What is the advantage of cert by application
- Definition of accident and incident for UAS

# Integrated Test and Evaluation

- What are the driving requirements?
  - Making assumptions on vehicle mix, requirements, etc
- Test airspace access for university researchers