CSMAC
Unmanned Aircraft Spectrum Subcommittee 4

April 22, 2020

Subcommittee Members

- Carolyn Kahn, Co-Chair
- Andrew Roy, Co-Chair
- Audrey Allison
- Michael Calabrese
- Tom Dombrowsky
- Mark Gibson
- Mark McHenry
- Carl Povelites
- Dennis Roberson
- Mariam Sorond
- Bryan Tramont

- NTIA Liaison: David Reed

Question:
Unmanned Aircraft Spectrum

a. The FAA has the responsibility of ensuring the safe integrations of all classes of UAS into the national airspace, from small to large UAS. Spectrum to support command and control operations will be critical for these emerging industry applications, to include urban air mobility and transcontinental cargo delivery.

b. What are appropriate models for ensuring timely and secure access to frequencies necessary to support UAS command and control requirements? What governance characteristics are important? Are there liability issues to consider for this function? Is it a 3rd party frequency coordinator model?

c. What is the potential need to create an entity that supports and facilitates collaboration across the disparate federal advisory committees for UAS?

    i. Develop alternative mechanisms and governance structures for such an entity

Schedule

- Subcommittee kickoff: January 16, 2020
- Subcommittee meetings:
  - Scope & planning: February 24, 2020
  - Framework: March 11, 2020
  - Inputs: March 25, 2020
  - Status update: April 8, 2020
- Scheduling interviews:
  - FAA DAC
  - FCC TAC

Two-Prong Approach

1. Examine current state of the UAS environment and the committees supporting it
   - ➢ Spreadsheet matrix of different organizations
   - ➢ Interviews with advisory boards to collect additional information

2. Identify way ahead for C-band (5030-5091 MHz) spectrum access
   - ➢ Potential spectrum access mechanisms
   - ➢ Evaluation in terms of pros/cons & priorities

Federal Advisory Committees and Other Bodies & Activities

- FAA Drone Advisory Committee
- FCC TAC
- RTCA Special Committee 228 – UAS Standards Development
- ICAO Spectrum Management Working Group
- NASA – UAS Traffic Management Pilot Program
- 3GPP
- UAS EXCOM
- FAA/FCC/NTIA response to Section 374 of FAA Reauthorization Act of 2018

Advisory Board Interviews

- Intended to conduct interviews with relevant federal advisory boards
  - Looking at potential other industry groups that may provide benefit
- Interviews will focus on three areas:
  - Advisory board functions and activity
  - CNPC development
  - UAS spectrum considerations

Current State of the Environment

- Overview of the environment
  - Definitions
  - Complexities
  - Spectrum access
  - Classes of systems
  - Standards
  - Ongoing efforts / scope of activities
- CNPC functions

- Spectrum options
- UAS spectrum access
  - Frequency access models
  - Governance/ownership
  - Security/interoperability
  - Liability issues
  - Licensing

Definitions: UAS CNPC and C2

Control and Non-Payload Communications (CNPC)

- ITU-R: The radio links, used to exchange information between the UA and UACS, that ensure safe, reliable, and effective UA flight operation[1]
  - Includes telecommand messages, non-payload telemetry data, support for navigation aids, air traffic control voice relay, air traffic services data relay, target track data, airborne weather radar downlink data, non-payload video downlink data
- FCC TAC: Includes C2, detect and avoid, air traffic management, etc.[2]
- RTCA: Data and information sent to/from the Pilot Station and the UA for control of the UA and other safety-critical functions. It does not include any messages sent to achieve mission (payload) objectives[3]

Command and Control (C2)

- ICAO: The data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight[4]
- FAA: The link between the ground control station and the small unmanned aircraft[5]

Potential C-Band (5030-5091 MHz) Spectrum Access Mechanisms

- Third-party coordinator
  - Single or multiple coordinators
- Automated sharing
- Sense & avoid
- Unlicensed
- Band partitioning

Approach might vary depending on UAS classifications or requirements

Considerations

- Spectrum requirements for UAS differ from other non-aviation uses/bands because of its complex environment
  - Safety-of-life / safety-of-flight
  - Altitude
  - Mission
  - Operational types
  - Size
  - Multiple communication needs
  - Scaling problem with large number of UAS anticipated
  - PNT requirements

Initial Observations

- Spectrum needs vary based on the complexity of UAS use cases
  - Multiple categories of UAS and mission types means no single solution is applicable to all
- CNPC spectrum access and management is critical to enabling safe integration of UAS into the NAS
- NTIA/FCC need to be informed of UAS spectrum requirements and ensure coordination and integration across organizations and activities
- U.S. leadership is needed to provide direction and a way ahead
- Need to establish access granting mechanism and service rules
  - Market/flexible vs rules/prescriptive approach
  - To enable development of new UAS services quickly

Next Steps

- Conduct interviews: February 2020 – July 2020
- Analyze information and develop a summary of findings: August 2020 – November 2020
- Iterate interim findings and conduct follow-on work: December 2020 – February 2021
- Deliver report and recommendations to NTIA: March 2021