



# FAA UAS SYMPOSIUM

## Submitting Operational Waiver Requests



Federal Aviation  
Administration



























# Expanded Operations Timeline



# Night Operations Waiver

- Application completed outside the scope of Pathfinder Program
- Process:
  - Reviewed FAA guidance on night operations waivers
  - Looked at a few samples of published waivers and reviewed the Specific Provisions
  - Worked with internal flight operations team to determine how we would conduct our night operations safely
  - Identified training materials on night operations, developed curriculum and test for pilots
  - Talked to other operators who had experience flying at night
  - Submitted waiver application... waited... responded to multiple FAA requests for additional information

# Night Operations Waiver Application

- Must include...
  - Method for PIC to maintain VLOS
  - Method for PIC to see and avoid other aircraft, people and structures
  - Method for PIC to continuously know position, altitude, orientation, movement of sUAS
  - Knowledge materials and method for ensuring personnel understand how to operate safely at night
  - Method to increase conspicuity of sUAS to be seen up to 3 miles OR system to avoid aircraft

# BVLOS Waiver

- Backed by Pathfinder Research
- Significant financial investment conducting research for over a year by the time our waiver was granted
- Waiver application included 40 pgs of documentation – see my 2017 Symposium Presentation for details of CONOPS and ORA  
[https://www.faa.gov/uas/resources/event\\_archive/2017\\_uas\\_symposium/media/Workshop\\_5\\_Part\\_107\\_Waiver\\_Process.pdf](https://www.faa.gov/uas/resources/event_archive/2017_uas_symposium/media/Workshop_5_Part_107_Waiver_Process.pdf)
- Waiver permits
  - Operations in class G air space outside of built up areas
  - Operations covering around 38 square nm (vs. 3.14 VLOS)
  - Does not require VO – option to extend area using Remote VO, however neither PIC nor RVO needs to see the UAS
  - Is not limited to a specific UAS type



# BVLOS Waiver Application

Must include...

- Safety case that mitigates risks of proposed operation to acceptable level
- Method for Remote PIC to ensure separation from other aircraft
- Method for Remote PIC to know location, altitude, orientation and direction of sUAS
- Method for avoiding flying over people
- Method for determining operating limits of command and control links (i.e. How will PIC know if GPS is available? What if GPS fails?)
- Training program and qualifications for flight personnel
- Description of (performance-based) requirements that the UAS's used under the waiver will conform to

# BVLOS Waiver Stats & Trends

- As of Feb, 2018, FAA granted 15 BVLOS waivers to 11 operators
- All waivers except PrecisionHawk and FLIR's require at least 1 VO (several require multiple VOs, i.e. the "FPV waivers").
- Some waivers limited to specific UAV model, while others are broader and based on performance based capabilities
- 4 waivers limited to specific geographic coordinates
- Key take-away → NO single Concept of Operations or Operational Risk Assessment for BVLOS operations and waivers!

# How to Get to BVLOS

## Gain VLOS experience with UAV

Pilot uses vision to separate UAV from aircraft. Pilot learns normal and emergency procedures, gains familiarity with how the platform performs.

## Pursue localized BVLOS operations

Focus on pilot training and operating procedures to maintain separation, i.e. Pilot uses vision to scan airspace and detect manned aircraft.

## Advance to longer distance BVLOS operations

Pilot uses technology to ensure separation: 1) track UAV position, 2) track cooperative manned aircraft, 3) detect non-cooperative manned aircraft. See Pathfinder FA2 Phase 3 Report, coming out soon.

