Attachment 20 Special Circumstances Description

Special Circumstances: Arctic Ocean Mid-Air Hazard Analysis

The University of Alaska, Fairbanks, conducted an Air Traffic Density study for this operations area. The results of this study appear to show the likelihood of a mid-air collision on this operation when the UAS is operated at or below 3,000ft MSL and up to 50 miles from the ship, is less than 1 in 10,000,000 per mission flight hour. As such it is requested that alternate means rather than visual observation for mid-air hazard mitigation be accepted. These alternate means include:

1. Monitoring any other ship operations in the vicinity of our operation. The NOAA ship does not operate helicopters. The ship's RADAR will provide information about any other ships within the area.
2. The aviation search and rescue team in the Alaskan Northern Borough operate only up to 80 miles from their bases over the water. Opening up communication channels with the search and rescue office will be part of our operating procedures so if they do need to undertake an S&R mission we can stand down.
3. The on-board UAS camera system will be setup to routinely search for any airborne threats or any other ships in the vicinity of the aircraft.
4. Regular coordination with the air traffic control that manages the Flight Information Region (FIR) regarding any anticipated operations. The regularity of coordination will be worked out with that Oceanic ATC supervisor which manages the affected FIR sector(s).
5. Monitoring of air traffic control frequencies between pilots and ATC.
6. Request ALTRV's through CARF for the operational area.
7. Filing a D-VFR flight plan prior to each flight operation.
8. Applicable regulations set forth in 14 CFR, including all subchapters that apply directly to the State or Public Aircraft operating beyond the 12 NM territorial limit of the United States will be strictly adhered to.
9. At a minimum, we will follow the safety protocols specified in ICAO article 3(d) and operate with due regard for the safety of civil aircraft. Furthermore, 14CFR 121.161 establishes the expected civil aircraft operations that may be encountered.

Our study is basing these conclusions on the following work:

1. On-site air traffic investigations that were conducted in North and Western Alaska.
2. Discussions with air traffic managers in both Fairbanks and Anchorage. The Fairbanks and Anchorage ATC rotate the tower staff at the sites along the coast. The Anchorage ATC discussions were also with the Center operators.
3. Discussions with fixed base aviation operators.
4. Discussion with airport managers.
5. Discussions with the North Slope Borough Search and Rescue aviation team in Barrow Alaska.
6. Analysis of both primary and secondary RADAR data collected by the 611 at Elmendorf AFB in Anchorage Alaska. This is the NORAD early warning RADAR center who operate and maintain a suite of coastal airborne search RADARS in Alaska.

7. Mathematical analysis of the probability of a mid-air collision based on aircraft size, speed, and density.

Highlights of this study and its results were presented to the FAA's UAS Program Office in early March 2009.