

March 12, 2015

**Subject:** Project description: Stratus ESG, ADS-B, Mode S

Appareo Systems is designing an implementation for the FAA's Next Generation regulation (Code of Federal Regulations Title 14 Part 91 Section §91.225). This regulation requires the installation of equipment (Radio) capable of ADS-B messages. Appareo's component is being called the Stratus ESG.

The radio broadcasts aircraft state information to ground stations and any other aircraft equipped with an ADS-B capable receiver. This provides increased situational awareness for pilots and ground crews. An additional function of the ESG is compliance as a Mode S transponder. The ESG has an integrated WAAS GPS receiver. Below are the identified FAA Technical Standard Orders (TSO) that provide the guidance in developing the Stratus ESG.

1. TSO-112e (16 September 2013) – Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment
  - o Requirements doc: DO-181E (17 March 2011) – Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System / Mode Select (ATCRBS/Mode S) Airborne Equipment
2. TSO-145d (20 December 2013) – Airborne Navigation Sensors Using the Global Positioning System Augmented by the Satellite Based Augmentation System
  - o Requirements doc: DO-229D (13 December 2006) – Minimum Operational Performance Standards for Global Positioning System / Wide Area Augmentation System Airborne Equipment
3. TSO-166b (2 December 2009) – Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Service – Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)
  - o Requirements doc: DO-260B (2 December 2009) – Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)

**Purpose of Experimental License:**

Appareo is looking to validate the design of the Stratus ESG in an aircraft. Testing will include the installation of the ESG followed by ground and flight tests. During the ground and flight tests, communication with ADS-B towers will be required. Data from these communications will be requested from FAA in Washington. Operation of the flight tests will be within 150 nautical miles from Fargo Airport (FAR). Operation of the aircraft will follow the operating requirements of the National Air Space.

The antenna used for this testing is mounted on the bottom side of the aircraft. The antenna is a Commercial Off the Shelf antenna with certification to TSO-C74c. Please note that in Form 442, it was indicated that the antenna will not be above 16 meters. This answer was considered as

relation to obstruction of air traffic flow. Since the antenna will be mounted to an aircraft, it will not obstruct the flow of air traffic.

At the conclusion of successful testing, the design will be solidified. The Stratus ESG will then be submitted for FCC compliance testing at a FCC authorized test facility.

Very Respectfully,



Vernon Miller  
Certification Specialist