

# Attachment 1

## **Responses to Supplemental Questions from Office of Engineering Technology pursuant to FCC Experimental License Application, FCC file # 0040-EX-RR-2005 (ref number 4041)**

*1. Peak envelope power (PEP), and transmit antenna gain*

Maximum ERP of the transmitting system (antenna plus transmission source) is +56 dBm as specified by RTCA DO-185A.

*2. Type of antenna.*

Antenna is a 4 element array capable of directional and omni-directional transmissions.

*3. Elevation above sea level of the antenna site.*

Ground level is 33 feet above sea level.

(Note: this is per [www.airnav.com/airport/MLB](http://www.airnav.com/airport/MLB))

*4. Height above ground of the focal point of the antenna.*

Height above ground is 27 feet.

(Note: this is based on our 2 story building with 11 feet for each story and 5 more feet for the fixture on the roof)

*5. Antenna polarization.*

Vertical.

*6. The azimuth the antenna is pointed or appropriate designator to indicate whether the antenna is rotating, non-directional, etc....*

The system is capable of 4 separate directional transmissions – a forward, right, left, and aft beam. Total directional coverage is 360 degrees. The system is also capable of omni-directional transmissions.

*7. Pulse repetition rate (PRR) the equipment is capable of operating on to include PRR stagger sequences if appropriate, whether the PRR is adjustable and what PRR's the equipment can accept, and any other information that would be helpful in understanding the pulse characteristics of the equipment.*

The transmission PRR is variable depending on aircraft density as specified in RTCA DO-185A. Maximum Mode 3C pulse transmission is 391 pulses/sec (based on a RTCA DO-185A high density whisper/shout sequence). Maximum Mode S pulse transmission is 240 pulses/sec (based on a maximum of 80 interrogations/sec). We expect the nominal Mode S PRR to be less given the low aircraft density of the Melbourne, Florida, airspace. For Mode 3C, the system defaults to maximum for 60 secs on power-up and then reduces transmissions because of the low aircraft density.

*8. Pulse width*

Mode C transmissions have pulse widths of 0.8 +/- 0.05 usecs. Mode S transmissions have pulse widths of 0.8 +/- 0.05 usecs, 16.25 +/- 0.125 usecs, or 30.25 +/- 0.125 usecs depending on the particular pulse in the sequence. Pulse widths are as specified in RTCA DO-185A.

*9. Equipment nomenclatures.*

Next generation TCAS equipment under development includes products identified by Rockwell Collins nomenclature as ISS-2100 and TSS-4100.

*10. Whether the equipment is capable of blanking transmissions in certain azimuths and any limitations with respect to blanking.*

The system is capable of sequential directional transmissions dividing the 360 deg azimuth into 4 quadrants – forward, right, aft, left. There are no azimuths where transmissions are inhibited. The system is also capable of omnidirectional transmissions.

*11. Radius of operations if appropriate.*

Per the operating limits specified by RTCA DO-185A, a maximum transmit ERP of +56 dBm and a minimum MTL of -72 dBm, it is possible to communicate out to 30 nmiles.

*12. Detailed description of the proposed operation to include any technical parameters that will be altered during operations.*

It is our intention to operate within the RF pulse characteristics specified in RTCA DO-185A with regard to frequency, width, spacing, and maximum ERP. Parameters most likely to be altered include transmission rates and data transmitted (in the case of Mode S). Also, we would like the option to transmit Mode 3A.

*13. Will interrogations (transmissions) be made on 1090 MHz as well as 1030 MHz (airborne transponders typically only transmit on 1090 MHz and receive on 1030 MHz)?*

No. This license request is for 1030 MHz only.

*14. If transmissions will be made on 1030 MHz, in what modes of operation will the transmitter operate (Modes 1, 2, 3A, 3C, 4, 5, Mode-S)?*

Modes 3A, 3C, and Mode-S. While standard TCAS transmissions are Mode 3C and Mode-S we would like to include Mode 3A capability in our license.

*15. Is this a TCAS and is TCAS the only reason why the 1030 MHz transmissions are needed (airborne Mode 4 and/or 5 operations will be very difficult if not impossible to authorize and airborne Mode-S is not authorized)?*

Yes. This is a TCAS function being transmitted.

*16. To whom is this product being sold (is this confined to overseas customers or US customers)?*

Products developed through the requested experimental license could be made available to both domestic and international customers.

*17. Does the waveform meet all of the required ICAO Annex 10 requirements and appropriate RTCA documents?*

The TCAS function is designed per RTCA DO-185A and appropriate ICAO Annex 10 guidelines.