

EXHIBIT NUMBER 4

- (a) This application is intended to cover general TCAS II development activities using a ground based test station in an engineering lab with an antenna located on the roof of the facility.

The setup would be used to collect data on aircraft flying over the lab facility. This system would interrogate and receive replies back from those aircraft. The setup would be configured such that it would not interfere with the operation of TCAS systems onboard aircraft in the vicinity. This is accomplished by the following means:

- The TCAS system in the lab is setup in an “on-ground” configuration by setting the air/ground discrete input to TCAS to an “on-ground” state and inputting a radio altitude value of 0 feet. This guarantees that the system will remain in a TA-Only mode of operation and thus will not issue resolution advisories.
- The Mode S Transponder in this system is not connected to an antenna on the roof, but rather to a dummy load. This prevents aircraft flying overhead from tracking this ground based system.

TCAS II characteristics are well defined in the RTCA DO-185 MOPS and more recently in an update which has been approved as DO-185A. The update does not contain any modifications to the RF characteristics in the original specification. TCAS II systems certified to DO-185 have been in revenue operation since 1990 onboard aircraft. A general overview of system operation is included below:

The TCAS II system is an airborne traffic alert and collision avoidance system that interrogates ATC transponders in nearby aircraft and uses computer processing to identify and display potential and predicted collision threats. The system consists of:

- TCAS Processor LRU with top and bottom directional 4 element antennas (optionally the bottom antenna may be an omni direction antenna).
- Mode S Transponder LRU with top and bottom omni direction antennas.
- TCAS/Transponder control panel
- Resolution advisory cockpit display(s)
- Traffic cockpit display(s)

This application is being submitted specifically for the TCAS Processor LRU. This LRU consists of a 1030 MHz transmitter, a 1090 MHz receiver, various input/outputs to other aircraft systems, and microprocessors for processing and resolving collision conflicts.

The system protects a volume of airspace around the TCAS II equipped aircraft. The system provides appropriate aural and visual advisories to the flight crew to provide adequate separation when the computer analysis of intruding aircraft transponder replies predicts a penetration of the protected airspace. The system provides two types of advisories. A traffic advisory (TA) indicates the relative position of an intruding aircraft that is approximately 35 seconds from the closest point of approach and may a short time later require a resolution advisory (RA). The TA provides the flight crew the opportunity to visually acquire the intruding aircraft. A resolution advisory will produce a threat resolution in the form of a vertical maneuver that will increase separation when the computer predicts the intruder aircraft is within approximately 25 seconds from the closest point of approach.

The TCAS II system can only generate resolution advisories for intruders equipped with operative Mode S or Mode C transponders, which provide information on the altitude of the intruder. Traffic advisories which display the relative position of the intruder can be generated for aircraft with operative Mode S, Mode C or Mode A transponders. The TCAS II equipment is viewed as a supplement to the pilot who, with the aid of the ATC system, has the primary responsibility for

avoiding mid-air collisions. The TCAS II system provides no indication of traffic conflicts with aircraft without operative transponders.

- (b) Collins is developing two new model numbers of the TCAS Processor LRU, the TTR-921 and the TTR-4000. During the development, lab testing is necessary to verify the ability of the equipment to track other aircraft through the interrogation/reply scheme. Future development and testing of TCAS equipment will include modifications to existing TCAS types, as well as next-generation equipment.
- (c) This program is intended to develop and certify a next-generation production version of the Collins TCAS II system.

The need for continued experimentation with TCAS equipment will continue on an on-going basis after the TTR-921 and TTR-4000 have received equipment authorizations.