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## Bulletin No. 12

### MOUNTING USER-SUPPLIED EQUIPMENT ON THE NSF/NCAR L-188C ELECTRA

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**Note: The NSF/NCAR L-188C ELECTRA has been retired from service as of  
January 1, 2001.  
The information contained here is for historical purposes.**

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The purpose of this Bulletin is to acquaint prospective users with the most important considerations in mounting user-furnished equipment on the Electra. RAF engineers, of course, are responsible for the detailed planning of specific installations, but to realistically fill out the instrumentation section of the Request for Aviation Support form (See [RAF Bulletin No.1.](#)), a basic knowledge of the aircraft configuration is important. An overview and summary of capabilities of the Electra is described in [RAF Bulletin No. 4.](#)

The user-supplied equipment for the aircraft must conform to the criteria called out in [RAF Bulletin No. 13, "Design, Fabrication and Approval of User-Supplied Equipment for NSF/NCAR Aircraft"](#).

The aircraft has been modified with permanent structural changes. Some are designed for versatility, accepting a variety of user-supplied sensors, while others are parts of the basic Electra measurement system. Several figures of this Bulletin reference the name Fuselage Station (F.S.); this is a standard nomenclature used by aircraft manufacturers to designate a distance in inches from an arbitrary selected datum line at or near the aircraft nose.

[Figure 1](#) and [Figure 2](#) show the general external configuration of the Electra.

Note: These figures show the now-removed gust boom. It has been replaced by the radome wind-gust system described in RAF Bulletin No. 23.



the cabin, while the bottom ones are accessible from inside the forward baggage compartment. All the apertures are identical. Each has a 25.4 cm (10 in.) by 35.6 cm (14 in.) insert or plug that is removable from inside the aircraft, and all inserts are interchangeable. When the insert is installed, the outside surface is flush with the aircraft skin. Equipment can be fastened to the inside or outside of the insert. Additional support for equipment fastened to the inside of the insert can be provided by four hard points, located at each corner of the insert. The insert is designed to support an equipment-loading moment of 6.91 kg-m (600 lb.-in.). The four hard points can sustain a total additional moment of 6.91 kg-m (600 lb.-in.). These load requirements take into consideration allowance for in-flight loads and crash loads.

### *Electra Interior Arrangement*

The Electra floor plan (See [Figure 7.](#)) shows the general layout of the cabin. The entire forward cabin is generally available for research equipment and observer seating. In the center cabin, only the left side is available for user equipment, because the right side is dedicated to the Electra data system and permanently-mounted research equipment. The forward portion of the aft cabin is available for user equipment, while the aft portion is dedicated to permanent observer stations. The lavatories, galley and the lounge area are not available for research equipment.

A typical cabin cross section is shown in [Figure 8.](#) It is a circular section of 3.12 m (123 in.) diameter and extends from F.S. 200 to F.S. 1034, being interrupted by cabin partitions. Entrance to the cabin is gained by the forward main-entry door and the aft service door. The doors are 0.89 m (35 in.) wide by 2.03 m (80 in.) high.

- **Equipment Racks and Seat-Support Structure**

All equipment inside the cabin must be carried by the standard instrument racks (See [Figure 9](#) and [Figure 10.](#)) or the seat-support structure (See [Figure 11.](#)) except for equipment attached to the four hard points on the fuselage apertures.

The allowable weight in the instrument racks is 204 kg (450 lb.), and the allowable overturning moment is 103.7 kg-m (9,000 lb.-in.). The moment arms are measured from the bottom of the bay opening to the center of gravity of the equipment. Equipment can be installed in the high-boy rack (See [Figure 9.](#)) from the front, rear or aisle side, while in the low-boy rack, equipment can be installed only from the front and rear. (See [Figure 10.](#)) Equipment also may be installed on top of the instrument racks, but care must be exercised not to exceed the allowable load requirements.

The allowable weight of equipment that can be fastened to the seat-support structure is 104 kg (230 lb.) with an allowable overturning moment of 53 kg-m (4,600 lb.-in.).

The moment arms are measured from the top of the support to the center of gravity of the equipment. The loading requirements for the racks and seat-supports take into consideration allowances for in-flight loads and crash loads.

The instrument racks and seat supports are attached to existing hard points in the cabin floor and side wall. They can be moved fore and aft to different hard point locations in the various cabins as the need arises.

- **Dropsonde Dispenser**

A standard AMT-13 dropsonde dispenser has been installed in a spare aft emergency exit. It is capable of dispensing droppable stores of 8.9 cm (3.5 in.) diameter and 45.7 cm (18 in.) length

including the NCAR wind-finding dropsondes.

### ***Inspection Procedure***

All equipment to be installed on NCAR aircraft must conform to NCAR and FAA standards for use on aircraft. See [RAF Bulletin No.13](#) for a detailed discussion of these standards.

Users are required to submit equipment for inspection in advance of the actual installation date. They will be notified of submittal deadlines shortly after commitment of the aircraft to the project.

### ***Extraordinary Costs***

The RAF will assist the user with aeronautical and electrical engineering design and fabrication of special equipment for adaptation to the aircraft. However, the RAF will require a reimbursement for "extraordinary" costs if these modifications result in extensive shop work and materials.

### ***Further Information***

Questions concerning equipment design and mounting should be directed to RAF's Aeronautical Engineer, Mark Lord by [email](#) or by phone: (303) 497-1046.

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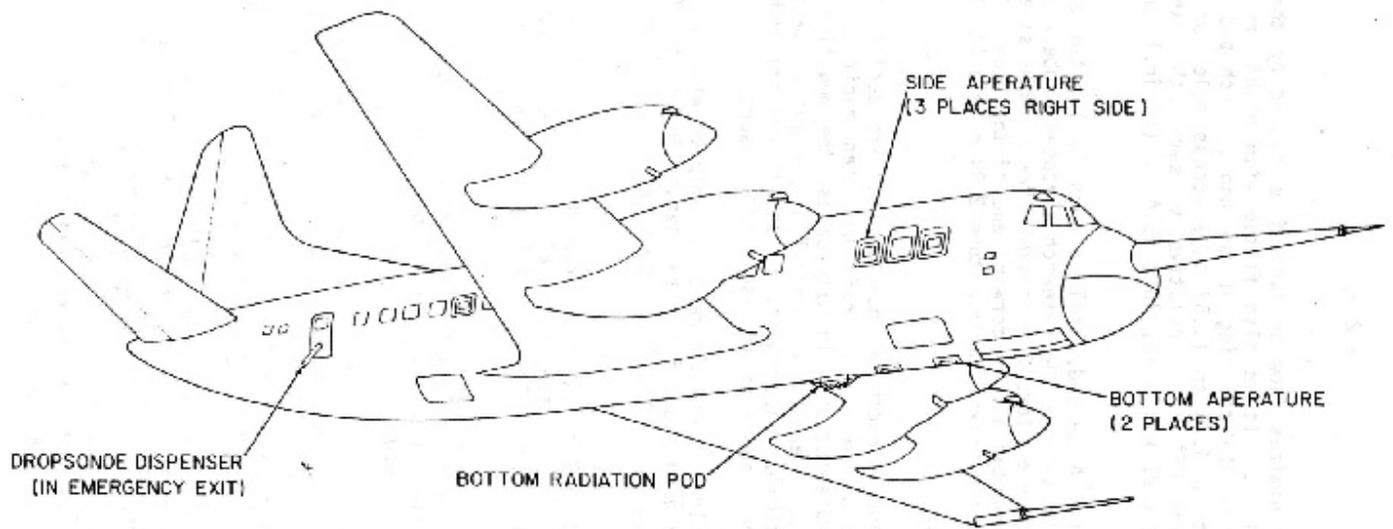
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**Figure 2. External configuration of the NCAR/NSF Electra, view #2.**

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