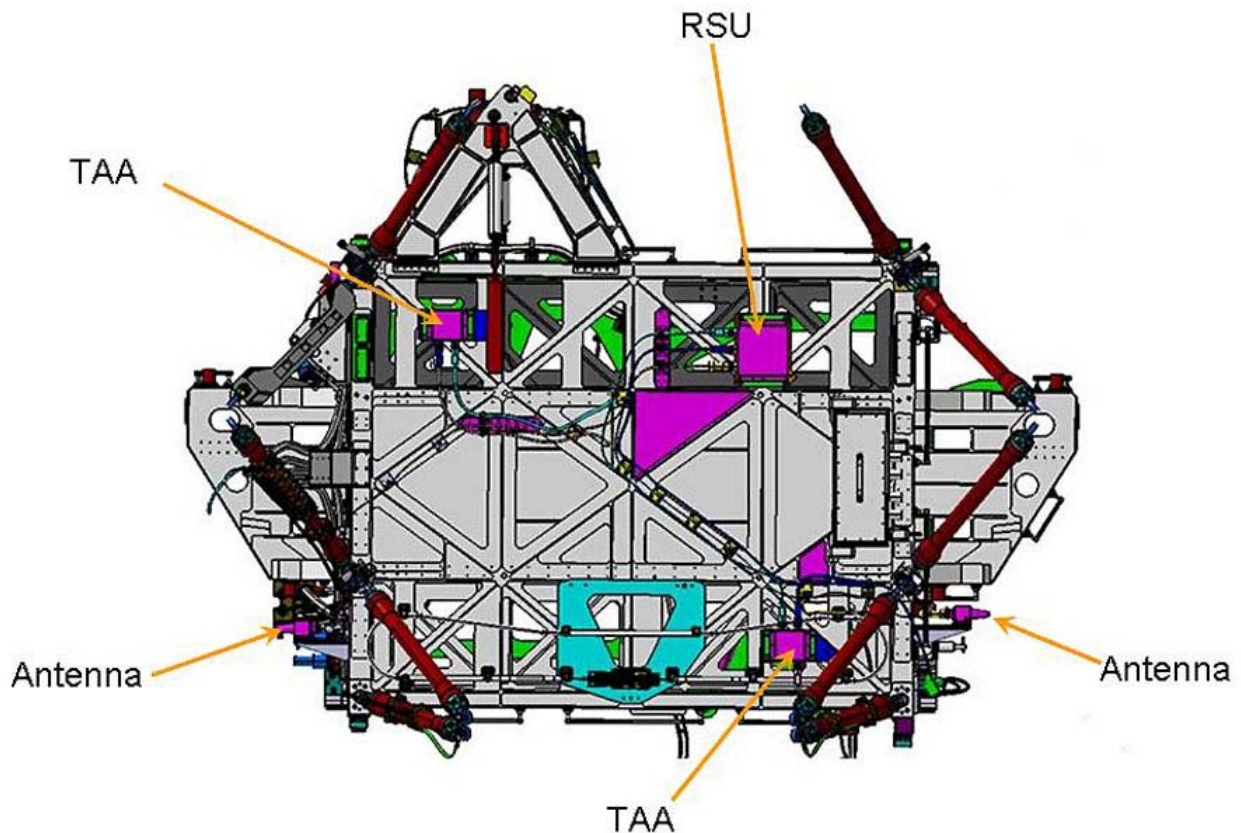

Space Exploration

External Wireless Instrumentation System (EWIS)

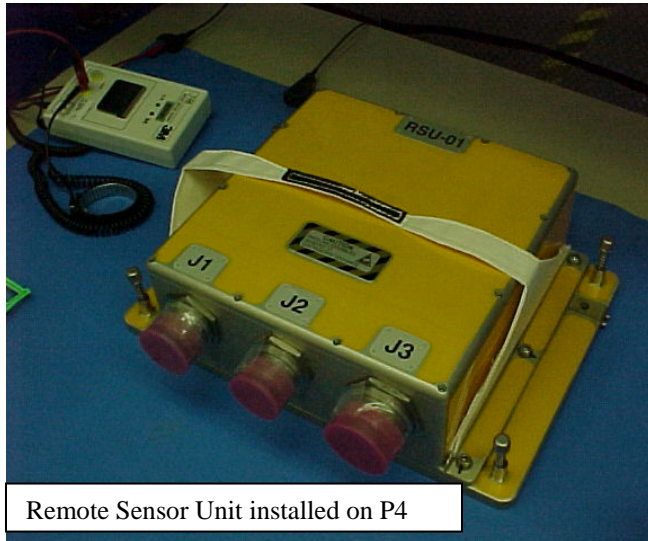


This is a picture of the inboard bulkhead on P4 looking outboard. This Bulkhead is just outboard of the SARJ

With the launch of the P4 element, NASA will deploy a new External Wireless Instrumentation System (EWIS) for the first time. The system consists of accelerometers placed around the outboard integrated truss structure. The system is currently installed on P4 and P5 and will also be installed on the S4 and S6 truss structures later this year at Kennedy Space Center. The six quarter size accelerometers on P4 measures accelerations in all directions, the x-, y- and z- axis orientations.

The vibration data seen by the accelerometers will be compared with their loads models so they can be further refined by engineers with actual on-orbit data to better predict the fatigue life and durability of the station's integrated truss structure. NASA and Boeing engineers will use these measurements, using refined models, to analytically

extend the 15-year design life of the truss elements. EWIS will also give engineers a better understanding of the actual response of the truss system on-orbit.

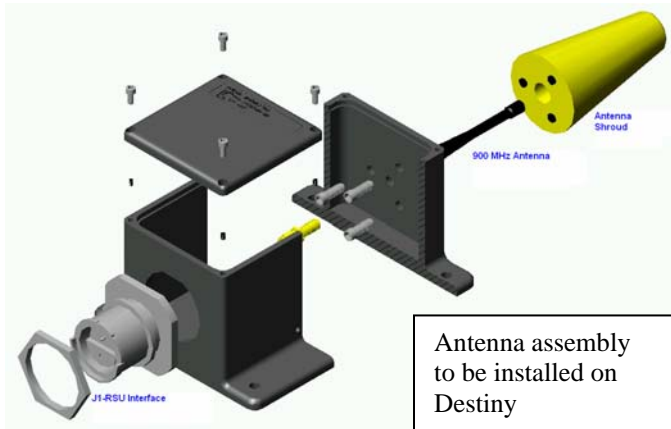


Remote Sensor Unit installed on P4

The space station has 33 hardwired accelerometers currently installed on the inboard truss elements (13 on S0, four on S1, six on P1, five on S3 and five on P3). The data from these accelerometers is transferred through the ISS Command and Data Handling System where it is relayed to the ground for engineers to analyze. The wireless system was created because there was no easy way to hardwire the accelerometers into the outboard truss elements, outside of the Solar Alpha Rotary Joint. The wireless system uses a spread spectrum radio system that

transmits at 900 MHz, similar to an older cordless phone. ISS power is supplied to the Remote Sensor Unit (RSU) on the P4 truss element, which contains the memory for the measurements, computer controls and the radio transmitter. The data will be collected as soon as P4 is powered up and will be stored in the RSU. When requested, it transmits the data to a briefcase sized Network Control Unit (NCU), which will be located in the avionics two rack in Destiny. In addition to the NCU, two 8-inch long antennas will be installed on the aft end cone on the nadir side of Destiny. The EVA to install these antennas is considered a get-ahead task for this mission, but more than likely will be installed on assembly mission 13A.1 in 2007. The NCU will be installed on station assembly mission 13A. EWIS is expected to be fully operational upon completion of station assembly mission 15A.

The new system was designed and tested by NASA and Boeing engineers, with work beginning in May 2003. It allows engineers to gather real-time data during dynamic events that might cause higher vibrations (loads) on the truss elements, such as docking operations with the space shuttle or Progress vehicles, SARJ rotations or during thruster firings during re-boosts. The data is expected to be retrieved several times a month. NASA and Boeing engineers believe these measurements will allow some of the conservatism and uncertainty to be removed from their models. Engineers also believe this data will be helpful in better understanding the kinds of loads exerted on future large structure exploration vehicles.



Antenna assembly to be installed on Destiny

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