



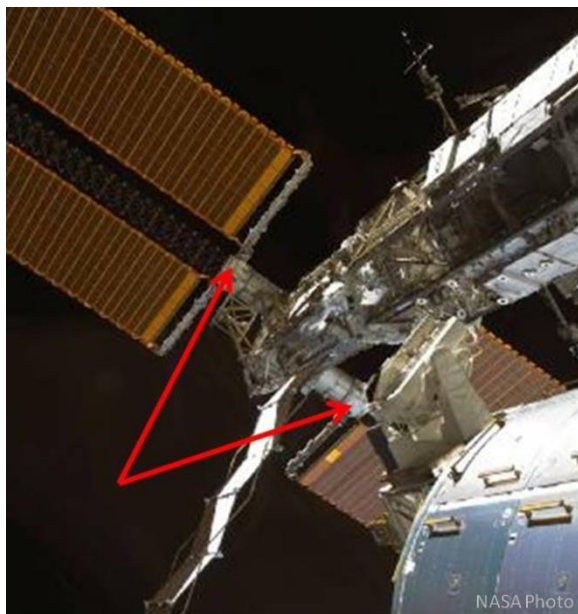
Invocon, Inc.

# Application Spotlight – EWIS

## Monitoring Space Station Solar Arrays

Solar arrays on the International Space Station (ISS) serve the critical function of providing electrical power for everything from life support to scientific studies. Therefore, the solar arrays must be continuously monitored to ensure they are not damaged by shock, vibration, or impact. However, because the solar arrays must rotate to track the sun, monitoring them is not trivial. To solve this problem, NASA turned to Invocon and its External Wireless Instrumentation System (EWIS).

EWIS Remote Sensor Units (RSUs) and Triaxial Accelerometer Assemblies (TAAs) are attached to the solar array trusses outboard of each Solar Array Rotating Joint (SARJ). They measure vibration at the micro-g level and then process or store the data before wirelessly transmitting it to the Network Control Unit (NCU).



EWIS located on Solar Array near SARJ



International Space Station

EWIS has two primary modes of operation:

First, it gathers highly-synchronized vibration data when scheduled by NASA engineers. This mode is used to monitor the structure during significant events such as docking and undocking of visiting vehicles or when re-boosting the ISS to a higher orbit. Synchronization is critical because it enables NASA to determine vibrational modes of the structure. NASA can program the accelerometers to be included in the measurement along with sample rate and other appropriate parameters.

Second, EWIS automatically defaults to a cycle counting mode that processes data in real-time to track the amplitude and number of vibration cycles experienced by each solar array. This information is used by NASA to determine the remaining useful life of the structure.

The wireless nature of EWIS greatly simplified the process of integrating it into the ISS and significantly improves its reliability.