

IUE SCIENCE OPERATIONS STATUS - AUGUST 1986

Two-Gyro/FSS Control System

Significant improvements have been made in the IUE two-gyro/FSS attitude control system since the last report on this subject in November 1985 (NASA IUE Newsletter No. 28, p. 147). During the past eight months, a dozen modifications have been made to the On-Board Computer (OBC) software which have improved operational flexibility and reliability. Observing efficiency has also been improved by the implementation of new ground system software.

The most significant OBC software modification was the new roll control algorithm which eliminates the roll-axis oscillation problem. The new roll control law has been used for normal operations since 14 May 1986. We have verified that the new algorithm does not reduce the pointing accuracy for exposures taken in any of the normal control modes.

While the origin of the roll oscillations is not completely understood, the new algorithm damps oscillations which sometimes exist at the end of a maneuver within a minute or two and prevents oscillations from occurring in other circumstances. The new algorithm uses less than one tenth the memory of the original code, which provides needed memory locations for future software changes. The new control algorithm is also the basis for two-axis Fine Sun Sensor control (pitch and roll) being developed for the one-gyro control system.

IUE on-target exposing time (telescope utilization) is the same for the three- and two-gyro control systems. Telescope utilization at Goddard over the six-month period January through June was 53.65 ± 6.39 percent in 1985 (three-gyro system) and 53.17 ± 6.35 percent in 1986 (two-gyro system).

Solar Array Power Predictions

IUE Operations Control Center analysts have projected the constraint-free Beta angle regions for the next several years, based on past solar array degradation history and the current power load for normal operations. The table below gives these Beta angle regions for February 1986 to August 1988. Observations can normally be obtained outside these regions, but battery discharge is likely to occur. It was assumed that the current spacecraft power load will apply throughout the period. There are several power-saving options under discussion which, if implemented, would increase the usable Beta angle range by three to six degrees at both ends. The risks and benefits of these options are being studied.

Year	Month	Beta range	Month	Beta range
1986	February	27° - 117°	August	29° - 115°
1987	February	30° - 113°	August	32° - 111°
1988	February	33° - 109°	August	35° - 107°

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