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AREA : Simulation and Modeling / Mission Planning

CATEGORY: Full Length Paper

Telecommunications Performance Prediction for Operational Orbit
Acquisition Maneuver Sequence Design

ABSTRACT:

Following launch on August 10, 1992, the **TOPEX/Poseidon** flight team began a complex sequence of maneuvers to, place the TOPEX/Poseidon satellite in it's operational orbit. This sequence was successfully completed on September 21. Working closely with the other Flight Operations Teams, Navigation designed each maneuver around operational constraints.

Of particular interest to maneuver design and implementation was the expected link performance during the maneuvers. Because of the spacecraft RF implementation and spacecraft geometry, maneuver constraints were developed to account for High Gain Antenna (**HGA**) or omni antenna performance.

The **telecom** constraints that guided the orbit acquisition maneuver sequence were: 1) The maneuver was constrained to occur during a TDRS view period 2) The TDRS view periods were scheduled to avoid the Russian RFI zones. 3) The HGA was used during the small maneuvers and **the omni's were used during the large maneuvers** 4) The large maneuvers were also constrained by omni antenna obscurations due to HGA and GPS antenna blockage and the partial coverage zones. (During these obscurations, the communication link could be lost for periods up to 10 minutes, during which time the maneuver was not permitted) .

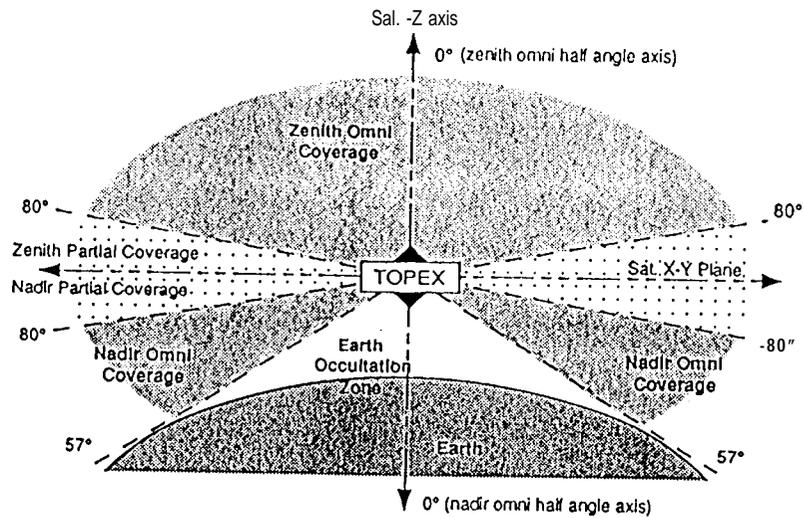
This paper will present the link prediction **models, the derived telecom constraints, and** the tailoring of the maneuver design based on the results.

Link performance was predicted using the **telecom** predictor program in the TOPEX Ground System (**TGS**) Satellite Performance Analysis Subsystem (SPAS) . Predicted versus actual results will be presented.

Figures showing the GPS and HGA cones of obscuration and **the omni** zones of partial coverage during omni operations are attached.

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TOPEX/POSEIDON POSSIBLE COVERAGE REGIONS FOR TDRS/OMNI ANTENNA LINK



TDRS-OMNI View Period Timeline Representation

