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Mapping the RFI Zones that Impact Telecommunications on the  
**TOPEX/Poseidon Project: Technique and Method**

ABSTRACT:

The terrestrial RFI regions which impact TOPEX's telecommunications operations are being mapped by the TOPEX/Poseidon Project. This has been accomplished by adapting the 2nd generation TDRSS transponder on board TOPEX to perform as an RFI radiometer, providing RFI monitoring and characterization capability.

RFI is "seen" by TOPEX via the NADIR omni antenna. When the nadir omni "sees" the RFI, the on board transponder's RFI limiter registers the event. Ground processing is then used for analysis and characterization.

As a result of the RFI monitoring, a library of the RFI zones has been developed. In addition to RFI intensity (radiometry), the library provides TOPEX's ground track LAT and LONG during the RFI event. TOPEX's RFI monitoring has identified three significant sources of RFI (outside the Russian RFI zones) which impact link performance. These are the DSN and RFI zones in the Caribbean and Australia.

Initially, the RFI radiometer was used to analyze return link data outages and late acquisitions. The technique was later used to assess Russian RFI West and East impact.

This paper will present TOPEX's RFI radiometer concept, implementation, and usage.

Results to be presented include: 1) Impact of the Russian RFI on link margins and comparisons to Goddard's original link estimates 2) Link performance during interference from the DSN and the RFI zones in the Caribbean and Australia. 3) The RFI radiometers use for evaluating multipath and interferometry.

One thing that has become apparent on TOPEX is that the telecom ops environment is a lot noisier than expected; and, the impact to telecommunications is more severe than anticipated.