

A SCENIC TOUR OF ATMOSPHERIC RADIO OCCULTATION: PAST, PRESENT, FUTURE

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Planetary radio occultation began with the US Mariner 4 mission to Mars in 1965. The technique was subsequently applied to many bodies in the solar system as far as Uranus and Neptune before it became adapted for use on Earth. The emergence of the Global Positioning System in the 1980s provided the necessary signals to make the idea practical and useful in a locale we can observe at close hand by many other means. Subsequent flight experiments, from GPS/MET in 1995 to CHAMP and SAC-C in 2000 to the current six-satellite COSMIC constellation have validated the accuracy and utility of the technique beyond all expectations. GPS-RO is now effectively the only atmospheric sensing technique with the accuracy and long-term stability to track the subtle signs of climate change above the earth's surface. Recent forecast impact studies at NCEP and NCAR have demonstrated dramatic forecast improvements with still sparse data. Today, ECMWF, UKMO, NOAA/NCEP, and other major weather services are assimilating COSMIC data operationally into daily forecasts. This presentation will review the history of RO from the early planetary days, summarize some recent results, and discuss possibilities for a more ambitious operational system to succeed COSMIC.