

JPL DEEP SPACE COMMUNICATIONS AND NAVIGATION SERIES

# ANTENNA ARRAYING TECHNIQUES IN THE DEEP SPACE NETWORK



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# Antenna Arraying Techniques In The Deep Space Network

**JS Bruner**



## **Antenna Arraying Techniques In The Deep Space Network:**

**Antenna Arraying Techniques in the Deep Space Network** David H. Rogstad, Alexander Mileant, Timothy T. Pham, 2005-02-18 An introduction to antenna Arraying in the Deep Space network Antenna arraying is the combining of the output from several antennas in order to improve the signal to noise ratio SNR of the received signal Now implemented at the Goldstone Complex and other Deep Space Network DSN overseas facilities antenna arraying provides flexible use of multiple antennas to increase data rates and has enabled NASA s DSN to extend the missions of some spacecraft beyond their planned lifetimes Antenna Arraying Techniques in the Deep Space Network introduces the development and use of antenna arraying as it is implemented in the DSN Drawing on the work of scientists at JPL this timely volume summarizes the development of antenna arraying and its historical background describes key concepts and techniques analyzes and compares several methods of arraying discusses several correlation techniques used for obtaining the combined weights presents the results of several arraying experiments and suggests directions for future work An important contribution to the scientific literature Antenna Arraying Techniques in the Deep Space Network Was commissioned by the JPL Deep Space Communications and Navigation Systems DESCANSO Center of Excellence Highlights many NASA funded technical contributions pertaining to deep space communications systems Is a part of the prestigious JPL Deep Space Communications and Navigation Series The Deep Space Communications and Navigation Series is authored by scientists and engineers with extensive experience in astronautics communications and related fields It lays the foundation for innovation in the areas of deep space navigation and communications by disseminating state of the art knowledge in key technologies [Antenna Arraying Techniques in the Deep Space Network](#) David H. Rogstad, Alexander Mileant, Timothy T. Pham, 2003 An introduction to antenna Arraying in the Deep Space network Antenna arraying is the combining of the output from several antennas in order to improve the signal to noise ratio SNR of the received signal Now implemented at the Goldstone Complex and other Deep Space Network DSN overseas facilities antenna arraying provides flexible use of multiple antennas to increase data rates and has enabled NASA s DSN to extend the missions of some spacecraft beyond their planned lifetimes Antenna Arraying Techniques in the Deep Space Network introduces the development and use of antenna arraying as it is implemented in the DSN Drawing on the work of scientists at JPL this timely volume summarizes the development of antenna arraying and its historical background describes key concepts and techniques analyzes and compares several methods of arraying discusses several correlation techniques used for obtaining the combined weights presents the results of several arraying experiments and suggests directions for future work An important contribution to the scientific literature Antenna Arraying Techniques in the Deep Space Network Was commissioned by the JPL Deep Space Communications and Navigation Systems DESCANSO Center of Excellence Highlights many NASA funded technical contributions pertaining to deep space communications systems Is a part of the prestigious JPL Deep Space Communications and Navigation Series The Deep Space

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Spaceborne Antennas for Planetary Exploration William A. Imbriale, 2006-06-30 This edited book is complementary to Large Antennas of the Deep Space Network Wiley 2002 which describes all the ground antennas used in support of the spacecraft Spaceborne Antennas for Planetary Exploration traces the development of the Jet Propulsion Laboratory JPL spacecraft antennas from the first Explorer satellite in 1958 to the present

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**1982 NASA Authorization** United States. Congress. House. Committee on Science and Technology. Subcommittee on Transportation, Aviation, and Materials, 1981

**1982 NASA Authorization (program Review)** United States. Congress. House. Committee on Science and Technology. Subcommittee on Transportation, Aviation, and Communications, 1980

Scientific and Technical Aerospace Reports, 1979

**Radio Occultations Using Earth Satellites** William G. Melbourne, 2005 the wave theory foundations of today s radio occultation techniques Forty years ago the premier radio occultation problem was how to profile the atmosphere and radius of Mars using signals sent by the Mariner 4 spacecraft Researchers then could rely on ray theory based techniques for accurate analysis of the thin uniform Martian atmosphere Today s radio occultation challenges mostly involve communications platforms and related data instrument systems and applications in the Earth s own atmosphere To deal with the density and complexity of this multilayered medium an analytical framework that goes beyond ray theory is needed Setting the cutting edge for the field Radio Occultations Using Earth Satellites A Wave Theory Treatment develops a purely wave theoretic approach to occultation analysis This approach yields more nuanced results than either ray or hybrid ray wave methodologies offer and proves suitable for the many variables at work in today s problems This groundbreaking text provides An introduction to the general theory of radio occultations Development of ray theory and scalar diffraction treatments of radio propagation processes Development of a wave theoretic treatment of the above wave propagation processes The correspondence between wave and ray theories A discussion of how to use a wave theoretic

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