



A Decade of Cassini Radio Science at Saturn

Richard G. French

Richard G. French, Cassini RSS Team Leader, Wellesley College, Wellesley, MA USA r french@wellesley.edu

Over the past decade, Cassini Radio Science observations have provided rich information about Saturn's rings, the atmospheres and ionospheres of Titan and Saturn, the gravitational fields of a host of Saturn's moons, and measurements of the dielectric properties of Titan's surface. Taking advantage of operating simultaneously at three wavelengths, the radial structure and particle distributions of the rings have been determined from dozens of occultation experiments, with highlights including unique contributions to our understanding of the F ring and evidence suggesting that the rings suffered a major impact over 600 years ago. A host of ionospheric and atmospheric occultations by Saturn have revealed evidence for spatial and temporal variations in their vertical structure. During several flybys of Titan, RSS experiments have determined the gravitational field of Saturn's largest moon, detected bistatic radar echoes, and studied the ionospheres and neutral atmospheres. Gravitational flybys of Titan and other Saturnian satellites provide valuable information about the internal structure of these remote worlds. The final stages of the Cassini mission, a series of "proximal" orbits during which the spacecraft will pass close to Saturn, will provide the opportunity to determine Saturn's gravitational field to a precision comparable to that of the Juno mission for Jupiter, and additional superb ring occultation measurements, leaving a rich legacy of observations for detailed and comparative studies.