



## WILLIAM T. PECORA AWARD

**Dr. John R. Apel**

**In recognition of his outstanding contributions as a visionary and pioneer  
in the field of satellite oceanography.**

Dr. John R. Apel is an internationally recognized pioneer in the use of satellite and aircraft data to study the world's oceans. He has made significant scientific, technical, and programmatic contributions in satellite oceanography and has been a world leader in the advancement of radar measurements of the sea.

Starting in 1970 when he joined the National Oceanic and Atmospheric Administration (NOAA), Dr. Apel argued for the development of oceanographic uses of the National Aeronautics and Space Administration (NASA) geodetic satellite, *Geos-3*. As a result, NOAA added a high-resolution mode to the *Geos-3* operational radar altimeter for wave height determinations. Before the end of the lifetime of *Geos-3* in 1979, the National Weather Service was using satellite wave height observations in its operational Marine Forecasts. While on assignment to NASA Headquarters in the early 1970's, Dr. Apel assisted with the development and evolution of the satellite oceanography program, and he chaired a NASA advisory committee that set the path for the future program in satellite oceanography. He also organized and chaired a major conference entitled "Sea Surface Topography from Space," the results of which established a scientific justification for space-based microwave measurements of the ocean and provided guidance to Federal agencies in advancing the case for ocean-viewing spacecraft.

Dr. Apel was a key advocate for and leader of the development of the successful *Seasat* mission, which paved the way for a new generation of ocean-viewing spacecraft that provide improved measuring and monitoring of the world's oceans. This includes the European Space Agency's *ERS-1* and *ERS-2*, U.S. Navy's *Geosat*, Russian *Almaz-1*, Japanese *JERS-1*, and most recently, the U.S.-French *TOPEX/Poseidon*.

It is equally important to recognize Dr. Apel's personal achievements in satellite oceanography research. He has been one of the most effective users of radar and optical images for studying oceans, especially their internal waves. He and his colleagues recognized internal wave surface signatures in early *Landsat* images of the ocean. He developed a quantitative theory for the generation, propagation, and dissipation of internal waves in shoal waters. He also applied nonlinear hydrodynamic theory and electromagnetic scattering concepts to images so that subsurface hydrodynamics can be discerned from surface measurements.

In recognition of a lifetime of leadership and accomplishments, the National Aeronautics and Space Administration and the Department of the Interior take pleasure in granting the 1998 William T. Pecora Award to Dr. John R. Apel.

Administrator  
National Aeronautics and Space Administration

Secretary of the Interior