

## Space Coast Scientists Receive NASA's Exceptional Engineering Achievement Medals

On June 30, 2011 research scientists Dr. G. Patrick Martin and Ms. Kathleen Andreozzi Minear were presented with NASA's most prestigious engineering honor, the Exceptional Engineering Achievement Medal. Their medals were presented by NASA Administrator Charles Bolden and Associate Administrator Chris Scolese in a televised ceremony at NASA headquarters in Washington, DC. Four medals were presented in this category, with Pat and Kathy receiving the only two awarded to non-agency individuals.



**NASA Transmit Antenna Combining Experiment  
Image Credit: AIAA SpaceOps**

The Exceptional Engineering Achievement Medal is given "for unusually significant engineering contributions towards achieving NASA's mission." They were recognized for their outstanding work on the NASA-funded Transmit Array Combining Experiment (TxACE), *"For the creation and operational demonstration of transmit adaptive arraying concepts and algorithms for widely-spaced apertures, including continual self-calibration through phase transfer methods and real-time tropospheric signal mitigation."*

The coherent uplink arraying technology was demonstrated using three 12m antennas spaced more than 60 meters apart. The NASA-funded demonstration took place at Harris' Palm Bay, FL campus. For over four decades the reverse of transmit arraying – receive arraying – had been possible. Signals from widely spaced antennas could be received and coherently combined, but not transmitted. Their method overcame a multitude of problems, and, at 1 a.m. during Tropical Depression 16 on September 29, 2010, the system mitigated these factors in real-time and autonomously. This was the first operationally feasible method ever demonstrated. Previous demonstrations did not address the phase variation due to each antenna 'seeing' a different path through the troposphere and were not self-calibrating (required either a moon-bounce or tower(s)).

Frank Van Rensselaer, former VP of NASA programs, was instrumental in bringing this innovative program to Harris. Frank was the VP and Senior Executive Account Manager for NASA business and attended the award ceremony at NASA Headquarters in DC.

"This is a tremendous award for Pat and Kathy and indicates NASA's recognition of the excellent engineering accomplishment of the TxACE experiment. Many NASA senior executives visited the TxACE facility during the testing and have consistently expressed their appreciation of the hard work and dedication of Pat and Kathy and their team," remarked Van Rensselaer.

Future NASA missions will rely on being able to transmit large amounts of data to the moon, Mars, and beyond. An array of many individual antennas has significant advantages over the traditional approach of continually increasing the power amplifier of one very large dish. This breakthrough technology brings NASA closer to realizing its future communication needs. Additionally, it enables high resolution RADAR imaging of asteroids and space situational awareness.



**NASA Administrator Charles Bolden and Associate Administrator Chris Scolese present Ms. Kathleen Andreozzi Minear and Dr. G. Patrick Martin with their Exceptional Engineering Achievement Awards**