

Dr Mark Psiaki receives the ION Kepler Award

The Institute of Navigation presented Dr Mark Psiaki with the prestigious Johannes Kepler Award during the ION GNSS+ 2021 Conference on 24 September.

Dr Psiaki was recognized for setting a standard of rigor, clarity, and thoroughness in addressing key estimation and signal processing problems in PNT.

He originated the technique of bit-wise parallel RF signal processing for use in general-purpose processors. This enabler of software-defined GNSS led to the first space deployment of a fully software-defined GNSS receiver on a general-purpose DSP and to the widespread adoption of software-defined GNSS across the aerospace industry.

Additionally, Dr Psiaki's real-time software radio expertise enabled the development of a spoofer cultivated in his research group. Dr Psiaki subsequently led the development of spoofing detection algorithms based on cross-correlation of unknown P(Y) codes and based on direction-of-arrival sensing.

Dr Psiaki was the lead signal processing designer/analyst for the iGPS program that combined Iridium L-band downlink signals, GPS signals, and INS data to enhance GPS anti-jam capabilities. Recent work on LEO-based navigation fuses observables from an existing global communications constellation with INS and other sensor data to provide a back-up to GPS. Another contribution demonstrates how Doppler-based navigation could replace pseudorange-based navigation if implemented using a large LEO constellation.

Dr Psiaki has made many contributions to the practice of modeling, estimation, and detection applied to GNSS, including the study of GNSS carrier phase modelling for space-based applications. His campaign to decode the GIOVA-A L1 BOC(1,1) PRN codes enabled Galileo receiver manufacturers to test their systems before the European Space Agency published the codes. His group's work on ionospheric scintillations led to the first commercially-available scintillation simulators.

Professor Psiaki holds the Kevin T Crofton Faculty Chair of Aerospace & Ocean Engineering at Virginia Tech. He studied at Princeton University, completing a BA in Physics in 1979 (*magna cum laude*) followed by an MA (1984) and a PhD (1987) in Mechanical & Aerospace Engineering. He is a past

recipient of the ION's Burka Award, its Tycho Brahe Award, and the Pride at Boeing Accomplishment Award. He is a Fellow of both the AIAA and the ION.

The Johannes Kepler Award recognizes and honours an individual for sustained and significant contributions to the development of satellite navigation. It is the highest honour bestowed by the ION's Satellite Division.