



## **NEWS** from the **Radio Technical Commission for Maritime Services (RTCM)**

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### The Radio Technical Commission for Maritime Services (RTCM) Honors Dr. Rudy Kalafus

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*Summary:* The Radio Technical Commission for Maritime Services (RTCM) has recognized Dr. Rudy Kalafus for his 25 years of service as Chairman of RTCM Special Committee 104 on Differential Global Navigation Satellite System (DGNSS) Service. Under his leadership, RTCM's series of DGNSS standards started with the U.S. Coast Guard's Differential NAVSTAR GPS service for ship harbor entrance and approach navigation, and have grown into internationally used services not only for navigation, but also for precise positioning in surveying, geodesy, agriculture, and other applications. Dr. Kalafus recently announced his retirement from the committee, and was presented with a plaque recognizing his service at the September meeting of Special Committee 104.

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Global Navigation Satellite Systems (GNSS) provide geographical positioning information from a constellation of satellites in orbit to receivers at sea, on the ground, and in the air. The best known of these systems is the U.S. Global Positioning System (GPS), but the Russian GLONASS system provides a similar service, as will the European Galileo system. Together they are known as Global Navigation Satellite Systems, and they can provide position accuracies in the 10 meter to 15 meter range. Although the satellites have the potential to provide more accurate positions, atmospheric and other effects degrade the quality of the satellite signals.

As impressive as GNSS systems are, they do not directly provide accuracies that are good enough to rely on for ships entering harbors, or docking, for example. The satellite signals can be corrected by using a reference stations at precisely known locations, which provide corrections to GNSS receivers nearby, through radio data links or via Internet. This technique is known as Differential GNSS (DGNSS) service, and it has enabled precise navigation not only by ships, but also aircraft, and ground vehicles. Now centimeter level accuracy can be obtained, providing surveyors and geodesists with the precision they need. New applications continue to be developed.

RTCM has been fortunate to have the services of Dr. Kalafus as the chair of Special Committee 104 on Differential GNSS Service, since its inception in 1983. He is one of the GPS pioneers, and recently has consulted with the Military and Advanced Systems group of Trimble Navigation. He worked at Trimble from 1988 until 2002, leading efforts to incorporate differential reference station and mobile capability in receivers, and

developing airborne receivers. Prior to that he was at the U.S. Department of Transportation's Transportation Systems Center from 1970 to 1987, where he was active in aircraft navigation and surveillance system development, notably Microwave Landing Systems (MLS) as well as GPS, and was instrumental in the early development of the Coast Guard radiobeacon-based differential GPS broadcast network, which led to the establishment of the RTCM Special Committee. He has been active in the development of satellite navigation standards for maritime and aviation between 1983 through the present.

Dr. Kalafus received a Ph. D. in Electrical Engineering from the University of Michigan in 1966, where he also received his BSEE and MSEE.