

Automatic weather station supports marine scientific research

Safe and efficient marine scientific research aboard scientific research vessel Tan Kah Kee of Xiamen University



The client:

Ningbo Topsun Marine Technology Co., Ltd.

Vaisala provided:

Maritime Observation System AWS430



同盛海洋
Topsun Marine

Scientific Research Vessel Tan Kah Kee (R/V TTK) is a 3,000 ton, comprehensive marine scientific research vessel with a mission of "scientific research, talent cultivation, serving society and cultural inheritance in the 21st century."

R/V TTK can conduct real-time and synchronous observation and on-site scientific experimental research on hydrology, chemistry, biology, geology, geophysics, atmospheric and related interdisciplinary fields, and supports high-speed remote information transmission.

The first comprehensive marine scientific research vessel in China, R/V TTK features an international

concept and is locally designed and built. Its concept and design are comparable to its international advanced peers, achieving multiple technological innovations in China, and includes cleanliness, quietness, versatility and sustainability features.

Meteorological challenges in marine scientific research

From its delivery in 2017 through the end of December 2022, R/V TTK had completed 39 scientific research projects including 1,207 days of marine navigation with scientific research experiments. For example, researchers conducted real-time matching records of meteorological data and GO8050 CO₂ navigation data on board; simultaneously, stable and accurate real-time synoptic meteorological observation data were collected, which is the basis of conducting related research on the interaction between sea and air.

R/V TTK's maritime operations are concentrated in the South China Sea and the Western Pacific, where the spatial distribution and temporal changes of the synoptic system are complex, with obvious seasonal variations characteristic of marine meteorology.

Compared to the largest commercial vessels, R/V TTK can be susceptible to severe weather and sea conditions: Navigating through favorable synoptic and sea conditions is important to ensure the safe and efficient operation of scientific research activities.

In addition to standard marine and synoptic forecast resources, R/V TTK needed an onboard automatic weather station so researchers

*Master the weather,
master the sea*

could obtain accurate, real-time atmospheric observation data and so the ship can safely navigate through favorable weather and sea conditions.

**The solution:
Modern, reliable observation
data onboard**

R/V TTK is equipped with the Vaisala Maritime Observation System AWS430. This automatic weather station is specifically designed to withstand the corrosiveness of the marine environment.

AWS430 successfully passed environmental, electrical, vibration and impact tests, and the testing specifications comply with Lloyd's Register and IEC60945 requirements. The automatic weather station provides accurate and reliable data on wind speed and direction, pressure, humidity and temperature, solar radiation, and rainfall to enable efficient research and safe navigation.

AWS430 weather station integrates classic meteorological sensors. Vaisala Ultrasonic Wind Sensor WMT700 is based on Vaisala's WINDCAP® wind

measurement technology to ensure accurate results. Sensors are equipped with probe heating function to avoid the probe from accumulating ice and snow in cold climates. Vaisala Temperature and Humidity Sensor HMP155, equipped with HUMICAP® temperature and humidity probes, features long-term stability and endurance in harsh marine environments, as the probe heating facilitates humidity inside sensors lower than surrounding environment to reduce the risk of condensation.

AWS430 fully supports NMEA0183 and IEC1162-1 data communication requirements and can receive GPS compass signals to obtain accurate, true wind data.

**The benefits:
Safe navigation and efficient
marine research**

Marine scientific research must be conducted with atmospheric observations, and the stability and reliability of AWS430 gives researchers confidence that they can accomplish their research goals aboard R/V TTK.

R/V TTK is a highly advanced marine science research vessel, and is the first of its kind in China. The vessel is equipped with the Vaisala Maritime Observation System AWS430 to enable safe navigation and efficient research.

Stable, accurate, and reliable real-time atmospheric observation data during navigation has been the standard matching for spot marine observation. Marine scientific research requires favorable meteorological conditions. During navigation, obtaining meteorological data is the prerequisite for meteorological research and analysis to ensure safe navigation and efficient research.

AWS430 is helping researchers on R/V TTK with reliable atmospheric observations. During navigation, the automatic weather station has operated reliably with convenient on-site maintenance.

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