Meteorology

Meteorology is a science that deals with the atmosphere and its phenomena and especially with weather and weather forecasting. The Meteorology Team consists of technicians and software developers who acquire, process and display meteorological data based on customer requirements. Meteorological data is acquired through ground-based and upper-air weather observations. The acquired meteorological data is then processed and displayed through Commerical Off-the-shelf (COTS) or custom software. Meteorological data allows flight test engineers to understand how meteorological conditions affect test articles, verify on-board meteorological sensors, monitor tests to ensure safety and enforce flight restrictions.

GROUND-BASED WEATHER OBSERVATIONS

Ground-based weather observations are recorded using fixed meteorological stations and portable meteorological stations. Both stations support compatible displaying and data recording options.

The MetPac is a fixed meteorological station that calculates and reports various parameters. MetPacs provide meteorological data at the MK-7 Arresting Gear and TC-7 Steam Catapult at NAS Patuxent River.

MetPac

The Transportable Automated Meteorological Station (TAMS) is a compact, rugged, self-contained portable meteorological station designed for rapid setup and operation in the field. The case and system components are built to withstand rough handling and severe weather conditions.

Transportable Automated Meteorological Station (TAMS)

GROUND-BASED METEOROLOGICAL SYSTEM PARAMETERS

- Mean wind speed
- Mean wind direction
- Standard deviation of wind direction
- Mean air temperature
- Instantaneous wind speed
- Instantaneous wind direction
- Instantaneous air temperature
- Relative humidity
- Barometric pressure
- Time of sample
- Wind gusts
- Minimum wind direction
- Maximum wind direction
- Dew point

RS92 Radiosonde

FOR MORE INFORMATION

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Meteorology

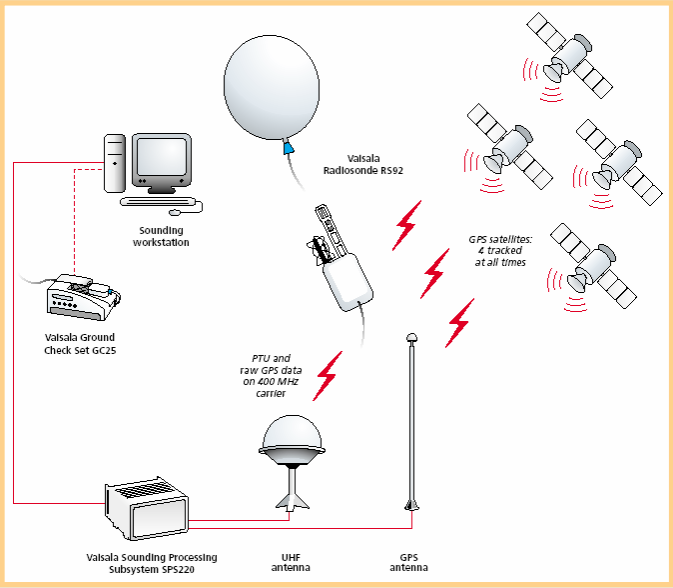
UPPER-AIR WEATHER OBSERVATIONS

ATR offers upper-air weather observations at Patuxent River and remote test sites. The upper-air weather observation system consists of a helium-filled balloon that carries a rawinsonde into the upper atmosphere. Rawinsondes are meteorological devices that are used to measure temperature, humidity, pressure, wind speed and direction in the upper atmosphere.

During the ascension, the rawinsonde constantly transmits atmospheric temperature, humidity and pressure data to ground receiving equipment. This equipment, called a sounding system, processes and converts the data into meteorological weather messages. When the rawinsonde reaches an altitude of approximately 30 km, the balloon bursts and the rawinsonde falls back to Earth. A parachute slows its descent.

UPPER-AIR METEOROLOGICAL SYSTEM PARAMETERS

- Time of sample
- Altitude of sample
- Barometric pressure
- Air temperature
- Relative humidity
- Dew point
- Refractive index value
- Modified refractive index value
- Wind direction
- Wind speed
- Air density
- Ascension rate of rawinsonde
- Sonic speed
- Custom parameters and outputs



Meteorological system diagram

FUTURE GROUND-BASED METEOROLOGICAL SYSTEM PARAMETERS

Goals:

- Replace current MetPac and TAMS systems with a more reliable and functional system. Current systems contain mechanical wind sensors
- Increase functionality between ground-based and upper-air meteorological systems. Ground observations must be manually entered during radiosonde preparation

Plans:

- Acquire Vaisala MAWS 110 meteorological system to replace the fixed MetPac systems and the portable TAMS system

Benefits:

- Increased reliability – Vaisala MAWS 110 meteorological system contains ultrasonic wind sensors with no moving parts
- Increased functionality – Vaisala MAWS 110 meteorological system can communicate with the Vaisala upper-air system. Ground observations are automatically entered during radiosonde preparation

FUTURE UPPER-AIR METEOROLOGICAL SYSTEM PARAMETERS

Goals:

- Replace legacy upper-air system to increase reliability
- Track location of radiosonde

Plans:

- Acquire Vaisala DigCORAIII upper-air meteorological system to replace the legacy upper-air systems
- Create program to produce an output file containing latitude and longitude in time history format

Benefits:

- Increased supportability and reliability
- Increased safety