



Turbulence diagnostics is an important step in research and development because it has great impact in numerous applications from aerodynamics to passenger comfort. Hotwire anemometers provide the best spatial and temporal resolution for turbulence investigations.

Constant Temperature Anemometry (CTA)

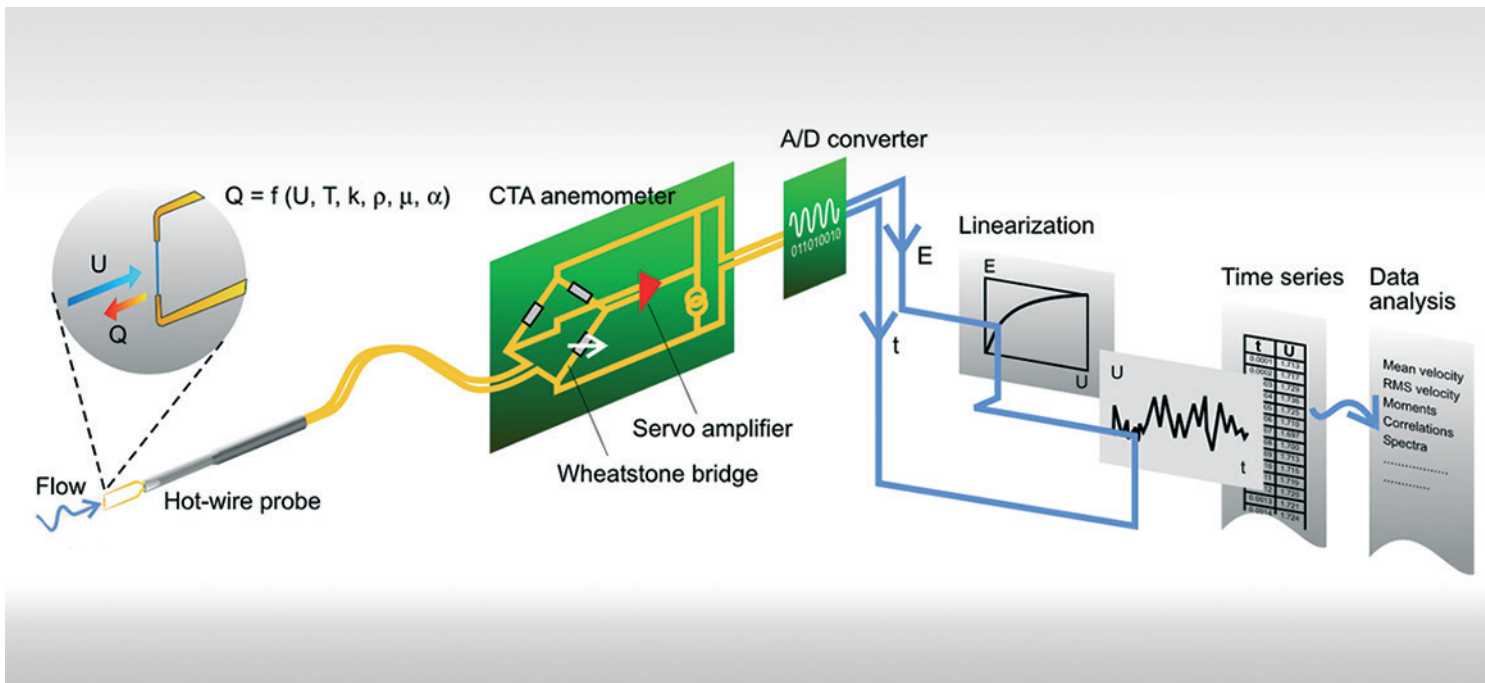
CTA is a well-established point measurement technique with commercial systems available for several decades. Application areas include temperature, shear stress, velocity and turbulence measurements in e.g. jets, boundary layers, transitional flows.

Even though the CTA technique is intrusive and its response is non-linear; it is still the best option for accurate turbulence investigations, boundary layer diagnostics, high-frequency temperature fluctuations and simultaneous multi-point velocity measurements.

We offer:

- High quality research grade anemometers
- Low cost, educational and mobile anemometers
- Automatic and manual calibration systems for air
- Manual calibration systems for water
- Probes with wire, fiber-film and film sensors
- Data acquisition and control systems
- Dedicated software package that reduces the burden of experiments; incl. hardware control, automated calibration and automated acquisition.

CTA Measurement Principle



The CTA measurement principle is based on heat transfer from a heated sensor.

The CTA measurement principle is based on the cooling of small sensors placed in the flow:

The temperature (resistance) of the sensor is kept constant by an advanced feedback control loop that contains an electronic bridge circuit. This way, the anemometer produces a continuous voltage that is proportional to the instantaneous flow velocity. The output signal is sampled with high resolution so the flow velocity is determined accurately both in the amplitude domain and in the frequency domain.

Three different anemometer systems cover a wide variety of applications, from extremely accurate turbulence investigations in a thin boundary layer to measuring mean wind profiles out in the open field. The MiniCTA systems are quite popular in field applications as well as for educational use.

Each anemometer system consists of a mainframe, CTA modules, calibration equipment, hotwire probes and accessories, a data acquisition and control system, and a dedicated software package.



StreamLine Pro - the most reliable research-grade CTA system.



MultichannelCTA - the multiple channel version of the MiniCTA system.

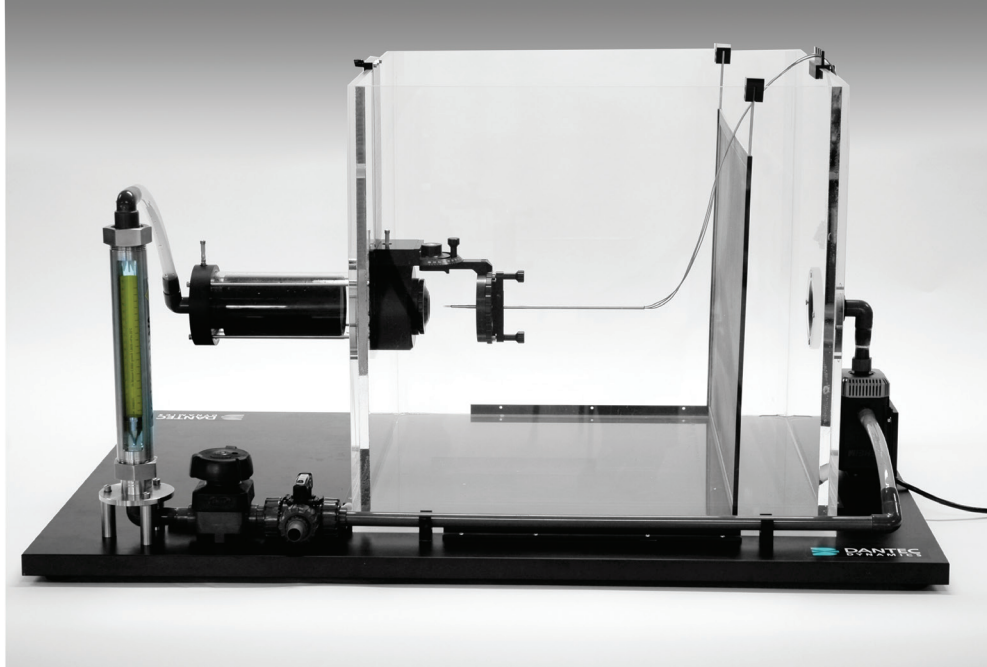


MiniCTA - the most compact CTA system for educational use.

Calibration is Key in CTA Measurements



StreamLine Pro Automatic (Air) Calibrator.



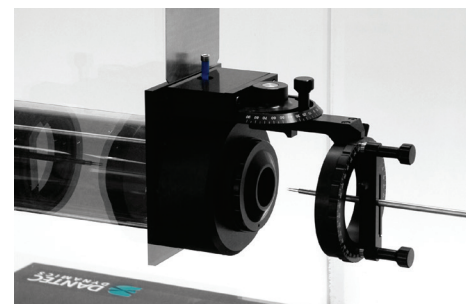
Water Calibrator.

An accurate CTA measurement requires an accurate calibration. With decades of experience Dantec Dynamics has designed an automatic and a manual calibrator for air applications and a water calibrator.

The air calibrators are able to produce speeds up to Mach 1 and the water calibrator up to 2 m/s, and the calibrators are delivered with exchangeable nozzles to cover their individual velocity range. All calibrators are compatible with the Pitch/Yaw – Roll (PYR) manipulators, which are required for directional calibrations.

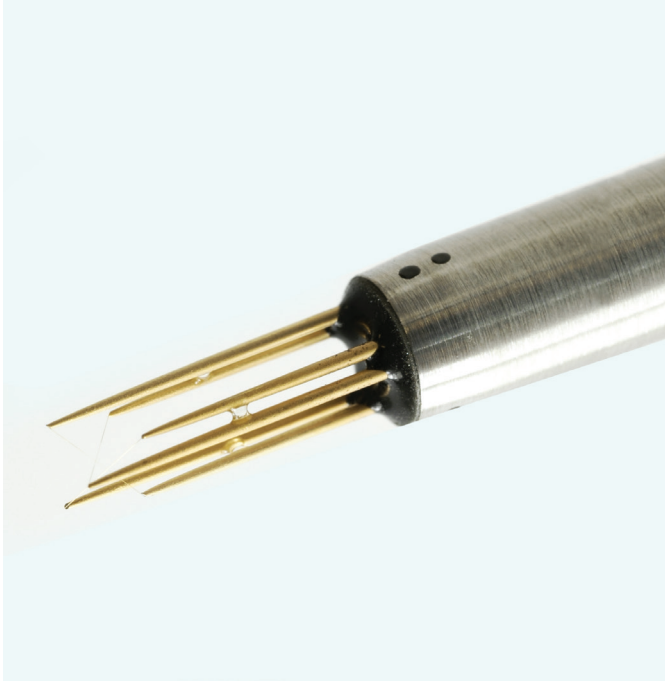
Directional calibrations are required for multiple-sensor hotwire and hotfilm probes. A single axis rotation (Pitch/Yaw) is sufficient for 2-sensor probes, whereas a two-axis rotation (Pitch/Yaw & Roll) is required for calibrating 3-sensor probes. These operations are made simpler by the manual and motorised PYR manipulators.

The motorised PYR manipulator is compatible with the air calibrators whereas the manual version is recommended for the water calibrator. Both versions are supported in the CTA software StreamWare Basic and StreamWare Pro.



Manual and motorized pitch-yaw manipulators allow probe rotation around two axes during directional calibration.

Probes



Triaxial Parallel-flow probe with gold-plated wire sensors.



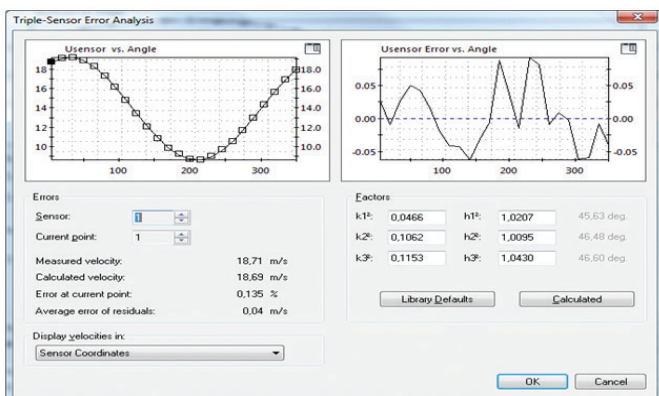
Triaxial cross-flow probe with fiber-film sensors.

Dantec Dynamics has a comprehensive probe program. The hotwire and hotfilm probes are a result of more than half-a-century design and manufacturing experience. The product range is complete with accessories: probe supports, mounting tubes and guide tubes.

Standard probes are available with different sensor materials for use in gaseous or liquid media, addressing different applications and challenges. For demanding applications where standard probes are not sufficient, custom designs can be provided upon request.

Dantec's probe manufacturing precision manifests itself during directional calibration events. For multi-sensor probes, the sensors should be placed perpendicular to each other in space to achieve a balanced directional sensitivity. This dictates the prong placement with tight manufacturing tolerances.

If the prong and sensor placement is close to ideal a low residual error during directional calibration is observed. The result is near-textbook values for the pitch and yaw coefficients and an accurate velocity measurement.



Dantec Dynamics' probe manufacturing precision manifests itself in directional calibration events.



Thin film coating in Dantec Dynamics' clean room facility.