

# **‘MICRO-CTA’ THERMAL ANEMOMETRY SYSTEM**

## **User Manual**



### **WARNING**

**Read this document before using the product.**

This probe is an experimental prototype, for measurement purposes only.

This system is not certified for use on aircraft.

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## Version Control

Version	Date	Summary of changes
1.0	02-2018	New document
1.1	02-2019	Updated specifications
2.0	09-2019	Updated content and specifications, reformatted

# 1 INTRODUCTION

## Principle of operation

This probe system includes a miniature thermal anemometer and a CMOS-based flex-probe (including one velocity sensor and one temperature sensor). The probe system carries out temperature corrections in hardware, and will stream data continuously over the USB cable to a connected PC.

The system will provide the CTA bridge voltage and fluid temperature. Note that velocity calibration is usually required. Calibration drift will be within ~2% over long periods of use or storage.

## System description

Miniaturized low-velocity thermal anemometry system.

## System components

1x CTA unit	The CTA unit has all of the sensors on-board, except for the fluid velocity and temperature sensors.
1x Sensor kit	One temperature and one velocity sensor are included in the base system. Note that these are not interchangeable.
1x USB cable	A low-profile USB micro->A connector is bundled with the system.

Please ensure that all the system components listed above have been supplied, and that there is no apparent damage from shipping.

## System requirements

To interface with a computer, the probe system requires 64-bit Windows 7 (or newer) operating system (not included). Note that computer interface is not needed for stand-alone streaming operation. The probe has been pre-loaded with firmware; the computer software drivers and data logging software will be provided electronically

## 2 DETAILED SPECIFICATION

Velocity range	< 10 mm/s to 120 m/s (custom extended range available)
Uncertainty	± 1 % relative
Compensated temperature range	0° to 70° C ambient for dry air
Calibration drift	< 2 % over long periods of use or storage
Storage temperature range	-40° to +85° C
Maximum relative humidity	95 % (non-condensing)
Communications interface	Data streaming via USB2.0
Power	via USB, typ.160 mA, 800 mW
Data acquisition rate	Up to 400 Hz
Digital resolution	16-bit
System requirements <sup>1</sup>	64-bit Windows 7 or later

<sup>1</sup>Note that computer interface is not needed for stand-alone streaming operation

### Physical Layout

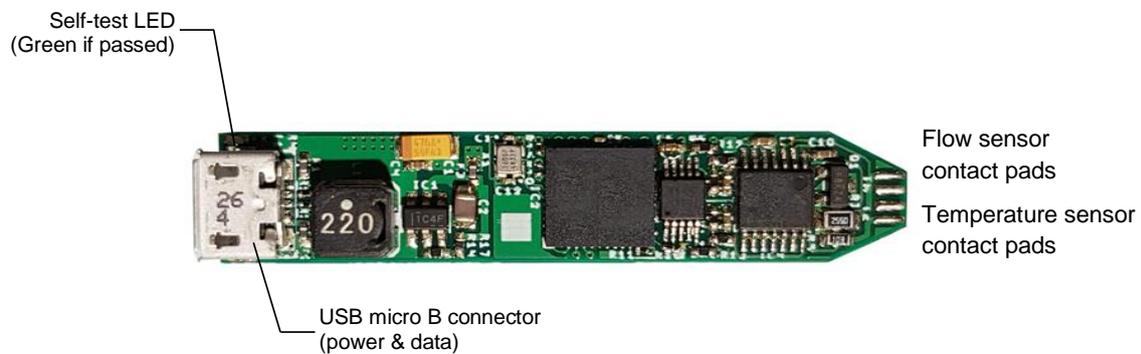


Figure 1: Description of the board components

### 3 CARE AND HANDLING

**WARNING:** Do not allow any liquids to come into contact with the sensor package, or the system may be permanently damaged.

**WARNING:** This system is intended for use with SSL proprietary CMOS sensors, and cannot be used with platinum-tungsten hot-wire probes.

- ESD precautions should be taken before handling.
- Keep the sensor free of dust, dirt and liquid. This will alter the system performance.
- Protect the sensor package from moisture and dust, and store in an ESD-safe sleeve when not in service.
- Connect cables to the probe with care, as the socket mountings are fragile.
- Ensure that appropriate strain relief is used: cable strain may cause erroneous sensor readings.
- Do not use the standard sensors in wet or condensing conditions. Store in dry environment, or with desiccant pouch. Coated sensors are available for use in wet, conductive or other harsh environments.

### 4 INSTALLATION

**WARNING:** The sensing elements are fragile, and should be handled with care.

**Power and data connections:** The system draws power entirely from the USB line, and communicates over USB. The system requires a computer or other USB host for operation.

### 5 SOFTWARE AND DRIVERS

Software is included to interface with a PC via the USB port, for data logging, diagnostics and visualization.

#### Drivers

There are two external drivers which must be downloaded and installed on the computer in order for the PC to be able to interface with the probe system, in addition to the specific system driver for your probe.

- [National Instruments LabView Run Time Engine \(LVRTE\)](#)
- [National Instruments VISA Run-Time Engine \(NIVISA\)](#)

These drivers are freely available for download from National Instruments. Compatible versions of both of these drivers have been bundled with your software package.

#### Executable

An executable software package is provided with your probe system, which facilitates direct communication between your PC and your probe using the probe's micro-USB connector. After launching the software, you should see the window reproduced below (Figure 2).

## Starting procedure

- 1) Connect the computer to the probe's micro-USB socket.
- 2) The probe will perform a power-on self-test, lasting a couple of seconds. If all tests pass, the on-board green LED will illuminate.
- 3) Load the program. It will start in the [ACTION] tab.
- 4) Using the [COM PORT] drop down menu, select the appropriate COM port.
- 5) Select the desired data rate, chart timespan and datalog duration, and enter a data file path if logging is enabled.
- 6) Press the white arrow near the top left corner of the window to run the application.
- 7) Ensure that there are no errors in the [ERROR] dialogue box. If an error has occurred at this stage, it is most likely an invalid COM port selection.

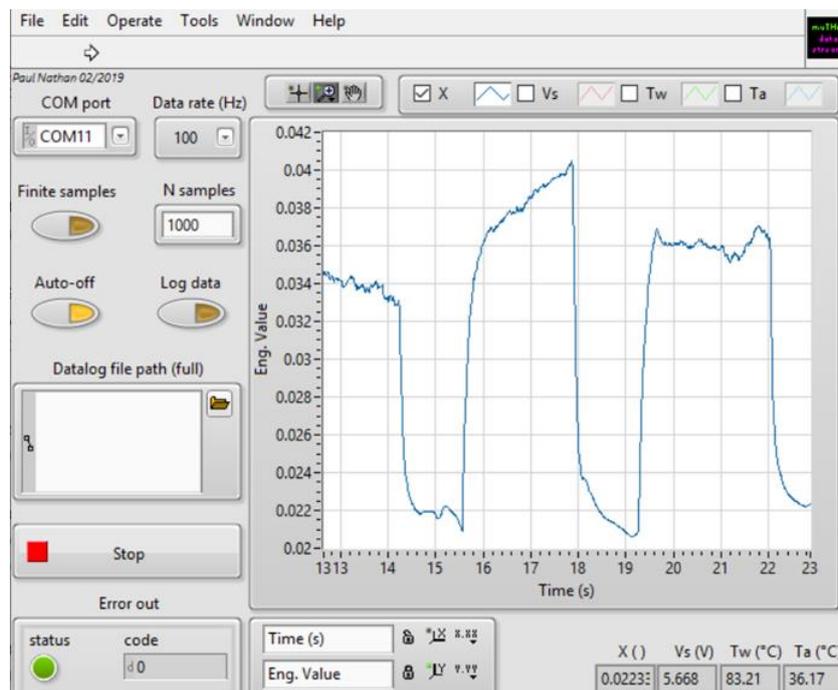


Figure 2: Probe system testing software screen-shot

## 6 TECHNICAL SUPPORT

Full technical support is available for this product and its associated software.

If you experience any difficulty in installation or use, or if you need additional support in the operation of the system, please contact your Surrey Sensors Ltd. account manager or technical representative.

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