



# 3D FLOW MEASUREMENT SYSTEM

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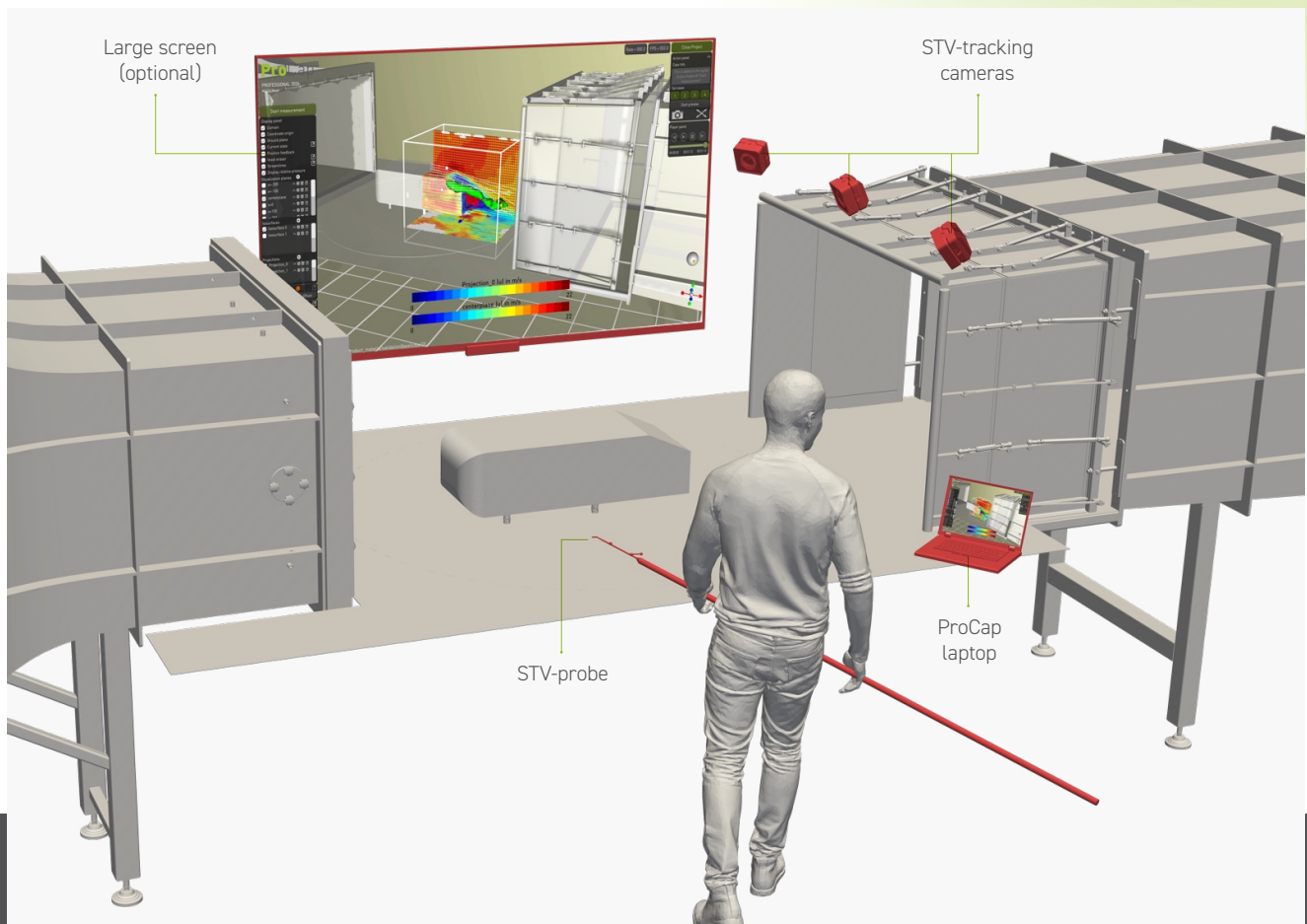
PRODUCT SHEET 2026

# ProCap or PIV

## Decision matrix

	<b>ProCap STV</b> <b>(Sensor Tracking Velocimetry)</b>	<b>PIV</b> <b>(Particle Image Velocimetry)</b>
<b>Visualization</b>	Real-time 3D velocity and pressure field reconstruction with streamlines, isosurfaces, and surface maps	2D or 3D velocity vector maps available after post-processing
<b>Seeding Required</b>	<b>No</b> works without tracer particles	<b>Yes</b> requires seeding with particles
<b>Setup Complexity</b>	<b>Low</b> portable probe & optical tracking	<b>High</b> lasers, cameras, seeding system
<b>Measurement Volume</b>	<b>Flexible</b> operator scans regions of interest	<b>Fixed</b> limited by laser sheet and camera view
<b>Real-Time Capability</b>	<b>Yes</b> true real-time visualization during scanning	<b>Limited</b> near real-time for 2D preview, but full analysis takes time
<b>Cost Level</b>	<b>Medium</b> specialized hardware	<b>High</b> lasers, optics, cameras, seeding
<b>Applications</b>	Wind tunnels, automotive, HVAC, sports, UAV, wind engineering, industry, education	Fluid mechanics research, unsteady flows, motorsport, turbulence studies
<b>Advantages</b>	No seeding required, fast and interactive scanning, immediate visualization	High resolution, full-field capture, time-resolved data for air and water, non-intrusive
<b>Limitations</b>	Operator-dependent scanning, lower resolution than PIV, air only, intrusive	Complex, expensive setup, safety concerns with lasers, no immediate result

# What is ProCap



## The ProCap software is a specialised solution for real-time flow measurement and visualisation.

It is primarily used in wind tunnel testing, experimental aerodynamics, and research environments.

**ProCap uses real-time Sensor Tracking Velocimetry (STV):** a probe is moved through the flow region, and its position is tracked optically while measuring velocity and pressure. The system reconstructs the 3D flow field in real time and displays it on a dedicated laptop, large screen or projection.

## Real-Time Visualisation

Displays flow fields instantly as you scan with the probe, including isosurfaces, streamlines and surface flow maps.

## Human-Centred Scanning

The operator moves the probe naturally, focusing on areas of interest. Flow features are detected, measured and refined during measurement.

## Full 3D Data

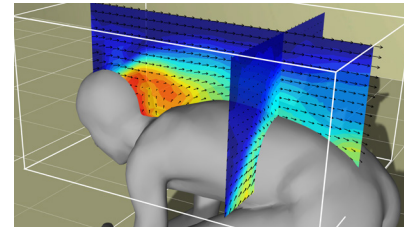
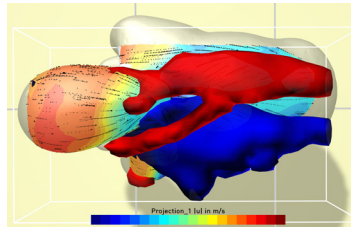
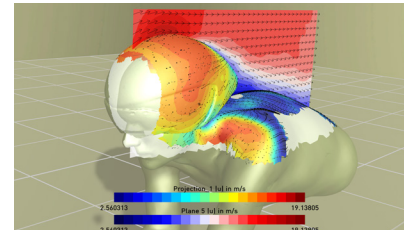
Velocity and pressure fields are captured without flow seeding or laser illumination. Each scan generates a complete 3D dataset in a very short time.

# Applications

## ProCap in Sports

- Work with real athletes, it's safe and fast!
- Track down complex flow patterns and optimize on site
- Trip flow at critical location to control the wake

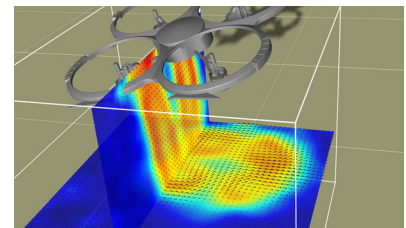
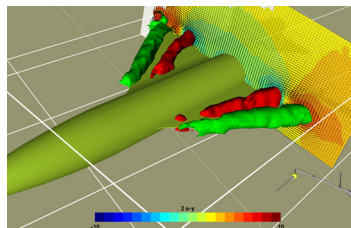
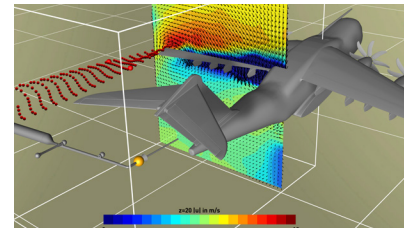
**Recommended configuration:**  
ProCap Professional with 14-hole iProbe



## ProCap in Aerospace

- Identify vortex cores and separation areas on flaps and wings
- Map surface pressure and locate flow separation lines on wings and fuselage
- Identify wing-fuselage interactions and propeller wakes

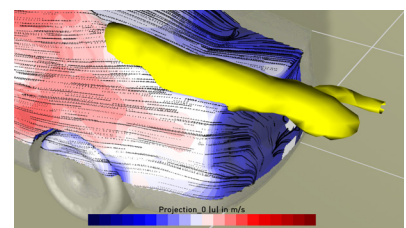
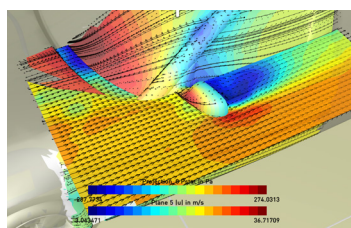
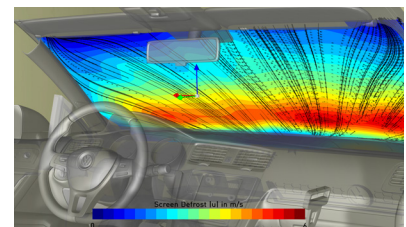
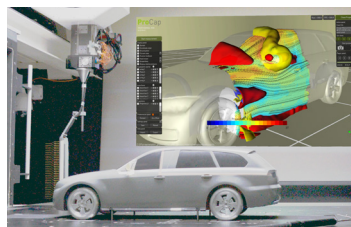
**Recommended configuration:**  
ProCap Professional with 5-hole iProbe



## ProCap in Automotive

- Analyze external aerodynamics in the wind tunnel or the ventilation inside the vehicle
- Examine complex flow situations around wheels, mirrors and in the wake
- Validate CFD

**Recommended configuration:**  
ProCap Professional with 14-hole iProbe and extended camera system for full-scale testing

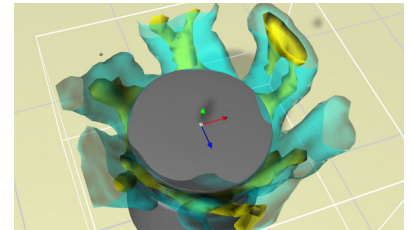
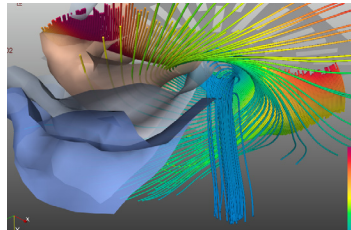
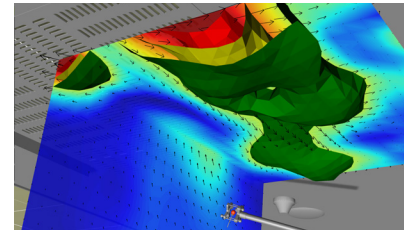


# Applications

## ProCap in HVAC

- Investigate complex low-speed flow structures
- Verify and trouble-shoot non-uniform flow distribution
- Map temperature fields and correlate with flow topology

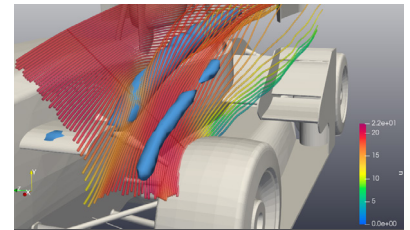
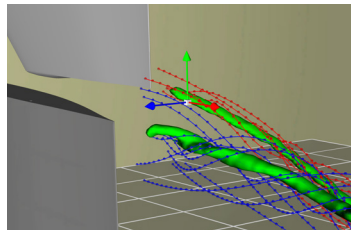
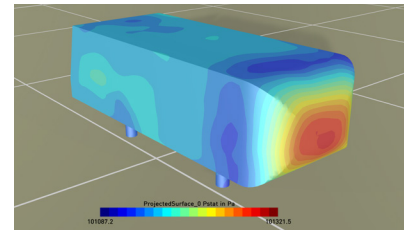
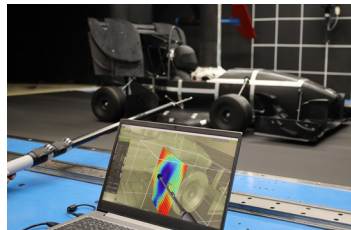
**Recommended configuration:**  
ProCap Professional with TriSonica Sphere for low flow speed and instantaneous temperature



## ProCap in Teaching

- Explain concepts like pressure drag, flow separation, vorticity, and stagnation pressure in real-time
- Completely safe to use in student projects
- Let students 3D print models, measure and compare with CFD

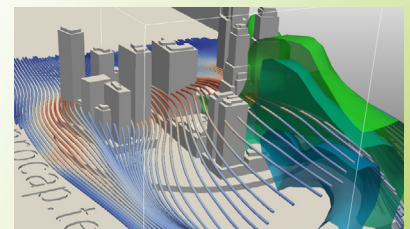
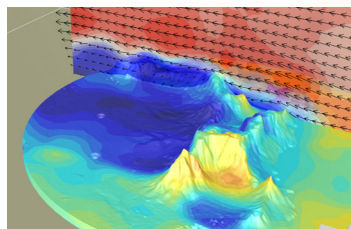
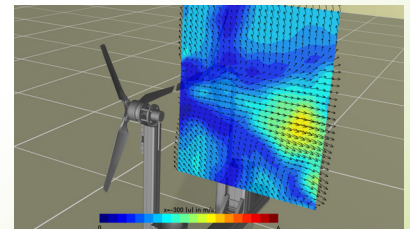
**Recommended configuration:**  
ProCap Compact or Professional with 5-hole iProbe



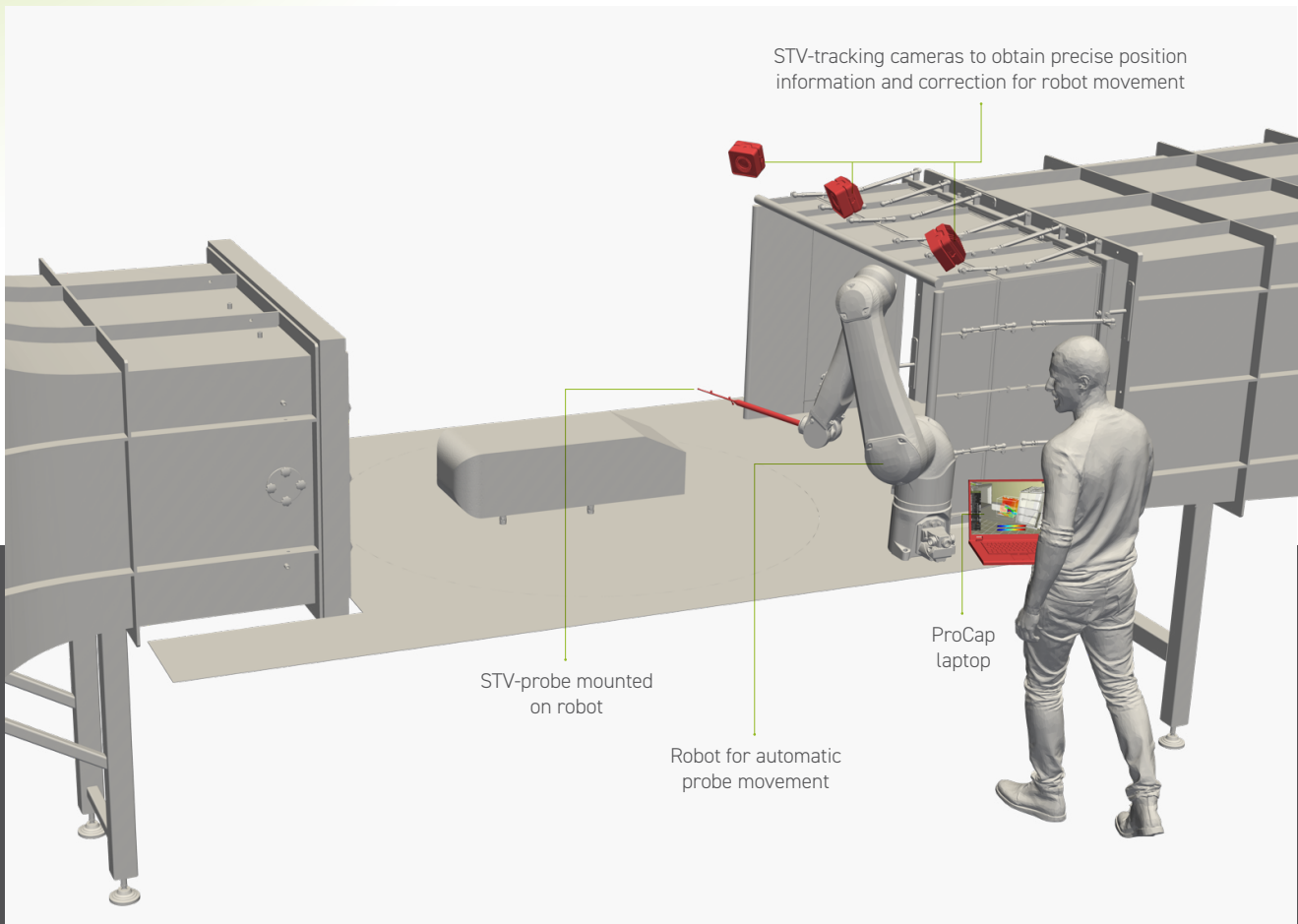
## ProCap in Wind Energy

- Examine complex flow situations around buildings
- Combine 3D surface maps with local time-resolved surface pressure measurements
- Study turbine wake structures and interactions

**Recommended configuration:**  
ProCap Professional with 14-hole iProbe



# ProCap & Automation



## ProCap simplifies the setup, supervision and processing of automated scanning

With the integrated tracking and smart flow probes, ProCap takes care of the data acquisition, position alignment, velocity correction, processing and visualization. All that's required from the mechanical traversing system or robot is to move the probe.

ProCap can be seamlessly integrated into automated measurement workflows, enabling a more efficient and controlled testing process.

## Applications without human access

Use the advantages of the ProCap technology in high-speed or hazardous environments.

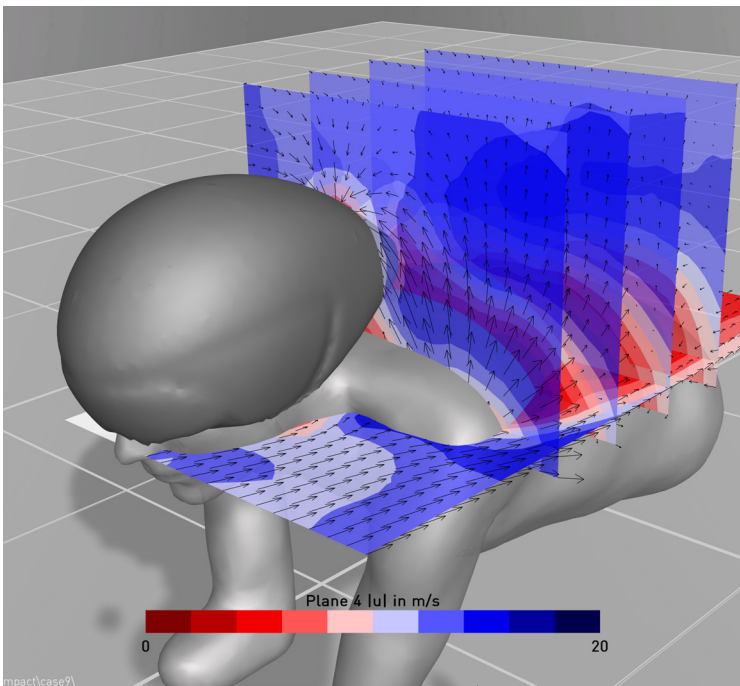
## Simplify and speed up traversing runs

No complex synchronization and alignment required. The fast probe and velocity correction allows for a continuous movement of the traverse.

## Active field of research

Ongoing collaborations in the research areas of intelligent scanning and AR/VR.

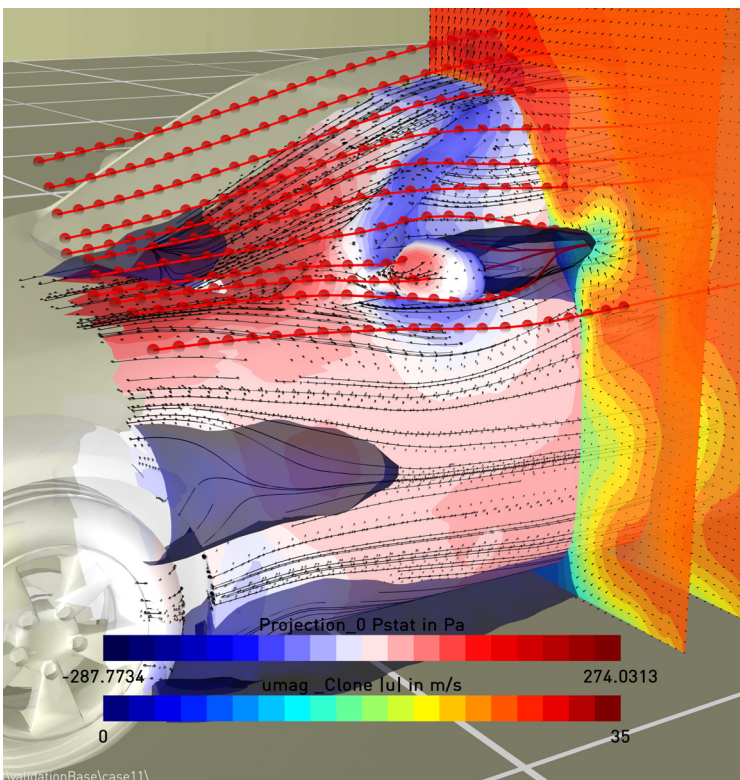
# ProCap Versions



## ProCap Compact basic kit

**Affordable starter package without compromising data quality**

- Versatile tool for small to medium sized applications (1-4 m<sup>3</sup>)
- Ideal for teaching
- Easy to transport and setup
- Includes the precalibrated Tio 3 camera bar
- Compatible with all digital standard probes
- Complete 3D output datasets compatible with CFD post-processors for further analysis in post-processing
- Perpetual license, initial updates and support included



## ProCap Professional upgrade

**Full real-time visualization capability real-time and configurable hardware**

- Covers the full range of applications including full-scale automotive
- Compatible with the Compact basic kit hardware components like the precalibrated Tio 3 camera bar and standard flow probes
- Fully configurable hardware including customized probes and large tracking systems
- Specific visualization features to analyze the flow topology in 3D and on model surfaces
- Real-time output of the statistical measurement uncertainty
- Optically trackable models
- Programmable user output functions and customized probes for research

# ProCap Standard Probes

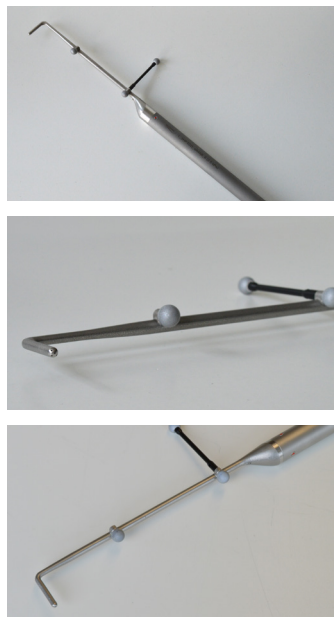
We offer a range of probes for the **ProCap** STV system to support a wide range of measurement applications.

## 5-hole iProbe

Digital 5-hole probe with onboard data processing and direct output in engineering units. A versatile, general-purpose probe offering an excellent balance of tip size, cost, and acceptance angle.

### Quantities

- 3 velocity components
- Static & total pressure
- Temperature
- Density
- Mach-Nr.



### Features

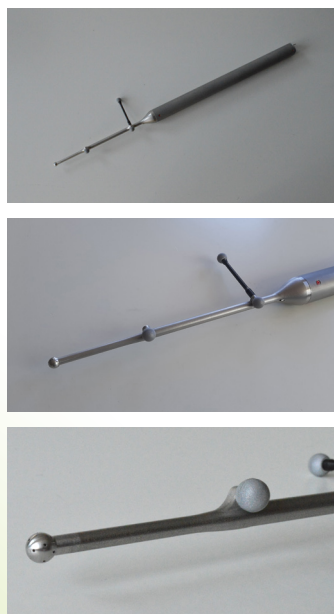
- For wind-tunnel applications and other use cases with directed flow >2m/s
- 50 Hz data output rate
- <1 m/s and <1° error (typical)
- 4 mm diameter spherical tip
- ±60° acceptance angle
- -20 to 70°C operating temperature
- 0 to 95% humidity, non-condensing
- Individually calibrated for selectable velocities with internal switching between calibrations
- Available with different pressure sensors for wide velocity ranges
- Additively manufactured in stainless steel
- Customized geometries (including tip diameter) on request

## 14-hole iProbe

Digital 14-hole probe with onboard data processing and direct output in engineering units. Versatile probe with maximum acceptance angle for complex flow structures and wake areas.

### Quantities

- 3 velocity components
- Static & total pressure
- Temperature
- Density
- Mach-Nr.



### Features

- For bluff body aerodynamics in wind tunnels and complex 3D flow structures
- 50 Hz data output rate
- <1 m/s and <1° error (typical)
- 7.5 mm diameter spherical tip
- ±160° acceptance angle
- -20 to 70°C operating temperature
- 0 to 95% humidity, non-condensing
- Individually calibrated for selectable velocities with internal switching between calibrations
- Available with different pressure sensors for wide velocity ranges
- Additively manufactured in stainless steel
- Customized geometries on request

# ProCap Specialized Probes

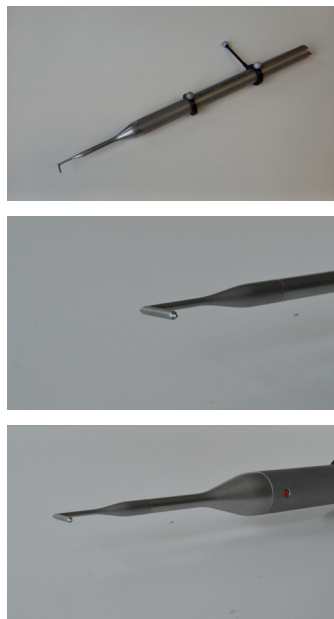
For specific measurement applications of the ProCap STV system, we offer specialized probes.

## 5-hole micro iProbe

Digital micro 5-hole probe with onboard data processing and direct output in engineering units. Micro-printed head for precise, high resolution measurements in thin shear layers and vortex cores.

### Quantities

- 3 velocity components
- Static & total pressure
- Temperature
- Density
- Mach-Nr.



### Features

- For small-scale wind-tunnel application, jets and surface flows with directed flow  $>2\text{m/s}$
- 50 Hz data output rate
- $<1\text{ m/s}$  and  $<1^\circ$  error (typical)
- 2 mm diameter cylindrical tip
- $\pm 60^\circ$  acceptance angle
- $-20$  to  $70^\circ\text{C}$  operating temperature
- 0 to 95% humidity, non-condensing
- Individually calibrated for selectable velocities with internal switching between calibrations
- Available with different pressure sensors for wide velocity ranges
- Additively manufactured in stainless steel
- Customized geometries on request

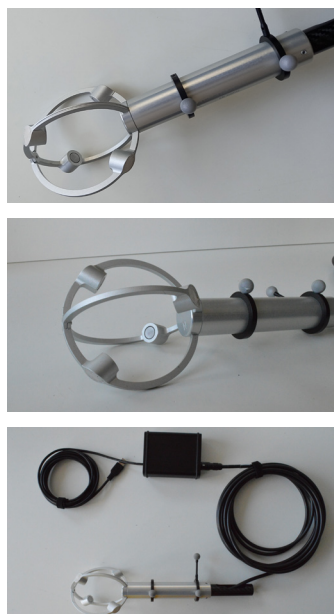
## TriSonica Sphere

Compact 3D ultrasonic flow probe with direct digital output in engineering units.

For low-speed applications between 0 and 10 m/s and temperature driven flows.

### Quantities

- 3 velocity components
- Temperature
- Speed of sound



### Features

- For HVAC and other low-speed and temperature driven flows in climatization, clean rooms and passenger comfort
- Time of flight measurement principle with uniquely fast response time for temperature
- 40 Hz data output rate
- Velocity: 0.01 m/s resolution with 0.1 m/s accuracy
- Temperature: 0.01  $^\circ\text{C}$  resolution with  $\pm 2\text{ }^\circ\text{C}$  accuracy
- $-20$  to  $72^\circ\text{C}$  operating temperature, non-condensing
- Unique design to minimize interference with the flow
- All aluminum body for durability

# ProCap Cameras

We offer a range of cameras for the **ProCap** STV system to fulfill different measurement tasks.

## Compact ProCap camera Trio 3



### Features

- Full 6DoF optical tracking with multiple cameras and capture software in a single, plug-and-play package
- Affordable, simple and portable tracking camera for many applications

### Tech Specs

- 120 Hz tracking range
- 1.5 to 5 m working distance
- 0.5 mm tracking accuracy
- No calibration needed
- Integrated perpetual license for the Motive tracking software

## Advanced ProCap camera Prime<sup>x</sup> 22



### Features

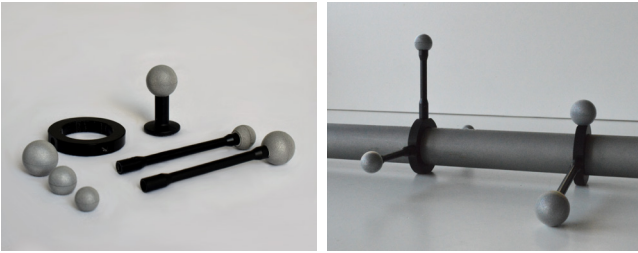
- The Primex 22 comes equipped with Ethernet connectivity, on-board processing, and a low distortion, "fast glass" lens.
- typically 4-8 cameras form a set

### Tech Specs

- 360 Hz tracking range
- Up to 21 m working distance
- 0.15 mm tracking accuracy
- Fast and user friendly system calibration
- Separate license for the Motive tracking software required

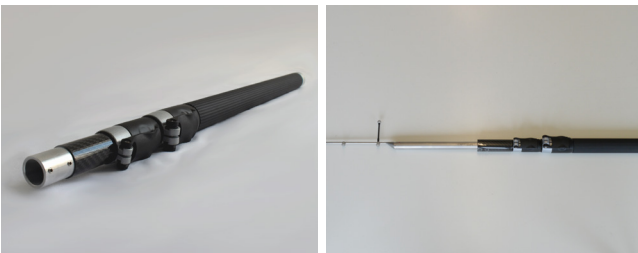
# ProCap Accessories

## Additional markers and mounting material



- Improve tracking quality with new markers
- Various marker sizes available
- Mounting rings and marker rods to add markers to the probe for robust tracking in difficult setups (e.g. limited access inside a car, internal flows)

## Telescopic extension poles



- A vital item when working in a larger wind-tunnel with a multi-hole probe
- Probe cable routed internally
- 0.8 m composite pole extendable to 2.5 m standard length, other sizes on request
- Specific pole for the ultrasonic pole available

## Magic arm and camera mounting hardware



- Articulated arm with clamp to mount the camera on existing structures
- Maximum flexibility in position and angle of the camera
- Tripod and mounting hardware for individual camera systems available

## Transportation case



- A standard, rugged transportation case is included in the basic kit
- Customized transportation cases for probes, cameras and optional equipment are available
- Consider getting a new foam insert to hold newly acquired probes of your kit



**Switzerland**  
**Germany**  
**Austria**  
**Rest of world**

**streamwise gmbh**  
Emil-Staub-Strasse 5  
8708 Männedorf  
Switzerland

+41 44 545 32 50  
procap@streamwise.ch  
www.procap.tech

**UK & Ireland**  
**Belgium**  
**Denmark**  
**Finland**  
**The Netherlands**  
**Norway and Sweden**

**Evolution Measurement**  
7 Regents Court, South Way, Walworth  
Business Park, Andover, Hampshire, SP10  
5NX  
United Kingdom

+44 1264 316470  
enquiries@evolutionmeasurement.com  
www.EvolutionMeasurement.com

**France**  
**Spain**  
**Portugal**

**EvoMesure Sas**  
Bât. les Lauriers – L'Orée des Mas, Av. du  
Golf, 34670 Baillargues,  
France

+33 9 52 08 08 09  
contact@evomesure.com  
www.evomesure.com

**Italy**

**EvoMisure S.r.l.**  
Milan  
Italy

+39 345 783 9383  
info@evomisure.it  
www.evomisure.it

**USA**  
**Canada**

**Evolution Measurement Inc.**  
3413 Hunter Rd. Ste D PMB 358 San  
Marcos, TX, 78666  
United States of America

+1 512 210 2288  
enquiries@evolutionmeasurement.com  
www.evolutionmeasurement.com

**Japan**

**OHTE GIKEN, INC**  
1-25-12, Kannondai, Tsukuba-Shi, 305-0856  
Ibaraki pref.  
Japan

+81 29 839 0777  
www.ohtegiken.co.jp

**PR China**

**York Technologies Ltd**  
802, Bldg A, Cyber Tower No.2  
Zhongguancun South Ave. Haidian District,  
100086 Beijing  
China

+86 10 8251 3838  
xutao@yorkinstrument.com  
www.york-tech.com