

# fusionTrack 500



Real-time high-speed 335 Hz and low latency 4 ms  
High-precision 90  $\mu\text{m}$  RMS up to 2 m  
Ethernet connection for both data and power (PoE+)  
Open system complete access to images and data  
Active and passive markers tracked simultaneously

The fusionTrack 500 is a passive and active, real-time optical pose-tracking system specially designed to detect and track reflective spheres, disks and IR-LEDs in real-time video streams. The fusionTrack is composed of two cameras that observe reflective and/or active fiducials (IR-LEDs) simultaneously, and it uses triangulation to calculate their locations with unrivalled precision and with an unparalleled non-interpolated measurement rate of 335 Hz. When several fiducials are affixed to a marker, the system can determine its pose (position and orientation) with 6 degrees of freedom (x,y,z, $\alpha$ , $\beta$ , $\gamma$ ).

The fusionTrack SDK enables access to data in real-time at different stages of processing, including raw images, individual 3D positions of fiducials (reflective spheres and disks / IR-LEDs) and up to the pose of markers. The SDK also provides multi-level fault checking. It allows access to error information in real-time at any processing stage: fiducial occlusion level, stereo de-calibration, marker registration error and more.

The fusionTrack can be customized to fit your requirements (e.g. precision level, acquisition speed, working volume, extensions). Moreover, the system is compatible with existing passive image-guided surgical tools that are widely used in the medical field. With its unparalleled measurement speed, accuracy and latency, the fusionTrack 500 is ideally suited for robotic applications.



Active markers



Passive markers

## About us Optical Measurement Solutions since 2004.

Atracsys designs, develops, certifies and industrializes real-time image processing systems for embedded applications and optical metrological systems according to the ISO 13485 medical quality system. Atracsys aims at continuously contributing to the improvements in healthcare all around the world, guiding surgical instruments with sub-millimetric precision.

## Benefits

Real time, high-speed (335 Hz), low latency (4 ms) - High performances unlock applications never imagined before. Especially robotic applications benefit from the real-time measurement. High-precision (90  $\mu\text{m}$  RMS at distances up to 2 m) - The fusionTrack provides maximal precision after warm-up.

Multi-level fault checking - This feature gives real-time access to several levels of error information, ranging from the fiducial occlusion, stereo left-right match, stereo de-calibration, marker registration error and more.

## Passive and active markers

Atracsys proposes a vast choice of passive and active markers designed and manufactured using the best available materials.

Superior manufacturing ensures higher tip precision for the instrument, probe or tool. Multiple fixing points, clamps and other accessories make it easy to fix the markers to specific tools or instruments.

The geometry of our markers is pre-integrated into the provided SDK, so no configuration is required to use them.

### 1. Passive Technologies

*Tindax* - markers with disposable reflective spheres : 5 different high-quality titanium markers with unique geometries.

*Navex* - patented technology with disposable reflective disks: 5 different high-quality carbon fiber markers with unique geometries and 1 pointer.

### 2. Active Technologies

*Active autoclavable wireless markers* can be customized according to your specific needs.

For development purpose we propose non-autoclavable wireless active markers. For example, the development kit enables custom built wireless active markers that perfectly fit your requirements.

## Hardware

Swiss-made quality guarantee - The fusionTrack is entirely designed, engineered, manufactured and verified by Atracsys in Switzerland according to the ISO 13485. Atracsys tracking systems have already been integrated into demanding surgical and industrial applications for over 10 years.

Highly customizable - Our technology can be customized to fit your requirements (i.e., precision level, acquisition speed, working volume, extensions). The fusionTrack is compatible with existing image-guided surgical tools that are widely used in the medical field.

## Technical specifications

Hybrid tracking	Reflective spheres / disks, Active wired and wireless
Acquisition	Parallel (all fiducials at the same time)
Resolution	2.2 Mp
Max. simultaneous markers <sup>(1)</sup>	Almost unlimited
Max. fiducials per marker	5
Interface	Gigabit Ethernet 1000BASE-T (IEEE 802.3ab)
Generic extension port	Trigger in/out, timestamp retrieval, synchronization of multiple devices
SDK	C (DLL)
Operating systems	Windows / Linux
Mounting	4 x M4 screws + tripod 1/4-20 UNC
Power requirements	Power over Ethernet (PoE+ IEEE 802.3at-2009 type 2): 48V 0.6A 25.5W
Operating temperature	15-30°C
Shock sensor	Shock sensor and RTC monitoring device even when not connected
Lasers	2 lasers for device positioning
Approvals	Electrical safety IEC 60601-1 ed3.1 (2012-08-20) Electromagnetic compatibility IEC 60601-1-2 ed 4.0 (2014) CB-Certificate available
Hardware requirements	Minimum host PC requirements: Intel(R) Core(TM) i3-6100U CPU @ 2.30GHz 4 GB DDR3 RAM 50 MB (Windows) or 30 MB (Unix/Linux) disc space Window 8.1 (32 and 64 bits supported) Linux (32 and 64 bits supported), gcc 5.4 or clang 3.8

## Model specifications

	fusionTrack 500
Size	528 mm x 80 mm x 88 mm
Weight	2.3 kg
Accuracy <sup>(2)</sup>	0.08 mm RMS up to 2 m 0.11 mm RMS up to 2.4 m 0.15 mm RMS up to 2.8 m  0.17 mm 95% CI up to 2 m 0.22 mm 95% CI up to 2.4 m 0.30 mm 95% CI up to 2.8 m
Tracking volume	Starts at 700 mm
Measurement rate	335 Hz <sup>(3)</sup>
Latency	~4 ms <sup>(4)</sup>

(1) Full speed tested with 4 markers (4 fiducials).

(2) Based on a single fiducial stepped more than 2000 points throughout the measurement volume at 20°C.

(3) non-interpolated

(4) 3ms image acquisition + ~1ms processing time & data transmission.

Due to continuous improvements, Atracsys reserves the right to modify information or specifications without prior notice.

