

## Triangulation Trajectory Measurement System



**The IMAGO Trajectory Measurement System (TMS) determines the position and velocity of any target (aircraft, missile, helicopter, dropped bomb, etc.) in real-time.**

### OVERVIEW

The IMAGO TMS uses two portable IMAGO Video Target Tracking Systems, and a trajectory computer. It is completely passive and does not emit any RF signals. It will work with most types of targets, the targets do not need to be enhanced or equipped with any special equipment.

The trajectory or Time-Space-Position-Information (TSPI) calculations can be done either during the flight (real time), or after the flight (post-processing). The target position and velocity are displayed on the system monitor as the trajectory is calculated in real-time. The data are also stored in an ASCII trajectory file.

### Technical Specifications

#### IMAGO XG Tracking Software

Please refer to the IMAGO XG Technical Specification.

• Tracker bearing accuracy	0.005 degrees.
• Time accuracy	<1 ms.
• RF Frequency	none, the IMAGO TMS is completely passive.
• Target Modifications Required	none, no enhancements or reflectors are required.
• Update Rate	50Hz or faster.
• Environmental Specification	IP65 Weatherproof.

The accuracy of a two tracker trajectory system depends on the pan tilt selected, the baseline between the cameras, and the location of the target. Best-case accuracy is generated using Imago's Standard pan tilt with high resolution encoders. Progressive scan cameras equipped with 500mm lenses. Target is located between the two video trackers and has a clearly defined track point such as a light on an aircraft or the tip of a bomb that can be seen by both cameras.

Range	Accuracy	Optimal Baseline
1 km	0.07m	500m to 2000m
2km	0.15m	1000m to 3000m
5km	0.3m	5000m
10km	0.8m	10000



## SYSTEM HARDWARE

### Standard System

A standard tracker configuration consists of rack mounted computers, monitors, and other electronics. The rack mounts are built in to the transit cases that can be placed on the table for operation. Each case is designed to be one or two person portable.

The cameras, and pan/tilt are transported in foam padded transit cases, and removed for set up.

Pan tilt for light payload (20 lbs), standard payloads (75 lbs) and heavy payloads (275 lbs) are available. Note that the lighter weight or lower-cost configurations are available.

## OPTIONS

### Cueing

To aid the acquisition of the target IMAGO offers a number of cueing options.

- The IMAGO Binocular Cueing system, which consists of instrumented binoculars, can be used for this task. A spotter aims the binoculars at the target; the tracker operator then slaves the tracker to the binoculars to acquire the target.
- Position Cue - The system can also be cued from radar data or other position information if it is available. IMAGO can

supply interfaces to radars and to telemetry from on-board position systems.

- GPS - IMAGO can point at a moving target that is transmitting its location in WG84 coordinates.

### Laptop Computers

Laptop computers can be used to replace rack mount computers. These can be transported in foam padded cases. Offering the advantage of a considerable reduction in system weight and size.

### Data Link

For real time trajectory a data link must be available between the two tracker sites. IMAGO can integrate with a link that uses a standard phone line, a cellular phone connection, fiber optic cable, radio, or microwave. IMAGO can advise on the best solution for a particular scenario, and can supply all of the necessary hardware for these types of links.

### Video Recording & Flight Analysis System

Video Recording Devices can be provided at each tracker to record the video of the tracked target. The video image shows the target, with the time and the azimuth and elevation overlaid on the image. The tracking videos can be recorded, on either a standard VCR, an off-the-shelf DVD recorder or IMAGO's Flight Analysis System.

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## ABOUT IMAGO

IMAGO has been building low-cost, high-performance video target tracking systems since 1987. IMAGO's video trackers are software based, can be easily updated, and are designed to use commercial-off-the-shelf hardware.

IMAGO's earlier sales were for standalone video trackers but as our technology advanced, IMAGO has been able to offer higher levels of sophistication. The addition of laser-rangefinders, multiple tracker triangulation systems and automatic cueing from other sensors has increased the level of accuracy and automation.

Our tracking systems are used both by private and defence groups around the world.

