

# iOET<sup>2</sup> - iSCU - iIPSC

## Opto-Electronic Target Tracking on Inertial Stabilized Platforms

Tracking targets in the sky, on the road or in the sea requires an automatic video tracking (also called TV-tracking) system to perform this task. With the iIPSC-MSG we have merged several devices to a powerful platform:

- iIPSC : Inertial Platform Stabilization & Control
- iSCU : Gyro based Stabilization & Control Unit
- iOET<sup>2</sup> : Opto-Electronic Target Tracker

- remote controlled 2 or 4 axes stabilized platform
- daylight & infrared camera + laser ranger all on one platform; optional laser designator or laser illuminator
- **gyro stabilization**; using MEMS or FOG or RLG sensor technology
- **advanced opto electronic target tracking**, processing all common data formats (PAL, HDTV, ...)
- high bandwidth, fast response
- robust system design
- for use on helicopters, fixed wing aircrafts, drones, speed boats, naval vessels or trucks

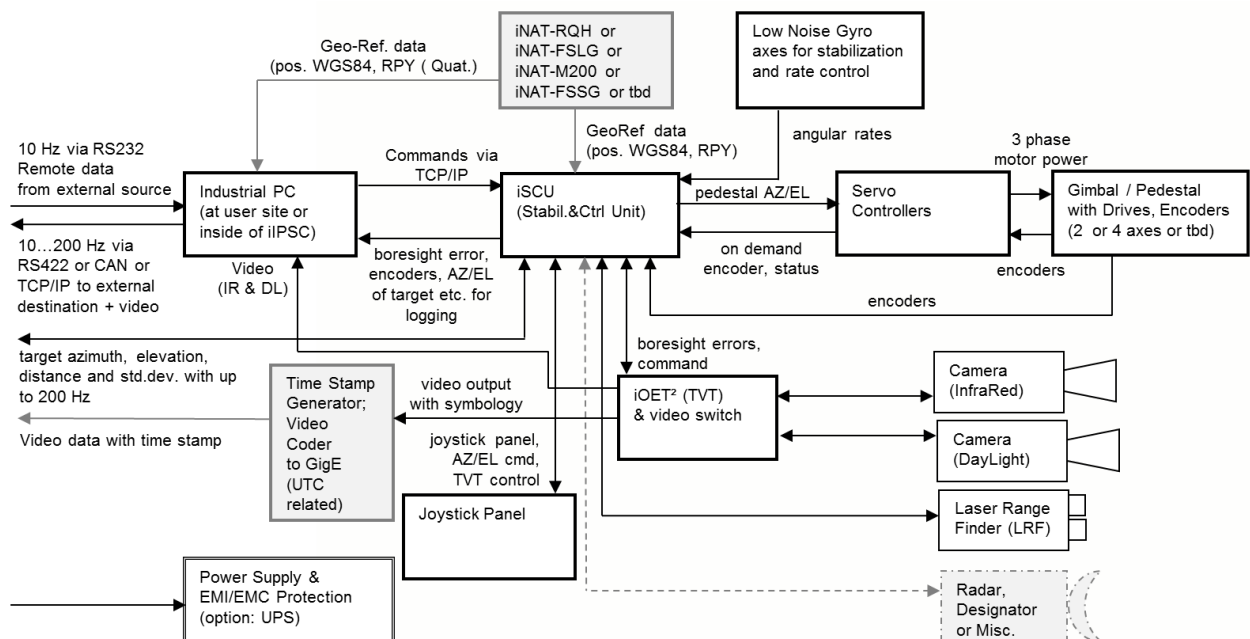
The iIPSC-MSG with  $< 200 \mu\text{rad}$  angular hysteresis (2 axes or 3 axes design) can be installed on land vehicles, helicopters, fixed wing aircrafts, naval vessels or speed boats. Versions are also provided with 4 axes and lower speed design

(iIPSC-LSG), where minimum angular hysteresis is required ( $< 50 \mu\text{rad}$ ). With iIPSC-HSG pedestals



with very high angular speed / very high angular acceleration ( $> 300 \text{ deg/s}$  and  $> 2'000 \text{ deg/s}^2$ ) are provided (see detailed datasheets).

Where the iIPSC with its included inertial sensors is stabilizing the optical platform and decoupling it from the vessels motion, the iOET<sup>2</sup> opto electronic target tracker, which is based on an advanced image processing, is able to track the target even under difficult conditions. An integrated trajectory estimator allows a continuous tracking even if the target is temporarily covered by buildings, clouds



or other targets. The tracker works with daylight cameras as well as with IR cameras (preferred).

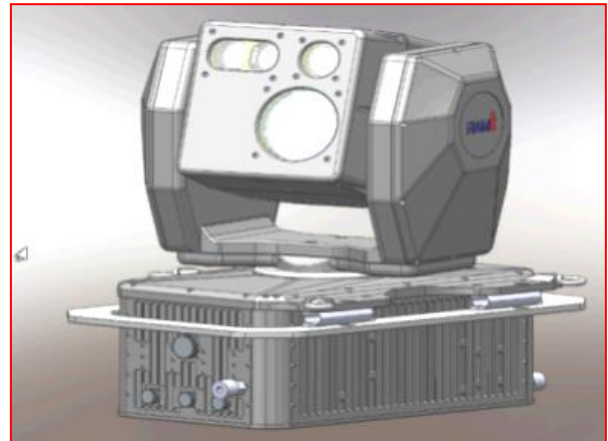


A user friendly configuration tool (iPSC-Control) is included, which allows the application specific configuration of the system. Furthermore a teach-in and education mode is available which can be used to educate the operator (if required) in an HIL (hardware-in-the-loop) mode. For advanced applications also a camera calibration tool is provided.

The optical heads of iPSC-MSG, iPSC-PT, iPSC-LSG and iPSC-HSG can be equipped with standard cameras and a laser range finder or with customized sensors. Semi- or fully customized solutions are provided on request.

The stabilized platforms are designed as a highly modular system with strong drive systems, designed to be operated in harsh environment (also available with nitrogen filling) and they can easily be adapted to the customer's needs.

The systems can be equipped with FOG based gyro systems (iNAT-FSLG, iNAT-FSSG, iNAT-CFM) or with MEMS gyro based inertial sensor systems (iNAT-M200) or with ring laser gyro based INS/GPS systems (iNAT-RQT), depending on requirements of stabilization and geo-referencing performance.

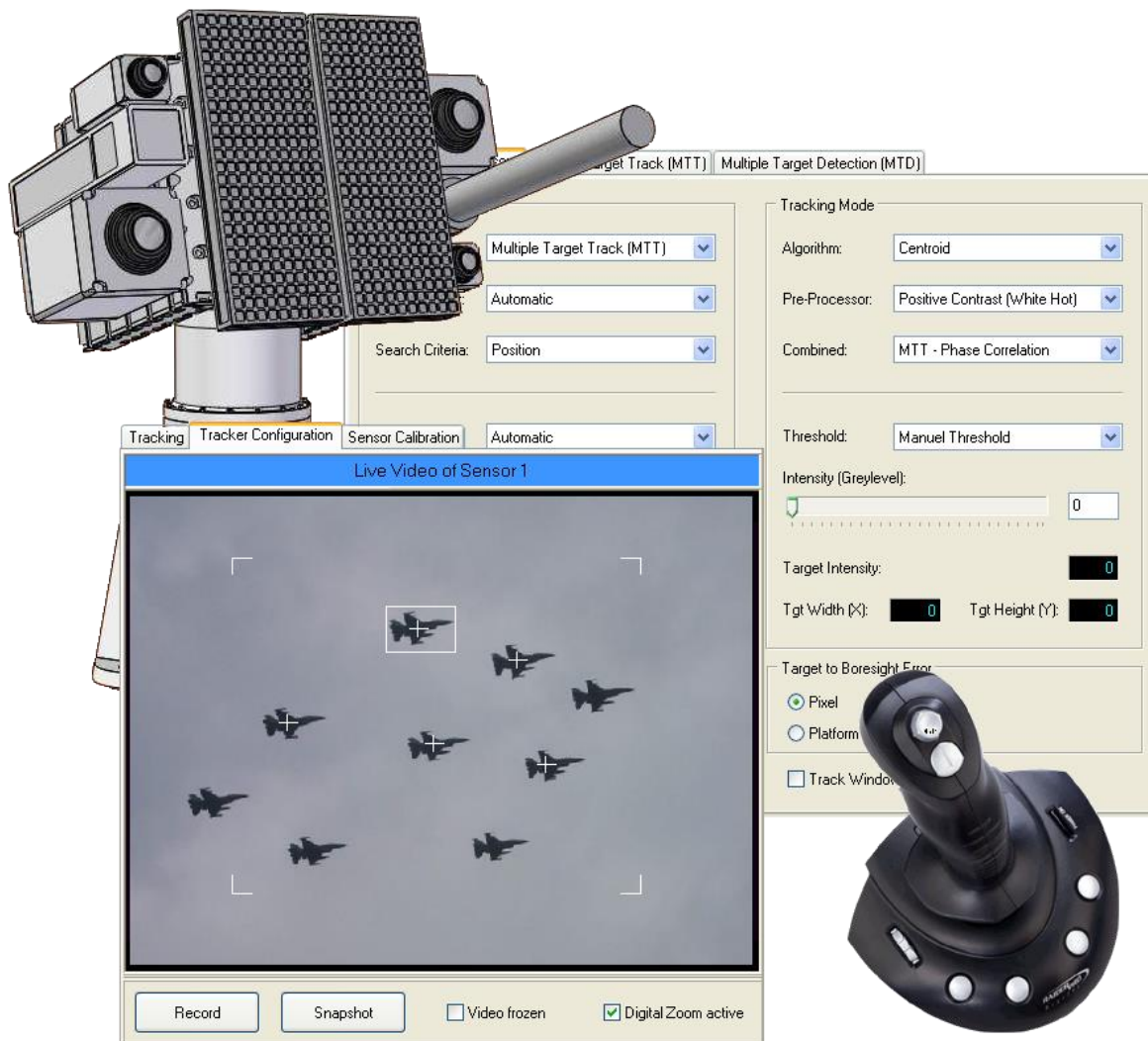


The integrated iSCU (Stabilization & Control Unit) provides the interface between the gyro system, the video tracker, the user operated joystick (iJP) or command computer and the servo drive system incl. encoders. Details are given in the above shown block diagram.

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## Advanced Control Software for iOET<sup>2</sup> Operation:



The iOET<sup>2</sup> control software supports an operation by common users as well as by highly skilled tracking experts. For fast integration success several standard configurations like

- Air-to-Air Tracking
- Ground-to-Air Tracking
- Air-to-Ground Tracking
- Ship-to-Air Tracking

and many features like

- automatic search and tracking of targets
- multiple target selection and tracking
- tracking of fast or slow moving targets
- automatic re-acquisition of temporary hidden targets
- picture-in-picture (PIP) capability
- each 2 channels of video input and video output

are provided. Furthermore using the Windows based software which is delivered together with the tracking system, the user can create application specific configurations with deep access to the algorithm adjustments. It also enables the operator to use snapshot and record features during the online session. iMAR provides full support in system adaptation and integration including application specific parameter optimization support and system design consultancy.

Features like multi target detection and joystick or external interface driven target selection or motion control are provided. As an option also a user operated camera calibration is supported.

iOET<sup>2</sup> supports the switching between 2 cameras (e.g. daylight and IR camera), the capability of online/offline parameter adjustment, a playback mode for optimization and training purposes and it provides a direct interface to every iMAR based iPSC platform stabilisation and control system for automatic target tracking operated on moving vehicles (trucks, aircrafts or naval vessels).

The performance of target tracking depends on the performance of the selected cameras as well as reasonable contrast and SNR conditions.

The high processing rate of up to 50 images per second, combined with high performance gyro stabilisation and most accurate pedestals leads to one of the most advanced inertial stabilized Opto Electronic Target Tracking systems (iOET<sup>2</sup>) in the market.

