

ST-CHD1000-1000

SensorTec Multi sensor
system

Product description

Multi sensor system (MS) is composed of a Day/Night Camera, Thermal Camera mounted on a pan-tilt unit. Day/Night and thermal cameras are installed on the same optical axis with a deviation of less than 0.05 dgr. The videos from both Day/Night and thermal cameras are available simultaneously as digital video H.264. MS includes a built-in test and status mechanism. All video distribution to viewing workstations is done digitally. Both video digital streams have low latency.

Functionality

Multi sensor system is equipped with day and night vision system and allows observation under all weather conditions even in fog, rain or snow. There is a thermal camera and a day-night high resolution camera with very high optical zoom placed on a movable pan & tilt platform. The platform will be able to turn the cameras in all directions, both in azimuth and elevation and controlled from the vehicle's operator place or remotely by the existing C&CC. The movable platform –pan tilt can accept different commands from the C&CC like home position, extremely slow

speed, high speed, variable speed in small steps-continuous, panoramic observation with constant speed, tour mode. A standard protocol is used. Day/Night and Thermal cameras have continuous optical zoom and continuous digital zoom. The System will provide stable picture in windy conditions with known - proven methods. The method chosen by the contractor will fulfil the end user expectations.

Construction and connection

The operator at the C&CC will be able to monitor the status of this power supply system. All data signals output from the MS can be sent to C&CC over a single Ethernet connection

System configuration

- Cooled MWIR Thermal camera
- Day/Night camera
- Pan-Tilt Blade
- Laser rangefinder
- Video processing unit (VPU-ST)



General features

- Simultaneous preview of day/night camera and thermal
- Continuous zoom on both payloads
- Radar connectivity (Slew to Cue)
- Radar tracking possibility
- Target acquisition and tracking (auto or remote triggering)
- Rigid system design
- Analytics board: video stabilization, multi object tracking
- CE marked
- Control and picture streaming via TCP/IP
- Gyro stabilized pan-tilt platform (Optional)
- Electronic image stabilization on both payloads
- Temperature range of the whole system: -32 to +60°C
- Maximum humidity of the whole system: 95%
- IP rating of the whole system: IP67

Vibration test: IEC 60068-2-64

Shock test: IEC 60068-2-27

Icing test: NEMA 250

Salt fog test: IEC 60068-2-52

Standard compliance: MIL-STD-810G,

MIL-HDBK-217-F

MIL-STD-461-F

MIL-STD-1275-D

Cooled MWIR Thermal Camera

ST-CHD series incorporates an incredible 1.3 mega pixel MWIR cooled detector. It has similar features as ST-CHD series only with HD resolution. The resolution is downsized to HD 1280 x 720 to have a standard 16:9 ratio video image. Just like ST-CHD series, ST-CHD series features a long-life cooler which produce virtual zero maintenance system with an extremely high MTBF. ST-CHD series comes with continuous zoom lens options with F/4 that ensures best image and long-range performance even with this huge detector. This makes ST-CHD series cameras and ideal tool for very long-range observation over sea and land in HD resolution.



Technical Specification

| | |
|-----------------------------|---|
| Detector | Cooled MWIR |
| Resolution | 1280 x 720 |
| Frame rate | 25 / 30Hz |
| Detector pitch | 10 μ m |
| Spectral range | 3 to 5 μ m |
| NETD | \leq 25mK |
| Focal length | 40 to 1000 mm |
| Field of View | 18° to 0.73° (H) |
| Continuous Optical Zoom | Yes, up to 25x |
| Continuous Digital Zoom | Yes, up to 16x |
| Focus | Automatic or Manual (remote) |
| Image stabilization | Yes (using VPU/ST) |
| Image processing | Tuneable Digital Detail Enhancement Histogram Equalization Non uniformity correction White Hot / Black Hot Colour Palette |
| Video outputs | HD-SDI, optional RTSP H.264 Ethernet stream (using VPU/ST) |
| Control interface | Serial, Ethernet |
| Consumption | 35 W typical, < 120 W maximum with heaters / lens defrost |
| Operating voltage | 18 - 48 Vdc |
| Operating temperature range | -32°C to +60°C |
| IP rating | IP67, built according to MIL-810 |
| Dimensions | 621 x 300 x 300 mm |
| Weight | 22 kg |

DRI

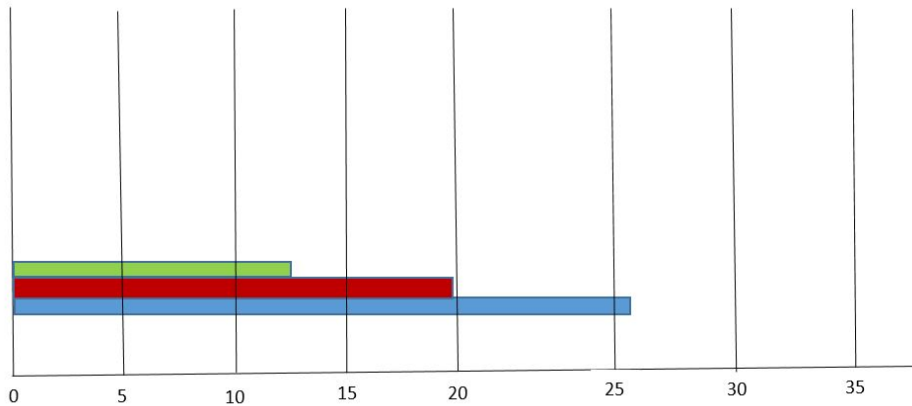
DRI – NATO (VEHICLE) TARGET (2.3m x 2.3m) , STANAG 4347 METHOD

| | |
|----------------|----------|
| Detection | 25.76 km |
| Recognition | 18.27 km |
| Identification | 12.45 km |

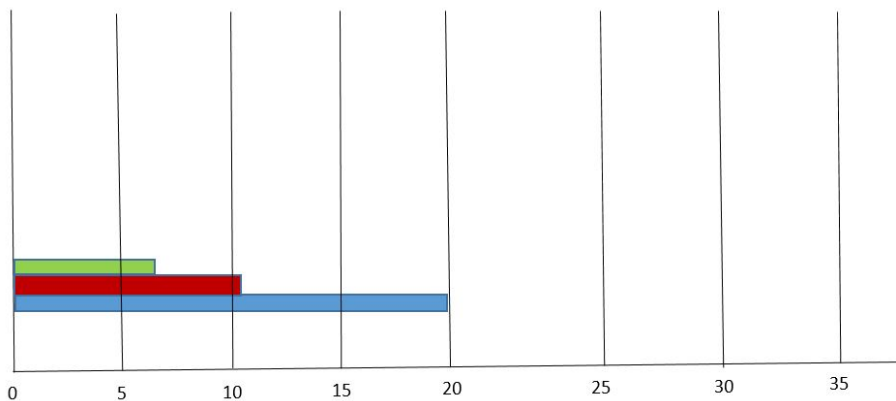
DRI - HUMAN TARGET (1.8m x 0.5m), STANAG 4347 METHOD

| | |
|----------------|----------|
| Detection | 19.85 km |
| Recognition | 10.93 km |
| Identification | 6.35 km |

Detection, Recognition, Identification of a Vehicle



Detection, Recognition, Identification of human



Day / Night Camera

The Day/Night Camera is an integrated unit, based on a highly sensitive CMOS megapixel camera module with sensitivity combined with powerful zoom lens. It is ideal for day/night surveillance of military camp, homeland security (border protection), and critical infrastructure protection (CIP) applications. It is designed to deliver high- performance images, even under the harshest conditions, in temperatures ranging from -32°C to $+60^{\circ}\text{C}$ with IP67 protection, built according to MIL-810 standards.



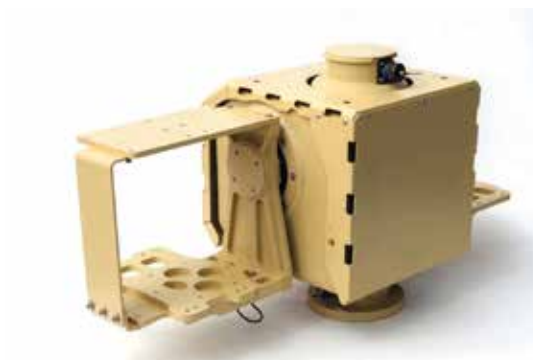
Technical Specification

| | |
|-------------------------|---|
| Sensor | 1/2.4" CMOS sensor |
| Pixels (H x V) | 1920 (H) x 1080 (V) |
| Sensitivity | Colour 0.02 Lux @ (F2.1, 25 fps); B&W 0.001 Lux @ (F2.1, 25 fps); |
| Focal length | 11 to 1000 mm |
| Field of view | 28°- 0.35° |
| Continuous Optical Zoom | Yes, up to 100x |
| Continuous Digital Zoom | Yes, up to 16x |
| Focus | Automatic or Manual (remote) |
| Image stabilization | Yes* (using VPU/ST) |
| Optical filters | Colour: IR Cut filter / B&W: VIS + NIR / B&W: Defog Filter – NIR only |
| Image processing | Auto / Manual White Balance Auto / Manual Gain Control True Wide Dynamic Range Digital Fog Removal / Auto Contrast Dynamic Noise Reduction |
| Video outputs | HD-SDI or analog, optional RTSP H.264 Ethernet stream (using VPU/ST) |
| Control interface | Serial, Ethernet |
| Consumption | 15 W typical, < 60 W maximum with heaters / lens defrost |
| Operating voltage | 18 - 48 Vdc |
| Operating temperature | -32°C + 60°C |
| IP rating | IP67, built according to MIL-810 |
| Dimensions | 777 x 216 x 206 mm |
| Weight | 18 kg |

Pan-Tilt

A unit with a very unique design and high-performance characteristics. It has a built-in static top, which can carry additional 50kg of load. This design is used for a top mounted

radar with a separate rotator. Two side wings are used for electro-optical system, which can consist of various sensor options. Also integrated is a military standard IMU and gyro, when the unit is used in demanding environment and needs to be stabilized.



Technical Specification

| | |
|---------------------------|---|
| Load capacity / Torque | 30 kg + 30 kg / 60 Nm |
| Static top load capacity | 50 kg |
| Weight | 43 kg (full configuration) |
| Dimensions (H x W x L) | 412 x 735 x 302 mm |
| Materials | Aluminium |
| Protection / IP rating | IP 67 |
| Operating temperature | -32°C to +60°C ° |
| Pan axis range / angle | n x 360° |
| Pan axis speed | 0.001°/s - 125 °/s |
| Tilt axis range / angle | ± 90° (depends on application) |
| Tilt axis speed | 0.001°/s - 125 °/s |
| Accuracy | 0.02° |
| Backlash | None |
| Stabilisation (Optional) | ±300μrad |
| Operating voltage | 24 - 48 VDC |
| Maximum power | 120 W |
| Communication to the unit | Eth 10/100 Base-T, RS-232, RS-485/422(optional) |
| Control protocol | DC-PT standard protocol |

Optional Subsystems

(need to be ordered separately)

(1) External video processing unit (ST-VPU)



Video processing unit (VPU-ST) is a hardware processing unit that is the “brains” of the multi sensor system. It combines all the payloads and Pan-Tilt unit into a single unit for the external observer and enable a single Ethernet connection to the whole unit including access to video streams and control of the entire system. VPU-ST enables dedicated advanced protocol that includes video as well as status and control. It has a powerful built in processor, that enables functions like video stabilization, H.264 encoding, video tracking.

- Power control and communication with each device
- Built in test for each device (BIT)
- Integrated Ethernet switch
- Communication interfaces: Ethernet (UDP), Serial
- H.264 Video encoding for all video payloads
- Two separated output video streams

- Control and video interface through Ethernet and serial (control only)
- * Wide variety of video processing:
- * Video stabilization with roll correction
- * Advanced hardware scene and object video tracking
- * On Screen Display (OSD)
- Connectivity: four military standard connectors; 3 x input / 1 output
- Power: 18 – 48 Vdc; 30 W max.
- Environmental: IP 67, build with accordance to MIL-810
- Operating temperature range: -32 to 60°C
- Dimensions: 261 x 185 x 73 mm
- Weight: 3000 g

(2) Laser rangefinder (ST-LRF)



LRF represents the ultimate long-distance laser rangefinder. It is light weight and features ranging capability up to 32 km. With reduced measurement ranges LRF meets high continuous measurement rates up to 40 measurements per second in single mode and up to 200 Hz in burst mode.

Technical Specification

| | |
|--------------------------------------|--|
| Eye safety | Laser Class 1 |
| Measurement range | 50m – 32 000m |
| Measurement range (Standard target): | 10 000m – Target size 2.3 x 2.3 m, visibility 15 km, target reflectivity 30%, detection probability >90% |
| Precision | 0.5 – 1.5 m depending on the distance and target reflectivity |
| Beam divergence | 0.35 mrad |
| Wave length | 1.54 μ m |
| Measurement rates | 40 meas. per min |
| Control interface | Serial, Ethernet |
| Operating voltage | 18 - 48Vdc |
| Power consumption | 3 W on standby, 7 W max on measurement |
| IP rating | IP67, built according to MIL-810 |
| Operating temperature | -32°C + 60°C |
| Dimensions | 172 x 151 x 75 mm with connector |
| Weight | 2 kg |

(3)Attitude and Heading Reference System (ST-AHRS)



Attitude and Heading Reference System (AHRS) is a high performance true geographical headings unit. It provides position, true heading and two Euler angles (pitch, roll). It supports multiple serial and Ethernet communication. It is housed in IP 67 enclosure with a military standard connector.

General features

- True north system - Positioning
- Multiple communication options - Navigation
- IP 67 enclosure - Targeting
- Fast update rate

Specification

| | |
|-------------------------------|---|
| Specifications Weight | 1.4 kg |
| Dimensions (H x W x L) | 800 x 150 x 110 mm |
| Materials | Plastic/Aluminium |
| Protection / IP rating | IP 67 |
| Operating temperature | -40°C to +65°C |
| Input voltage | 12 VDC – 48 VDC |
| Power consumption | 2.1 W |
| Communication | RS-232, RS-485, RS-422, Ethernet Base 10T |
| Protocol | NMEA |

Specification

| Positioning: | Horizontal (RMS (67%)) | Vertical (2DRMS (95%)) |
|------------------------|------------------------|------------------------|
| Autonomous, no SA:* | 1.2 m | 2.5 m |
| Materials | 0.3 m | 0.6 m |
| Protection / IP rating | 0.50 m | 1.0 m |
| Operating temperature | 10 mm + 1 ppm | 20 mm + 2 ppm |

| | |
|-------------------|--|
| Heading (RMS): | 0.30° @ 0.5 m antenna separation 0.15° @ 1.0 m antenna separation 0.08° @ 2.0 m antenna separation 0.04° @ 5.0 m antenna separation |
| Pitch/Roll (RMS): | 1° |
| Heave (RMS):* | 30 m (DGPS), 10 cm (RTK) |

*Depends on multipath environment, number of satellites in view, and satellite geometry

(4) Lens Cleaning System (ST-LCS)



Lens Cleaning System (LCS), unlike traditional cleaning systems that use wipers, our state of the art system uses only high pressured distilled water and air to clean camera lenses. the key advantage of this system is that there is no mechanical contact with the lens that could potentially damage it or its anti-reflective coating. this advantage is especially effective on systems that are subjected to salt water, mist or sand since the traditional wiper cleaning process scratches the surface of these highly priced sensitive lenses. with its three-stage procedure, the LCS gently and efficiently removes all of the dirt and any deposits from camera lenses. the initial design of the system is slightly complex, but it becomes increasingly practical and economically viable with the size of the multi-sensor and the number of payloads (cameras, laser range finder, etc.). the entire cleaning process is fully automated and controlled through software for maximum convenience.

the three stages off the cleaning procedure are:

1st stage: Applying distilled water to the lens.

soak the lens with distilled water to dissolve salt and buildup and prepares the lens for the 2nd stage to gently remove dirt and deposits.

2nd stage: Removing dirt and deposits from the lens with mixture of high-pressure air and distilled water.

A high-pressure mixture of air and distilled water is sprayed on the lens, removing all the dirt and deposited on the lens without mechanically touching and damaging the lens.

3rd Stage: Air drying the lens.

High-pressured air removes the distilled water from the lens and makes the camera ready for operation.

Specification

| | |
|---|---|
| High pressure nozzles | 2 or more, depends on the multi sensor system |
| EM control valves | 4 or more, depends on the multi sensor system |
| High pressure distilled water reservoir | 20 litres |
| High pressure air reservoir | 6 litres |
| Power supply | 230 Vac 50Hz |
| Max. power consumption | 1.5 kW (while compressor is running) |
| Temperature range | 0°-65° (can be used in sub-zero temperatures) |
| Weight | 25 kg |



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