ILS S2
Incident Light Sensor

Datasheet

Rev. 0.1 - 02/2018

MAIA
the multispectral camera

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ILS S2 – Incident Light Sensor is a product by

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1 DATASHEET

1.1 OVERVIEW

The Incident Light Sensor integrated with MAIA S2 multispectral camera (ILS S2) measures the level of the ambient light for each shot in each band of MAIA S2. It allows the correction for downwelling light changes during the flight, such as those caused by clouds covering, and calculate the true reflectance ratios for the correct index calculations.
Furthermore, the ILS S2 features a 6-axis inertial unit for motion processing, an environmental sensor for pressure, temperature and humidity measurement and a GNSS receiver with an embedded antenna that provides timestamp and position information for accurate geotagging of each image acquired by MAIA S2.
The ILS S2 connects directly to MAIA S2 multispectral camera and is powered and controlled by it, without any specific action required by the user for its operation, once properly mounted on board. All parameters measured by ILS S2 are automatically stored into the log file related to the image acquisition set, and are available for pre-processing with MultiCam Stitcher Pro, the MAIA images pre-processing software.
A high precision GNSS version with RTK is available, which allows a centimeter-level positioning accuracy. In this case, an additional ILS S2 which acts as base station is necessary for proper operations.

1.2 SPECIFICATIONS

1.2.1 FRAME

- Size: 70 mm x 70 mm x 40 mm (excluding connectors)
- Weight: 160 g

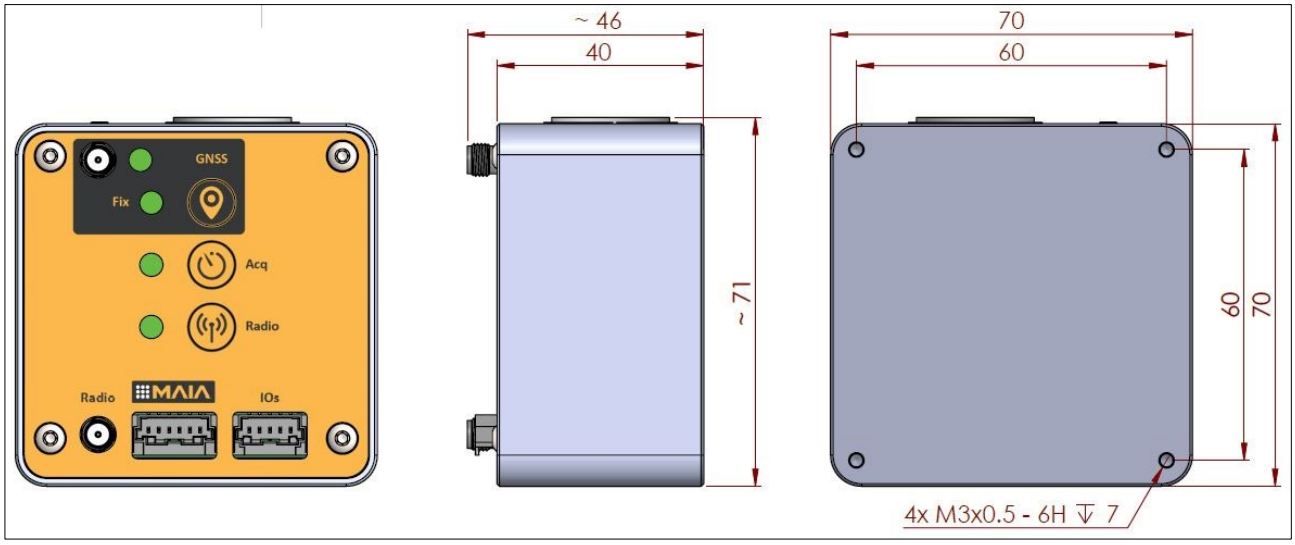

Figure 1 Mechanical design of the ILS case (measurements are in millimeters) and description of screws.

1.2.2 POWER SUPPLY

- Powered by the MAIA S2 multispectral camera (recommended);
- powered by a 4.5 - 9 VDC / 600 mA supply.

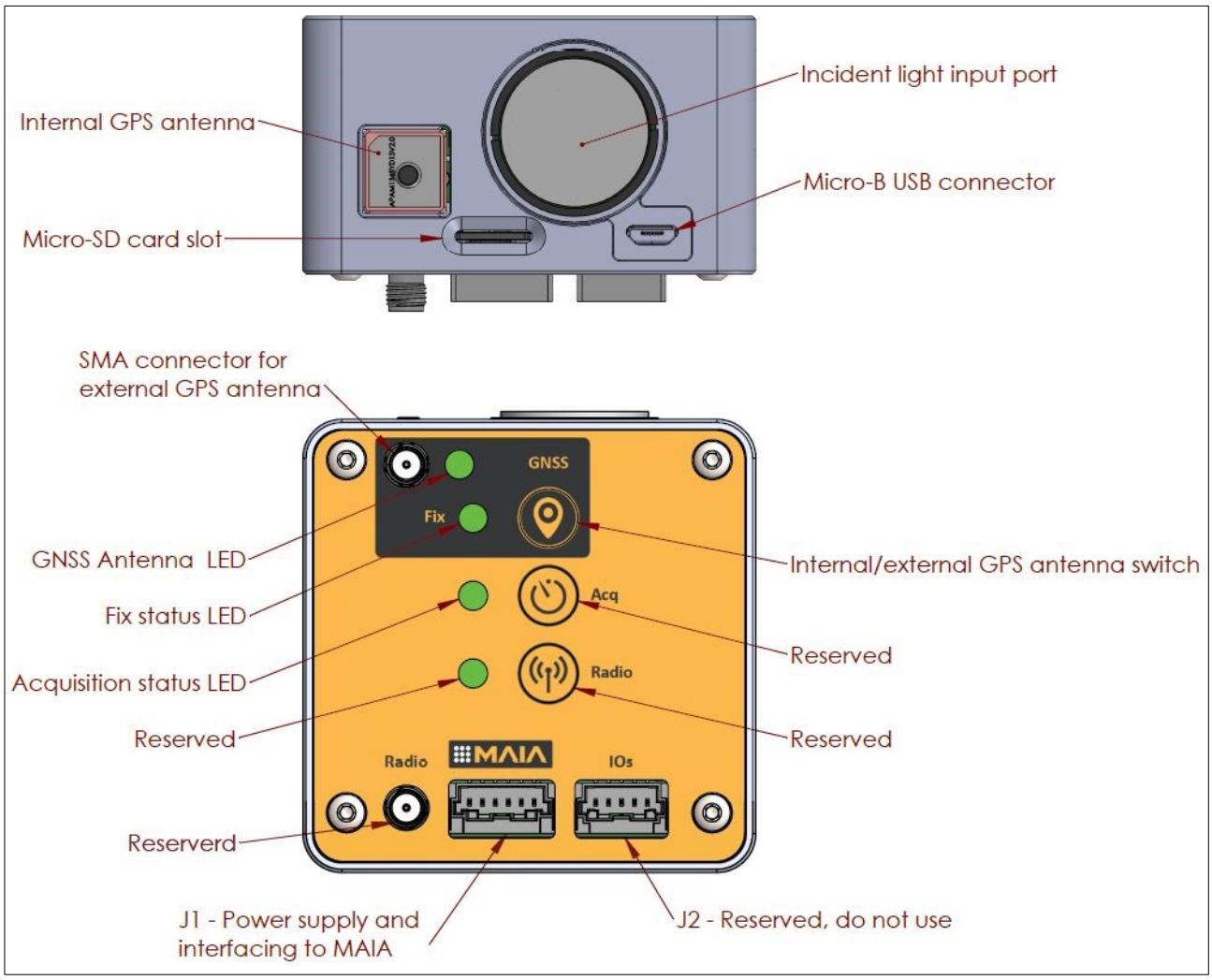

Figure 2 Description of leds, plugs and components of ILS case.

1.2.3 IRRADIANCE SENSOR

- True cosine correction of incident light;
- incident light level measured for each band of MAIA S2 multispectral camera, with matched spectra depending on the filter-set installed;
- accurate irradiance measurement thanks to patented technology.

Band	Start WL (nm)	Stop WL (nm)	CWL (nm)	Colour
1	433	453	443	Violet
2	457.5	522.5	490	Blue
3	542.5	577.5	560	Green
4	650	680	665	Red
5	697.5	712.5	705	Red Edge 1
6	732.5	747.5	740	Red Edge 2
7	773	793	783	NIR 1
8	784.5	899.5	842	NIR 2
9	855	875	865	NIR 3

Table 1 Summary of optical bands detected by ILS WV related to MAIA S2 multispectral camera.

1.2.4 6-AXIS IMU (INVENSENSE ICM-20689)

- 3-axis gyro with +/- 250 deg/s full-scale-range and 0.1 deg/s resolution;
- 3-axis accelerometer with +/-4 g full-scale-range, and pitch and roll angles with 0.1 g resolution.

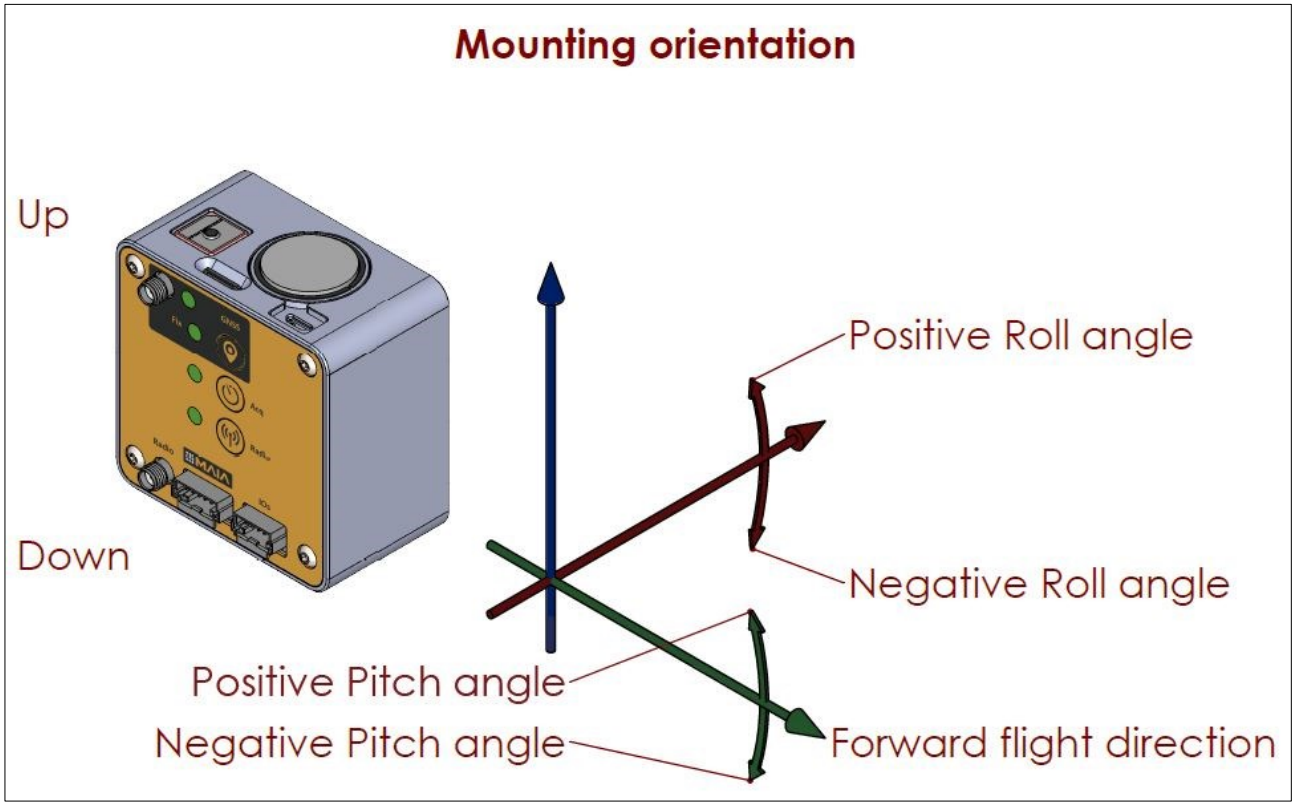

Figure 3 ILS mounting orientation.

1.2.5 ENVIRONMENTAL SENSOR (BOSCH BME280)

- 0-60 ºC temperature measurement range, ±1 ºC accuracy (*);
- 800-1100 mbar pressure measurement range, +/-1 mbar accuracy;
- 0-100% RH humidity measurement range, +/-5% RH accuracy.

(*) The thermometer measures the temperature inside the ILS case, which is, in general, higher than the ambient temperature due to several external factors, including the heating caused by the solar radiation and the dissipation feature of the mounting fixture.

1.2.6 GNSS RECEIVER

- Standard precision receiver or high precision RTK for centimeter-level positioning accuracy;
- concurrent reception of up to 3 GNSS (GPS, Galileo, GLONASS, BeiDou);
- navigation sensitivity of -165 dBm;
- better and faster positioning, supporting all satellite augmentation systems;
- integrated passive antenna;
- SMA connector supporting active or passive external antenna.

Figura 4 ILS mounted onboard a RPAS in connection with MAIA multispectral camera.

1.3 KEY FEATURES

- Irradiance levels of light measured with bands matched with the MAIA S2 multispectral camera;
- GNSS receiver with onboard antenna, supporting the use of an external active or passive antenna;
- 6-axis IMU and pressure, temperature, humidity sensors;
- seamless connection to the MAIA S2 multispectral camera;
- data of each measured parameter are included in the camera log file;
- single-cable connection to MAIA S2 multispectral camera for power supply and control;
- 1s measurement rate of all parameters, synchronized with the image acquisition;
- micro SD card for additional log files storage (8 GB bundled);
- USB interface to access the SD from the host computer without removing the SD.

2 REVISIONS

Version	*Date*	*Notes*
Rev. 0.1	02/2018	Preliminary