

Multiscale Observation Networks for Optical  
monitoring of Coastal waters, Lakes and Estuaries

## *Solar-tracking radiometry platform (So-Rad)*

### Installation

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V1.0

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# 1. System Components

The main components of the default So-Rad system configuration are shown in Figure 1. This includes:

- Stainless steel control box (12kg). This enclosure is IP65 rated but this depends on proper installation and care. Dimensions of the box are 400x400x150mm and mounting brackets are included at the top of the box to secure it to your platform. Please observe:
  - A bead of silicon grease should be rubbed onto the seal of the enclosure before deployment
  - The seal should be kept clean and free of debris
  - The enclosure should only be mounted vertically with cables pointing down.
  - Secure the enclosure with a strap if it is mounted in an environment where strong winds or wave motion may occur
- A motor enclosure (5kg)
- A clamp to secure the motor, ending in a common end plate

Use only bolts made of stainless steel.

Because every platform is different you will need to **produce a suitable mounting counterpart to the square end plate**. In rare conditions you may be able to bolt the clamp directly to a vertical surface. Usually, a clamp to a railing or pipe will be required. The dimensions of the end plate are 200 mm W x 100 mm H. The bolt holes are 170 mm (long edge) and 70 mm (short edge) apart (all measured centre-to-centre). Each hole is 11mm in diameter with the centre located 15mm from each edge.

**Two radiance sensors** (e.g. TriOS Ramses ARC) will be mounted on the motor enclosure, one pointing at the water surface and one at the sky, both in the direction marked Front on the enclosure and sensor axle.

**An irradiance sensor** should be mounted at a suitable location where it cannot be shaded by platform structure (but observe that it remains well below any lightning rods), in the vicinity of the control box. Standard sensor cable lengths supplied are 5m. No clamp is provided for the downwelling irradiance sensor. It can be secured (slightly extending above) existing structure such as masts or poles or railing using jubilee clips and some rubber sheet. Scaffolding clamps may also be used but should not be overtightened. Note that scaffolding materials may corrode in marine environments.

**Orientation of the motor enclosure.** The 'home' position of the motor is marked on the enclosure and sensor axle. When the unit is powered on the sensor shaft will align with the home position on the motor enclosure. Use the markings on the motor enclosure to determine how to rotate the enclosure upon installation, so that it either points to front or side of your measurement platform. Then determine the angles to which the sensors may be rotated in clockwise and counter-clockwise direction to avoid pointing sensors back at the platform, as these will have to be configured in the software.

There are **two satellite positioning receivers** which should be installed in parallel with the bow-to-stern axis of the platform. They need not be placed in the centre of the ship as long as one is directly in front of the other, ideally with approximately 2 m distance between them (heading accuracy increases with distance between the receivers). The receivers may already be marked F(ront) or R(ear). The software can be configured to swap them around if the reported heading of the platform



is reversed by 180°C, so the order in which they are mounted is not critical. Please observe that the most accurate positioning is achieved when the receivers are mounted at equal height on a flat metal surface without major structures above and around. For example, it is better to allow 1m spacing between them on the roof of a cabin than to have them 2m apart but surrounded by plated metal, which can create bounced satellite signals, decreasing accuracy.

Attach **sensor cables** to the control box, route them to the motor enclosure, then attach to sensors before securing sensors into place (to prevent accidental loss of a sensor). Using TriOS RAMSES sensors it does not matter to which cable/socket each sensor is connected. Make a note of the serial number of the downwelling irradiance sensor, if it is visible. It is very important that there is **sufficient cable** length at the sensor end to allow rotation within the clockwise and counter clockwise margins allowed at the installation location. It is equally important that these **cables do not get caught** on the platform or the enclosure and clamps themselves in a way that will impair movement. If this happens, the motor will not break the cables but generate an alarm which then needs to be manually reset after clearing any restriction of movement. Use cable ties to bundle sensor cables together in a loop behind the sensor holders. Cable guides available from IT merchants or homeware stores can also be used.

#### **Safety notices:**

Do not open the control box unless instructed to do so by trained personnel, particularly in outdoor and/or wet conditions. Use only suitably rated cabling to provide electric power to the control box.

Secure all cables to stable structures using cable ties to prevent damage. Do not create trip hazards.

Do not install heavy components alone. Observe precautions when working at height.

Observe any other relevant Health and Safety notices issued by the platform owner and relevant authorities. PML cannot accept liability for harm or damage caused by installation or operation of the So-Rad. All equipment has been tested for safe operation, prior to transport.



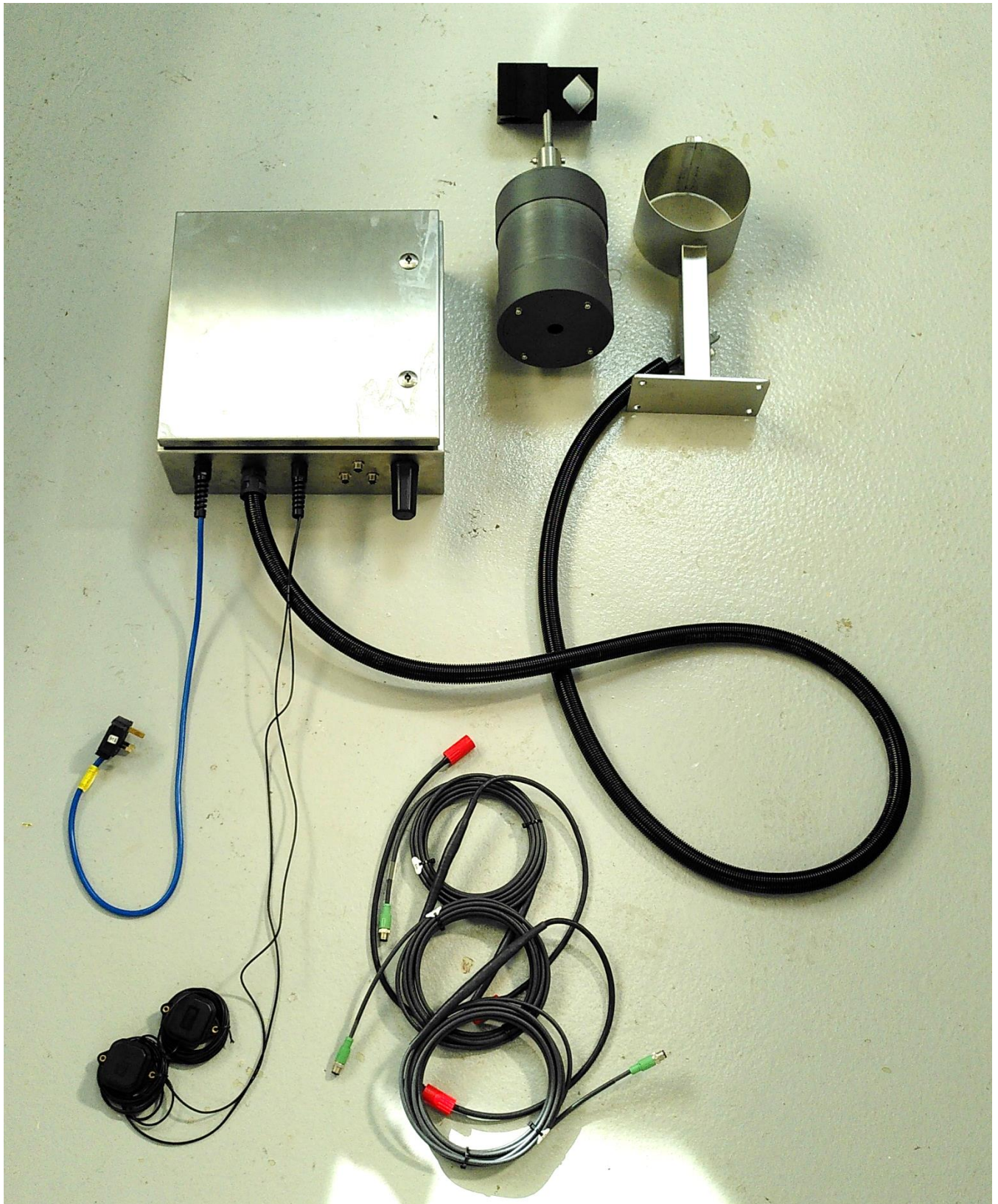


Figure 1 So-Rad system components (excluding radiometers).

