

HSP1 Spectrometer



- Based on SPN1 radiometer, which measures Global & Diffuse irradiance.
 - No moving parts, no polar alignment needed
 - Works on moving platforms as well as fixed stations
 - Make the SPN1 hyperspectral by replacing broadband detectors with spectrometers
 - Several generations of prototypes constructed to get to the current configuration
- Prototypes tested on sea and land

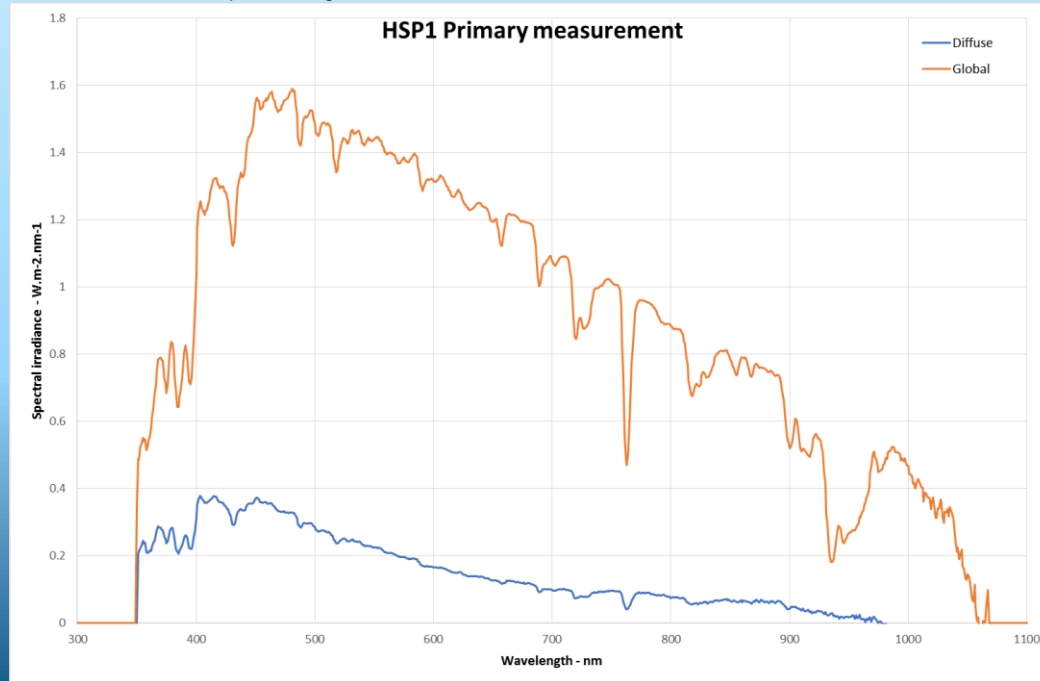


HSP1 Spectrometer development



- From early prototypes in plastic box, to well thought out instrument package.
- Additional spectral channels available for reflectance or sky radiance
- Currently building pre-production test batch, leading to regular production.
- Systems have been used by PML (AMT cruise), Univ Valencia, Lakelab, Met Eireann, Uni Colorado

Wood, J., Smyth, T. J., and Estellés, V.: Autonomous marine hyperspectral radiometers for determining solar irradiances and aerosol optical properties, *Atmos. Meas. Tech.*, 10, 1723–1737, <https://doi.org/10.5194/amt-10-1723-2017>, 2017



HSP1 Spectrometer detail

Specifications

- Spectral range 350nm – 950nm (1050nm potential)
- Optical bandwidth ~3nm
- Measurement – Global horizontal & Diffuse horizontal spectral irradiance, plus any additional channels
- Field of View for Direct/Diffuse partition $\sim\pm 5^\circ$
- Measurement time ~1s
- Power requirement ~10W @ 12V (reductions planned)
- Internal diagnostics – enclosure RH%, Pressure, Temperature, GPS position & time, (Orientation optional)
- Connectivity – Ethernet cable, (WiFi / GSM optional)
- Data storage – >1 year at 1-min storage interval.
- ASCII datafile storage, automatic upload via dropbox

Calibration & Accuracy

- Calibration via transfer standard in integrating sphere to NPL / NIST FEL lamp
- Accuracy target 5%, stability ~1%
- Suitable for long-term unattended usage

Retrievals

- Primary output is calibrated Global & Diffuse spectra, plus supplementary channels
- Algorithms & code for retrievals of AOD, reflectance are being developed and will be openly available
- Diffuse/Direct ratio-based AOD retrievals particularly promising

Availability & cost

Currently building pre-production batch in preparation for commercial production (late 2021 or early 2022).

Target price £12k - £15k depending on accessory package.



MONOCLE

Monocle-h2020.eu/Home

John Wood – Peak Design Ltd

HSP1 Spectrometer

Thank you for your interest