

SMART PROCESSING HYPERSPECTRAL DETECTION AND RECONNAISSANCE SYSTEM

SPHYDER is a hyperspectral system which has been conceived for remote sensing applications. Designed and manufactured entirely in-house, the system brings the realtime analysis and displaying of results to the hyperspectral market.

A user-friendly GUI (for both the aircraft system and the ground station) enables the organisation of training across a range of disciplines ranging from Operator to Mission Planner to Mission Analyst.

HYPERSPECTRAL PAYLOADS AND SYSTEMS

We have developed and manufactured Hyperspectral Sensors for both airborne and space platforms.

Airborne

SIM-GA demonstrator and the latest cutting-edge hyperspectral SPHYDER system.

Space

VIMS on CASSINI Mission, VIRTIS on ROSETTA, VENUS EXPRESS, DAWN Missions, JIRAM for JUPITER, and the most recent, PRISMA payload.

We have many years of experience in optical design and manufacturing and has developed and built Hyperspectral Systems able to guarantee to the end-user the highest quality results.

PEDIGREE IN HYPERSPECTRAL TECHNOLOGIES

The company has been exploring hyperspectral technology for more than 20 years and the range of products illustrates the huge potential of hyperspectral sensors in a broad range of applications ranging from environmental monitoring to the real-time detection of small targets in the maritime environment.

SPHYDER

Following extensive research and development activities, we understand the potential of this technology and the potential for its deployment through space, airborne and ground platforms.

Through years of deployment and use of hyperspectral demonstrators such as SIM.GA, it has been concluded that custom optics, state-of-the-art sensors and in-house developed processing allow discrimination and identification of small objects even at long distances in overcast weather, against a high level of clutter.

KEY FEATURES

Real-time

The main frustration of hyperspectral sensors is the associated lengthy data analysis. The SPHYDER system overcomes this by providing Real-Time Decision Support Information during flight.

Ground Station software

The system includes bespoke software which provides indepth analysis and mission planning intelligence.

High spatial resolution data

The high resolution of SPHYDER allows the surveying of large areas in short time, thus allowing real-time intervention and reduced operating costs.

High data reliability

Mission optimisation is assured through in-flight calibration and flight monitoring procedures.

Deployable on multiple platforms

The system can be deployed on unmanned (e.g.remotely controlled for missions like 3000m AGL), fixed and rotarywing aircraft.

Extended operation

SPHYDER enables data acquisition and elaboration over a wide temperature range and long mission times.

Flexible and modular construction

SPHYDER can be tailored to fit specific application requirements due to extensive system hardware and software modularity.

Integration with other systems

SPHYDER outputs can easily be integrated with various on-board sensors (e.g. EO/IR, etc.).

CONFIGURATION

SPHYDER configuration comprises:

- Real-time processor (e.g. for SAR operations)
- Ground Station Software
- Hardware (see system configuration).

REAL-TIME MAIN FUNCTIONS

The deployment of the system allows the following real-time operations to be implemented for various applications.

Target Search (Search and Rescue)

- Detection
- Recognition
- Identification (invariant to atmospheric conditions)
- Classification of targets
- Geo-localization.

Classification

- Area segmentation
- Identification of class materials
- Geo-localization.

GROUND STATION MAIN FUNCTIONS

- Mission debriefing and reporting
- Planning of future missions
- Training
- Large-scale processing of all acquired images (e.g. georeferencing, mosaicing)
- Specific and complex data processing, not manageable or needed in real-time
- Spectral Signatures database.



Human Machine Interface (HMI)

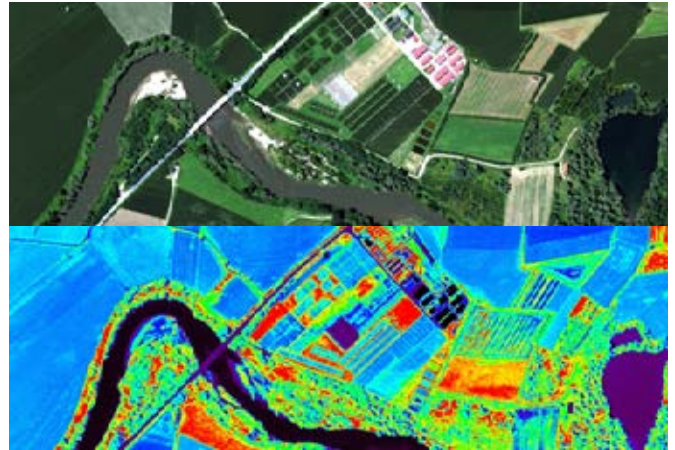
Both System RT and Ground functions are customizable depending on end user requirements:

- Hosted on existing or dedicated consoles
- Fully customisable.

APPLICATIONS

Environmental

- Dumps Monitoring
- Soil Mineralogy mapping
- Hydrocarbon-bearing materials pollution
- Bathymetry
- Coastal erosion mapping
- Asbestos mapping
- Area classification
- Water quality analysis (Inland and coastal).



Area mapping

Military and paramilitary

- Search and Rescue (SAR)
- Camouflage detection
- Soil analysis for docking operations
- Detection of vehicle tracks
- Tracking of vehicle movements
- Detection of man-made submerged objects
- Illegal activities reconnaissance (drug plantations)
- Anomaly Detection (manmade objects, camouflage).



Camouflage detection

Forestry and agriculture

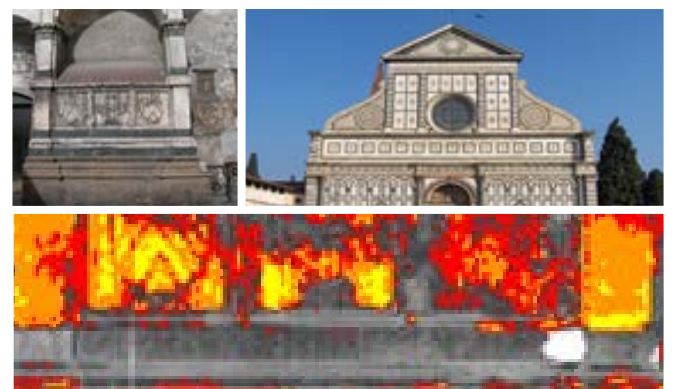
- Forest fire detection
- Mapping of burned areas
- Forest monitoring
- Vegetation classification
- Bio-geo-physical analysis of vegetation
- Soil mineralogy analysis.



Fire fighting

Prevention

- Support to Geo-Hazards analysis
- Support to Precision Agriculture
- Support to Cultural heritage assessment and conservation.



Support to cultural heritage assessment and conservation

SPHYDER



TECHNICAL SPECIFICATION

Parameters	PAN	VNIR	SWIR
Spectral range	[400, 1000] nm	[400, 1000] nm	[900, 2500] nm
Spectral sampling	Panchromatic and RGB	2.5nm	6nm
Spectral bands	3	240	266
Field Of View (FoV)	±14.5°	±14.5°	±10.8°
GSD @ H=1000m	0.07m	0.33m	1m
Swath @ H=1000m	500m	520m	374m

ENVIRONMENTAL

Shock	MIL-STD-810E
Vibration	MIL-STD-810E
EMI/EMC	MIL-STD 461F
Operating Temperature	-40°C to +50°C

POWER

Power consumption	Power peak of 400W
Power Supply	Compatible 18-32 VDC
	MIL-STD-704D

PHYSICAL

Optical Head (mm)	Ø360 x H 390
Monitoring and Control	
Electronics (mm)	-200 x 220 x 150
Processing Unit (mm)	219 x 178 x 69
Weight	40kg (for the overall system)
Software Interface	Ethernet
Data Transfer Unit	Extractable HDs and DataLink
Recording Capacity	At full resolution 12hrs
Installation	Customisable

SYSTEM CONFIGURATION

Optical Head	With three channels: VNIR, SWIR and Panchromatic
GPS/IMU	Various solutions, depending on the platform
Battery	Optional
Processing units	Two
Human Machine Interface	Customisable and user-friendly.
Ground Station Software	
Monitoring and Control Electronics	

All components are ITAR free.

