Miratlas

Atmospheric Intelligence

- Multidomain Sensing
- Resilient Optical Communications
- Drone Detection

- **From atmospheric uncertainty to mission certainty**

- Reliable free space **optical communications and directed-energy operations with real-time environmental intelligence**

LA FRENCH TECH 2030

osac ISO 9001 EN 9100 opave Aeroservices

www.miratlas.com

Why Atmospheric Intelligence Matters

Optical links fail. **Drones evade detection**. Directed-energy systems miss their targets.
All because the atmosphere is ignored.

Atmospheric turbulence, aerosols, dust, and cloud cover degrade performance across:

- **Optical communications** (Satcom, Free Space Optical Links)
- **EO/IR sensors** (surveillance, tracking, missile defense)
- **Directed-energy weapons** (laser targeting, beam propagation)
- **Counter-UAS system**s (drone detection and interception)

We **measure, model, and predict** atmospheric conditions with u**ltra-local, high-resolution data, not estimates, not models.**
Our Atmospheric Intelligence Network provides:

- **Real-time turbulence and cloud cover data**
- **Predictive analytics** for sensor optimization and threat detection
- **Seamless integration** with Intelligence, Surveillance and Reconnaissance, ISR, air defense, and optical communication systems
- **Proven resilience** in operational environments (TRL 7-8)

Result:

- **Resilient optical communications** (optimized link availability, reduced outages)
- **Improved drone detection** (higher confidence, lower false alarms)
- **Enhanced directed-energy system performance** (better targeting, reduced degradation)
- I**mproved Grid Stability through better PV forecasting**.

Atmospheric Intelligence for Research, Energy, and Climate
The Sky Monitor is **a passive optical sensing system** that delivers **ultra-local, high-resolution atmospheric data, 24/7, in real time.**
By measuring **turbulence, cloud cover, and optical propagation quality**, it enables **precision environmental intelligence** for scientific, industrial, and operational applications.

Key applications	Miratlas Impact
Direct-to-Earth Optical Communications	**Site selection, OGS operation, network routing**: Enables reliable DtE FSOC through optimal mitigation strategies (site diversity, dynamic routing) based on real-time weather conditions.
Photovoltaic Forecasting	Improves solar energy production estimates through **precise irradiance, cloud cover, and atmospheric stability data → optimized grid integration and reduced forecasting errors.**
Contrail Detection	**Real-time monitoring** of condensation trails for **aviation climate impact studies** and **air traffic optimization.**
Climate Change Research	**Long-term atmospheric datasets** to support climate models and environmental studies.
Atmospheric Modelling	**High-fidelity measurements** for weather prediction, pollution tracking, and atmospheric physics research.
Astronomy & Space	**Site characterization operational optimization** for ground-based telescopes and optical Space Situational Awareness.
Defense	**Improves drone detection** and **optimizes directed energy weapons** for enhanced threat mitigation.

Product & Service Tiers

Sky Monitor Hardware

- Own your atmospheric sensing station for **permanent deployment.**
- **Custom configurations** (e.g., add SHABAR for daytime turbulence, LWIR for cloud cover).
- **Ideal for :** Long-term monitoring, critical infrastructure, research facilities.

. **Atmospheric Data as a Service (Subscription)**

- Access **real-time and historical atmospheric data** via API or dashboard.
- No hardware required—leverage our global network of Sky Monitors.
- **Scalable coverage** (single site to multi-region).
- **Ideal for:** Telecom operators, energy providers, and organizations needing operational atmospheric intelligence.

Lamarck Program (Non-Commercial Access)

- **Free or low-cost access** to atmospheric data for **research, education, and public good.**
- **Supports:** Academic institutions, non-profits, and government research.

Learn more: https://miratlas.com/lamarck/

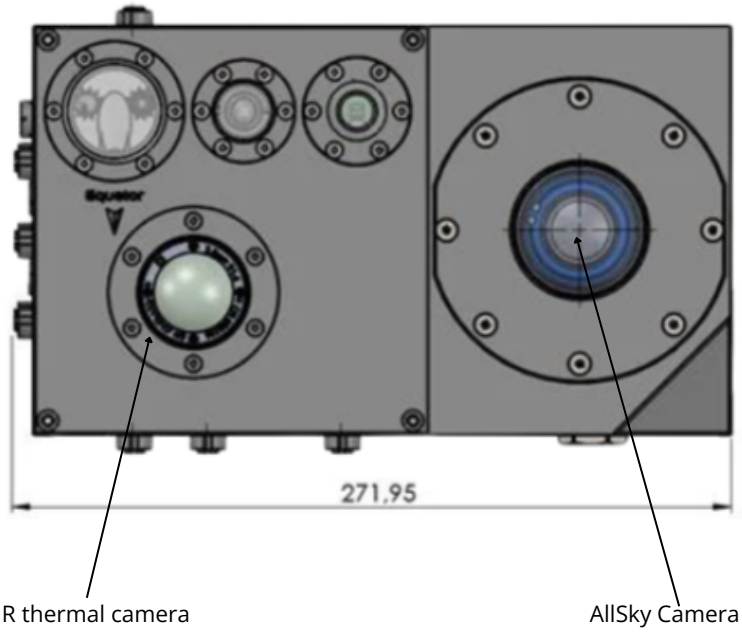
Why Miratlas ?

- **Proven Technology:** TRL 7-8, deployed worldwide (Europe, North America, Asia)
- **Scientific Rigor**: Trusted by ESA, CNES, DLR, ONERA, Airbus, Durham University
- **Flexible Engagement:** From **hardware sales to data subscriptions** to **non-commercial access.**
- **Seamless Integration:** APIs, dashboards, and **on-premises deployment for sovereign applications.**

Miratlas

Sky Monitor :
All in one instrument Standard configuration : Main Unit, C-DIMM & weather station
+ Optional Equipments

Data	Unit	Range	Resolution	Accuracy	Periodicity	FOV	Avaibility	Class
Allsky visible	ADU	0 ~ 255	1	<<1	60 to 300s	180°	Always	CLOUDS
Allsky LWIR	°C	-40 ~ 120	0.06	2%	60 to 300s	180°	Always	
Nighttime transparency		0 ~ 1	0.004		60 to 300s	180°	Always	
Nighttime seeing	arcsec	0.2 ~ 20	0.002	7%	60s	Polaris	Clear night	TURBULENCE
Nighttime Fried parameter r0	cm	0.5 ~ 50	0.05	7%	60s	Polaris	Clear night	
Nighttime isoplanatic angle θ0	arcsec	0.06 ~ 10	0.01	1%	60s	Polaris	Clear night	
Nighttime scintillation	ADU	0 ~ 255	1	1%	60s	Polaris	Clear night	
Daytime seeing	arcsec	0.2 ~ 20	0.01	11%	2s or 60s	180°	Clear day	
Daytime Fried parameter r0	cm	0.5 ~ 50	0.05	11%	60s	180°	Clear day	
Daytime seeing SHABAR	arcsec	0.2 ~ 20	0.01	12%	60s	Sun	Clear day	
Daytime Fried parameter r0 SHABAR	cm	0.5 ~ 50	0.05	12%	60s	Sun	Clear day	
Daytime isoplanatic angle θ0 SHABAR	arcsec	0.05 ~10	0.05	38%	60s	Sun	Clear day	
Daytime C_n^2 SHABAR (24 altitude samples)	$m^{-2/3}$	$1e^{-17}$ ~ $1e^{-12}$	-	-	60s	Sun	Clear day	
Downwelling infrared	W/m2	115 ~ 550	0.1	3.5	60s	80°	Always	AEROSOLS
Sky temperature	°C	-60 ~ 40	0.02	0.5	2s or 60s	10°	Always	
Precipitable water column	cm	0 ~ 15	0.003	20%	60s	10°	Clear sky	
Irradiance	mag/arcsec2	8 ~ 22	0.0001	2%	60s	10°	Dusk & Dawn	
Temperature	°C	-40 ~ 85	0.1	±0.3	2s or 60s		Always	WEATHER
Pressure	hPa	10 ~ 1100	0.1	±0.5	2s or 60s		Always	
Humidity	%	0 ~ 100	0.05	±3	2s or 60s		Always	
Wind speed	km/h	0 ~ 216	0.18	±3% @10m/s	2s or 60s		Always	
Wind direction	°	0 ~ 359.9	0.1	±3% @10m/s	2s or 60s		Always	
Rain	mm	0 ~ 500	0.01	±4%	60s		Always	
Rain rate	mm/h	0 ~ 500	0.001	±4%	60s		Always	



Size, Weight & Power:
272x170x141mm, 5.3 kg, <40W

C-DIMM
440x300x260mm, 5.4kg

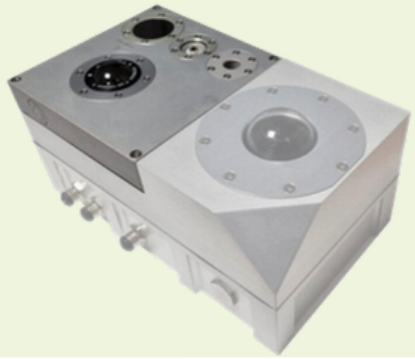
Weather station
160x160x263mm 2.1kg

Data requirements
100Mb/s speed recommended
100MB/hour data upload, typ.

Alt/Az tracking mount (option)
850x750x300mm 34kg net
12W to 100W peak

Operation Conditions	Values
Operating Temperature	-30°C to +50°C
Storage Temperature	-30°C to +70°C
Relative Humidity	Up to 93% @ +40°C
Atmospheric Pressure	No limits
Wind Speed	Up to 80 km/h

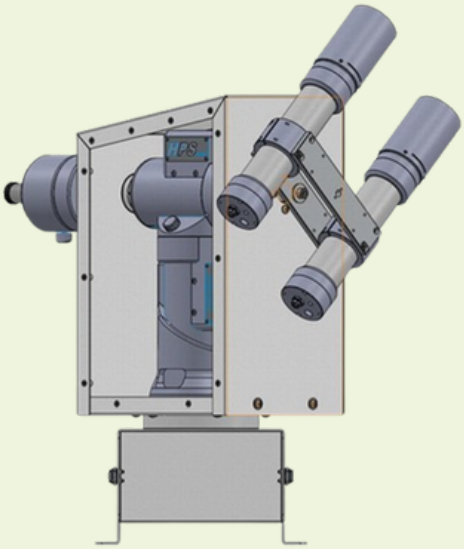
Cloud cover LWIR imager



Parameter	Value
Detector	Uncooled microbolometer (Vox)
Resolution	480 x 480 pixels circular projection
Acquisition frequency	1-15mn programmable
Spectral range	8µm to 14µm
Temperature range radiometrically calibrated	-40°c to +120°C +0/+4°
Digitization (NETD)	16bit, 50mK resolution
Field of view	360°
Aperture	f/1.4
Dimensions	Internal
Protection class	IP67
Operating temperature	-25°C to+40°C calibrated
Storage temperature	-40°C to +70°C
Lens	DLC coated Germanium *f*.theta calibrated
Weight	100g

C-DIMM tracking mount

Required if the installation site is in the Southern Hemisphere



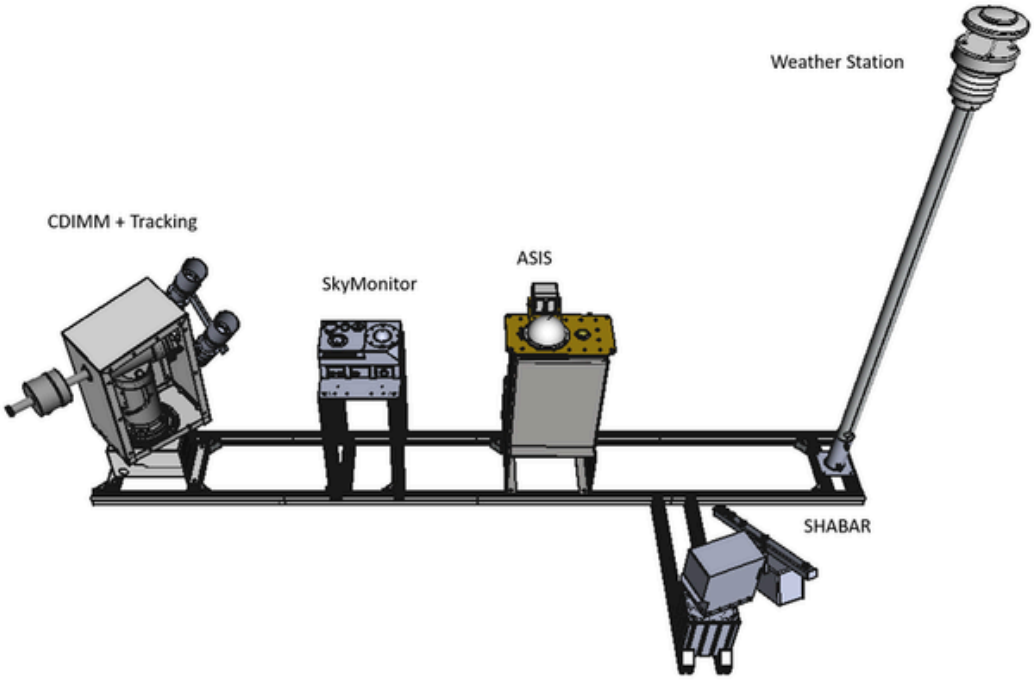
Parameter	Value
Mount Type	Altazimuth
Encoders	Absolute 2 axis
Resolution	20” pointing 0.7” RMS tracking
Speed	2 to 15°/s
Operating temperature	-15°C to +35°C
Interface	GigE
Protection class	IP66

SHABAR

Parameter	Value
Dimensions (WxDxH) at home position	320 x 160 x 580 mm
Weight	10 kg
Power	5 W (idle), 20 W (slewing)
Operating temperature	-15 to +40°C
Outdoor operation	weather proof
Turbulence vertical sampling	24 altitude points from 1m to 1 000m

SKY MONITOR

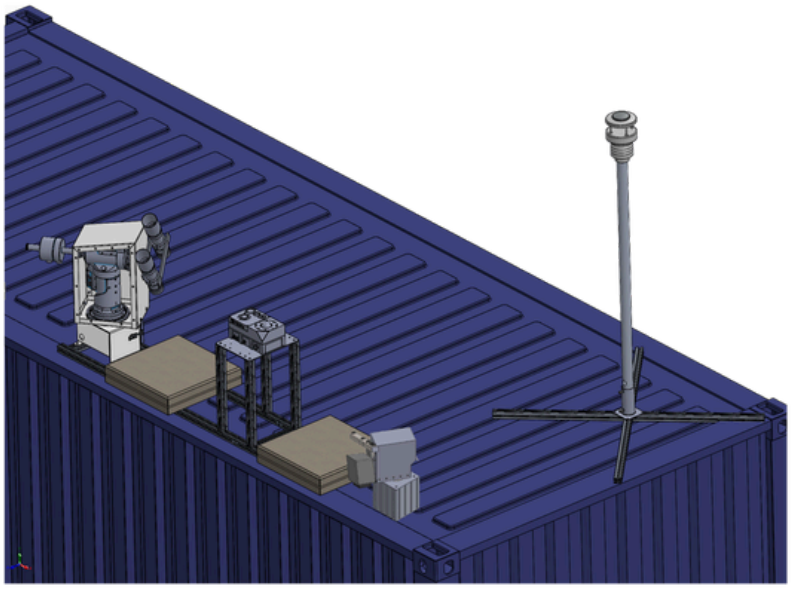
	Description
ISM4	Sky Monitor v4, diurn and nocturn seeing (C-DIMM), all sky imaging, irradiance, sky temperature and environmental parameters monitoring, GigE connectivity, <15x15x17cm, <40W, Allsky visible, Seeing, r0, isoplanatic angle, scintillation, transparency (Night & Northern Hemisphere only), seeing, r0, (Day) pyrgeometer, sky temp., total water column, irradiance, ext. temp., pressure, humidity, wind, rain/rain rate, IP66
LWIR	All Sky LWIR camera 640x480, 360° with radiometric calibration. IP66.
ALTAZ	High precision Alt/Az tracking mount for the C-DIMM with absolute encoder, IP66
SHABAR	daytime turbulence profiler in the boundary layer, C_n^2, seeing and r0
INST	On site installation per unit, up to two days and two nights
WARR	Additional warranty per year up to 5 years total



For its installation, the Sky Monitor requires only a **few square meters of flat horizontal surface with a clear view of the sky**.

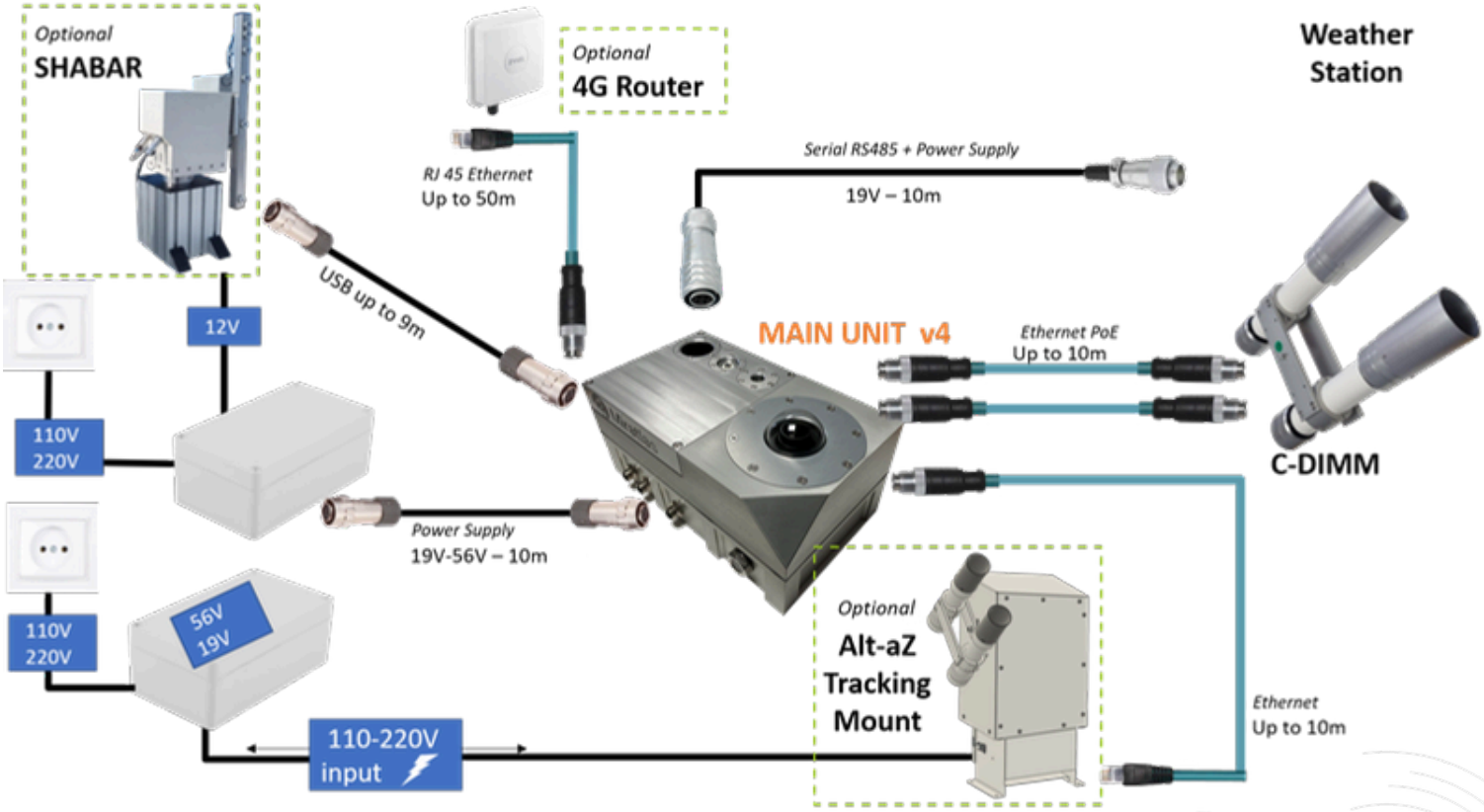
Each system has bolting points for direct fixations. We propose supportive structures to minimize the installation on structures where drilling isn't possible such as shipping containers.

On the right, exemple of non-penetrant installations, roof top, container, etc...



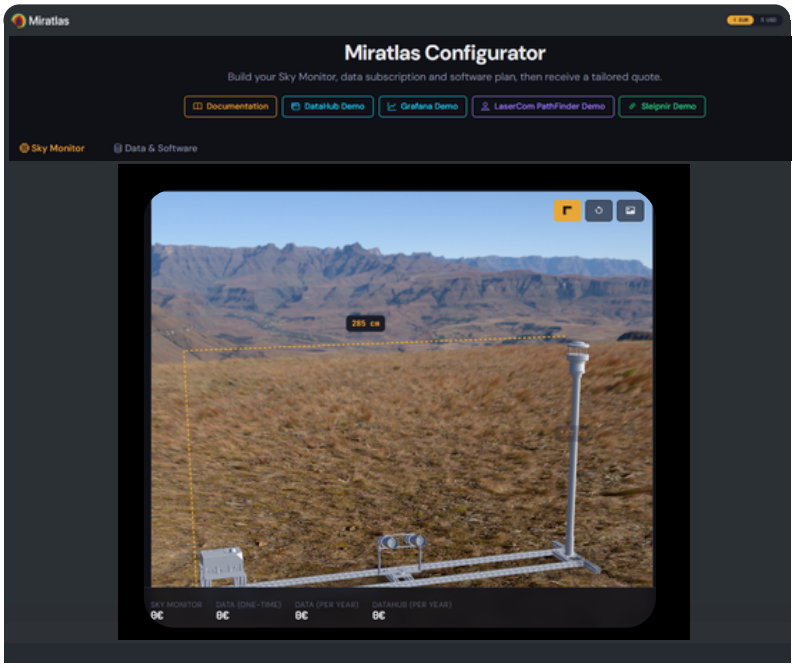
With your order, please specify:

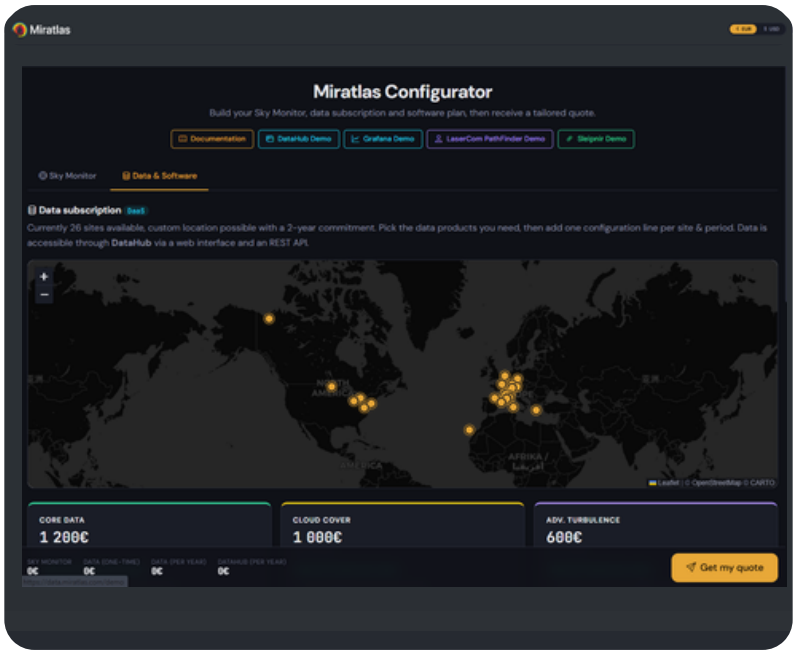
- **Installation location**, installation in the southern hemisphere will require the Alt-Az tracking mount,
- **Type and distance to power**, 220 or 110V, plug type,
- **Availability and distance to Ethernet**, up to 50m RJ45 cable, 4G router available as an option,
- **Network parameters**, IP address, port, DHCP, DNC etc...



Sky Monitor Configurator

The Miratlas Sky Monitor Configurator is a user-friendly tool designed to simplify the deployment and management of Sky Monitor stations. It allows users to configure sensor settings, communication parameters, and operational thresholds through an intuitive interface. By streamlining setup and maintenance processes, the Configurator ensures reliable operation, faster deployment, and consistent performance across the monitoring network.





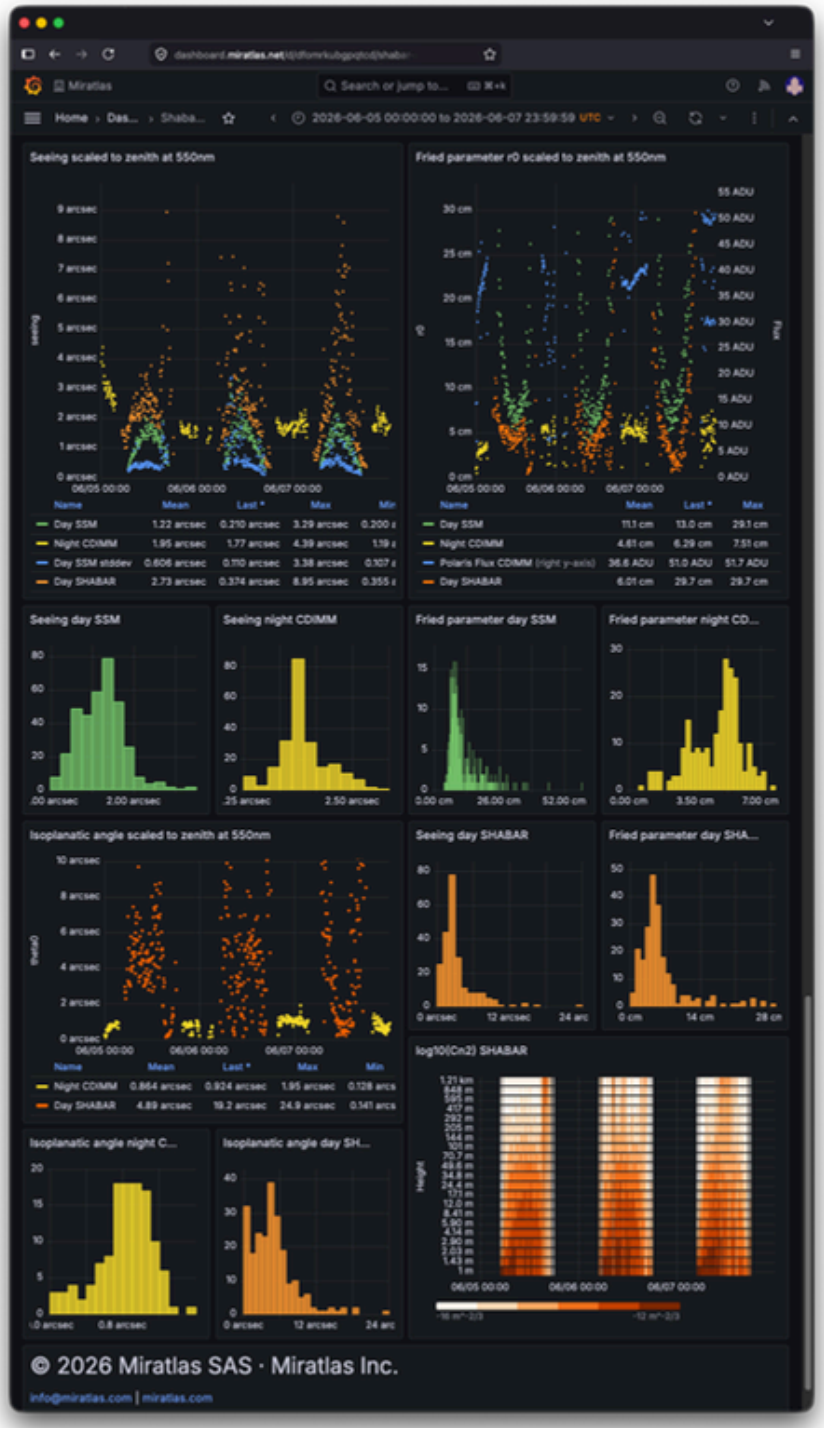
Configure your future Sky Monitor using our online tool to get our pricing in real-time. Once you submit your form, we will get in touch to discuss the next steps.

https://miratlas.com/configurator/

From this page, you can also access demos of our different platforms.

GRAFANA : Sky Monitor Dashboard

Powered by Grafana, the Miratlas Sky Monitor Dashboard provides a clear and intuitive view of real-time sky conditions and sensor performance. Through interactive visualizations, users can monitor cloud coverage, atmospheric conditions, system status, and historical trends from a single interface. The dashboard enables efficient data analysis, rapid anomaly detection, and informed operational decision-making.



Open your web browser and navigate to https://dashboard.miratlas.net/login. You will be prompted with the Grafana login page. Enter your username and password in the respective fields

Explore the various panels, visualizations, and data available on the Miratlas Dashboard.

Sky Monitor DataHUB

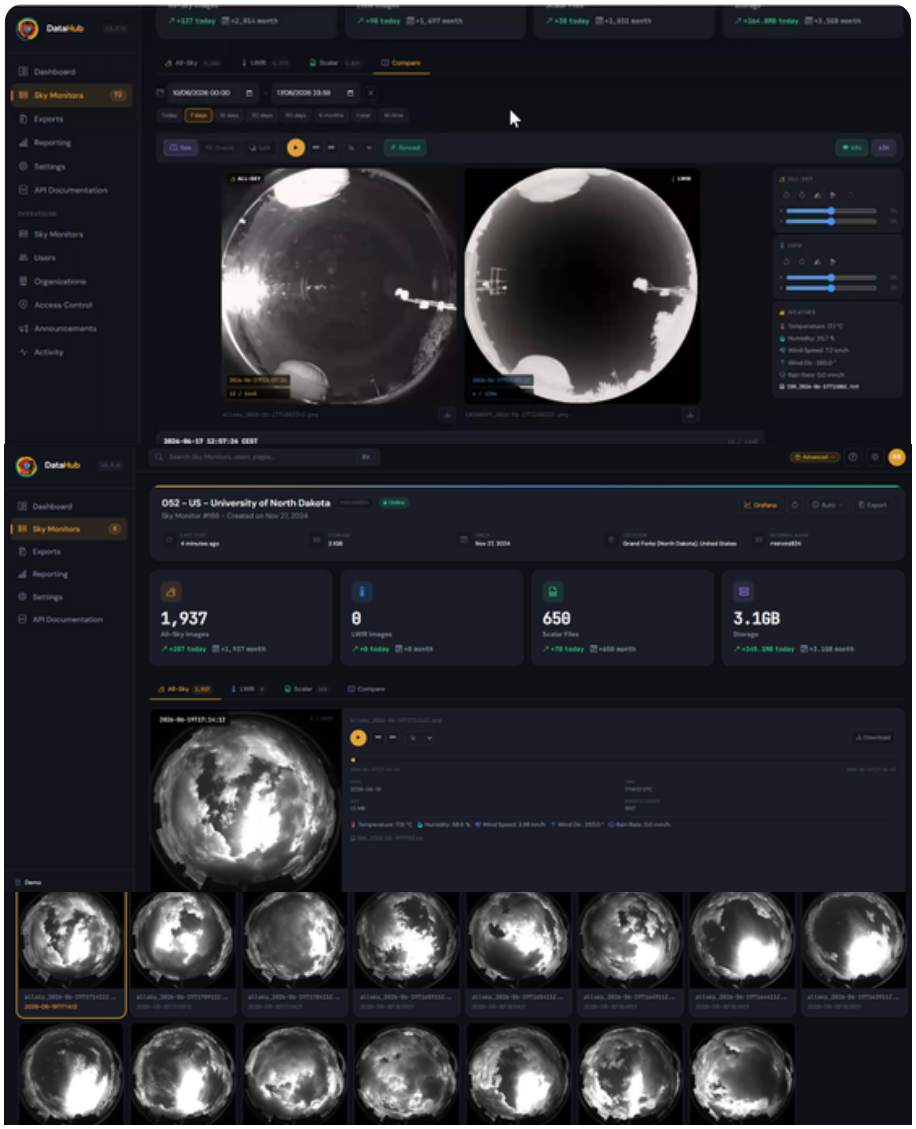
The service delivers direct access to long-term atmospheric measurements without the need to deploy or maintain dedicated instrumentation.

Key capabilities include:

- Continuous all-sky imaging and environmental monitoring
- Atmospheric turbulence measurements and Cn^2 profile characterization
- Cloud cover and meteorological data
- Secure data access through a web portal or API
- Advanced Grafana dashboards with enhanced visualization and analytics tools

Designed for site characterization, performance assessment, and operational support, the Sky Monitor Data Hub provides the atmospheric intelligence required for optical systems, laser communications, space surveillance, adaptive optics, and other high-performance applications

Access to the DataHub requires a subscription



Explore live sky monitoring stations : All-Sky, LWIR and Scalar data from the last 7 days. **No account required**.
https://data.miratlas.com/demo

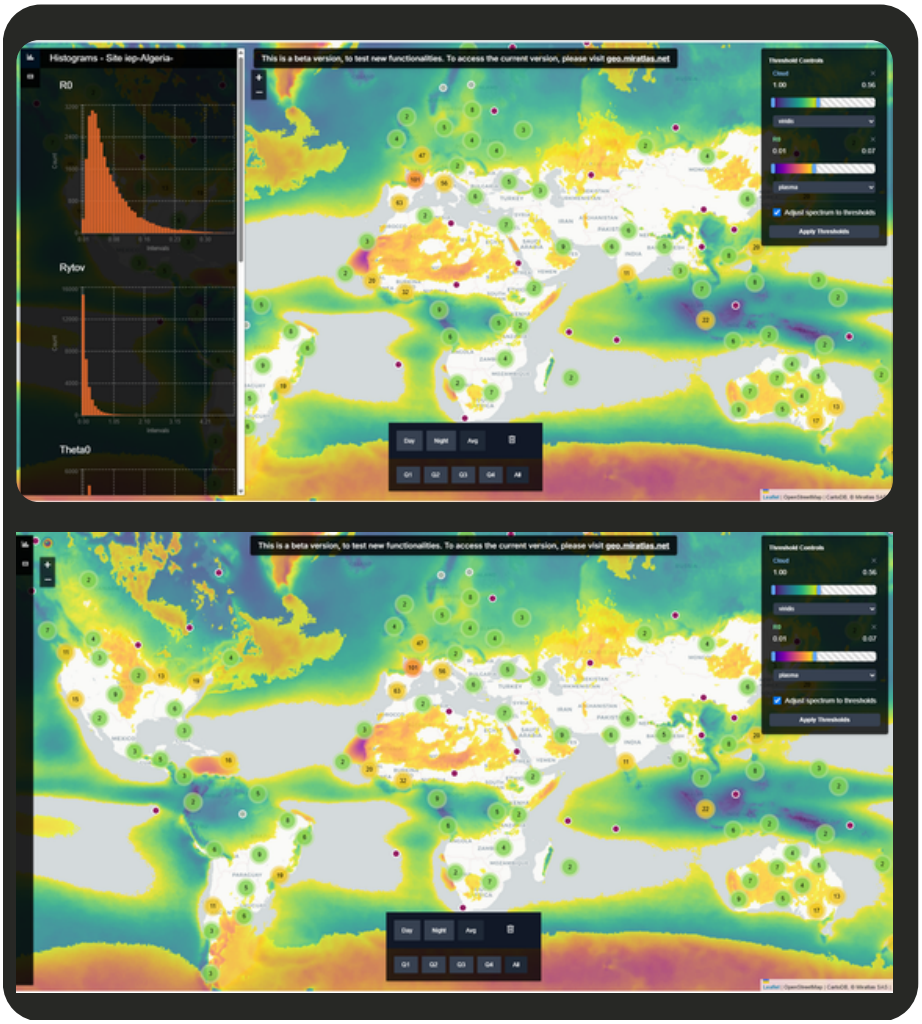
LaserCom Pathfinder - Predictive Intelligence for Optical Link Operations

Pathfinder is Miratlas' predictive analytics and operational decision-support software platform.
It transforms atmospheric data into real-time routing and availability intelligence.

Using data from the Sky Monitor, the Lamarck database, and ultra-local forecasting models, Pathfinder helps customers:

- identify the best OGS locations
- simulate real optical link availability
- optimize transmission windows
- anticipate performance degradation
- improve multi-site routing
- reduce CAPEX and OPEX

Pathfinder enables operators to shift from reactive operations to predictive network management.



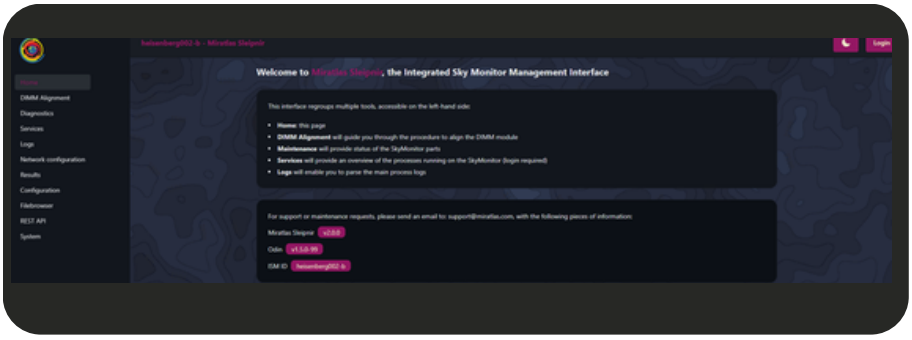
Open your web browser and navigate to
https://geo.miratlas.com/map
To access full version :
info@miratlas.com

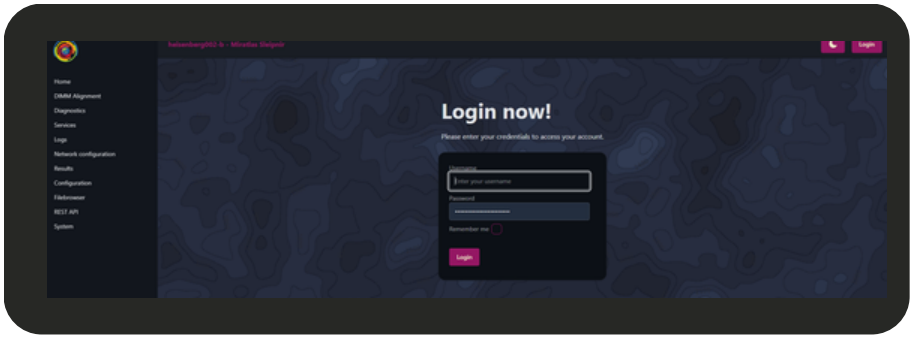
Miratlas Slepinir : Sky Monitor Managment Interface

Sky Monitor Managment Interface : Miratlas Slepinir

This interface provides access to multiple tools available from the left-hand navigation panel:

- Home: Access the main interface page.
- DIMM Alignment: Guides the user through the DIMM module alignment procedure.
- Maintenance: Displays the status and monitoring information of SkyMonitor components.
- Services: Provides an overview of the processes running on SkyMonitor (login required).
- Logs: Enables access to and analysis of the main process logs





To connect to Slepnir :
https://miratlas.com/sleipnir

Miratlas

Atmospheric Intelligence

- Multidomain Sensing
- Resilient Optical Communications
- Drone Detection

- ***Trusted by ESA, CNES, DLR, ONERA, Airbus, and Fraunhofer.***
  Deployed across the World: Europe North America and Asia

Miratlas'team
Contact us :

www.miratlas.com

ISO 9001
EN 9100