SKY MONITOR

Miratlas®

The Sky Monitor combines a full array of passive optical sensors and analyses light propagation to continuously characterize atmospheric absoption and scattering.

Applications include **Satcom**, Direct-to-Earth Free Space Optical Communications, providing all the parameters specified by the CCSDS and **Aviation** contrail detection.
Providing **real time, continuous measurements** of :

- **Cloud cover**, high resolution imaging,
- **Turbulence**, night & day,
- **Environmental**, sky temperature, irradiance, water column,
- **Meteorological**, temperature, pressure, humidity, wind, rain.

The Sky Monitor enables site survey & selection, optical terminal design & operations, ground segment optimization planning & routing.
With its low SWaP, rugged & carrier grade design, the Sky Monitor is plug & play and provides **local, high precision measurements** with its complete array of passive sensors including :

- **Allsky visible imager**, 450-1000 nm,
- **C-DIMM,** nighttime turbulence,
- **Sun Scintillation Monitor,** daytime turbulence in the ground & boundary layers
- **Weather Station,**
- **Allsky thermal cloud cover imager,** 8-14µm , radiometrically calibrated,
- **Alt-Az tracking mount with absolute encoders** enabling C-DIMM operation worldwide, auto-alignement and full sky surveys.

Sky Monitor, C-DIMM & weather station

Data	Unit	Range	Resolution	Accuracy	Periodicity	FOV	Avaibility	Class
Allsky visible	ADU	0 ~ 255	1	<<1	300s	180°	Always	**CLOUDS**
Allsky LWIR	°C	-40 ~ 120	0.06	2%	300s	180°	Always	
Nighttime transparency		0 ~ 1	0.004		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	0.004	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	
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°	2s or 60s		Always	
Rain	mm	0 ~ 500	0.01	1 mm	60s		Always	
Rain rate	mm/h	0 ~ 500	0.001	±4	60s		Always	

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Miratlas®

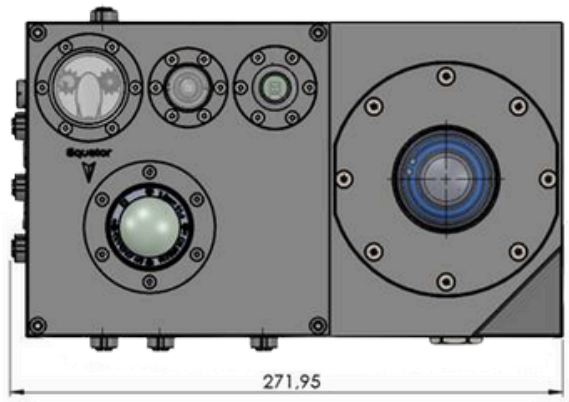
Size, Weight & Power:
272x170x141mm, 5.3 kg, <40W

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
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

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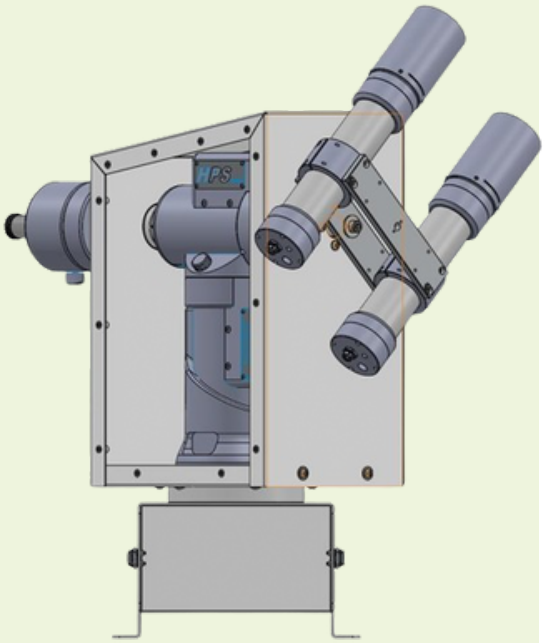
Cloud cover LWIR imager (option)

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 (option)



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

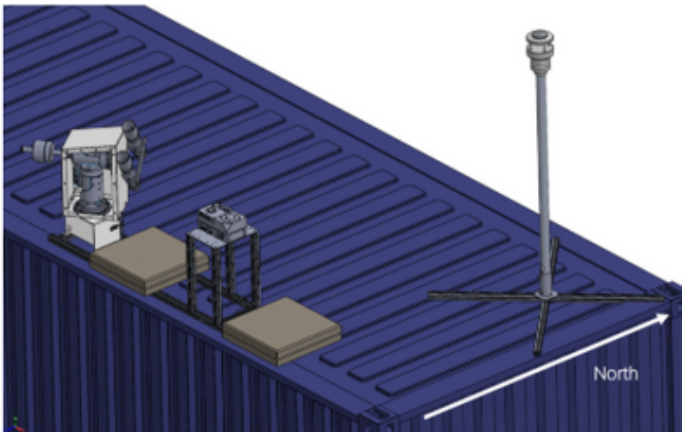
SKY MONITOR

	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
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.

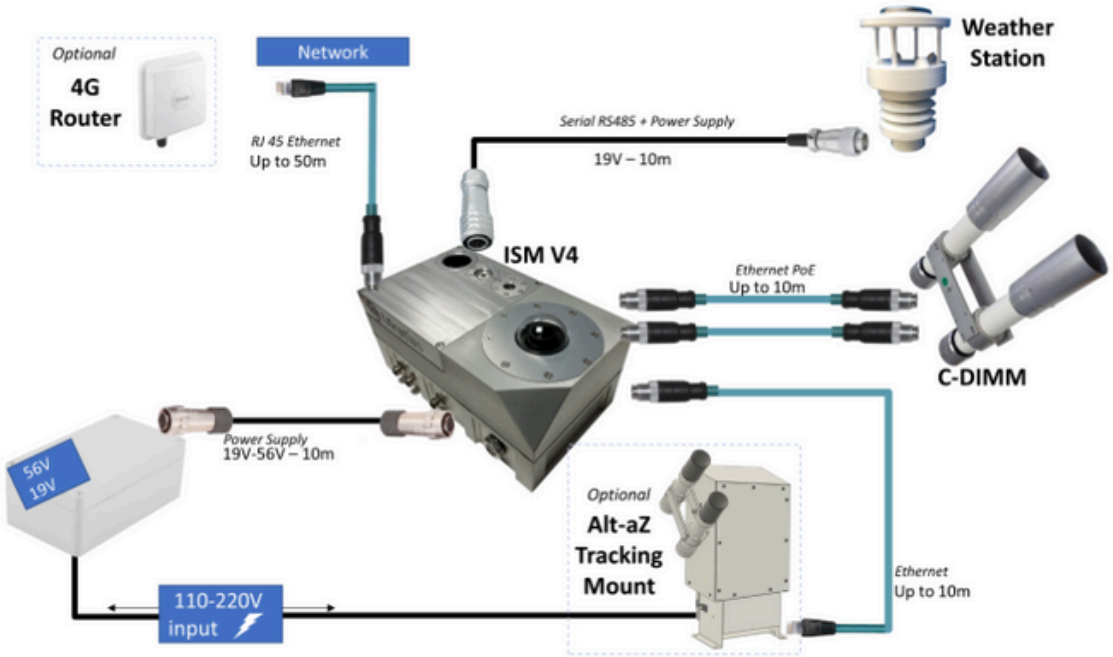
On the right, exemple of non-penetrant installations, roof top, container, etc...



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 Component and Connectivity Layout



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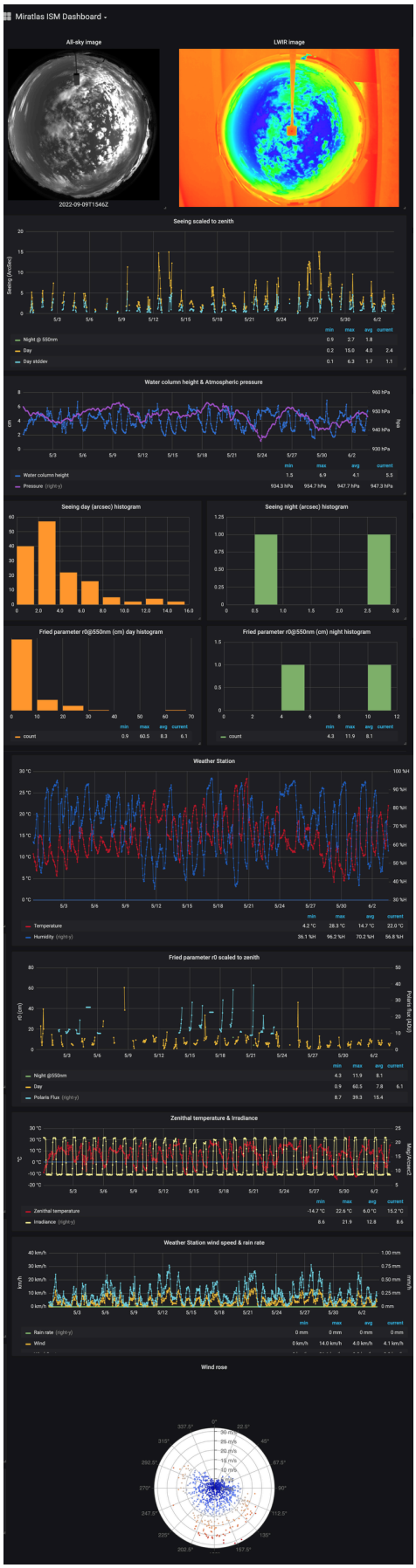
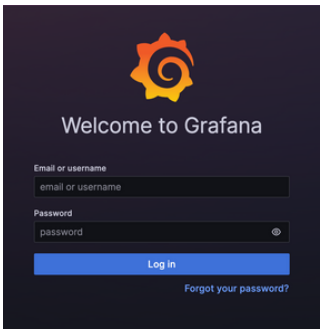


Grafana First Steps

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.

1 Username: Your registered username

2 Password: Your secure password



Step 3 : Explore Data

Congratulations! You are now logged in. Explore the various panels, visualizations, and data available on the Miratlas Dashboard.