WMO Oscar/Space Database Update

14th International Winds Workshop (IWW14)

23-27 April 2018, Jeju, Republic of Korea

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WMO Space Programme

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

WMO OMM
World Meteorological Organization
Organisation météorologique mondiale

Contents

- What is WMO OSCAR
- OSCAR/Space maintenance Scheme
- IWWG's contributions to OSCAR/Space
- Recommendations for strengthening the overall process

What is WMO OSCAR?

WMO Space Programme

Programmes > Space > Home

(http://www.wmo.int/pages/prog/sat/index_en.php)

WMO Space Programme

The Space Programme`s objective is to promote availability and utilization of satellite data and products for weather, climate, water and related applications to WMO Members. It coordinates environmental satellite matters and activities throughout all WMO Programmes and gives guidance on the potential of remote-sensing techniques in meteorology, hydrology and related disciplines.

Quick Access

- OSCAR/Requirements (Observing Requirements Database)
- OSCAR/Space (Satellite & Instrument Database)
- Satellite Status list
- Satellite User Readiness Navigator (SATURN)
- Product Access Guide (PAG)
- Virtual Laboratory for Education and Training in Satellite Meteorology (VLAB)
- Working Documents for Meetings

Upcoming Meetings and Events

04/04/17 to 06/04/17	ET-SAT-11
02/05/17 to 05/05/17	Inter-Programme Expert Team on Satellite Utilization and Products, 3rd session (IPET-SUP-3)
16/05/17 to 19/05/17	GODEX-NWP

» Go to Meetings and Events

Latest News and Announcements

08/03/2017	Americas and Caribbean Focus Group session – 9 March 2017, 16:00 UTC
03/03/2017	The first imagery from China's next-generation weather satellite was released
13/02/2017	Satellite Foundation Course for GOES-R/16 (SatFC-G)

» Go to News and Announcements

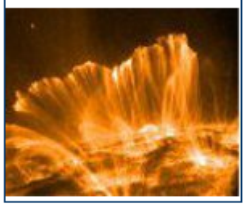
The WMO Space Programme has 4 main components:

The space-based Observing System

Access to Satellite Data and Products

Awareness and Training

Space Weather Coordination



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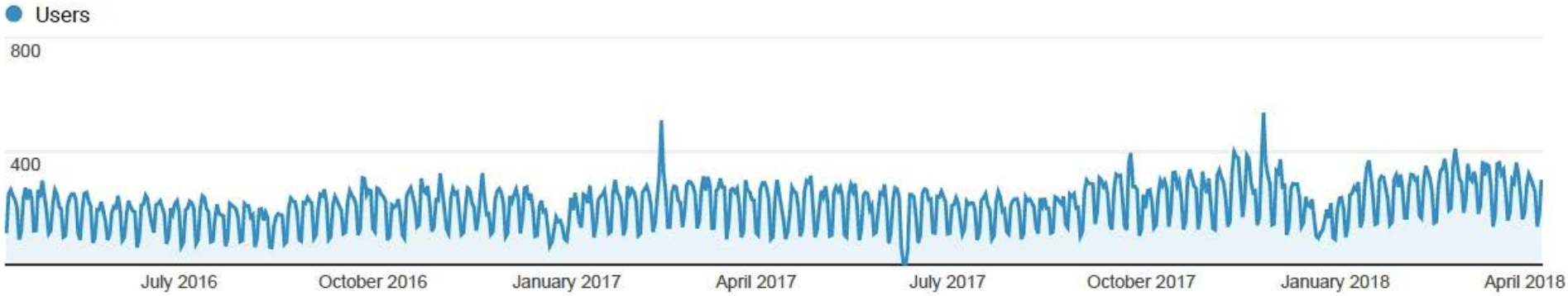
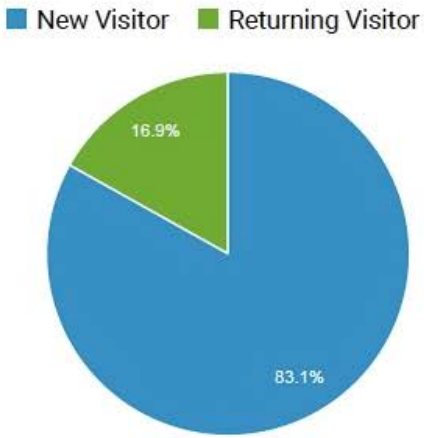
Statistics on OSCAR/Space Audience



Users	New Users	Sessions
102,201	102,169	184,127

Number of Sessions per User	Pageviews	Pages / Session
1.80	823,593	4.47

Avg. Session Duration	Bounce Rate
00:04:56	53.23%



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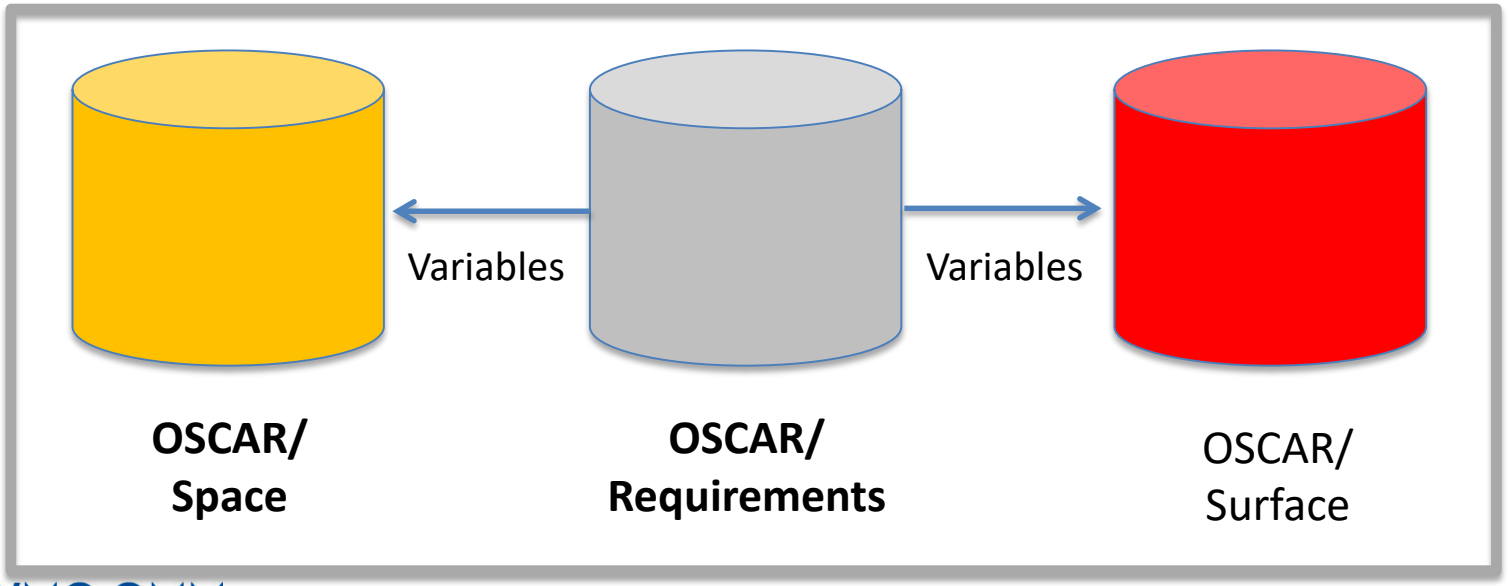
Statistics on OSCAR/Space Audience

	Country	Users	% Users
1.	United States	23,677	22.92%
2.	India	6,713	6.50%
3.	United Kingdom	5,386	5.21%
4.	Germany	5,050	4.89%
5.	China	4,613	4.47%
6.	France	3,852	3.73%
7.	Russia	3,303	3.20%
8.	Italy	3,147	3.05%
9.	Japan	3,014	2.92%
10.	Canada	2,742	2.65%

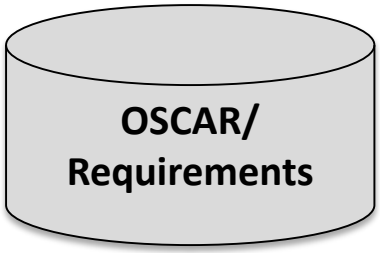
WMO Observing System Capability Analysis and Review tool (OSCAR)

- WMO-maintained online resource with 3 components:
  - **OSCAR/Space**: satellite programmes, instruments, and the variables they can observe
  - **OSCAR/Surface**: surface-based stations/platforms under WIGOS
  - **OSCAR/Requirements**: observation requirements for 14 "application areas" and for all relevant variables



- WIGOS Information Resource
- Basis for WMO Rolling Review of Requirements

‘OSCAR/Requirements’ provides…..



14 WMO Application Areas:

- Global Numerical Weather Prediction
- High-resolution Numerical Weather Prediction
- Nowcasting
- Sub-seasonal to Longer-range Forecasting
- Forecasting Atmospheric Composition
- Monitoring Atmospheric Composition
- Atmospheric Composition info → services in urban and populated areas
- Ocean Applications
- Aeronautical Meteorology
- Agricultural Meteorology
- Hydrology
- Climate Monitoring (GCOS) [now including GFCS requirements]
- Climate Applications
- Space Weather

https://www.wmo-sat.info/oscar/requirements

from Top Page of the OSCAR/Requirements

OSCAR

Observing Systems Capability Analysis and Review Tool

Login

Home | Observation Requirements | Space-based Capabilities | Surface-based Capabilities | Quick Search...

Overview | Variables | Requirements | Layers | Themes | Application Areas

User requirements for observation (OSCAR/Requirements)

This database is the official repository of requirements for observation of physical variables in support of WMO Programmes and Co-sponsored Programmes. These requirements are maintained by the focal points designated for each application area.
It is the foundation of the **Rolling Requirements Review (RRR)** process overviewed by the **Inter-Programme Expert Team on Observing System Design and Evolution (IPET-OSDE)** of CBS. (More information)

The requirements are regularly reviewed by groups of experts nominated by these organizations and programmes. For WMO, this process is conducted by the Inter-Programme Expert Team on Observing System Design and Evolution (IPET-OSDE) and its designated focal points for each of the Application areas .

In addition, Themes offer an additional, cross-cutting view on variables and requirements

Using the database

To explore the database, you can use the **"Quick Search"** in the top right corner, when looking for a specific Variable or Application area. You can also **consult the full tables accessible through the top menu**, and use the filter options provided.

The database is open for consultation. Editing is only possible by designated focal points, after login.

For any questions or clarifications regarding the **content** of the database , please directly contact the respective focal point. A list of all focal points can be found on the Application areas page

Wind (horizontal)

Definiti

Requirements are expre… …al variables in terms of 6 criteria: **uncertainty**, **horizontal resolution, vertical resolution, observing cycle, timeliness,** and **stability** (where appropriate).
For each of these criteria the table indicates 3 values determined by experts:

- The **"threshold"** is the minimum requirement to be met to ensure that data are useful
- The **"goal"** is an ideal requirement above which further improvements are not necessary
- The **"breakthrough"** is an intermediate level between "threshold" and "goal" which, if achieved, would result in a significant improvement for the targeted application. The breakthrough level may be considered as an optimum, from a cost-benefit point of view, when planning or designing observing systems.

The "uncertainty" characterizes the estimated range of observation errors on the given variable, with a 68% confidence interval (1 σ).

Layer

Application Area

Uncertainty

Coverage

Resu ar ind (horizontal)" in 7 bles

Require ents define or Wind (ho ontal) (25)

This tables shows a related requirements or more operations/filt g, please consult the full list of Requirements

Note: In reading the v lues, goal is marked blue, breakthrough gr n and threshold orange

Id	Variable	Layer	App Area	Uncertainty	Stability / decade	Hor Res	Ver Res	Obs Cyc	Timeliness	Coverage	Conf Level	Val Date	Source
119	Wind (horizontal)	HS&M	Climate-AOPC (deprecated)	2 m.s^{-1} 3 m.s^{-1}		100 km 200 km 500 km		3 h 4 h 6 h	3 h 6 h 12 h	Global	firm	2007-07-19	AOPC
120	Wind (horizontal)	HT										19	AOPC
121	Wind (horizontal)	LS											AOPC
122	Wind (horizontal)	LT	(deprecated)	3 m.s^{-1}		200 km		4 h	6 h				AOPC
22	Wind (hori												RGOS
23	Wind (horizontal)	LS LT	Aeronautical Meteorology	2 m.s^{-1} 3 m.s^{-1} 5 m.s^{-1}		50 km 70 km 100 km	0.15 km 0.3 km 0.6 km	5 min 7 min 10 min	60 min 90 min 3 h	Global	firm	2000-06-23	ET ODRRGOS
239	Wind (horizontal)	HS&M	Climate Modelling Research (deprecated)	3 m.s^{-1} 4 m.s^{-1} 5 m.s^{-1}		50 km 100 km 500 km	2 km 3 km 5 km	3 h 6 h 12 h	30 d 45 d 60 d	Global	reasonable	1998-10-29	WCRP
240	Wind (horizontal)	LS HT	Climate Modelling	1 m.s^{-1} 2 m.s^{-1}		10 km 50 km	0.2 km 1 km	60 min 3 h	30 d 45 d	Global	reasonable	2012-12-01	WCRP

The Atmospheric Observation Panel for Climate (AOPC) was established by the GCOS Steering Committee in recognition of the need for specific scientific and technical input concerning atmospheric observations for climate.

*"goal" is marked **blue**, "breakthrough" **green** and "threshold" **orange***

List of vertical Layers and horizontal Coverages

Export

Vertical dimension

This table lists all layers sorted by domain. In OSCAR, a 'layer' refers to a range of altitude or depth where a physical variable is measured and a requirement for this variable is applicable. This concept allows assigning different requirements for the same variable depending on the considered altitude or depth.

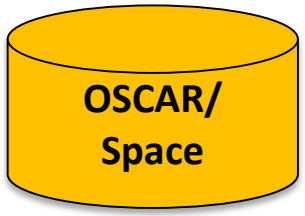
Domain	Acronym	Full name
Atmosphere	TC	Total column
	TrC	Troposphere column
	HS&M	High stratosphere and mesosphere
	LS	Low stratosphere
	HT	High troposphere
	LT	Low troposphere
	Near Surface	At the surface (in the air)
	Cloud-top	At the cloud top surface
	TOA	Top of the atmosphere
	LoThermo	Low Thermosphere (From 100 km to 200 km altitude)
	HiThermo	High Thermosphere (From 200 to about 500 km altitude)
Ocean	Sea surface	Surface of the ocean
	Bulk	Bulk layer (ocean sub-surface)
	Upper oc	Upper ocean
	Deep oc	Deep ocean
Terrestrial	Land surface	Land surface
	Root	Root region of the soil
	Deep soil	Deep soil layer
	Interior	Interior earth

Horizontal dimension

This table lists all 'horizontal coverage' types used in OSCAR to further specify where a specific Requirement is applicable, e.g only over the oceans, at specific points (Airports), regionally or globally.

Name	Definition
Global	Applicable globally
Global ocean	Globally applicable to oceans and ocean surfaces
Global land	Globally applicable to land surfaces and over land surfaces
Costal areas	Globally applicable to coastal areas
Regional	Applicable in specific WMO regions as defined in "Comments"
Sub-regional	Applicable in specific areas of typically 1000*1000 km to be defined in "Comments"
Local	Applicable in specific areas of typically 100 *100 km to be defined in "Comments"
Point	Applicable at specific locations, e.g. Airports, to be defined in "Comments"

OSCAR/Space Database System



1. **Factual information on satellites and instruments** (“*capabilities*”)

   – 81 agencies
   – 673 satellites
   – 927 instruments

2. **Assessment of instruments, and Gap Analyses** (“*analysis and review*”)
   - Mapping instruments to measured variables
   - “Gap Analysis” by measured variable, or by type of mission
   - **The built-in Expert system will infer the prioritized results?????**

(Part 1) Looking-up information

Agency

Programme

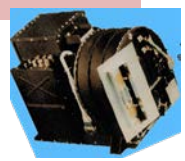
Satellite

- Name, purpose
- Mass, power
- Orbit (type, alt, ECT, longitude)
- Launch date, end date, status
- Data access, telecom frequencies

Payload status

- Instrument status, dates
- Link to calibration events

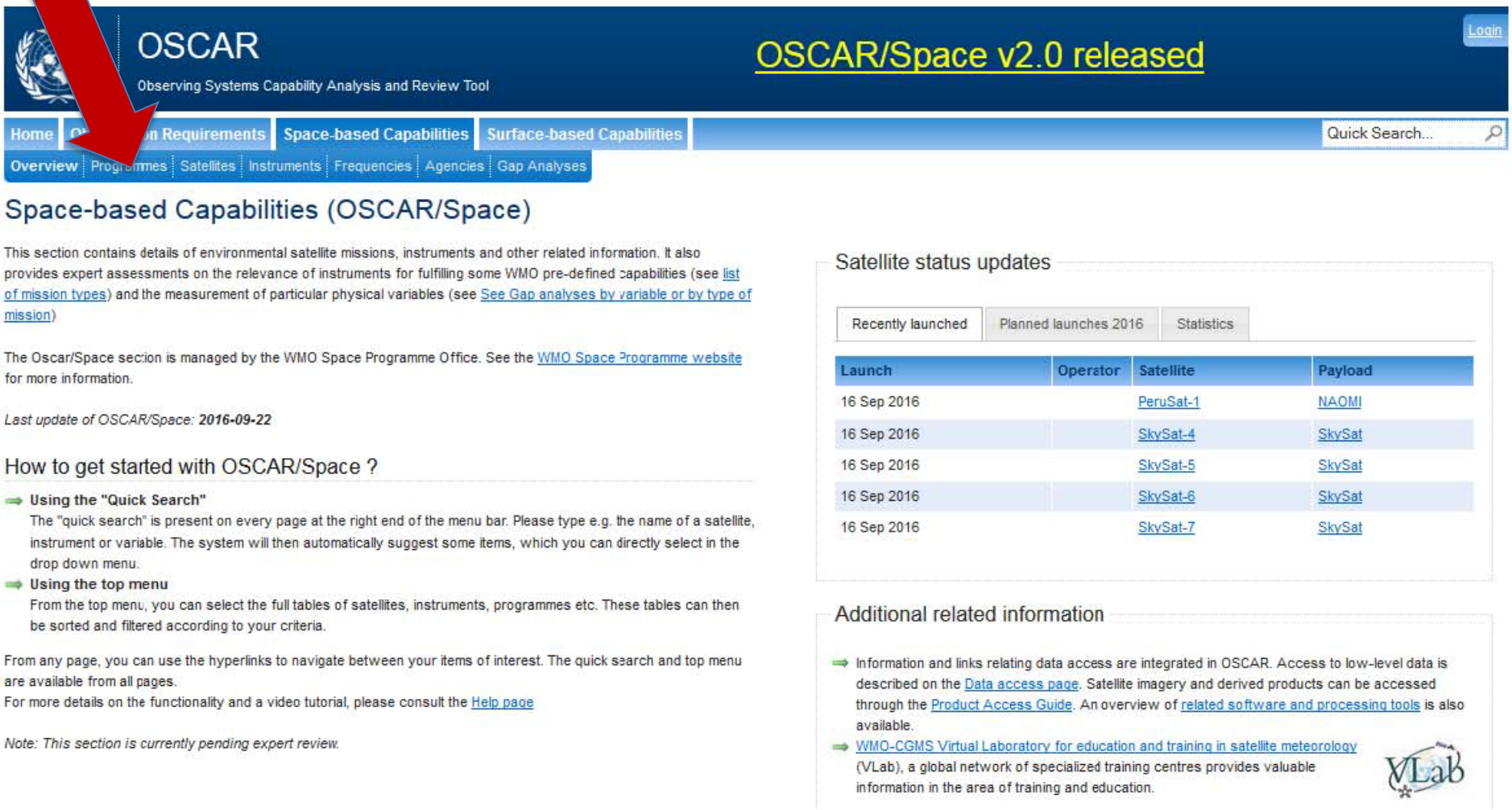
Instruments



- Name, purpose
- Mass, power
- Type, description, scan mode
- Resolution, FOV, coverage
- Status
- Spectral characteristics

Looking-up Satellite Programme

selecting “Programmes” from Top Page of the OSCAR/Space



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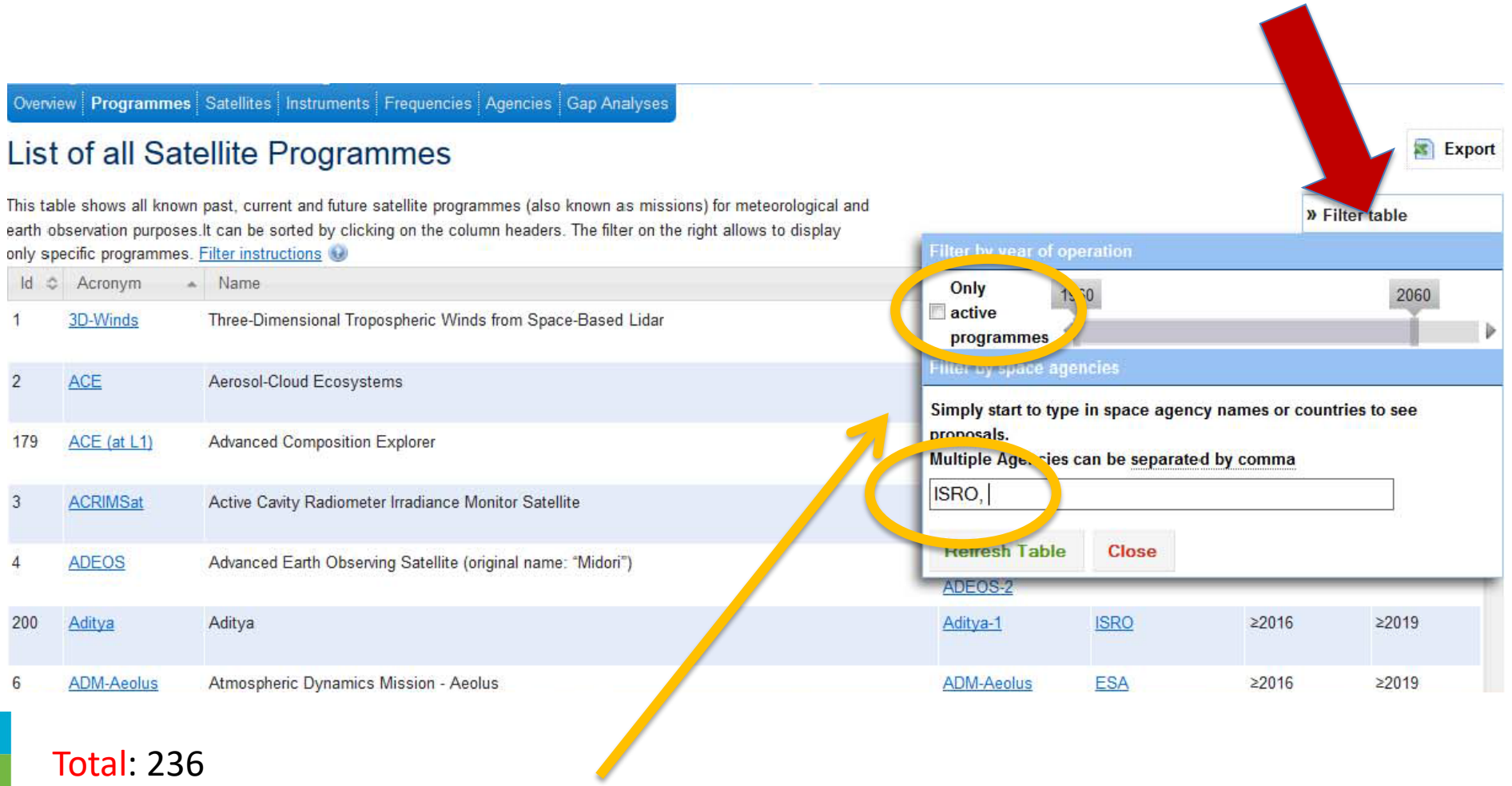
Satellite Programmes



Total: 236

Example Filter: ISRO, currently active programmes

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Satellite Programmes: ISRO, active programmes

List of all Satellite Programmes

Export

This table shows all known past, current and future satellite programmes (also known as missions) for meteorological and earth observation purposes.It can be sorted by clicking on the column headers. The filter on the right allows to display only specific programmes. Filter instructions

» Filter table

Active Filter: Date range: *Only currently operational* | **Space Agencies:***ISRO,* Remove filter

Id	Acronym	Name	Satellites	Spaceagencies	First launch	Last EOL
200	Aditya	Aditya	Aditya-1	ISRO	≥2016	≥2019
18	CartoSat	Satellite for Cartography	CartoSat-2C	ISRO	≥2016	≥2021
83	INSAT-3	Indian National Satellite - 3	INSAT-3D INSAT-3DR	ISRO	2013	≥2024
259	NEMO-AM	Nanosatellite for Earth Monitoring and Observation-Aerosol Monitoring		ISRO	2016	≥2021
114	OceanSat	Satellite for the Ocean	ScatSat-1	ISRO	2016	≥2021
136	RISAT	Radar Imaging Satellite	RISAT-1	ISRO	2012	≥2017
139	SARAL	Satellite with ARgos and ALtiKa	SARAL	CNES ISRO	2013	≥2018

Example Satellites: INSAT-3DR

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Satellite: INSAT-3DR

Acronym	INSAT-3DR		
Full name	Indian National Satellite - 3D repeat		
Satellite Description	• 6th flight unit of the INSAT-3 series. • Missions: operational meteorology.		
Mass at launch	2060 kg	**Dry mass**	907 kg
Power	1164 W		
Data access link	http://www.imd.gov.in/section/satmet/dynamic/insat_3d.htm		
Data access information	• Near-real time availability of full resolution data by HRIT. • Availability of selected images and data by LRIT. • Availability of DCP messages by ground lines. • Alert messages of SASAR to LUT in real time. • See frequencies in the table below.		
Orbit	Geostationary orbit	**Altitude**	35786 km
Longitude	74° E		

Space agency	ISRO		
Status	Commissioning		
Details on Status (as available)			
Launch	08 Sep 2016	**EOL**	≥2024
Last update:	2016-09-08		

Note: red tag: no longer operational , green tag: operational , blue tag : future

- Indian National Satellite - 3
  - INSAT-3A (2003 - 2016)
  - INSAT-3B (2000 - 2010)
  - INSAT-3C (2002 - 2016)
  - INSAT-3D (2013 - 2021)
  - **INSAT-3DR** (2016 - 2024)
  - INSAT-3DS (2022 - 2029)

Satellite Payload

All known Instruments flying on INSAT-3DR

Acronym	Full name
DCS	Data Collection Service
SAS&R	Advanced Aided Search & Rescue
IMAGER	INSAT imager
SOUNDER	INSAT Sounder

Show instrument status and calibration

Satellite Field of View

Estimate of the satellite's footprint, assuming a zenith angle of 75 °

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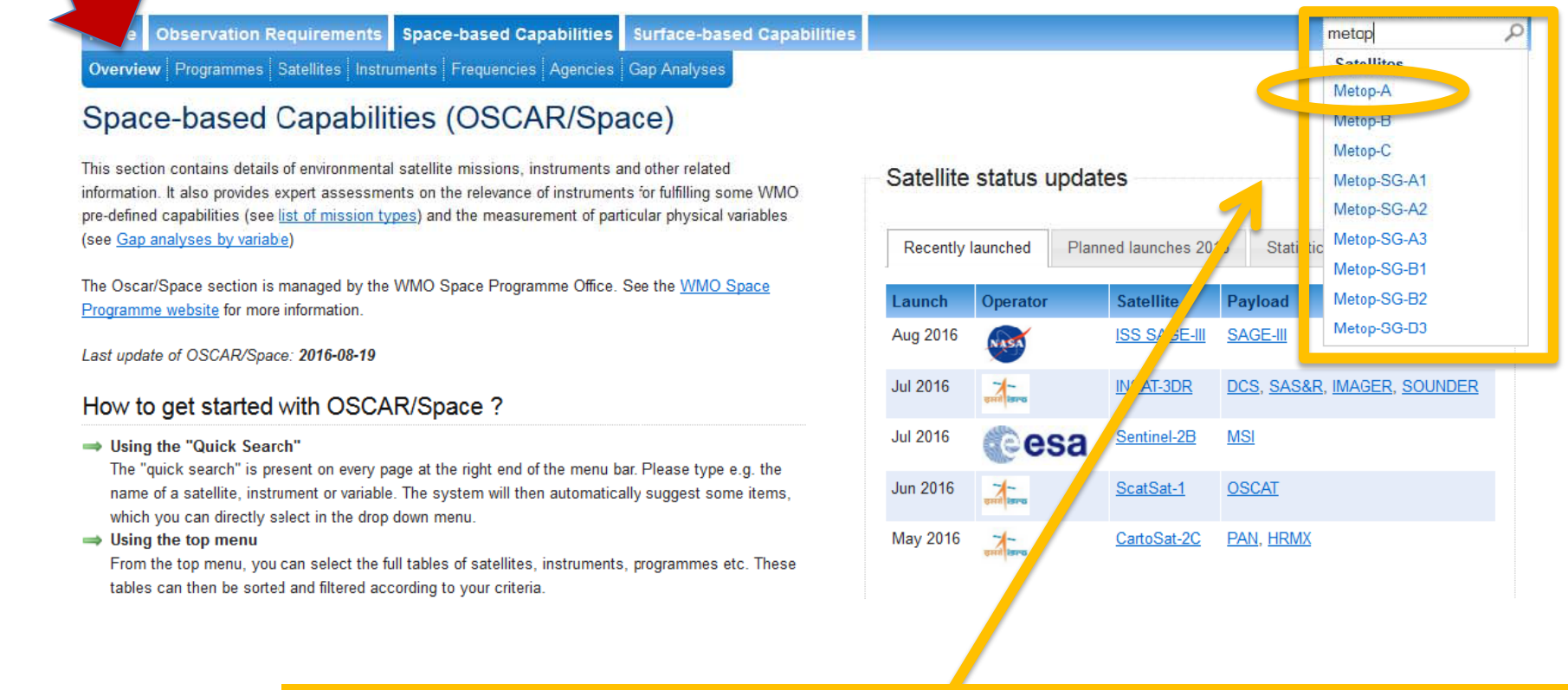
Looking-up Payload status (example: Metop-A)

selecting “Overview” from Top Page of the OSCAR/Space



Search: Metop
(automatic dropdown menu after 2 typed letters)

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Payload status, Calibration events
Example: Metop-A

Acronym	Metop-A		
Full name	Meteorological operational satellite - A		
Satellite Description	• 1st flight unit of the EPS programme. • Main mission: operational meteorology • Substantial contribution to ocean and ice monitoring, climate monitoring, atmospheric chemistry, and space weather.		
Mass at launch	4085 kg	**Dry mass**	3769 kg
Power	1810 W		
Data access link	http://www.eumetsat.int/website/home/Satellites/CurrentSatellites/Metop/MetopServices/index.html		
Data access information	• Direct Broadcast (AHRPT): Real-time availability of AMSU-A, ASCAT. AVHRR, GOME-2, GRAS, HIRS/4, IASI, MHS, DCP messages and SEM/2 (MEDEP + TED). LRPT not available.Near-real-time availability of extended-area coverage data by EARS. Near-real time availability of Level 1 data by EUMETCast. Alert messages of S&RSAT to LUT in real time. (Further info at http://www.eumetsat.int/website/home/Satellites/CurrentSatellites/Metop/MetopServices/index.html) • EUMETSAT Product Navigator, Metop-A		
Orbit	Sunsynchronous orbit	**Altitude**	827 km
ECT	09:30 desc		

Space agency	EUMETSAT , ESA
Status	Operational
Details on Status (as available)	• LRPT failed soon after launch, one AHRPT transmitter failed 6 months later. • Global data disseminated by EUMETCast became the primary dissemination system. • As of Sept 2008 the redundant AHRPT unit is utilised for a partial coverage, enabling the reception and retransmission of NPT data by

Note: red tag: no longer operational , green tag: operational , blue tag : future

- EUMETSAT Polar System
  - **Metop-A** (2006 - 2016)
  - Metop-B (2012 - 2018)
  - Metop-C (2018 - 2024)

Satellite Payload

All known Instruments flying on Metop-A

Acronym	Full name
A-DCS	Advanced Data Collection System (also called "Argos-3")
AMSU-A	Advanced Microwave Sounding Unit - A
ASCAT	Advanced Scatterometer
AVHRR/3	Advanced Very High Resolution Radiometer / 3
GOME-2	Global Ozone Monitoring Experiment - 2
GRAS	GNSS Receiver for Atmospheric Sounding
HIRS	High-resolution Infra Red Sounder / 4
IASI	Infrared Atmospheric Sounding Interferometer
MHS	Microwave Humidity Sounding
S&RSAT	Search & Rescue Satellite-Aided Tracking System
SEM/MEPED	SEM / Medium energy proton detector
SEM/TED	SEM / Total Energy Detecto

Show instrument status and calibration

Payload status, Calibration events Example: Metop-A

Satellite payload

All known instruments flying on Metop-A

Instrument	Full name	Start date	EOL date	Status	NRT data	Calibration and events	Comments
A-DCS	Advanced Data Collection System (also called "Argos-3")	15 May 2007	≥2016 *	Active	Yes		
AMSU-A	Advanced Microwave Sounding Unit - A	15 May 2007	≥2016 *	Degraded	Yes	www.eumetsat.int	The AMSU-A channel 50.3 and 54.95 GHz are experiencing increasing noise, and have exceeded the threshold in September 2013.
ASCAT	Advanced Scatterometer	15 May 2007	≥2016 *	Active	Yes	www.eumetsat.int	
AVHRR/3	Advanced Very High Resolution Radiometer / 3	15 May 2007	≥2016 *	Active	Yes	www.eumetsat.int	
GOME-2	Global Ozone Monitoring Experiment - 2						
GRAS	GNSS Receiver for Atmospheric Sounding						
HIRS/4	High-resolution Infra Red Sounder / 4						
IASI	Infrared Atmospheric Sounding Interferometer						
MHS	Microwave Humidity Sounding						
S&RSAT	Search & [illegible]tellite-Aided Tracking System						
SEM/MEPED	SEM / Medium en[illegible] detector						
SEM/TED	SEM / Total Energy Dete[illegible]						

* The information in this field is estimated or assu[illegible]

METOP-A MHS

INSTRUMENT SPECIFICATIONS

- WMO OSCAR (Satellite Instrument Specifications)

INSTRUMENT EVENTS

- Metop-A MHS List of Instrument Events: User Notification Service

DATA OUTAGES

- Availability of data in the Data Centre

INSTRUMENT MONITORING

- *This information is currently not available on-line*

RELEVANT DOCUMENTS

TITLE	TYPE	REFERENCE	VER
MHS Level 1 Product Generation Specification	PGS	EUM.EPS.SYS.SPE.990006	6
MHS Level 1 Product Format Specification	PFS	EPS.MIS.SPE.97229	7E

Top

eumetsat.int Landing page

Direct Link to GSICS (in planning)

GSICS

WMO OMM

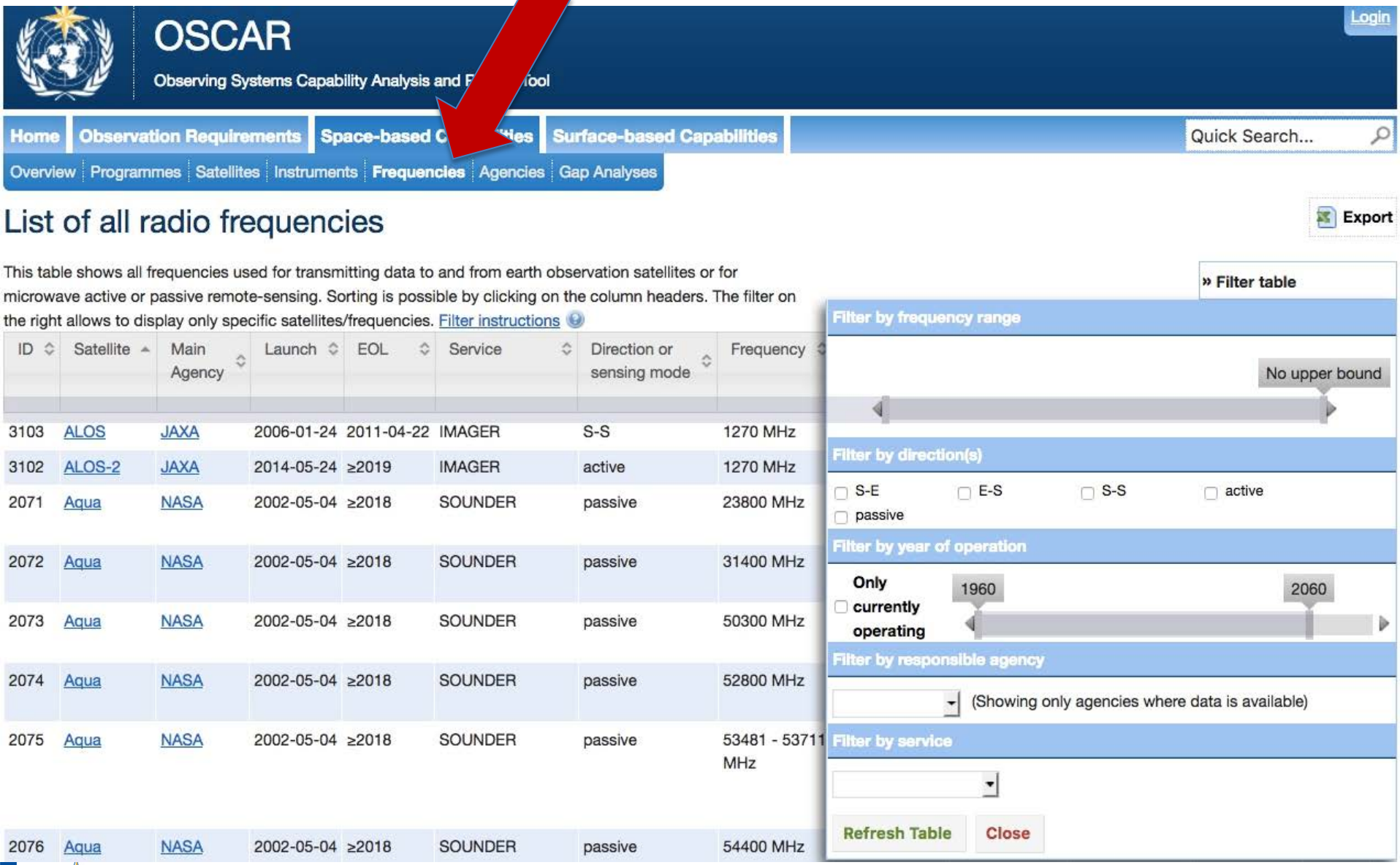
http://www.eumetsat.int/website/home/Data/Products/Calibration/Instrumentstatusandcalibration/index.html#metopamhs

for Frequency management

"What is the potential impact on **Jason missions** of proposals for **sharing 5350-5470 MHz (C band) with commercial broadband providers**?"

"Give me all satellites that use C band, for sensing or for telecommunication"

selecting “Frequencies” from Top Page of the OSCAR/Space



Information for frequency management

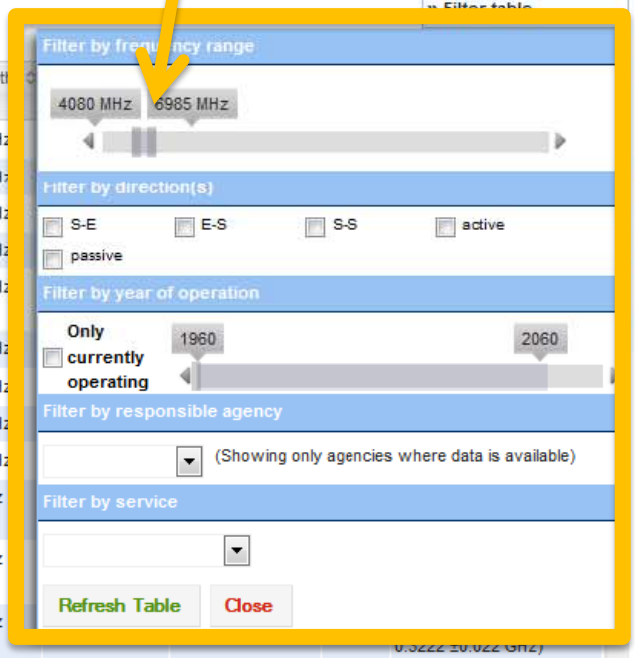
Filter C band range

List of all radio frequencies

Export

This table shows all frequencies used for transmitting data to and from earth observation satellites or for microwave active or passive remote-sensing. Sorting is possible by clicking on the column headers. The filter on the right allows to display only specific satellites/frequencies. Filter instructions

ID	Satellite	Main Agency	Launch	EOL	Service	Direction or sensing mode	Frequency	Emission designator	Bandwidth				
2350	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	23800 MHz	N/A	270000 kHz				
2354	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	31400 MHz	N/A	180000 kHz				
2358	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	50300 MHz	N/A	180000 kHz				
2362	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	52800 MHz	N/A	400000 kHz				
2366	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	53481 - 53711 MHz	N/A	170000 kHz				
2370	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	54400 MHz	N/A	400000 kHz				
2374	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	54940 MHz	N/A	400000 kHz				
2378	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	55500 MHz	N/A	330000 kHz				
2382	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	57290.344 MHz	N/A	330000 kHz				
2386	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	57073.344 - 57507.344 MHz	N/A	78000 kHz				
2390	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	56920.144 - 57660.544 MHz	N/A	36000 kHz				
2394	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	56946.344 - 57634.344 MHz	N/A	16000 kHz				
2398	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	56958.344 - 57622.344 MHz	N/A	8000 kHz	H		A	AMSU-A Channel 13 (Fo ± 0.3222 ±0.010 GHz)
2402	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	56963.644 - 57617.044 MHz	N/A	3000 kHz	H		A	AMSU-A Channel 14 (Fo ± 0.3222 ±0.0045 GHz)
2406	Aqua	NASA	2002-05-04	≥2016	SOUNDER	passive	89000 MHz	N/A	6000000 kHz	V		A	AMSU-A Channel 15
2410	Aura	NASA	2004-07-15	≥2016	SOUNDER	passive	118000 MHz		N/R kHz	TBD		A	MLS channel 1



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Information for frequency management: Sensing and telecom frequencies

List of all radio frequencies

Export

This table shows all frequencies used for transmitting data to and from earth observation satellites or for microwave active or passive remote-sensing. Sorting is possible by clicking on the column headers. The filter on the right allows to display only specific satellites/frequencies. Filter instructions

» Filter table

Date range: *1960-2060* | **Frequency range:** *4080 MHz - 6985 MHz* Remove filter

ID	Satellite	Main Agency	Launch	EOL	Service	Direction or sensing mode	Frequency	Emission designator	Bandwidth	Polarisation	Data rate or Baseband	D/A	Comments
1731	INSAT-3DR	ISRO	2016	≥2024	CDAS	S-E	4798 MHz	96K0G1D	96 kHz	linear	40.0 kbps	D	SOUNDER raw data
1738	INSAT-3DS	ISRO	≥2022	≥2029	CDAS	S-E	4798 MHz	96K0G1D	96 kHz	linear	40.0 kbps	D	SOUNDER raw data
2285	Metop-A	EU	2006-10-19	≥2016	SCATTEROMETER	active	5255 MHz		N/R kHz	V		A	ASCAT
2286	Metop-B	E	2012-09-17	≥2018	SCATTEROMETER	active	5255 MHz		N/R kHz	V		A	ASCAT
2287	Metop-C	AT	≥2018	≥2024	SCATTEROMETER	active	5255 MHz		N/R kHz	V		A	ASCAT
2588	RadarSat		1995-11-04	2013-03-29	IMAGER	active	5300 MHz		30000 kHz	H		D	C-band SAR
68	JAS	ASA	2008-06-20	≥2016	TM & Raw Data	S-E	5300 MHz	320MQ3N	320000 kHz	RHCP&LHCP		D	Telemetry and Altimeter real-time data
69	JASON-3	NASA	2016-01-17	≥2021	TM & Raw Data	S-E	5300 MHz	320MQ3N	320000 kHz	RHCP&LHCP		D	Telemetry and Altimeter real-time data
70	JASON-3	NASA	2016-01-17	≥2021	TM & Raw Data	S-E	5300 MHz	100MQ3N	100000 kHz	RHCP&LHCP		D	Telemetry and Altimeter real-time data
393	JASON-2	NASA	2008-06-20	≥2016	TM & Raw Data	S-E	5300 MHz	100MQ3N	100000 kHz	RHCP&LHCP		D	Telemetry and Altimeter real-time data
2281	JASON-2	NASA	2008-06-20	≥2016	ALTIMETER	active	5300 MHz	N/A	320000 kHz	TBD		A	Poseidon-3 C-band
2288	JASON-1	NASA	2001-12-07	2013-07-01	ALTIMETER	active	5300 MHz	N/A	320000 kHz	TBD		A	Poseidon-2 C-band
2289	JASON-3	NASA	2016-01-17	≥2021	ALTIMETER	active	5300 MHz	N/A	320000 kHz	TBD		A	Poseidon-3B C-band
2589	RadarSat-2	CSA	2007-12-14	≥2016	IMAGER	active	5405 MHz		100000 kHz	H&V		D	C-band SAR
2590	RCM-1	CSA	≥2018	≥2025	IMAGER	active	5405 MHz		100000 kHz	H&V		D	C-band SAR
2591	RCM-2	CSA	≥2018	≥2025	IMAGER	active	5405 MHz		100000 kHz	H&V		D	C-band SAR
2592	RCM-3	CSA	≥2018	≥2025	IMAGER	active	5405 MHz		100000 kHz	H&V		D	C-band SAR

Total: 49

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Frequency information: Jason-3

Telecommunication frequency or microwave sensing channel information Hide expert details

Service	Dir or Mode	Frequency	Emission designator	Bandwidth	Polarisation	D/A	Data rate or Baseband	Comments
TM & Raw Data	S-E	5300 MHz	320MQ3N	320000 kHz	RHCP&LHCP	D		Telemetry and Altimeter real-time data
TM & Raw Data	S-E	5300 MHz	100MQ3N	100000 kHz	RHCP&LHCP	D		Telemetry and Altimeter real-time data
TM & Raw Data	S-E	13575 MHz	320MQ3N	320000 kHz	RHCP&LHCP	D		Telemetry and Altimeter real-time data
DORIS	E-S	401.25 MHz	23K0G1D	23 kHz	RHCP	D		Precise positioning by DORIS
DORIS	E-S	2036.25 MHz	95K0G1D	95 kHz	RHCP	D		Precise positioning by DORIS
Command	E-S	2040.493 MHz	8K00G2D	8 kHz	RHCP	D		Commands
SOUNDER	passive	18700 MHz	N/A	N/R kHz	TBD	A		AMR channel 1
SOUNDER	passive	23800 MHz	N/A	N/R kHz	TBD	A		AMR channel 2
SOUNDER	passive	[illegible]	N/A	N/R kHz	TBD	A		AMR channel 3
ALTIMETER	active	5300 MHz	N/A	320000 kHz	TBD	A		Poseidon-3B C-band
ALTIMETER	active	13575 MHz	N/A	320000 kHz	TBD	A		Poseidon-3B Ku-band

WMO OMM

(Part 2) Assessments: Gap Analyses

Two sides of the same relationship:

- **Which "variables" can be measured** with a given instrument? Which capability does the instrument contribute to?

- **Which "instruments" can measure** a given variable? Which instruments are responding to the WMO Vision?…and during which period of time ?

‘OSCAR/Space’ is a tool for ‘Gap Analysis’

Requirements
Requirements
Requirements
Requirements

OSCAR/ Requirements

Long-term WIGOS Vision 2025 / 2040

Gap Analysis

“Statement of Guidance”

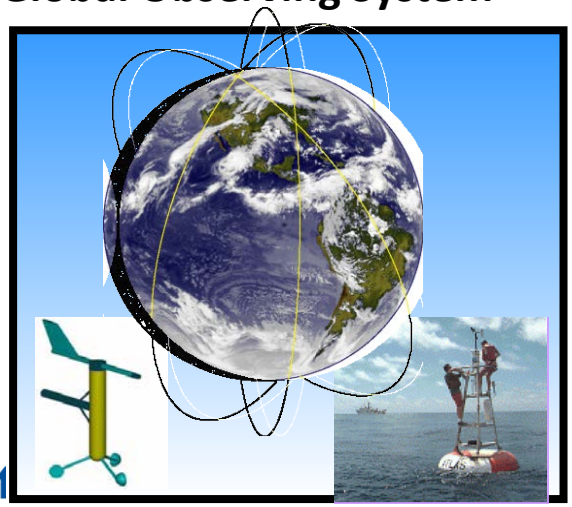
Implementation Plan
(Actions,Recom)

Members agencies and programmes

Database on the Global Observing System

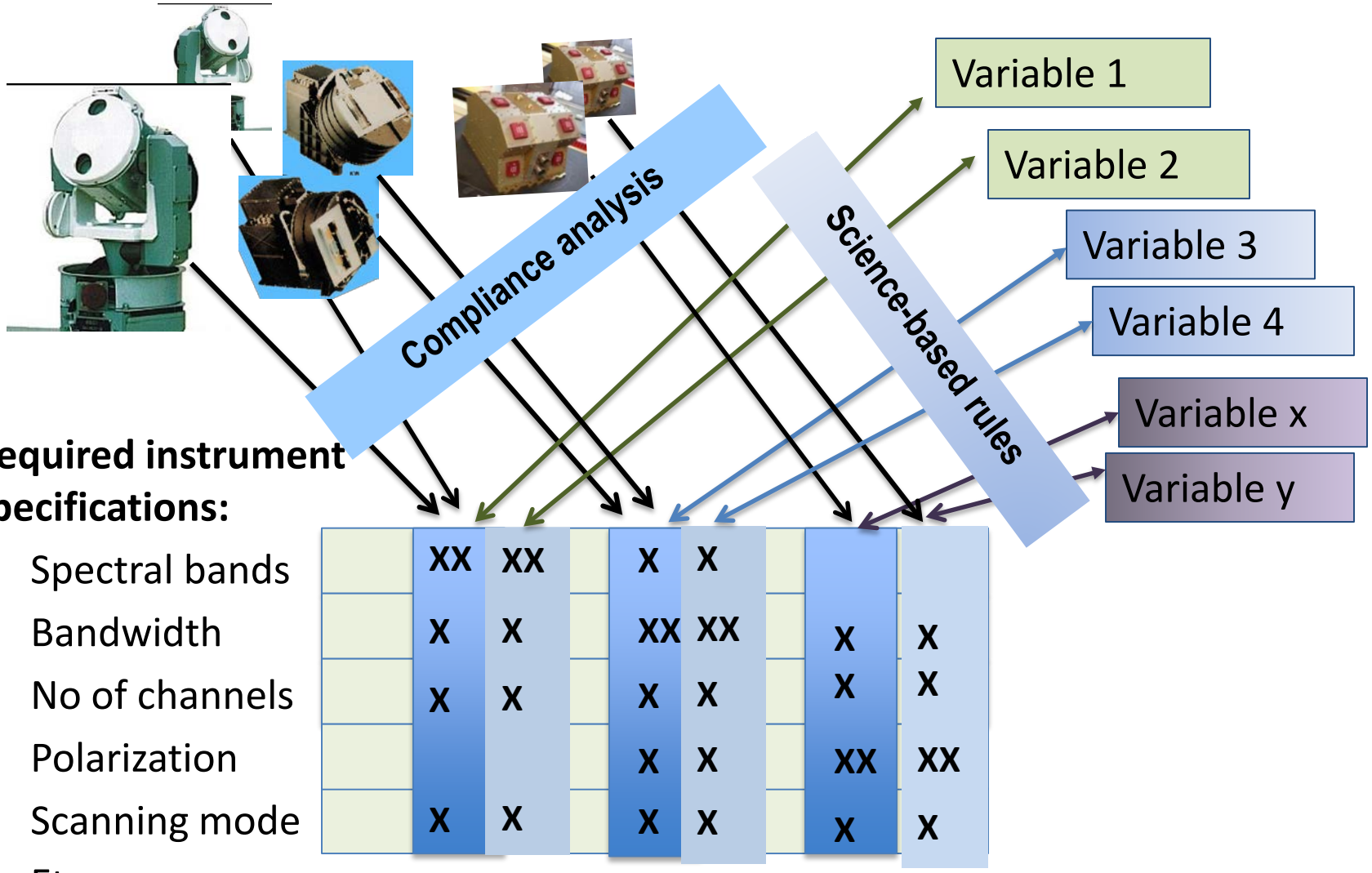
OSCAR/ Surface

OSCAR/ Space



WMO OMM

Instrument-variable mapping principle



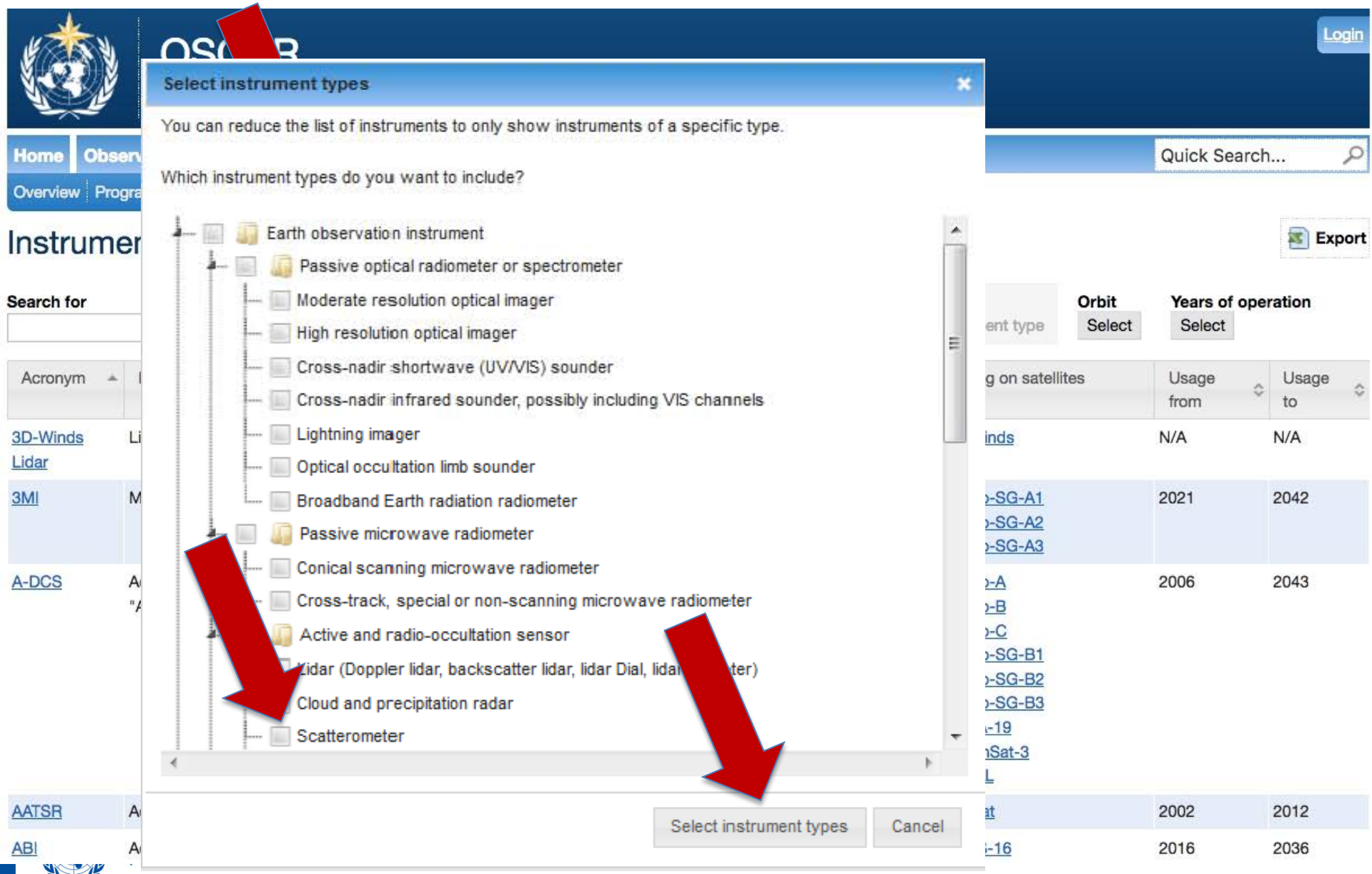
Required instrument specifications:

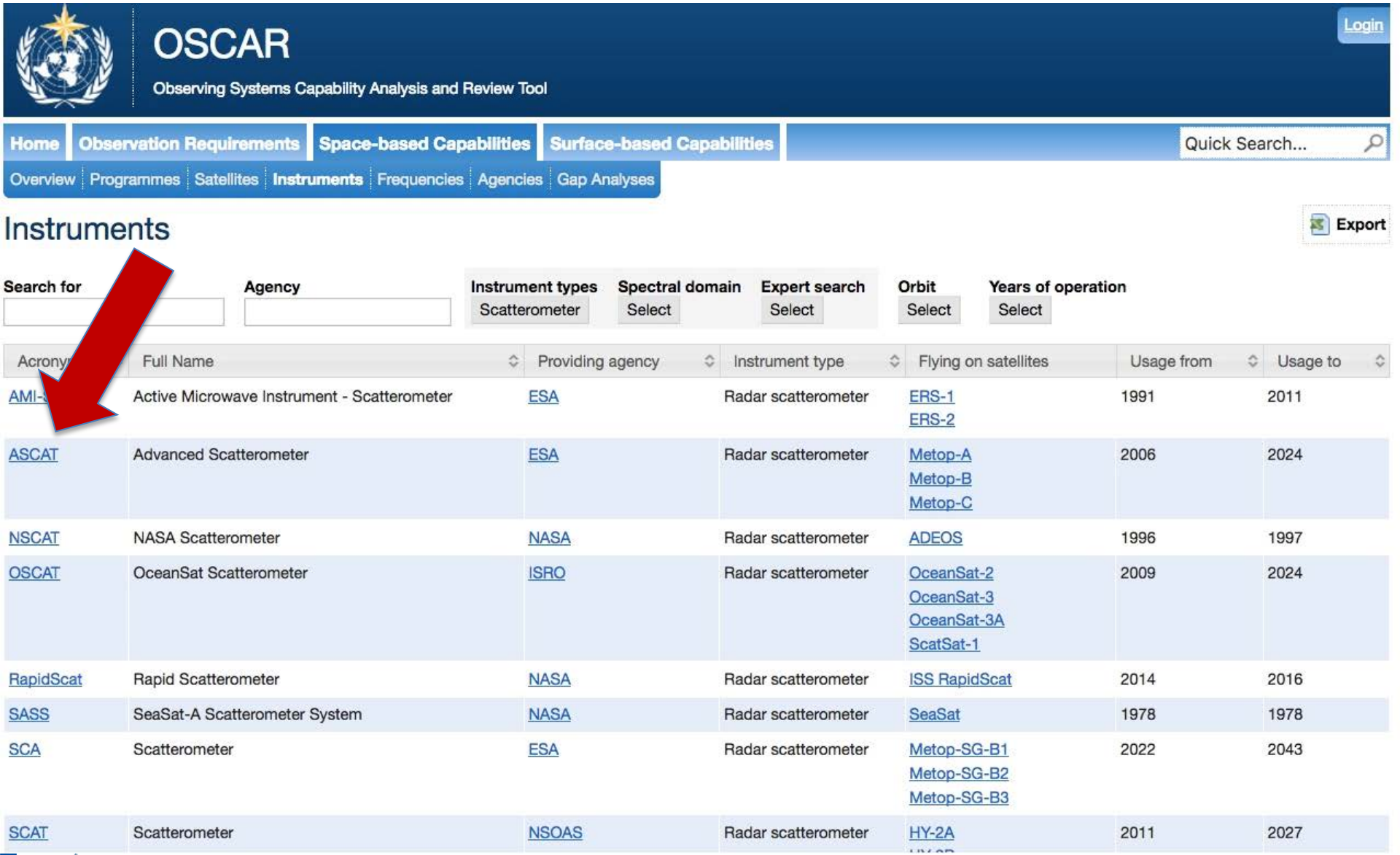
- Spectral bands
- Bandwidth
- No of channels
- Polarization
- Scanning mode
- Etc..

WMO OMM

Gap Analysis from “Instruments”: Scatterometer

selecting “Instruments” from Top Page of the OSCAR/Space




OSCAR
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Instruments
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Search for
Agency
Instrument types
Scatterometer
Spectral domain
Select
Expert search
Select
Orbit
Select
Years of operation
Select
Acrony
Full Name
Providing agency
Instrument type
Flying on satellites
Usage from
Usage to
AMI-
Active Microwave Instrument - Scatterometer
ESA
Radar scatterometer
ERS-1
ERS-2
1991
2011
ASCAT
Advanced Scatterometer
ESA
Radar scatterometer
Metop-A
Metop-B
Metop-C
2006
2024
NSCAT
NASA Scatterometer
NASA
Radar scatterometer
ADEOS
1996
1997
OSCAT
OceanSat Scatterometer
ISRO
Radar scatterometer
OceanSat-2
OceanSat-3
OceanSat-3A
ScatSat-1
2009
2024
RapidScat
Rapid Scatterometer
NASA
Radar scatterometer
ISS RapidScat
2014
2016
SASS
SeaSat-A Scatterometer System
NASA
Radar scatterometer
SeaSat
1978
1978
SCA
Scatterometer
ESA
Radar scatterometer
Metop-SG-B1
Metop-SG-B2
Metop-SG-B3
2022
2043
SCAT
Scatterometer
NSOAS
Radar scatterometer
HY-2A
2011
2027

Instrument: ASCAT

Instrument: ASCAT

Instrument details

Acronym	ASCAT				
Full name	Advanced Scatterometer				
Purpose	Sea surface wind vector. Also large-scale soil moisture				
Short description	C-band (5.255 GHz), side looking both left and right. 3 antennas on each side				
Background	Evolution of the AMI-SCAT flown on ERS-1 and ERS-2				
Scanning Technique	Two 550-km swaths separated by a 700-km gap along-track. 3 looks each pixel (45, 90 and 135° azimuth)				
Resolution	Best quality: 50 km – standard quality: 25 km – basic sampling: 12.5 km				
Coverage / Cycle	Global coverage in 1.5 days				
Mass	260 kg	Power	215 W	Data Rate	42 kbps

Providing Agency	ESA
Instrument Maturity	Flown on operational programme
Utilization Period:	2007-05-15 to ≥2024
Last update:	2012-06-06

Detailed characteristics

Tentative Evaluation of Measurements

The following list indicates which measurements can **typically** be retrieved from this category of instrument. To see a full Gap Ana

Note: table can b

Gap Analysis from "Variables"

Variable	ce for easuring this variable	Operational limitations	Explanation
Wind speed over the surface (horizontal)	1 - primary	Over sea only.	C-band scatterometer around 5.3 GHz
Soil moisture at surface	2 - very high	Coarse spatial resolution. Affected by vegetation.	Scatterometer in C-band (around 5.3 GHz)
Wind vector over the surface (horizontal)	2 - very high	Over sea only.	C-band scatterometer around 5.3 GHz
Leaf Area Index (LAI)	3 - high	Coarse spatial resolution.	C-band scatterometer sensitive to LAI
Biomass	4 - fair	Index only. Coarse spatial resolution.	C-band sensitive to total biomass
Sea-ice type	4 - fair	No specific limitation.	Scatterometer, C-band (around 5.3 GHz). Type interpreted as age/roughness
Snow cover	4 - fair	Coarse spatial resolution. Thick snow only.	Scatterometer in C-band (around 5.3 GHz)
Snow status (wet/dry)	4 - fair	Coarse spatial resolution. Thick snow only.	Scatterometer in C-band (around 5.3 GHz)
Soil moisture (in the roots region)	4 - fair	Coarse spatial resolution. Affected by vegetation.	Scatterometer in C-band (around 5.3 GHz). Assimilation process required

WMO OMM

Measurement timeline for Wind speed over the surface (horizontal)
(Definition: Module of the horizontal component of the 3D wind vector)

Found 116 results

First Previous 1 2 3 Next Last

Instrument	NRT?	Relevance	Satellite	Orbit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
MWRI (FY-3RM)		3 - high	FY-3RM-1														X	X	X	X	X	X		
MWRI (FY-3RM)		3 - high	FY-3RM-2																	X	X	X	X	X
MADRAS		4 - fair	Megha-Tropiques	20 °					X	X	X													
TMI		3 - high	TRMM	35 °	X	X	X	X	X	X	X	X												
DDMI		4 - fair	CYGNSS (8 sats)	35 °										X	X	X	X	X						
SHIOSAI		4 - fair	COMPIRA	51 °												X	X	X	X	X	X			
Altimeter (COMPIRA)		5 - marginal	COMPIRA	51 °												X	X	X	X	X	X			
RapidScat		1 - primary	ISS RapidScat	51.6 °							X	X	X											
GMI (core)	No	3 - high	GPM Core Observa	65 °							X	X	X	X	X									
SCAT (HY-2A)		1 - primary	HY-2C	66 °												X	X	X	X	X	X			
SCAT (HY-2A)		1 - primary	HY-2D	66 °													X	X	X	X	X	X		
SCAT (HY-2A)		1 - primary	HY-2F	66 °															X	X	X	X	X	X
SCAT (HY-2A)		1 - primary	HY-2G	66 °															X	X	X	X	X	X
ALT (HY-2A)		5 - marginal	HY-2C	66 °												X	X	X	X	X	X			
ALT (HY-2A)		5 - marginal	HY-2D	66 °													X	X	X	X	X	X		
ALT (HY-2A)		5 - marginal	HY-2F	66 °															X	X	X	X	X	X
ALT (HY-2A)		5 - marginal	HY-2G	66 °															X	X	X	X	X	X
NRA		5 - marginal	TOPEX-Poseidon	66 °																				
Poseidon-2		5 - marginal	JASON-1	66 °		X	X	X	X	X	X													
Poseidon-3	Yes	5 - marginal	JASON-2	66 °	X	X	X	X	X	X	X	X	X	X	X									
Poseidon-3B	Yes	5 - marginal	JASON-3	66 °									X	X	X	X	X	X						
SRAL (JASON)		5 - marginal	JASON-CS-A	66 °													X	X	X	X	X	X	X	X
SRAL (JASON)		5 - marginal	JASON-CS-B	66 °																			X	X
SSALT		5 - marginal	TOPEX-Poseidon	66 °																				
KaRIN		4 - fair	SWOT	78 °														X	X	X	X			
Altimeter		5 - marginal	SWOT	78 °														X	X	X	X			
SHF		3 - high	Meteor-P1	81.2 °																				
SHF		3 - high	Meteor-P2	81.2 °																				
MTVZA-OK (MW)		2 - very high	SICH-1M	82.5 °																				
Delta-2D		3 - high	Okean-O-1	82.5 °																				

Relevance

Measurement timeli r *Wind speed over the surface (horizontal)*

Definition: Module of the horizo omponent of the 3D wind vector.

Hint: Move around in the timelin crolling up, down, left or right.

Found 116 results

First Previous 1 2 3 Next Last

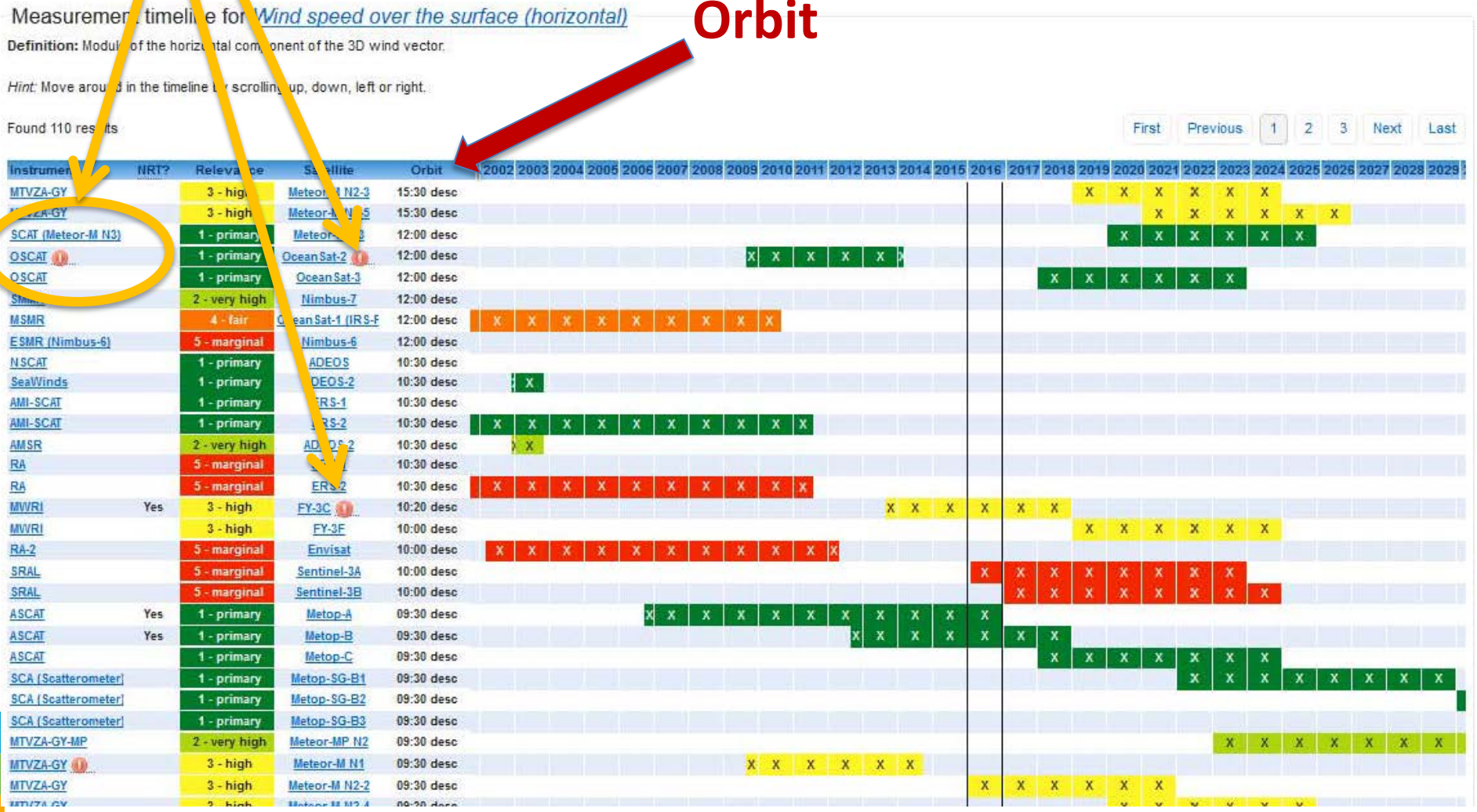
Gap analysis

Instrument	NRT?	Relevance	Satellite	Orbit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
RapidScat		1 - primary	ISS RapidScat	51.6 °							X	X	X											
SCAT (HY-2A)		1 - primary	HY-2C	66 °												X	X	X	X	X	X			
SCAT (HY-2A)		1 - primary	HY-2D	66 °													X	X	X	X	X	X		
SCAT (HY-2A)		1 - primary	HY-2F	66 °															X	X	X	X	X	X
SCAT (HY-2A)		1 - primary	HY-2G	66 °															X	X	X	X	X	X
SASS		1 - primary	SeaSat	108 °																				
SeaWinds		1 - primary	QuikSCAT	06:00 asc	X	X																		
SCAT (Meteor-M N3)		1 - primary	Meteor-M N3	12:00 asc														X	X	X	X	X	X	
WindRAD		1 - primary	FY-3E	06:00 desc											X	X	X	X	X	X				
WindRAD		1 - primary	FY-3H	06:00 desc														X	X	X	X	X	X	X
SCAT (HY-2A)		1 - primary	HY-2A	06:00 desc				X	X	X	X	X	X	X	X									
SCAT (HY-2A)		1 - primary	HY-2B	06:00 desc											X	X	X	X	X	X				
SCAT (HY-2A)		1 - primary	HY-2E	06:00 desc													X	X	X	X	X	X		
SCAT (CFOSAT)		1 - primary	CFOSAT	07:00 desc											X	X	X	X	X					
SCAT (CFOSAT)		1 - primary	CFOSAT follow-on	07:00 desc															X	X	X	X	X	X
OSCAT		1 - primary	ScatSat-1	08:44 desc									X	X	X	X	X	X						
ASCAT	Yes	1 - primary	Metop-A	09:30 desc	X	X	X	X	X	X	X	X	X	X	X									
ASCAT	Yes	1 - primary	Metop-B	09:30 desc						X	X	X	X	X	X									
ASCAT		1 - primary	Metop-C	09:30 desc											X	X	X	X	X	X	X			
SCA (Scatterometer)		1 - primary	Metop-SG-B1	09:30 desc															X	X	X	X	X	X
SCA (Scatterometer)		1 - primary	Metop-SG-B2	09:30 desc																				
SCA (Scatterometer)		1 - primary	Metop-SG-B3	09:30 desc																				
AMI-SCAT		1 - primary	ERS-1	10:30 desc																				
AMI-SCAT		1 - primary	ERS-2	10:30 desc	X	X	X	X																
NSCAT		1 - primary	ADEOS	10:30 desc																				

Gap analysis

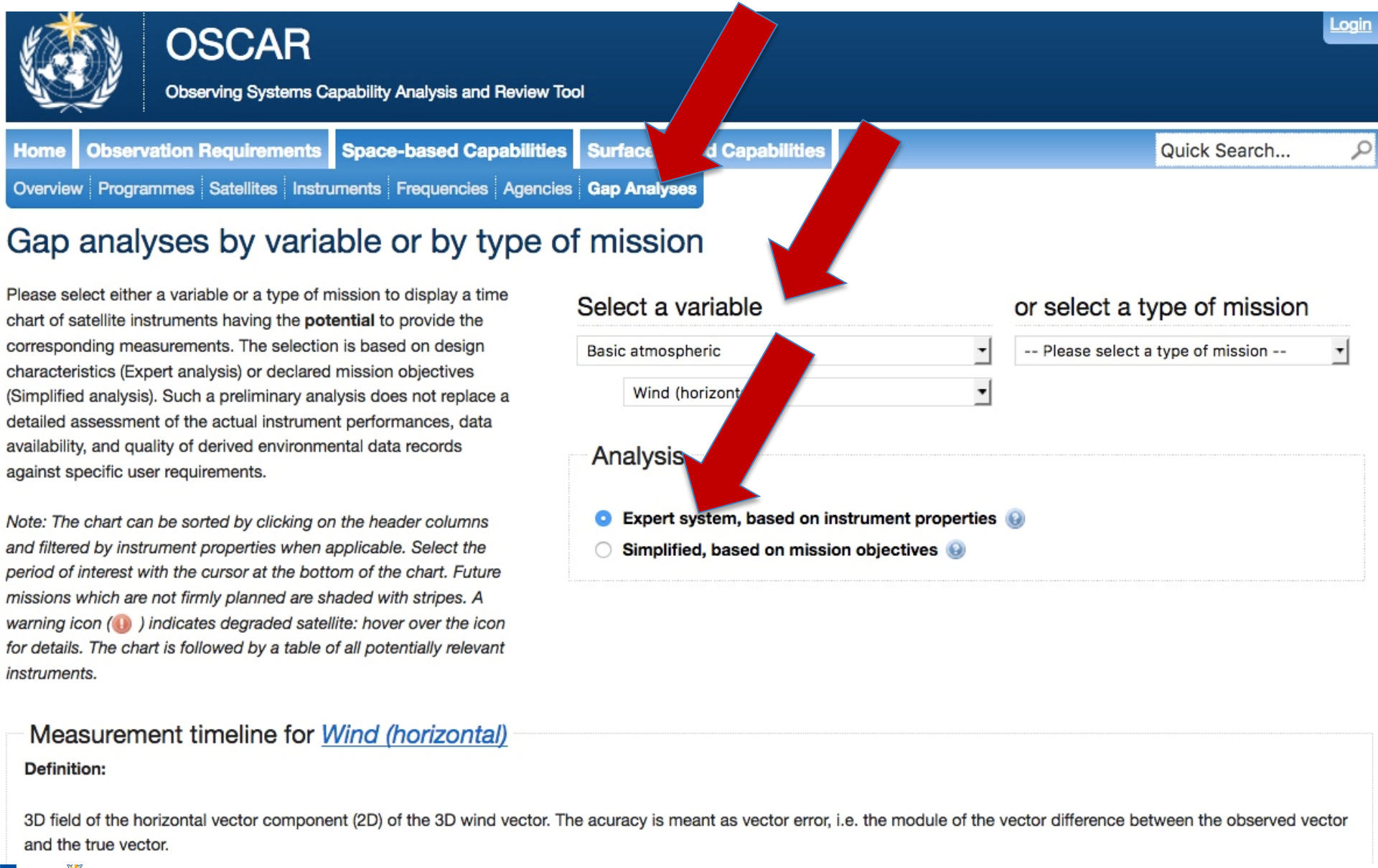
Flag instrument issue
indicates "degradion"

Orbit



WMO OMM

selecting “Gap Analysis” from Top Page of the OSCAR/Space



Found 319 results

First Previous 1 2 3 4 5 Next Last

Instrument	NRT?	Relevance	Satellite	Orbit	09	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	202
MERSI-2		4 - fair	FY-3RM-1													X	X	X	X	X	X	
MERSI-2		4 - fair	FY-3RM-2																X	X	X	
SSCC		5 - marginal	ATS-1	150°W																		
ABI		2 - very high	GOES-T	137°W												X	X	X	X	X	X	
IMAGER (GOES 8-11		3 - high	GOES-9	135°W																		
IMAGER (GOES 8-11		3 - high	GOES-10	135°W																		
IMAGER (GOES 8-11		3 - high	GOES-11	135°W	(	X	X															
VISSR		4 - fair	GOES-1	135°W																		
VISSR		4 - fair	GOES-3	135°W																		
VISSR		4 - fair	SMS-2	135°W																		
IMAGER (GOES 12-1	Yes	3 - high	GOES-15	134.9°W		X	X	X	X	X	X	X	X	X	X	X						
IMAGER (GOES 12-1	Yes	3 - high	GOES-14	104.2°W	X	X	X	X	X	X	X	X	X	X								
VHRR (ATS)		4 - fair	ATS-6	94°W																		
ABI		2 - very high	GOES-17	89.5°W										X	X	X	X	X	X	X	X	
ABI		2 - very high	GOES-16	75.2°W									X	X	X	X	X	X	X	X	X	
ABI		2 - very high	GOES-U	75°W																	X	
IMAGER (GOES 12-1		3 - high	GOES-12	75°W	(	X																
IMAGER (GOES 8-11		3 - high	GOES-8	75°W																		
MVIRI		3 - high	Meteosat-3 (X-AD(	75°W																		
VISSR		4 - fair	GOES-2	75°W																		
VISSR		4 - fair	SMS-1	75°W																		
IMAGER (GOES 12-1		3 - high	GOES-12 (S-Ameri	60°W		X	X	X	X													
IMAGER (GOES 8-11		3 - high	GOES-10 (S-Ameri	60°W	(																	
IMAGER (GOES 12-1	Yes	3 - high	GOES-13	59.8°W	(	X	X	X	X	X	X	X	X	X								
MVIRI		3 - high	Meteosat-3 (ADC)	50°W																		
MSSCC		5 - marginal	ATS-3	45°W																		
MSU-GS		3 - high	Electro-L N1	29.6°W			X	X	X	X	X	X										
IRFS-GS		2 - very high	Electro-M N1	14.5°W																	X	
MSU-GSM		2 - very high	Electro-M N1	14.5°W																	X	
MSU-GS		3 - high	Electro-L N3	14.5°W										X	X	X	X	X	X	X	X	

OSCAR/Space Maintenance Scheme

Maintenance and Support: Outlook

Two main tasks for OSCAR/Space:

(1) Updating facts

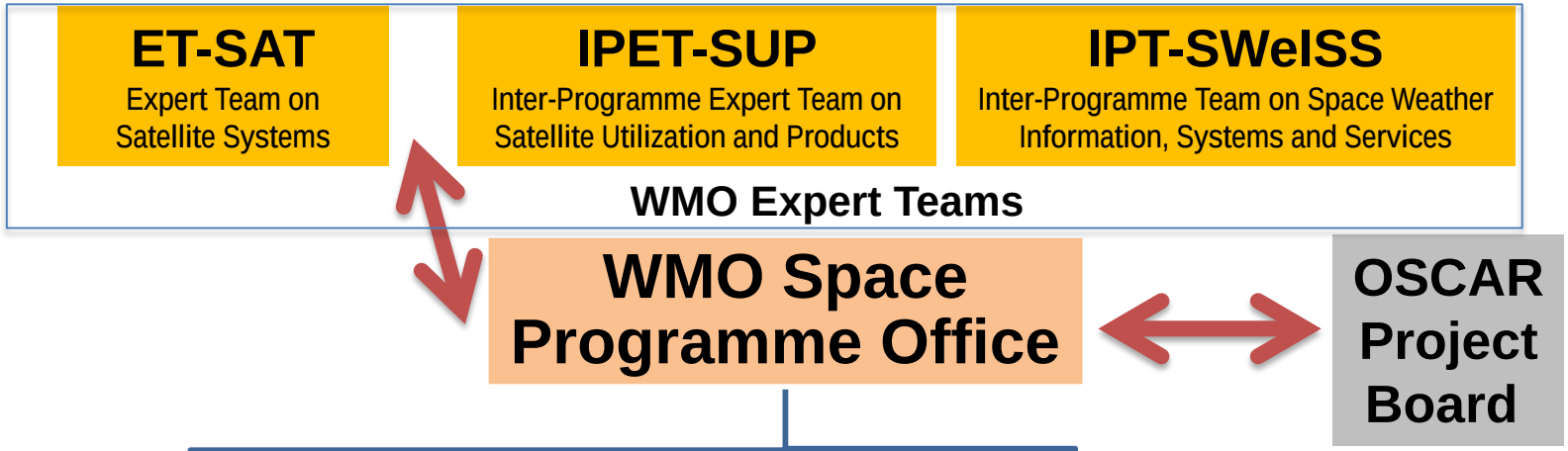
(2) Keep under review assessments, functions, rules, interfaces

Under supervision of WMO CBS expert teams, e.g. ET-SAT, IPET-SUP, IPT-SWeISS, and consistent with overall OSCAR development (with OSCAR/Surface and OSCAR/Requirement)

WMO Space Programme office plans to establish:

- **OSCAR/Space Support Team (for task 1)**
- **OSCAR/Space Science and Technical Advisory Team (task 2)**

Maintenance and Support Scheme for OSCAR/Space



OSCAR/Space

Support Team (O/SST) for maintenance

- CGMS Members, Observers
- Other partners

OSCAR/Space

Science and Technical Advisory Team (O/SSAT)

- CGMS International Science Working Groups:
  - ITWG –Sounding
  - IWWG – Winds
  - IPWG – Precipitation
  - IROWG – Radio Occultation
  - ICWG – Clouds
- WMO GSICS, SCOPE-CM, SCOPE-NC

IWWG's Contributions to OSCAR/Space

WMO OMM

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space

Gap Analyses by Variable (0/2)

http://www.wmo-sat.info/oscar/gapanalyses?view=179

Questions/Advices	Comments
What are the definitions for the various Relevance Designations (very high, high, fair, etc) and do they exist somewhere on the OSCAR site? Knowing these definitions would enable more consistent Relevance labelling of the various observation sources.	The ratings provide a qualitative idea of the relative achievable performance of the retrievals from instruments of different types and characteristics. The rating is a "blending" of several elements: the uncertainty, the vertical resolution, and the frequency and spatial resolution of the retrieved measurement in comparison with the space-time variability of the geophysical parameter. It is planned to add the "**Rating criteria**" to the Gap analysis by Variable" in order to make the User aware of the background for the quoted rates.

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space

Gap Analyses by Variable (1/2)

http://www.wmo-sat.info/oscar/gapanalyses?view=179

Questions/Advices	Comments
- Relevance of ABI, AHI, FCI is marked as "Very high" in contrast to the previous GOES or MTSAT imagers or SEVIRI (which are "high")? The capabilities or quality of ABI, AHI and FCI might be better (although not necessarily in a major way for winds), but it is thought that the relevance for AMVs is the same for all these instruments and should be 'very high'. - Relevance is marked as "fair" for MODIS, VIIRS and MetImage, and "marginal" for AVHRR. However, both MODIS, VIIRS and AVHRR AMVs are currently assimilated in NWP models. So it is thought that 'high' or 'very high' rating should be more appropriate, even if it is understood that VIIRS and AVHRR might be rated lower than MODIS or METImage due to the lack of availability of WV channels for example. In fact METImage is very similar to SEVIRI (VIS, IR and WV channels used for AMVs) and the relevance to extract the winds is then rather similar for the 2 instruments even if the coverage is different. In fact coverage of GEO and LEO are seen as complementary and be not rated as more or less important.	The current rating criteria are: 1. Doppler lidar 2. Hyperspectral sounder in GEO; OR Imager in GEO or Molniya with channels in VIS and TIR at 6-8, 10-13 and 13.3 μm 3. Imager in GEO or Molniya with channels in VIS and TIR at 6-8 and 10-13 μm 4. TIR imager in LEO with channels at 6-8 and 10-13 μm; OR Imager in GEO with channels in VIS and TIR at 10-13 μm; OR High-spatial-reolution multi-angle VIS radiometer in LEO; OR Very-high spectral resolution limb sounding spectrometer for oxygen lines in the VIS and NIR ranges 5. VIS imager in GEO; OR TIR imager at 10-13 μm in LEO

Example of Rules (rating value is «subjective»)

Variable: Atmospheric temperature

Instrument type	Main relevant Property	Rating	Operational limitations
IR radiometer	No. of channels in the 15 μm band (in LEO)	3.4	Cloud sensitive, coarse vert. resolution
	No. of channels in the 15 μm band (in GEO)	3.3	Cloud sensitive, coarse vert. resolution
	No. of channels in the 4.3 and 15 μm bands (in LEO)	3.1	Cloud sensitive, coarse vert. resolution
	No. of channels in the 4.3 and 15 μm bands (in GEO)	3.0	Cloud sensitive, coarse vert. resolution
IR spectrometer	Spectral resolution in the 15 μm band (in LEO)	2.2	Cloud sensitive
	Spectral resolution in the 15 μm band (in GEO)	2.1	Cloud sensitive
	Spectral resolution in the 4.3 and 15 μm bands (in LEO)	1.3	Cloud sensitive
	Spectral resolution in the 4.3 and 15 μm bands (in GEO)	1.0	Cloud sensitive
MW radiometer	No. of channels in the 54 GHz band (conical scanning)	2.3	No specific limitation
	No. of channels in the 54 and 118 GHz bands (conical scanning)	2.0	No specific limitation
	No. of channels in the 54 GHz band (cross-track scanning)	1.4	No specific limitation
	No. of channels in the 54 and 118 GHz bands (cross-track scanning)	1.1	No specific limitation
Limb sounder	Short-wave spectrometry in occultation	5.1	Daylight, high atmosphere only
	Short-wave spectrometry by mechanical/electronic scanning	5.0	Daylight, high atmosphere only
	IR spectrometry	4.1	High atmosphere only
	Millimetre-submillimetre wave spectrometry	4.0	High atmosphere only
R.O. sounder	No. of soundings / day (single satellite)	3.2	Inaccurate in low troposphere
	No. of soundings / day (satellite cluster)	1.2	Inaccurate in low troposphere

Requests from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space
Gap Analyses by Variable (2/2)
http://www.wmo-sat.info/oscar/gapanalyses?view=179

Requests	Accepted Proposal
Operational limitation is marked as "**Polar Regions only**" for MODIS, VIIRS, MetImage, and AVHRR. AMVs using these data are extracted up to 50 deg latitude (single mode AVHRR and Leo-Geo) and have a global coverage for dual Metop AVHRR operations. It is proposed to replace the operational limitation "Polar Regions only" by "High latitudes" and to precise that the coverage is global for Dual operations for AVHRR and METImage.	"**Polar regions only**" is now re-worded as "**Limited to high latitudes**".
3D winds are presently produced in a demonstration mode at CIMSS from AIRS instrument. It is proposed to add AIRS in the list and to set the relevance to "marginal" or "fair".	The addition of variable "Wind (horizontal)" in the capability of hyperspectral sounders in LEO was implemented and reviewed by IWWG.

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space

Multi-purpose VIS/IR from GEO

http://www.wmo-sat.info/oscar/observingmissions/view/2

Questions/Advices	Comments
AMVs are mentioned in the #1 rating, as well as the #4 rating. This is a bit confusing. AMVs are mentioned in all the ratings, which is fine if AMVs can be produced from the available observations described in each rating.	AMV is possible with different level of performances, depending on the available channels. The rating, however, is determined by the set of all the Variables retrievable from the specified set of channels, not AMV only.
The "red" colour code designation says: "VIS/IR radiometer with >=1 channel(s) in VIS, in the TIR window ~ 11 µm and (possibly) in the TIR water vapour 6.3 µm band. Basic operational cloud and cloud motion monitoring limited to daylight." The last sentence is only true IF only a VIS band is present, but the "red" colour designation seems to indicate the availability of 11um window observations.	This rating category refers to instruments with a minimal number of channels, but inclusive of VIS, therefore only possible in daylight. AMV are included, provided that also there is IR (for height assignment).

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space

Multi-purpose VIS/IR from LEO

http://www.wmo-sat.info/oscar/observingmissions/view/1

Questions/Advices	Comments
AMVs aren't mentioned. AMVs are now extracted from several LEO satellites (MODIS, AVHRR, VIIRS, MISR) and presently used in NWP models for high latitude areas. They will be extracted in the future from at least EPS-SG METImage and S3/SLSTR. AMVs must appear in the multi-purpose VIS/IR imagery from LEO list.	AMV is not mentioned here because not driving for the rating of the mission "Multi-purpose VIS/IR from LEO". It appears, however, listed and rated under each instrument equipped with the appropriate channels.

Note: "Multi-purpose VIS/IR from GEO" and "Multi-purpose VIS/IR from LEO" will be merged in future updating, and the rating definition will be re-arranged. IWWG comments will be taken into account

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Requests from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space

IR temperature/humidity sounding from LEO

https://www.wmo-sat.info/oscar/observingmissions/view/3

Requests	Accepted Proposal
'wind profile in clear air' is mentioned for GEO but not for LEO. 3D winds are presently derived in a demonstration mode from AIRS at CIMSS and 3D winds are also planned to be extracted from Metop IASI. The coverage is limited to high latitudes. It is proposed to add the 'wind profile in clear air' mention also for LEO IR sounders.	The addition of variable "Wind (horizontal)" in the capability of hyperspectral sounders in LEO was implemented and reviewed by IWWG

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space
Observation Requirement Variable: Wind (horizontal)
http://www.wmo-sat.info/oscar/variables/view/179

Questions/Advices	Comments
What are definitions of "High" "Low" Troposphere? Perhaps, Mid troposphere should be included as one of the layer designations	The terms "Lower troposhere", "Higher troposphere", "Lower stratoshere" and "Higher stratosphere and Mesosphere" have been agreed long ago, accounting for the variability with latitude, the vertical resolution generally achievable by remote sensing, and in order to simplify the User work of establishing requirements. According to CIMO, the conventional thresholds are: LT: surface-500 hPa; HT: 500-250 hPa; LS: 250-30 hPa; HS&M:30-0.01 hPa

Questions/Advices from IWWG for "AMVs (Horizontal) Capabilities" in OSCAR/Space
Instruments Section

Questions/Advices	Comments
Imager (GOES-12-15) - Coverage / Cycle: Full disk is every 3 hours. Northern and Southern Hemisphere sectors every 30 minutes. Continental US coverage every 15 minutes (nominal operations) or 7.5 minutes (rapid scan operations) - GOES-13 satellite should be tagged green since it is currently an operational satellite)	- The description "Full disk every 30 min. Limited areas in correspondingly shorter time intervals" refers to the instrument capability. The IWWG comment refers to operating modes, that are not described, - GOES-13 is now back-up, at 59.8°W.

Properties and Rules in OSCAR/Space

- For the purpose of identifying which variable can be retrieved from an instrument, and with which quality, an appropriate set of the main instrument characteristics is extracted as '**Properties**'.

- A variable is derived from the instrument Properties by means of the retrieval algorithm. In OSCAR/Space, the linkage between the variable and the appropriate Properties is expressed as '**Rules**'.

- For one variable, many Rules are applicable, function of:
  - the instrument type, i.e. the physical principle exploited
  - the specific set of Properties having a bearing on the retrieval
  - operational characterics of the satellite hosting the instrument.

- The current number of Rules defined in OSCAR/Space is over 2720. The number of Properties is over 290.

Example of Rules (rating value is «subjective»)

Variable: Atmospheric temperature

Instrument type	Main relevant Property	Rating	Operational limitations
IR radiometer	No. of channels in the 15 μm band (in LEO)	3.4	Cloud sensitive, coarse vert. resolution
	No. of channels in the 15 μm band (in GEO)	3.3	Cloud sensitive, coarse vert. resolution
	No. of channels in the 4.3 and 15 μm bands (in LEO)	3.1	Cloud sensitive, coarse vert. resolution
	No. of channels in the 4.3 and 15 μm bands (in GEO)	3.0	Cloud sensitive, coarse vert. resolution
IR spectrometer	Spectral resolution in the 15 μm band (in LEO)	2.2	Cloud sensitive
	Spectral resolution in the 15 μm band (in GEO)	2.1	Cloud sensitive
	Spectral resolution in the 4.3 and 15 μm bands (in LEO)	1.3	Cloud sensitive
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	No. of channels in the 54 and 118 GHz bands (conical scanning)	2.0	No specific limitation
	No. of channels in the 54 GHz band (cross-track scanning)	1.4	No specific limitation
	No. of channels in the 54 and 118 GHz bands (cross-track scanning)	1.1	No specific limitation
Limb sounder	Short-wave spectrometry in occultation	5.1	Daylight, high atmosphere only
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	Millimetre-submillimetre wave spectrometry	4.0	High atmosphere only
R.O. sounder	No. of soundings / day (single satellite)	3.2	Inaccurate in low troposphere
	No. of soundings / day (satellite cluster)	1.2	Inaccurate in low troposphere

Retrievable variable processing in OSCAR/Space

- The identification and qualification of the variables retrievable from an instrument makes use of a quasi-objective methodology.

- The variables have been selected on the basis of User requirements (by official committes and expert groups) and feasibility of observing from Space.

- Currently, OSCAR/Space manages 191 variables (122 for EO, 69 for SW).

- A variable can be retrieved from instruments of different types. The quality of the retrieval depends on the physical principle exploited by the type of instrument, and the specific instrument characteristics.

- The processing method evaluates which variables can (in principle) be retrieved from an instrument, and provides a rough rating of the achievable quality.

Some Critical Areas in OSCAR/Space

Maintenance:

- it is very difficult to get the latest information on satellite status:
  - too many satellites continue to be listed as 'operational', whereas they are likely to be inactive, maybe since long;
  - in cases of too long absence of fresh information, the status of the satellite is quoted as '*Unclear*';
  - the problem is amplified when moving to the status of the specific instruments flown on the satellite;
- the frequency plan information is often incomplete or missing.

Development and maintenance:

- further development and maintenance scheme of OSCAR/Space is being pursued, within a resource-limited context.

Need for cooperation:

- contacts to ensure cooperation for maintenance and, possibly, development, have been established. The outcome of these initiatives is basic for the future of OSCAR/Space.

Information on OSCAR/Space

Most up-to-date and relevant is the User Manual
http://www.wmo.int/pages/prog/sat/documents/OSCAR_User_Manual-2016-09-10.pdf

it is currently linked on the OSCAR homepage
https://www.wmo-sat.info/oscar/

On the same page, we also have a flyer but it needs updating:
http://www.wmo.int/pages/prog/sat/documents/oscar_brochure.pdf

WEATHER CLIMATE WATER

7L30

Thank you

WORLD METEOROLOGICAL ORGANIZATION

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