

OSCAR

The Observation Systems Capability Analysis and Review Tool (OSCAR) is an important building block of WIGOS (WMO Integrated Global Observing System) and more specifically of the “Rolling Requirements Review” process. It allows the consultation of:

- User requirements for observation of WMO application areas
- Facts and capabilities of space-and surface-based observing systems

By comparing capabilities with requirements, a critical review and gap analysis can be performed.

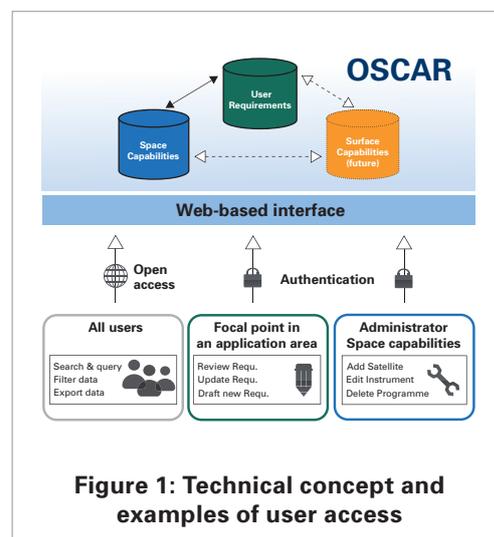
CONCEPT

OSCAR is a system of three interlinked modules. It is web-based and available to the public (www.wmo.int/oscar). Editing of information is only possible for dedicated focal points and other assigned contributors (Figure 1).

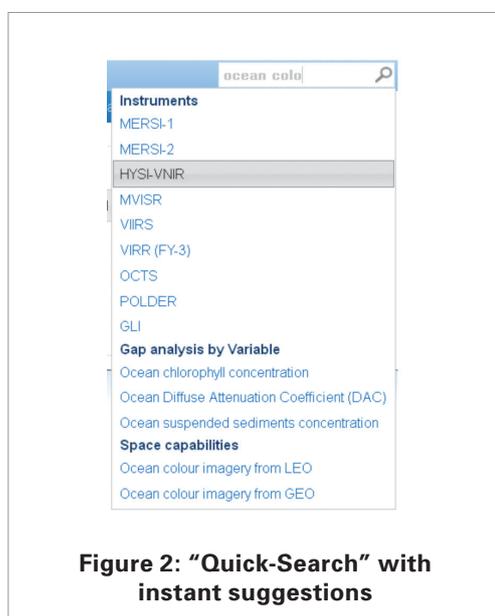
Two modules of OSCAR are available at present:

- **OSCAR/Requirements**
- **OSCAR/Space**

The third module is OSCAR/Surface – an inventory of all surface-based stations and their capabilities, which is currently being designed.



UTILIZATION



OSCAR targets all users interested in the status and the planning of WMO observing systems as well as data users looking for instrument specifications at platform level.

The user interface of the two existing modules has been streamlined to support efficient and intuitive consultation.

One of the core functionalities is the so-called “Quick-Search”, which facilitates the quick look-up of specific items, such as variables, satellites, instruments etc. by providing an intelligent auto-suggest function (Figure 2).

Most factual information is organized in tables. These can be sorted and filtered using advanced criteria. Context sensitive links on each data item lead to related information, allowing the user to explore OSCAR from different viewpoints. In addition, all tabular data can also be exported for convenient offline use.

(1) OSCAR/Requirements

Repository of user requirements for observation

This module is the official repository of requirements for observation of physical variables in support of WMO and co-sponsored programmes.

PROCESS

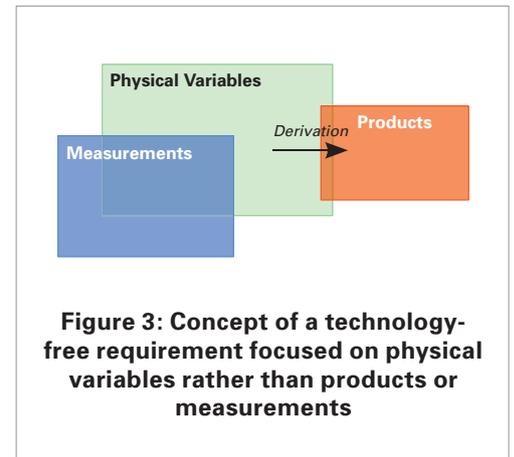
Variables are defined in a technology-free manner, i.e. without being constrained by space- or surface-based measurements. They do not necessarily overlap with the direct output of a specific instrument (Figure 3).

Requirements for these variables are expressed in terms of the following criteria:

- uncertainty (*)
- horizontal and vertical resolution
- observing cycle
- timeliness

For each WMO application area, requirements are directly maintained on-line by designated focal points and are regularly reviewed by groups of experts.

This process is overseen by the Commission for Basic Systems' Inter-Programme Expert Team on the Observing System Design and Evolution (IPET-OSDE, former ET-EGOS).



STATUS AND CONTENT

OSCAR/Requirements currently stores definition and details of about 200 physical variables. Focal points maintain 600+ requirements defined in 22 different application areas.

Variables, together with their definitions, units and other information, can easily be accessed using the "Quick-Search" functionality.

User requirements are recorded in tables which can be sorted and filtered, e.g. by variable, application or spatial domain.

OUTLOOK

The requirements module will be further developed to differentiate local/regional and global requirements. Other functionalities will be added as required.

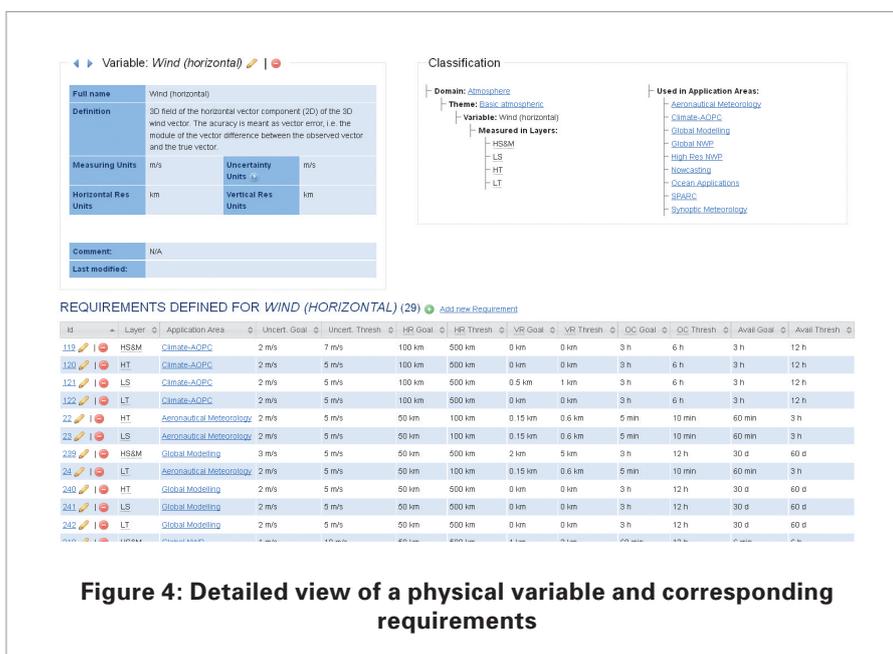


Figure 4: Detailed view of a physical variable and corresponding requirements

(*) Uncertainty is generally understood here as the estimated range of observation errors with a 1 σ confidence interval.

(2) OSCAR/Space

Space-based capabilities

This module can essentially be used in two ways:

1. As an inventory of **factual information** on satellite capabilities, such as instruments, satellites, programmes and agencies, with related details;
2. As a tool providing **expert assessments** on the relevance of instruments for fulfilling pre-defined capabilities and the measurement of particular geophysical variables.

FACTUAL INFORMATION

OSCAR/Space includes information on:

- 200+ satellite programmes
- 500+ individual satellites
- 700+ instruments
- plus other related details

The interface allows the user to create advanced queries using filters, such as: “Show all satellites planned in the period 2020-20260, flying in geostationary orbit and operated by NOAA or CMA” or “Show all currently flying instruments of the Radar Altimeter type” (Figure 5).

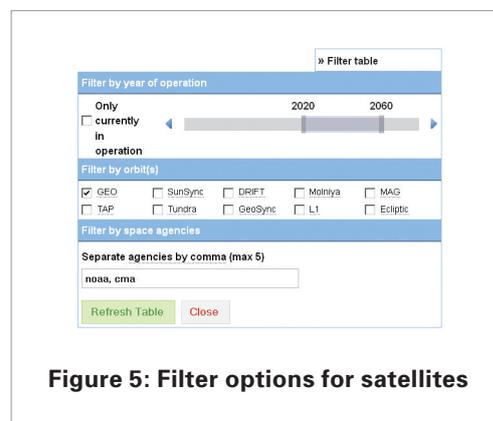


Figure 5: Filter options for satellites

CAPABILITY ASSESSMENTS

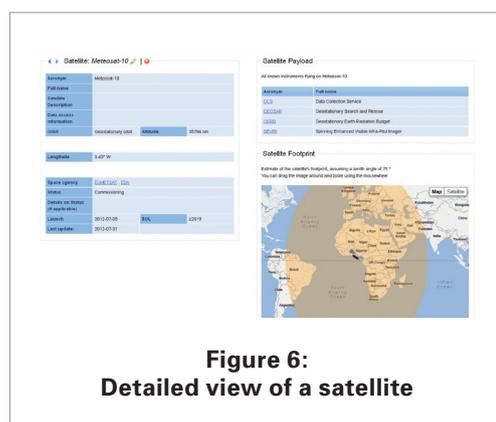


Figure 6: Detailed view of a satellite

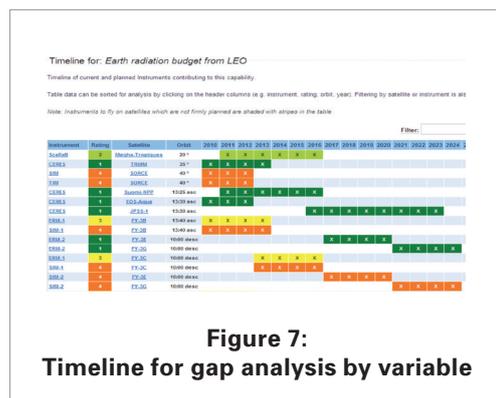


Figure 7: Timeline for gap analysis by variable

OSCAR/Space currently provides 2 kinds of expert assessments:

a) Gap Analyses by Variables

These qualitative analyses are based on an expert assessment of the relevance and limitations of instruments with regard to the measurement of particular geophysical variables.

b) Capability review

The “Capability review” refers to the list of capabilities identified in the “WMO Vision of Global Observing Systems for 2025”, or to the “Implementation Plan for Evolution of Global Observing Systems”. The review identifies which instruments are most suitable to provide the capability identified in the WMO plans.

The tool automatically generates timelines of the instruments and satellites involved (Figure 7).

OUTLOOK

Future versions might also include a “compliance analysis”, comparing instrument performance with the actual quantitative requirements defined in OSCAR/Requirements.

(3) OSCAR/Surface

Surface-based capabilities

This future module, which is currently being designed, shall provide:

1. Basic instrument/platform metadata and capabilities of surface-based observing platforms contributing to WIGOS, analogue to OSCAR/Space. It will mostly feed from existing sources of metadata (e.g. expanded WMO-No. 9, Vol. A, GAWSIS);
2. Tools for estimating how surface-based observing systems capabilities meet the observational user requirements.

Among others, OSCAR/Surface shall provide reports and information on capabilities according to specific criteria (e.g. application areas, variables, layers, platform types, etc.) for the world, a regional association, a country, or pre-defined region according to the following options:

- **List observing stations** or deduced integrated capabilities
- **Interactive maps of observing stations** or deduced integrated capabilities
- **Summary reports**

OSCAR will also provide links to other distributed databases provided by WMO Members, such as the Radar Database. This distributed part of OSCAR is called OSCAR/Distributed.

Domain	Application Area	Layer	HR	VR	OC	Timeliness	Uncertainty
Atmosphere	Global NWP	Surface	240 km	n/a	3h	25min	2.5K
Atmosphere	High Resolution NWP	Surface	240 km	n/a	3h	25min	2.5K

Value range	Comment
Value > Threshold	No impact
Breakthrough < Value ≤ Threshold	Significant impact
Goal < Value ≤ Breakthrough:	Optimal
Value ≤ Goal:	Oversampled
No requirements value	n/a

Figure 8: Example of critical review (capabilities compared to requirements) for “Air Temperature (at surface)” in a given region

For more information, please contact:

World Meteorological Organization | WMO Space Programme | www.wmo.int/sat

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