OBSERVING SYSTEMS CAPABILITY AND REVIEW TOOL (OSCAR)

OSCAR/Space developments and updating process

(Submitted by N. Hettich, WMO Secretariat)

Summary and Purpose of Document

This document describes the current status of the space-based part of the Observing Systems Capability and Review Tool (OSCAR/Space). It highlights major achievements since the last ET-SAT session, such as new functionalities and updated content. Possible future developments of the tool are discussed.

In response to an action agreed at the seventh ET-SAT meeting (Action 7.05), a procedure is also proposed to control the updating process.

ACTION PROPOSED

The Expert Team is invited to:
- Review the re-structured gap-analysis / evaluation of measurements
- Provide feedback on the tool, and guidance in developing the proposed new functionalities
- Review and endorse the update and maintenance procedure for OSCAR/Space

APPENDIX

1. OSCAR/Space updating/maintenance procedure, draft v0.3
1. BACKGROUND

The Observing Systems Capability Analysis and Review tool (OSCAR) is a web-based database tool, which contains user requirements for observation, and information about space- and surface-based observing systems. In addition to factual characteristics of these observing systems, it offers different functionalities to analyze current and future capabilities against requirements, based on expert assessments.

OSCAR is made up of three main modules:
- OSCAR/Requirements (Stores definitions of geophysical variables and user requirements for observation),
- OSCAR/Surface (surface-based capabilities module, not yet available)
- OSCAR/Space (space-based capabilities module), which is the scope of the present document.

OSCAR is accessible at www.wmo.int/oscar and can be easily located from the Space Programme home page www.wmo.int/space or by popular search engines with keywords like “WMO Oscar”.

2. CURRENT STATUS

After a test and validation phase, OSCAR/Space, (formerly known as SOCRAT) was opened to the public and presented to the fifteenth session of the Commission for Basic Systems (CBS-15) in September 2012. A number of developments have been completed since ET-SAT-7, most notably:

- The factual content has been scrutinized, updated and considerably expanded;
- The internal instrument classification and assessments based on objective design features have been re-worked and are now more fine-grained; this aims to ensure that for any given instrument OSCAR gives a meaningful list of variables that this instrument has the potential to measure (reciprocally, for any variable, OSCAR should give a meaningful list of instruments that have the potential to measure it);
- In the same time, the granularity of the rating that is displayed has been reduced as requested by ET-SAT, to avoid an over-interpretation of the results;
- Satellite Frequencies were added for GEO and operational LEO satellites, including a set of filters to support frequency coordination. OSCAR/Space can thus serve as the repository of satellite communication frequencies for CGMS Working group I (Telecommunications) activities;
- The WMO-CGMS satellite status list (www.wmo.int/pages/prog/sat/satellitestatus.php) is now automatically generated by OSCAR;
- Additional filters and other functionality have been implemented for the various tables satellites, instruments, frequencies);
- A procedure detailing the maintenance and update process for OSCAR/Space has been drafted (Attached as Appendix).

Following the presentation of OSCAR at various conferences and meetings (including the 2012 EUMETSAT Satellite Users’ Conference, CBS-15, Tenth EUMETSAT User Forum in Africa, Third Asia-Oceania Meteorological Satellite Users’ Conference, 2013 American Meteorological Society annual meeting), user statistic now show an increased interest in OSCAR, with currently around 100 unique visits per day from around the globe.
It should be noted that, in addition to Earth Observation capabilities, a large number of satellites and instruments for Space Weather have been recently entered in OSCAR. These capabilities are still under review by the Inter-Programme Coordination Team on Space Weather and the related assessments are therefore neither complete nor validated.

3. PLANNED DEVELOPMENTS

A number of improvements and additions are planned, which shall further improve the usefulness of OSCAR as a comprehensive analysis and planning tool for the earth observation community.

3.1. De-coupling satellite and instrument status

At present, the payload of a satellite is considered operationally available when the satellite is launched, which generates a bias in the gap analysis since it does not take into account the commissioning period or possible instrument failures. To overcome this shortcoming, it is planned to change the data model and de-couple instrument status from satellite status. This will enable to acknowledge the start or end of operation and specific status of each instrument in the generated gap analysis timelines (e.g. commissioning period, degraded operation, instrument failure before lifetime of satellite, etc.).

3.2. Instrument performance model / quantitative gap analysis

Following the request of ET-SUP-7 (Action 7.09) and others, the inclusion of quantitative performances of instruments for measuring particular variables, based on either models or real instrument classes is currently being investigated. Such a quantitative performance evaluation would be necessary to perform a detailed gap-analysis against available user requirements for observation.

3.3. OSCAR/Space external interfaces and data sharing opportunities

The conversion of the satellite status list (www.wmo.int/pages/prog/sat/satellitestatus.php) to a dynamic version fed by content from OSCAR demonstrated a way of sharing data across domains and displaying it in different contexts. This leads to better data coherence and greatly reduced maintenance.

The external interface based on REST-compliant\(^1\) web-services could also allow external partners to directly display OSCAR content on their websites, filtered and formatted to individual needs. This is potentially useful for CGMS, CEOS, or others (thus responding to ET-SAT Action 7.07). In the spirit of collaboration and the increasing importance of open data\(^2\), these external interfaces could be further developed and standardized if interest is confirmed.

4. SUMMARY

OSCAR developments are well on track and significant progress has been made. One major scientific challenge is the modelling of quantitative instrument performances which can be used for a gap-analysis against user requirements. ET-SAT is invited to review the current status and provide guidance on future OSCAR developments and the prioritization of actions.

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\(^1\) Data exchange standard, for explanation, see e.g. http://en.wikipedia.org/wiki/REST

\(^2\) Background information can be found on e.g. http://en.wikipedia.org/wiki/Open_data
WIGOS Information Resource

OSCAR/Space updating/maintenance procedure
V0.3

Document change record

<table>
<thead>
<tr>
<th>Date and Version</th>
<th>Description</th>
<th>Authorized by</th>
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<tbody>
<tr>
<td>10.04.2013 / v0.1</td>
<td>Initial draft</td>
<td></td>
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<tr>
<td>29.04.2013 / v0.2</td>
<td>Edits by J. Lafeuille</td>
<td></td>
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<tr>
<td>29.04.2013 / v0.3</td>
<td>Editorial changes, paragraph on content versioning, paragraph on user feedback</td>
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OSCAR/SPACE UPDATING/MAINTENANCE PROCEDURE

1. INTRODUCTION

1.1 Purpose and scope

This procedure defines the roles, responsibilities and steps to be followed to update content, functionality and interface of the OSCAR/Space module with the aim to ensure that OSCAR/Space content is up-to-date, correct, quality-controlled, accessible and fit for purpose.

Note: OSCAR/Space feeds another information resource, the CGMS Satellite Status list, which is thus indirectly covered by this procedure.

1.2 Document plan

The document contains seven sections:

Section 1: Introduction  
Section 2: Roles  
Section 3: Content updating process  
Section 4: Updating of functionality and interface  
Section 5: User feedback and evaluation  
Section 6: Resources for Oscar updating and maintenance  
Section 7: Evolution of the procedure

1.3 Background documents

- OSCAR/Space Software Requirements Specification
- WIGOS Information Resource (WIR) functional requirements specification
- ISO/IEC 14764:2006 Software Maintenance
- CIMO Guide Part 3 Chapter 1 Quality management

1.4 Definitions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>OSCAR</td>
<td>Observing System Capability Analysis and Review Tool</td>
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<tr>
<td>WIGOS</td>
<td>WMO Integrated Global Observing system</td>
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<tr>
<td>WIR</td>
<td>WIGOS Information Resource</td>
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<tr>
<td>CEOS</td>
<td>Committee on Earth Observation Satellites</td>
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<tr>
<td>CGMS</td>
<td>Coordination Group for Meteorological Satellites</td>
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2. ROLES

The updating and maintenance processes involve the following roles. In practice, one person can take multiple roles.

<table>
<thead>
<tr>
<th>Role name</th>
<th>Description</th>
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</table>
| SP Office        | Space Programme Office  
                  (Including external contractors acting by delegation of the SP  
                  Office staff and in accordance with the present procedure) |
| Satellite Operators | Satellite operators with missions recorded in OSCAR  |
| ET-SAT           | CBS Expert Team on Satellite Systems  |
3. CONTENT UPDATING PROCESS

There are two levels of content updates:
- First level: updates based on non-controversial factual evidence,
- Second level: other updates, resulting of expert assessment.

3.1 First level: updating of factual content

Scope: Refers to update, insertion or deletion of factual content, based on non-controversial factual evidence (e.g. satellite launch dates, new satellite plans, start or end of operational service, orbit characteristics, instrument specifications, ground segment and programme description).

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP Office keeps track of publicly available information from official satellite operator sources and updates OSCAR accordingly [If necessary, updates are confirmed with Satellite Operator focal points]</td>
<td>SP Office</td>
<td>Continuous, Delay of max 2 months</td>
</tr>
<tr>
<td>2</td>
<td>Satellite Operators inform SP Office of important changes or factual errors in OSCAR</td>
<td>Satellite operators</td>
<td>As necessary</td>
</tr>
<tr>
<td>3</td>
<td>CGMS satellite operators regularly validate factual information within their responsibility through annual reports to CGMS</td>
<td>Satellite operators</td>
<td>yearly</td>
</tr>
<tr>
<td>4</td>
<td>For non-CGMS members, updates are collected either via CEOS or, if relevant (e.g. non-CEOS Members), through direct call from the SP Office</td>
<td>SP Office in consultation with CEOS</td>
<td>yearly</td>
</tr>
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3.2 Second level: updating of assessments

Scope: Refers to assessments of the suitability of certain instruments for fulfilling pre-defined capabilities or measuring specific variables. Since these assessments can be subject to discussion, effort is made to seek endorsement by representative or authoritative experts.

<table>
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<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>1</td>
<td>Instruments are classified and assessed according to objective design features</td>
<td>SP Office</td>
<td>As new satellites/instruments are added</td>
</tr>
<tr>
<td>2.1</td>
<td>Thematic science groups are invited to review the instrument rating per</td>
<td>Science groups (e.g.</td>
<td>Typically 2-yearly, or when major updates</td>
</tr>
</tbody>
</table>
2.2 ET-SAT validates the assessments and other details in their field of expertise

3. SP Office implements changes requested by ET-SAT and/or science groups,

3.3 Traceability of updates

All operations (insert, update, delete) are automatically recorded by the system. An administrator can access these logs and reverse changes if necessary.

A list of major content updates (e.g. structural changes, assessments) is maintained by the SP Office.

4. Updating of functionality and interface of the tool

Conceptual and/or technical changes to the structure, functionality and interface of the tool can be differentiated in “system maintenance”, “adaptive/corrective maintenance” and “feature updates”.

4.1 System maintenance

**Scope:** Maintenance tasks necessary to provide 24/7 accessibility and recovery services in case of failure. Includes the regular maintenance of hosted server environment.

<table>
<thead>
<tr>
<th>Process 1</th>
<th>Description</th>
<th>Responsibility</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Ensure maintenance of application backups and keep recovery versions. (Application and Content)</td>
<td>OSCAR Technical Administrator</td>
<td>Continuous</td>
<td></td>
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<table>
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<tr>
<th>Process 2</th>
<th>Description</th>
<th>Responsibility</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Monitor and configure technical platform (web server, database systems etc) Inform OSCAR Developer of any significant changes in environment</td>
<td>OSCAR Technical Administrator</td>
<td>As needed, at least bi-annually, or if necessary</td>
<td></td>
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4.2 Adaptive/corrective maintenance

**Scope:** Refers to analysis and correction of discovered bugs or incompatibilities arising through the use of new devices and browsers, as well as minor changes to the presentation (wording, layout).

<table>
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<tr>
<th>Step</th>
<th>Description</th>
<th>Responsibility</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>1</td>
<td>Recording, prioritizing and validating requests</td>
<td>SP Office</td>
<td>continuous</td>
</tr>
<tr>
<td>2</td>
<td>Implementation and test of update, inform users (if applicable / relevant)</td>
<td>OSCAR Developer</td>
<td>as applicable, with delay of max 2 months</td>
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</table>
4.3 New features, new functionalities and presentation

**Scope:** This refers to adding new functionalities, or significantly changing current behaviour of the tool, including presentation and user interface.

<table>
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<th>Responsibility</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>1</td>
<td>Recording of general feedback and feature requests from Expert Groups, Satellite operators, users, OSCAR development team</td>
<td>SP Office</td>
<td>Continuous</td>
</tr>
<tr>
<td>2</td>
<td>ET-SAT provides guidance on evolution of functionality and interface [WIR development team is consulted if requests have effects on other OSCAR modules]</td>
<td>ET-SAT [WIR project manager]</td>
<td>yearly</td>
</tr>
<tr>
<td>3</td>
<td>Approved features are recorded in the Software Requirements Specification for OSCAR/Space</td>
<td>SP Office</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Changes are implemented in accordance with overall OSCAR procedures and schedules</td>
<td>OSCAR Developer</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>OSCAR manual(s) are updated as necessary</td>
<td>SP Office, OSCAR Developer</td>
<td></td>
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4.4 Traceability

- A list of discovered bugs, incompatibilities and problems, along with their priority and status is maintained by the OSCAR Developer
- A list of all feature requests is maintained by the WMO SP
- Approved functionalities/ features or changes of such are recorded in the Oscar “Software Requirements Specification” (SRS) Document.

5. USER FEEDBACK AND EVALUATION

User feedback is collected through an email address indicated on the OSCAR homepage, which is checked on a regular basis by the administrator.

User emails are responded and appropriate actions are taken in accordance with the processes outlined in Section 3 and Section 4, for instance:
- an explanation is provided to the user, added in OSCAR views or in the user manual;
- a modification is brought to the interface or the functionality;
- contents are corrected, or a proposal for correction submitted to a satellite operator or a science group for validation.

Structured online surveys are used at regular intervals (every 1-2 years, as appropriate) to collect information on visitor characteristics and feedback on user satisfaction and possible areas for improvement.
Visitor statistics (number, origin, access characteristics) are collected. These statistics are reviewed on an annual basis within the SP Office.

6. RESOURCES FOR OSCAR UPDATING AND MAINTENANCE

The CBS Recommendation 1 (CBS-15) on Implementation and Sustainability of the Database of Observation Requirements and Observing Capabilities states:

(1) That resources be assigned with high priority within the Secretariat to complete the software development and, on a sustained basis, for technical maintenance, first-level contents updating and, through consultancy, for technical-level updating and quality control, as a key activity of the WMO Integrated Global Observing System;

(2) That Members, expert teams of the Open Programme Area Group on Integrated Observing Systems, satellite operators including the Expert Team on Satellite Systems and members of the Coordination Group for Meteorological Satellites, support the database updating process through submitting inputs and providing reviews and feedback.

7. EVOLUTION OF THE PROCEDURE

This procedure is maintained by the SP Office, in consultation with ET-SAT. If any change in the procedure might affect other OSCAR modules, the relevant bodies (e.g. the Inter-Programme Expert Team on Observing System Design and Evolution (IPET-OSDE), for the requirements module) and the WIR development team are consulted.