W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

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COMMISSION FOR BASIC SYSTEMS

OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

EXPERT TEAM ON SATELLITE UTILIZATION AND PRODUCTS

First Reduced Session

GENEVA, SWITZERLAND

7-8 October 2009

FINAL REPORT

Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation of behalf of the constituent body when the matter is, in his opinion, urgent and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

EXECUTIVE SUMMARY

The Expert Team on Satellite Utilization and Products (ET-SUP) was convened in a reduced session in Geneva, Switzerland from 7 to 8 October 2009. This reduced meeting was attended in Geneva by the incoming Chairman, the outgoing Chairman, the Secretary of the last session, a representative of EUMETSAT, and the WMO Secretariat. Other ET-SUP members participated remotely by telephone during parts of the meeting. This was the first opportunity to convene ET-SUP with its new membership as established following CBS-XIV. Of particular note was the first participation of a representative of JCOMM, which was particularly welcomed given the cross-cutting role of ET-SUP and the expectation that it can develop strong linkages with all application communities.

Primary objectives for the session were to develop a detailed action plan and to initiate the key actions that need to be conducted in advance of the fifth ET-SUP meeting to be held in March 2010.

The meeting was informed of the outcome of CBS, CM and EC that set the frame for future ET-SUP activities. It took note of the Terms of Reference and Work Programme established by the CBS and its Management Group respectively, had a thorough exchange of views on the approach to be taken for completing these tasks and agreed on a list of actions to initiate its implementation.

Among its major outcomes, the session:

- Identified key issues for expanding satellite data utilization across WMO Members and WMO (and co-sponsored) programmes and agreed that the issues would be addressed within the Work Programme;
- Acknowledged the ongoing pilot activities in RA II and in RAs III/IV as excellent initiatives to advance some important objectives of ET-SUP at the regional level;
- Agreed on short-term actions for the Questionnaire on Availability and Use of Satellite Data and Products by WMO Members to be issues early 2010;
- Decided to review the approach to this questionnaire for future editions, with more emphasis on monitoring the actual use of satellite data and products in all relevant thematic areas and communities;
- Noted the report from the Virtual Laboratory for Education and Training (VL) and the achievements made possible by the availability of a Technical Support Officer, and agreed to review the potential use of the COMET Environmental Satellite Resource Centre (ESRC) as a host for the Virtual Resource Library;
- Recommended to strengthen coordination and synergy with user groups or other entities with satellite-related activity of direct relevance to the work of ET-SUP;
- Established a preliminary agenda for the fifth meeting of the Expert Team and allocated actions accordingly.

1. ORGANIZATION OF THE SESSION

1.1 Opening of the session

The first reduced session of the Expert Team on Satellite Utilization and Products was opened at 09h00 on Wednesday, 7 October 2009, at the WMO Headquarters in Geneva, Switzerland.

Ms Barbara Ryan, Director of the Space Programme, welcomed the participants (See Appendix I) on behalf of the WMO Secretary General. She underlined the importance of ET-SUP to advise the CBS with a users' perspective on satellite matters and highlighted that ET-SUP was expected to adopt a broad user perspective across all WMO Programme areas. In this respect she welcomed the involvement of JCOMM in ET-SUP, which should ensure that the expectations of the ocean application areas are well taken on board.

Adoption of the agenda

The provisional agenda was adopted as contained in Appendix II, with the addition of Space Weather under Item 11, Any Other Business.

Working arrangements for the session

It was agreed that remote participants would have flexibility to join or leave the session as convenient for them, in view of the time zone differences.

2. INTRODUCTION BY THE CHAIRMAN

The ET-SUP Chairman, Dr Luiz Machado, gave an overview of past ET-SUP achievements and expressed his views on the future steps to be accomplished by the Expert Team. Among the new challenges to be addressed by the Expert Team, he suggested in particular:

- Facilitating easy and cost-effective data access, e.g. through DVB-S systems;
- Stimulating the use of adequate data formats and open source software tools;
- Expanding the RARS network to hyperspectral sounders;
- Supporting data assimilation;
- Enhancing dialogue among data users and providers;
- Unifying the approach of R&D and operational satellite data usage;
- Increasing coordination and synergy among communities of practices and science groups;
- Developing an active communication between the Space Programme Office, ET-SUP, and regional points of contacts;
- Carefully investigating users' needs e.g. through additions to the questionnaire;
- Extending training efforts to all WMO Members;
- Preparing a new global virtual training event.

The meeting agreed that all these points were important to address. Regarding data distribution aspects, it was felt that the global cost (including user and provider cost) should be considered when evaluating the cost-effectiveness of dissemination techniques; and it was clarified that the emphasis put on DVB-S dissemination was not exclusive of other data dissemination techniques. The importance of industry standard formats was noted. The meeting also highlighted that data dissemination strategies should recognize that different types of users would have different needs and capabilities, and the most adequate data access means would thus be generally different. In particular, the use of the full set of raw data from future satellite systems will require very high telecommunication, storage and computing capabilities that few operational

centres will be able to afford; while a majority of users will have interest in accessing higher level products requiring lower bandwidth. This suggests that high-speed links shall be required among a few major processing centres while multicast systems would be most appropriate for broad product dissemination towards a high number of users.

3. OUTCOME OF WMO MEETINGS, INCLUDING CONSULTATIVE MEETINGS, EXECUTIVE COUNCIL AND CBS, WITH DIRECT RELEVANCE TO ET-SUP

The Secretariat recalled how the ET-SUP contributed to the governance structure of WMO, through the Implementation/Coordination Team on Integrated Observing systems (ICT-IOS) and the Commission for Basic Systems (CBS), and provided some highlights of the outcome of major WMO meetings occurred since the fourth and last meeting of ET-SUP held in September 2008:

- Ninth Consultative Meeting on High-level Policy on Satellite Matters (CM-9);
- Fourteenth session of the Commission for Basic Systems (CBS-XIV);
- Sixty-first session of the Executive Council (EC-LXI).

The Expert Team noted that most of the recommendations and achievements of ET-SUP had been taken up by these bodies and led to important recommendations and decisions, which shows the important role played by the Expert Team. It was regretted however that the recommendations to strengthen the Space Programme Office had not been followed, which threatens the overall progress of the Space Programme.

With reference to discussions on the International Geostationary Laboratory (IGeoLab), it was clarified that the interest of the former IGeoLab candidate projects related to geostationary hyperspectral sounding and to geostationary microwave sensing had not been questioned, but that no agreement had been reached on a demonstration mission for these projects, which have thus been terminated.

The Expert Team noted the guidance provided by CM, CBS and the EC, in particular regarding the integration of observing systems in the context of WIGOS, the need to enhance user information on satellite data availability and access, the need to address users' needs at the regional level, the promotion of cost-effective data distribution systems, the satellite inter-calibration initiative and the sustained coordinated processing of environmental satellite data. The meeting also noted the emergence of a Global Framework for Climate Services (GFCS) as an outcome of the 3rd World Climate Conference.

4. ET-SUP TERMS OF REFERENCE, WORK PROGRAMME AND MILESTONES

The Secretariat informed the meeting on the Terms of Reference of ET-SUP as defined by the fourteenth session of the Commission for Basic Systems (CBS-XIV) held in Dubrovnik, Croatia in March-April 2009, and the Work Programme subsequently assigned to the ET-SUP by the CBS Management Group at its tenth meeting (CBS-MG-10) held in Geneva in June 2009. This Work Programme is defined for the period leading up to CBS-XV, which is expected to be held in the last quarter of 2012. An intermediate milestone will be the CBS Extraordinary session, which is expected to be held in November 2010.

The Expert Team noted that the Terms of Reference of ET-SUP were addressing nine main topics that constituted a comprehensive approach to the development of satellite data use across WMO Members and Programmes, and could be summarized as follows:

- Monitoring data availability and use through a questionnaire;
- Widening the use of R&D satellite data and products:
- Improving data availability;
- Improving information on data access, utilization, and capacity building opportunities;

- Training of users;
- Evolution of the observing system;
- Sustained and coordinated processing of satellite data;
- Integration of observing systems in WIGOS;
- Reporting to appropriate bodies.

The meeting took note of the Work Programme established for ET-SUP by the CBS Management Group, which listed deliverables for each main task associated with these topics. It was understood that the main purpose of this first reduced meeting was to define a course of actions enabling to fulfil this Work Programme.

5. STATUS OF ACTIONS FROM PREVIOUS ET-SUP MEETINGS

W. Benesch gave a summary of the status of actions resulting from previous ET-SUP meetings. Meanwhile the ET-SUP has been re-established by CBS-XIV with an updated Terms of Reference, new members, and a new Work Programme. It was noted that all these actions had been successfully completed, or could be otherwise closed, with the only exception of the actions copied below:

ET-SUP-3.10 Mr Anthony Mostek to contact each Regional Focus Group (RFG) to identify dedicated focal points and to assist, where necessary, in the establishing of monthly RFG sessions in all regions. In particular Mr Mostek should liaise with CMA and other VL CoEs to facilitate the establishment of an RFG in Asia.

Action ET-SUP-4.1: V. Gaertner and L. Machado, as VLMG Co-chairs, to ensure that VLMG, involving a subgroup as appropriate, provides updated information for the current revision of Document WMO No. 258. Deadline: February 2009.

Action ET-SUP-4.12: WMO Space Programme Office to identify from the questionnaire responses problem areas (either thematic or related to individual Members) and, if resources permit, to formulate a means to address these problems (next ET-SUP).

Action ET-SUP-4.14: V. Gaertner, and the Regional Association Rapporteurs (via the WMO Space Programme Office) to seek input from various areas of the world and various application areas illustrating the benefits of satellite data and products and supply this information to the WMO Space Programme for inclusion on web pages (July 2009).

Action ET-SUP-4.15, -4.16, -4.17 (these three actions are linked):
- *WMO Space Programme Office to forward to all ET-SUP members the "Draft requirements for AWS sensors to contribute to the calibration and ground-truth of space-based observations" Deadline: 30 October 2008.*
- *ET-SUP members to send comments on these draft requirements to the ET-SUP Chair with copy to WMO Secretariat. Deadline: 28 February 2009.*
- *ET-SUP Chair to consolidate these comments and forward them to the ET-AWS Chair, with copy to WMO Space Programme Office. Deadline: 31 May 2009*

The Chairman underlined the number of actions that had been successfully completed, and it was agreed that the outstanding actions would be added to the new Work Plan.

Furthermore, the following actions were agreed:

ET-SUP-R1_1: WMO Secretariat to review with the Virtual Laboratory Technical Support Officer (VL TSO) and the Virtual Laboratory Management Group (VLMG) the status of the consolidated calendar of training events on the Space Programme website, and define a working procedure to ensure that the information is comprehensive enough and kept up-to-date either on the WMO website or through a link to an external site. (January 2010)

ET-SUP-R1_2: WMO Secretariat to check the status of the "Draft Requirements for Automatic Weather Station sensors to contribute to ground-truth of space-based observations", and confirm whether there is still a need to review them. (November 2009)

6. REPORTS FROM REGIONAL RAPPORTEURS ON THE SPACE PROGRAMME

6.1 Pilot Project in RA II

T. Kurino and J.-G. Won briefed the meeting on the status of the Pilot Project to develop support for NMHSs in Satellite Data, Products and Training. It was emphasized that the main focus of the project was to facilitate the timely provision of satellite-related information by satellite operators to users, i.e. NMHSs in RA II, with special attention to developing countries.

In its first phase, the project had the following action plan:

- Issuance of bi-monthly newsletters for RA II Members (from September 2009);
- Establishment of Pilot Project web pages on the WMO Space Programme (WMO SP) website (hosted by WMO SP) (by the end of 2009);
- Creation of a mailing list for RA II Members and possibly another one for Coordinating Group members (by the end of September 2009);
- Identification of requirements through the above activities and by preparing for a survey of RA II Members in order to organize assistance to recipient Members (by August 2010);
- Alignment of Pilot Project activities with Virtual Lab activities to optimize assistance to NMHSs in RA II (by August 2010);
- Creation of a second-phase working plan (by summer 2010).

The Expert Team congratulated the project leads for this timely initiative that appears to be an excellent way to mobilize regional players to meet the regional needs in accordance with the objectives and priorities of the Space Programme. It was understood that the number of satellite operators among RA II Members was an opportunity to reach substantial achievements, but made it particularly important to coordinate efforts. In conclusion, the ET-SUP felt that this project could play a pilot role in the strategy to expand satellite data use across WMO Regions and Programmes, and wished to be kept informed of the progress made.

ET-SUP-R1_3: The RA II Pilot Project coordinators to inform ET-SUP-5 of the status and progress of the project. (March 2010)

6.2 Data requirements gathering in RA III and RA IV

L. Machado reported on the action undertaken in RA III and RA IV, in response to the IGDDS Implementation Plan, to draw a list of requirements for satellite products.

It was clarified that this exercise was specifically targeted at the dissemination by GEONETCast-Americas (GNC-A), based on two considerations:

- The limited access to satellite data, which is regularly expressed as a bottleneck for satellite data use in South America;
- The opportunity of current availability of bandwidth in the GNC-A system, and need for this system to develop its user basis.

The idea was thus to disseminate over GNC-A a basic set of data and products that would guarantee a minimum access to satellite-based information to all countries, including the less advanced, in South and Central America and the Caribbean. It was further noted that the template

used in this exercise had been also adopted by NOAA for further requirements gathering actions with other communities of practice.

The meeting recommended to be very specific in the description of the products, in particular the difference between level 1 imager data suitable for quantitative processing and the low resolution imagery that can only be displayed for qualitative use. The meaning of the various categories and priorities should also be explained. It was anticipated that this expression of requirements would facilitate fruitful interaction between the user community and the data providers, i.e. NOAA and EUMETSAT in the present case.

This approach was thought to be applicable in other regions as well.

7. DEVELOPMENT OF THE ACTION PLAN

7.1 Questionnaire and monitoring issues

R. Francis reported on the experience gained on the questionnaire on availability and use of satellite data for WMO Members and highlighted the strengths and weaknesses of this approach.

Recognized strengths are:

- Potential to reach a truly global audience;
- Ability to reveal both status and trend information;
- Basis for focused actions leading to improvements.

There are however inherent weaknesses:

- Relatively low response rate;
- Inhomogeneous or ambiguous replies, possibly due to lack of clear guidance to respond;
- Large effort needed to process and interpret the replies.

The Secretariat confirmed that each reply should be assignable to one Region only in order to allow a regional interpretation. As a consequence, countries involved in several Regions should be invited to provide one reply per Region.

The meeting acknowledged that there was insufficient guidance on whether the information should be collected at the level of a WMO Member (i.e. a country) or at the level of an Organization (NMHSs, and other governmental entities). The scope of the enquiry should be wider than just meteorological activities, especially bearing in mind the applications to e.g. ocean and environmental applications; however in the short term, in order to maintain continuity and comparability with the previous editions, the priority was to monitor the situation of NMHSs.

The meeting discussed the possibility to collect information on satellite receiving equipment from satellite operators (e.g. through the licensing process when available). It was however highlighted that legal issues may prevent disclosing such information. Furthermore, the meeting considered that there is now a wide diversity of methods to access satellite data (including direct readout, FTP retrieval, DVB-S retransmission systems, etc) which makes it difficult to maintain valid statistics; on the other hand, it would be more meaningful to focus on satellite data usage rather than access.

The questionnaire should be tailored to the kind of information to be collected, i.e. to the indicators chosen to measure the progress towards the expansion of the meaningful use of satellite data and products. This expansion should be measured both quantitatively (number of users, amounts of data) and qualitatively (thematic application areas, type of satellite and products, per Region). It was felt that the current approach of a questionnaire sent to each Member was well adapted to collect information on the proportion of WMO Members involved in satellite data use,

but that a direct approach through specialist user groups and centres of excellence could be more appropriate to capture thematic information.

The meeting agreed it would be a significant advantage to issue the questionnaire in all official WMO languages. Replies to open questions would be more difficult to capture in different languages, hence guidance should be given to provide such open responses in English only.

It was agreed that the 2010 issue could be an updated version of the current one, but that there was need and opportunity for a more thorough review of the questionnaire for the following issue (i.e. 2012 if the biennial frequency is maintained). There was scope for revisiting the expected outcome, the format, the modalities and the technology used for this enquiry.

In conclusion, the following course of actions is agreed;

ET-SUP-R1_4: WMO Secretariat will circulate the current questionnaire and associated guidance note to all ET-SUP members for review. (mid October 2009)

ET-SUP-R1_5: ET-SUP members to provide comments on the questionnaire and guidance note, with a view to identify necessary adaptations for the 2010 issue. (by 15 November 2009)

ET-SUP-R1_6: R. Francis will consolidate the comments and propose an updated version. (30 November 2009)

ET-SUP-R1_7: WMO Secretariat to arrange translation in official languages. (December 2009)

ET-SUP-R1_8: WMO Secretariat to send out the new questionnaire, and put it on line, calling for replies by March 2010. (January 2010)

ET-SUP-R1_9: ET-SUP to establish a task team (March 2010) that would be in charge of drafting an interpretation to be circulated to ET-SUP members (July 2010) in view of the planned submission of the final outcome to CBS.Ext(10).

ET-SUP-R1_10: C. Donlon, A. Rea (TBC), W. Benesch (TBC) to propose a new approach of the questionnaire for 2012 and beyond, possibly directed towards a more thematic approach, and submit a proposal to ET-SUP-5. (March 2010)

7.2 Satellite data and product utilization

W. Benesch recalled the main scope of ET-SUP which is to increase satellite data and product utilization across WMO Members and Programmes. He reviewed two complementary aspects of this issue: accessibility and utilization, and made suggestions that were discussed.

The meeting agreed that access to data had significantly progressed over the years as reflected in the outcome of the questionnaire, and this may be partly due to ET-SUP initiatives; but there is still scope for improvement. Effort should be continued in two particular areas: expanding data access technical means (in the context of WIS/IGDDS project), and encouraging wider data sharing.

Promoting the utilization of satellite data and products has become a central issue. In the light of the outcome of the questionnaire, several lines of action can be identified and should be addressed by ET-SUP:

- Advocate the allocation of more resources in NMHSs to satellite applications, which requires that the benefits of satellite data use are demonstrated and publicized;
- Encourage sharing of efforts and capabilities for product processing;

- Provide software tools, in particular for processing new or R&D satellite data;
- Promote awareness of Internet-based training opportunities;
- Promote satellite applications to new or emerging areas.

The sharing of processing capabilities would seem an obvious option in view of the increasing amount and complexity of future satellite data. It can be approached through promoting global networks of expertise and operational processing capabilities through e.g. the concept of Sustained Coordinated Processing of Environmental Satellite Data (SCOPE). There is currently a SCOPE-CM for Climate Monitoring, and similar initiatives may be considered in the future for e.g. ocean applications, hydrology, cryosphere, or atmospheric chemistry. Collaboration should also be encouraged on a regional basis among neighbouring countries, or through a network of sub-regional centres of expertise, as is the case for instance on the AMESD initiative in RA I.

The meeting also noted the initiative of EUMETSAT to systematically review the opportunities for using third-party R&D satellite data and make them available.

7.3 Web-based information

Providing information is a major task of the Space Programme. While publications (SP series) and participation in conferences do contribute to this function, the main vehicle nowadays is certainly the website. Important re-design of the WSP website was performed in 2007 in response to ET-SUP recommendations, and the website has grown since. The meeting confirmed the usefulness and value of the website in its present form, but agreed that there was still scope for improvement.

It was proposed to circulate an enquiry form among ET-SUP members asking to evaluate each page of the website against the following four criteria:

- Relevance of the topic;
- Correctness (accuracy, updating) of the contents;
- Accessibility (navigation);
- Look and feel.

The enquiry form would also ask for suggestions. In discussing the relevance, it is important to assess whether the information should best be provided on the Space Programme website itself, or the user be rather redirected to external websites of recognized quality.

It was furthermore suggested to look at Google Analytics access statistics as a “quality indicator “.

ET-SUP-R1_11: WMO Secretariat to circulate among ET-SUP members an enquiry form to evaluate relevance, correctness, accessibility and look-and-feel of the WSP web pages and call for suggestions. (October 2009)

7.4 Virtual Laboratory for Education and Training

The status of the VL was presented. ET-SUP noted significant achievements and acknowledged that the availability of a Technical Support Officer (TSO) had been a key to create such a positive momentum. It thanked INPE for taking the first step in recruiting the TSO for an initial period of nine months, and NOAA for its readiness to support this position for the year to come.

ET-SUP-R1_12: WMO Secretariat to communicate to INPE ET-SUP’s appreciation of the role and positive impact of theVL Technical Support Officer (TSO), and the wish that the contract be extended if possible in order to avoid a gap with the follow-on contract to be placed by NOAA/CIRA. (October 2009)

The meeting discussed the suitability of VL to address the needs of various communities beyond meteorology. ET-SUP confirmed that the five-year strategy included extending the VL to application areas well beyond operational meteorology, including e.g. climate, ocean, atmospheric chemistry, hydrology, environmental applications. However this development was just being initiated.

ET-SUP-R1_13: C. Donlon to indicate points of contacts for training on oceanic applications, who would contribute to the expansion of the VL. (October 2009)

Discussing the website, it was acknowledged that the TSO needed access to a website where he/she can upload pages. This should thus be outside of the WMO server (vlab.wmo.int), but could be accessible from the WMO web page through appropriate links.

The proposal was made to use the "Environmental Satellite Resource Center" (ESRC) developed by COMET to host the Virtual Resource Library. This proposal is very attractive. Several questions should however be investigated:

- What should be changed to existing VL resources to be migrated to ESRC?
- Is it openly accessible in spite of the password scheme?
- What would be the best articulation between the WMO VL page and ESRC portal?
- Is that a long-term and sustainable solution?
- Are there any intellectual property or data policy issues?

A discussion shall be prepared on this topic for ET-SUP-5.

ET-SUP-R1_14: A. Mostek to prepare for ET-SUP-5 an analysis of the impact and benefit of relying on the ESRC for the Virtual Resource Library and describe a practical way forward. (February 2010)

The meeting discussed the scheduling of VLMG and ET-SUP meetings and recommended that the next meeting of the VLMG be convened in Beijing, China in April-June time frame, with a tentative duration of three days.

7.5 Regional needs

It was emphasized that for the time being, regional needs should be addressed in priority through Pilot Projects as described in Section 6. Furthermore, the outcome of the questionnaire should be brought to the attention of the proper Regional Association bodies.

7.6 Other actions

The meeting reviewed the various tasks of the Work Programme and found it comprehensive enough. No other action was added.

7.7 Schedule, lead actors and priorities

Lead actors were defined, as indicated in the preliminary agenda for ET-SUP-5 contained in Appendix III.

8. INTERACTION OF ET-SUP WITH USER COMMUNITIES

The meeting reviewed the existing mechanisms ensuring its linkage with the various user communities. This included:

- Representation within ET-SUP of the various user communities such as NWP, marine, aviation, climate, etc ;

- Interaction of ET-SUP with other Expert Teams (ET-EGOS, ET-SAT, IPET-DRC,) and with ad-hoc groups established by the WMO Space Programme (GSICS, IGDDS-IG; RARS-IG, SCOPE-CM and VLMG)
- Interaction with external science user groups (e.g. Gewex Radiation Panel, GHRSST, IPWG, IROWG, ITWG, IWWG);
- Linkages with Regional Associations and their subsidiary bodies.

The participation of JCOMM representatives in ET-SUP was felt an important element to build a strong relationship with the ocean application areas that, in the past, were not fully adequately reflected in ET-SUP. Similar linkages with other application areas should be pursued.

C: Donlon informed the meeting of the existing structure of specialist groups addressing the main oceanic essential variables such as sea surface temperature, salinity, sea level, ocean surface wind, ocean colour, sea ice, or waves. The meeting appreciated that such groups had a unique expertise in each particular area, and that a parallel could be made with ITWG, IWWG, IPWG; IROWG that are addressing satellite sounding, wind vectors, precipitation, and radio-occultation respectively. Experience shows that interaction between these specialized science groups and the Space Programme and its Expert Teams is highly valuable.

It was noted that ET-SUP activities were cross-cutting these thematic product areas, and that most if not all these areas were confronted with similar challenges related to: user requirements, data accessibility, data calibration and usability, adequate formats, software tools, user information, promotion of R&D satellite data, response to specific regional needs, and monitoring of data usage. Thus, it was felt important that in all its activities, ET-SUP carries the needs and expectations of the various programme areas (such as NWP, ocean, climate, etc.). This could only be achieved through an active relationship with points of contacts within these areas. ET-SUP thus agreed to take an action to identify representative groups of each application area, and points of contacts within these groups.

ET-SUP-R1_15: WMO Secretariat to draw a mapping of user groups with relevant space activities, to be reviewed by ET-SUP, with a view to guide future interaction of ET-SUP with the various programme areas. (February 2010)

In addition to the thematic approach, ET-SUP should ensure a proper geographic representativeness of its activities, through active involvement of regional Rapporteurs or other regional points of contacts (including e.g. the Centres of Excellence).

ET-SUP-R1_16: WMO Secretariat to identify the relevant points of contact for Space Programme activities in the six Regional Associations, when no Space Programme Rapporteur is designated. (February 2010)

9. DRAFT AGENDA AND DOCUMENTATION PLAN FOR ET-SUP-5

A preliminary agenda was developed for the fifth full ET-SUP meeting, and authors were proposed, as contained in Appendix III.

10. SHORT-TERM ACTIONS UNTIL ET-SUP 5

A summary of actions agreed at the meeting is contained in Appendix IV.

11. ANY OTHER BUSINESS

11.1 JCOMM involvement in ET-SUP

Welcoming the involvement of JCOMM representatives in ET-SUP, the meeting recommended that the WMO Space Programme, the Ocean Affairs Division, and the JCOMM ET-SUP representatives review the outcome of ET-SUP-RED-1 in order to ensure that, in the future, ET-SUP properly addresses the expectations of both JCOMM and the Space Programme.

11.2 Space Weather

The meeting wished to be kept informed of the progress of Space Weather activities within WMO. The Space Programme Office developed for CBS-XIV a proposal to set up an Inter-Programme Coordination Team on Space Weather (ICTSW), with a mandate including harmonization of data formats, instrument specifications, warning services. The proposal was adopted by CBS in consultation with the Chairman of CAeM, and further endorsed by the Executive Council. On 7 October, the WMO SG sent a circular letter to all WMO Members inviting them to nominate a point of contact, to notify their willingness to participate in and support Space Weather activities and, if interested, to nominate experts for the ICTSW. A similar letter was sent to international Organizations including ESA, EUMETSAT, ICAO, IMO, ISES, ITU, and UN-OOSA to seek their collaboration and support. In parallel, bilateral contacts were made with different WMO Members to explore opportunities for support through e.g. secondment of staff. In a meeting with ESA, matters of common interest have been identified among the WMO Space Weather initiative and the Space Weather component of the new ESA Space Situational Awareness programme. It is also being considered to address Space Weather issues at a workshop on aviation hazards tentatively scheduled for March 2010 in Santiago, Chile under the auspices of the WMO Commission for Aeronautical Meteorology.

It was highlighted however that Space Weather activities cannot go much beyond the exploratory stage as long as no extra-budgetary resource is allocated to the Secretariat to support this additional activity.

11.3 FY-3A

The meeting noted with interest the detailed information provided by CMA on FY-3A. R. Francis informed the meeting that ECMWF in collaboration with CMA have measured a positive impact of assimilation of FY-3A sounding data on NWP performance; this impact being comparable with the impact achieved by assimilating ATOVS.

11.4 Web meeting

The meeting acknowledged that the use of a phone conference system had enabled valuable participation of members and invited experts located at a long distance from Geneva, since these participants had no possibility to attend this particular meeting in Geneva because of time and financial constraints. In order to facilitate more interaction in remote participations in the future, it was recommended to consider using a web-based meeting capability, which would allow better sharing of documents and presentation.

12. REVIEW AND ADOPTION OF THE DRAFT REPORT

The draft report of the meeting, including its appendices, was reviewed and adopted, subject to editorial finalization by the WMO Secretariat in consultation with the Chairman.

13. CLOSURE OF THE SESSION

The session was closed at 16h00 on Thursday, 8 October 2009.

APPENDIX I

LIST OF PARTICIPANTS

Attending in Geneva

MACHADO	Luiz Augusto Toledo	Chair	Brazil
BENESCH	Wolfgang	Outgoing chair	Germany
FRANCIS	Richard		United Kingdom
ROESLI	Hans-Peter	(representing V. Gaertner)	EUMETSAT
LAFEUILLE	Jerome	Secretariat	WMO

Participating via teleconference

DONLON	Craig		JCOMM
JANG	Jae-Dong		Korea
KIMURA	Tatsuya	Invited expert	RA II Pilot Project
KURINO	Toshiyuki	Invited expert	RA II Pilot Project
MOSTEK	Anthony		USA
OWADA	Hiromi		Japan
PILON	Jacki		France
REA	Anthony		Australia
SHIMIZU	Akihiro	(assisting H. Owada)	Japan
WON	Jae-Gwang	Invited expert	RA II Pilot Project
ZHANG	Peng		China

APPENDIX II

AGENDA

1 ORGANIZATION OF THE SESSION
- **1.1** Opening of the session
- **1.2** Adoption of the agenda
- **1.3** Working arrangements for the session

2. INTRODUCTION BY THE CHAIRMAN

3. OUTCOME OF WMO MEETINGS INCLUDING CONSULTATIVE MEETINGS, EXECUTIVE COUNCIL AND CBS, WITH DIRECT RELEVANCE TO ET-SUP

4. ET-SUP TERMS OF REFERENCE, WORK PROGRAMME AND MILESTONES

5. STATUS OF ACTIONS FROM PREVIOUS ET-SUP MEETINGS
2.

6. REPORTS FROM REGIONAL RAPPORTEURS ON THE SPACE PROGRAMME
- **6.1** Pilot Project in RA II
- **6.2** Data requirements gathering in RA III and RA IV

7. DEVELOPMENT OF THE ACTION PLAN
- **7.1** Questionnaire and monitoring issues
- **7.2** Satellite data and product utilization
- **7.3** Web-based information
- **7.4** Virtual Laboratory for Education and Training
- **7.5** Regional needs
- **7.6** Other actions
- **7.7** Schedule, lead actors and priorities

8. INTERACTION OF ET-SUP WITH USER COMMUNITIES

9. DRAFT AGENDA AND DOCUMENTATION PLAN FOR ET-SUP-5

10. SHORT-TERM ACTIONS UNTIL ET-SUP 5

11. ANY OTHER BUSINESS

12. REVIEW AND ADOPTION OF THE DRAFT REPORT

13. CLOSURE OF THE MEETING

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APPENDIX III

PRELIMINARY AGENDA FOR ET-SUP-5 (22-26 March 2010)

	Document responsible
1 ORGANIZATION OF THE SESSION	
1.1 Opening of the session	
1.2 Adoption of the agenda	Secretariat
1.3 Working arrangements for the session	Secretariat
2. CHAIRMAN'S REPORT	Luiz Machado
3. ET-SUP TERMS OF REFERENCE AND WORK PROGRAMME	Jerome Lafeuille
4. OUTCOME OF WMO MEETINGS INCLUDING CONSULTATIVE MEETINGS, EXECUTIVE COUNCIL AND CBS, WITH DIRECT RELEVANCE TO ET-SUP	Jerome Lafeuille
5. STATUS OF ACTIONS FROM PREVIOUS ET-SUP MEETINGS	Jerome Lafeuille
6. QUESTIONNAIRE AND MONITORING ISSUES	
6.1 Status of the 2010 questionnaire	Richard Francis
6.2 Plans for future questionnaires	Craig Donlon + Anthony Rea (TBC) + Wolfgang Benesch (TBC)
7. WEB-BASED INFORMATION (Evaluation and suggestions)	Jerome Lafeuille
8. VIRTUAL LABORATORY FOR EDUCATION AND TRAINING	
8.1 Report on possible use of ESRC for the VL Resource Library	Anthony Mostek
8.2 VL Activity report (including plan for Time Zone Compatible Training Event and expansion of the VL to new areas such as research)	Volker Gaertner
9. DATA DISTRIBUTION (WIS, RARS AND IGDDS, Code and format issues)	Anthony Rea + Jerome Lafeuille
10. PROCESSING SOFTWARE TOOLS (generic data analysis software , production software)	Jacki Pilon (TBC) + Luiz Machado
11. SATELLITE-RELATED ASPECTS IN WIGOS (including GSICS.., QMS standards and reference to QA4EO)	Jerome Lafeuille
12. SCOPE-CM AND EXPANSION OF THE SCOPE CONCEPT	Barbara Ryan
13. REPORTS FROM RELEVANT REGIONAL ACTIVITIES	
13.1Pilot Project in RA II	J-G.Won/T. Kurino
13.2Data requirements gathering in RA III and RA IV	Luz Machado
14. INTERACTION OF ET-SUP WITH USER COMMUNITIES	
14.1 Mapping of user groups and application areas	Jerome Lafeuille
14.2 Report from JCOMM	Craig Donlon
15. ANY OTHER BUSINESS	
16. REVIEW AND ADOPTION OF THE DRAFT REPORT	
17. CLOSURE OF THE MEETING	

APPENDIX IV

SUMMARY OF ACTIONS

I. Outstanding actions from previous ET-SUP meetings

Action ET-SUP-3.10 Mr Anthony Mostek to contact each Regional Focus Group (RFG) to identify dedicated focal points and to assist, where necessary, in the establishing of monthly RFG sessions in all regions. In particular Mr Mostek should liaise with CMA and other VL CoEs to facilitate the establishment of an RFG in Asia.

Action ET-SUP-4.1: V. Gaertner and L. Machado, as VLMG Co-chairs, to ensure that VLMG, involving a subgroup as appropriate, provides updated information for the current revision of Document WMO No. 258. Due date: February 2009.

Action ET-SUP-4.12: WMO Space Programme Office to identify from the questionnaire responses problem areas (either thematic or related to individual Members) and, if resources permit, to formulate a means to address these problems (next ET-SUP).

Action ET-SUP-4.14: V. Gaertner, and the Regional Association Rapporteurs (via the WMO Space Programme Office) to seek input from various areas of the world and various application areas illustrating the benefits of satellite data and products and supply this information to the WMO Space Programme for inclusion on web pages (July 2009).

Action ET-SUP-4.15, 16, 17 (these three actions are conditioned by new action ET-SUP-R1_2):
- *WMO Space Programme Office to forward to all ET-SUP members the "Draft requirements for AWS sensors to contribute to the calibration and ground-truth of space-based observations" Deadline: 30 October 2008.*
- *ET-SUP members to send comments on these draft requirements to the ET-SUP Chair with copy to WMO Secretariat. Deadline: 28 February 2009.*
- *ET-SUP Chair to consolidate these comments and forward them to the ET-AWS Chair, with copy to WMO Space Programme Office. Deadline: 31 May 2009*

II. New actions from ET-SUP-RED-1

ET-SUP-R1_1: WMO Secretariat to review with the Virtual Laboratory Technical Support Officer (VL TSO) and the Virtual Laboratory Management Group (VLMG) the status of the consolidated calendar of training events on the Space Programme website, and define a working procedure to ensure that the information is comprehensive enough and kept up-to-date either on the WMO website or through a link to an external site. (January 2010)

ET-SUP-R1_2: WMO Secretariat to check the status of the "Draft Requirements for Automatic Weather Station sensors to contribute to ground-truth of space-based observations", and confirm whether there is still a need to review them. (November 2009)

ET-SUP-R1_3: The RA II Pilot Project coordinators to inform ET-SUP-5 of the status and progress of the project. (March 2010)

ET-SUP-R1_4: WMO Secretariat will circulate the current questionnaire and associated guidance note to all ET-SUP members for review. (mid October 2009)

ET-SUP-R1_5: ET-SUP members to provide comments on the questionnaire and guidance note, with a view to identify necessary adaptations for the 2010 issue. (by 15 November 2009)

ET-SUP-R1_6: R. Francis will consolidate the comments and propose an updated version. (30 November 2009)

ET-SUP-R1_7: WMO Secretariat to arrange translation in official languages. (December 2009)

ET-SUP-R1_8: WMO Secretariat to send out the new questionnaire, and put it online, calling for replies by March 2010. (January 2010)

ET-SUP-R1_9: ET-SUP to establish a Task Team (in March 2010) that would be in charge of drafting an interpretation to be circulated to ET-SUP members (July 2010) in view of the planned submission of the final outcome to CBS.Ext(10).

ET-SUP-R1_10: C. Donlon, A. Rea (TBC), W. Benesch (TBC) to propose a new approach of the questionnaire for 2012 and beyond, possibly directed towards a more thematic approach, and submit a proposal to ET-SUP-5. (March 2010)

ET-SUP-R1_11: WMO Secretariat to circulate among ET-SUP members an enquiry form to evaluate relevance, correctness, accessibility and look-and-feel of the WSP web pages and call for suggestions. (October 2009)

ET-SUP-R1_12: WMO Secretariat to communicate to INPE ET-SUP's appreciation of the role and positive impact of the VL Technical Support Officer (TSO), and the wish that the contract be extended if possible in order to avoid a gap with the follow-on contract to be placed by NOAA/CIRA. (October 2009)

ET-SUP-R1_13: C. Donlon to indicate points of contacts for training on oceanic applications, who would contribute to the expansion of the VL. (October 2009)

ET-SUP-R1_14: A. Mostek to prepare for ET-SUP-5 an analysis of the impact and benefit of relying on the ESRC for the Virtual Resource Library and describe a practical way forward. (February 2010)

ET-SUP-R1_15: WMO Secretariat to draw a mapping of user groups with relevant space activities, to be reviewed by ET-SUP, with a view to guide future interaction of ET-SUP with the various programme areas. (February 2010)

ET-SUP-R1_16: WMO Secretariat to identify the relevant points of contacts for Space Programme activities in the six Regional Associations, when no Space Programme Rapporteur is designated. (February 2010)