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COMMISSION FOR BASIC SYSTEMS
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EXPERT TEAM ON SATELLITE UTILIZATION AND PRODUCTS
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VLab STATUS AND PLANS

(Submitted by Volker Gärtner)

Summary and Purpose of Document

This document reports on activities within the WMO-CGMS Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) along with future plans and directions. Since January 2013, VLab members have offered a variety of training opportunities with highlight to the WMO/NOAA Train the Trainer Workshop for WMO RA III/IV, the Precipitation Event Week, the Virtual Round Table on Competence Requirements for Aeronautical Meteorological Personnel and the Satellite Direct Readout Event.

Furthermore, important developments have taken place since ET-SUP-6, including the CBS endorsement of the application by DMN Casablanca to become a VLab Centre of Excellence (CoE), the establishment of the WMO VLab Trust Fund to collect funds for the continuation of the employment of the VLab Technical Support Officer (TSO), and the sixth Virtual Laboratory Management Group meeting (VLMG-6) in October 2012 in São José dos Campos, Brazil.

ACTION PROPOSED

The seventh session is invited to:

(a) Note the important achievements of the VLab and to provide comments.

Appendix: VLab report to CGMS-40

VLab STATUS AND PLANS

Introduction

This document reports on the activities and plans of the WMO-CGMS Virtual Laboratory (VLab). The status of the VLab as presented to CGMS-40, in November 2012, is provided in the Appendix. Since ET-SUP-6 (2011) the VLab management group has met several times in virtual meetings and had one face-to-face meeting in Brazil (VLMG-6, October 2012). VLMG-6 was a successful event with representations from almost all VLab Centres of Excellence (CoEs) presenting achievements and planning future activities. The meeting also raised an important issue of concern regarding the number of personnel available at their VLab CoEs is often below the limits necessary to meet the agreed expectations for CoEs. Actions and Recommendations from VLMG-6 are also available in the Appendix. Additionally, two issues of the VLab Newsletter were published in 2012, giving a good overview of the breadth of VLab training opportunities. The VLab Newsletter is available online at http://www.wmo-sat.info/vlab/vlab-newsletter/. Regarding the most recent activities of VLab (since January 2013), a short review of major achievements and plans is given below.

Event Week on Precipitation

In the context of VLab, EUMETSAT organised an Event Week to highlight the importance of satellite data for monitoring precipitation. This training week consisted of eight online sessions dealing with the monitoring of precipitation from space. Three main topics were considered: VIS/IR Precipitation Estimates, Microwave Precipitation Estimates and Multi-sensor Precipitation Estimates. Around 300-400 people, from 150 different locations, attended the live sessions. Altogether 33 countries were involved in this training event. This has been the largest live online training event organised by EUMETSAT. The live sessions were recorded and will be converted into webcasts that will be added to the EUMETSAT Training Library.

WMO/NOAA Train the Trainer Workshop for WMO RA III/IV

The VLab and the WMO Space Programme organised, supported by NOAA as hosts, the WMO/NOAA Train the Trainer (TtT) Workshop for WMO RA III/IV members. The 1.5-day workshop preceded the 2013 NOAA Satellite Conference (8-12 April) in the same venue and had 22 participants. Main topics covered were as follows:

a) Introduction, operations and capabilities of the GEONETCast (GNC);
b) Disaster mitigation products and the importance of GNC as a risk-reducing global data access system;
c) Training Channel and Transfer of training material via GNC, e.g. clips of near-real-time Focus Group recordings and COMET materials;
d) Supporting systems, EUMETCast, HRIT/EMWIN/LRIT; GNC-Americas, and GOES Data Collection System;
e) Reviewing regional requirements documentation and the need for better integration of regional dissemination systems;
f) System demonstrations.

Participants in the WMO/NOAA TtT Workshop raised some key concerns that are presented below:

- In Central and South America and the Caribbean, operational users of satellite data from GOES and other systems require a low-cost, operational and sustained data dissemination system building on GNC-Americas and EUMETCast. Arrangements for cost-sharing, e.g. of bandwidth fees, should be developed with urgency.
- Training on the use of satellite data and associated visualization, processing and analysis tools should be made available, taking into account the different needs and skills of satellite data users. Training should in particular involve preparing users from the region for GOES-R.

- The proposed standing coordination group for satellite data requirements in RA III and IV should establish user needs for data, products, training, and associated issues (e.g., data formats). The group should ensure linkage to and follow-up by satellite providers at the appropriate level, and represent the needs of a wide variety of users in the region.

Virtual Round Table on Competence Requirements for Aeronautical Meteorological Personnel

This results from a current action from VLMG-6 (2012):

Action VLMG-6.12: VLab to host an Online Event called “Aviation Virtual Round Table”. The event, similar to an event week, will be a lecture/discussion forum covering the information on the new WMO regulations on Aviation Meteorology Competency and related matters, but in different languages and by the different RTCs. The event can be spaced over a week, at various time zones and using the RTCs/CoEs as hosts and invite some the experts to answer questions. Forum will be open to aviation personnel to be informed and learn of the new regulations, timelines and implications. Suggest date mid January 2013.

Coordination for the Virtual Round Table (VRT) on Competence Requirements for Aeronautical Meteorological Personnel started in October 2012, just after the VLMG-6. Kathy-Ann Caesar and Adanna Robertson-Quimby (CIHM, VLab Barbados), in collaboration with the WMO Commission for Aeronautical Meteorology Expert Team on Education, Training and Competences (CAeM ET/ETC) and the International Civil Aviation Organization (ICAO), prepared a set of standard slides for presentation. The first of the Virtual Round Table events was presented in English (27 March 2013) by Kathy-Ann Caesar and Adanna Robertson-Quimby. The session was composed of a 45 minutes presentation plus time for discussion and questions. More than one hundred participants registered for this event, some participating in the live online event, others watching the recorded session.

With assistance from WMO, all the material used in the event (slides, messages, post-event survey and certificates) was translated to Spanish, French and Russian. Presenters for the VRT events in these languages were identified in VLab Centres of Excellence in Costa Rica, Niger and Russian Federation. The VRT – Spanish version was presented by Vilma Castro (8 May 2013) and also had more than 100 participants registered. Hamidou Hama (ASECNA) presented the latest event in French, on the 15th of May. The French version had more than 40 participants in the live online session, joining from 23 different Countries. The date for the fourth Virtual Round Table event in Russian is still to be confirmed.

Valuable data has been collected in post-event surveys after each event. These will be part of a final report that will be compiled after the fourth event (Russian). VRT events in Arabic and Chinese are still under consideration.

Satellite Direct Readout Events

During 2013, the VLab is organising a series of online events about the direct readout capabilities of polar orbiting systems. The idea is that each satellite operator that operates polar orbiting systems with a direct readout capability could present two online sessions in consecutive days to present: (1) the main scientific aspects of the satellite instruments and (2) the direct readout system and particularly the local processing software.

EUMETSAT started this series of events by presenting two sessions about the EPS/Metop (7 and 8 May 2013). The sessions had 53 registered participants. The participants who submitted the post-event survey revealed interest in attending similar sessions about NPP, Aqua, Terra, JPSS and any other polar orbiting system that would give coverage to the Tropical North Atlantic.

The next couple of sessions will be presented by NOAA, which has already agreed to collaborate in this event (dates are to be announced shortly). The VLab is confident that other Satellite Operators will also be interested in taking part in this initiative.

Resources and links to the recorded sessions already presented are available from the VLab central website at http://www.wmo-sat.info/vlab/satellite-direct-readout/

Conceptual Models for the Southern Hemisphere Project

This results from actions ET-SUP-6.27, VLMG-6.07, VLMG-6.08 and CGMS-40.9:

Action ET-SUP-6.27: VLMG co-chair to ask the VLMG for its opinion to extend the SatMaNu concept to areas outside Europe, especially to the Southern Hemisphere. This should include a discussion on providing the necessary resources to proceed with this activity.

Action VLMG6-07: The CoEs Brazil, Argentina, Australia and South Africa to send the TSO an email to express their interest to contribute with conceptual models for the Southern Hemisphere.

Action VLMG6-08: Contact Michel Davison (NOAA International Desk), to request his contribution.

Action CGMS-40.9: CGMS to investigate the possibility to provide funding to the VLab CoEs in Argentina, Australia, Brazil and South Africa, to establish a project for generation of conceptual models for the Southern Hemisphere.

“Conceptual Models for Southern Hemisphere” is a joint project between four southern hemisphere VLab Centres of Excellence: Argentina, Australia, Brazil and South Africa. The project is co-funded by WMO and EUMETSAT.

The purpose of the project is to improve warnings and awareness of weather risks through the use of conceptual models. The objectives of the project are to produce and make available resources about Conceptual Models for the CoE areas of interest. Additionally, these resources will be also made available for other training institutions within the Southern regions. It is foreseen that products of this project will help to increase the operational forecasters’ understanding of the weather systems.

The project is under the coordination of Vesa Nietosvaara (EUMETSAT) and Veronika Zwatz-Meise. The progress of the work will be communicated via a dedicated page in the VLab central website at http://www.wmo-sat.info/vlab/conceptual-models-southern-hemisphere/

Conclusion

This document reports on the status of the WMO-CGMS VLab and presents some upcoming activities and challenges.

The major challenged posed to VLab is to keep CoEs meeting the agreed expectations, whilst the number of personnel available in their Centres is often below the limits necessary to keep the level of training activities required in their respective area of responsibility.

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CGMS-40 WMO-WP-18
V1, 29 October 2012

Prepared by WMO
Agenda Item: VI.1
Discussed in Plenary

VIRTUAL LABORATORY AND RELATED MATTERS

Submitted by WMO Secretariat

The paper reports on activities within the Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) along with future plans and directions. Since September 2011, VLab Training Centres of Excellence offered a total of 48 courses, 31 Regional Focus Group sessions and two Event Weeks in the topic of Aviation using both online and classroom resources. This shows a slight increase in the number of training opportunities compared to last year's reporting period.

Furthermore, important developments have taken place since CGMS-39, including the CBS endorsement of the application by DMN Casablanca to become a VLab Centre of Excellence (CoE), the establishment of the WMO VLab Trust Fund to collect funds for the continuation of the employment of the VLab Technical Support Officer (TSO), and the sixth Virtual Laboratory Management Group meeting (VLMG-6) in October 2012 in São José dos Campos, Brazil.

A summary of the annual reports from the CoEs for the period from September 2011 to August 2012 is given in this status report.

CGMS is invited to note the important achievements of the VLab, to provide comments and to consider the actions and recommendations below.

Actions/Recommendations proposed:

- Satellite operators to provide regular, annual contributions into the WMO VLab Trust Fund to ensure the continuation of the post of the VLab TSO. (The same was also a recommendation at the 10th EUMETSAT User Forum in Africa, Addis Ababa, Ethiopia, 1-5 October 2012);
- WMO in cooperation with the VLab co-chairs to continue facilitate the integration of ISRO and IMD into the VLab;
- Satellite operators and WMO to provide necessary resources for the translation of relevant training materials (websites, modules and related) into other WMO languages;
- CGMS and WMO to investigate the possibility to provide funding to the VLab CoEs in Argentina, Australia, Brazil and South Africa, to prepare conceptual models for the Southern Hemisphere. The conceptual models could follow the example of the SatManu prepared by ZAMG for the Northern Hemisphere;
- Satellite operators and trainers to take note of the new "CBS Guideline for ensuring user readiness for new generation satellites" and plan appropriate projects to ensure user readiness;
- CGMS operators active in VLab to recall their commitments to the VLab, as per the agreed expectations defined in "Expectations from Satellite Operators" (available at http://www.wmo-sat.info/vlab/governance-documents/).
- CGMS to endorse the DMN Morocco Casablanca facility as a new CoE of the VLab sponsored by EUMETSAT.

Virtual Laboratory and Related Matters

1 INTRODUCTION

This report briefly describes the latest activities / achievements of the Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) since September 2011. Besides the various activities which took place in the VLab Centres of Excellence (CoEs) the major achievements are the CBS endorsement of the application by DMN Casablanca to become a VLab Centre of Excellence (CoE), establishment of the WMO VLab Trust Fund to collect funds for the continuation of the employment of the VLab Technical Support Officer (TSO), and the Sixth Virtual Laboratory Management Group meeting (VLMG-6) in October 2012 at INPE in São José dos Campos, Brazil.

Section two of this report provides a summary and analysis of the annual reports received from the VLab CoEs and supporting CGMS Satellite Operators and Agencies. In Section three, the activities of the Virtual Laboratory since CGMS-39 are highlighted. Finally, Section four outlines the proposed actions and recommendations.

2 SUMMARY OF ANNUAL REPORTS FOR THE PERIOD FROM SEPTEMBER 2011 TO AUGUST 2012

The Satellite Operators and Agencies supporting VLab and the CoEs reported on their training activities for the period September 2011 to August 2012 by completing standard format reports. Full reports can be downloaded from the VLab central website at http://vlab.wmo.int

CoEs, using both online and classroom resources, offered a total of 48 courses, 31 Regional Focus Group sessions and two Event Weeks in the topic of Aviation (summing up to 28 online lectures for the two Event Weeks together) during the reporting period. This shows a slight increase in the number of training opportunities offered when compared with the previous year. This trend was led mainly by an increase in the training offered online. Similarly to the last reporting period, training languages included English, French, Portuguese, Spanish, Russian and Chinese.

Regarding the total number of participants attending VLab training events, once more it exceeded the 2000 figure. This number excludes 3 of the courses offered by CoE Beijing (offered in Chinese), as together they sum up to 8624 participants. Also excluded is the number of participants using the online resources that are accessible via VLab partner websites, such as the recorded lectures available from some VLab CoEs and Satellite Operator websites (e.g. Russian Federation, Brazil, Australia, EUMETSAT, JMA, and NOAA), and also VISIT Teletraining (CIRA) and COMET modules.

3 ACTIVITIES IN THE VIRTUAL LABORATORY SINCE CGMS-39

The widening of training and outreach of activities taking place in the various CoEs has contributed to a growth in the VLab community since CGMS-39. The main activities conducted by the VLab within the last 12 months can be summarised as follows:

3.1. New Centre of Excellence in Morocco

After endorsement by CBS-15, and subject to confirmation by CGMS-40, the Direction de la Météorologie Nationale (DMN) Morocco will become an official VLab CoE for Training in Satellite Meteorology and related environmental remote sensing through its Casablanca facility. This new CoE will significantly enhance the education and training capabilities of countries in WMO Region I, focusing on the French speaking countries of North Africa and the Maghreb region. VLMG partners welcome the new CoE, which already actively participated in the VLMG-6 meeting in Brazil.

3.2. VLMG-6 Meeting 8-11 October 2012, Brazil

The VLMG-6 meeting took place at the National Institute for Space Research (INPE) in São José dos Campos, Brazil, 8-11 October 2012. A total of 30 participants made this meeting a very successful event, with representation from all VLab partners except KMA (which was hosting the 3rd Asia/Oceania conference in Jeju Island in the same week). VLab CoEs, Satellite Operators and Agencies, and Partner Programmes presented their latest achievements and planned activities which, together with the discussions that took place, generated actions and recommendations that were captured in the VLMG-6 report (to be available soon at the VLab central website). A draft list of VLMG-6 actions and recommendations is included in Annex I.

Main issue of concern:
During presentations, each CoE had repeatedly mentioned that for the level of training activities required in its respective area of responsibility, the number of personnel available at their VLab CoEs is often below the limits necessary to meet the agreed expectations for CoEs. In some cases, agreed support to CoEs by sponsoring satellite operators is insufficient. VLMG would like to highlight this fact as this is endangering the effectiveness and success of the VLab in several areas of the world. In many of the CoEs, the focal point is the only one person working or involved in the VLab.

3.3. RFG Activities

Regional Focus Group sessions (RFG) have been running for a number of years now, the most active being the Americas and Caribbean RFG, South African RFG, and the Caribbean Weather Discussion. Also the Australian CoE had run a few sessions and the CoE in Niamey has started to organise RFG events in 2012 with increasing success. A general consensus was shared during the VLMG-6, that this kind of activity helps to build a sense of community and also facilitates the access to information on satellite meteorology and critical weather events for those who are in the beginning of their careers and may be excluded from the official channels of information. In addition, the RFG infrastructure and methodology could be used to provide advice to regional operational services during critical weather situations even (e.g. hurricanes, volcanic ash).

3.4. Event Weeks

Another two Aviation Weeks were organised by VLab CoEs Australia and Barbados in 2012. Based on the success of these Aviation Weeks in disseminating information about the Competency Standards for Aeronautical Weather Forecasters and Observers, which have helped numerous NMSs to better understand and prepare to attain the new competency standards, the VLMG suggested Event Weeks as an appropriate means to contribute to competency training in aviation and other areas as required. Themes such as Marine forecasting and Climate Monitoring were suggested for future Event Weeks to be organised by the VLab.

3.5. RGB Workshop

A Workshop on standards and use of RGB satellite products for nowcasting and short-range forecasting was organised by WMO and EUMETSAT on 17-19 September 2012 in Seeheim (Germany), in liaison with, and support to, the VLab and the WMO Severe Weather Forecasting Demonstration Project (SWFDP). Coordinated generation and guidance in handling and interpretation of multi-spectral satellite imagery was considered by VLMG a useful activity, which goes beyond training and will enable operational staff to more efficiently use newly developed products from the next generation of satellite imagers.

3.6. Coordination with Partner Programmes

The VLab continues collaborating with Partner Programmes. Highlights from the collaborations in 2012 are the preparation of the workshop “Engaging the minds of online learners” offered at the Eumetcal Workshop in March, Exeter, UK; contribution to the Committee on Space Research (COSPAR) Capacity Building Workshop on Remote Sensing of the Global Water Circulation to Climate Change, September – Beijing, China; and the WMO/KMA RA-II Pilot Project VLab Training Event, October – Jincheon, Republic of Korea, held in conjunction with the 3rd Asia/Oceania Meteorological Satellites Users’ Conference.

In addition to collaborations already established, VLab will jointly try to manage the dissemination of training material on the GEONETCast training channel together with CEOS WGCapD.

3.7. Widening the Scope

During the VLMG-6 discussions it was iterated that the opportunity should be used to widen the scope of VLab by addressing additional application areas for training, in line with the VLab 5-year strategy and WMO priorities. **Emphasis will be given to conduct new training courses for climate, marine and land surface applications**.

Furthermore, the outreach into the scientific communities active in Earth observation offers opportunities. The cooperation with COSPAR (initiated in March 2012 through a VLab-COSPAR Memorandum of Understanding) and with the Brazilian universities operating EUMETCast stations, are to be pursued.

4 CONCLUSIONS AND PROPOSED ACTIONS AND RECOMMENDATIONS

This paper reports a growing participation in VLab training activities, highlighting the increase in online activities such as the RFGs and the “Event Weeks”, and the importance of the increased visibility of VLab activities to countries in all WMO Regions.

It also shows how crucial the continuity of the employment of a Support Officer is, to keep the progress of the on going and planned activities of the VLab.

CGMS is invited to note the important achievements of the VLab, to provide comments, to confirm the nomination of DMN Morocco, as a new CoE, and to consider the following recommendations from VLMG-6:

Recommendation 6.01: Satellite operators to provide regular, annual contributions into the WMO VLab Trust Fund to ensure the continuation of the post of the VLab TSO. (The same was also a recommendation at the 10th EUMETSAT User Forum in Africa, Addis Ababa, Ethiopia, 1-5 October 2012).

Recommendation 6.02: WMO in cooperation with the VLab co-chairs to continue facilitate the integration of ISRO and IMD into the VLab.

Recommendation 6.03: Satellite operators and WMO to provide necessary resources for the translation of relevant training materials (websites, modules and related) into other WMO languages.

Recommendation 6.04: CGMS and WMO to investigate the possibility to provide funding to the VLab CoEs in Argentina, Australia, Brazil and South Africa, to prepare conceptual models for the Southern Hemisphere. The conceptual models could follow the example of the SatManu prepared by ZAMG for the Northern Hemisphere.

Recommendation 6.05: Satellite operators and trainers to take note of the new “CBS Guideline for ensuring user readiness for new generation satellites” and plan appropriate projects to ensure user readiness.

Recommendation 6.06: CGMS operators active in VLab to recall their commitments to the VLab, as per the agreed expectations defined in ‘Expectations from Satellite Operators’ (available at http://www.wmo-sat.info/vlab/governance-documents/), in particular in terms of:

- Providing adequate support to staff from the operator and associated institutions for attending major training events;
- Assuring staff support essential for organizing training events (administrative staff, lecturers, teachers);
- Investing in the continuous development of lecturers and teachers;
- Ensuring adequate broadband infrastructure.

Annex I

VLMG-6 Actions and Recommendations (DRAFT)

Action VLMG6.01: TSO to support CoE South Africa to set Saba Meeting web-conferencing software to cater for a larger online audience in their RFG activities.
Actionee(s): Lu Veeck.
Due date: Next South Africa RFG session.

Action VLMG6.02: VLab CoEs to provide assistance in linking training in satellite meteorology to information on the new WMO standards and competencies.
Actionee(s): All VLab CoEs.
Due date: End of November 2012.

Action VLMG6.03: Investigate whether the taxonomy of the ESRC includes satellite competence categories.
Actionee(s): Mark Higgins.
Deadline: Mid November 2012.

Action VLMG6.04: WMO SP to send the TSO the final analysis of the WMO Global Survey on Use of Satellite Data 2012. The TSO is to make the results available to VLab members.
Actionee(s): Stephan Bojinski and Lu Veeck.
Deadline: January 2013.

Action VLMG6-05: To capture the lessons learnt from the VLab members that have already organised Event Weeks and formulate a guide of good practices for running this kind of event.
Actionee(s): Roger Deslandes, Kathy-Ann Caesar, Maja Kuna and Lu Veeck.
Due date: next VLMG online meeting (End February 2013).

Action VLMG6-06: CMA to let the VLab TSO know when the FY2/FY3 tool kits are available in English, so that they can be advertised via VLab means of communication. When the FY2/FY3 tool kits are translated they will be made available for training events.
Actionee(s): Liu Jian and Lu Veeck.
Due date: When translation is ready.

Action VLMG6-07: The CoEs Brazil, Argentina, Australia and South Africa to send the TSO an email to express their interest to contribute with conceptual models from the Southern Hemisphere to enhance the SatManu.
Actionee(s): Daniel Barrera, Claudia Campetella, Roger Deslandes and Winifred Jordaan.
Due date: 19 October 2012.

Action VLMG6-08: Contact Michel Davison (NOAA International Desk), to request his contribution.
Actionee(s): Bernie Connell.
Due date: 19 October 2012.

Action VLMG6-09: VLab to coordinate the work for identifying the tools used for satellite data visualisation and processing and relevant e-learning tools.
Actionee(s): Lu Veeck and Eduard Podgaisky.
Due date: Next VLMG web meeting.

Action VLMG6-10: All CoEs to go through the list of “Behavioural Descriptors” to make a preliminary evaluation of the “maturity” of their CoEs regarding the key headings proposed by working group 5.
Actionee(s): All CoEs.
Due date: 25/10/2012.

Action VLMG6-11: All CoEs to participate in the Discussion Forum about the Maturity Model coordinated by Roger Deslandes and Mark Higgins.
Actionee(s): All CoEs to participate. Roger Deslandes and Mark Higgins to moderate the forum.
Due date: October and November 2012.

Action VLMG6-12: VLab to host an Online Event called “Aviation Virtual Roundtable”. The event, similar to an event week, will be a lecture/discussion forum covering the information on the new WMO regulations and related matters, but in different languages and by the different RTCs. The event can be spaced over a week, at various time zones and using the RTCs/CoEs as hosts and invite some the experts to answer questions. Forum will be open to aviation personnel to be informed and learn of the new regulations, timelines and implications. Suggest date mid January 2013.
Actionee(s): Kathy-Ann Caesar and Luciane Veeck to coordinate and help from all VLab
CoEs.
Due date: Coordination by January 2013.

Action VLMG6-13: VLab partners to design regional projects with specific objectives that have clear benefits, and WMO (through Resource Mobilization Office and otherwise) and others to assist in funding suitable resourcing partners to support such projects.
Actionee(s): CoEs and the Satellite Operators together with other programs in WMO.
Due date: Pilot projects ready, as demonstrators, by autumn 2013.

Action VLMG6-14: Mark Higgins to investigate whether the Marine forecasting courses can be set up as a project; (possible help, Kathy, Roger, Winifred, Stella) Date 2014.
Actionee(s): Mark Higgins (possible help from Kathy-Ann Caesar, Roger Deslandes, Winifred Jordaan and Stella Aura).
Due date: 2014.

Action VLMG6-15: WMO Secretariat to provide CIRA with original correspondence related to the establishment of VLab CoEs. Such information can be made available to all CoEs upon request.
Actionee(s): Stephan Bojinski.
Due date: End of November 2012.

Action VLMG6-16: VLMG to explore with COSPAR possible areas of capacity building and hosting institutions; with an initial focus on RA I.
Actionee(s): VLMG and COSPAR
Due date: 2013

Action VLMG6-17: Formulate and align satellite competencies with Satellite taxonomy model. Seek input from further stakeholders at forums such as COCOM, Eumetcal, and CALMet etc.
Actionee(s): Roger Deslandes and Mark Higgins.
Due date: Report progress at each online VLMG meeting.

Action VLMG6-18: All VLab partners to submit their planned events to the VLab online calendar of events. TSO to validate events for public view only when confirmation of the event is received from partners.
Actionee(s): All VLab partners and TSO.
Due date: Events listed above to be submitted by the end of November 2012. Newly planed events to be submitted on demand. Event confirmations to be emailed to the TSO as they occur.

Action VLMG6-19: All VLab CoEs and Supporting Satellite Operators/Agencies to provide an indicative list of planned training events in the 2013-2015 timeframe, including a short statement on the underlying motivation.
Actionee(s): All VLab CoEs and Supporting Satellite Operators/Agencies.
Due date: January 2013.

Action VLMG6-20: TSO to make a detailed presentation about the further developments of the VLab calendar of events in the next VLMG web meeting.
Actionee(s): TSO.
Due date: Next VLMG web meeting (February 2013).

Action VLMG6-21: Kathy-Ann Caesar to investigate the possibility of organising a regional training event could be organised at the NOAA Satellite Conference in April 2013.
Actionee(s): Kathy-Ann Caesar.
Due date: February 2013.

Action VLMG6-22: VLab TSO to publish the all the documents and material related to the VLMG-6 meeting in the meeting website at the VLab Moodle area.
Actionee(s): Lu Veeck.
Due date: 19 October 2012.

Recommendation 6.01: Satellite operators to provide regular, annual contributions into the WMO VLab Trust Fund to ensure the continuation of the post of the VLab TSO. (The same was also a recommendation at the 10^{th} EUMETSAT User Forum in Africa, Addis Ababa, Ethiopia, 1-5 October 2012).

Recommendation 6.02: WMO in cooperation with the VLab co-chairs to continue facilitate the integration of ISRO and IMD into the VLab.

Recommendation 6.03: Satellite operators and WMO to provide necessary resources for the translation of relevant training materials (websites, modules and related) into other WMO languages.

Recommendation 6.04: CGMS and WMO to investigate the possibility to provide funding to the VLab CoEs in Argentina, Australia, Brazil and South Africa, to prepare conceptual models for the Southern Hemisphere. The conceptual models could follow the example of the SatManu prepared by ZAMG for the Northern Hemisphere.

Recommendation 6.05: Satellite operators and trainers to take note of the new 'CBS Guideline for ensuring user readiness for new generation satellites' and plan appropriate projects to ensure user readiness.

Recommendation 6.06: CGMS operators active in VLab to recall their commitments to the VLab, as per the agreed expectations defined in "Expectations from Satellite Operators" (available at http://www.wmo-sat.info/vlab/governance-documents/), in particular in terms of:

- Providing adequate support to staff from the operator and associated institutions for attending major training events;
- Assuring staff support essential for organizing training events (administrative staff, lecturers, teachers);
- Investments in the continuous development of lecturers and teachers;
- Ensuring adequate broadband infrastructure.

Recommendation 6.07: Training can, but may not necessarily be provided cost-free. VLab CoEs should carefully consider the advantages and disadvantages of establishing a fee regime.

Recommendation 6.08: The cooperation with Eumetcal shall be continued.

Recommendation 6.09: Jointly try to manage the dissemination of training material on the GEONETCast training channel together with CEOS WGCapD. It was furthermore agreed that Humberto Barbosa shall participate in both groups (VLab and CEOS WGCapD) to facilitate an efficient information exchange.

Recommendation 6.10: VLMG welcomed the partnership with COSPAR to expand the range of capacity building opportunities to CoEs. VLab CoEs are encouraged to contribute to future COSPAR training events by sending students and/or lecturers, and provide distant lectures as appropriate, while CGMS operators should enable the participation.