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| **WORLD METEOROLOGICAL ORGANIZATION**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **COMMISSION FOR INSTRUMENTS AND**  **METHODS OF OBSERVATION**  **CIMO MANAGEMENT GROUP**  **Tenth Session**  Brussels, Belgium 19 - 20 October 2012 |  | CIMO/MG-10/Doc. 4.2(2)  (15.X.2012)  \_\_\_\_\_\_\_  ITEM: 4.2  Original: ENGLISH |

**Progress and Plans of the Expert Team**

**on New Technologies and Testbeds**

*(Submitted by A.Gusev, OPAG Co-chair)*

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| **Summary and purpose of document**  This document provides information on progress achieved and future of the Expert Team on New Technologies and Testbeds (ET-NTTB). |

**Action proposed**

The Meeting is invited to review the information provided in the document and make any recommendation relevant to the work of the CIMO on these matters.

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**Appendix:** I Work Plan of ET-NTTB (2011-2014)

**I - B.2 Expert Team on New Technologies and Testbeds – TOR**

1. Monitor, evaluate and report on development and implementation of:

• Microwave Radiometers, especially the quality of temperature measurements in the planetary boundary layer;

• GPS Water Vapour Networks and quality of data in suitable intercomparison with other systems including radiosonde and microwave radiometer;

• Raman water vapour lidar and specifically quality of absolute humidity measurements in the troposphere;

• Wind-finding systems;

• Meteorological lidar systems;

• Cloud radars;

• Instruments for the operational aerosol and volcanic ash measurements;

• Other new technologies, such as eddy-covariance measurements for energy flux measurements and meteor scattering radars.

2. Review outcomes of testbeds and coordinate inclusion of guidance material in IOM reports and the CIMO Guide on:

* The performance of new surface based remote-sensing technology, including strengths and weaknesses, accuracy, reliability and cost effectiveness;
* The principles for the optimal mix of surface based in situ and remote-sensing systems (interoperability) to improve both temporal and spatial capabilities for future operational upper air networks.

3. Review and update existing training material and support OPAG-capacity-building in the production of suitable training workshops, reference material and guidelines for all operational aspects of remote-sensing systems.

4. Establish Task Teams to address specific tasks, as appropriate, monitor Task Team work progress and report to CIMO-MG, if appropriate.

**II – Current workplan (see annex 1)**

**III – Status of ET activity**

1. **Guidance on meteorological use of GNSS**

IOM Report was prepared in 2011, Chapter in CIMO Guide is in progress (delivery in 2012).

1. **Guidance on operational use of passive microwave profilers**

Document with guidance material was prepared in 2011, Update CIMO Guide Chapter in progress (delivery in 2012).

1. **Standard on LIDARs used for visual range.**

“Item 3 overlaps by and large in my opinion with the work of ISO/TC 146/SC 5/WG 6 Working group Lidar. This working group, however, has shifted its attention more towards windlidar. There will be a meeting next week in Brussels of this committee that I will attend” it is from Arnoud Apituley.

1. **Monitor, evaluate and report on development and implementation of new remote sensing technologies and their operational application.**

Reports on performance implementation and operational use of various systems are presented on TECO‑2012. IOM report on new RS technologies will be presented in 2013 as summary of these works.

1. **Monitoring of CIMO testbeds**

Necessary to discuss the results during ET meeting (shifted on March 2013).

1. **Assessment of the uncertainty and traceability to SI of vertical profiles in the atmosphere by various remote sensing technologies**

The progress is here, but it is necessary to discuss on ET meeting the principles of optimal mix of various technology (shifted on March 2013).

**ANNEX 1**

**WORKPLAN**

**B2: CIMO Expert Team on New Technologies and Testbeds**

**(2011-2014)**

| ***No.*** | ***Task description*** | ***Person responsible*** | ***Action*** | ***Deliverable*** | ***Deadline for deliv.*** | ***Status***  ***[%]*** | ***Comments*** |
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| 1. | **Guidance on meteorological use of GNSS** | **S. de Haan**  R. Ware | 1. Finalize development of guidance document on theory and operational use of GNSS for meteorology, incl. comparison with other systems such MWR and radiosondes, guideline on operational use of WP, recommendations on data exchange protocols, if appropriate 2. Develop update for CIMO Guide chapter | 1. IOM report  2. Updated CIMO Guide Chapter | 2011  2012 |  |  |
| 2. | **Guidance on operational use of passive microwave profilers** | **A. Koldaev**  R. Ware  P.W.Chan  D.Klugmann | 1. Develop guidance material on operational use of passive microwave profilers (with emphasis on PBL performance) 2. Review relevant CIMO Guide chapter and develop update if appropriate | 1. Document with guidance material  2. Updated CIMO Guide Chapter | 2011  2012 |  | ET-RSUT&T, para 4.1.19 |
| 3. | **Standard on LIDARs used for visual range** | **D.Klugmann**  M. Nakazato | 1. Inform ET and MG on status of development of ISO standards (incl. recommendation & justification on whether WMO should approach ISO to develop them as ISO-WMO standards) 2. Collaborate with ISO working group on development of standards on lidars | 1. Document to CIMO MG 2. Input to ISO standards | 2012 (MG-10)  In phase with ISO development process |  |  |
| 4. | **Monitor, evaluate and report on development and implementation of new remote-sensing technologies and their operational application** | MWR-**A.Koldaev**  R. Ware  GNSS-  **S. Haan**  R. Ware  J. Won  Raman WV  **A.Apituley**  Wind-finding  **H. Klein-Baltink[[1]](#footnote-2)**  Cloud radars  **D.Klugmann**  A. Koldaev  Aersol&volcanic ash detection  **A.Apituley**  J. Won  Other:  **R.Kivi[[2]](#footnote-3)**  G. Yuchun**[[3]](#footnote-4)** | 1. Review and evaluate development and implementation of various new remote-sensing technologies and their potential/readiness for operational application, including path to operation use and traceability to SI (MWR, GNSS, Raman WV lidar, wind-finding systems, cloud radars, aerosol&volcanic ash detection, etc…) 2. Prepare reports on performance and use of those systems 3. If appropriate, compile IOM report out of report on the various systems   Responsibilites for various subdocuments:   * MWR, * GNSS * Raman WV lidar * wind-finding systems * cloud radars * aerosol&volcanic ash detection * other | 1. Report on performance, implementation and operational use of various systems to the attention of WMO Members 2. IOM report on new RS technologies | March 2012  2013 |  |  |
| 5. | **Monitoring of CIMO testbeds** | **J.G. Won**  D.Klugmann  A. Apituley | 1. Monitor and review outcomes of all CIMO Testbeds and Lead Centres (with focus on performance & limits of new surface-based RS technologies) 2. Assess need to, and develop, up-date for relevant part of CIMO Guide, as necessary. | 1. Document summarizing main outcomes of testbeds relevant to ET Terms of Reference   2.1 Report to OPAG-A Chair if update required   * 1. Revised CIMO Guide Chapter | 2012 (MG-10)  Dec. 2013 |  | ET-RSUT&T, para 4.1.20 |
| 6. | **Assessment of the uncertainty and traceability to SI of vertical profiles in the atmosphere by various remote-sensing technologies** | **J.G. Won**  D.Klugmann  A. Apituley  H. Klein-Baltink**[[4]](#footnote-5)**  **M. Nakazato** | 1. Based on the testbeds outcomes, develop principles for optimal mix of surface-based in-situ & RS technologies (incl. satellites) 2. Identify tools and techniques to verify to what extent the remote-sensing observations meet criteria that ensure conformity and traceability to SI 3. Develop recommendations on how to improve traceability of RS observations relevant to ET Terms of Reference | 1.1 Preliminary report  1.2 Document listing principles for optimal mix of various technologies (incl. justification)   1. Document with assessment of traceability of RS techniques 2. Document with proposals on how to improve traceability of RS techniques | 2012 (MG-10)  2013  2013  Apr. 2014 |  | CIMO-XV, para 5.20 |
| 7. | **Contribute to the implementation of WIGOS and provide relevant advice and support to the CIMO-MG** | TBD | 1. Address relevant items of WIGOS Implementation Strategy approved by Cg-XVI and subsequent WIGOS IP | TBD after Cg-XVI |  |  |  |
| ***Lower priority*** | | | | | | | |
| 8. | **Report on modern possibility of remote sensing of snow depth by means of passive and active radar airborne and spaceborne systems** | **A. Koldaev**  G. Yuchun**[[5]](#footnote-6)** | 1. Study the latest results of different research groups in Canada, Europe, Russia and Japan concerning the space born and aircraft remote measurements of the snow pack. | 1. Recommendations for the implementation of the remote sensing tools into the program of international inter -comparisons of snow precipitation measurements | 2012/13 |  | In cooperation with A3 (SPICE Intercomparison) |
| 9. | **Examine the reliability and consistency of wind measurements by wind profilers towards the development of an ISO-WMO standard** | **P.W.Chan** | 1. Study the different possibilities of the validation of the remote sensing wind profiler data by means of high meteorological towers, unmanned airplanes, tethered balloons and others | 1. Report to CIMO-MG on potential for development of a CIMO standard | 2013/14 |  | In close cooperation with A1 and B1 |

1. To be confirmed by ET Chairperson [↑](#footnote-ref-2)
2. To be confirmed by ET Chairperson [↑](#footnote-ref-3)
3. To be confirmed by ET Chairperson [↑](#footnote-ref-4)
4. To be confirmed by ET Chairperson [↑](#footnote-ref-5)
5. To be confirmed by ET Chairperson [↑](#footnote-ref-6)