WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR INSTRUMENTS AND METHODS OF OBSERVATION
OPAG-UPPER-AIR

JOINT MEETING

CIMO EXPERT TEAM ON UPPER-AIR SYSTEMS INTERCOMPARISONS
First Session

AND
INTERNATIONAL ORGANIZING COMMITTEE (IOC) ON UPPER-AIR SYSTEMS INTERCOMPARISONS
First Session

GENEVA (SWITZERLAND), 17-20 MARCH 2004

Distr.: RESTRICTED

CIMO/OPAG-UPPER-AIR/
/ET-UASI-1/IOC-1/Doc. 3.3(1)

(17.III.2004)

ITEM: 3.3

Original: ENGLISH ONLY

PROGRESS OF TESTING "UNIVERSAL" UPPER-AIR SYSTEMS

(Submitted by John NASH, ET Chair)

Summary and purpose of document

This document provides a briefing on the progress made testing "universal" upper-air systems.

Action proposed

The meeting is invited to take into account information presented in this document when discussing issues of high priority.

Progress of Testing "Universal" Upper-Air Systems

1. Before the era of dedicated ground systems for specific radiosonde types, many radiotheodolite systems were quite flexible in use, and would function adequately with a range of radiosondes from different manufacturers. However, the output was usually decoded manually from a chart recorder with the results not always of the accuracy now required from modern radiosondes.

2. Modern radiosonde systems elivering the high accuracy required for climate purposes are usually based on dedicated processing developed by the manufacturer and tested in WMO radiosonde Comparisons and other national and bilateral tests.

3. In national networks where more than one radiosonde type has been used with a given type of modern ground system, the resultant processing has not been totally consistent with best practice associated with each radiosonde type. This is usually because the system has not been adequately tested for the various radiosonde types, and the radiosonde manufacturer may have only limited responsibility for the output obtained with his radiosonde.

4. The best radiosonde systems are usually the result of test and development between the manufacturer and a limited number of national meteorological services that have the capability to test the radiosonde system performance thoroughly in the first years of operation. Systems that have not been subject to this scrutiny are much less likely to be thoroughly debugged and may suffer significant operational problems. [An example of this would be the original Vaisala GPS radiosonde which was introduced into operation worldwide before the operational debugging had been completed.]

5. Historically many of the systems supplied by donors into the tropical upper-air network have been of this type, (e.g. windfinding radars or radiotheodolites which were not used operationally in the donor country).

6. Currently, investment is being made into the radiosonde network, especially to regenerate radiosonde stations in tropical regions required for GCOS operations. In some cases, dedicated GPS radiosondes systems will be supplied, because the technical infrastructure is not judged suitable for radiotheodolite operations.

7. However, one of the main problems limiting the operation of these tropical stations is the cost of the radiosondes (GPS especially), it is preferable that new ground systems funded by the donor should be capable of operating with more than one radiosonde type. It would be preferable to use a mixture of GPS radiosondes (for occasional high flights) and cheaper non-GPS radiosondes with a suitable radiotheodolite for the majority of flights with smaller balloons.

8. Thus, a "universal" ground system to provide this facility has been procured through the WWW system, to be installed in Dar-es-Salaam, Tanzania. The performance of this system will be evaluated insitu against high quality radiosonde measurements provided by a suitable contractor . This test will be performed by staff in Tanzania under supervision from the contractor, so that reliable test results are obtained.

9. It is much too expensive to test every possible option, and currently the proposal is to evaluate just one type of 403 MHz GPS radiosonde and one type of 1680 MHz radiosonde with the radiotheodolite. These radiosondes would probably be of types that are currently considered to have significant accuracy limitations, compared to the best quality radiosondes available.

10. The expert team is asked to comment on what would be considered an adequate test for a system that might become quite widespread in tropical regions in future, but using radiosondes that will currently not provide optimum quality for relative humidity measurements. -Should efforts be made to expand the number of radiosondes tested and how could this be done efficiently without escalating the cost of the test?