

WORLD METEOROLOGICAL ORGANIZATION
WEATHER, CLIMATE AND WATER



COMMISSION FOR HYDROLOGY

**Exploratory meeting on CHy's Proposal for the Assessment of
the Performance of Flow Measurement Instruments
and Techniques**

(Geneva, 25 to 27 April 2007)

FINAL REPORT

1. Opening remarks

Mr A. Tyagi welcomed the participants and suggested that Mr Paul Pilon be chair of the meeting. Mr Pilon thanked the participants for electing him as chairman of the meeting and asked the participants to consider the meeting agenda. The agenda was adopted without changes. It is attached as Annex 1 of this report.

2. Self-introduction by participants

All participants introduced themselves. The list of participants is attached as Annex 2.

3. Organizational matters

Working hours were established. The chairman informed the participants on the activities carried out by WMO and provided details of its organization. All the PowerPoint presentations made during the meeting are posted on the following site: http://www.wmo.int/pages/prog/hwrp/chy/flow_ppt.html and the report of the meeting on:

http://www.wmo.int/pages/prog/hwrp/chy/documents/report_flow.pdf

4. The proposal in the context of CHy programme of work

Mr Pilon provided information on the Terms of Reference of the initiative as adopted Basic Systems (c). He also mentioned paragraph 13.6 of the CHy report:

“The Commission considered the concept that had been adopted by CHy-XI regarding the establishment of a limited number of projects to focus attention on priority issues. It urged the AWG to follow a similar approach during the next intersessional period.”

The chairman introduced the expected results of the meeting, stressing the importance of this proposal for the NHSs.

5. Overview of the proposal

Ms Fulford presented the document “Proposal for the Assessment of Flow Measurements Instruments and Techniques”. The representative of IAHS recommended ways to present to CHy and Congress the proposal. The chairman explained that the proposal was going to be presented in the next IAHR Congress to be held in Venice in early July.

6. Examples of national approaches to the assessment of flow measurements instruments

Mr Kim made a presentation on the “Present Status of Streamflow Measurement Techniques in Korea”. During its presentation he included information on the development of rating curves using 1D unsteady flow models. The cooperation with the University of Iowa was mentioned.

Mr Le Coz made a presentation on: “Technical and methodological needs and efforts: the case of France.”

Mr McCurry made a presentation on: “the Assessment in the Water Survey of Canada of the Performance of Measurement Instrumentation”. Training and accreditation of technicians using

ADCPs was mentioned. It was noted that Universities are still not teaching these newer technologies.

Ms Fulford made a presentation on “U.S. Geological Survey: Assessing Flow Measurement Instruments”.

7. ISO activities: past, present and future

Information on ISO activities was presented.

8. Point of view of other international organizations: Statements by IAHS, IAHR and HMEI

8.1 IAHS

The representative of IAHS presented information on the Association. He informed that the IAHS would be very interested on the topic of the meeting and the plans of the Project and proposed to bring this to the attention of the PUB programme.

8.2 IAHR

There is a committee on Hydraulic Instrumentation Section that is composed by 15 members. They have meetings every 2 years. Additional information on the WMO project will be presented during next IAHR Congress. A Website was mentioned that contains information on many instruments. The site is: (www.iuhr.uiowa.edu:88/instruments/index.jsp)

8.3 HMEI

Mr Sumner provided information on the Association. He informed the meeting that on its website there is a catalogue of instruments. The web site is listed in annex 2.

9. Uncertainty analysis, the state of the art

The ISO publication “Guide to the expression of uncertainty in measurement”, which was published in 1993, was discussed. The implementation example was focused on ADCPs, and it was mentioned that this approach would be considered for other instruments and technologies.

10. Expected outputs of the proposal and how to obtain them (work plan)

Annex 3 of this document contains the expected outputs of the proposal and also the agreed upon work plan. The meeting considered that it was important to keep in mind that the expected outputs of the proposal would be helpful for reviewing, revising and developing WMO and NHSs’ standards.

11. Governance of the initiative

The meeting discussed various options for governing the activities associated with the proposal. The various aspects of governance were considered:

- Efficiency (convenience of having a small group)
- Complexity of the CHy Initiative

Need for clear direction and prompt action
Importance of competent Technical Oversight
Clear focus on NHSS needs

The alternative governance options were considered:

- A) Status Quo.- Managed simply as a CHy project with other organizations being invited to participate but with no formal management responsibility.
- B) CHy-CIMO.- Managed as a joint project of the two Commissions with shared responsibility for management.
- C) Mixed Models
 - a. Formal management team comprising representatives from IAHR, IAHS, ISO, HMEI, and CHy designated expert linking to RA's Working groups on Hydrology, CHy designated expert representing developing country perspective. The group would be lead by a designated CHy expert. The project remains under the auspices of the CHy. Total number of the formal management team would not exceed 7 members. The management team must be technical experts that are actively working on the project.
 - b. Similar to C) a) but with one difference, namely the management team would be independent of CHy, with the chair selected by the team.

The meeting recommended with consensus that the preferred option was C) a). The meeting requested that a report of the meeting be provided to the President of CHy during Congress by the Secretariat. The meeting also hoped that the President would consider the output of this meeting and that the Commission would continue to support this initiative.

12. The role of the different players and the way forward

Annex 3 includes the results of the discussion on this item. The role of specific experts and the estimated amount of time to complete the activities are highlighted in italics in this report.

The meeting stressed the importance of recognizing contributors with respect to publications and documents to be posted on the Web.

13. Adoption of the final report and closure of the meeting

The participants adopted the report and requested the WMO Secretariat to make the necessary editorial changes and send the final version to the participants by e-mail.

The chairman of the meeting thanked the participants for all their contributions. The representative of the WMO Secretariat also thanked the Chairman and the participants.

The meeting was closed at 17:00 on 27 April 2007.

**EXPLANATORY MEETING ON CHY'S PROPOSAL FOR THE ASSESSMENT OF THE
PERFORMANCE OF FLOW MEASUREMENTS AND TECHNIQUES**

(Geneva, 25 to 27 April 2007)

AGENDA

1. Opening remarks
 2. Self-introduction by participants
 3. Organizational matters (Hours, Chairman designation)
 4. The proposal in the context of CHy programme of work
 5. Overview of the proposal
 6. Examples of national approaches to the assessment of Flow Measurements Instruments and Techniques. The cases of
 Republic of Korea – W. Kim
 France – J. Le Coz
 Canada – P. McCurry
 USA – J. Fulford
 7. ISO activities: past, present and future
 8. Point of view of other international organizations: statements by IAHS, IAHR and HMEI
 9. Uncertainty analysis, the state of the art - M. Muste
 10. Expected outputs of the proposal and how to obtain them (work plan)
 11. Governance of the initiative
 12. The role of the different players and the way forward
 13. Adoption of the final report and closure of the meeting
-

**EXPLANATORY MEETING ON CHY'S PROPOSAL FOR THE ASSESSMENT OF THE
PERFORMANCE OF FLOW MEASUREMENTS AND TECHNIQUES**

(Geneva, 25 to 27 April 2007)

LIST OF PARTICIPANTS

Mr Paul J. Pilon
Engineering Advisor
International Joint Commission
234 Laurier Avenue West, 22nd Floor
Ottawa ON
K1P 6K6 Canada

Tel: (613) 995 0194
Fax: (613) 993 5583
E-mail: pilonp@ottawa.ijc.org

Mr Patrick J. McCurry
National Manager, Hydrometric Operations
Hydrometric Monitoring Division
Water Survey of Canada
Environment Canada
373 Sussex Drive, Office E-103
Ottawa, Ontario K1A 0H3
Canada

Tel: (613) 992 9337
Fax: (613) 992 4288
E-mail: pat.mccurry@ec.gc.ca
www.wsc.ec.gc.ca

Mr Jérôme Le Coz
Equipe Hydraulique des Rivières
UR Hydrologie Hydraulique
Cemagref – HHLY
3 bis quai Chauveau
CP 220
69336 Lyon Cedex 09
France

Tel: (33 4) 72 20 87 86
Fax : (33 4) 78 47 78 75
E-mail : lecoz@lyon.cemagref.fr

Mr Odinn Thorarinsson
National Energy Authority
Hydrological Service
Grensásvegur 9
IS-108 REYKJAVIK
Iceland

Tel: (354) 569 6000
E-mail: odinn.thorarinsson@os.is
www.os.is

Mr Gunnar Sigurdsson
National Energy Authority
Hydrological Service
Grensásvegur 9
IS-108 REYKJAVIK
Iceland

Tel: (354) 569 6000
E-mail: gs@os.is
www.os.is

Mr Won Kim
Korean Institute of Construction Technology
2311 Daehwa-dong, Ilsan-gu, Koyang-si,
Kyounggi-do (zip code: 411-712)
Republic of Korea

Tel: (82 31) 910 0265
Fax: (82 31) 910 0251
E-mail: wonkim@kict.re.kr

Mr Zurab Kopaliani
Roshydromet State Hydrological Institute
V.O. 2nd Line 23
199053 St. Petersburg
Russian Federation

Tel: (78 12) 323 3265
Fax: (78 12) 323 1028
E-mail: ggi@hotmail.ru

Mr Viacheslav Manukalo
Deputy Chairman
State Hydrometeorological Service
6, Zolotovoritaska Street
Kyiv-34
01034 Ukraine

Tel: (380 44) 239 93 77
Fax: (380 44) 228 10 62
E-mail: bojko@ukrweather.kiev.ua

Ms Janice Fulford
Testing Section Chief
Hydrologic Instrumentation Facility
U.S. Geological Survey
Building 2101
Stennis Space Center, MS 39529
USA

Tel: (1 228) 688-1501
Fax: (1 228) 688-1577
E-mail: jfulford@usgs.gov
www.water.usgs.gov

International Organizations

Mr Arthur J. Askew
President
IAHS
4A avenue de la Foretaille
1292 Chambésy
Geneva, Switzerland

Tel: (41 22) 758 14 45
E-mail: arthuraskew@greenmail.ch
www.iahs.info

Mr Marian Muste
IAHR
Research Engineer and Adjunct Professor
IIHR-Hydroscience & Engineering
The University of Iowa
323E C. Maxwell Stanley Hydraulics Laboratory
Iowa City, IA 52242-1585
USA

Tel: (1 319) 384 0624
Fax: (1 319) 335 5238
E-mail: marian-muste@uiowa.edu
www.iihr.uiowa.edu

Mr Bruce Sumner and Ms Christine Charstone
Executive Secretary and Administrator
Association of Hydro-Meteorological Equipment
Industry (HMEI)
Room 7L21, WMO Building
7 bis, avenue de la Paix
CH-1211 Genève 2

Tel: (41 22) 730 8004
Fax: (41 22) 730 8340
E-mail: hmei@wmo.int
www.hydrometeoindustry.org

Mr Gerhard Pevny
General Manager Logotronic
Logotronic
Phorusgesse 8
1040 VIENNA
Austria

Tel: (43 1) 587 2971
Fax: (43 1) 587 2971/41
E-mail: gerhard.pevny@logotronic.co.at
www.logotronic.at

Mr Ian Thompson
Director
YSI Europe
Unit 8, Business Centre West
Avenue One
LETCHEWORTH
UK

Tel: (44) 77 67 342 565
Fax: (44) 14 62 673 582
E-mail: ithompson@ysi.com
www.YSI.com

Ms Gayle Rominger
Executive Vice-president
YSI-Environmental (SonTek)
1725 Brannum Lane
YELLOW SPRINGS OH 45432
USA

Tel: (937) 767 7241
Fax: (937) 767 9353
E-mail : grominger@ysi.com
www.YSI.com

WMO Secretariat:

Mr Gabriel Arduino
Hydrology and Water Resources Department
WMO
7 bis, avenue de la Paix
CH-1211 Genève 2

Tel: (41 22) 730 83 31
Fax: (41 22) 730 80 43
e-mail : garduino@wmo.int
www.wmo.int

Mr Claudio Caponi
Hydrology and Water Resources Department
WMO
7 bis, avenue de la Paix
CH-1211 Genève 2

Tel: (41 22) 730 8407
Fax: (41 22) 730 80 43
e-mail : ccaponi@wmo.int
www.wmo.int

Mr Miroslav Ondras
World Weather Watch Department
WMO
7 bis, avenue de la Paix
CH-1211 Genève 2

Tel : (41 22) 730 8409
Fax: (41 22) 730 8021
e-mail : mondras@wmo.int
www.wmo.int

1) Summary of field discharge measurement instrumentation and techniques

“Techniques” includes methodologies and procedures for conducting field measurements and estimation of discharges (for example site selection, model of the vertical distribution of velocity, algorithms for the determination of discharge)

This summary includes instruments and techniques used or for potential use by NHSs

Tentative work plan

Prepare structure of the form and populate it (Experts) (*JF draft template end of July*)

Upload it on the web and request contributions to fill gaps (WMO Secr) (*September 2007*)

Notify NHSs by circular letter (WMO Secr) (*November 2007*)

Synthesis of results (Experts (*JF& others to be decided later*)+ WMO Secr) (*January 2008 (to be revised) after receiving the responses*)

2) Collection of international and national standards and guidelines regarding field discharge measurement instrumentation and techniques as identified under 1;

Tentative work plan

In the letter under 1 include a request for standards & guidelines (Secretariat)

- Format could be either pdf, link to websites or hardcopy (identifying the source, issuing authority, copyright restrictions)
- In one or more of the 6 official languages of WMO (E, F, R, S, A, C)

Upload it on the web and request additional contributions (WMO Secr)

3) Framework for the assessment of uncertainty in discharge measurement and guidelines for its implementation (to be lead by MM & JF)

- Standardized approaches to UA
- UA implementation examples
- Guidance in the form of decision-aid tools
- UA database (information on uncertainties estimated using the standardized approach)
- UA outcomes/inferences (recommendations for optimization of instrument configuration, operation and algorithms)

Note.- The last three items would be limited to two examples (profilers and point current meters)

Tentative work plan

Literature review of existing approaches (8 months draft document for review on the Web)

Synthesis of recommended standardized approach to UA for discharge measurements (8 months draft document for review on the Web)

Developing implementation examples of the UA (8 months draft document for review on the Web)

Development of decision-aid tool prototype and associate UA database for proof of concept and demonstration purposes for two instruments and multiple techniques (20 months draft document for review on the Web)

Development of examples of the utility of prototype for improvement of measurement approaches and processes (20 months draft document for review on the Web)

4) Guidelines for conducting and reporting results of instrument calibration and performance tests on instruments and techniques (JF & PMcC)

- Establishment of protocols/specifications for instrument calibration and testing and verification of performance characteristics of instruments and techniques (20 months draft document for review on the web)
- Develop sample format for reporting testing and verification results (8 months draft document for review on the Web)

5) Collection of test reports on the performance of instruments and techniques (WMO Secretariat)

- Manufacturer specs(HMEI)
- Multiple instrument comparisons
- Tests conducted under laboratory conditions (WMO Secretariat & IAHR)
- Reports by HSs (WMO Secretariat)
- Contact details of institutions where testing is conducted (WMO Secretariat & IAHR)
- Others

Tentative work plan

Build the collection by:

- Request reports, possibly as part of the letter in 1)
- Links to manufacturers through HMEI (subsequent to receipt of reports)
- Request labs through IAHR (ditto)

6) Overall Website design to disseminate all of the above (WMO Secretariat – 3 months)

Contents:

Output of 1) to 5) above plus:

Forum/chat facility
Search engines
News feature
Guidance on targeting community involvement
