ICG/IOTWS Working Group 5 – System for Interoperable Advisory and Warning Centres

Report on Inaugural Meeting of RTWP Coordination Group
Grand Hyatt Hotel, Nusa Dua Bali, Indonesia, 14-15 November 2008

1. Registration

The participants completed the registration list and introduced themselves to the meeting. Mr Geoff Crane (chair of WG5), Mr Rick Bailey and Dr Spiro Spiliopoulos joined the meeting by telephone from Melbourne, Australia, and the participants agreed to accept their contributions to the meeting. A list of participants is provided in Annex I.

2. Opening and Session Organisation

The meeting was opened by the Chair of ICG/IOTWS, Dr Jan Sopaheluwakan. He welcomed the participants to the meeting and provided background on the process that had led to the formation of the Regional Tsunami Watch Provider (RTWP) Coordination Group (RCG). He recalled the Phuket Ministerial Meeting of January 2005 which gave a clear mandate to UNESCO IOC to establish a Tsunami Early Warning System for the Indian Ocean. The ICG/IOTWS had been entrusted to deliver an end to end warning system and had established the RCG to coordinate the implementation of the regional network of RTWPs. He acknowledged the role of the Japan Meteorological Agency (JMA) and the Pacific Tsunami Warning Centre (PTWC) and reminded the meeting that the first aim of the RTWPs was to emulate the Interim Advisory Service (IAS) provided by JMA and PTWC. He noted that we were still in the transitional phase and to date, India and Australia were providing Service Level 1 RTWP services. The inauguration of the Indonesian Tsunami Early Warning System (InaTEWS) marks a further step forward in the development of the IOTWS.

2.1 Confirmation of Representatives and Delegates

The participants discussed the membership of the RCG, and the roles of the ICG/IOTWS observers in the group. The ICG through recommendation ICG/IOTWS-V.5 had instructed WG5 to establish the RCG and had listed the inaugural membership of the group. The participants considered that the main purpose of the RCG was to provide technical coordination and advice to the ICG through WG5. The group should therefore be able to draw upon all available technical expertise, but decisions on policy could only be made by Member States of the ICG. The meeting concluded that the group should be renamed as the “RTWP Task Team” (RTT) and this recommendation should be made at the next session of the ICG. The membership of the group was agreed as follows:

RCG Membership

- Current and potential RTWPs of Australia, India, Indonesia, Iran, Malaysia, Thailand, and ADPC
- Interim Advisory Service providers, JMA and PTWC
- Representatives from two NTWC
2.2 Review of Agenda and Timetable

Mr Tony Elliott, Head of the ICG/IOTWS Secretariat, explained that the preliminary agenda had been drawn up in consultation with the WG5 chair, Mr Geoff Crane. The meeting requested some changes to the agenda. In particular, as the Indonesian RTWP representative was not able to join the meeting until the second day, it was decided to postpone the election of the chair and vice chair of the group to later in the agenda. For similar reasons, the nomination of two NTWC representatives was also postponed.

A copy of the final meeting agenda is provided in Annex II.

3. Review

The meeting was joined by Mr Charles Ngunjiri, vice chair of WG5, who took over as chair of the meeting.

The members reviewed Recommendation ICG/IOTWS-V.5, which instructed WG5 to establish the RCG, and the Terms of Reference of the group contained in the RTWP Implementation Plan. As previously agreed, a recommendation will be made to the ICG to change the name of the group to RTWP Task Team. The Task Team will report to WG5.

Recommendation

- RTWP Coordination Group to change name to RTWP Task Team.

4. Status Reports from Current and Potential RTWPs

4.1 Australia

Mr Geoff Crane provided Australia’s status report. Australia had taken a total system approach to designing the Australian Tsunami Warning System (ATWS), using best available inputs from earthquake analysis, ocean modelling, coastal tsunami threats and warning messages. The Joint Australian Tsunami Warning Centre (JATWC), operated by the Australian Bureau of Meteorology and Geoscience Australia, became operational in July 2007. The JATWC was formally launched on 31 October 2008, accompanied by the introduction of a stratified and streamlined warning system, together with a comprehensive new suite of warning messages. At the same time, an in-house developed Tsunami Decision Support Tool (TDST) was introduced.

The ATWS comprises a comprehensive national seismic network, tsunameter network and coastal tide gauge network. As of November 2008, Australia’s tsunameter network comprised two units in the Indian Ocean off NW Australia, one in the Coral Sea off NE Australia, and two in the Southern Ocean off SE Australia.

A tsunami scenario database had been developed for a restricted domain covering the eastern half of the Indian Ocean and the western half of the Pacific Ocean. The JATWC commenced sharing earthquake information for the Indian Ocean with other potential RTWPs in July 2008. An upgraded tsunami scenario data base covering the whole of the Indian and Pacific Oceans was being constructed and would become operational in early 2009. The JATWC expected to commence regional tsunami watches in late 2009.
The JATWC would be ready to shadow the Interim Advisory Service and commence Service Level 2 to other Indian Ocean countries as per the schedule outlined in the RTWP Implementation Plan.

Mr Crane noted that there was a need for WG5 to hold an intersessional meeting prior to the ICG/IOTWS-VI session to be held in Bangkok in April 2009. On behalf of Australia he offered to host this meeting at the Bureau of Meteorology in Melbourne in late February 2009.

Dr Shailesh Nayak (India) enquired if Australia had generated any performance statistics over the last 6 months. Mr Crane replied that only a few potentially tsunamigenic earthquakes had occurred in that time and he didn’t have any performance statistics for these. He later clarified that Australia’s reporting threshold was magnitude 6.5. Although they had no plans to change this, internally the JATWC recorded and analysed events of lower magnitude and in future all solutions would be included for statistical analyses.

Mr Peter Koltermann, Head of UNESCO IOC Tsunami Unit, enquired who received the JATWC bulletins. Mr Crane responded that the JATWC had been sharing earthquake bulletins with the other potential RTWPs and the IAS since July 2008.

Dr Nayak commented that all potential RTWPs should present performance statistics to the next session of the ICG. Mr Crane agreed.

4.2 India

Mr Srinivasa Kumar presented India’s status report. The Indian Tsunami Early Warning Centre (ITEWC) at INCOIS commenced the RTWP transition process in July 2008 and had been sharing Service Level 1 earthquake information with Australia, Indonesia, Iran, Malaysia, Thailand, PTWC, JMA and UNESCO IOC. 57 earthquakes >M 6.0 had been reported between July and October, of which 13 were undersea and >M 6.5.

INCOIS had conducted a comparison of its final estimates with USGS, PTWC, JATWC and GFZ. In terms of earthquake magnitude, INCOIS compared very well with GFZ, followed by JATWC. However there were inherent limitations in the comparisons due to the different magnitude scales used. In terms of focal depth, deep events (>100km) were resolved more accurately than shallow depths.

Mr Kumar described the performance of the INCOIS tsunami model during the 12 September 2007 event, and provided an update on India’s progress on vulnerability and inundation mapping. He also provided an overview of future areas of work. India was aiming to initiate RTWP Service Level 2 by December 2008 and was discussing collaborative arrangements for Service Level 3 with Maldives, Mauritius, Thailand, Oman, ADPC and others. India was also focusing efforts on SOPs for the issue of bulletins in the Indian Ocean, on combining best practices, validation of models, water level data assimilation into forecast models, development or real-time inundation models, development of new technologies for deep ocean tsunami observing systems, R&D in plate tectonic modelling and paleotsunamis, and the development of multi-hazard early warning systems for all oceanogenic hazards.

Discussion followed on the format of bulletins, including the use of graphical information. David McKinnie (USA) informed that NOAA had been in talks with Google Earth about displaying warning centre information on Google Map. Peter Koltermann noted that the authenticity of a warning was an issue that needed to be addressed. He also requested the group to consider setting display standards.
4.3 Indonesia

Dr Fauzi presented Indonesia’s status report. He recalled the activities and events since the beginning of 2008 leading up to the inauguration of InaTEWS on 11 November and went on to describe the planned activities for 2009, culminating in the full operation of the Decision Support System (DSS) in November 2009, and with Indonesia providing RTWP Service Levels 1, 2 and possibly 3 to the IO community. He provided an overview of the entire InaTEWS system, including its seismic, GPS, sea level and tsunameter networks. He then provided a detailed description of the DSS and explained how it was used in an event. He described how the various components of the InaTEWS fitted together in the context of the warning timeline, from seismic “first alert” to the “all clear”. Finally, he summarised how information flowed to the public in a timely manner, to both national and international communities.

Dr Shailesh Nayak enquired how much time it took for the tsunameter buoys to register that a tsunami had been generated. Dr Fauzi responded that in the case of the Bengkulu earthquake of September 2007, it took 40 minutes for the tsunami to reach the buoy location. Dr Joern Lauterjung (Germany) clarified that the buoy network had been designed so that a tsunami would be recorded by a tsunameter within 5-6 minutes after an earthquake.

Mr David McKinnie enquired how BMG accessed international warning information. Dr Fauzi replied that warning messages were received by GTS, email and fax. He also noted that warnings from PTWC were now considered as a second opinion and that data from the instrument networks was the main source of information.

4.4 Iran

Dr Vahid Chegini presented Iran’s status report. He noted that 8 institutes were cooperating on the development of the Iranian National Tsunami Warning System (INTWS). He reported that a Datawell Waverider buoys had been deployed in Chabahar Bay in Balouchestan Province and that one more would be deployed offshore of Jask in Hormozgan Province. Seismographs had been installed in Bandarabbas, Minab and Zahedan, and one more was planned for installation at Chabahar. A sea level gauge had been installed at Chabahar by GFZ and was operated by the Hydrographic Department of the National Cartographic Centre. Data was available on the IODE sea level monitoring facility website: http://www.ioc-sealevelmonitoring.org. Dr Chegini went on to summarise the progress made in bathymetric and topographic mapping and on numerical modelling of the Makran tsunami source zone.

Dr Chip McCreery (PTWC) enquired if the seismic network was adequate for doing an earthquake analysis within 5 minutes. Dr Chegini responded that it was.

4.5 Malaysia

Dr Mohamed Rosaidi bin Che Abas presented Malaysia’s status report. Dr Rosaidi reported on progress made by Malaysia in developing tsunami model scenarios. He noted that numerical models were important for assessing both the level of threat and the area at threat. Fault parameters were determined using empirical formulae relating fault magnitude and rupture area. Simulation points had been determined every 100km along subduction zones in East and West Malaysia, and 30 scenarios had been generated for each simulation point. Currently 6000 scenarios were available in the database and Malaysia planned to expand this. It also planned to increase resolution, particularly in shallow water, and expand the database of regional scale model scenarios for the Indian Ocean. For this, Malaysia planned to develop 11300 scenarios from 565 simulation points, and aimed to complete this by the end of 2009.
4.6 ADPC

Mr Arjunapermal Subbiah presented ADPC’s status report. He provided an overview of progress made both in establishing ADPC’s detection and warning system and on establishing an institutional framework for its operation. Five real-time sea level stations had been installed in Philippines, Thailand and Vietnam and one was soon to be established in Myanmar. Four real time broadband seismic stations were being installed in Myanmar, Philippines and Vietnam. A regional facility was being developed at ADPC in Bangkok for data receipt, processing and evaluation and provision of tsunami watch bulletins. A joint workshop would be held with INCOIS 19-21 November to develop standard operating procedures between ADPC, INCOIS and member countries. A Technical Expert Committee meeting would be held at ADPC in November to evaluate the operational readiness of the regional facility.

Beyond May 2009, the ADPC network would evolve to ensure the sustainability of the system. A working group comprising five member countries had been formed to guide this process, with Maldives acting as secretariat.

Dr Ed Young (USA) requested that the joint INCOIS-ADPC workshop should report back to the RCG and Mr Subbiah agreed.

5. Summary of RTWP Earthquake Bulletins since August 2008

Mr Tony Elliott reported that the ICG/IOTWS Secretariat had been maintaining a log of earthquake bulletins received from the ITEWC, JATWC, JMA, and PTWC since August 2008. He presented a spreadsheet, which included earthquake parameters (date, time, magnitude, location, depth) and details of the time at which each bulletin had been issued and received. This spreadsheet would be made available to the RCG members for their review.

Mr David McKinnie thanked the Secretariat for carrying out this service and requested that they continue until an alternative arrangement was agreed by the RCG.

Actions

- Secretariat to continue maintaining log of RTWP earthquake bulletins
- RTWPs to include Secretariat on email list for bulletins
- RTWPs to inform Secretariat when commencing Service Level 1 and request email address list.
- RTWPs to inform Secretariat of any problem email addresses for Secretariat follow up.
- Secretariat to keep RTWPs advised on changes to email addresses.
- RTWP Task Team and WG5 to define the process of enhancing the service content of RTWPs in consultation with the Interim Advisory Service Providers

6. Interoperability Issues

6.1 Watch Products

Mr Geoff Crane introduced this topic and led a discussion on watch products, including forecast point definitions, threat levels and thresholds. The issue of graphical products was discussed and there were differing views on the use of these in warnings. It was concluded that WG5 was the correct forum to discuss this issue so the discussion was postponed to the next WG5 intersessional meeting.
Actions

- WG5 to promote innovative ways to use sophisticated model products in consultation with the user community.

6.2 Information Exchange Formats

The members discussed information exchange formats and noted that there was a need for information bulletins to contain standard information, although not every bulletin should necessarily look the same. There could be different formats depending on whether the threat was near-field or far-field. The group should consult with WG1 on designing a template for seismic information and with WG2 for sea level information. WG5 should fulfil the role of advising on watch formats for the wider Indian Ocean watch recipients.

Actions

- WG5 to agree on templates required for earthquake parameters and tsunami height information between RTWPs and NTWCs. Templates need to include standard and optional information
- WG5 to decide on watch formats after wider consultation.

6.3 Distribution of Trial Products

The members agreed that there was a need to exchange information between operational agencies, not individuals. Peter Koltermann reminded the meeting that the UNGA had resolved that the official TWFPs nominated by Member States should receive warnings and that it was therefore essential for the RTWPs to use the TWFP list maintained by the IOC Secretariat. Geoff Crane noted that where official TWFPs are individuals, it is also necessary for warning messages to go to 24/7 operational addresses. He also noted that during the developmental stage, messages should also be copied to project development staff, as requested by the Member States.

Actions

- Trial products to be distributed to operational agency email addresses only, not individuals. (General comment for all RTWP communications)
- RTWPs to use IOC TWFP list

6.4 Exchange of SOPs and Users’ Guides

The members considered that there was a need to share SOPs for producing bulletins so that each RTWP understood what the other RTWPs were doing and how they were preparing their bulletins. This also extended to JMA and PTWC. For the NTWCs, guidance on the development of SOPs should come from WG5. Peter Koltermann noted that the PTWS was currently developing a Users’ Guide. Once published, the RCG may take this into consideration as a template for the IOTWS, if they wish. Dr Nayak commented that SOPs should reflect the different tsunami sources and travel times in the Indian Ocean and that the RCG needed to provide guidance on this.
Actions

- RTWPs to share SOPs for producing bulletins so that each RTWP understands what the others are doing
- JMA and PTWC to share their SOPs with RTWPs
- WG5 to produce SOPs for NTWCs
- RCG to deliberate on PTWS Users’ Guide when available
- RCG to provide guidance on generic SOPs to reflect different sources and travel times in the Indian Ocean

7. Update of IOTWS Implementation Plan

The IOTWS Implementation Plan specified detailed requirements of the design and implementation of the tsunami warning and mitigation system for the Indian Ocean. It was last updated in February 2007 and there was a pressing need to update it again prior to the ICG/IOTWS-VI meeting in April 2009. The RTWP Implementation Plan was published in June 2008 and is a stand-alone document. However the members agreed that the main components should be integrated into the IOTWS Implementation Plan to provide a complete description and up to date status of the IOTWS. To update the plan, the Secretariat will require assistance and input from the RTWPs and NTWCs. Australia, India, Indonesia, Iran and Malaysia offered to assist the Secretariat in writing a chapter on the RTWPs in the IOTWS Implementation Plan.

Actions

- RTWP Implementation Plan to be integrated into IOTWS Implementation Plan
- RTWPs and NTWCs to provide Secretariat with updates for the IOTWS Implementation Plan
- Australia, India, Indonesia, Iran Malaysia to assist the Secretariat in writing the RTWP chapter in the IOTWS Implementation Plan
- Secretariat to publish updated IOTWS Implementation Plan at least 1 month prior to ICG/IOTWS-VI.

8. Election of Chair and Vice Chair of RCG

Dr Fauzi of Indonesia was elected as chair of the RCG, proposed by Australia and seconded by India.

Mr Srinivasa Kumar of India was elected as vice chair of the RCG, proposed by Malaysia and seconded by Australia and Indonesia.

Mr David McKinnie made a statement on behalf of the USA in which he expressed his satisfaction that the group had decided on the structure of the RCG. He stated that the USA would be happy to work with the chair and vice chair and pledged to support the group in achieving its objectives.

Dr Fauzi thanked the members for their support and thanked the donors for their support in developing the InaTEWS.
9. Nomination of Representatives from two NTWCs to join RCG
Kenya was nominated as an NTWC representative on the RCG and this was accepted by Mr Charles Ngunjiri.

The members decided that either Oman or Sri Lanka should be nominated as the second NTWC representative on the RCG. As neither Member State was represented at the meeting, the Secretariat was requested to contact each of them to determine their interest and willingness to join the group and to report back to WG5 and the ICG.

Dr Joern Lauterjung noted that Germany was supporting several Indian Ocean countries in the development of their NTWCs and suggested that Germany should join the group as an observer to provide advice. The members agreed to this suggestion and co-opted Germany as an observer.

10. Preparation for ICG/IOTWS-VI meeting in Thailand
This agenda item was deferred to the WG5 intersessional meeting to be held in Melbourne in February 2009.

11. Review of Action Items and Recommendations
The following list summarises the action items agreed at the meeting:

- Secretariat to continue maintaining log of RTWP earthquake bulletins
- RTWPs to include Secretariat on email list for bulletins
- RTWPs to inform Secretariat when commencing Service Level 1 and request email address list.
- RTWPs to inform Secretariat of any problem email addresses for Secretariat follow up.
- Secretariat to keep RTWPs advised on changes to email addresses.
- RTWP Task Team and WG5 to define the process of enhancing the service content of RTWPs in consultation with the Interim Advisory Service Providers
- WG5 to promote innovative ways to use sophisticated model products in consultation with the user community.
- WG5 to agree on templates required for earthquake parameters and tsunami height information between RTWPs and NTWCs. Templates need to include standard and optional information
- WG5 to decide on watch formats after wider consultation.
- Trial products to be distributed to operational agency email addresses only, not individuals. (General comment for all RTWP communications)
- RTWPs to use IOC TWFP list
- RTWPs to share SOPs for producing bulletins so that each RTWP understands what the others are doing
- JMA and PTWC to share their SOPs with RTWPs
- WG5 to produce SOPs for NTWCs
- RCG to deliberate on PTWS User’s Guide when available
- RCG to provide guidance on generic SOPs to reflect different sources and travel times in the Indian Ocean
• RTWP Implementation Plan to be integrated into IOTWS Implementation Plan
• RTWPs and NTWCs to provide Secretariat with updates for the IOTWS Implementation Plan
• Malaysia, Indonesia, India, Iran and Australia to assist the Secretariat in writing the RTWP chapter in the IOTWS Implementation Plan
• Secretariat to publish updated IOTWS Implementation Plan at least 1 month prior to ICG/IOTWS-VI.

It was agreed that the membership of the RCG would comprise:

• Current and potential RTWPs of Australia, India, Indonesia, Iran, Malaysia, Thailand, and ADPC
• Interim Advisory Service providers, JMA and PTWC
• Representatives from two NTWC

The members recommended that the name of the RTWP Coordination Group should be changed to “RTWP Task Team”.

The members elected Dr Fauzi (Indonesia) as chair and Mr Srinivasa Kumar (India) as vice-chair of the group.

The members nominated Kenya and either Oman or Sri Lanka as NTWC representatives to the group. Kenya accepted the nomination and the Secretariat will follow up with Oman and Sri Lanka.

The members co-opted Germany to the group as an observer.

12. Date and Venue for Next Meeting
The decision on the date and venue for the next meeting of the RCG was deferred until the WG5 intersessional meeting to be held in Melbourne, 23-24 February 2009 (dates to be confirmed by Secretariat).

13. Close of meeting
The meeting was closed at 5:30pm by the chair, Mr Charles Ngunjiri, who thanked the participants for their work.
## ANNEX I

### PARTICIPANT LIST

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Rick Bailey (by telephone)</td>
<td>Australia</td>
<td><a href="mailto:r.bailey@bom.gov.au">r.bailey@bom.gov.au</a></td>
</tr>
<tr>
<td>Dr Vahid Chegini</td>
<td>Iran</td>
<td><a href="mailto:v_chegini@inco.ac.ir">v_chegini@inco.ac.ir</a></td>
</tr>
<tr>
<td>Mr Geoff Crane (by telephone)</td>
<td>Australia</td>
<td><a href="mailto:g.crane@bom.gov.au">g.crane@bom.gov.au</a></td>
</tr>
<tr>
<td>Dr Ridwan Djamaluddin</td>
<td>Indonesia</td>
<td><a href="mailto:ridwan@ceo.bppt.go.id">ridwan@ceo.bppt.go.id</a></td>
</tr>
<tr>
<td>Dr Fauzi</td>
<td>Indonesia</td>
<td><a href="mailto:fauzi@bm.gov.id">fauzi@bm.gov.id</a></td>
</tr>
<tr>
<td>Mr Srinivasa Kumar</td>
<td>India</td>
<td><a href="mailto:srinivas@incois.gov.in">srinivas@incois.gov.in</a></td>
</tr>
<tr>
<td>Dr Shailes Nayak</td>
<td>India</td>
<td><a href="mailto:secretary@moes.gov.in">secretary@moes.gov.in</a></td>
</tr>
<tr>
<td>Mr Charles Ngunjiri</td>
<td>Kenya</td>
<td><a href="mailto:mainangunjiri@yahoo.com">mainangunjiri@yahoo.com</a></td>
</tr>
<tr>
<td>Dr Pariatmono</td>
<td>Indonesia</td>
<td><a href="mailto:pariatmono@ristek.go.id">pariatmono@ristek.go.id</a></td>
</tr>
<tr>
<td>Dr Mohd Rosaidi bin Che Abas</td>
<td>Malaysia</td>
<td><a href="mailto:rosaidi@met.gov.my">rosaidi@met.gov.my</a></td>
</tr>
<tr>
<td>Dr Jan Sopaheluwakan</td>
<td>Indonesia</td>
<td><a href="mailto:jan@sopaheluwakan.com">jan@sopaheluwakan.com</a></td>
</tr>
<tr>
<td>Dr Spiro Spiliopoulos (by telephone)</td>
<td>Australia</td>
<td><a href="mailto:spiro.spiliopoulos@ga.gov.au">spiro.spiliopoulos@ga.gov.au</a></td>
</tr>
<tr>
<td>Mr Sunaryo</td>
<td>Indonesia</td>
<td><a href="mailto:sunaryo@bm.gov.id">sunaryo@bm.gov.id</a></td>
</tr>
<tr>
<td>Mr Thomas Hoffmann</td>
<td>Germany</td>
<td><a href="mailto:thl@gfz-potsdam.de">thl@gfz-potsdam.de</a></td>
</tr>
<tr>
<td>Dr Nobuo Hamada</td>
<td>Japan</td>
<td><a href="mailto:HFB02062@nifty.ne.jp">HFB02062@nifty.ne.jp</a></td>
</tr>
<tr>
<td>Dr Joern Lauterjung</td>
<td>Germany</td>
<td><a href="mailto:lau@gfz-potsdam.de">lau@gfz-potsdam.de</a></td>
</tr>
<tr>
<td>Dr Charles McCreery</td>
<td>PTWC</td>
<td><a href="mailto:charles.mccreery@noaa.gov">charles.mccreery@noaa.gov</a></td>
</tr>
<tr>
<td>Mr David McKinnie</td>
<td>USA</td>
<td><a href="mailto:david.mckinnie@noaa.gov">david.mckinnie@noaa.gov</a></td>
</tr>
<tr>
<td>Mr Eberhard Mikusch</td>
<td>Germany</td>
<td><a href="mailto:eberhard.mikusch@dlr.de">eberhard.mikusch@dlr.de</a></td>
</tr>
<tr>
<td>Mr Torsten Riedlinger</td>
<td>Germany</td>
<td><a href="mailto:torsten.riedlinger@dlr.de">torsten.riedlinger@dlr.de</a></td>
</tr>
<tr>
<td>Mr Volker Stapke</td>
<td>Germany</td>
<td><a href="mailto:volker.stapke@bgr.de">volker.stapke@bgr.de</a></td>
</tr>
<tr>
<td>Dr Edward Young</td>
<td>USA</td>
<td><a href="mailto:edward.young@noaa.gov">edward.young@noaa.gov</a></td>
</tr>
<tr>
<td>Mr Arjunapermal Subbiah</td>
<td>ADPC</td>
<td><a href="mailto:subbiah@adpc.net">subbiah@adpc.net</a></td>
</tr>
<tr>
<td>Mr Dandi Prasetyo</td>
<td>UNDP</td>
<td><a href="mailto:dandi.prasetyo@undp.org">dandi.prasetyo@undp.org</a></td>
</tr>
<tr>
<td>Mr Tony Elliott</td>
<td>UNESCO IOC</td>
<td><a href="mailto:t.elliott@unesco.org">t.elliott@unesco.org</a></td>
</tr>
<tr>
<td>Dr Peter Koltermann</td>
<td>UNESCO IOC</td>
<td><a href="mailto:p.koltermann@unesco.org">p.koltermann@unesco.org</a></td>
</tr>
<tr>
<td>Mr Michael Rottmann</td>
<td>UNESCO IOC</td>
<td><a href="mailto:m.rottmann@unesco.org">m.rottmann@unesco.org</a></td>
</tr>
</tbody>
</table>
UNESCO IOC  
Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS)  
Working Group 5 – System for Interoperable Advisory and Warning Centres  

Inaugural Meeting of RTWP Coordination Group  
Grand Hyatt Hotel, Bali, Indonesia  
14 - 15 November 2008  

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<td>- Watch formats (Ref WG5)</td>
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<td>- Sitreps (Ref WG5)</td>
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<td></td>
<td>(iii) Distribution of trial products (RCG)</td>
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<td>(iv) Exchange of SOPs and Users Guides (RCG)</td>
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<tr>
<td>7.</td>
<td>Update of IOTWS Implementation Plan:</td>
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<td></td>
<td>- Based on Status Reports and other inputs from Member States</td>
</tr>
<tr>
<td>8.</td>
<td>Election of Chair and Vice Chair of RCG</td>
</tr>
<tr>
<td>9.</td>
<td>Nomination of Representatives from Two NTWCs to Join RCG</td>
</tr>
<tr>
<td>10.</td>
<td>Preparation for ICG/IOTWS-VI in Thailand, April 2009:</td>
</tr>
<tr>
<td></td>
<td>- Recommendations to WG5 for ICG</td>
</tr>
<tr>
<td>11.</td>
<td>Review of Action Items and Recommendations</td>
</tr>
<tr>
<td>12.</td>
<td>Date and Venue for Next Meeting</td>
</tr>
<tr>
<td>13.</td>
<td>Close of Meeting</td>
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</tbody>
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