1. Opening and Session Organisations

Dr Satheesh Shenoi, chair of the ICG/IOTWS Working Group 2 on Tsunami Detection, Warning and Dissemination, welcomed the participants to the meeting and gave an overview of the meeting agenda (Annex 1). The participants of the meeting are listed in Annex 2.

2. Status Reports from RTSPs

The current status of the Regional Tsunami Service Providers (RTSPs) was reported on by Mr Peter Coburn of Australia, Mr Yedi Dermadi of Indonesia, and Dr Srinivasa Kumar of India.

3. Status of implementation of the IOTWS Seismic Stations

Dr Mark Leonard discussed the seismic monitoring stations in the Indian Ocean region. He urged Member States to reply to the Secretariat’s emails requesting the details of seismic networks including administrative and technical contact information.
4. **Status of implementation of the IOTWS Sea Level Stations**

Ms Nora Gale presented on the sea level station networks in the Indian Ocean region. She demonstrated how the stations and associated metadata can be viewed in Google Earth. The IOTWS Secretariat has requested sea level network operators in the Indian Ocean to provide the detail of their networks including administrative and technical contact information.

**Action:** Secretariat to request that seismic and sea level station operators provide network and contact information by the end of September 2014 and make this information available on the ICG/IOTWS website by the end of October 2014.

**Action:** Secretariat to investigate using the password protected webpage on the ICG/IOTWS website to include Member State SOPs and their public warning link URLs.

5. **Outcome of the ICG/IOTWS Steering Group Meeting**

Mr Tony Elliott reported on the status of action items from the ICG/IOTWS Steering Group meeting, Perth, 10-11 December 2013 as they related to WG2. Each action was discussed in terms of progress and further work (Annex 3).

6. **Outcome of the TOWS-WG Task Team on Tsunami Watch Operations meeting, Paris, February 2014**

Dr Srinivasa Kumar reported on the meeting of the IOC Working Group on Tsunami and other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) Task Team on Tsunami Watch Operations held in Paris, February 2014. The ICG/IOTWS representatives on the Task Team are Mr Rick Bailey and Dr Srinivasa Kumar. Dr Kumar summarised the proposed generic naming convention for regional Tsunami Service Providers (e.g. IOTWS-TSP), Areas of Responsibility and Areas of Service, and he presented the Earthquake Source Zone maps defined for each of the world’s four Tsunami Warning Systems. There was a discussion about the Red Sea and Gulf being outside the IOTWS Area of Responsibility and therefore no assessment of events with magnitudes less than eight is undertaken. It was broadly agreed by the Task Team that the IOTWS Key Performance Indicators (KPIs) were satisfactory and could be adapted for use by the other ICGs, and also that all TWS’s should develop a service definition document along the lines of the draft IOTWS document. Furthermore, it was decided that Tsunami Warning Focal Point (TWFP) and National Tsunami Warning Centre (NTWC) definitions would be harmonised across the ICGs.

**New Agenda Item – ITIC Tools**

Dr Laura Kong presented on the International Tsunami Information Center (ITIC) tools. The real-time earthquake display and alert system (CISN, published USGS solutions), TideTool (interactive sea level monitoring, PTWC software), and Tsunami Travel Time (TTT) were demonstrated.

7. **Communication Test Results**

Mr Peter Coburn presented the RTSP Performance Report from 1 November 2012 to 20 September 2013. He reviewed the results of the Communications Tests to date noting the
high response rate (23 countries) of the recent June 2014 test. NTWC web access and status reporting results up to December 2013 were presented (see figure below) and member states were urged to report their warning status on an RTSP website during tests and live events.

8. IOTWS RTSP Service Definition

Mr Peter Coburn reviewed the RTSP Service Definition document noting updates to the text made since the last Steering Group Meeting in Perth, December 2013. He highlighted nine areas of change. Mr Coburn will circulate a list of changes to the IOTWS RTSP Service Definition document and the rationale for each one to WG2 members.

**Action:** RTSPs to submit the RTSP Service Definition Document to Working Group 2 by the end of October 2014.

Dr Srinivasa Kumar commented that the Banda Sea and the Java Sea are joint Areas of Responsibility with the PTWS.

Dr Kong commented that beginning in October 2014, PTWC will not issue a forecast in the first ten minutes after an earthquake to avoid underestimation of the event and follow-on evacuation effects. PTWC will continue to release a bulletin immediately after the event, but it will no longer contain a magnitude. This generated comments that perhaps IOTWS-RTSPs should likewise not rush the initial threat assessment.

Dr Mark Leonard gave a presentation on earthquake fault scaling. He reviewed the seismotectonics of eastern Indonesia, the Makran trench and the Arabia Plate. There was a discussion about slow earthquakes and tsunamis generated by landslides.

**Action:** Dr Mark Leonard in coordination with the RTSPs to investigate the maximum earthquake magnitudes in the Gulf and Red Sea. RTSPs to then undertake tsunami modeling to assess the potential impact of such earthquakes, and recommend an appropriate RTSP service for these areas.
RTSP Indonesia has requested a back-up service for coverage in the Banda Sea and the Java Sea from the other IOTWS-RTSPs and the Secretariat will ask for a formal resolution on this in accordance with the TOWS recommendations.

**Action:** IOTWS Secretariat to seek clarification from RTSP Indonesia regarding its request for back-up service coverage in the Banda Sea and the Java Sea from the other IOTWS-RTSPs by August 2014 in coordination with the PTWS Secretariat.

Dr Kumar presented on the proposed version 5.2 of the IOTWS spatial layers and coastal forecast zones which extend the IOTWS Area of Responsibility northwards to the Java and Banda Seas, southwards to the southern tip of South Africa, and eastwards to Cape York in Australia.

**Action:** RTSP Indonesia and RTSP Australia to provide feedback on the coastal forecast zones proposed by RTSP India (version 5.2).

**Action:** Secretariat to share the new coastal forecast zones proposed by RTSP India with South Africa and to request the NTWC to provide feedback.

9. **Documentation**

Dr Shenoi discussed progress and timelines for the IOTWS User Guide and the RTSP chapter in the IOTWS Implementation Plan.

**Action:** WG2 Chair to oversee the completion of the RTSP chapter to the IOTWS Implementation Plan by the end of December 2014.

**Action:** RTSP Australia to circulate the draft Users Guide to the other RTSPs by the end of July. Comments from other RTSPs should be submitted to RTSP Australia by the end of August. The Secretariat should send the updated draft to WG2 members for review.

10. **IOWave14 Plans**

A separate IOWave14 Task Team meeting was held during the afternoon of 27 June 2014. Please refer to Annex 4 for the report of this meeting.

11. **Summary of Actions and Recommendations**

**Working Group 2 Actions:**

**Action:** Secretariat to request seismic and sea level station information to be received from Member States by end of September and make this information available on the ICG/IOTWS website by the end of October 2014.

**Action:** Secretariat to investigate using the password protected webpage on the ICG/IOTWS website to include Member State SOPs and their public warning link URLs.

**Action:** RTSPs to submit the RTSP Service Definition Document to Working Group 2 by the end of October 2014.
**Action:** Dr Mark Leonard in coordination with the RTSPs to investigate the maximum earthquake magnitudes in the Gulf and Red Sea. RTSPs to then undertake tsunami modelling to assess the potential impact of such earthquakes, and recommend an appropriate RTSP service for these areas.

**Action:** IOTWS Secretariat to seek clarification from RTSP Indonesia regarding their request for back-up service coverage in the Banda Sea and the Java Sea from the other IOTWS-RTSPs by August 2014 in coordination with the PTWS Secretariat.

**Action:** RTSP Indonesia and RTSP Australia to provide feedback on the coastal forecast zones proposed by RTSP India (version 5.2).

**Action:** Secretariat to share the new coastal forecast zones proposed by RTSP India with South Africa and to request the NTWC to provide feedback.

**Action:** WG2 Chair to oversee the completion of the RTSP chapter to the IOTWS Implementation Plan by the end of December 2014.

**Action:** RTSP Australia to circulate the draft Users Guide to the other RTSPs by the end of July. Comments from other RTSPs to RTSP Australia by the end of August. The Secretariat to send to WG2 members for review.

**IOWave14 Task Team Actions**

**Action:** The Secretariat will circulate a request for Member State scenario(s) being exercised and participation level prior to the exercise at the time the Exercise Manual is circulated.

**Action:** The Secretariat will request national contacts for the exercise to be nominated in the circular letter that announces the Exercise.

12. **Closing**

Dr Shenoi closed the Working Group 2 meeting at 1:30pm.
# Annex 1

**Intersessional Meeting of ICG/IOTWS Working Group 2 on Tsunami Detection, Warning and Dissemination**

**Hyderabad, India**  
**June 27, 2014**

## Agenda

<table>
<thead>
<tr>
<th>Item</th>
<th>Time</th>
<th>Topic</th>
<th>Lead / Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0900</td>
<td>Opening and Session Organisation</td>
<td>Satheesh Shenoi</td>
</tr>
<tr>
<td>2</td>
<td>0915-0930</td>
<td>Status Reports from RTSPs</td>
<td>RTSPs &amp; NTWCs</td>
</tr>
<tr>
<td>3</td>
<td>0930-</td>
<td>Status of implementation of the IOTWS Seismic Stations</td>
<td>Mark Leonard</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Status of implementation of the IOTWS Sea Level Stations</td>
<td>Secretariat</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Outcome of the ICG/IOTWS Steering Group Meeting</td>
<td>Secretariat</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Outcome of the TOWS-WG Task Team on Tsunami Watch Operations meeting, Paris, February 2014</td>
<td>Srinivasa Kumar</td>
</tr>
<tr>
<td>7</td>
<td>1030</td>
<td>Communication Test Results</td>
<td>Peter Coburn</td>
</tr>
<tr>
<td>8</td>
<td>1100-1230</td>
<td>IOTWS RTSP Service Definition</td>
<td>Srinivasa Kumar/Peter Coburn/Mark Leonard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Area of Responsibility (joint areas with PTWC, Service for Red Sea and Gulf region)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- New spatial layers (CFZ, CFP, ESZ)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RTSP Public Bulletin Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Procedure for cancelling or revising tsunami bulletins</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RTSP Performance Indicators</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Harmonisation of RTSP websites</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Document finalisation</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1230-1245</td>
<td>Documentation</td>
<td>Satheesh Shenoi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IOTWS User guide</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RTSP chapter in IOTWS Implementation Plan</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1245-1300</td>
<td>IOWave14 Plans</td>
<td>Peter Coburn</td>
</tr>
<tr>
<td>11</td>
<td>1300</td>
<td>Closing</td>
<td>Satheesh Shenoi</td>
</tr>
</tbody>
</table>
Annex 2

Intersessional Meeting of ICG/IOTWS Working Group 2 on Tsunami Detection, Warning and Dissemination
27 June 2014
Hyderabad, India

MEETING PARTICIPANTS

WG2 Chair

Dr Satheesh SHENOI
Director
INCOIS
"Ocean Valley", Pragati Nagar, Nizampet P.O.
Hyderabad
Telengana
500090
India
Tel: +91 40 23895000
Fax: +91 40 23895001
Email: shenoi@incois.gov.in

Participants

Mr Abdullah AL-SABRI
Director
Department of Meteorology
Hadda St
Sana’a
Yemen
Tel: +967-711918619
Fax: +967-1231217
Email: alsabriagm@yahoo.com

Mr Francois ALBERT
Director of Tsunami Early Warning System
Seychelles Meteorological Services, Ministry of Environment, Natural Resources and Transport
PO Box 1145, Pointe Larue
Mahé
Seychelles
Email: f.albert@meteo.gov.sc

Mr Joseph AMOLLO
Chief Meteorologist
Kenya Meteorological Department
Kenya Meteorological Department, P.O Box 30259
Mr Jean Bernardo ANDRIANAIVOARISOA
Researcher
Institute and Observatory of Geophysics in Antananarivo (IOGA)
Institute and Observatory of Geophysics in Antananarivo (IOGA)
P.O. Box 3843
101 Antananarivo
Madagascar
Tel: +261 22 301 82
Email: andrijb08@gmail.com

Mr Peter COBURN
Operations Manager
Joint Australian Tsunami Warning Centre
Bureau of Meteorology, Melbourne
700 Collins Street
Docklands
GPO Box 1289
Melbourne VIC 3001
Australia
Email: p.coburn@bom.gov.au

Mr Yedi DERMADI
Staff of Earthquake Management Operation Subdivision
Indonesian Meteorological Climatological and Geophysical Agency
Head Office
Jl. Angkasa 1 No.2
Kemayoran
Jakarta Pusat 10720
Jakarta
Indonesia
Email: ydermadi@yahoo.com

Mr Ibrahim HUMAID
Assistant Geologist
Maldives Meteorological Service
Hulhule
22000
Maldives
Tel: + 960 797 5954 / 332 3084 / 332 3302
Padmanabham JIJJAVARAPU  
Indian National Centre for Ocean Information Services  
"Ocean Valley"  
P.B No.21  
IDA Jeedimetla P.O  
Hyderabad 500 055  
India  
Email: padmanabham@incois.gov.in

Mr Mohammad Hossein KAZEMINEZHAD  
Assistant Professor, (PhD)  
Iranian National Institute for Oceanography (INIO)  
No. 9, Etemad Zadeh St.  
West Fatemi Ave.  
1411813389 Tehran  
Iran Islamic Rep of  
Tel: (098)2166944867  
Email: mkazeminezhad@inio.ac.ir

Dr Laura KONG  
Director ITIC  
UNESCO IOC NOAA International Tsunami Information Centre  
737 Bishop Street, Suite 2200  
Honolulu Hawaii 96813 USA  
United States  
Tel: 1-808-532-6423  
Fax: 1-808-532-5576  
Email: laura.kong@noaa.gov

Mr Patanjali KUMAR  
Scientist ‘C’  
Indian National Centre for Ocean Information Services  
"Ocean Valley",  
Pragathi Nagar (BO), Nizampet (SO)  
Hyderabad-500090  
Hyderabad 500090  
Andhra Pradesh  
India  
Tel: 23886067  
Email: patanjali@incois.gov.in

Dr Mark LEONARD  
Research Scientist
Mr Samwel MBUYA
Manager of Forecasting Services
Tanzania Meteorological Agency, Zanzibar Office Division
Tanzania Meteorological Agency
P.O. Box 3056
Dar es Salaam
Tanzania
Tel: +255 764 750980
Fax: +255 22 2460735
Email: samwel.mbuya@meteo.go.tz

Mr Mussa MUSTAFA
Chief
Instituto Nacional de Meteorologia
Rua de Mukumbura, 164, C.P. 256
Maputo
Mozambique
Tel: 258 1 490 148
Fax: 258 1 490 148
Email: mussa_m@inam.gov.mz

Mr Ayub Shaka MWADALI
Senior Assistant Director
Kenya Meteorological Department
P.O. Box 30259
Nairobi 00100
Kenya
Tel: +254 72-2747738
Fax: +254-20-3876955
Email: mwadali@meteo.go.ke

Dr Sugeng PRIBADI
Analyst
Indonesian Meteorological Climatological and Geophysical Agency
Head Office
Jl. Angkasa 1 No.2
Kemayoran
Jakarta Pusat 10720
Jakarta
Indonesia
Mr Aliani Toiha SAIFOU-DINE  
National Agency of Civil Aviation and Meteorology  
B.P. 72  
Moroni  
Comoros  
Tel: +269 7733924/3343924  
Fax: +269 7730948/7738003  
Email: alianitoiha@yagoo.fr

Mr Dipankar SAIKIA  
Indian National Centre for Ocean Information Services  
"Ocean Valley"  
P.B No.21  
IDA Jeedimetla P.O  
Hyderabad 500 055  
India  
Email: dipankar.s@incois.gov.in

Secretariat

Mr Tony Elliott  
Head of ICG/IOTWS Secretariat  
IOC/UNESCO Perth Programme Office  
c/o Bureau of Meteorology  
PO Box 1370, West Perth  
1 Ord St Street  
Perth WA 6872  
Australia

Ms Nora Gale  
Assistant Programme Specialist  
ICG/IOTWS Secretariat  
IOC/UNESCO Perth Programme Office  
c/o Bureau of Meteorology  
PO Box 1370, West Perth  
1 Ord St Street  
Perth WA 6872  
Australia
Annex 3

Outstanding Working Group 2 Actions from ICG/IOTWS Steering Group Meeting
Perth, Australia
10-11 December 2013

Action: WG1 chair to work with WG2 and WG3 chairs to develop material on tsunami risk assessment, preparedness and management relating to ‘Disaster Resilience in the Built Environment’. Outstanding

Action: Secretariat to assess logs after communication tests and follow up on an individual Member State basis. To be done following this recent June 2014 comms test

Action: Secretariat to request MS to share their SOPs, URL for tsunami warnings (if available), and examples of warning products. Feedback from Jakarta SOP workshop was that it was not so easy for Secretariat to collect SOPs, but SOPs can be shared between Member States. SOPs link can be included on password protected section of ICG/IOTWS website.

Action: Secretariat to issue biannual RTSP updates on new developments with communication tests. Not started, needs follow-up. This can be distributed with the comms test report. Input from the RTSPs is required.

Action: RTSPs to work on formats of (public) bulletins. It is suggested to use a similar format to the Exchange Bulletins (i.e. Type 1-4), but to avoid confusion between the two. Ongoing, part of RTSP service definition document. ‘Formats’ refers to referral sections in the Bulletins.

Action: RTSPs to issue public tsunami bulletins at the same time as tsunami exchange bulletins. Ongoing, part of RTSP service definition document

Action: Geoscience Australia to update the map of IOTWS earthquake source regions to include seismicity north of Timor. Ongoing, INCOIS & GA work in progress. Note source regions in Banda and Java Seas.

Action: RTSPs to implement the naming convention for tsunamigenic earthquakes/tsunamis decided on by TOWS-WG (i.e. Flinn Engdahl + year with sequentially numbered events in the same year and region). Ongoing, part of RTSP service definition document

Action: WG Chairs to submit Implementation Plan input for their strategic pillars to ICG chair by March 2014. Needs action

Action: RTSPs to update the IOTWS Users Guide with a view to finalizing by the end of March 2014. RTSP Australia to circulate the draft Users Guide to the other RTSPs by the end of July. Comments from other RTSPs to RTSP Australia by the end of August.
Annex 4

Report of the IOWave14 Task Team Meeting
Hyderabad, India
27 June 2014

1. Exercise Objectives (compare with IOWave11)
IOWave14 will be conducted on 9th and 10th September, 2014. Mr Peter Coburn reviewed the exercise objectives as per the IOWave Exercise Manual. Mr Elliott reviewed the four Terms of Reference of the IOWave14 Task Team.

2. Exercise scenario and timings
Mr Coburn presented the IOWave14 presentation that he presented in the SOP Workshop earlier in the week. He reviewed the two scenarios and presented propagation and impact maps.

**Action:** The Secretariat will circulate a request for Member State scenario(s) being exercised and participation level prior to the exercise at the time the Exercise Manual is circulated.

**Action:** The Secretariat will request national contacts for the exercise to be nominated in the circular letter that announces the Exercise.

3. Confirmation of RTSP participation
Mr Peter Coburn confirmed that RTSP Australia will be participating in both scenarios and re-iterated that it will be conducted in real-time. Dr Srinivasa Kumar also confirmed RTSP India will be running both scenarios in real-time. Dr Yedi Dermadi also confirmed that this will be the case with RTSP Indonesia.

4. Exercise structure and levels of Member State participation
Mr Coburn invited Member States to comment on their anticipated level of participation. Mr Ardito Kodijat and Dr Harkunti Rahayu reminded the meeting of the five types of exercises (i.e. workshop, drill, table top, functional and full-scale). Australia’s NTWC and DMO will participate, but not the media or the public. The Secretariat noted that the UNESCAP Project target countries of Timor Leste, Bangladesh, and Myanmar are hoped to participate down to at least the Disaster Management Organisation level.

5. Preparation and content of Exercise Manual; Review of evaluation section content and mechanism
Mr Coburn shared the Table of Contents of the IOWave11 exercise manual. We will follow the structure of the first three chapters of the Manual. It was agreed to include visual maps of the scenario in the manual. Bulletins will not be included in the Exercise Manual. They will be sent out as a package beforehand and also released on the day in real-time.

The Post Evaluation Section was discussed. Dr Laura Kong shared her experience from past exercises. Mr Coburn presented the contents of the evaluation form for National Tsunami Warning Centres. Mr Elliott noted that each evaluation form relates to the six core objectives of the exercise. Following IOWave11 there were several questions that Member States that needed to be clarified regarding questions on the evaluation form, which resulted in delays submitting the completed evaluation forms.
There was discussion about the amount of time required to complete the feedback forms. Dr Srinivasa Kumar suggested that 3 months was appropriate. The Task Team was aiming for a 1 month turn around for evaluation form submission. Dr Kong commented that big countries require substantial time and that the form should be shortened if the response time is limited. The PTWS uses an online tool (Survey Monkey), which saves time in completing and compiling evaluations. Dr Kong is familiar with Survey Monkey and has offered her assistance. Mr Ardito Kodijat noted that the UNESCAP project is due to finish in December, so the time period for evaluation reporting is critical.

Member States will be requested to submit IOWave14 evaluation forms soon after the event. The Task team will compile a report on the exercise and present it to the ICG for approval in March 2014.

6. **Publicity and Press Release**
Mr Elliott commented that publicity is very important to get participation of stakeholders involved and engage/inform the public. IOC UNESCO will issue a press release one week prior to the exercise. This press release will be circulated to all Member States via the TNCs. Individual countries are urged to issue one or two press releases themselves, depending on their level of participation.