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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
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INFORMATION DOCUMENT

**DRAFT STRATEGY AND PLAN 2009–2010
FOR THE REGIONAL TEWS'S WITHIN THE FRAMEWORK FOR A GLOBAL OCEAN-
RELATED HAZARDS WARNING AND MITIGATION SYSTEM FRAMEWORK (GOHWMS)
AND IMPLEMENTATION OF TOWS-WG RECOMMENDATIONS**

Summary: Based on Resolution EC-XLI.6, this draft strategy and plan provides a short- to medium-term framework to support the implementation of a global tsunami and other sea level-related hazards warning and mitigation system. In the short-term term, it addresses preliminary actions that are prerequisite to harmonize activities and planning among the four intergovernmental coordination groups for regional tsunami warning systems (TWS); in the medium-term, it addresses core actions for the implementation of such ocean-wide TWS within the GOHWMS framework ensuring close cooperation with other relevant IOC programmes and bodies as well as related UN agencies and bodies. An updated version of the draft strategy and plan, based on the review of the ICGs, will be submitted to the 43rd Executive Council in 2010 for adoption.

**DRAFT STRATEGY AND PLAN 2009–2010
FOR A GLOBAL OCEAN-RELATED HAZARDS WARNING AND MITIGATION SYSTEM
FRAMEWORK (GOHWMS) AND IMPLEMENTATION OF TOWS-WG RECOMMENDATIONS**

Background

Resolution EC-XLI.6 requested:

- (ii) *the Executive Secretary to prepare, in consultation with the co-chairs of the TOWS-WG and the ICG chairs, a strategy and plan to support implementation of the Global Ocean-related Hazards Warning and Mitigation System Framework and TOWS-WG recommendations, to be provided to the TOWS-WG at least one month in advance of its next meeting.*

This document presents a preliminary draft of such strategy and plan based on the provisions of Resolution EC-XLI.6, Resolution XXIV-14, the Framework Document of the Ad Hoc Working Group for Global Tsunami and Other Ocean-related Hazards Warning and Mitigation System Framework (GOHWMS), and the recommendations of the First Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG) (Paris, 3–4 April 2008) and of the Global Meeting of the Intergovernmental Coordination Groups for Tsunami Warning Systems (Global TWS) (Paris, 24–27 March 2009). The current draft was integrated by the Second Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG) (Paris, 27 March 2009).

Purpose

This strategy and plan provides a short- to medium-term framework to support the implementation of a global tsunami and other sea level-related hazards warning and mitigation system. In the short-term term, it addresses preliminary actions that are prerequisite to harmonize activities and planning among the four intergovernmental coordination groups for regional tsunami warning systems (TWS); in the medium-term, it addresses core actions for the implementation of such ocean-wide TWS within the GOHWMS framework ensuring close cooperation with other relevant IOC programmes and bodies as well as related UN agencies and bodies.

The draft strategy and plan advocates:

- (a) A more streamlined and coherent coordination and governance structure for the functioning of the ICGs and their working groups to maximize their success and sustainability building upon the experience and lessons-learned from other regions and thus effectively contributing to the GOHWMS framework. The effectiveness of this process strongly relies upon the involvement of other related IOC programmes and coordinating bodies.
- (b) A coordinated and integrated initial operational capability of regional TWS and related systems to provide early warning and mitigation on coastal inundation hazards caused by tsunamis, hurricanes, storm surges, and strong swells.
- (c) A resource mobilization plan based on assessed needs and agreed upon by relevant intergovernmental and governmental partners and funding agencies.
- (d) A coordination process for monitoring progress in the implementation of these tsunami and other sea level related hazards warning systems globally and reporting periodically on it to the IOC Governing Bodies.

Focus

The draft strategy and plan focuses on key areas in the implementation of this system of systems and necessary coordination process; it is organized into four main areas, broken down into elements:

Area A – Operation deals with requirements for **Observations, monitoring and data** (A.1), **Watch, warning and communication** (A.2), and **Capacity building, information exchange and community awareness raising** (A.3).

Area B – Coordination and governance deals with optimal **Structure of ICGs** (B.1), **Interaction between ICGs and IOC Governing Bodies** (B.2), and **Cooperation with other bodies** (B.3).

Area C – Financing deals with **Ensuring sustainable funding** (C.1) for the implementation of the regional systems contributing to the framework.

Area D – Monitoring and reporting deals with **Establishing a monitoring and reporting process** (D.1) to measure progress in the implementation of the plan and reporting on it to the IOC Governing Bodies.

Plan

The plan defines for each element a series of objectives, specific actions, relevant stakeholders, timeframe, and performance indicators.

Element A.1 – Observations, monitoring and data

For establishing an effective coordination within a system of regional warning systems within a global multi-hazard framework, the plan indicates core actions to satisfy requirements for the forecast of inundation caused by storm surges or swells under the regular process of meteorological and oceanographic event forecasting, and for the rapid detection of tsunamigenic phenomena (earthquake, volcanic eruption, landslide), verification of the wave generation (deep sea and sea level data), and analysis of its tsunamigenic character.

Priority actions are identified as follows:

A.1.1 If not already available yet, define, agree on and promote standards for observations, modelling and forecasting methods to generate harmonized alert messages:

(a) Establish an inter-ICG Task Team, comprised of a representative from each ICG, ideally directly involved with tsunami watch operations (see A.2.2 below).

A.1.2 Ensure exchange of seismic data for tsunami watch and warning in cooperation with CTBTO and others as appropriate:

(a) Based upon the IOC data exchange policy finalize with CTBTO an agreement about the provision of i.a. seismic data to TWCs

(b) Consult with the CTBTO Secretariat, and others as appropriate, the possibilities for improved exchange and standardization of real-time seismic data and coordination of training programmes for global seismic monitoring.

A.1.3 Provide technical implementation groups, such as GLOSS-GE (coastal sea level stations) and DBCP (deep ocean tsunameters), with user requirements and data stream information for sea level information required for providing real-time data for tsunami and other sea-level related hazards:

(a) Create a Task Team on sea level measurements requirements based on existing groups within the ICGs. The Task Team should:

- *Develop requirements for tsunami warning system sea level data, all characteristics of the data stream including networks and network design, for the information of relevant implementation groups;*
- *Review the provision and availability of sea level data as it pertains to tsunami warning systems and provide advice, as appropriate to GLOSS, DBCP and the ICGs;*
- *Provide a focal point for sea level issues within the family of ICGs.*

A.1.4 Promote the generation of high-resolution bathymetric data and use of digital elevation models to support risk assessment and warning functions:

(a) Collaborate with IHO including for the extension of the tasks of GEBCO.

A.1.4 Devote enhanced attention to ecosystem observations to support coastal hazard studies and vulnerability and post-hazard assessment programs:

(a) Task the Panel for Integrated Coastal Observation (PICO) with the implementation.

Element A.2 – Watch, warning, dissemination and communication

The plan defines actions related to telecommunication needs and standardization of watches and warnings and their dissemination.

A.2.1 Review and define global telecommunication needs for tsunami warning:

(a) JCOMM to undertake an analysis of telecommunication needs, including how to access GTS information and the issue of access beyond the National Meteorological and Hydrographic Services (NMHSs).

A.2.2 Building upon the experience in the Pacific and Indian Ocean define, agree on and promote standards and practices for tsunami watch and warning:

(a) Establishment of an inter-ICG Task Team reporting to TOWS-WG, comprised of a representative from each ICG, ideally directly involved with tsunami watch operations. The terms of reference are to:

- *Provide a focal point for the ICGs for coordination of tsunami watch operations among the Tsunami Warning Systems;*
- *Document current and proposed products, working through existing Regional Coordination Groups or their equivalents;*
- *Review terminology and recommend methods for harmonisation;*
- *Document responsibilities, coverage, limits and different architecture;*
- *Develop agreement on uniform standards, procedures and guidelines for tsunami watch operations; and*

- *Develop guidelines for review of tsunami watch operations.*
- (b) *Due to unevenly distributed capacity on an inter- and intra-regional level a number of nations do not have now, and may never have, the capacity to discharge their responsibilities fully. A nominated TWFP does not necessarily equate to a national capacity to respond. The WG agreed that this issue should be brought to the IOC for discussion and advice, perhaps seeking a secondary mechanism that may be activated in such cases*

Element A.3 – Capacity building, information exchange and community awareness raising

The plan indicates also actions related to capacity building, information exchange and community awareness raising campaigns, where coordination is needed not only within IOC but also with other contributors.

A.3.1 Ensure coordinated capacity building actions:

- (a) *Promote a dialogue and coordination among all relevant actors and potential donors/funders at a high level, to ensure consistency in messages and actions and optimize the response.*
- (b) *Establish an inter-ICG Task Team reporting to TOWS-WG to facilitate the exchange of experiences and information on preparedness actions, education/awareness raising campaigns and other matters related to coastal community disaster preparedness. This Task Team would in essence be the focal point of IOC programmes when coordinating requirements and priorities for related tsunami actions, such as initiatives with UNISDR and WMO. The terms of reference are to:*
 - *Promotion of disaster preparedness in coastal communities*
 - *Extension of programmes that have been successful in one region to other TWSs*
 - *Sharing of risk and hazard assessment tools and products*
 - *Potential for enhanced uptake of tsunami material in school curricula*
 - *Further consideration of the idea of a tsunami awareness day, possibly connected to the International Day for Disaster Reduction (8 October)*

A.3.2 Ensure coordinated information exchange and community awareness raising actions:

- (a) *Facilitate the sharing and development of risk assessment products among national and local civil defence and emergency authorities.*
- (b) *Promote the development of educational and awareness products and events, making use of the Tsunami Information Centres (TICs).*

Element B.1 – ICG Structure

The strategy and plan promotes a more streamlined structure of the ICGs, whereby a similar working group structure should be adopted by all ICGs, contributing to coordinated outputs and improved interoperability, but recognising the need for some working groups to address regional specific issues.

B.1.1 Ensure a harmonized working group structure that maps easily across all ICGs:

(a) Review and revise working group structure of all ICGs based on the results of the Global TWS Meeting and status of TWS implementation.

(b) ICGs Chairs to continue to consider on the implementation of the Framework for the Global Tsunami and Other Ocean-Related Hazards Early Warning System Framework (GOHWMS).

Element B.2 – Interaction between ICGs and Governing Bodies

Potential inefficiency in the operation of the ICGs and effective interaction between the ICGs and the Governing Bodies should be addressed with a view to streamlining and rationalising the input to IOC Governing Bodies. Only those matters requiring decision should be tabled, and in such a way as to harmonise the work of the IOC and introduce consistency.

B.2.1 Streamline and rationalize inputs from ICGs into Governing Bodies:

(a) Undertake a review of the inputs from the ICGs into the IOC Governing Bodies.

(b) Organize the Global TWS Meeting in conjunction with the meeting of the TOWS-WG.

Element B.3 – Cooperation with other bodies

Cooperation with both, other subsidiary bodies of IOC, at the scientific/technical and regional level as well as with other organizations like WMO/WWRP, UNISDR, SCOR, IUGG, and ICSU's Scientific Planning Group in Natural Disasters and Integrated Research on Disaster Risk (IRDR) Programme is necessary to ensure optimized coordination of ocean-related natural hazards warning and mitigation systems globally.

B.3.1 Optimize contribution of primary and secondary subsidiary bodies to TOWS:

(a) Consolidate and transition work with other bodies of IOC in defined areas (science, observations, services).

B.3.2 Enhance cooperation with other bodies and organizations:

(a) Explore cooperation with ICSU, especially its Scientific Planning Group in Natural Disasters and Integrated Research on Disaster Risk (IRDR) Programme, and other relevant organizations to ensure scientific inputs into the Tsunami Warning work.

(b) Establish a Task Team to facilitate the exchange of experiences and information on preparedness and awareness actions with—among others—UNISDR and WMO (see A.3.1 above).

Element C.1 – Sustainable financing

A resource mobilization plan is needed for the global integration of existing and planned observation and warning systems within a GOHWMS framework, agreed upon with all relevant contributors, other UN organizations, Member States, and international funding agencies.

C.1.1 Secure additional and sustainable financing for the implementation:

(a) Develop a coordinated resource mobilization plan for the GOHWMS Framework.

Element D.1 – Measuring progress and reporting to relevant bodies

The implementation and coordination process ensuring a global system of regional sea-level related hazards warning systems will be accompanied by a set of performance measures and periodic reporting to IOC governing bodies.

D.1.1 Measure performance and progress towards objectives contained in the plan of action:

(a) Establish means to monitor performance and report to IOC governing bodies on progress every two years.

Contributors

The implementation of the strategy and plan will require the contribution of different contributors. Key stakeholders of the strategy and plan will be (a) the IOC and its subsidiary bodies, especially the four regional ICGs, IODE, GLOSS, JCOMM, as well as relevant programmes in Ocean Sciences; (b) major UN and non-UN partners of IOC in the field of warning and mitigation systems and disaster reduction such as UNISDR, GEOSS and WMO, and (c) specialized international bodies like CTBTO, research seismic monitoring networks including FDSN, GSN, and national partners.

The following matrices contain a synthesis of the plan with timeframes and performance indicators.

Area A – Operation

Elements and objectives	Specific actions	Responsibility	Timeframe	Progress indicators
A.1 Observations, monitoring and data				
A.1.1 Define, agree on and promote standards for observations, modelling and forecasting methods to generate harmonized alert messages. [TOWS-WG1 Rec.]	<i>(a) Establish an inter-ICG Task Team, comprised of a representative from each ICG, ideally directly involved with tsunami watch operations (see A.2.2 below).</i>	ICGs, national TWCs	End 2010	Standards for observations, modelling and forecasting agreed and promoted.
A.1.2 Ensure exchange of seismic data for tsunami watch and warning building upon existing networks like FDSM, GEOPHON, IRIS and CTBTO. [TOWS-WG1 Rec.]	<i>(a) Based upon the IOC data exchange policy finalize with CTBTO an agreement about the provision of i.a. seismic data to TWCs (b) Consult with the CTBTO Secretariat, and others as appropriate, the possibilities for improved exchange and standardization of real-time seismic data and coordination of training programmes for global seismic monitoring.</i>	ICGs, CTBTO, FDSN, GSN, other seismic networks	End 2010	Seismic information harmonised and interoperable.
A.1.3 Provide technical implementation groups, such GLOSS and DBCP, with user requirements and data stream information for sea level information required for providing real-time data for tsunami and other sea-level related hazards. [Res. EC-XLI-6.]	<i>(a) Create a Task Team on sea level measurements based on existing groups within the ICGs.</i>	ICG WGs on sea level and warnings, JCOMM/GLOSS, JCOMM/DBCP, other sea level networks	End 2009	Sea level data information and network design requirements prepared through appropriate consultation and made available to technical implementation groups.
A.1.5 Promote the generation of high-resolution bathymetric data and digital elevation models [TOWS-WG1 Rec.]	<i>(a) Collaborate with IHO including for the extension of the tasks of GEBCO.</i>	ICGs, IOC	2009	Coastal bathymetry recognised as priority issue by IOC Governing Bodies.
A.1.4 Devote enhanced attention to ecosystem observations to support coastal hazard studies and vulnerability and post-hazard assessment programmes. [TOWS-WG1 Rec.]	<i>(a) Task the Panel for Integrated Coastal Observation (PICO) with the implementation.</i>	IOC, ICGs, PICO	2010	Coastal hazards studies undertaken.
A.2 Watch, warning, dissemination and communication				
A.2.1 Review and define telecommunication needs for tsunami warning. [TOWS-WG1 Rec.]	<i>(a) JCOMM to undertake an analysis of telecommunication need, including how to access GTS information and the issue of access beyond the NMHSs.</i>	ICGs, JCOMM	2010	Access to GTS for non NMHSs clarified with agreed mechanisms.

Elements and objectives	Specific actions	Responsibility	Timeframe	Progress indicators
A.2.2 Building upon the experience in the Pacific define, agree on and promote standards and practices for tsunami watch and warning. [TOWS-WG1 Rec.; Res. EC-XLI.6]	<i>(a) Establishment of an inter-ICG Task Team to review and harmonise regional tsunami watch operations</i>	ICGs, national TWCs	End 2009	Present and proposed arrangements documented and reviewed. Terminologies harmonised. Standard formats and procedures agreed. Guidelines for review of regional tsunami watch and warning operations developed.
	<i>(b) Review status of implementation of TWFPs</i>	IOC	End 2009	TWFPs requiring priority capacity building actions identified.
A.3 Capacity building, information exchange and community awareness raising				
A.3.1 Ensure coordinated capacity building actions. [TOWS-WG1 Rec.]	<i>(a) Promote a dialogue and coordination among all relevant contributors and potential donors/funders at a high level, to ensure consistency in messages and actions and optimize the response.</i>	ICG WGs, TOWS-WG, ICAM, UNISDR, national contributors, donors	2010	All relevant contributors and potential donors/funders engaged in sustained financing of ICGs work and programmes.
A.3.2 Ensure coordinated information exchange and community awareness raising actions. [TOWS-WG1 Rec.]	<i>(a) Facilitate the sharing and development of risk assessment products among national and local civil defence and emergency authorities.</i>	ICGs	End 2009	Extension of programs that have been successful in one region to other TWSs.
	<i>(b) Promote the development of educational and awareness products and events, making use of the Tsunami Information Centres (TICs).</i>	UNESCO/IOC, UNISDR, TICs	2010	TICs playing a relevant role in developing educational programmes and tools for TWSs.
	<i>(c) Establish a Task Team to facilitate the exchange of experiences and information on preparedness actions, education/awareness raising campaigns and other matters related to disaster management and preparedness.</i>	ICGs, UNISDR, WMO	2009	Task Team on community preparedness established and working by correspondence.

Area B – Coordination and governance

Elements and objectives	Specific actions	Stakeholders	Timeframe	Progress indicators
B.1 ICG Structure				
B.1.1 Ensure a harmonized working group structure that maps easily across all ICGs. [TOWS-WG1 Rec.; Res. EC-XLI-6]	(a) Review and revise working group structure of all ICGs based on the results of the Global TWS meeting and status of TWS implementation .	ICGs via the Chairs.	2010	ICGs Working Group structure streamlined.
	b) ICGs Chairs to continue to reflect on the implementation of the GOHWMS framework.	ICG Chairs.	2010	GOHWMS Framework reflected in ICG planning.
B.2 Interaction between ICGs and Governing Bodies				
B.2.1 Streamline and rationalize inputs from ICGs into Governing Bodies. [TOWS-WG1 Rec.]	(a) Undertake a review of the inputs from the ICGs into the IOC Governing Bodies.	TOWS-WG	Proposal to be submitted to 43 rd EC in 2010	New ICGs reporting structure adopted.
	(b) Organize the Global TWS meetings in conjunction with the meeting of the TOWS-WG.	ICGs, TOWS-WG	March 2009	Done for 2009.
B.3 Cooperation with other bodies				
B.3.1 Optimize contribution of primary and secondary subsidiary bodies to TOWS-WG. [TOWS-WG1 Rec.]	(a) Consolidate and transition or share work with other bodies of IOC in defined areas (science, observations, services).	Governing bodies and subsidiary bodies	2010	Evidence of joint or contributing activities in programme and budget.
B.3.2 Enhance cooperation with other bodies and organizations. [TOWS-WG1 Rec.]	(a) Explore cooperation with ICSU, especially its Scientific Planning Group in Natural Disasters and Integrated Research on Disaster Risk (IRDR) Programme, SCOR, WMO/WWRP, IGBP, IUGG	IOC Secretariat, WMO, UNISDR, ICSU, etc.	2010	Evidence of undertaken cooperation activities.

Area C – Financing

Elements and objectives	Specific actions	Stakeholders	Timeframe	Progress indicators
C.1 Sustainable financing				
C.1.1 Secure additional and sustainable funding and support for the implementation	(a) Develop a resource mobilization plan for the GOHWMS Framework.	IOC, other UN organizations, Member States, international funding agencies	2009 on	(i) Resource mobilization plan finalized and implemented. (ii) Level of resource acquired vs. assessed needs.

Area D – Monitoring and reporting

Elements and objectives	Specific actions	Stakeholders	Timeframe	Progress indicators
<i>D.1 Measuring progress and reporting to relevant bodies</i>				
D.1.1 Measure performance and progress towards objectives contained in the plan of action	<i>(a) Establish systems to monitor performance and report to IOC governing bodies on progress every two years.</i>	ICGs. TOWS-WG	2009–2013	(i) Monitoring and reporting system established. (ii) Progress reports every two years.

ANNEX

LIST OF ACRONYMS

CTBTO	Comprehensive Test Ban Treaty Organisation
DBCP	Data Buoy Cooperation Panel
FDSN	Federation of Digital. Seismological Network
GE	Group of Experts
GEBCO	General Bathymetric Chart of the Oceans
GOPHON	GEOFORschungsNetz (Geo Research Network)
GEOSS	Global Earth Observation System of Systems
GLOSS	Global Sea-Level Observing System
GOOS	Global Ocean Observing System
GOWHMS	ad hoc Working Group for Global Tsunami and Other Ocean-related Hazards Early Warning System
GSN	Global Sensor Networks
GTS	Global Telecommunication System
ICAM	Integrated Coastal Area Management Programme
ICG	Intergovernmental Coordination Group
ICSU	International Council for Science
IHO	International Hydrographic Office
IODE	IOC International Oceanographic Data and Information Exchange
IRIS	Incorporated Research Institutions for Seismology
IUGG	International Union of Geodesy and Geophysics
JCOMM	WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology
NMHS	WMO National Meteorological and Hydrological Service
NTWC	National Tsunami Warning Center
NTWFP	National Tsunami Warning Focal Point
PICO	Panel for Integrated Coastal Observation
SCOR	Scientific Committee on Oceanic Research
TIC	Tsunami Information Centre
TOWS-WG	Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems
TWFP	Tsunami Warning Focal Point
TWS	Tsunami Warning System
UN	United Nations

UNISDR	United Nations International Strategy for Disaster Reduction
WG	Working Group
WMO	World Meteorological Organization
WWRP	World Weather Research Programme

Intergovernmental Oceanographic Commission (IOC)
United Nations Educational, Scientific and Cultural Organization
1, rue Miollis
75 732 Paris Cedex 15, France
Tel.: +33 1 45 68 10 10
Fax: +33 1 45 68 58 12
<http://loc.unesco.org>