## Annex II: Grant Application Form

Multi-donor Voluntary Trust Fund on Tsunami Early Warning Arrangements in the Indian Ocean and Southeast Asia

### A. Overview

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<td>LIST OF SUPPORTING ORGANIZATIONAL DOCUMENTS</td>
<td>On file with IOC/UNESCO Note: All Annexes referred to in this document are Annexes specific to this document. They can be provided upon request.</td>
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| 3 | FOCAL POINT AT ORGANIZATION AND RELEVANT CONTACT INFORMATION | Dr. Peter Koltermann  
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<p>| 4 | PROJECT TITLE | Strengthening Tsunami Warning and Emergency Responses: Training Workshops on the Development of Standard Operating Procedures for Indian Ocean and Southeast Asian Countries |
| 5 | BENEFICIARY COUNTRIES | Indian Ocean and Southeast Asian Countries in UNESCO region with borders to the Indian Ocean and/or western Pacific marginal seas that can be affected by tsunamis and earthquakes, including Bangladesh, Brunei Cambodia, China, Iran, India, Laos, Maldives, Sri Lanka, Pakistan, Philippines, Myanmar, Thailand, Malaysia, Singapore, Indonesia, |</p>
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<td>TOTAL BUDGET (US$) AND BREAKDOWN OF FUNDS</td>
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Executive Summary

This Project seeks to strengthen existing tsunami warning and emergency responses through training workshops and capacity building missions to assist countries in the development of Standard Operating Procedures (SOP) as part of their Tsunami Warning Center and Tsunami Emergency Response Plans (e.g., Annexes I and II).

National Tsunami Warning Centers (NTWC) are currently being developed in the Indian and South China Sea regions. The NTWC, as the Tsunami Warning Focal Point (TWFP) with the responsibility of receiving international tsunami advisories and issuing official tsunami warnings within their own country, must have robust, well-tested tsunami warning standard operating procedures. When warnings are issued, Disaster Management Organizations (DMO) must then have equally well-practiced tsunami emergency response standard operating procedures to ensure an efficient rapid response that will evacuate people out of tsunami inundation zones before the wave’s arrival. These are concepts endorsed by Member States of the IOC/UNESCO Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System, whose Member States have long and valuable working experience in tsunami hazard mitigation.

Currently, most countries do not have well-tested protocols and procedures. This conclusion is based on polling and discussions of 23 countries participating in the Regional Tsunami Workshop on Mitigation, Preparedness and Development of Tsunami Early Warning Systems in the Indian Ocean Region 14-16 June 2006 (Annex VII), 20 countries participating in the Third session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System 3-5 August 2006 (Annex VIII), 20 countries attending the IOC/UNESCO XXth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System 1-5 May 2006 (Annex IX), 14 countries attending the International Round Table Dialogue on Earthquake & Tsunami Risks in Southeast Asia and the South China Sea Region 27 - 28 April 2006 (Annex X), 11 countries responding to the IOTWS WG 6 Capacity Questionnaire (Annex III), and the conclusions of the ESCAP-funded Mapping Study on Tsunami Early Warning Systems in the Indian Ocean and Southeast Asia (Draft, December 2006, Annex XI).

In order to ensure standards of interoperability and consistency in evaluation and warning message content, regionally coordinated approaches are needed to support the
development of effective end-to-end Tsunami Warning Response Plans (TWRP) and Standard Operating Procedures (SOP) for tsunami early warning systems. Further, there is a need to stimulate technical and institutional capacity building and through this, agreement and implementation of regionally-transferable procedures for the rapid exchange of data and event information related to a potentially damaging events.

For an effective warning system, Disaster Management Organizations (DMO), or their equivalent, from all levels of government should be responsible for public safety, health and welfare of the people and community during natural or man-made disasters. Disaster Management Organizations and other government and non-government organizations must develop Tsunami Emergency Response Plans (TERP) and accompanying Standard Operating Procedures and Checklists to properly coordinate and execute rapid and massive public coastal evacuations in response to a Tsunami Warning Center’s notification of an approaching tsunami on a 7x24 basis. TERP should be developed as part of an organization’s broader multi-hazard Emergency Plans.

Both tsunami early warning systems and disaster management must ultimately be integrated into national, provincial, district and village levels to strengthen a community’s capacity to respond appropriately to tsunami warnings and cope with disaster.

The Project is designed as a Regional Project in which a standard, generic set of COP, SOP, checklists, and flow charts will be provided as a common starting point. These materials, derived from best practice experiences of existing systems in the Pacific and especially from Japan and the USA, are intended to constitute a set of globally-consistent procedures and protocols for tsunami warning and emergency response. From this common point, the Project proposes to undertake Country-dedicated missions using practicing and/or well-experienced experts to assist in the development of responses specific to their needs and requirements.

For this, one Regional Training Workshop is planned to provide guidance, templates, and best practices to countries across the IOTWS region; the workshop will be conducted at the beginning-to-middle of the Project period to introduce the concepts and provide reference materials. A second Regional Best Practices Workshop is proposed, but is not financially possible under the current budget limit within the provisional approval. Four Country-dedicated, multi-mission technical assistance sub-projects will be carried out over a 6-8 month period in order to work directly with the country to build understanding and capacity to develop sound tsunami warning and emergency response SOPs; the sub-Projects will consist of technical assessment and recommendations to strengthen each country’s protocols and procedures, development of or improvement upon their existing SOPs, and conduct of a types of drill, such as a tabletop exercises, to evaluate the feasibility of the developed SOPs. Additionally, it is intended that under separate funding, this approach will also continue to assistance Indonesia, as well as assist Sri Lanka and the Maldives.

Note: This proposal is being submitted through the IOC of UNESCO in collaboration with the ITIC. The ITIC was established by Resolution IV-6 of the Fourth Session of the IOC in 1965.
B. What specific institutional, technical, system-wide or other capacity building needs does this project intend to address? What has already been done or is ongoing to address these needs? What capacity niche will the project fill that is not currently being fulfilled?

This Project is designed strengthen national capacities to carry out effective “End to End” Tsunami Response. The Response will need to involve a variety of stakeholders:

An effective response occurs when tsunami warning centres immediately and reliably detect, evaluate, and issue clear, concise, and useful tsunami threat evaluations and other information products to emergency authorities and the public, and emergency operations centres then immediately initiate procedures to notify all persons in vulnerable communities of an approaching tsunami and then to oversee the movement of affected persons to safety zones. Disaster Management Organizations and other first responders such as the police are often the mobilizing force instructing the public to evacuate. Because tsunamis are rapid-onset crises requiring immediate action with little or no time available for discussion, all required responses, known as Standard Operating Procedures (SOP), should be pre-planned and agreed upon, already-practiced through pre-event exercises or drills, and well-coordinated among the responding stakeholders.

Standard Operating Procedures (SOP, e.g., Annexes I and II) are the mechanism for operating effective and reliable warning systems and disaster management systems. This project seeks to directly address this important and complex issue.

A number of countries in the Pacific, where tsunamis are a known hazard, have developed operational SOPs for tsunami warning and emergency response. The Project will take advantage of the expertise and existing materials to develop templates for use during the Trainings. Since 26 December 2004, many countries in the Indian Ocean and Southeast Asia have taken steps to increase tsunami awareness and preparedness for the next tsunami, including the establishment of Tsunami Warning Centres and Tsunami Warning Focal Points to receive international advisories and then act upon the information as the national authority to ensure public safety. Many of these activities have been undertaken as direct action steps resulting from guidance provided by information sharing by the UNESCO IOC’s International Tsunami Information Centre and Member States of the 40-year old UNESCO IOC Pacific Tsunami Warning and Mitigation System, and through the consultative activities under the aegis of the IOC/UNESCO Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System and the Pacific Tsunami Warning and Mitigation System.

The ITIC plans to provide assistance according to the following Concept of Operations for “End to End” Tsunami Response:

- In order to implement a successful Global Tsunami Early Warning and Mitigation System, Tsunami Warning Centres and Disaster Management Organizations at all levels of government (national, provincial, district and local levels) require pre-event development of documents describing their responses and actions.
These documents include Tsunami Event Alarm Response Plans (by the TWC), and Tsunami Emergency Response Plans (by Emergency Centres after receiving the TWC alert), Standard Operating Procedures (SOP) to follow, and Response Checklists that are followed to enable quick processing and action to be taken, on a 24 x 7 basis. For the TWC, this may mean the issuance of a warning within 5 minutes, and for the NDMO, this would mean the immediate alerting of communities and households, and as required, conduct the evacuation of people out of the expected flooding zone. An SOP is a set of written instructions that document a routine, or repetitive activity followed by an organization. These documents and procedures must be linked at all levels from international to national to local institutions for TWC’s, and each TWC’s documents and procedures must to linked to the corresponding Emergency Operations Agencies, and vice versa.

National TWC and DMO must create and customize Tsunami Response documents to meet their country’s needs. The documents form the basis on which to conduct routine exercises and drills to ensure response procedures can be effectively enacted on a 24 x 7 basis. They are the minimum requirements for the establishment and efficient, timely functioning of regional end-to-end TEWS.

National or Regional Tsunami Warning Centres (TWC) should transmit Tsunami Messages via multiple communication paths to established 24 x 7 government national, provincial, district, and/or local level emergency office or operations command centre. If TWC messages are simultaneously being transmitted to media and thus to the general public, media training should be conducted.

Upon receipt of TWC Tsunami Message, Disaster Response Agencies will implement their TERPs; SOP’S, and checklists. Agencies will interpret the tsunami message and determine proper course of action. If a Tsunami Warning is issued for their coastal jurisdiction, begin public notifications and implement public evacuation plans.

The IOC Project proposes to strengthen tsunami emergency response procedures through the emphasis on standard operating procedures. The Project will provide information and guidance on how to develop new and/or strengthen and streamline existing protocols and procedures, or SOP’s. These SOP’s cover a number of concept of operation activities to produce an “End to End” process, ranging from communication procedures and checklists, to the conduct of public coastal evacuations, coordination of stakeholders and the roles and jurisdictions for government, non-government, and private sector.

The IOC Project seeks to strengthen processes, emphasizing the linkages and coordination from international to national to provincial and local community levels. It strives for a holistic approach, and will work with the relevant players at the international and country levels to achieve the Projects goals.

Within this context, in which success requires parallel actions in a number of related but different activities, an IOTWS WG 6 Capacity Questionnaire (January 2007, Annex III) showed that 70-90% had requested assistance for activities described above.
To date, the ITIC has only provided assistance, in collaboration with the UNDP, in Indonesia where it has spent from September 2006 through February 2007 helping the National Tsunami Warning Centre and Local organizations to understand the important value of using SOPs, what SOPs are and how they are used, and how to use drills and exercises to test the feasibility of the SOPs (Annex IV). In 2007, the plan is to continue the support, subject to funding, to establish the necessary linkages between national and local responsible organizations (Annex V). The ITIC has not provided any in-depth assistance to any other country to date, but has provided some sample templates to a few Pacific countries during its 2-week ITIC Training Programme in October 2006 (Annex VI).

C. How was the problem identified and the project designed? Which entities (organizations and/or individuals) were consulted? For each organization, briefly explain the process and reasons for consultation.

In the aftermath of the 2004 Sumatra tsunami, the IOC was acknowledged as the lead UN agency, based on its experience with the 40-year old operational Pacific system, for the coordination of an Indian Ocean Tsunami Warning and Mitigation System. During this time, the PTWC and JMA as the existing operational centers, the ITIC as the IOC’s lead tsunami warning system information resource, and PTWS tsunami experts consulted extensively with countries, participated in tsunami capacity assessment missions, and provided numerous informational presentation on how to build an end-to-end tsunami warning and mitigation system. These experts learned firsthand that much work would need to be done by each country to develop good capacities to mitigate against tsunamis. The collective recognition by these practicing Tsunami Experts is in large part the prime motivation for this proposal by the ITIC.

Additionally, several meetings and workshops in 2006 have provided further justification for the need, and several are summarized below.

A Regional Workshop on Mitigation, Preparedness and Development of Tsunami Early Warning Systems in the Indian Ocean Region was convened in Bangkok by the ISDR Secretariat, IOC/UNESCO, and UNESCAP from 14-16 June 2006 (Annex VII). 23 Indian Ocean and Southeast Asian countries attended. The workshop endorsed recommendations on how to integrate tsunami early warning systems into disaster risk reduction and development planning; initiatives on strengthening of national disaster preparedness and mitigation in the Indian Ocean region; and the intention expressed at the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System at its second session (ICG-IOTWS-II) in Hyderabad, 14-16 December 2005, to develop a working group on the societal aspects of tsunami early warning systems. The workshop agreed that the societal aspects of tsunami early warning systems are fundamentally critical to the effectiveness of the systems, but have not been given sufficient attention to date. Several participants emphasized that technology alone, while important, cannot save lives and reduce property damage alone. There is an overall need to strengthen tsunami warning and mitigation both upstream and downstream to the last kilometer on the beach.

The workshop recommendations included the implementation of Standard Operating Procedures, which are a “foundation of effective, reliable warning systems, and must be
tailored to the chosen form of the warning system. Countries may need to assess the strengths and weaknesses of their existing systems and take steps to address gaps for the development and implementation of standard operating procedures.” Additionally, the workshop proposed a regional coordination mechanism to support the development of effective national standard operating procedures for tsunami early warning systems. Standard Operating Procedures coordinate decision-making processes, which were also included as workshop recommendations. See Annex VII.

The need for capacity building and technical assistance has been identified from discussions and polling at other recent meetings, including the 20 countries participating to the Third session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System 3-5 August 2006 (Annex VIII), the 20 countries attending the IOC/UNESCO XXth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System 1-5 May 2006 (Annex IX), and the 14 countries attending the International Round Table Dialogue on Earthquake & Tsunami Risks in Southeast Asia and the South China Sea Region 27 – 28 April 2006 (Annex X).

Finally, the current situation is reflected by the results of the Mapping Study on Tsunami Early Warning Systems in the Indian Ocean and Southeast Asia, draft December 2006 (Executive Summary, Annex XI), and also by the results of a Questionnaire asking to IOTWS WG 6 Member States in January 2007 (WG6 Report, Annex III). The results of these two studies show an urgent need to build up the capacity of countries. The Mapping Study reports that all countries except Indonesia, Sri Lanka and Thailand, lack SOPs that are adequate to provide and respond to tsunamis in a timely manner. The WG 6 Capacity Questionnaire showed that only 36% of the 10 respondents have this capacity, and 90% require assistance to develop it; while not representative, it did provide an indication of areas where high priority should be given.

The Project plans to further consult with the IOTWS WG 6 regarding the workplan and implementation of this Project once it is officially approved, and can provide Project updates to the group if requested. For this, the Project will work through the ICG/IOTWS Secretariat and the Chair/Vice-Chair of IOTWS WG 6.

The IOC Project focuses on the end-to-end product of tsunami warning by strengthening the processes of the tsunami warning centre to issue useable tsunami alerts rapidly and the processes of emergency officials to take action based on the tsunami advisory. Success is achieved when all are in coordination and act quickly without confusion to move people out of harm’s way during a real event, and chances for success are increased through exercises and drills that build preparedness for response.

D. Briefly describe the group of persons whose capacity the project aims to build (“target group”).

The proposal has two “target groups.” These are the 1) Regional and National Tsunami Warning Centers (TWC)/National Disaster Warning Centers whose mission is to provide early detection and evaluation of the threat, and notify the appropriate
authorities (DMO/EOC) and the public in a reliable, accurate, and timely manner with useful information appropriate for each customer; and the 2) National Disaster Management Organizations (DMO) / Emergency Operations Centers (EOC), whose mission is to ensure public safety by evaluating the threat provided by the TWC and taking action to advise communities and individuals if there is a need to evacuate. Both groups must be reliable and consistent in their services, and possess redundant communications for the receipt of data and issuance of information messages.

Where there might be overlap in the responsibilities of these organizations, or where the responsibilities are placed on other agencies, the Project will decide the targets with further consultation with the country. The Regional Trainings will invite all of the above to participate, and also consult to the Focal Points of the ICG/IOTWS WG 6. The in-country support will also target the same groups, but work with these entities to bring in other key national and local stakeholders, as appropriate.

The criteria for country selection would consider the country’s present level of SOP preparedness, the level of in-country support from the UNDP Country Office and other international consultants (knowing that this is essential for the local SOP component), the hazard or actual threat (and thus the urgency of which the assistance is needed).

It is recognized that the current level of support does not enable many countries to receive direct in-country assistance. To allow for greater participation, the Project will consider, subject to the approval of the target country, inviting neighbouring countries to participate to training missions. Additionally, the IOC ITIC will continue to work in partnership with the UNDP to continue to provide assistance to Indonesia, and subject to funding, assistance to Sri Lanka and the Maldives (Annex V).

E. What is the overall strategy of the project in addressing the problem referred to in Section B? Which other options were considered and rejected (explain why)?

For this Project, in order to ensure standards of interoperability and consistency in evaluation and warning message content, regionally coordinated approaches are needed to support the development of effective end-to-end Tsunami Warning Response Plans (TWRP) and Standard Operating Procedures (SOP) for tsunami early warning systems. Consistency of operations across the region, and the general familiarity developed by providing a consistent set of common reference documents, are important factors which will encourage cooperation and contribute to the building an effective coordinated system. Accordingly, the Project’s goals are two-fold:

- To strengthen tsunami warning and emergency responses of agencies within countries,
- To improve upon the timeliness and accuracy of tsunami advisories provided by the regional tsunami warning system.

To accomplish this, the Project’s Strategy is to provide regionally-consistent documents as a starting baseline for countries, and then to follow this up with several country-dedicated capacity building efforts involving practicing or well-experienced experts to assist in their customization.
As such, 1 Regional Training will be provided to provide templates and SOP guidance to a large audience. A 2nd Regional Workshop was considered as a means of sharing Best Practice SOPs at end of Project, but could not be accommodated under the current budget (another USD $110,000 would be needed).

These country expert consultations are intended to stimulate technical and institutional capacity building within countries by having experts visit the countries, thus engaging a larger stakeholder group, and having them visit several times over a 6-8 month period, thus building a working relationship of experts with the countries.

To meet the Project’s goal of improving and enhancing upon the timeliness and accuracy of the actual regional tsunami advisories, the Project will use practicing TWC experts that can also directly interact on operational activities that improve cooperation between the country’s TWC and the experts’ TWC. An example activity would be the development, agreement and implementation of (regionally-transferable) procedures for the rapid exchange of data and event information related to a potentially-damaging event.

Because of funding limitations, as appropriate, the Project could consider conducting country specific assistance to two neighbouring countries with similar threats, so as to encourage cross-country cooperation, benefits and consistency. However, this should be balanced by the need for country-specific customizations.

Due to funding and time limitations, the Project is only able to accommodate 4 Country Sub-Projects. Additional countries could be added at a cost of $55,000/country.

The Project’s implementation strategy for building capacity and developing robust SOPs for countries will be to develop templates using existing materials used by warning centres and emergency response agencies in the Pacific, and then to use these as the basis for hands-on technical assistance to write well-designed SOPs. The templates, as well as working examples will be presented during the Regional Training, and also the 1st in-Country mission. Experts from existing tsunami warnings centres, such as the Pacific Tsunami Warning Centre and the Japan Meteorological Agency and other warning centres with extensive experience in the Pacific, will be consulted and involved in the conduct of this Project.

The assistance emphasizes hands-on, interactive activities for developing agreed-upon, coordinated SOPs through stakeholder meetings, and involves the utilization of experts, either practicing or with extensive prior experience, to guide and assist countries in developing their SOPs. The testing of the feasibility of the developed SOPs is planned within the scope of this Project in order to validate their functionality and assist in the preparation of staff for real events.

F. Results Framework: Please fill out the questions below and include performance indicators under each question.

The overall Project Deliverables, or Performance Indicators are summarized as follows:
• Provision of 1 Regional SOP Training (at beginning of Project) to relevant stakeholders,
• Provision of 4 country SOP assistances (each country assistance to last 6-8 months and include 3 missions),
• Provision of SOP Materials for Regional workshops and Country missions (COP/SOP Guidance and generic templates, Best Practice, other reference documents)
• Country-developed documents, with input from Expert consultants, based on country’s present operations (e.g., COP/SOP, checklists, flow charts, etc. – these are living documents which are continually improved upon as new services and capabilities are added),
• Provision of Exercise Training and Training Materials, or other sharing on SOP-evaluation processes that can be carried out to test the workability of the SOPs.

With regard to SOP materials, it is emphasized that there will be one set of materials that represents a generic, minimum set of materials. From these, countries may need to customize them further according to the country’s development level (least to well-developed, low to high-income), and according to the application (national, provincial, departmental). Reference materials will include working examples from a variety of situations.

Performance Indicators will be measured by the number and rank level of attendees to the Project trainings or workshops, the effectiveness, impact, and practicality of the improved procedures over baseline event emergency responses, and the conduct, performance, and post-drill evaluation of SOPs. A detailed survey or questionnaire specific to tsunami warning alarm response and tsunami warning emergency response will be distributed at the Regional Training Workshop and compiled to provide the baseline against which the outcomes of this Project will be measured. A final survey or questionnaire will be distributed and compiled to assess the impact of this Project. The Final Activity Report will compare the baseline and status at the end of the Project period, and make recommendations on further assistance that may be needed.

i. List the capacities you expect this project to develop among members of the target group.

The project will enable National Tsunami Warning Centres and National Disaster Management Organizations to draft high-level Concept of Operations and effective SOP’s to rapidly and effectively respond to tsunami events in an “end to end” capacity. These products are essential not only for the organizations themselves, but also highly informative for distribution to other stakeholders who must work with them. The products are also useful as description information for the media and public who want to understand how their tsunami warning system works.

At the end of the Project, countries should have acquired knowledge and practice on:
1. How to draft an agency’s Concept of Operations
2. How to draft an agency’s Standard Operating Procedures (SOP) and Checklists.
3. How to conduct interagency coordination through Tsunami Stakeholder Coordination concepts. This concept is essential for sustainability of an effective response.

4. How to use SOP’s and checklists as a means to continually improve their operational response through the use of internal scenario exercises

ii. What are the specific activities that will be undertaken in this project to develop the capacities indicated above?

Implementation Approach:

Upon further consultation with potential country partners, based on its experience in Indonesia in 2006, and considering the request of the Trust Fund in December 2006, IOC ITIC has revised its implementation approach to conduct 1 Regional workshop for training, provision of materials, and best-practice information sharing, and 4 in-depth, multi-mission country SOP capacity building assistances. Each country assistance would consist of 3 missions. This would be in addition to the continuing work in Indonesia, and new UNDP-collaborative work in Sri Lanka and the Maldives. If more funding were available, additional countries could be served.

The First Regional Workshop will provide training and guidance materials to a wide audience, and especially to those countries for which the Project will not conduct in-depth missions. The modality of the training will be through lecture, and hands-on, small group exercises to demonstrate principles of COP/SOP, development of such procedures and checklists, and the testing of SOPs perhaps through the simulation of a table-top scenario exercise followed by a post-exercise debriefing.

If this Project were funded by an additional $110,000, a Second Regional Workshop would be held to provide an opportunity for sharing the progress of countries and for the IOC and its partners to provide further guidance on the next steps for ensuring a functioning TEWS. A logical next step would be to introduce the concept of a Region-wide tsunami exercise similar to that conducted by the Pacific in 2006 (Exercise Pacific Wave ‘06, Annex XII).

The country-specific missions work directly with national entities to improve their current processes over a 6-8 month period through multiple missions. The assistance may involve modification of their existing protocols and procedures, or adoption of new ones, all of which will be customized according to their individual needs and requirements. For these missions, the same set of experts will come so as to develop continuity in assistance. The assistance will also work with the country to encourage the testing of some component of their SOPs through an exercise or tabletop scenario conducted during or prior to the last mission.

For both efforts, the ITIC will engage experienced practitioners to work with countries. Terms of Reference of the Experts to be used in this Project, and a list of potential experts is provided in Annex XIV.

As each country is unique, every assistance project must be tailored. The highest challenge will be both to change the paradigm shift of disaster management organizations from response to pre-event mitigation and preparedness, and once done,
to provide an adequate and appropriate level guidance to countries such that they can immediately understand, embrace, and customize procedures, protocols, and checklists comprising response SOP. This is the motivation for the provision of templates and guidelines that are generic and simple, and which build the minimal system. The Project will achieve this through Project-developed materials, and through actual examples of existing tsunami warning centres and response agencies.

For in-Country assistance, the missions will be organized in order to
1. Provide information on best practices,
2. Work with country to evaluate their existing procedures and practices (COP and SOP),
3. Recommend improvements and work hands-on with country to strengthen the end-to-end tsunami warnings through the development of SOPs for tsunami warning and emergency response.
4. Provide information on exercises and drills, and how to conduct them,
5. Participate in a tabletop exercise involving stakeholders to test the feasibility of developed SOPs.

The information provided will include Concept of Operations documents that describe the high-level how to of the system, e.g., the institution roles and descriptions of activities related to the detection of potentially damaging tsunamis (and other hazards as appropriate), the alert of communities and households, and as required, the evacuation of people away from expected flood zones. From the COP, Standard Operating Procedures templates and examples will be provided; these describe the procedures followed, the agencies involved and their roles and responsibilities, the timelines for response and action, and how the communication of information is done. Collectively, the SOP’s for tsunamis should comprise the Tsunami Warning Centre Response Plan (TWRP) or Tsunami Emergency Response Plan (TERP), or the procedures followed when a tsunami alarm is triggered.

As an example, sample Concept of Operations, Emergency Response, and Standard Operating Procedures are provided in Annexes I and II, respectively, for the Pacific Tsunami Warning Center and for the Hawaii State Civil Defense for tsunami emergency response.

Selection Criteria of Countries for Capacity Building
The IOC used the following criteria for selecting the countries in which to conduct capacity building missions:

- Results of various past assessments of gaps and needs
- Discussions with countries across the RTF target region regarding their present tsunami warning and emergency response status, and their interest and probable commitment to development or implement such end-to-end systems
- Consideration of where in-country disaster management resources of the UNDP could be used in collaborative capacity building
- Consideration of where additional funding resources are likely to meet the needs of tsunami-affected countries
- Extent of the tsunami hazard to the country
Within the RTF target region, the greatest frequency of tsunamis is associated with active subduction surrounding Indonesia - this extends from the Indian Ocean through the marginal seas of the western Pacific, and into the Pacific. The highest casualties from the 2004 Indian Ocean tsunami were in Indonesia, Sri Lanka, India, Thailand, Maldives, Myanmar, and Malaysia. In the western Indian Ocean, the greatest threat is from the Makran source region located off the coast of Pakistan. In the marginal seas of the Pacific, the greatest threat is from tsunamis generated around the Philippines that would affect the Philippines, Indonesia, Malaysia, Brunei, Vietnam, and China. These countries thus represent potential candidates for country capacity building missions.

Based on these considerations, the IOC selected Myanmar, Pakistan, Philippines, and Vietnam as the countries in which to conduct SOP capacity building under this Project. Unfortunately, the present funding allocation will not be able to cover efforts in all countries.

With regard to the selected countries, Myanmar has requested IOC assisted strongly during its most recent national report at the ICG/IOTWS-IV in February 2007, Pakistan is directly affected by Makran-generated tsunamis and has requested assistance to the development of a good tsunami warning centre as it upgrades its seismic monitoring network, the Philippines continues to be the source of local tsunamis for which strong immediate warning and emergency responses are required at the local levels, and Vietnam has stated that it is currently fast-tracking hazard mapping and modeling and the establishment of a tsunami warning service.

Consideration of Other Countries, include Indonesia, Maldives, and Sri Lanka

In 2007 and 2008, the IOC ITIC expects to partner with the UNDP to continue its assistance to Indonesia, and to extend similar support to the Maldives and Sri Lanka, using UNDP funds. Annex IV describes the work in Indonesia in 2006, and Annex V (UNDP Memo for the Record, February 2007) describes the continuing partnership with the UNDP for Indonesia. The primary objective of the 2007 Indonesia work will be the efforts to link the national with local developments to create the end-to-end warning. Work with the Indonesia National Warning Center will also focus on the implementation of the recommendations and exercising of the procedures to fine-tune their operations. This funding arrangement has also been agreed to for Sri Lanka and the Maldives (Annex V).

May 2007 update, discussions with UNDP RP:
There is no change in status from April 2007. Discussions continue with potential funding sources and are not confirmed for SOP work in Sri Lanka and the Maldives.

In discussions with other donors, it was indicated that the USA intended to provide Concept of Operations workshops in India, Indonesia, Sri Lanka, and Thailand, and that there was interest to involve the IOC ITIC in the Agenda of these efforts.

iii. How do you expect the target group will use the capacity that will be developed under this project?

The ITIC firmly believes, based on its experiences in working with countries in the PTWS and in Indonesia specifically in 2006, that the most important goal of any assistance is the achievement of sustainability. In this sense, the ITIC strives to work
with people to build their comprehension of the needs and processes, and to provide them with the understanding, background reference materials, and ultimately the confidence to be able to develop and enhance their own systems. While this is more difficult when conducting regional trainings, in direct country assistances, the ITIC will strives to build trusted working relationships to assist now and for the future. This is the underlying philosophy of UNESCO IOC’s capacity building strategy, where assistance is provided that is:

• Enduring, so as to produce long-term impacts; in this regard, time is invested to provide the “know why” and “know how”, and post-training contact is maintained;
• Develops both operational, for addressing today’s needs, and research capabilities, for addressing tomorrow needs;
• Presents guidance in a holistic approach, wherein stakeholders include not only scientists and technicians, but decision-makers and civil society
• Optimizes the available resources (in funding and people to train and be trained) by actively seeking to reduce / eliminate duplication and overlap in content, and partnering with agencies to reach similar target groups and present an integrated approach.

As such, this Project is envisioned as a hands-on guided effort to fast-track development of capacity through the writing of actual agency operational products. The end result will be that countries will have technically-assisted COP and SOPs for tsunami warning and emergency response. The complexity, completeness, and robustness of these plans will be dependent on each country’s initiative and interest; at the minimum, we hope that each participating country will have started a draft from which they will continue to enhance and improve.

Afterward, the ITIC will commit to continue to work with each country at their request. If there is sufficient interest for advance Training, the ITIC will seek additional funds for follow-up training; development training to assist in the planning and conduct of exercises and drill as a means to validate SOPs may be of interest as a Phase II Project.

G. What is the internal capacity of the organization submitting this proposal to undertake activities and achieve expected deliverables?

The UNESCO IOC has been acknowledged as the lead United Nations organization for coordinating the development of tsunami warning and mitigation systems globally.

The ITIC was established by Resolution IV-6 of the Fourth Session of the IOC in 1965. At the 39th Executive Council in June 2006, IOC was charged to negotiate with the USA the establishment of ITIC as an IOC Programme Office.

The IOC’s ITIC has a technical mission overseeing warning systems, helping regions and countries to establish new systems, fostering tsunami research, serving as a repository for the collection of tsunami event data, and in developing and distributing education and awareness materials on tsunamis (Annex XII). Its focus prior to the 2004 Indian Ocean tsunami was in the Pacific where about 80% of the world’s tsunamis are observed, but presently, it is strongly assisting in the IOTWS and other regions.
Each of the ITIC professional staff comprises more than 15 years of experience in tsunami warning and emergency response operations. These include the topics of technical earthquake and tsunami detection and evaluation, and message content and dissemination, emergency response and evacuation, drills and exercises, preparedness and outreach. Additionally, the ITIC regularly and closely works with the existing international tsunami warning centers (PTWC, JMA, WC/ATWC). Starting from April 2007, the ITIC staff will increase with the addition of a secondment from JMA who will assist in all ITIC activities, including those to be carried out in the Project, supporting the development of tsunami warning systems in the Indian Ocean, the Pacific, and globally.

Since the 1970’s, the ITIC has also conducted training and capacity building programmes (ITIC Training Programme (ITP) - Hawaii, Annex VI) in tsunami warning and mitigation in close cooperation with the PTWC and Hawaii Civil Defense organizations. In the aftermath of the 26 December 2004, the ITIC has organized and conducting a number of trainings in tsunami warning and emergency response operations, seismology, and tsunami numerical modeling for Indian Ocean and other tsunami prone countries. The trainings utilize international experts and have been organized in cooperation with host countries of the Indian Ocean.

Within the target region, the IOC maintains two Secretariats to coordinate and facilitate the development of the TEWS (Annex XII). These are the Secretariat for the ICG/IOTWS, located in Perth, Australia, and the Secretariat for the ICG/PTWS, located in Honolulu, Hawaii. The ITIC serves as the Secretariat of the ICG/PTWS, and as such provides comprehensive coordination, facilitation and capacity building assistance for the Pacific. In developing this Project and conducting the Project Workplan, the ITIC will work in close collaboration with the ICG/IOTWS Secretariat. The two Secretariats have already built up strong and close working relationships directly with Member States, and are well aware of their needs through the outcomes of the ICG meetings, and numerous personal interactions directly with the responsible agencies of the countries.

Both Secretariats belong to the IOC Tsunami Co-ordination Unit (TCU), headquartered in Paris, France. From Paris, the Project will utilize tsunami-experienced staff to carry out the expert consultations. Additionally, and very importantly, Project results will be reported out globally through the TCU in Paris.

H. How will the project contribute to regional coordination and/or cooperation towards the establishment and functioning of a regional early warning system for tsunamis and other hazards in the Indian Ocean and Southeast Asia region?

See E above, and additionally:

Establishing a functional regional TEWS in the Indian Ocean and Southeast Asia region:

In coordinating the development of Tsunami Early Warning Systems (TEWS), it is the IOC’s philosophy that the system must be:

- Fully owned by countries,
- Based on international multi-lateral cooperation,
- Based on open and free exchange of data,
- Protect all countries in the region,
- Transparent and accountable to all members.

Practically, this translates that an effective TEWS should provide timely, reliable, and consistent information to the responsible authorities. Well-established and well-known procedures in analysis and response tend to create environments that are predictable for evaluation of the threat and thus response to the threat, and this predictability is the essential requirement for a well-functioning, respected system. This consistency can be established between countries (national SOP) and regions or oceans (international SOP). Currently, the Indian Ocean is coordinated through the ICG/IOTWS and the South China Sea and western Pacific marginal seas are coordination through the ICG/PTWS. Consistency (system interoperability) in procedures is an absolute requirement for countries, which have coastlines along two oceans (IOTWS and PTWS).

To accomplish this, the IOC, its Secretariats for the ICG/PTWS and ICG/IOTWS, and its ITIC are intending to work very closely to guide the establishment of interoperable systems.

Additionally, as the ITIC's primary technical mission is to assist in the establishment of sound regional and national tsunami warning systems, it works in close cooperation and collaboration with the existing, long-lived international tsunami warning centres that are currently providing permanent and interim international services. These centres (USA's Pacific Tsunami Warning and West Coast/Alaska Tsunami Warning Centers, and the Japan Meteorological Agency) have a vested interest in providing an interoperable consistent and functioning service to all of its customers.

Regional and Inter-Regional Coordination and Cooperation:

Regionally-coordinated approaches are needed to support the development of effective end-to-end Tsunami Warning Response Plans (TWRP) and Standard Operating Procedures (SOP) for tsunami early warning systems. Consistency of operations across the region, and the general familiarity developed by providing a consistent set of common reference documents, are important factors which will encourage cooperation and contribute to the building an effective coordinated system. As the Indian Ocean and Southeast Asia encompass two tsunami warning coordination groups (ICG/IOTWS and ICG/PTWS), there will naturally be formed consistency between regions and among countries with the region, and especially for those countries which belong to both the Indian Ocean and the Pacific system.

The IOC recognizes this strongly, and within this Project, intends to develop guidance materials, based on a compilation of best practices globally, that are regionally transferable. Further, the ITIC does plan to use them for trainings in the IOTWS for the western Indian Ocean and Africa in 2007, the PTWS, and the CARIBE-EWS where it is directly involved, and will make the materials also available to NEAMTWS for their use. The ITIC can assure this since it currently has funded training efforts in all three mentioned oceans.

As the Project evolves, good practices and examples of countries will be captured and shared at ICG and other international and national meetings. In this manner, the Project
hope to build a dynamic resource of best practices which countries can refer to. The Regional Workshop (especially if funding can be found for a 2nd Regional Best Practices Workshop) is intended to encourage the sharing of best practices and networking between countries. Cross-country benefits are possible if two adjacent or close-by agencies share the same COP/SOPs because of their similar capacities, data streams, or computer platforms. Development of these synergies will be encouraged. Training of adjacent countries is also possible that can encourage cross-country cooperation and networking.

Regional Data and Information Exchange:

The IOC supports a policy of free and open data exchange, and encourages the sharing of data and information amongst countries in the region in order to promote best decision-making for early warning. However, the IOC recognizes that data and information sharing decisions are national prerogatives. In general, the rapid exchange of seismic and sea level waveform data already have globally-consistent data exchange procedures and protocols which have been made known to member states through the various IOTWS WGs. Within a country's TWC operations manual, the TWC should describe methods and protocols for their rapid exchange of data and information, and are generally common to all TWC and earthquake monitoring centres. Several organizations and/or countries have indicated a plan to provide regional tsunami early warning advisories, and the interim service providers continue to provide timely information on potentially tsunamiigenic events.

To encourage further support of regional data and information sharing, the Project's missions, with IOC support, will work to strongly encourage national information and data sharing internationally. The Experts should also be able to provide the necessary technical expertise on methods of data and information exchange and/or follow-up facilitation and implementation after and between missions.

As each country mission's expert team will provide a reporting document to the IOC, any agreements, procedures, and protocols will be captured and can be given wide distribution to countries of the Indian and Pacific Oceans, relevant international seismological and sea level organizations, and regional coordinating agencies by the ICG/IOTWS and ICG/PTWS Secretariats, the ITIC, and by the IOC Tsunami-Coordination Unit.

Importance of SOPs as integral part of functioning Regional System:

The development of SOP's will coordinate the decision making process with respect to tsunami early warning at all levels - regional, national and local. SOP's will facilitate good decision-making because there will be clear definition of organizational roles and responsibilities. Existence and use of SOP's are especially essential for rapid efficient tsunami response because tsunamis are termed as rapid-onset disasters for which there is little time to prepare. Because of this, all responses need to be pre-planned, well-practiced, and automatic to minimize loss of life.

For an effective warning system, tsunami warning centers need to quickly disseminate consistent and reliable tsunami threat information in an understandable and concise manner. Disaster Management Organizations (DMO), or their equivalent, from all levels of government that are responsible for public safety, health and welfare of the
people and community during natural or man-made disasters, then need to interpret the information for public safety. Tsunami Emergency Response Plans (TERP) and accompanying Standard Operating Procedures and Checklists are used to properly coordinate and execute rapid and massive public coastal evacuations in response to a Tsunami Warning Center’s notification of an approaching tsunami on a 7X24 basis. As appropriate, TERP are also developed as part of an organization’s broader multi-hazard Emergency Plans.

The facilitation of a consistent regional approach and provision of templates and working examples for developing COP, SOP and TERP will fast-track the development of a regional early warning system and strengthen its functioning. Consistent protocols, criteria and thresholds for action, and terminology and lexicons of message content are critical for good responses, which minimize confusion and uncertainty. This is especially important as presently there are a number of countries who are developing the capabilities to provide regional services.

I. What is the knowledge management strategy to collect, codify and disseminate lessons and experiences emanating from the project?

The lessons learned from this project will be collected and codified at the UNESCO IOC’s International Tsunami Information Centre.

Regionally, the outcomes in each country will be shared widely at international meetings, and the examples, best practices, and other templates and guidelines are proposed to be published as a UNESCO document in order to establish it as a reference guide for the development of functional and sound tsunami early warning system. The IOC and its ITIC will disseminate lessons and experiences to the international tsunami community.

As an organization of the UNESCO IOC, ITIC will report on its Trainings and capacity development in the formal sessions of the Intergovernmental Coordination Groups for the Indian Ocean Tsunami Warning and Mitigation System and the Pacific Tsunami Warning and Mitigation System. As the IOC is also coordinating systems for the Caribbean and north Atlantic and Mediterranean, the ITIC will also report and seek to develop similar programs of training and capacity building in these regions as well as in eastern and southwestern Pacific, thus promoting a globally consistent approach. Presently, the ITIC will conduct, in cooperation with the US Geological Survey, a training in Seismology and Tsunami Warning, for Caribbean Tsunami Warning Focal Point planned for June 25-30, 2007. This will assure a high level of information sharing and encouragement of a regional and consistent approach to operational early warning.

The approach is intended to promote consistency in development and content through the wide global distribution of a standard set of guidance documents and best practices and case examples that countries can then use as their foundation for SOP development. The ITIC intends to use these materials in the Pacific, and the Caribbean, and in this manner, encourage global consistency in content and approach. In order to build these sets of reference materials, Project funding is set aside for information and best practice missions and for the development of the guidance material.
It should be emphasized that UNESCO IOC views this Project as just one contribution of a continuing effort to strengthen tsunami warning and emergency response capacities in the Indian Ocean and Southeast Asia. A further necessary activity will be to exercise and test the feasibility of the SOPs in order to validate their functionality and assist in the preparation of staff for real events.

See J for strategy and post-Project options.

J. What concrete steps will be taken to ensure sustainability beyond project end?

The ITIC advocates the building the end-to-end tsunami warning, and within this is implied that many different associated activities that are required for a functioning TEWS. Unfortunately, within the current amount of funding, the IOC is not be able to provide a comprehensive assistance in all aspects - rather, it seeks to concentrate on the tsunami alert component to build the institutional capacity of the authorized agencies to efficiently monitor, evaluate threats, and respond.

In order to ensure that SOPs are integrated and used by the countries and the region as a whole, the Project will encourage countries developing SOPs to conduct regular exercises within their own countries to ensure that the processes they have developed work and that they are integrated into the entire government response for TEW.

An immediate application using the products of the Project is in the conduct of national or regional exercise or drills that utilize the SOPs that have been developed. Preparedness requires constant practice so that people know what to do, and potential technical or other procedural difficulties are addressed and resolved before the actual crisis. An exercise provides an opportunity for participants to review and validate their tsunami response procedures, including procedures for warning and communications, organizational response, and if desired, evacuation. As the exercise is planned by emergency response agencies and tsunami warning centers, it encourages the practice of an end-to-end analysis and the importance of working together to save lives and property.

Within the Project, it is intended that for the country assistance sub-Project, the Experts help countries to learn and carry out a minimal exercise in order to test the feasibility of their developed processes. In this regard, the Project will provide templates and exercise manuals with evaluation forms and guidance on post-exercise evaluations. Success can be measured in various ways, including the timing of responses, and the quality of the decisions made to maximize life safety. It is imperative to emphasize that exercises provide a non-life threatening environment where SOP flaws can be highlighted and then action immediately taken to correct the situation.

Regional exercises are also ways in which to build support for system interoperability - however, a regional exercise is not planned within the time frame of this Project.

Afterward, the ITIC will make its continued consultative expert services available to all countries for follow-up visits and continued interaction. As requested, the ITIC will consider to continue to work closely with the country to develop ways in which to evaluate the performance of their developing system, such as through the planning.
conduct, and evaluation of tsunami exercises and drills to test communication methods
and the effectiveness of protocols.

If there is sufficient interest for advance Training, the ITIC will seek additional funds for
follow-up assistance and to increase the number of countries served; development
training to assist in the planning and conduct of exercises and drill as a means to
validate SOFs may be of interest as a Phase II Project.

K. Describe the partnership approach that will be employed to meet the project’s
objectives. What partners at the regional, national and local levels (as relevant) will
be involved and how will these be involved in the implementation of the project.

To the maximum extent possible, the Project will engage and link with other existing
Projects so provide a coordinated approach to the country. The IOC ITIC has
established a Working Partnership with the UNDP Regional Programme and its
Country Offices in order to directly interact with the key stakeholders and responsible
authorities in each country; this effort started with co-support of Indian Ocean observers
from Indonesia, Sri Lanka, and the Maldives to the Exercise Pacific Wave ’06 in the
Philippines, and has continued with country-dedicated efforts in Indonesia in 2006 and
2007, with Sri Lanka and the Maldives in 2007 and 2008, subject to funding. When
possible, collaborative activities will be undertaken and especially when the same target
group is addressed. This philosophy supports an integrated approach to disaster risk
management.

Regional, national and local partnerships with Tsunami Warning Centres, National
Disaster Management Organizations, and relevant non-government organizations will
be developed to meet the project’s objectives. The project seeks to strengthen the
abilities of organizations to develop and design their own processes that best meet their
needs; therefore the ITIC believes its role will be to support national and local agencies,
who are assumed to take the leadership role in the writing of COP, TERP, and SOPs. As
an example, an integrated, unified international, multi-sectoral, cross-agency approach
has been adopted for the development of local SOFs within Indonesia; for this, the IOC
has partnered with the UNDP, IFRC/PMI, Germany, and USA and is implementing
assistance as a Consortium (Annex IV) working with National and Local agencies.

At the international level, the Project will utilize the cooperative assistance of experts
from actual tsunami warnings centers and emergency operations centers to offer
practical help and experience. The Project’s strategy emphasizes hands-on, interactive
activities for developing agreed-upon, coordinated SOPs through stakeholder meetings,
and involves the utilization of experts, either practicing or with extensive prior
experience, to guide and assist countries in developing their SOPs. The ITIC already has
extensive experience in organizing and utilizing practicing experts as part of its Training
programmes (Annex VI).

L. What are the expected counterpart contributions (in-kind and cash) from your
organization towards this project?

The ITIC (ICG/PTWS Secretariat) will provide in-kind personnel service from its office
staff to implement this project. No salaries or benefits are to be paid to ITIC staff. The
ICG/IOTWS Secretariat and IOC TCU Senior Tsunami Advisor will also provide in-kind personnel service to implement and coordinate this project. Only air travel, daily subsistence allowances, terminal fees, and training materials preparation and printing costs, and meeting venues costs are required.