U.S. Indian Ocean Tsunami Warning System (IOTWS) Program
Integrated Program Work Plan 2005-2007

APPENDIX B

PERFORMANCE MANAGEMENT PLAN

February 2008 Version 2.1

CONTENTS

INTRODUCTION

This Performance Management Plan (PMP) describes the results framework, data collection sources and methods, and performance indicators and targets for the US IOTWS Program. The February 2008, Version 2.1 includes the results of an intensive mid-program review process which led to a number of revisions to the US IOTWS Program Work Plan and PMP (reflected in Version 2.0) and the final target results achieved through the end of the program. Version 2.1 retains the Version 2.0 PMP features including greater clarification to definitions and data collection methodology; a modified list of indicators; and revised sets of targets that allow a more precise measurement of US IOTWS achievements in addition to a complete summary of targets achieved during the US IOTWS Program. The US IOTWS Program duration was initially planned to span from August X, 2005 through September 2007; but was granted a no-cost extension for a completion date of March 31,2008.

RESULTS FRAMEWORK

The results framework for the US IOTWS Program is provided in Table B.1. The US IOTWS Program falls under Special Objective 498-095 and SpO Intermediate Result 3. Four sub-intermediate results and their respective indicators are detailed incorporating and refining the expected results included in the Inter-Agency Agreements for NOAA, USGS, and USFS and in the scope of work for the USAID and the PI. The results framework captures the expected results for the US IOTWS Program referenced in Table B.1 and shown in Figure B.1. This results framework Version 2.1 has been refined to reflect a review of the program's Year 1 activities as well as the findings of the IG Program Audit.

DATA SOURCES, COMPILATION, AND REPORTING

The results framework provides specific indicators that were used by all agency partners to report the progress of the US IOTWS Program. A description of each indicator, including unit of measure, targets, and responsibility is provided in Table B.2. Each partner agency was required to measure progress using the relevant indicators provided in Table B.2 on a monthly basis. Each agency submitted performance management reports to USAID for consolidation by the PI. These results were incorporated into the Semi-Annual and Annual Reports for the Program that tracked with the semi-annual process for preparing the "4102 Report" to Congress. Completed performance management reports from each partner agency were submitted on a monthly basis.

In addition to monthly performance monitoring, each partner agency contributed to other reporting mechanisms required by USAID. These included the following:

- 4102 Report to Congress submitted by the field to USAID/ANE every May and December
- ANE Tsunami Tracker Database
- Ad hoc information requests from USAID/Washington, OMB, and Congress.

REPORTING RESPONSIBILITY

USAID RDM/A was ultimately responsible for providing input on these reports to AID/W. At a program level, the PI has been responsible for compiling and reporting data to USAID. The PI assisted each partner agency compile and report data at the agency level. Agencies were

given a brief period to review and comment on draft PMP report submissions, as well as draft submissions of aforementioned reporting mechanisms.

TABLE B.1 RESULTS FRAMEWORK FOR THE US IOTWS PROGRAM

USAID Special Objective (SpO) for Tsunami Recovery and Reconstruction: To save lives; help individuals rejoin the workforce and return to communities; support host government-led reconstruction & early warning/disaster preparedness efforts

SpO Intermediate Result (IR) 3: Early Warning System Established

- SpO Indicator 3.1: Number of communities trained in disaster preparedness
- SpO Indicator 3..2: Number of communities included in national alert system

SpO IR 4: Technical Assistance, Good Governance & Reconciliation

- SpO Indicator 4.1: Number of government agencies that received technical support

Special Interest Reporting Indicator

- SpO Special Indicator C: Kilometers of coastline under improved, sustainable environmental management

Sub-IRs (Program-level IRs)

Sub-IR 1. Scientifically sound design for IOTWS developed

- Indicator 1.1: Conceptual design for early warning system design provided to and accepted by ICG/IOTWS
- Indicator 1.2: Numbers of protocols, and products established by or with ICG/IOTWS member nations that enable interoperability of the regional IOTWS system

Sub-IR 2. Tsunami detection and early warning capabilities improved

- Indicator 2.1: Number of agreements developed for the installation, deployment, or integration of tsunami detection and communication system components
- Indicator 2.2:Number of IOTWS or national tsunami detection and communication system components installed, deployed, and or upgraded
- Indicator 2.3: Number of tsunami detection and communication system components integrated into the IOTWS and operated in accordance with ICG/IOTWS standards and criteria

Sub-IR 3. National capacity in disaster management improved

- Indicator 3.1: Number of tsunami/all hazards warning dissemination and disaster management system mechanisms designed, developed, or improved at the national level
- Indicator 3.2: Number of communities included in national alert systems (ref. SpO Indicator 3.2)
- Indicator 3.3: Number of government agencies that received technical support (ref. SpO Indicator 4.1)

Sub-IR 4. Local preparedness and coastal mitigation for tsunamis and related hazards improved

- Indicator 4.1: Number of communities trained in disaster preparedness (ref. SpO Indicator 3.1)
- Indicator 4.2: Number of coastal communities initiating activities that support

resilience

REVISIONS IN FEBRUARY 2007 PMP

The US IOTWS undertook a revision process to the US IOTWS Program Work Plan March 2006 Version 1.0 and Program Monitoring Plan as a result of a mid-program review and in response to the findings of a program audit undertaken in September-October 2006 by the Office of the Regional Inspector General[1]. Although the program had achieved significant results, the audit highlighted a number of weaknesses that made it difficult to verify these achievements. This PMP addresses both the changing program realities after Year I of activities as well as some of the weaknesses in the data collection and verification methodology identified in the audit. Changes reflected in Version 2.0 are outlined below.

A. Language clarifications
Wording of indicators, definitions of key concepts, and methodology for data collection were changed throughout the PMP to allow for a more accurate and precise measure of program achievements. These clarifications are intended ensure that both the technical partner agencies and lay people can easily understand how targets are calculated.

B. Removal and addition of indicators
A total of two indicators were removed from the PMP and one was added in Version 2.0 to make a total of 10 indicators. The Expected Outcome (EOs) listed by Program Area (Ref: Figure B.2 in Version 1.0) were considered an unnecessary organization layer to the PMP and they have been removed from Version 2.0. However, the EOs continue to provide a logical organizational structure for activities across partner agencies and are referenced in the Work Plan.

In the course of the program review and audit, it was concluded that two indicators should be removed from the PMP due to insurmountable methodological issues. These include

- Indicator 4.3: Kilometers of coastline under improved, sustainable environmental management (ref. SpO Indicator C); and
- Indicator 5.1: US$ leveraged through private sector, NGO, donor, and public sector resources in support of the development of an end-to-end IOTWS.

Indicator 4.3 upon review was considered outside the manageable interests of the US Government and of the program. The timeframe required to create the conditions for sustainable environmental management are beyond the two year limit of the US IOTWS Program. No pragmatic methodology could be identified to provide valid and reliable data to calculate Indicator 5.1. Since data for money leveraged depended upon self-report and because of the hesitation of many non USG partners to divulge these data, it was decided that Indicator 5.1 was not a useful for measuring program achievement.

An additional Indicator was included in the Version 2.0 PMP. The new Indicator 2.1 was created to reflect the logical progression and stages of US IOTWS activities that enable the interoperability of a regional IOTWS system. The indicator disaggregates the former Version 1.0

[1] Ref: Memorandum of January 22, 2007 Subject: Audit of Critical Activities Financed by USAID Regional Development Mission/Asia's US Indian Ocean Tsunami Warning System Project

Indicator 2.1 into two indicators – 1.2 which now measures products and protocols established to enable interoperability of the regional IOTWS system, and 2.1 which measures the number of agreements developed for tsunami detection and communications components. The new indicator now reads:

- Indicator 2.1: Number of agreements developed for the installation, deployment, or integration of tsunami and communication system components.

For the purposes of accounting, FY06 indicators reported for 1.2 will not officially be disaggregated to reflect the addition of the new indicator. Agreements calculated under indicator 1.2 for FY06 will remain as reported for FY06. Agreements will only be calculated under the separate Indicator 2.1 for FY07 results. (However, US IOTWS

will also unofficially for internal purposes track Indicator results for FY06 Actuals to reflect PMP Version 2.0 Indicator 1.2 and 2.1changes).

PMP Version 1.0 Indicators 2.1 and 2.2 have subsequently become Indicators 2.2 and 2.3 respectively.

C. Modification of data collection methodology and source requirements

PMP Version 2.0 had sought to greater specify the methodology for data collection; identify the agencies responsible for collection; and the source data required for verification for each indicator. These inclusions have sought to provide guidance for US IOTWS partners on necessary and sufficient evidence required to reliably substantiate targets achieved and standardized categories for source documentation.

Two indicators have had changes significant changes to data their collection and calculation methodology:

- Indicator 3.2 has been revised to utilize a completely different methodology for 2007 from 2006. Indicator 3.2 which measure the number of communities included in a national alert system, relied on national self-reports. This proved confounding in three ways. First, it has been difficult to elicit these data from national partners. Second, it has been difficult if not impossible to verify the data. And third, it has been difficult from these data to reliably show the relationship between US IOTWS inputs with national linkage outcomes.

  To remedy these shortfalls; US IOTWS has taken a more stringent approach to measuring Indicator 3.2 in PMP Version 2.0. The program will seek to rely on internally collected data from US IOTWS partners to provide evidence and verification of linkages.

- Indicator 3.3 has combined national government and local government agencies trained to reflect one number. National and local government agencies will continue to be counted as separate entities for the purposes of targets, but will be reported as one total number.

D. Adjustments to target projections for 2007

As a part of the review process, targets have also been modified from Version 1.0 projections for most indicators. Indicators have been modified to reflect the realities encountered by the program during Year 1 and to more accurately reflect achievements expected from activities in Year 2. Targets have been modified upwards in some instances to reflect that original target projections were exceeded in FY06. In other instances, targets have been modified downwards to reflect actual program needs or to address methodological challenges. Each indicator provides information on original Version 1.0 targets as well as the cause for revision.

Table B.2 Performance Monitoring Plan Indicator Tables

USAID SPECIAL OBJECTIVE 498-045 To save lives, help individuals rejoin the workforce and return to communities, support host government-led reconstruction & early warning/disaster preparedness efforts			
SPO-LEVEL INDICATORS			
IR 3. Early Warning System Established	**FY**	**Planned ***	**Actual***
SpO Indicator 3.1: **Number of communities trained in disaster preparedness** *(See Program Indicator 4.1 below)*	**06**	**500**	**187**
	07	**712**	**20,290**
SpO Indicator 3.2: **Number of communities included in national alert systems** *(See Program Indicator 3.2 below)*	**06**	**400**	**294**
	07	**320**	**399**
IR4: Technical Assistance, Good Governance & Reconciliation	**FY**	**Planned**	**Actual**
`SpO Indicator 4.1: **Number of government agencies (e.g. municipalities, central government offices) that received technical support** *(See Program Indicator 3.3 below)*	**06**	**45**	**112**
	07	**160**	**195**

***Planned and actual values are cumulative.

PROGRAM-LEVEL INDICATORS

Sub-IR1: Scientifically sound design for IOTWS developed	FY	Planned	Actual
Indicator 1.1: Draft and refined versions of conceptual IOTWS design provided to and accepted by ICG/IOTWS	**06**	**2**	**2**
	07	None	**2**

Unit of measure: Design

Definition: The conceptual IOTWS design, including refinements of the design, serves as the regional technical baseline to guide development of national systems. The conceptual design consists of a conceptual framework, a description of requisite components, and an outline of required standards and other metrics; for example, details of location for detection devices, protocols for sharing information/data, essential channels of communications, etc.

Relevance: Provides scientifically sound basis for design of IOTWS, specifically for use by ICG/IOTWS member states.

Target::
2006 Actual
NOAA: 2 [1 Draft Conceptual Design; 1 Refined Conceptual Design]

***Data Collection and Analysis Methodology*:** NOAA experts will develop one draft design and one refined version. Data collection will be undertaken by NOAA and analyzed through file reviews. Data collected will include the following:

- Materials directly relevant to the design process;
- Minutes of the ICG or ICG Working Group meetings at which the various draft conceptual designs are discussed and recommendations made;
- Copies of draft design; and
- One or more documents that attest to acceptance of the draft and refined conceptual design by the ICG/IOTWS.

Data source: NOAA, USG delegations to IOC meetings.

Data Verification: Draft and refined copy of conceptual design. Meetings minutes or proceedings indicating acceptance of concept design documents and refinements by ICG/IOTWS. Copies of documents will be retained by PI.

Sub-IR1: Scientifically sound design for IOTWS developed	FY	Planned	Actual
Indicator 1.2: Number of protocols and products established by or with ICG/IOTWS member nations that enable interoperability of the regional IOTWS system	06	10	8
	07	31*	30
	08	0	1

Unit of measure: Protocol or product

Definition: "Protocols" are a common set of rules and instructions that govern how systems can operate compatibly with each other. For the IOTWS, these protocols include technical designs and operating standards, performance criteria, and data access standards to ensure interoperability of the various tsunami detection system components. "Products" are analyses, studies or publications which address critical knowledge gaps and further regional interoperability. Protocols and products may result from both direct and indirect US assistance and are developed by or with ICG/IOTWS member states.

Relevance: Agreement on the content of technical protocols and how these would be implemented provide the basis for achieving interoperability of each component in the US IOTWS and thus provide the basis for establishing a functional end-to-end early warning system that is robust and reliable.

Targets:

2008 Actual:

NOAA: 1 [1 adoption of National Warning Center CONOPS Standards and Practices]

2007 Actual

NOAA: 16 [1 Tsunami Model Standard for the IOTWS; 1 Inundation Model Performance Standards; 1 "Core Station" Concept and Definition; 1 Tsunameter Conceptual Array/ Baseline; 1 Thailand adoption of IOTWS/NOAA DART Operation Standards (MOU/IA); 1 RANET technologies upgraded to meet IOTWS country requirements; 1 Indonesia adoption of IOTWS Interoperability Principals (Multi-hazard MOU); 1 ComMIT Web Interface developed and completed; 1 Tsunami Propagation Database for Indian Ocean; 1 Indonesia Adoption of Standards for Tide stations (Indonesia Sea Level IA – Australia IA); 1 Australia Agreement to support and augment IOTWS (Australia IA); 1 Indonesia Adoption of IOTWS/NOAA DART Operations Standards, Adoption of Modeling Standards (Indonesia IA); 1 Establishment of International Tsunameter Partnership to promote Tsunameter Interoperability; 1 Adoption of Standards for Deep-Ocean sea level stations; 1 Adoption of Standards for coastal sea level stations; 1 Adoption of Data Format Standard for Sea Level Stations;]
USGS: 6 Products [1Thailand Fault Map; 1 Indonesia Fault Map, 1 CISN display installed at BMG, 1 training on use of CISN software, 1development of seismic station template; 1 training on installation of EID server]

2007 Planned

NOAA: 17 [1 Tsunami Model Standard for the IOTWS; 1 Inundation Model Performance Standards; 1 "Core Station" Concept and Definition; 1 Tsunameter Conceptual Array/ Baseline; 1 Thailand adoption of IOTWS/NOAA DART Operation Standards (MOU/IA); 1 RANET technologies upgraded to meet IOTWS country requirements; 1 Indonesia adoption of IOTWS Interoperability Principals (Multi-hazard MOU); 1 ComMIT Web Interface developed and completed; 1 Tsunami Propagation Database for Indian Ocean; 1 Indonesia Adoption of Standards for Tide stations (Indonesia Sea Level IA – Australia IA); 1 Australia Agreement to support and augment IOTWS (Australia IA); 1 Indonesia Adoption of IOTWS/NOAA DART Operations Standards, Adoption of Modeling Standards (Indonesia IA); 1 Establishment of International Tsunameter Partnership to promote Tsunameter Interoperability; 1 Adoption of Standards for Deep-Ocean sea level stations; 1 Adoption of Standards for coastal sea level stations; 1 Adoption of Data Format Standard for Sea Level Stations; 1 adoption of National Warning Center CONOPS Standards and Practices]
USGS: 6 Products [1Thailand Fault Map; 1 Indonesia Fault Map, 1 CISN display installed at BMG, 1 training on use of CISN software, 1development of seismic station template; 1 training on installation of EID server]

2006 Actual**

NOAA: 5 [1 MOA between NOAA and Australia; 1 Agreements reached for GTS Maldives upgrade; 1 Agreement for GTS upgrade in Sri Lanka; 1 Agreement from IOTWS implementation plan to upgrade

sea-level stations; 1 Agreement from IOTWS implementation plan to install buoys]
USGS: 2 [1 Agreement from IOWTS implementation plan to install or upgrade GPS systems; 1 Agreement from the IOC/IOTWS implementation plan to install or upgrade seismic stations]
PI: 1 [1 Consolidated Report for 16 Countries Affected by the 26 December 2004 Tsunami to the IOC in October 2005]

Data Collection and Analysis Methodology: Data collection will be undertaken by US IOTWS Activity Managers and analyzed through document reviews.

Data Source: US IOTWS Activity Managers and ICG/IOTWS Member Country Counterparts
Data Verification: Protocols, communications and documents referring to adoption of or intention to apply protocols enabling interoperability with regional IOTWS system, and products. Copies of documents will be retained by PI.

*Note: Target was readjusted from December 2005 Version 1.0 PMP to reflect the disaggregation of Indicator 1.2 to two different indicators in February 2007 Version 2.0. The Version 1.0 Indicator 2.1 included "agreements" which has now been made a separate indicator, 2.1. The previous Indicators 2.1 and 2.2 have subsequently become indicators 2.2 and 2.3 respectively.

Indicator results if FY06 Actuals were revised to reflect PMP Version 2.0 Indicator 1.2 and 2.1 changes.

	FY	Planned	Actual
Indicator 1.2: Number of protocols and products established by or with ICG/IOTWS member nations that enable interoperability of the regional IOTWS system	**06**	**n/a**	**1**
	07	**23**	**24**

Sub-IR2: Tsunami detection and early warning capabilities improved	FY	Planned	Actual
Indicator 2.1:Number of agreements developed for the installation, deployment, or integration of tsunami detection and communications system components*	06	n/a*	n/a*
	07	11	17
	08	0	1

Unit of measure: Agreement

Definition: An agreement refers to a formal or informal expression of intent between two parties confirming the acceptance of plans to install, deploy or integrate a tsunami detection and communication system component (or components). Agreements may involve issues such as: operations and maintenance related to the various tsunami detection components; software used for communication and detection systems; data transfer and use, etc. Agreements may result from direct of indirect US assistance and are developed by or with ICG/IOTWS member nations.

Relevance: Agreements provide the basis for determining the strength of national level support for the end-to-end system and the reliability of operations of each component in the US IOTWS and help provide the basis for establishing a functional end-to-end early warning system at a regional level.

Targets:

2008 Actual
NOAA: 1 Agreements [1 Partnership with the Asian Institute of Technology for the ITTI]

2007 Actual
NOAA: 8 Agreements [1 Agreement for PTWC to provide notification of tsunami relevant information to IO nations; 1 Agreement for partnership with University of Washington Extension to establish the International Tsunami Training Institute; 1 MOU/IA with Thailand for collaboration on 1st DART deployment and follow-on operation and maintenance; 1 MOU with Indonesia on Multi-hazards assessment, warning and preparedness; 1 implementing agreement under multi-hazards MOU with Indonesia for sea-level station upgrades; 1 Implementing arrangement with Indonesia for collaboration on 2nd DART deployment, operations, and maintenance; 1 Implementing arrangement with Indonesia for tsunameter research and development; 1 Implementing arrangement with Australia for collaboration on DART deployments in the Indian Ocean]
USTDA: 7 Agreements [1 Agreement with BMG for Disaster Management Plan and Technology Strategy Project, Indonesia; 1 Agreement with the Disaster Management Center for the Strategic Advisory and ICT Systems Project, Sri Lanka; 1 Agreement with NDWC for Disaster Warning System Integration and Capacity Building Project, Thailand; 1 Agreement with BMG for National Emergency Communications Strategy Project, Indonesia; 1 Agreement with the Department of Meteorology for the Disaster Early Warning Center Capacity Development and Systems Project, Sri Lanka; 1 Agreement with the Ministry of Disaster Management and Human Rights for the Emergency Communication Strategy Project, Sri Lanka; 1 Agreement with BMG for the Earthquake Detection and Seismology Training Project, Indonesia]
USGS: 2 [1 GPS agreement, Indonesia; 1 seismic agreement, Indonesia]

2007 Planned
NOAA: 9 Agreements [1 Agreement for PTWC to provide notification of tsunami relevant information to IO nations; 1 Agreement for partnership with University of Washington Extension to establish the International Tsunami Training Institute; 1 MOU/IA with Thailand for collaboration on 1st DART deployment and follow-on operation and maintenance; 1 MOU with Indonesia on Multi-hazards assessment, warning and preparedness; 1 implementing agreement under multi-hazards MOU with Indonesia for sea-level station upgrades; 1 Implementing arrangement with Indonesia for collaboration on 2nd DART deployment, operations, and maintenance; 1 Implementing arrangement with Indonesia for tsunameter research and development; 1 Implementing arrangement with Australia for collaboration on DART deployments in the Indian Ocean; 1 Partnership with the Asian Institute of Technology for the ITTI]
USGS: 2 [1 GPS agreement, Indonesia; 1 seismic agreement, Indonesia]

***Data Collection and Analysis Methodology*:** NOAA and USGS will retain files of copied agreements and/ or communications for planned installation, deployment or integration system components relevant to their respective activities.

Data source: US IOTWS Activity Managers, ICG/IOTWS, NDMOs, and other relevant partners.

Data Verification: Documents confirming agreement in addition to other relevant communications, plans, or technical materials. Copies of documents will be retained by PI.

*Note: A new Indicator, 2.1, was added in the process of PMP revision. The previous PMP Indicator 2.1 as related to the US IOTWS Integrated, "Program Work Plan 2005 – 2007" has subsequently become Indicator 2.2 and the previous Indicator 2.2 is now Indicator 2.3.

Indicator results if FY06 Actuals were revised to reflect PMP Version 2.0 Indicator 1.2 and 2.1changes.

	FY	Planned	Actual
Indicator 2.1:Number of agreements developed for the installation, deployment, or integration of tsunami detection and communications system components	**06**	**n/a**	**7**
	07	**18**	**25**

Sub-IR2: Tsunami detection and early warning capabilities improved	FY	Planned	Actual
Indicator 2.2: Number of IOTWS or national tsunami detection and communication system components installed, deployed, and/or upgraded*	06	10	4
	07	18**	13
	08	0	5

Unit of measure: System component

Definition: A "component" refers to an instrument or other technology required for a core station. A "core station" is an observing station that enables tsunami detection and transmission of tsunami data to warning centers and meets all ICG/IOWTS performance, reliability, data exchange, and other criteria. For example, a tsunami detection station is a core IOTWS station if it meets the standards and protocols developed in the sea level detection working group and it reports on the Global Telecommunications System (GTS) in real time.

Components may be installed, deployed, and/or upgraded as a result of direct or indirect US assistance. *Direct* US assistance encompasses: tsunami detection and communication system components, including seismometers, geodetic instruments (GPS), tide gauges, DARTs, and GTS upgrades, which, together form what have been identified as core stations in the regional conceptual plan design. *Indirect* US assistance includes both an array of equipment provided by NOAA outside of the IOTWS Program, including upgrades to existing equipment in member states and/or providing advice on installation, deployment or upgrading of relevant equipment.

Relevance: Successful installation and operation of these components are essential milestones in order to detect tsunamis and transmit data about them to tsunami warning centers.

Targets:
2008 Achieved
USGS: 5 components [2 accelerometers, Indonesia, 3 new broadband Stations for Indonesia]

2007 Achieved
NOAA: 8 components [1st DART station deployed; 1 Prigi, Indonesia sea-level station; 1 Cilacap, Indonesia sea-level station; 2nd DART station deployment; 1 RANET ground receivers installed in Indonesia; 1 RANET ground receiver installed in Sri Lanka; 1 GTS upgrade for Maldives; 1 GTS upgrade for Sri Lanka]
USGS: 1 components [1 Thai seismic station integrated into NEIC]

2007 Planned
NOAA: 8 components [1st DART station deployed; 1 Prigi, Indonesia sea-level station; 1 Cilacap, Indonesia sea-level station; 2nd DART station deployment; 1 RANET ground receivers installed in Indonesia; 1 RANET ground receiver installed in Sri Lanka; 1 GTS upgrade for Maldives; 1 GTS upgrade for Sri Lanka]
USGS: 6 components [1 Thai seismic station integrated into NEIC; 2 accelerometers, Indonesia, 3 new broadband Stations for Indonesia]

2006 Actual
NOAA: 4 [coastal sea level stations: 1Indonesia; 2 Maldives; 1 Sri Lanka]

Data Collection and Analysis Methodology: NOAA and USGS and will keep files of identified core station needs and technical specification required (where necessary) of the "components" of the various systems to be installed, deployed and/or upgraded. Evidence for completed activities for component interventions including certifications of receipt, acceptance letters, work orders etc. will be filed. Additional evidence related to post installation, deployment, or upgrade activity/ usage by recipient/ end user including tests, performance data, personal communications should be solicited and analyzed on a rolling basis.

Data source: US IOTWS Activity Managers, NDMOs, and other relevant partners.

Data Verification: Signed acceptance letters from recipient IOTWS partners or completed work orders for equipment installation, deployment or upgrade. When possible and practical, additional supporting data in the form of photographs, test data, follow up communications related to core station activity post US IOWTS intervention should be collected. Copies of documents will be retained by PI.

*Note: A new Indicator, 2.1, was added in the process of PMP revision. PMP Indicator 2.1 as related to the US IOTWS Integrated, "Program Work Plan 2005 – 2007" has subsequently become Indicator 2.2 and the previous Indicator 2.2 is now Indicator 2.3.
**Note: Target was readjusted down from 25 in December 2005 Version 1.0 PMP to reflect needs.

Sub-IR2: Tsunami detection and early warning capabilities improved	FY	Planned	Actual
Indicator 2.3: Number of tsunami detection and communication system components integrated into the IOTWS and operated in accordance with ICG/IOTWS standards and criteria.*	06	15	5
	07	16**	16

Unit of measure: System component

Definition: A "system component" refer to a tsunami system detection, analysis or communications element integrated into an international network, such as the Global Telecommunications System (GTS) or Global Seismic Network (GSN). Integration will necessarily involve an iterative process of testing and systematic linking of the various components of the detection and warning system along with developing standard operating procedures to ensure that data and interoperability with the member state is compatible and consistent with ICG/IOTWS technical standards.

Relevance: Installing detection hardware alone does not alone produce a functioning system. This indicator measures the number of functioning system components (seismometers, geodetic instruments (GPS), tide gauges, DART buoys, and communication networks) integrated and contributing to a sustainable overall end-to-end tsunami early warning system.

Targets:

2007 Achieved

NOAA: 8 [2 coastal sea level stations; 2 DART II stations; 2 GTS upgrades, Sri Lanka and Maldives; 2 RANET]
USGS: 3 [3 Malaysian Seismic Stations]

2007 Planned

NOAA: 8 [2 coastal sea level stations; 2 DART II stations; 2 GTS upgrades, Sri Lanka and Maldives; 2 RANET]
USGS: 3 [3 Malaysian Seismic Stations]

2006 Actual

NOAA: 4 [coastal sea level stations: 1Indonesia; 2 Maldives; 1 Sri Lanka]
USGS: 1 [1 seismic station integrated in NEIC production system (Chang Mai, Thailand)]

Data source: US IOTWS Program Team, NDMOs, and other partners and contractors working on equipment installation or protocols.

***Data Collection and Analysis Methodology*:** The US IOTWS Activity Manager works with relevant organizations of ICG/IOTWS member states to document the integration process and the results of tests of the system to ensure successful integration. Where necessary, test data may be analyzed further by team to recommend additional fine-tuning, in which case, interim integration results may be reported. Documentation should show schematically how integration is achieved within the national system and between national systems and the IOC.

***Responsible*:** US IOTWS Activity Managers

Data Verification: Integration documentation including Activity Manager reports and test data. Copies of documents will be retained by PI.

*Note: As a new Indicator 2.1 was added in the process of PMP revision. PMP Indicator 2.1 as related to the US IOTWS Integrated, "Program Work Plan 2005 – 2007" has subsequently become Indicator 2.2 and the previous Indicator 2.2 is now Indicator 2.3.

**Note: Target was readjusted down from 22 in December 2005 Version 1.0 PMP to reflect needs.

Sub-IR3: National capacity in tsunami warning dissemination and disaster management improved	FY	Planned	Actual
Indicator 3.1: Number of tsunami/all-hazards warning dissemination and disaster management system mechanisms designed, developed and/or improved at the national level	06	20	17
	07	62*	69**
	08	0	4

Unit of measure: System mechanism

Definition: "System mechanisms" are sets of procedures and structures that contribute to the institutionalization of disaster management operations. Mechanisms include organizational leadership structures; enabling policies to ensure NDMOs possess authority and resources for decision making and response; communication systems for warning dissemination; warning dissemination and disaster response processes and protocols; replicable training modules/programs/simulation exercises/drills; and resource centers at national, provincial, or local institutional levels, as appropriate. Definition of system mechanism areas include:

- *Organizational leadership structures*: Includes chain-of-command with clear articulation of responsibilities in routine and emergency situations. Will usually link to political decision-makers and military or other emergency "first responders"
- *Enabling policies*: Agency and government-wide policies, laws, regulations, decrees, technical guidance, personnel procedures and other instruments that provide legal basis for warning system and which guide the system's functioning vis-à-vis other parts of the government, private sector and the public.
- *Communication systems for warning dissemination*: Articulates structures and functioning of these for disseminating warnings. Should include not only physical parts of the system (warning towers, mass media) but also organization of private and public agencies and community leadership to receive, interpret and act on messages received.
- *Warning dissemination and disaster response processes and protocol:* Structure and rules for ICS, TARNS, others. These should come from the agencies but need evidence of how these are incorporated into equivalent structures in member countries. This integration (or transfer) should be governed by formal or informal protocols within the context of the US IOTWS Program.
- *Replicable training modules/programs/simulation exercise/drills:* Training of personnel and/or information on how to train personnel. Schedule of simulation exercises/drills and documentation that these have occurred, preferably with Program staff witnessing and evaluation.
- *Resource center components*: Information dissemination mechanisms (through Internet and/or hardcopy) at designated member country "node" or center established for this purpose or provided role for this purpose.

Relevance: This indicator measures the warning dissemination and disaster management components that need to be in place to communicate warnings at national levels and up to the "last kilometer" and to respond to disasters.

Targets:

2008 Actual

NOAA: 4 [1 CCR guidelines; 1 ITT course developed and institutionalized at AIT; 1 National Warning Center CONOPS adapted for Indonesia, Thailand and Sri Lanka: 1 CONOPS workshop, Indonesia]

2007 Actual

USFS: 21 [9 ICS training modules; 2 ICS study tour; 2 ICS protocols/procedures; 1 ICS simulation; 1 ICS best practices/operational structure; 3 TARNS simulation exercises 2 TARNS protocols/ procedures]
NOAA: 15 [1 ITTI University of Washington; 2 RANET Sri Lanka, Indonesia; 3 Web based Community Model (ComMIT); 3 CCR national framework/training systems, Indonesia, Thailand, Sri Lanka; 1 CCR regional framework/training system; 1 National and Regional CONOPS compendium; 1 Training module for Elements of Tsunami/Multi-hazard warning system, Sri Lanka; 2 GTS upgrades, Maldives, Sri Lanka; 1 Multi-hazards Identification and Analysis Tool]
USGS: 11 [1 Software module; 1 Public Server; 1 NEIC Implementation; 1 Evaluation; 1 External Transport Protocol implemented; 1 Seismic Hazard Training, Thailand; 1 Seismology, Data Analysis and Tsunami Warning Training, Indonesia; 1 NEIC Training Exchange, Golden CO, USA; 1 Regional Training Program in

Advanced Seismology and Tsunami Warning, Malaysia; 1 GTS. Advanced Seismology and Tsunami Warning Training, Thailand]
USTDA: 1 [1 Disaster Management Plan and Technology Strategy, Indonesia]
PI: 4 [3 Disaster Management Policy Reviews, Indonesia, Sri Lanka, Thailand; 1 Series of four SOP Workshops, Indonesia]

2007 Planned
USFS: 18 [7 ICS training modules; 1 ICS study tour; 2 ICS protocols/procedures; 1 ICS simulation; 1 ICS operational structure; 3 TARNS simulation exercises 2 TARNS protocols/ procedures; 1 TARNS multi-hazard]
NOAA: 20 [1 ITTI University of Washington; 2 RANET Sri Lanka, Indonesia; 3 Web based Community Model (ComMIT); 3 CCR national framework/training systems, Indonesia, Thailand, Sri Lanka; 1 CCR regional framework/training system; 1 National and Regional CONOPS compendium; 2 GTS upgrades, Maldives, Sri Lanka; 3 Training module for Elements of Tsunami/Multi-hazard warning system, Indonesia, Sri Lanka; 1 National Warning Center CONOPS adapted for Indonesia, Thailand and Sri Lanka: 1 Multi-hazards Identification and Analysis Tool; 1 CCR guidelines; 1 ITT course at AIT]
USGS: 5 [1 Software module; 1 Public Server; 1 NEIC Implementation; 1 Evaluation; 1 External Transport Protocol implemented]
USTDA: 2 [2 Prototype Emergency Management Systems to Sri Lanka]

2006 Actual
USFS: 6 [1 ICS leadership management structure, Sri Lanka; 1 ICS module, Sri Lanka; 2 ICS study tours; I Standard Operating Procedure/protocol in train-the-trainer process, Sri Lanka; 1 ICS resource center, Sri Lanka]
USFS, NOAA: 3 [1 TARNS; 1 NDWC Thailand operation structure improved for warning dissemination; 1 NDWC internal operations structure improved for media outreach]
USGS: 5 [1 Training, Application of Seismology in Tsunami Detection and Alert; 1 Training, Methods for Estimating Seismic Source Parameters; 1 Training Seismic and Tsunami Warning Center, Indonesia; 1 Regional Seismic Training; 1 Seismic and Tsunami Warning Training, Maldives]
USTDA: 3 [2 Operational CONOPS, Thailand; 1 CONOPS simulation, Thailand]

***Data Collection and Analysis Methodology*:** US IOTWS Activity Managers will collect relevant documentation related to system mechanism activities. Methodology involves determining with stakeholders, the point at which the particular component has been designed, developed or improved.

Data source: US IOTWS Activity Managers, NDMOs, other relevant partners.

Data Verification: Design, implementation and monitoring documents related to the activities. Where training occurs in the course of activity implementation, the provider will ensure that signed participant sheets are maintained and reported to TraiNet (via the PI). Copies of documents will be retained by PI.

*Note: Target was readjusted up from 44 in December 2005 Version 1.0 PMP to reflect needs.
**Note: Numbers reflect four PI targets and five USGS targets which were planned as activities but erroneously had not been included in 2007 target projections.

Sub-IR3: National capacity in tsunami warning dissemination and disaster management improved	FY	Planned	Actual
Indicator 3.2: Number of communities included in national alert systems	**06**	**400**	**294***
	07	**320****	**399**

Unit of measure: Community

Definition: A national alert system refers to a national tsunami warning and alert system which may also be part of an all hazards warning and alert system. This indicator will specifically measure the number of communities that have become or will become included in a national tsunami warning and alert system as a result of US IOTWS activities. For the purpose of this indicator, communities are defined as 100 households of 5 persons (i.e. 500 persons on average) that are located in tsunami vulnerable areas.

Relevance: Communities vulnerable to disasters will be notified earlier and thus able to take steps to protect themselves.

Targets:
2007 Actual
USFS: 260 [TARNS training participants who have gone on to connect communities to national warning system. Because of differing methodologies for FY06 and FY07 data collected, 2007 Planned Targets will seek to reach 2006 Actuals plus 26 additional communities to reach a target of 320. Each of an estimated 80 total TARNS participants are expected to connect four communities]
NOAA: 139 [103 RANET Indonesia; 36 RANET Sri Lanka]

2007 Planned
USFS: 26 [TARNS training participants who have gone on to connect communities to national warning system. Because of differing methodologies for FY06 and FY07 data collected, 2007 Planned Targets will seek to reach 2006 Actuals plus 26 additional communities to reach a target of 320. Each of an estimated 80 total TARNS participants are expected to connect four communities]

2006 Actual
USFS: 294 [Extrapolation of communities covered by 99 NDWC installed warning towers]

***Data Collection and Analysis Methodology*:**
US IOTWS Activity Managers and relevant partners to provide data/evidence of communities included in national alert system as a result of US IOTWS activities. USFS and PI will collect data from questionnaires given to TARNS participants that elicit information on specific activities and steps community members have taken to become included in national alert systems (as a result of what they have learned from the workshops). Questionnaires will be distributed and data collected during the TARNS III workshop. Data will be analyzed for trends and community inclusion into the national alert system. Sample (or if possible all) data will be verified for 1) activities taken and 2) activities planned if within 2 months of program close-out. US IOTWS grantee D-TRAC or similar NGO will be utilized to assist in verification process.

Data Source: PI, USFS and other partners will collect TARNS data. Additional data to be collected by US IOTWS Activity Managers, NDMOs, other relevant partners.

Data Verification: Questionnaires, data summaries and analysis reports for TARNS. Other relevant evidence as collected. Copies of documents will be retained by PI.

* Note: Indicator actuals from the 2006 Annual Report were calculated using a differing methodology from the revised PMP Version 2.0 that limits the ability to combine results from the separate years. Version 1.0 data collection was limited to National Warning Center reports which have been both difficult to acquire and to verify. Version 2.0 take a more direct approach in measuring results by utilizing US IOTWS partners to collect, verify and analyze data.

**Note: Target was readjusted down from 800 in December 2005 Version 1.0 PMP to reflect a more robust approach to data validation in measurement.

Sub-IR3: National capacity in tsunami warning dissemination and disaster management improved	FY	Planned	Actual
Indicator 3.3: Number of government agencies that received technical support	**06**	**45**	**112**
	07	**160***	**195**

Unit of Measure: Agency

Definition: A "government agency" refers to any government institution either at the national or sub-national level. Technical support received may be a result of either direct or indirect US assistance. Technical assistance and training provided to government technical agencies, research bodies and administrative levels of government include all forms of training, consultations, technology transfers, assistance with preparation of plans and other forms of assistance that build capacity of the agency in early warning systems and disaster preparedness.

Relevance: The primary mode of technology transfer through the US IOTWS Program will be through capacity building of national and local government agencies and selected research bodies.

Targets:

2007 Achieved
PI: 30 [Participants in US IOTWS Small Grants Program trainings]
USGS: 31 [2 Public Seismic Data and EIDS assistance; 4 Paleoseismology Trainings; 2 Seismic Hazard Trainings; 4 Seismic/tsunami training]
USFS: 19 [ICS trainings; TARNS activities]
NOAA: 3 [2 CCR Sri Lanka, 4 CCR Indonesia]

2007 Planned
PI: 30 [participants in US IOTWS Small Grants Program trainings]
USGS: 12 [2 Public Seismic Data and EIDS assistance; 4 Paleoseismology Trainings; 2 Seismic Hazard Trainings; 4 Seismic/tsunami training]
NOAA: 6 [2 CCR Sri Lanka, 4 CCR Indonesia]

2006 Actual 70 Central Government/ 42 local
USFS: 73
NOAA: 9
USGS: 8
PI: 22

Data Collection and Analysis Methodology: USFS, USGS, PI and NOAA Activity Managers will collect data for each government agency receiving technical support identifying relevant activity and recipient details. Analysis will be from file reviews. Different sub-sections of any single government administrative area will be treated as a separate agency for the purposes of measurement. For example, a training provided to the Ministry of Interior at the national level and a separate training provided to Ministry of Interior at a district level will be counted as two agencies.

Data source*:* US IOTWS Activity Managers

Data Verification: Training materials, description of assistance provided, and activity reports. Participant lists with daily signed attendance sheets. Copies of certificates of completion. Correspondence from recipients describing and verifying type of assistance received. Copies of documents will be retained by PI.

**Note: Target was readjusted up from 90 in December 2005 Version 1.0 PMP to reflect the fact that original FY07 Targets were exceeded in FY06.

Sub-IR4: Local preparedness and coastal mitigation for tsunamis and related hazards improved	FY	Planned	Actual
Indicator 4.1: Number of communities trained in disaster preparedness	**06**	**500**	**187**
	07	**712***	**20,290**

Unit of measure: Person(s) trained

Definition: This indicator consists of the number of government officials, NGO representatives, and local leaders trained in disaster preparedness and, indirectly, the communities represented or reached by these individuals and their organizations/agencies. Persons trained will consist primarily of individuals who live in the potentially tsunami-affected communities, provide tsunami relevant public services to these communities or work for NGOs working in these communities. Persons trained by or in collaboration with other regional programs and partners such as the IFRC which utilize US IOTWS training materials and modules will be included in calculations.

Relevance: By making citizens more aware of emergency procedures, the impact of disaster can be mitigated.

Targets:
2007 Achieved
PI: 19,231 [Small Grants Program]
USFS: 706 [ICS and TARNS]
NOAA: 166 [CCR, Tsunami Education Program]

2007 Planned
NOAA/PI: 145 [120 CCR; 25 Tsunami Education Program]
USFS: 380[160 TARNS; 220 ICS]

2006 Actual
USFS/NOAA: 144 [144 TARNS]
NOAA/PI: 43 [43 CCR]

***Data Collection and Analysis Methodology*:** US IOTWS Activity Managers and partners will take headcounts at each training session. Trainings cover trainings and workshops including all modules of ICS, TARNS, CCR, or other trainings that target local/community level disaster preparedness. Information will be collected on trainees and forwarded to the PI who will disaggregate data according to gender; whether they are local, national government representatives or NGOs; and which communities they represent.

Data source: The number of people trained will be based on TrainNet database populated by attendance sheets from each workshop.

Data Verification: Participant lists with daily signed attendance sheets. Copies of certificates of completion. Evaluation sheets. Copies of documents will be retained by PI.

*Note: Target was readjusted down from 1000 in December 2005 Version 1.0 PMP to reflect program activities.

Sub-IR4: Local preparedness and coastal mitigation for tsunamis and related hazards improved	FY	Planned	Actual
Indicator 4.2: Number of coastal communities initiating activities that support resilience	**06**	**50**	**2**
	07	**67***	**83**

Unit of measure: Community

Definition: For the purpose of this indicator, "communities" are defined as 100 households of 5 persons (i.e. 500 persons on average) that are located in tsunami vulnerable areas. "Resilience" is defined as combination of three characteristics: magnitude of a shock that a system can absorb and remain within a given state; the degree to which the system is capable of self organization; and the degree to which the system can build capacity for learning and adaptation. Resilience activities will include the development of a coastal community resilience assessments or the initiation of an action plan to increase resilience based on an assessment. Targets include communities whose representatives or development agents received the CCR Guide and training sessions.

Relevance: By organizing communities to adopt appropriate disaster preparedness measures, the impact of tsunamis and other disasters can be mitigated in particularly vulnerable areas. [NOTE: Done to differentiate between 4.1]

Targets:
2007 Planned
NOAA: 29 [29 CCR]
PI: 52 [52 Grantee recipient communities]

2006 Actual
PI: 2 [2 Small Grants recipient communities]

***Data Collection and Analysis Methodology*:** NOAA, PI and collaborating USG Activity Managers will track trainees in their community assessment process and obtain copies of assessments, which include action plans. The assessments and/or action plans will be sent into the PI as a part of the deliverable of community trained represented. Activities undertaken by grantees to support resilience will be documented and reported to PI. PI will undertake file reviews, site visits, and other follow up activities to monitor progress.

Data source: US IOTWS Activity Managers, Grantees, and other relevant partners.

Data Verification: Community assessments and action plans. Activity and monitoring reports. Copies of documents will be retained by PI.

*Note: Target was readjusted down from 200 in December 2005 Version 1.0 PMP to reflect program activities.