Sentinel Asia:
Procedures for Data Analysis Nodes

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Revision Record

Version	Date	Nature of revision/Notes	Authorisation
1.0	Apr 2009	First formal draft	Sentinel Asia JPT
1.1	Aug 2011	Modified version	Sentinel Asia JPT
1.2	Apr 2013	Modified version	Sentinel Asia JPT
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1   Introduction

Purpose

The purpose of this document is to define the procedures that govern the establishment and operation of a Data Analysis Node (DAN) within the framework of the Sentinel Asia project.

This is a subsidiary document to the Terms of Reference (TOR) and Implementation Plan (IP) documents agreed among the Sentinel Asia participants, as shown in the figure below. Corresponding documents exist for the definition of procedures relating to Data Provider Nodes (DPN) and Emergency Observation Requests (EOR).
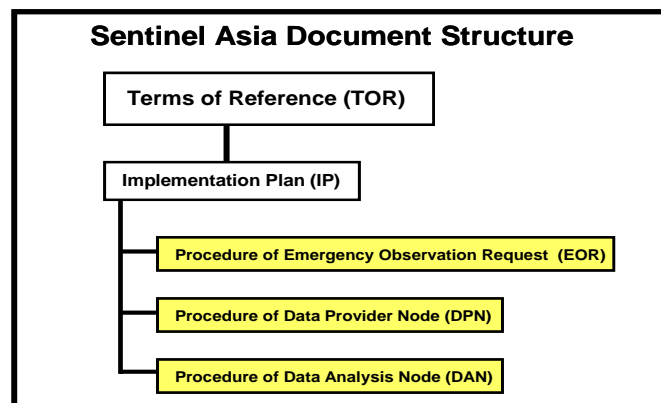

Figure 1-1
Sentinel Asia documentation hierarchy

Formal versions and revisions of this document are authorised by the members of the Joint Project Team (JPT) of Sentinel Asia.

Background

Statistics indicate that the Asia-Pacific region suffers disproportionately from natural disasters. Over the last 30 years, the region has been impacted by some 37% of disasters recorded worldwide, and accounts for 57% of global fatalities and 89% of the total victims associated with such disasters.
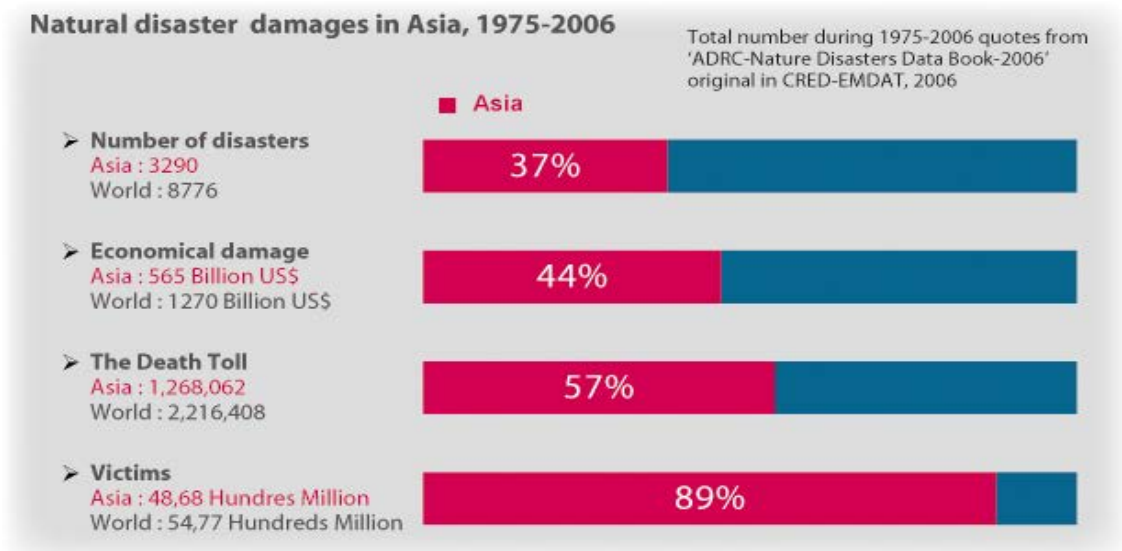
Figure 1-2
Asian disaster statistics

In light of these distressing statistics, the Asia-Pacific Regional Space Agency Forum (APRSAF) in 2005 proposed an initiative called Sentinel Asia, to showcase the value and impact of Earth observation technologies, combined with near-real-time internet dissemination methods and Web-GIS mapping tools for disaster management support in the Asia-Pacific region.

Sentinel Asia aims to:

- improve safety in society through the application of information and communication technologies (ICT) combined with space technologies;

- improve the response time and accuracy of disaster preparedness and early warning;

- improve disaster assessment and understanding of disaster impact and physical extent;

- minimize the number of victims and social/economic losses resulting from disasters;

- contribute to the establishment of post-disaster rehabilitation and recovery plans.

Many of these goals are possible only through the wide-area and fast response collection of images and other data which can be acquired by Earth observing satellites.

Sentinel Asia is a voluntary and best-efforts-basis initiative led by the Asia-Pacific Regional Space Agency Forum (APRSAF) to share disaster information in near-real-time across the Asia-Pacific region, using primarily the Web-GIS technology. Its architecture is designed to operate initially as an internet-based, node-distributed information distribution backbone, eventually distributing relevant satellite and in situ spatial information on multiple hazards in the Asia-Pacific region.

The implementation plan for Sentinel Asia envisages an operational structure which includes a number of kinds of 'Nodes':

The Asian Disaster Reduction Center (ADRC): The ADRC was established in 1998 with the mission to enhance disaster resilience of the member countries, build disaster resilient communities and to establish networks among countries through a variety of programmes - including personnel exchange in this field. The ADRC is the first point of contact for users seeking to exploit the benefits of Sentinel Asia.

Data Provider Nodes (DPN): These Nodes have access to a data stream from a spacecraft which they either own or have an agreement with the owners for operational access to, as well as supporting satellite data reception facilities and/or data archives; Data Provider Nodes are tasked to process the imagery they can collect in near real-time or from their existing archives into agreed information products, and make it available through the rest of the network.

Data Analysis Nodes (DAN): These Nodes analyze the satellite data provided by the DPNs, generate value added and combined products, which can be used by disaster management agencies and their partners, and disseminate the results through the Sentinel Asia System. One of these Nodes is nominated to be the **Principal Data Analysis Node (P-DAN),** and has the additional responsibility of coordinating the response of all other DANs to each Emergency Observation Request (EOR) like a Project Manager of IDC.

International Disaster Charter (IDC):The European and French space agencies (ESA and CNES) initiated the International Charter "Space and Major Disasters", with the Canadian Space Agency (CSA) signing the Charter on 20 October 2000. The International Charter aims at providing a unified system of space data acquisition and delivery to those affected by natural or man-made disasters through Authorized Users.

Contents

Section 2 summarises the roles and responsibilities of a Data Analysis Node in the context of the Sentinel Asia framework. Section 3 explains the criteria for qualifying as a Data Analysis Node and explains the application process and schedule. Section 4 details the Procedures that govern the operation and coordination of Data Analysis Nodes. Definitions and acronyms are listed in Appendix A.

2   Roles and Responsibilities of a Data Analysis Node

Roles of a DAN

The basic role of the Data Analysis Node within the Sentinel Asia framework is to add value to the Earth observation satellite data provided by the Data Provider Nodes and to analyze and/or combine that data with other geospatial information to generate higher level products and information which will be of value to disaster response applications.

Given the time criticality of disaster response applications, Data Analysis Nodes inject these products and information with minimum delays into the Sentinel Asia network.

The context of the Data Analysis Node (DAN) role is indicated in the Sentinel Asia data flow diagram below. In some cases, Data Provider Nodes may fulfil some of the functions of a Data Analysis Node – depending on their capabilities.
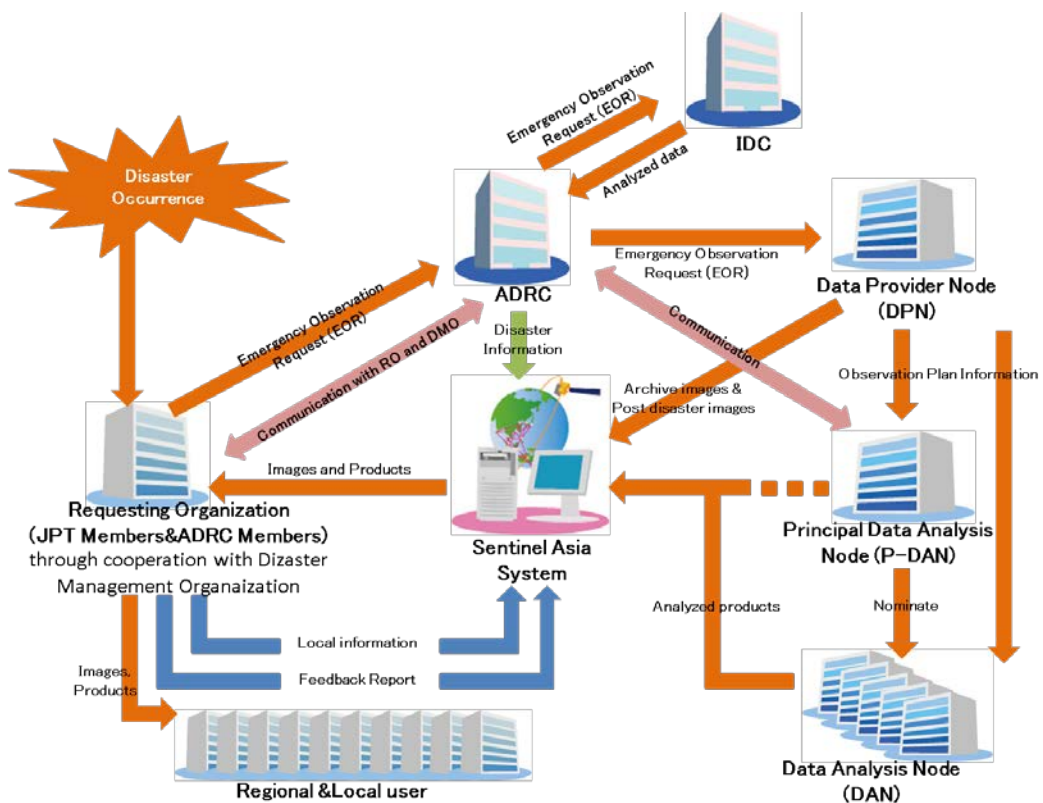

Figure 2-1
Context for the role of the DANs within Sentinel Asia

Responsibilities of a DAN

In brief, Data Analysis Nodes have a responsibility to:

– Provide an up-to-date point of contact for the transmission of analyzable data from the Data Provider Nodes;

– Maintain a library of relevant geospatial datasets and information that could be of value in combination with the data supplied by the Data Provider Nodes for the rapid generation of information in response to an Emergency Observation Request;

– Make best efforts to supply analyzed data and information products to the Sentinel Asia system with minimum delay;

In addition, the Node nominated to be the Principal Data Analysis Node (P-DAN) has the additional responsibility of coordinating the response of all other DANs to each EOR, and in this capacity serving as an interface among the DANs and the ADRC. The P-DAN must maintain a current awareness of the capabilities and resources available to each of the other DANs in order to direct an optimal response to each disaster situation – exploiting the strengths of each DAN as appropriate. The P-DAN will also maintain a complete history of EORs supported and the value added heritage of all DANs.

Refer to section 4 of this document for more detailed descriptions of the procedures associated with the roles and responsibilities of the DAN.

3   Qualifying as a Data Analysis Node

Qualification criteria

Any agency wishing to qualify as a Data Analysis Node within the Sentinel Asia framework must satisfy the following requirements:

– Be either a member of the Sentinel Asia JPT or a member of the ADRC;

– Be able to provide personnel capable of communicating adequately in English, as the basis for communications among Sentinel Asia partners;

– Be capable of implementing the roles and responsibilities as outlined in section 2: this will require immediate access to datasets and information required in combination with Earth observation satellite data from the Data Provider Nodes to generate high level data products and information for disaster response applications;

– The technical capability to receive, process, and transmit the datasets with minimum delay in the context of the flow of the Emergency Observation Request within the Sentinel Asia system;

– Provision of sufficient resources (personnel and technical facilities) to fulfil the roles and responsibilities of a Data Analysis Node;

– Conclude a successful demonstration of the capability to provide analyzed data in response to Emergency Observation Requests (EORs) and provision of data in response, as the core function of the Sentinel Asia framework.

Application process

Applications for qualification as a Data Analysis Node for Sentinel Asia should be made in writing to the Secretariat. The application should clearly indicate how the applicant is willing and able to contribute in response to EORs from Sentinel Asia. It should also indicate, the relevant datasets and information which it holds or has access to, and which kinds of high level data products and information it may be able to support in response to EORs. Key personnel with expertise in each of the capability domains of the applicant should be identified, so that all Sentinel Asia participants are aware of the key individuals to be involved and consulted in the case of a particular type of disaster. DAN applicants should also indicate the typical response time they are capable of given operating conditions and technical capabilities.

As a first step, the Secretariat will informally review and provide feedback to the applicant – confirming that the main qualification criteria are satisfied and that the applicant is willing to undertake a demonstration of their capability to execute EORs, receive sample inputs from the DPNs, and provide data to the Sentinel Asia system in response.

The Secretariat will circulate the application with its recommendation to the JPT members, with a 2 week response window in which JPT members should

respond indicating whether they support the Secretariat recommendation. Decision on applications for qualification as a Data Analysis Node should be by consensus of the JPT. The Secretariat will thereafter provide a formal written response to the applicant indicating whether their application is approved or not. Successful applicants will be provided with a schedule for their qualification as a Data Analysis Node – indicating the next steps necessary for the trial of procedures to confirm the applicant is capable of satisfying the technical requirements.

4 Data Analysis Node Procedures

Operations Procedures

Each DAN will:

1. Establish and maintain a current set of contact details (email, telephone, fax) such that the EORs from the ADRC can be conveyed to the appropriate personnel within regular working hours.

2. Upon reception of an EOR from the ADRC, make a determination (in consultation with the P-DAN) as to whether the analyzed data, information and services which the DAN is able to offer, would be relevant and beneficial in support of the particular disaster.

3. In consultation with the P-DAN, initiate a data analysis plan for those EORs which the DAN determines that it is equipped to support; this data analysis plan will cover: identification of additional information that may be of value in combination with the data and imagery to be supplied by the DPNs; generation of higher level products for use in the disaster response process. The P-DAN will share the overall data analysis plan with the ADRC, identifying the nominated DANs and their contributions.

4. The DAN will report as necessary on the progress and conclusion of the data analysis plan to the P-DAN which will serve as the coordinating body for informing the RO and any third parties as to progress.

5. Upload using agreed transmission and format standards (specified in the techncial documents) the results of the data analysis efforts to the Sentinel Asia system.

6. Transfer using transmission and format standards (specified in other Sentinel Asia documents) the results of the data analysis efforts to other DANs as required.

7. Ensure appropriate system security measures are applied at all stages of the information handling process, including transmission of information to the Sentinel Asia network.

8. In support of Sentinel Asia record-keeping, record details of the EOR (location, type, extent of disaster etc), the type and quantity of data and analysis supplied in response, and the disaster response applications to which the Sentinel Asia system was applied. This is in support of the ongoing monitoring of the utilisation and performance of the Sentinel Asia system.

9. Consistent with the Sentinel Asia communications strategy, seek to publicise the use of Sentinel Asia at the time of each disaster, and to promote the benefits of the framework.

The P-DAN has a special coordination role in interfacing among the ADRC and the other DANs, and must have the knowledge required of each DAN's capabilities to assign data analysis duties in response to each EOR – based on the location and type of the particular emergency.

The IDC data analysis is conducted under supervision of the PM.   At the time of IDC escalation from Sentinel Asia, the PM is undertaken by DANs authorized by IDC. PM will upload the analized products to the Sentinel Asia system.

Coordination Procedures

Fulfil obligations agreed from time to time by the JPT of Sentinel Asia including in relation to the continuing implementation plan for Sentinel Asia.

Provide a representative(s) for an annual face-to-face meeting among DAN agencies, with the purpose of reviewing the progress of Sentinel Asia during the preceding year and agreeing actions to further develop and progress in the coming year.

Data Policy Issues

Any data utilised by or provided by the DANs will be subject to the Sentinel Asia data policy guidelines:

1. The copyright rules of the supplying agency shall apply to any data or products supplied by the Sentinel Asia system.

2. The relevant copyright marks shall be displayed on any image or derived products – eg *"Provided by Sentinel Asia, © DPN Agency" or "Provided by Sentinel Asia, Satellite data © DPN Agency, further processing applied by DAN Agency"*.

3. Sentinel Asia outputs are strictly for humanitarian, academic and non-commercial purposes and shall not be used for any other purpose whatsoever. Also, the data which provided by Data Provider Node is strictly for Data Analysis by DAN or organization who designated formally by the DAN and these data may not be distributed to the third Parties.

4. Sentinel Asia is a best efforts framework and participating agencies shall not be held to any assurance or warranty that the outputs satisfy a particular purpose, nor shall they accept any liability or compensation claims resulting from use of the Sentinel Asia outputs.

Various measures shall be applied to enforce these data policy procedures, including the conclusion of Non-Disclosure Agreements by all DPN and DAN agencies.

It is fundamental objective of Sentinel Asia to share data with those in need, and all parties to the process must recognise that any data contributed to the Sentinel Asia system will be shared in this way.

Outreach Procedures

It is a stated objective of the Sentinel Asia Implementation Plan to promote utilisation of disaster-related information obtained by space and remote sensing technology in order to mitigate and prevent damage caused by natural disasters, including:

– improving public understanding of the benefits of space technology applications and of Sentinel Asia in particular;

– demonstrating the value of international co-ordination;

– demonstrating the real and significant benefits resulting from application of Sentinel Asia to actual disasters.

With these objectives in mind, Sentinel Asia partner agencies have the right to use Sentinel Asia outputs for promotional purposes – with due credit given to the agencies involved in acquisition and processing – and a clear copyright statement.