

Sentinel Asia:
Procedures for Data Provider Nodes

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Sentinel Asia: Procedures for Data Provider Nodes

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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 Provider Node (DPN) 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 Analysis Nodes (DAN) and Emergency Observation Requests (EOR).

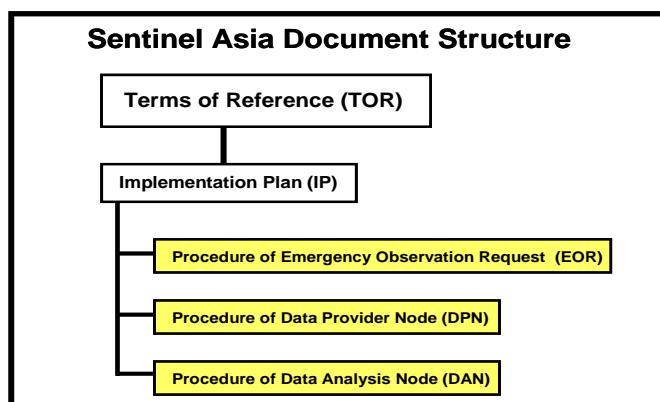


Figure 1-1
Sentinel Asia documentation hierarchy

Formal issues 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.

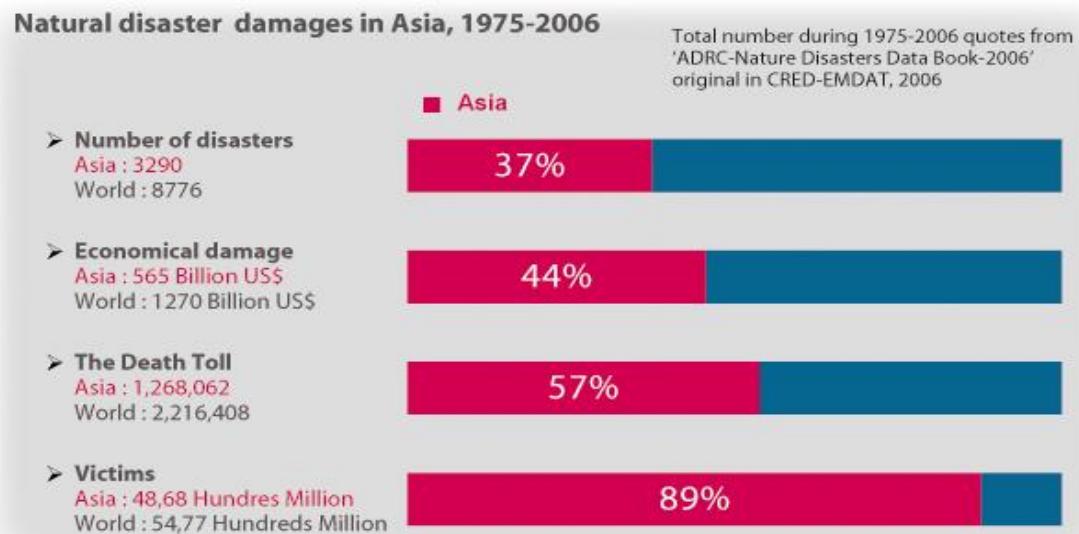


Figure 1-2
Asian disaster statistics

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 speed and accuracy of disaster preparedness and early warning;
- improved disaster assessment and understanding of their impact and physical extent;
- minimize the number of victims and social/economic losses resulting from disasters;
- contribute to the establishment of rehabilitation 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 applied by disaster management response 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.

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 Provider Node in the context of the Sentinel Asia framework. Section 3 explains the criteria for qualifying as a Data Provider Node and explains the application process and schedule.

2 Roles and Responsibilities of a Data Provider Node

Roles of a DPN

The basic role of the Data Provider Node within the Sentinel Asia framework is to inject imagery and data into the Sentinel Asia information systems in support of disaster response efforts. It does this in response to Emergency Observation Requests issued via the Asian Disaster Reduction Center (ADRC). Data Provider Nodes endeavour to supply the Sentinel Asia web system with data and information from their archives for the affected region, and on-demand data which is acquired for the affected area from the Earth observing satellites to which they have access.

Given the time criticality of disaster response applications, the emphasis for the Data Provider Nodes is on speed of response to the Emergency Observation Requests and the ability to undertake rapid acquisition and dissemination of supporting satellite data is of the utmost importance. As indicated in the Sentinel Asia data flow diagram below, the Data Provider Nodes also play a role in providing data products to the Data Analysis Nodes (DANs) and the P-DAN for them to provide higher level and combined data products in support of disaster response applications. P-DAN nominates some DAN that is suitable for analysis of the EOR. In some cases, Data Provider Nodes may themselves fulfil some of the functions of a Data Analysis Node – depending on their capabilities.

Given the central role of the Data Provider Nodes in the Sentinel Asia system, DPN agencies are expected to play an active role in the further development and management of the Sentinel Asia framework.

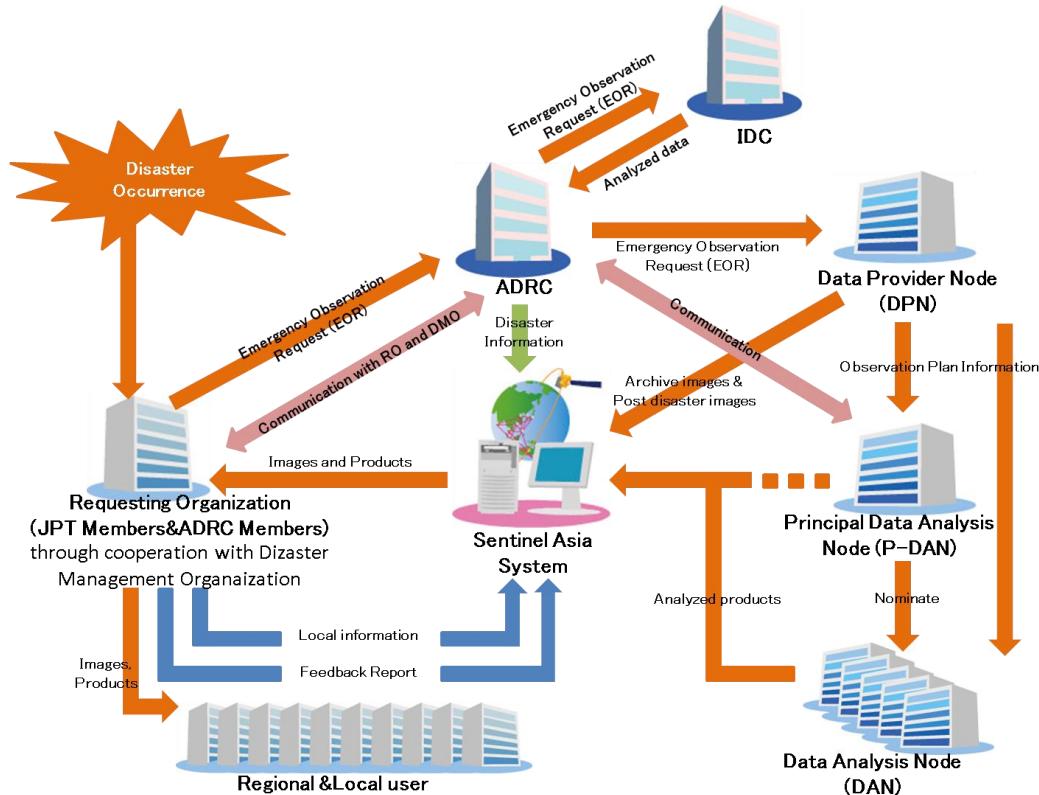


Figure 2-1
Context for the role of the DPNs within Sentinel Asia

Responsibilities of a DPN

In brief, Data Provider Nodes have a responsibility to:

- Provide an up-to-date point of contact for the transmission of EORs from the ADRC or RO;
- Make best efforts to supply imagery and geospatial data from both archive and active satellite observing systems to the Sentinel Asia system and to the P-DAN and DAN with minimum delay; this infers that in some instances Data Provider Nodes may be unable to respond to particular EORs;
- Support ongoing management and coordination efforts, including regular telcons and meetings with other Data Provider Nodes, as part of the ongoing development and progression of the Sentinel Asia framework;

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

3 Qualifying as a Data Provider Node

Qualification criteria

Any agency wishing to qualify as a Data Provider 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 operational access to the scheduling and reception of Earth observation data from: an active satellite mission which the Node owns and which has the potential to contribute to disaster-related applications; or a suitable satellite data archive; DPNs must also have access to suitable satellite data processing facilities for the processing and supply of data to the Sentinel Asia framework;
- Provision of sufficient resources (personnel and technical facilities) to fulfil the roles and responsibilities of a Data Provider Node;
- Demonstration of the capability to execute Emergency Observation Requests (EORs) and provision of data in response, as the core function of the Sentinel Asia framework.

Application process

- 3.1.1 Applications for qualification as a Data Provider Node for Sentinel Asia should be made in writing to the Secretariat. The application should clearly indicate which Earth observing satellite data sources the applicant is willing and able to contribute in response to EORs from Sentinel Asia – with some indication of capacity/volumes available. It should also indicate, for a typical EOR scenario, the capability of its satellite acquisition and its information processing systems in terms of delay between receiving an EOR and uploading data to the Sentinel Asia system (this will be a function of many parameters including satellite orbital characteristics, instrument pointing capabilities, number and location of acquisition facilities and their networking). 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.
- 3.1.2 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 and to provide data to the Sentinel Asia system in response.

- 3.1.3 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 Provider 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 Provider Node – indicating the next steps necessary for the trial of procedures to confirm the applicant is capable of satisfying technical requirements.

4 Data Provider Node Procedures

Operations Procedures

Each DPN 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 approved EOR by ADRC, make a determination (in consultation with the ADRC) as to whether the satellite data, information and services which the DPN is able to offer, would be relevant and beneficial in support of the particular disaster.
3. Initiate a data acquisition plan for those EORs which the DPN determines that it is equipped to support; this data acquisition plan will cover: emergency scheduling of satellite observations of the post-disaster state of the affected area; retrieval of archive imagery of the pre-disaster state of the affected area. The DPN will share the acquisition plan with the ADRC, RO, P-DAN and DAN.
4. The DPN will report as necessary on the progress and conclusion of the data acquisition plan to the ADRC which will serve as the coordinating body for informing the RO and any third parties as to progress.
5. Using the agreed transmission and format standards (specified in the technical documents), the DPN will upload the results of the data acquisition efforts (supplemented with? whatever analysis content can be applied rapidly) to the Sentinel Asia system, and notify the ADRC, RO, P-DAN and DAN of this.
6. Transfer using transmission and format standards (specified in other Sentinel Asia documents) the results of the data acquisition efforts to the P-DAN and DANs as required.
7. In support of Sentinel Asia record-keeping, record details of the EOR (location, type, extent of disaster etc), the type and quantity of data 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.
8. 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 framework.

Coordination Procedures

Each DPN will:

1. Provide a representative(s) for monthly coordination telcons among the DPN agencies to progress and develop Sentinel Asia activities. These telcons will be arranged by the Sentinel Asia Secretariat and will be documented using minutes and action records.

2. Endeavour to address the actions assigned to each agency as a result of the monthly coordination telcons.
3. Provide a representative(s) for an annual face-to-face meeting among DPN 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.
4. Fulfil obligations agreed from time to time by the JPT of Sentinel Asia including in relation to the continuing implementation plan for Sentinel Asia.

Data Policy Issues

Any data utilised by or provided by the DPNs 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.