IAA Study Group Status Report

Responsible Commission: COMMISSION 4

Study Number: SG 4.20

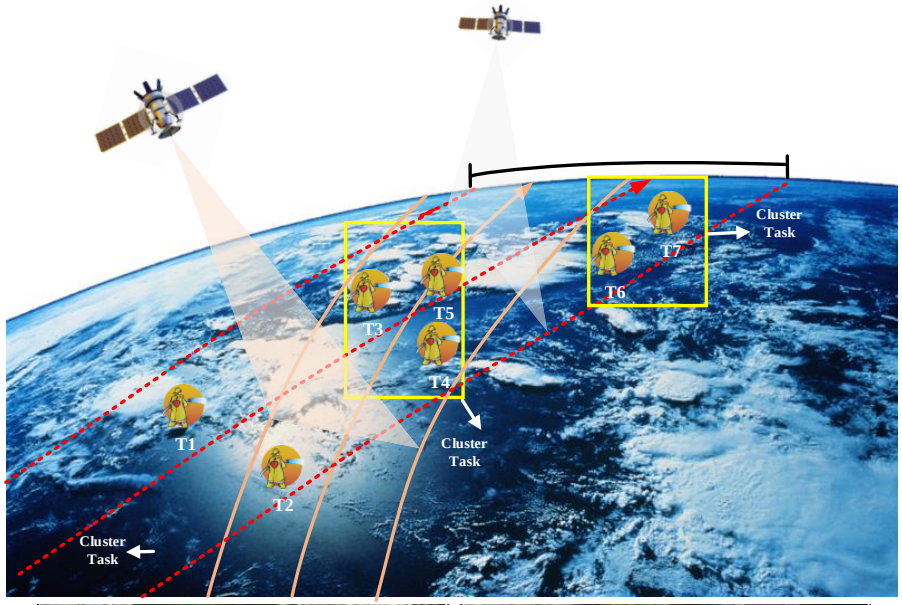
Study Title: International Cooperation on Remote Sensing in Earthquake Emergency Response

September, 2018

Guidelines

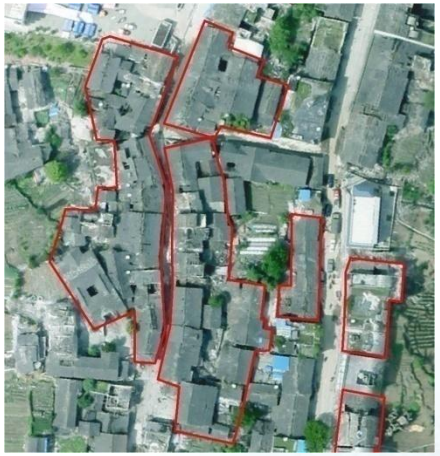
- 1.Background
- 2.Introduction
- 3.Progress

1.Background

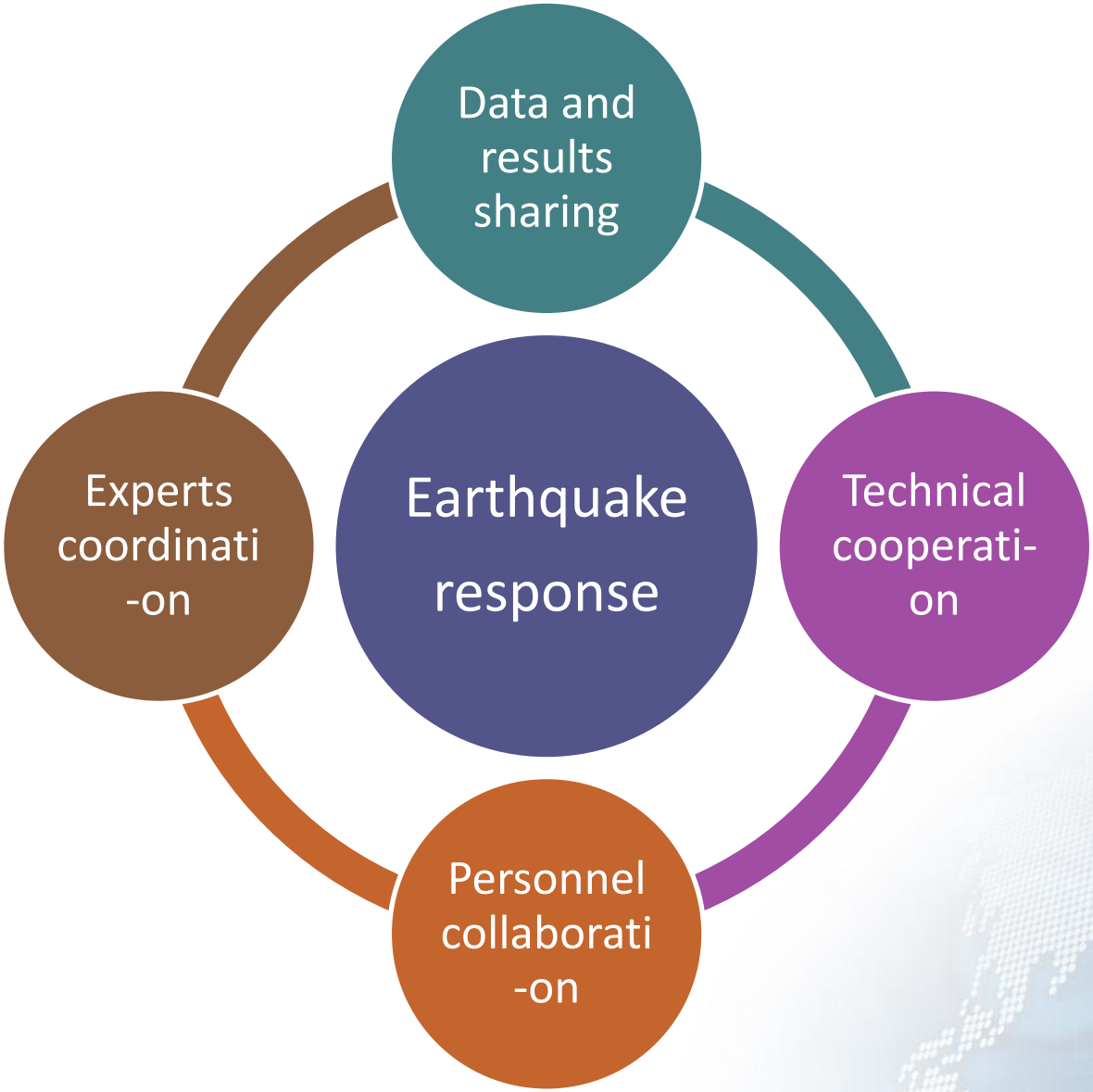


Remote Sensing is significant in Earthquake Emergency:

- **Where**
- **Extent**
- **Response**



1.Background



Besides the RS data sharing, it is same important that experts all over the world can be efficiently gathered after a devastating earthquake.

Forming an IAA Study Group on April 2015:

International Cooperation on Remote Sensing in Earthquake Emergency Response, which can enables better coordinated in:

- **Experts**
- **RS images**
- **Technology**
- **Experience**

2.Introduction

- **Brief Study Description**

An effective coordination policy will be proposed, in which technical capabilities will be better utilized and experts all over the world can be efficiently gathered after a devastating earthquake. The advantages will complement each other and provide emergency support for future strong earthquakes.

2.Introduction

- **Overall Goal**

Propose solutions to :

➢ form an international collaborative mechanism;

➢ and to exchange remote sensing products of seismic disaster

for earthquake emergency response

2.Introduction

- **Intermediate Goals**

1. Innovation of RS in theory and technology;
2. Enhance international communication among both young experts and professional teams;
3. Enhance international exchange of remote sensing products and expertise.

2.Introduction

- **Members**

Chair(s): Bao Weimin (China), Co-Chair(s): Jean-Michel Contant (France) , Jan-Peter Muller (UK)

- **Other Members**

Australia: Ge Linlin

China: Gu Xingfa, Zhang Jingfa, Shen Xuhui, Wang Xiaoqing, Shan Xinjian, Zhu Jianjun, Liao Jingjuan, Xu Jing,

HongKong: Lin Hui

Italy: Paolo Ganba

UK: Jan-Peter Muller, Li Zhenhong

USA: Lu Zhong

Guidelines

- 1.Background
- 2.Introduction
- **3.Progress**

➢ **3.1 Completed the first draft of the final report**

➢ **3.2 Discussed the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes**

➢ **3.3 Developed an earthquake damage information extraction method based on deep learning**

3.1 the second draft of the final report

- **1. Introduction**
- **2. Data**
- **3. Technology**
- **4. Hardware and software environment**
- **5. Expert knowledge and group interpretation**
- **6. Production**
- **7. Typical case**
- **8. Cooperation framework**

3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

- Background
- On December 29, 2015, China successfully launched a geosynchronous orbit satellite with a maximum spatial resolution of 50 meters - (GF-4)
- The GF-4 satellite can respond to the observation plan within a few minutes. It has unparalleled advantages in terms of timeliness and spatial coverage for emergency observations after the occurrence of a major earthquake.

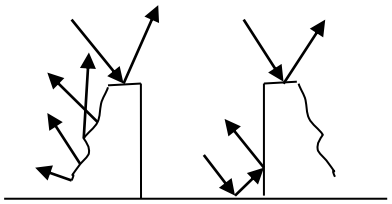
3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

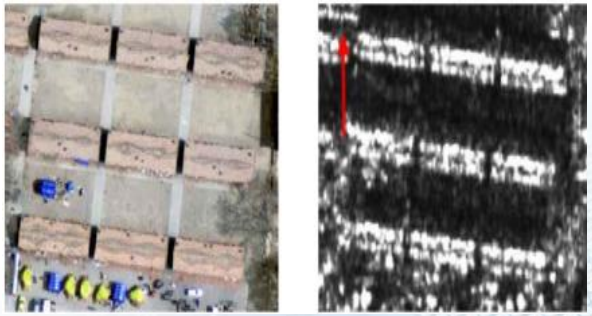
3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

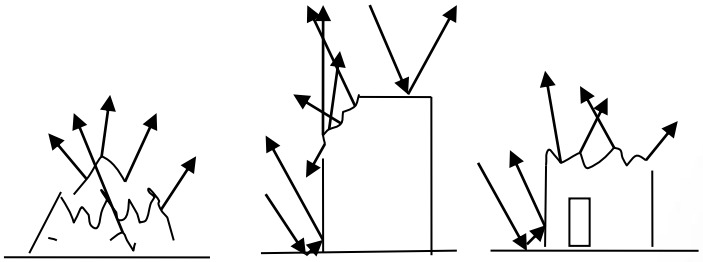
- Background
- On the other hand, the United States, China, Russia, the United Kingdom, Italy and other countries are carrying out related work on geosynchronous orbit SAR satellites.
- Geo-SAR can make up for the shortcomings of optical remote sensing in meteorological, environmental and nighttime emergency observations after earthquakes. It can provide data support for emergency response of severe earthquakes, rapid macroscopic understanding of the extent of disasters and the degree of disasters, and the delineation of earthquake-stricken areas.

3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

- Key issues
- 1. Feature Description and Modeling of Typical Earthquake Damage Targets of Geosynchronous Orbit Remote Sensing Satellite.

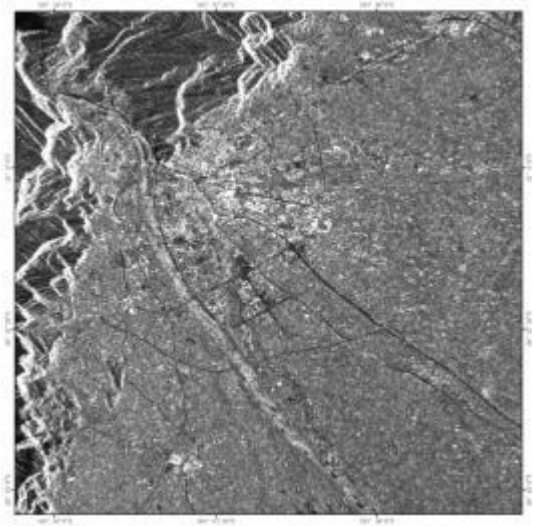


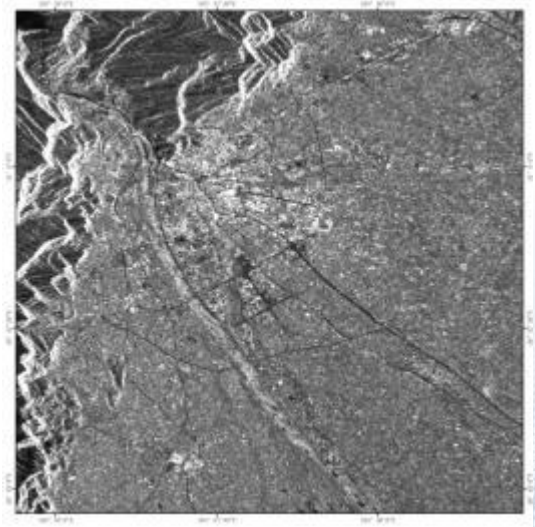


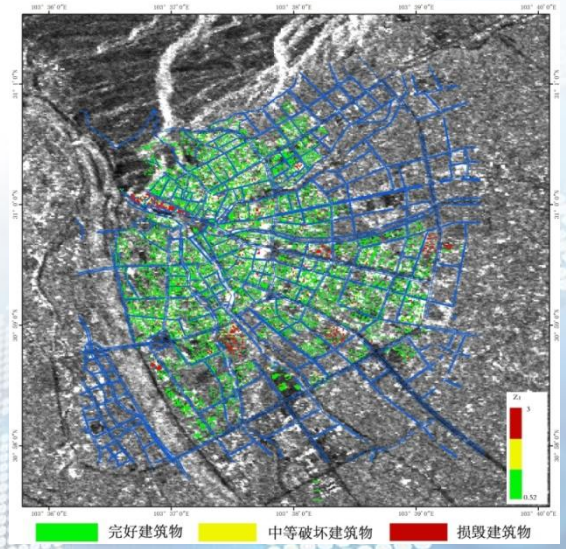


3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

- Key issues
- 2. Earthquake damage information recognition method based on geosynchronous orbit remote sensing satellite







3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

- Key issues
- 3. Rapid delineation in the heavy disaster areas. Rapidly delineating earthquake-stricken areas after earthquake is the cornerstone for saving lives and reducing economic losses.

3.2 the key issues of geosynchronous orbit satellites for emergency response to heavy earthquakes

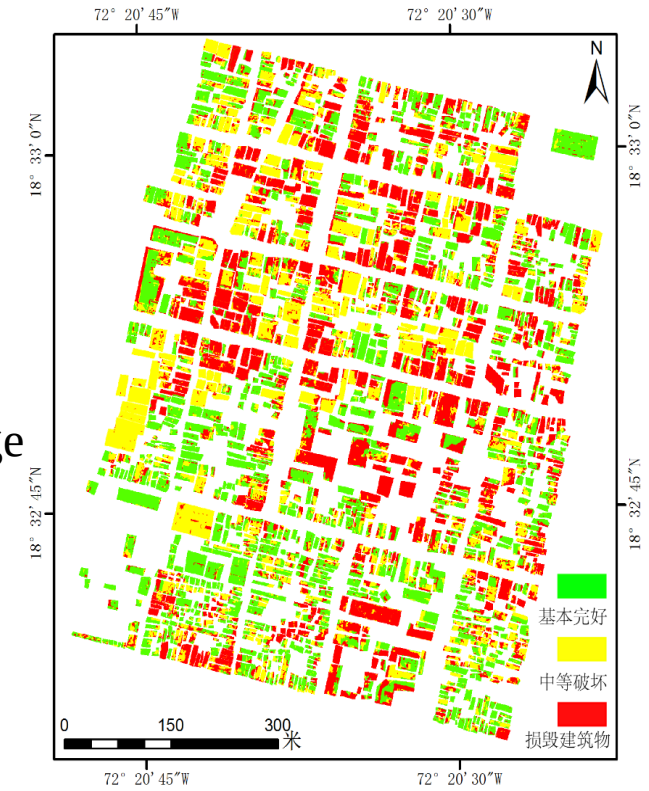
- Application prospects

- Breaking through the data-information bottleneck within 3 hours after the earthquake.
- Improve the remote sensing emergency response capability of severe earthquakes.
- Improving the ability of seismic remote sensing assistant decision-making services.

3.3 earthquake damage information extraction method based on deep learning

- Developed a seismic damage information extraction method based on CNN method，and apply its model to optical image and SAR images.

optical image



SAR image

Thank you for you attention!!!