

# International Aerospace and Satellite Applications Training Program(IASA 2015)

Earth Observation Technologies for Earthquake  
Damage and Loss Assessment

## Special Report



UNITED NATIONS Office  
for Outer Space Affairs

## International Training Program (2015) Earth Observation Technologies for Earthquake Damage and Loss Assessment Special Report

The training program on ‘Earth observation technologies for earthquake damage and loss assessment’ is jointly organized by the UNOOSA/UN-SPIDER, National Disaster Reduction Center of China (NDRCC), Asia Pacific Space Cooperation Organization (APSCO) and Regional Centre for Space Science and Technology Education in Asia and the Pacific (China) (affiliated to the United Nations). In the World Conference on Disaster Risk Reduction (WCDRR) in Sendai, the Sendai Framework for Disaster Reduction 2015-2030 identified critical role of space based technologies in disaster risk reduction. The momentum gathered from this important milestone in disaster risk reduction should be used to strengthen cooperation and capacity building in the field of space based technologies internationally. Very high resolution (VHR) satellite data are potential sources to provide detailed information on damage for a large area in a short time. Rapid post-disaster damage assessment of the house and other important infrastructure is essential for the decision of recovery and reconstruction. The damage caused by the event could be assessed by comparing pre- and post-disaster images. The objective of the training course is to impart skills to use integrated EO technology for earthquake damage and loss assessment by introducing the basic concepts and methodologies developed through operational research and application.

The theme of the training was using integrated Earth observation technology in disaster management in general and assessing earthquake damage in particular. Seven experts as tutors from UN-SPIDER, Digital Globe, Indian Space Research Organisation (ISRO) and NDRCC conducted the training. A total of 34 participants from 19 countries participated in the training programme, including Bhutan, Pakistan, Bangladesh, Indonesia, Thailand, Peru, Mongolia, Oman, Saudi Arabia, Singapore, Burma, Mozambique, Iran, Turkey, Venezuela, Algeria, Ethiopia, Brazil and China. Among them, 27 participants were respectively sponsored by RCSSTEAP, UNOOSA/UN-SPIDER Beijing Office and APSCO. In addition, some postgraduates from Beihang University majoring in international space technology application also attended the training program.

Training covered theory and hands on sessions on following topics: Role of earth observation in providing critical information during earthquake disaster; Rapid mapping using earth observation during earthquake situations; Concepts of earthquake damage and loss assessment; Visual interpretation, object-oriented segmentation and classification to facilitate change detection of pre and post-disaster based on VHR satellite imagery to perform structural damage assessment; Semi-automated techniques to extract information on buildings and other infrastructure and integrating it with population and risk data to evaluate casualties and losses; Crowd source platforms to use EO to perform rapid assessment; Advance techniques to access satellite images during emergencies and so on.

The training it is expected to make participants fully conversant with use of earth observation in disaster management in general and assessing earthquake damage and losses in particular. The participants will be able to identify damaged infrastructure and learn about the methodology of damage and loss assessment using integrated EO technology. An interaction of experts and participants is expected to build a network, exchange of knowledge and new research frontiers in earthquake damage and loss assessment. Overall, this training is expected to contribute to the capacity building of national partners to use space technology for disaster management to augment development process.

Apart from the technology training, the Regional Center in China provided a Chinese traditional music show to all participants, and also a tour to the Great Wall, helping them have a better understanding of Chinese culture. And at the end of the closing ceremony, the course completion certificates have been awarded to the participants jointly by the Organizers. Participants who attended the session expressed their satisfaction over the content of the training course and spoke highly on the lecturers. Advises and suggestions are given for improvement of the contents, course objectives and teaching quality.

### Training Schedule

Date	Time	Topic	Lecturers	
Sep 14– 16, 2015 (Monday to Wednesday)		Attend 5th UN–SPIDER Beijing Conference on Space–based Technologies for Disaster Management		
Sep 17, 2015 (Thursday)	10:00–10:30	Inauguration ceremony of the Training	Dr. Shirish Ravan, UN–SPIDER	
	10:30–11:00	Group Photo & Coffee break & Transfer to Training Room		
	11:00–12:15	Topic 1: Earth observation for earthquake damage assessment (Lecture) – basic concepts and applications		
		12:15–14:00	Lunch	
		14:00–15:30	Topic 2: Earth Observation to facilitate Nepal earthquake response and recovery – Lessons learned(Lecture)	Dr. Basanta Shreshtha, ICIMOD
		15:30–15:45	Coffee Break	
		15:45–17:15	Topic 3: Background information extraction for earthquake damage and loss assessment– High resolution satellite images for rapid DSM, Landuse/Land cover and automated workflow for urban infrastructure (buildings) mapping (Lecture)	Mr. Abhineet Jain, DigitalGlobe
Sep 18, 2015 (Friday)	09:00–10:30	Topic 4: Ways to quick access and process high resolution images during disasters –First Look and Tomnod Crowdsourcing platform (Lecture)	Mr. Andrew Steele, DigitalGlobe	
	10:30–10:45	Coffee Break		
	10:45–12:15	Topic 4: Practice of first Look and Tomnod crowdsourcing platform (hands–on)	Mr. Andrew Steele, DigitalGlobe	
	12:15–14:00	Lunch		
	14:00–15:30	Topic 5: Rapid information extraction from high resolution satellite images (Lecture)	Ms. Vandita Srivastava	
	15:30–15:45	Coffee Break		
	15:45–17:15	Topic 5: continued...(hands–on)	Ms. Vandita Srivastava	
Sep 19, 2015 (Saturday)		Day off		



## Training Schedule

Sep 20, 2015 (Sunday)	09:00–10:30	Topic 6: Earthquake emergency response mapping– basic concepts and applications (Lecture)	Mr. Liu ming
	10:30–10:45	Coffee Break	
	10:45–12:15	Topic 6 : Multi–source Data pre–processing (hands–on)	Mr. Liu ming
	12:15–14:00	Lunch	
	14:00–15:30	Topic 7: Fast and reliable derivation of disaster information from reference map (hands–on)	Ms.He Haixia
	15:30–15:45	Coffee Break	
Sep 21, 2015 (Monday)	15:45–17:15	Topic 7: Fast and reliable derivation of disaster information from reference map (hands–on)	Ms.He Haixia
	09:00–10:30	Topic 8: Physical objects damage information extraction and loss assessment (Lecture)	
	10:30–10:45	Coffee Break	
	10:45–12:15	Topic 8 : Buliding damage assessment using high resolution images (hands–on)	Ms.He Haixia
	12:15–14:00	Lunch	
	14:00–15:30	Topic 8: Road damage assessment using high resolution images (hands–on)	Ms.He Haixia
Sep 22, 2015 (Tuesday)	15:30–15:45	Coffee Break	
	15:45–17:15	Topic 8: Tents monitoring using high resolution images (hands–on)	Ms.He Haixia
	09:00–10:30	Topic 9: Secondary disaster identification and analysis (hands–on)	Mr. Liu ming
	10:30–10:45	Coffee Break	
	10:45–11:45	Topic 10: Comprehensive loss assessment for earthquake damage(Lecture)	Mr. Liu ming
	11:45–12:15	Feedback, survey and evaluation	
	12:15–14:00	Lunch	
14:00–16:00	Experiences sharing by participants in use of EO during earthquake disasters		
16:00–16:20	Closing Ceremony		

## The 5th UN-SPIDER Beijing Conference



The United Nations International Conference on Space-based Technologies for Disaster Management is a vital component of this training. Mr. Weng Jingnong, executive director of RCSSTEAP attended the conference and gave a speech





## Opening Ceremony



Leaders from the Regional Center in China, UN-SPIDER, APSCO and National Disaster Reduction Center of China attended the opening ceremony for this training.

## Experts from Abroad and China



Ms. Vandita Srivastava--  
India Institute of Remote Sensing



Mr. Basanta Shreshtha--ICIMOD



Mr. Andrew Steele--DigitalGlobe.



Ms. He Haixia-NDRCC



Mr. Shirish Ravan--UN-SPIDER



Mr. Liu Ming-NDRCC



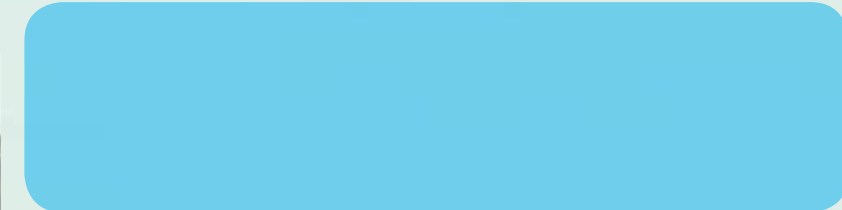
# Closing Ceremony



The closing ceremony was organized successfully on Sep.22th, 2015 at International School of Beihang University. Leaders summarized the training program and awarded the certificates to the trainees.



# Wonderful Moments





## Wonderful Moments



## Feedback from the Trainees

This program is very good and I get much benefit from it.

Generally, all training contents are useful and thank you for everything. But some lectures are not to transfer all information to participants.

All the training program open a wide area for us. I suggest that it should be held longer. And I hope the curriculum can relate more about practices.

providing network for online and required courses. Online presentation at the same time for related organizations of participants.

Focus should be case studies in the relevant field. Min background in RS&GIS should be mandatory. So that basic topic can be eliminated.

Prepare all the tools such as internet connection, software, etc. Maybe practice more using manual and automatic material.

Best hotel I have stayed on training.

More topics on damage assessment and risk assessment, GNSS for ocean Applications, Beidou GNSS for disaster application, improvement of early warning using SBT, floods, space law and policy.

Thank you very much for the effort, we have a so good information. I suggest there could be Better prepared presentations in advance, and the hands-on training in my point of view is basic.

Congratulations and Thanks for this opportunity. I am very happy being here.

Regional Centre for Space Science and Technology Education in  
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