



A practice of Disaster Monitoring from ISS/Kibo

For CANEUS Workshop @Sendai
03-17-2015

Norimitsu KAMIMORI

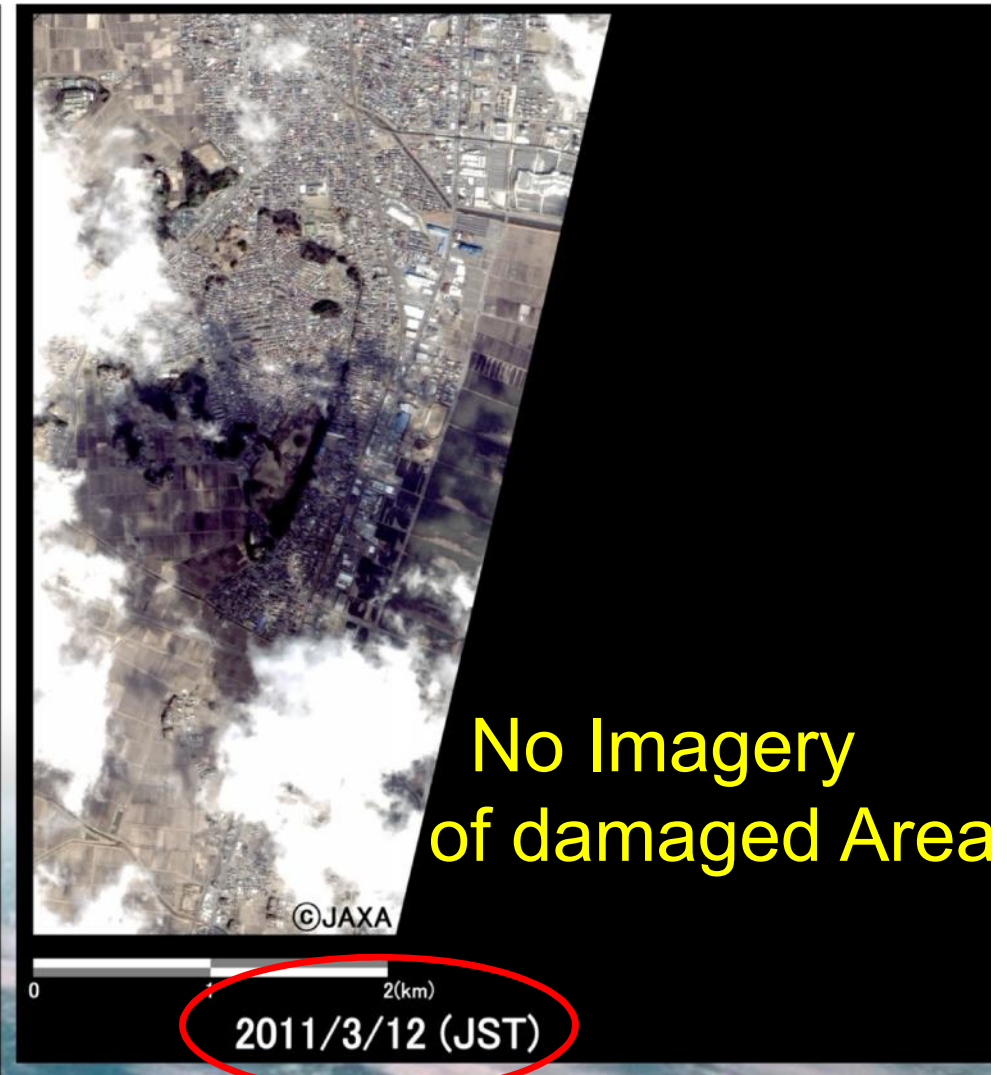
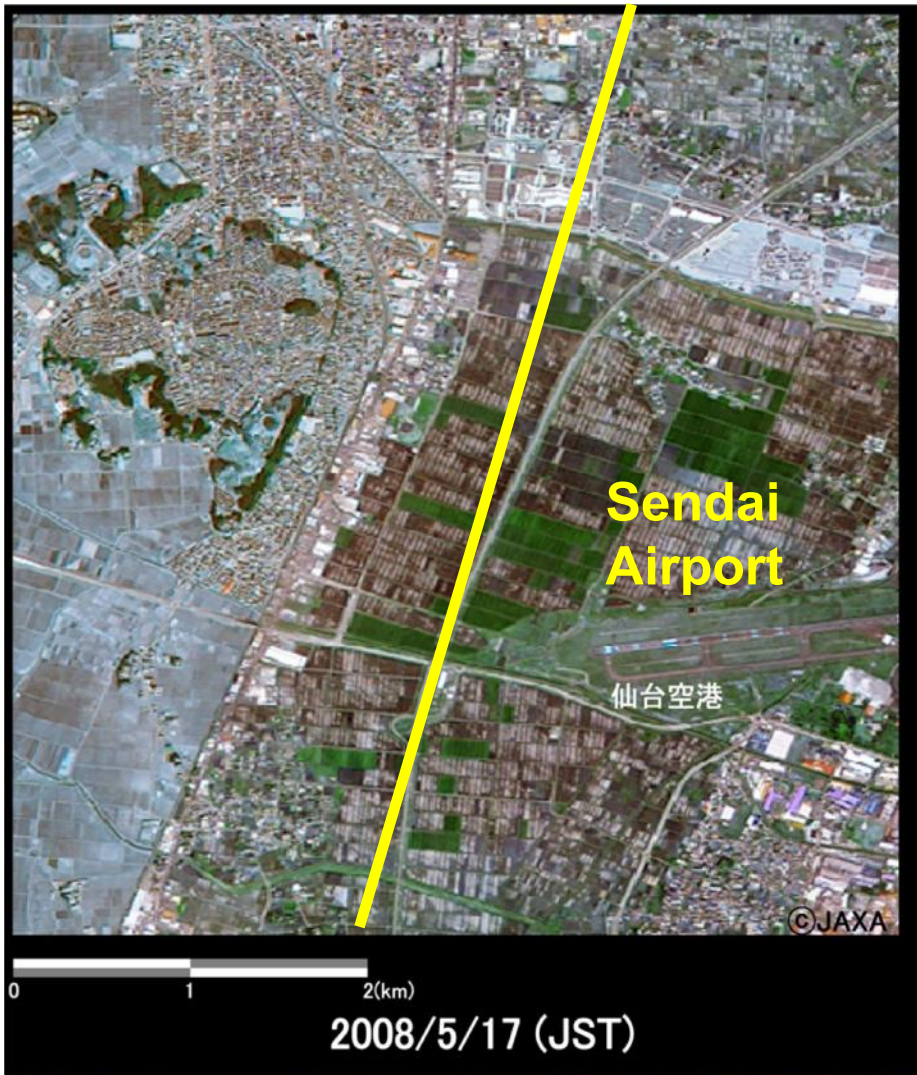
Human Spaceflight
Mission Directorate, JAXA

Haruyoshi Katayama, Dr.

1st Satellite Application
Mission Directorate, JAXA

Disaster Monitoring by ALOS

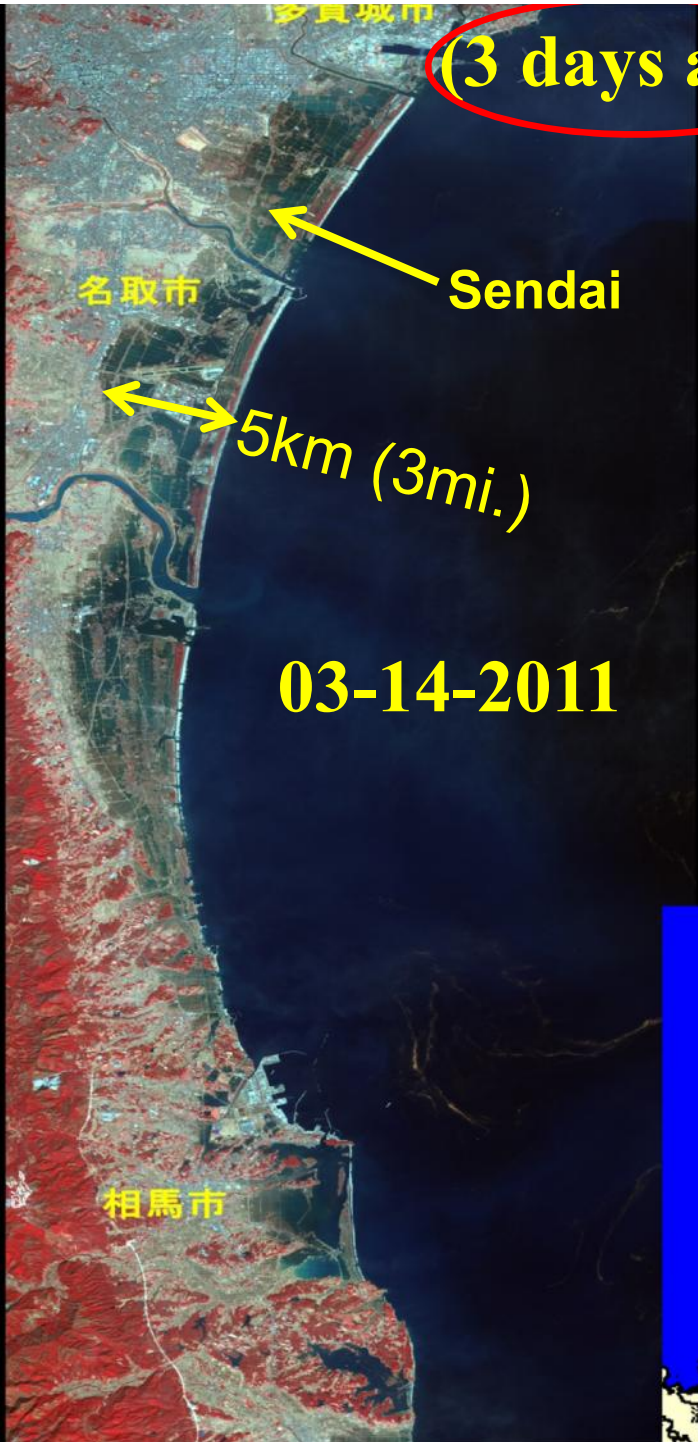
1 day after Tsunami 3-11-2011



Disaster Monitoring



02-27-2011



03-14-2011

(3 days after Tsunami)



Needs to Disaster Monitoring from Space



<Needs>

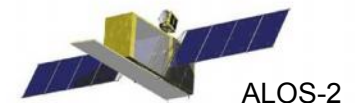
① Rapid Monitoring
within 3 hours

② Night Data
1 survey in night time
for rescue from morning
within 6 hours

③ More Resolution

<Means>

- Satellites Constellation (Big/Small)
- ISS
- Airship / Airplane



- Synthetic Aperture Radar
- IR Camera
- High Sensitivity Camera

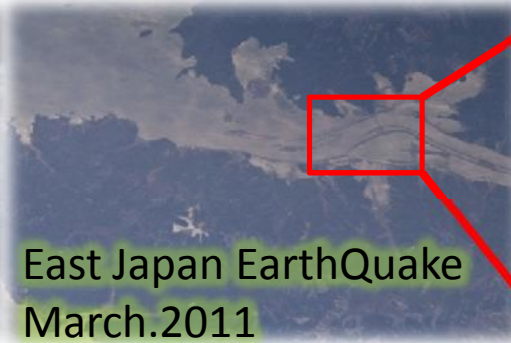
- Optical Sensor



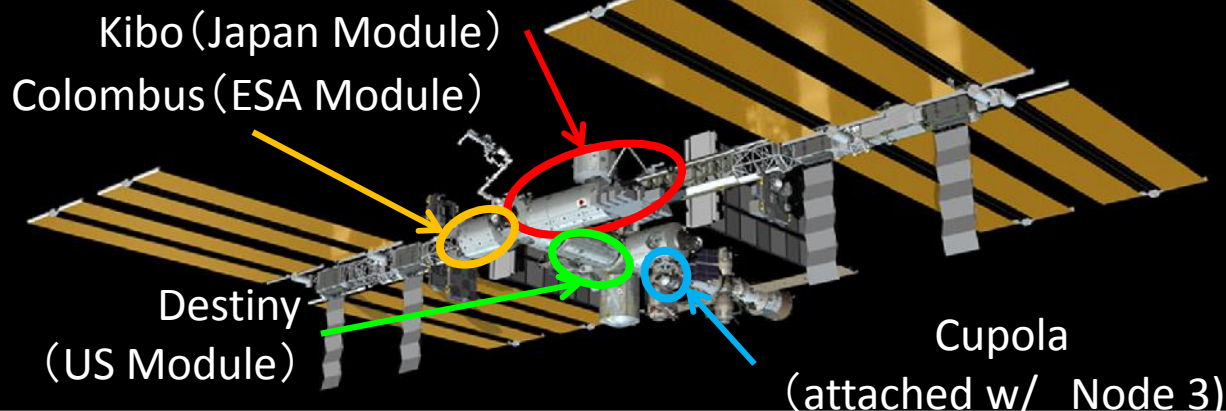
Disaster Monitoring from ISS



- Astronauts can;
 - ❑ look over all the earth
 - ❑ detect and select easily about observing area
- Various Camera/Sensors can be launched in short time;
 - ❑ 4 K camera, High Definition Camera;



Major Observing Points



Disaster Monitoring from ISS

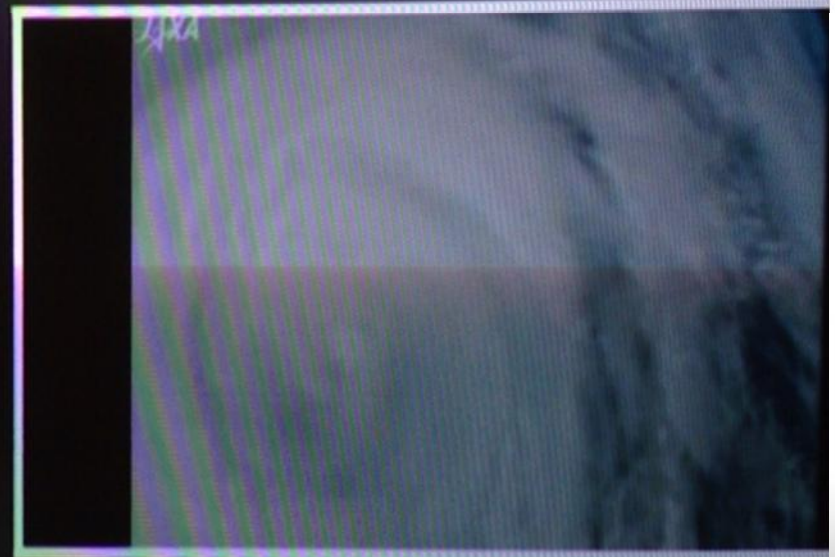


なぜ秋に?
台風連続の謎

Observed Taihoon #27 and #28 in Oct.2013
by High Definition Camera on Kibo/Exposd Facility
And NHK (Major Broadcast) used these photos.

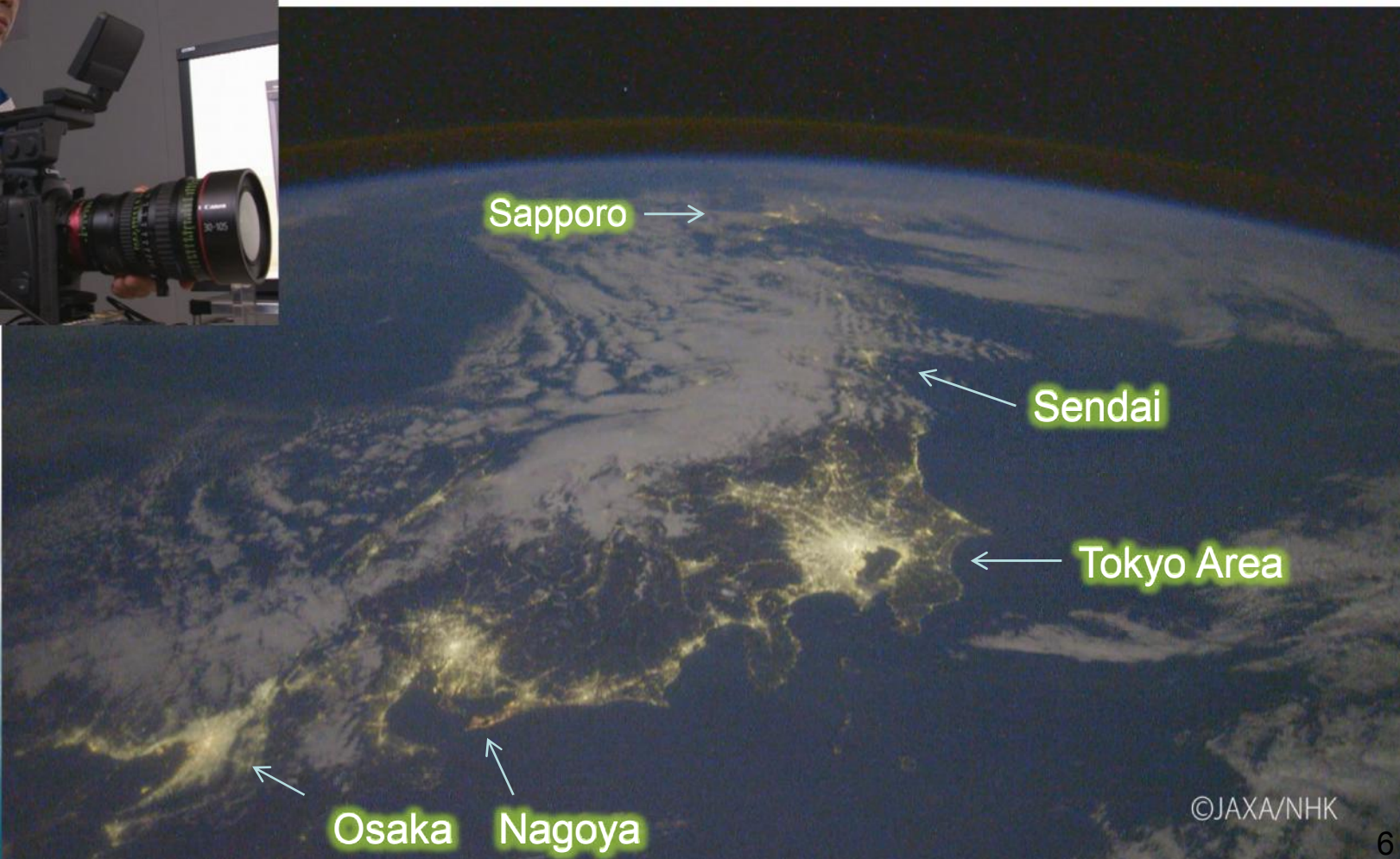


台風28号



台風27号

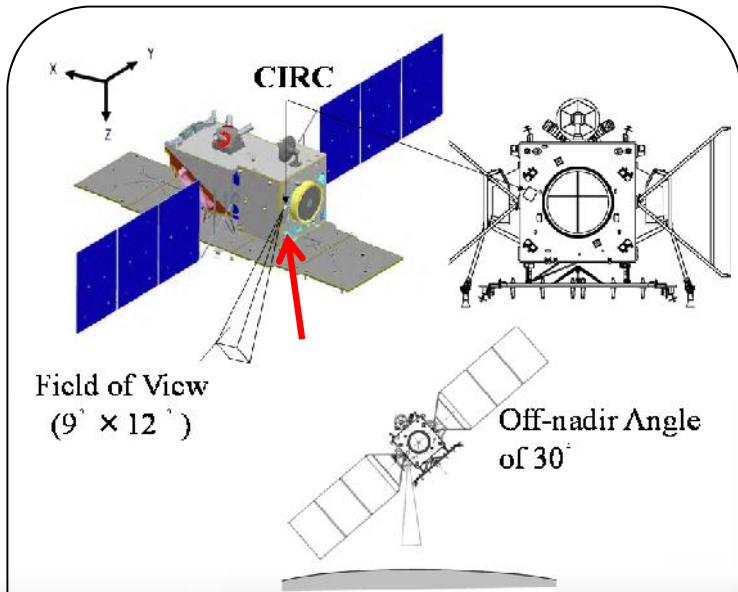
4K Camera from ISS



Compact IR Camera(CIRC) on ISS and ALOS-2

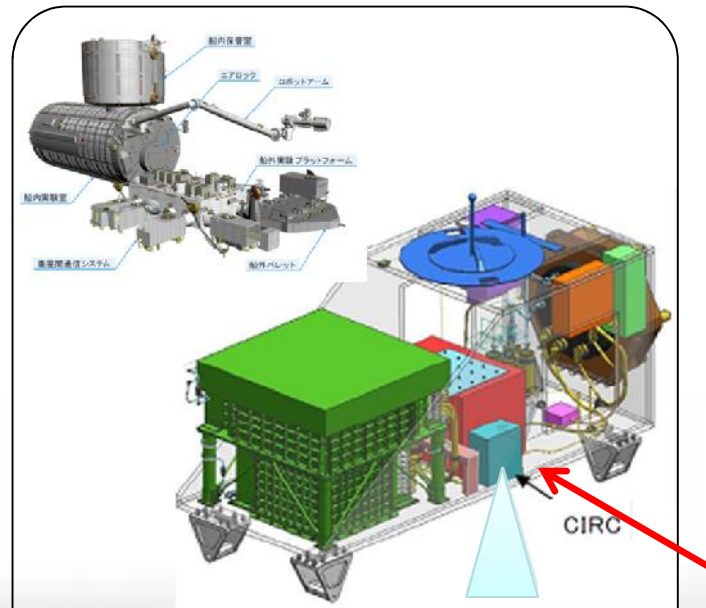


CIRC is developed as a technology demonstration payload of the ALOS-2 and ISS(JEM/CALET)



ALOS-2

- Disaster, and continuous updating of national land information
- Launched in May 24, 2014



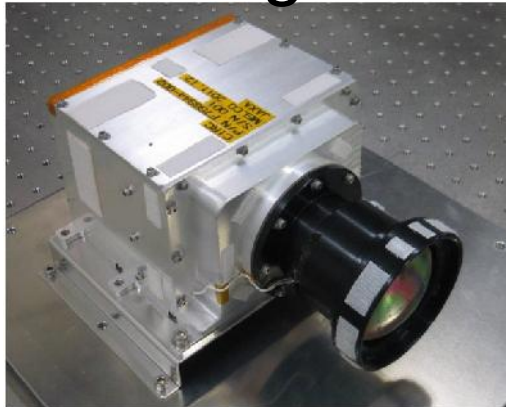
JEM/CALET

- Research for the nature of the sources of high energy particles and photons
- Launch in Aug.2015

Compact Infrared Camera (CIRC)



Proto Flight Model



Baseline specifications of the CIRC

Detector	Microbolometer SOI diode IR FPA (MELCO)
Size	11 cm x 18 cm x 23 cm
Mass	~ 3 kg
Wavelength	8 - 12 μm ★
Pixel Array	640 x 480
Spatial resolution	< 210 m @630 km (ALOS-2) <130 m @ 400 km (CALET) (<0.33 mrad)
Field of View	12° x 9°
Dynamic range	180 K - 400 K
Power	< 20 W
NEdT	0.2 K @300 K
FPN	0.3 K @300 K

➤ Microbolometer (uncooled infrared array detector)

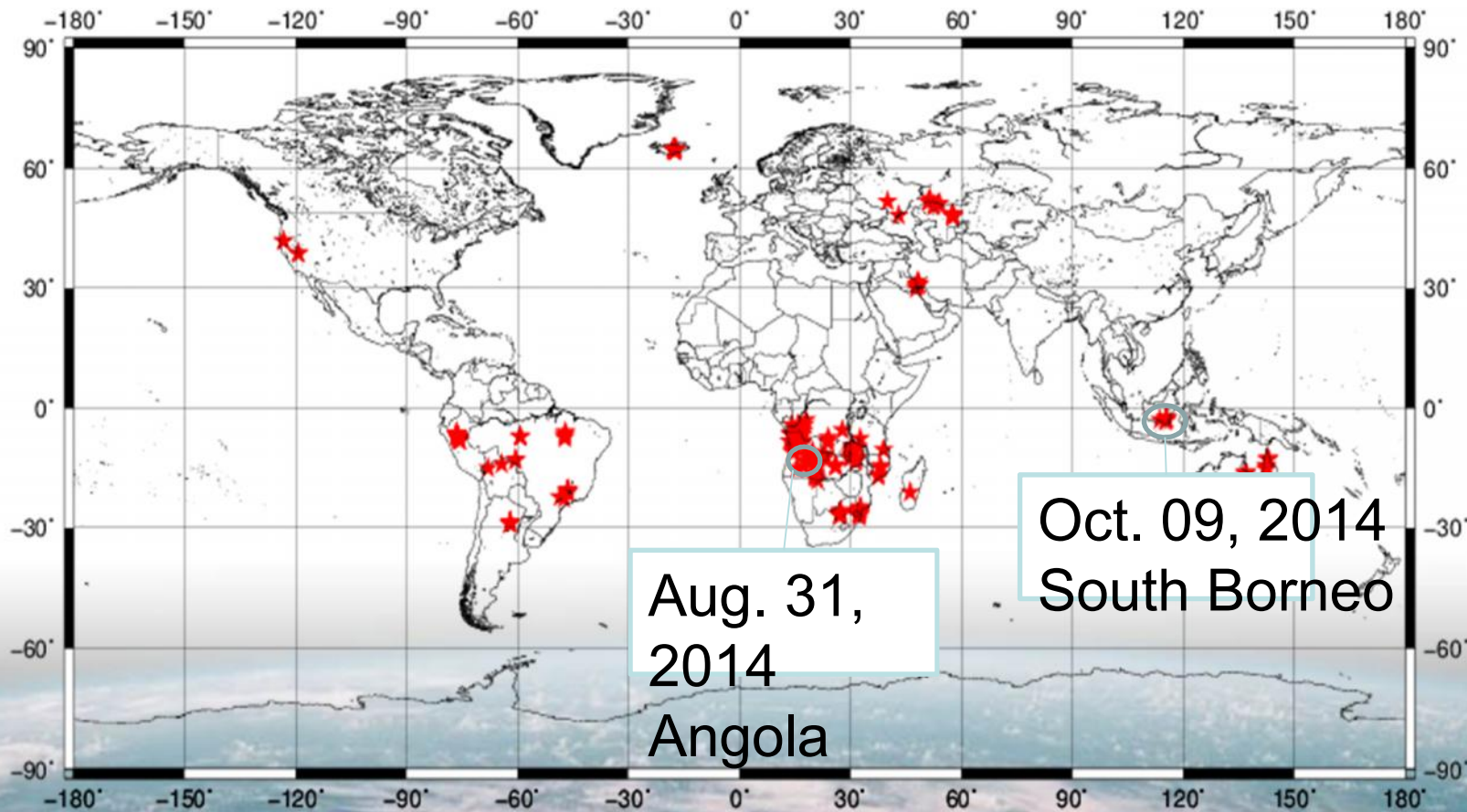
- ◆ Small size
- ◆ Light weight
- ◆ Low power consumption

★ The largest microbolometer ever used for earth observations from space.

Wildfires detected by CIRC



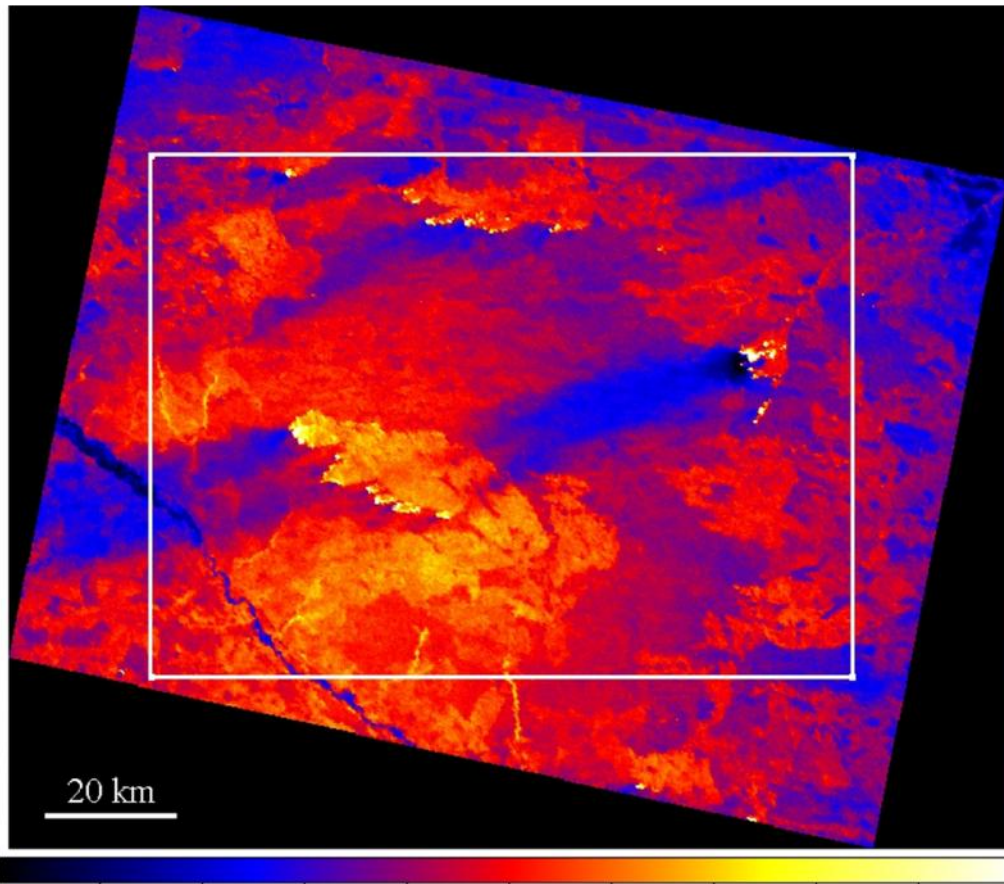
FireDetected



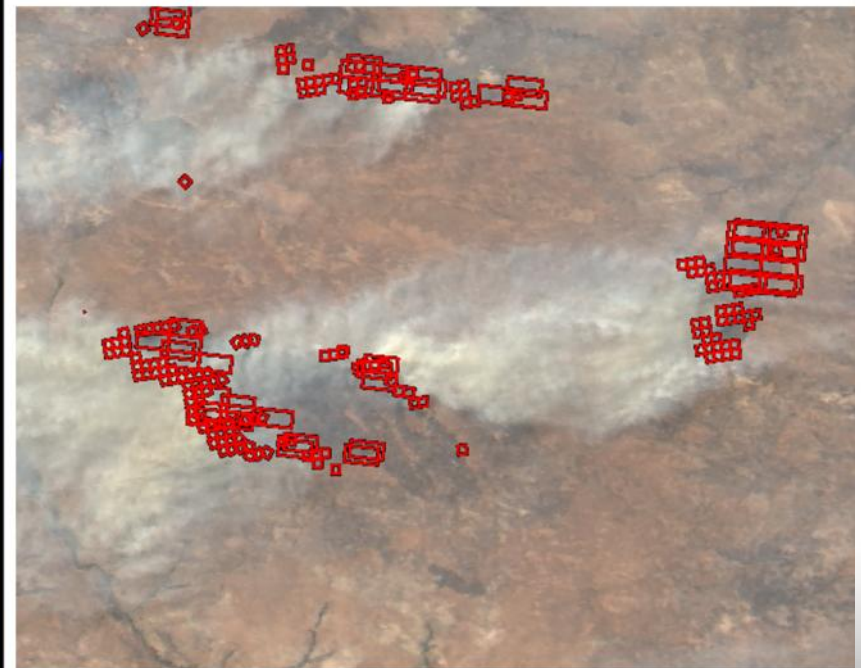
Wildfires are detected more than 300 scenes of ALOS-2/CIRC

Wildfire detection with the CIRC

Observation time: UT 2014/08/31 10:29
Angola wildfire



CIRC image



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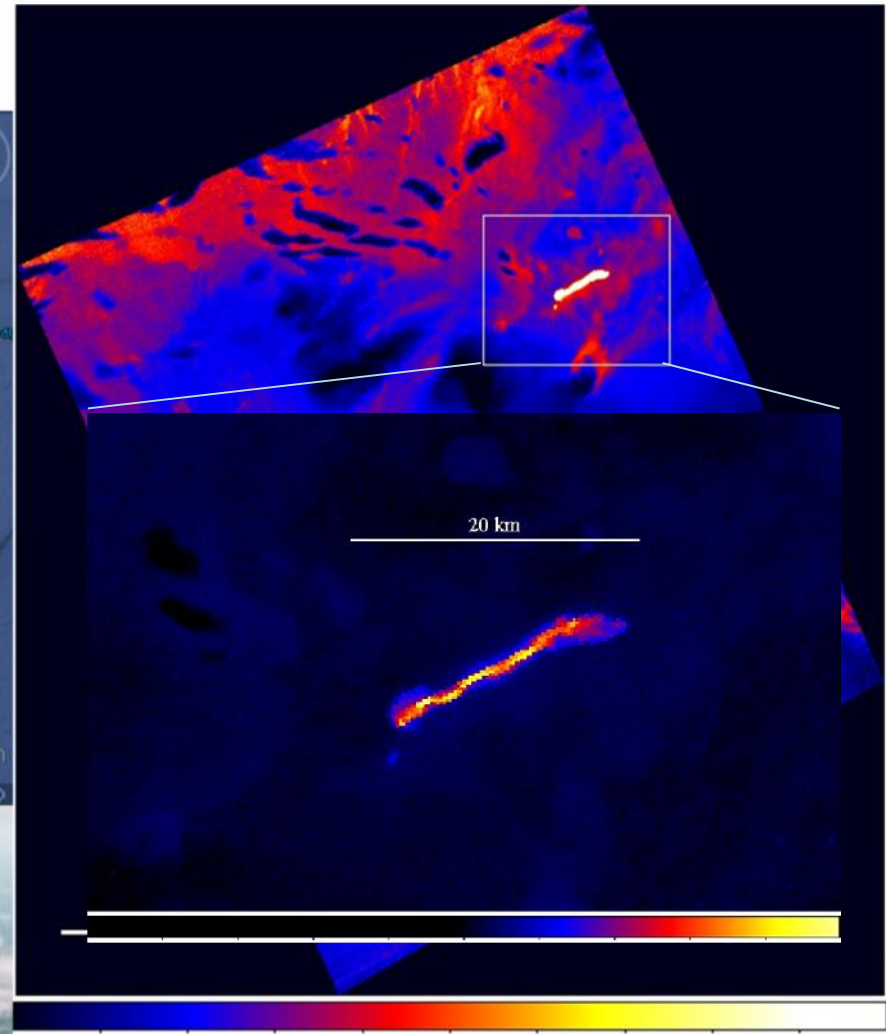
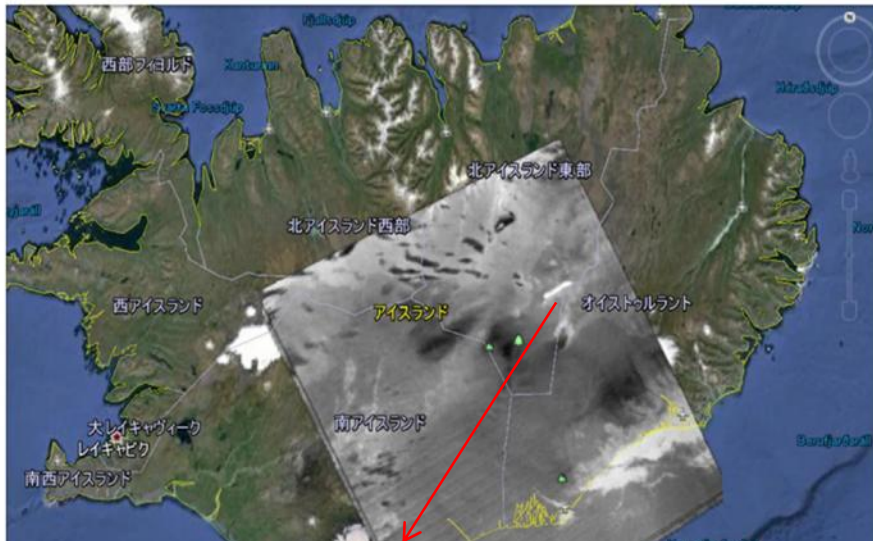
MODIS visible image and areas
wildfire was detected (MOD14)

<http://fire.cris.hokudai.ac.jp/>
provided by K. Nakau

Volcano Iceland/Burdarbunga



Obs. time UT 2014/09/11 23:28



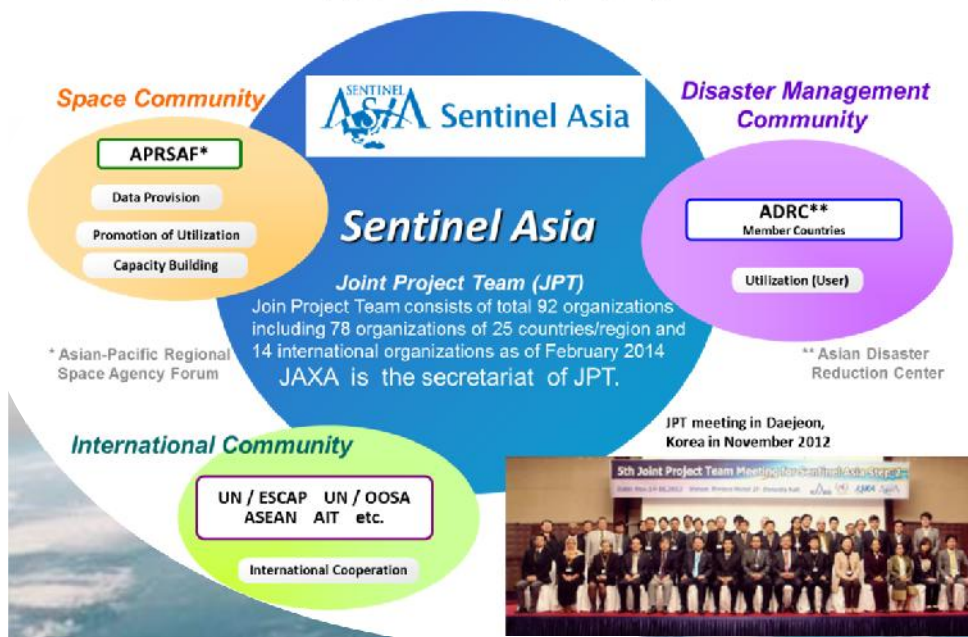
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Disaster Data Sharing in Region/World



- JAXA/Japan' Government share the data to ;
 - (1) Sentinel Asia
 - (2) International Charter, "Space and Major Disasters"
 - (3) direct data providing in Bi-lateral level

センチネルアジア



国際災害チャータ





Backup



JAXA's Missions & Organization



Total personnel: 1,650

President

Dr.Naoki Okumura

Vice-President

Mr.Kiyoshi Higuchi

Policy&Budget Control

Admin. Management

Systems Engineering

S&MA

Industries Collaboration Center

University Collaboration Center

Space Education Center

Space Tracking and Data Acquisition Dep.

Environment Test Technology Center

Space Science (ISAS)



Lunar & Planetary Explor.



Human Spaceflight



Space Transport.



Satellite Application (Civil)



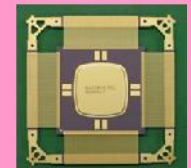
Satellite Application (Security)



Aviation



R&D



New Japan's Basic Plan for Space Policy

modified Jan.2015



Social Infrastructure	Security and Prevention to Disaster		Promotion for Space Industries		Expansion of Frontier
	National Security	Protection from Disaster	Application Promotion	Industrial Capability	Science & Technology
A. Navigation Satellites	Quazi-Zenith Satellites System				E. Space Science & Planetary Exploration
B. Remote Sensing Satellites	IGS	ASEAN Disaster Information Network (Satellites Constellation)			
	Geometological Satellite				F. Human Space Activity
C. Comm & Broadcast Satellites	Defence Comm. Satellite	Comm. Network in Disaster	Comm & Broadcast Satellites		
D. Transport. System	National Space Transport. System				G. Space SolarPower

referred from web page of Japan's Cabine Office