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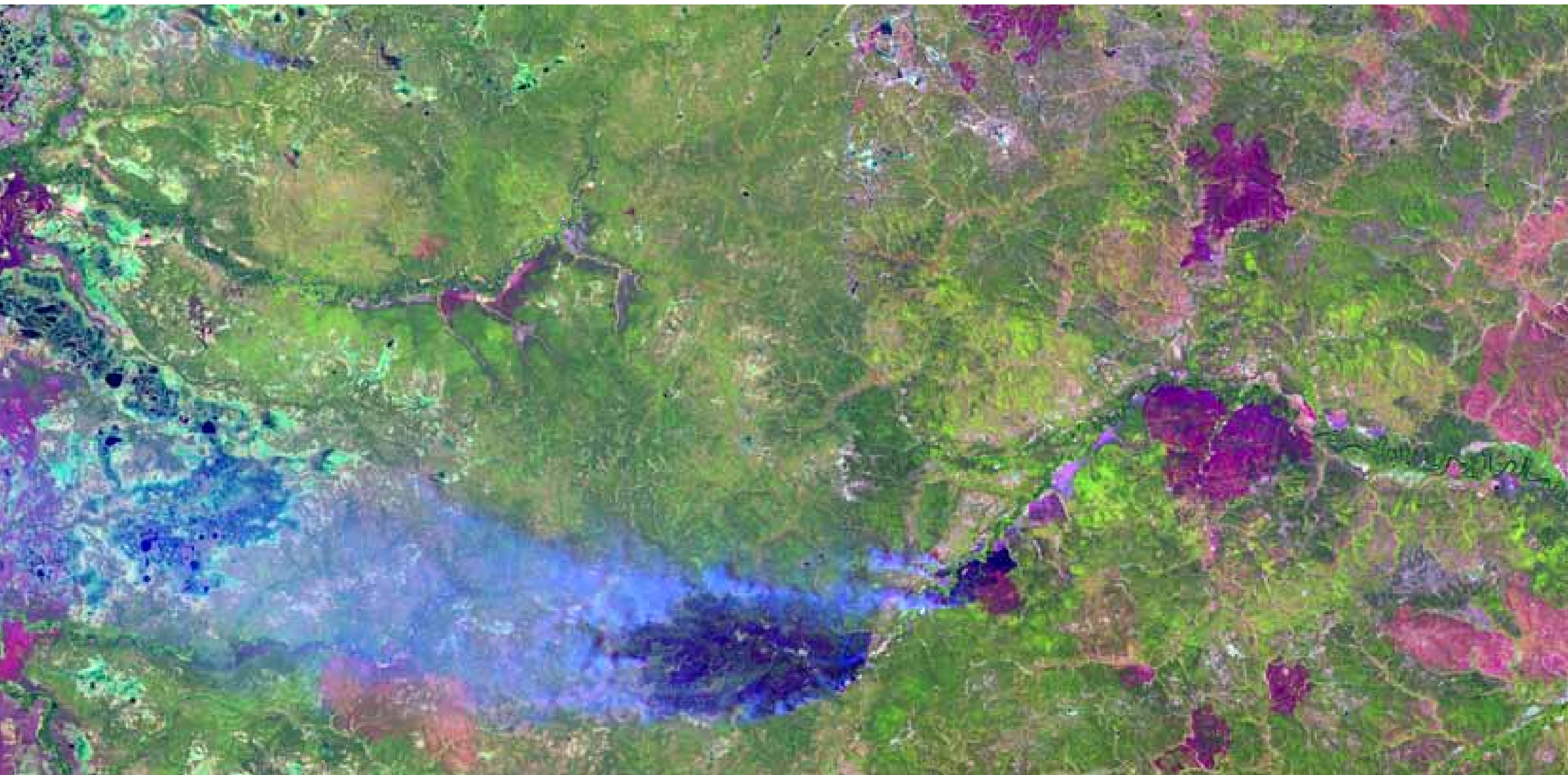
Asia-Pacific
Economic Cooperation

Report for Workshop on Application of Satellite Technologies for Emergencies Preparedness, Management and Response in Asia-Pacific Region

Ramada Bintang Bali Resort, Kuta, Indonesia
APEC Emergency Preparedness Working Group
October 30-31, 2013



APEC Project EPWG 01/2012A

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Preface

The workshop “Application of Satellite Technologies for Emergencies Preparedness, Management and Response in Asia-Pacific Region” was held at Ramada Bintang Bali Resort, Kuta – Indonesia on October 30-31, 2013 under the supervision of the Federal Space Agency of the Russian Federation. The event provided a platform for various stakeholders involved in disaster management, environment protection and remote sensing to discuss and review the use of satellite imagery for emergencies preparedness, management and response.

The workshop was conducted as the key element of APEC Project EP 01 2012A. The project was initiated by the Russian Federation with support of Viet Nam, Indonesia and Chinese Taipei as co-sponsoring economies. The workshop was co-organized by APEC, Federal Space Agency (Roscosmos), EMERCOM Russia and RDC SCANEX. The event was largely devoted to examining specific characteristics of satellite technologies application for different types of emergencies, discussion of international cooperation and mechanisms of fast remote sensing data delivery for EPMR and Crisis Management centers network development in Asia-Pacific Region.

The participants included experienced academicians, business actors, governmental officials and representatives of 12 APEC economies and 2 international organizations (UNOOSA and ASEAN). The workshop consisted of 5 plenary sessions, a key-note lecture, a breakout session, and comprehensive discussions leading to a number of follow-up recommendations that were accepted by all the participants.

We thank all the participants for their contribution and energy. Particular thanks to the facilitator and break-out facilitators as well as speakers and all those who sent comments to the draft write-up. We would also like to thank Ms. Anna Prokopchik from Roscosmos, Ms. Yulia Zhitina from EMERCOM Russia and Mr. Sergio Narea from the APEC Secretariat who have guided and supported us in delivering this project.

We fully anticipate that the outcomes of the workshop will be beneficial in supporting of overall objectives of the APEC Emergency Preparedness Working Group.

Project Overseer

Bochkarev Alexander
Deputy Director of International and Contractual Department
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Workshop Summary and Recommendations

Delegates from 12 APEC economies (PRC, Indonesia, Malaysia, Mexico, Peru, Philippines, Russia, Thailand, Viet Nam, Australia, USA, Chinese Taipei) and 2 International organizations (UNOOSA/UN-SPIDER and ASEAN) met in Bali, Indonesia during October 30-31, 2013 to participate in the workshop on Application of Satellite Data for Emergencies Preparedness, Management and Response (EPMR) in Asia-Pacific Region. The workshop was conducted as key element of APEC Project EP 01 2012A, initiated by Russia and supported by Indonesia, Chinese Taipei and Viet Nam as co-sponsoring economies. The workshop was co-organized by APEC, Russian Federal Space Agency, EMERCOM Russia and RDC SCANEX.

The workshop attended by 32 delegates, saw experts in satellite Remote Sensing (RS) technologies, officials/experts from Emergency and International Agencies, Space Agencies and Universities sharing experience and best practices in application of satellite data for emergencies preparedness, management and response.

The workshop consists of 21 presentations divided into 5 sessions and breakout group discussions. Representatives of APEC economies presented information about regional experience in use of satellite technologies for EPMR; development and future trends in application of space images for EPMR; predicting of natural disasters in agriculture using remote sensing; near real time identification of adverse forest effects; optimizing of satellite technologies for coastal disaster mitigation. Workshop participants were briefed by Roscosmos on work of the International Charter "Space and Major Disasters". UNOOSA/UN-SPIDER participant presented an approach to reduce vulnerabilities to hazards through good practices in geospatial information management. EMERCOM Russia representatives reported about crisis centers development, plan for its network development and use of space monitoring for operational control. Participant from ASEAN announced information about recent activity of ASEAN coordinating centre for humanitarian assistance on disaster management (AHA Centre). Workshop participants were briefed on new social oriented initiative "Space Watch" – a system of public monitoring from space.

During breakout session workshop participants discuss and elaborate recommendations for APEC on application of satellite technologies for different types of emergencies, crisis management centers network development, international and regional cooperation in application of satellite data for EPMR.

The overarching recommended solutions include:

APEC

- APEC should address and try to mitigate the existing asymmetries or differences in capacities between developed and developing economies in the APEC region.
- APEC should continue to raise capacities and technical knowledge of the importance of space technology in addressing EPMR by government and non-government stakeholders located in the Asia Pacific region. The hosting of this important workshop with EMRCOM, ROSCOSMOS and SCANEX is an important contribution, which should be continued or followed up.
- It is advisable to reorganize GNSS subgroup, (existing within the framework of the APEC Transportation WG), and create on its basis a fully functional WG on applied satellite technologies for a wide range of solutions within the framework of APEC (EPMR, supporting sustainable agriculture and forestry, marine resource management, etc.) and develop a close relationship with the International Committee on GNSS with Secretariat at UNOOSA in Vienna (http://unoosa.org/oosa/en/SAP/gnss/icg.html).
- It is desirable that at the annual meeting of the working group representatives from APEC economies deliver reports on:

  – their respective use of and access to satellite-based data/product in satisfying their emergency management needs over the preceding 12 months, highlighting extant arrangements, areas where difficulties were encountered and any recommendations for future improvement;

  – initiatives and recommendations, prepared by each economy covering the accounting year within the framework of past events (conferences, seminars, etc.);

  – plans and specific activities aimed at implementation of these initiatives and recommendations.

Education

- To conduct a regular training courses/workshops on technical issues on the access and use of space-based tools, applications, data and products for EPMR on annual basis.
- Creation of educational programs and training of employees of key stakeholders at various levels, from local to government. For these purposes it is necessary to give a full picture of the possibilities of modern satellite imagery and other space-based tools and applications, as well as the existing and used practices in different areas (disaster management, ecological monitoring etc.).
- The participants to the APEC workshops reiterated the need for APEC to include not just technical staff but decision makers in the participants list of future workshops. There is a danger to only involve technical experts. This will not assist in increasing the broad use of space technologies for EPMR among APEC economies. Management needs to support technical staff to be better trained and to increase the use of these technologies.

Research

- APEC should sponsor the implementation of pilot projects of high priority to economies of the Pacific region. Disasters continue to present obstacles for the economic development of the region. A regular activity that is sponsored by APEC-EPWG that implements projects on a regular basis in order to improve disaster management should be a priority. These pilots should rotate on an annual basis across different categories of disasters: hydro-meteorological, geo-hazards, technological hazards, etc.
- Involvement of the scientific community is required to conduct local research, as well as various

types of joint research work. It is necessary to develop common approaches and requirements for the various types of monitoring, etc.

Institutional

- Developed APEC economies should leverage and make available existing centers of excellence (e.g. Pacific Disaster Center, SCANEX, Moscow State University, Emergency Management Australia, UN-SPIDER Beijing Office) to improve capacities of developing economies and better access to satellite technologies for EPMR by developing countries in the Pacific region.
- Creating a network of stations and clearinghouses with the possibility of online access, fast delivery of data, standardized products and maps to help all participants speak the same language.
- Combining modern satellite technologies (remote sensing, satellite positioning and monitoring of ships traffic, satellite telecommunication, etc.) to solve EPMR problems.

Web

- To open a special web-site with unified space image metadata archive from all leading satellite operator and data providers, and linking to similar initiatives at the regional and global levels;
- To open a special web-site with recommendations, best practice cases, educational and training materials in EPMR, and linking to similar initiatives at the regional and global levels;
- Creating a common platform: regions - geo-portals, etc.

Finance/Legal

- Promoting the pooling of financial, technical and human resources to increase access to remote sensing data reception facilities and for data processing across the APEC economies;
- To assess a special funding or special conditions of data exchange based on open data policies in case of emergency situations (cross border natural and anthropogenic disasters) - legal base;
- To facilitate open access and distribution of commercial space imagery from license limitation during emergency to complement existing international or regional mechanisms that may not be accessible for all phases of the disaster management cycle or cover smaller, but still damaging and costly disasters.

Opening Remarks

Vasily Gudnov
Head of International Legal Department of the Federal Space Agency,
International Contractual Directorate

Ladies and gentlemen, dear colleagues and guests!

I am very pleased and honored to address you. Let me open our workshop held by Roscosmos, EMERCOM and RDC SCANEX in the frame of APEC Emergency Preparedness WG. My special thanks to LOC and Indonesian authorities for hospitality and opportunity. It's a real pleasure to be here in Indonesia, in such beautiful and amazing place!

And some words about Roscosmos. This April the "Keystones of state policy of the Russian Federation in the area of space activities till 2030 and with a further perspective" were adopted by the Government. The document specifies principles, purposes, expected results and priority directions of space activities. Special attention is paid to international space cooperation.International cooperation in the area of space activities will always be a priority of Russian space policy. In our point of view, successful performance of ambitious projects of any kind is based on efficient international cooperation. Asia Pacific region is one of the most important for us because Russia is a part of it.We always suppose satellite technology as a tool for different branches of economy, people's prosperity, safety and security. Our special attention is paid to the widening of space technology applications used for mitigation of emergencies. The GLONASS constellation today comprises 29 satellites. Accessibility of the GLONASS navigation field is 100% and available to all users. In the near future we are planning transition to a new generation of navigation spacecraft with a longer assured life cycle. New satellites will be equipped with the COSPAS-SARSAT receivers and transmitters providing the global application with operational efficiency and high object positioning accuracy in case of accidents.

This year Roscosmos has become a fully potential member of the International Charter on Space and Major Disasters, whose main task is to mitigate the consequences of natural and anthropogenic disasters by providing states suffered from emergencies with free-of-charge remote sensing data over the area of the emergency. Roscosmos will contribute to the Charter work by providing remote sensing data from. The deployment of an orbital constellation of remote sensing spacecraft is planned for the near future. The Federal Space Program of the Russian Federation provides for tripling the orbital remote sensing spacecraft constellation by 2018, whose information is also expected to be provided in the interests of the International community.

So, I expect we could use this workshop to share the best practices among the APEC states for better understanding our needs and capabilities. Thank you!

Opening Remarks

Maksim Zayko
Head of International organizations unit, International Cooperation Unit,
EMERCOM of Russia

Good afternoon, dear colleagues!

First of all, I would like to thank all attendees for their attention to the subject of space monitoring. Currently, a lot is said on the subject, and many countries have stated or are stating their wish to use remote sensing of Earth for solving practical tasks, yet in reality, very few practically use 100% of possibilities of space monitoring. This happens for a variety of reasons – often due to the lack of necessary information (high resolution imaging, various specters needed for analysis and prognosis), the lack of technological capabilities of data processing, and one of the most relevant reasons is the lack of practical experience of using space monitoring data for prevention and elimination of emergency situations and natural disasters.

During the international seminar, we will look not only at the various methods of using and processing of data, but at the different fields of use of remote sensing of Earth. For example, some countries are advanced in the use of space monitoring with the goal of elimination of consequences of large-scale floods and earthquakes, while others successfully battle with forest fires of with its help, and other parties have reached significant progress in the field of lowering the risks of crop loss – which as we can probably agree, is too important both, for the socio-economic development of the country, and for the region. Not a year goes by for us not to find a new field of application of data, received from Earth's satellites. EMERCOM of Russia wishes for this platform to become a bridge for exchange of experience and knowledge between experts who are representing APEC economies, in the field of space monitoring. EMERCOM of Russia sees evident gain that can stem from using data from remote sensing for prevention, as well as the elimination of emergency situations. Wholesomeness, depth and high quality of space imagery, ability to conduct comparison in time, analysis of the situation and recommendations that were based on them, helped avoid human losses during the large-scale flooding in the Far-Eastern region in the spring and autumn of this year – and that is the most important aspect in our field of work!

At the same time, a number of problems were brought to surface during the response, in particular the lack of an established, well-running informational exchange between crisis management centres, especially when the situation stops being local and turns into a interstate, global level. Thus, for this seminar, EMERCOM of Russia sees the work on suggestions for the development of guidelines on data exchange between CMCs, and easing the space monitoring data exchange between countries, that are involved in the response process for eliminating the consequences of natural disasters, that have interstate characteristics.

Workshop Agenda

Day 1	
8.30 – 9.00	**Registration**
9.00 – 9.05	Workshop opening, announcements on administrative and logistical issues Oganes Targulyan, RDC SCANEX, Russia
9.05 – 9.20	Welcome and Opening Remarks Vasily Gudnov, Federal Space Agency (Roscosmos), Russia Maksim Zayko, EMERCOM Russia
9.20 – 10.10	Keynote lecture: Alexey Kucheiko, RDC SCANEX, Russia "Application of Satellite and Communication Technologies for EPMR"
10.10 – 10.20	**Group Photo**
10.20 – 10.30	**Coffee Break**
Session 1 10.30 – 12.00	**Regional and international experience in application of satellite and communication technologies for EPMR** (Chairman Oganes Targulyan) Zhang Wei, Department of Satellite and Remote Sense, National Disaster Reduction Center, China "Space Technology Application for Disaster Management in China" Cesar Carcamo, School of Public Health and Administration Universidad Peruana Cayetano Heredia, Peru "The use of GIS data for the projection of the impact of an earthquake in Peru" Kriengkrai Khovadhana, National Disaster Warning Center, Ministry of Information and Communication Technology, Thailand "Application of Satellite Technologies for Disaster Warning in Thailand" Bui Quang Huy, Disaster Management Center Ministry of Agriculture and Rural Development, Viet Nam "Space Technology Application on Disaster Risk Reduction in Vietnam" Fernando R. Echavarria, U.S. Department of State, Office of Space & Advanced Technology, Bureau of Oceans, Env. & Science (OES/SAT), USA "Remote Sensing and Disaster Management: A U.S. Perspective" Tzu-Yin CHANG, National Science and Technology Center for Disaster Reduction, Chinese Taipei "APPLICATION OF GEOSPATIAL DATA AND REMOTE SENSING TECHNIQUES FOR DISASTER SURVEILLANCE IN CHINESE TAIPEI"

12.00 – 13.00	**Lunch**
Session 2 13.00 – 14.30	**Specific characteristics of satellite technologies application for different types of emergencies** (Chairman Alexey Kucheiko) Mikhail Zimin, RDC SCANEX, Russia “Satellite technologies and remote sensing: from first steps to advanced use” Andrey Sarychev, RDC SCANEX, Russia “Predicting natural disasters in agriculture using remote sensing data” JULIO CASTILLO URDAPILLETA, Director of Space Security, Mexican Space Agency “Mexican Early Warning System For Disasters”
14.30 – 15.00	**Coffee Break**
Session 2 15.00 – 16.00	**Specific characteristics of satellite technologies application for different types of emergencies – continuation** (Chairman Alexey Kucheiko) Maria Dorofeeva, RDC SCANEX, Russia “Modern and prospective satellite systems and their application for EPMR” Natalia Filimonova, RDC SCANEX, Russia “Satellite monitoring as basis of expeditious control of sea water areas” Andrey Sarychev, RDC SCANEX, Russia “Near real-time identification of adverse forest effect using remote sensing data” Enggar Sadtopo, Deky Rahma Sukarno, Ministry of Marine Affairs and Fisheries (MMAF), Indonesia “Indonesian Experience on Optimizing Satellite Technology for Coastal Disaster Mitigation: Case Study of North Coast of Java”
16.00 – 16.45	Breakout sessions: **Application of satellite technologies for different types of emergencies, Crisis management centers network development, international and regional cooperation in application of satellite data for EPMR** The main goal is the discussion and elaboration of recommendations for APEC economies to be included into Final Document Group 1 moderator: Mikhail Zimin Group 2 moderator: Alexey Kucheiko Group 3 moderator: Andrey Sarychev
16.45 – 17.15	Breakout sessions reports back (by group discussion facilitators)
17.15 – 17.30	**Announcements**
19.00 – 22.00	**Gala Dinner**

Day 2	
Session 3 9.00 – 10.00	**International cooperation and mechanisms of fast remote sensing data delivery for EPMR** (Chairman Oganes Targulyan) Vasily Gudnov, Roscosmos, Russia “Roscosmos participation in the International Charter “SPACE and MAJOR DISASTERS”” Luc St-Pierre, Senior Programme Officer, United Nations Office for Outer Space Affairs (UNOOSA) “UN-SPIDER: A model approach to reduce vulnerabilities to hazards through good practices in geospatial information management”
Session 4 10.00 – 11.00	**Crisis Management centers network development in Asia-Pacific Region** (Chairman Oganes Targulyan) Maksim Zayko, EMERCOM of Russia, Andrey Kudinov, Russian National Emergency Management Centre, EMERCOM of Russia “Using the information of space monitoring system for operational control in EMERCOM of Russia” Janggam Adhityawarma, ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) “Current Status and Future Needs of Space-based Information for Regional Disaster Monitoring and Response at AHA Centre” Andrey Kudinov, Russian National Emergency Management Centre, EMERCOM of Russia Maksim Zayko, EMERCOM of Russia “Results of the work on the creation of centers for Crisis Management unified state system of prevention and liquidation of emergency situations and objectives for their development”
11.15 – 11.30	**Coffee Break**
Session 5 11.30 – 12.15	**Remote Sensing and Emerging Environment Issues** (Chairman Andrey Sarychev) Maria Dorofeeva, RDC SCANEX, Russia “Space Watch” – a system of public monitoring from space Philippe Courrouyan, CLS-Asia “Prevention and Management of Natural Disasters”*
12.15 – 12.30	**Workshop Closing remarks** Maksim Zayko, EMERCOM Russia
12.30 – 12.40	**Workshop Adjourn**
13.00 – 14.00	**Lunch**
16.00 – 21.30	**Technical Tour**

* Presentation was not presented during workshop due to technical reasons
(flight delay – late speaker arrival), slides included into Project Final Report

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Application of Satellite Technologies for Emergencies Preparedness, Management and Response (EPMR) in Asia-Pacific Region

Dr. Kucheiko Alexey, Deputy General Director, RDC SCANEX

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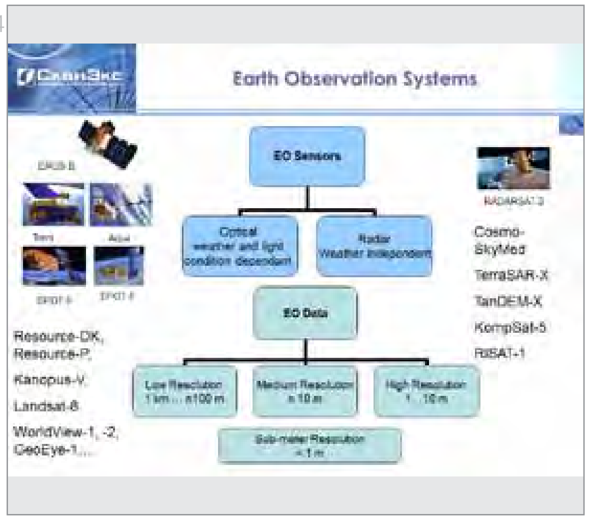

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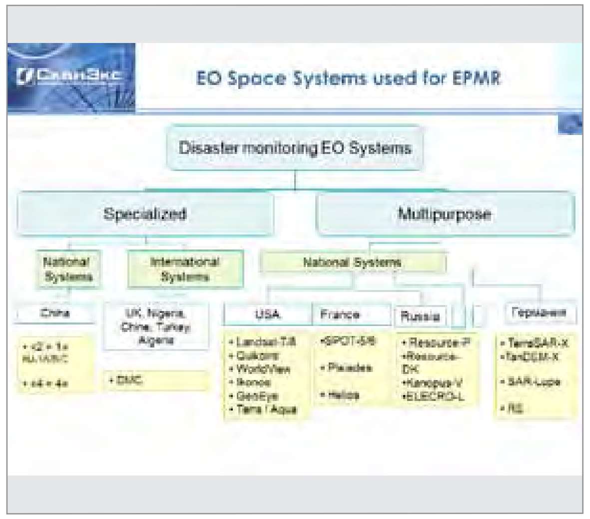

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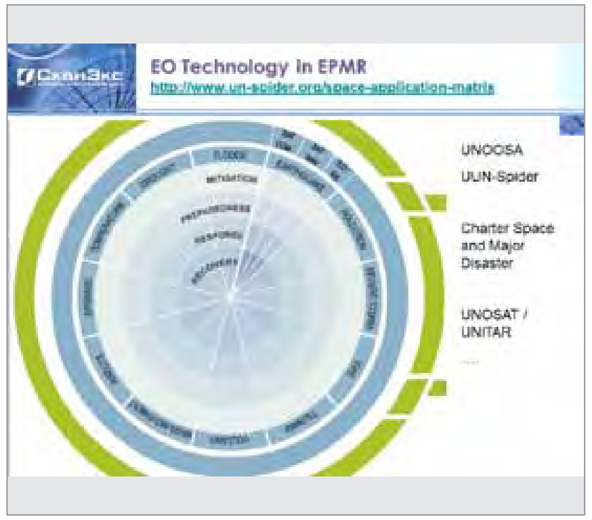

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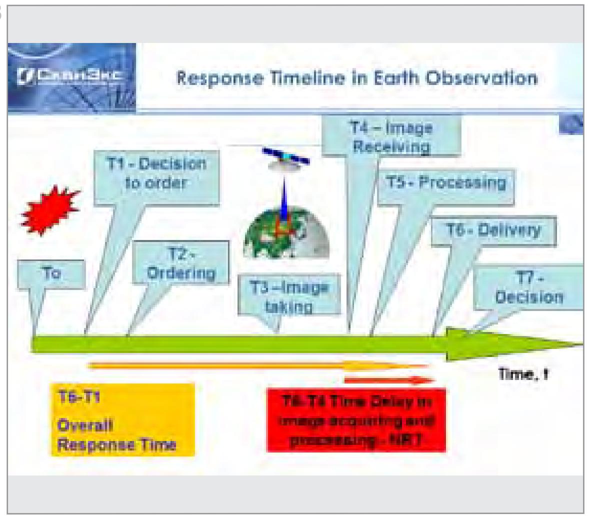

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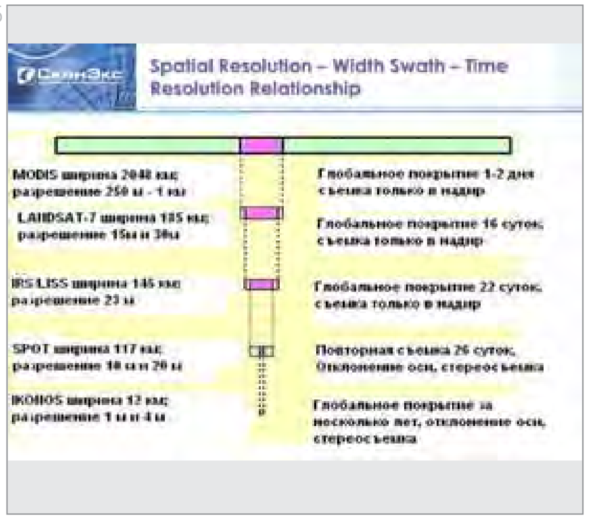

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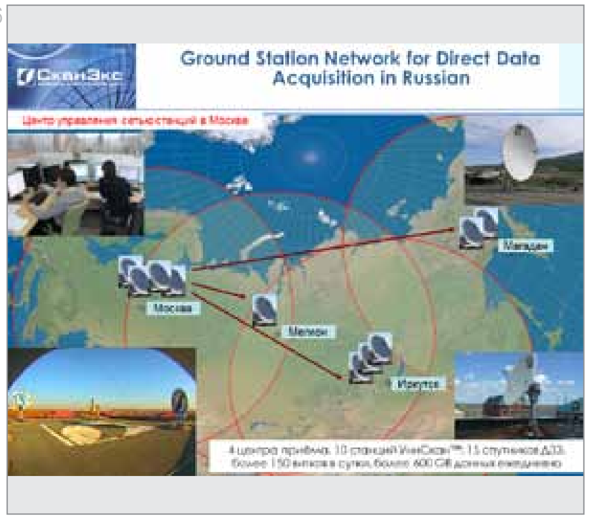

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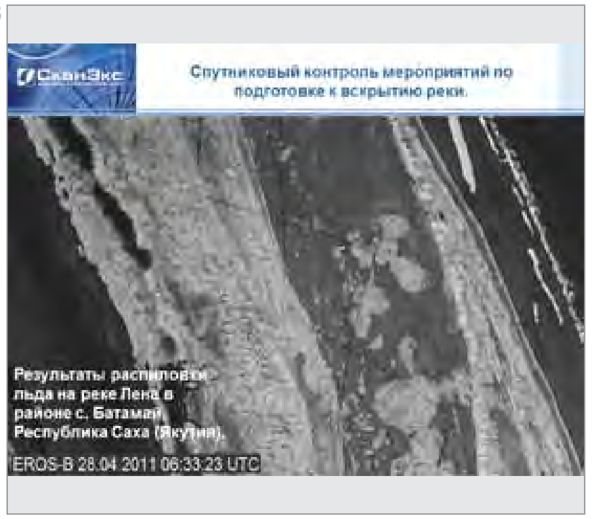

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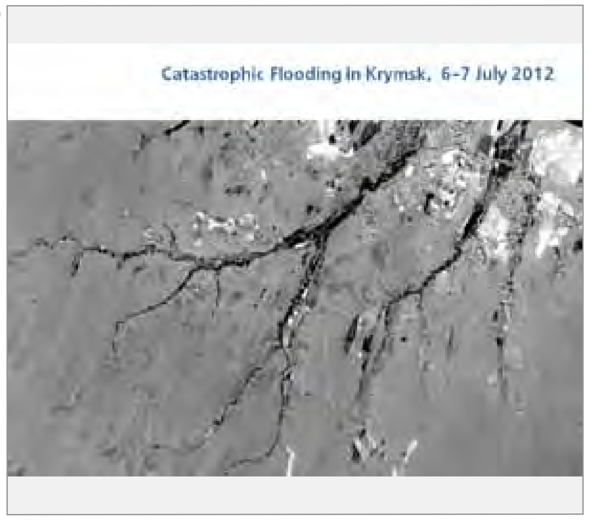

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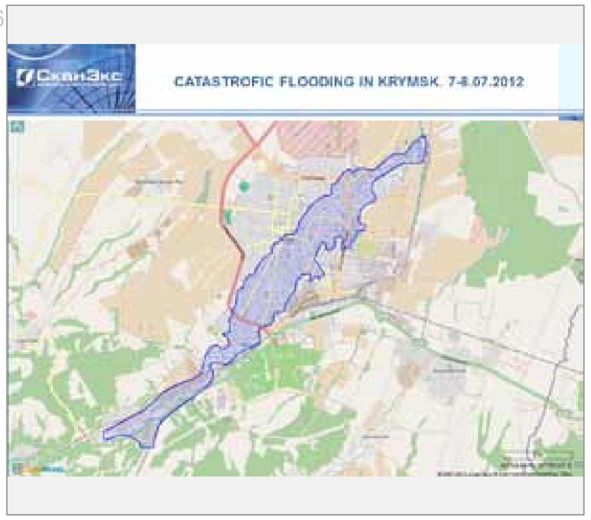

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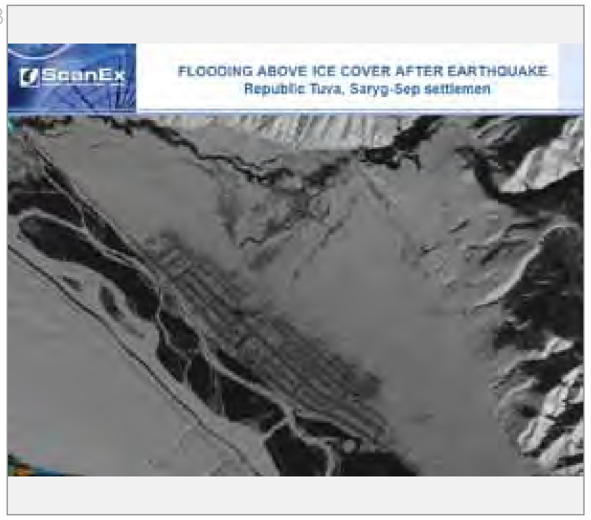

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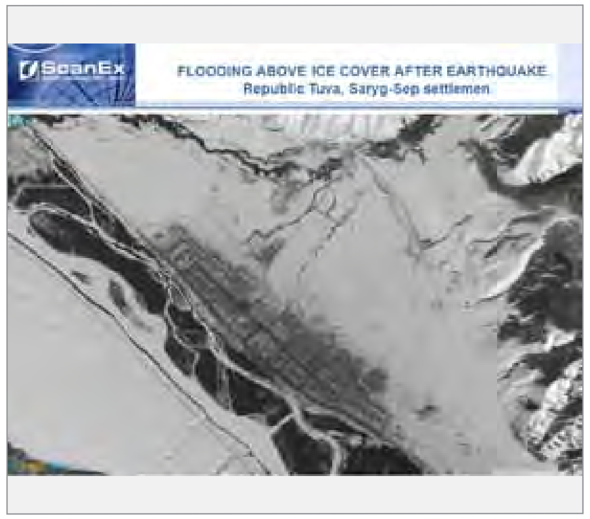

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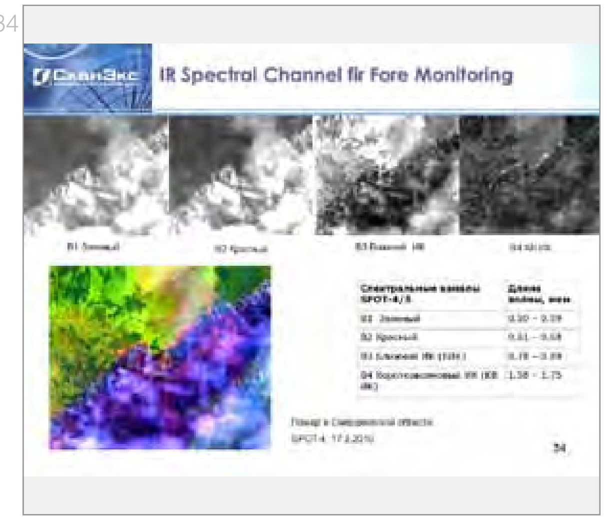

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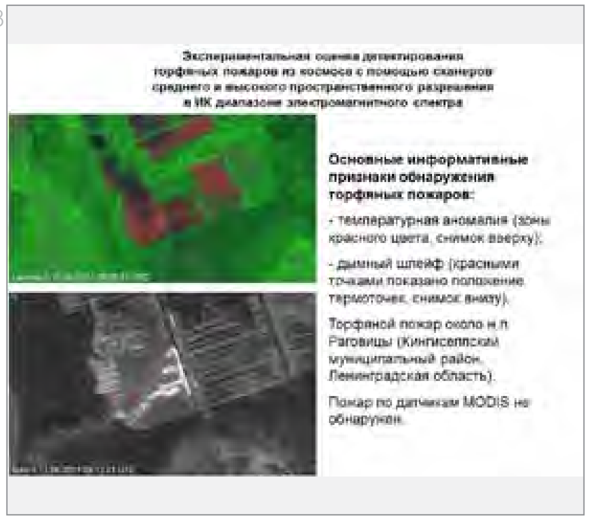

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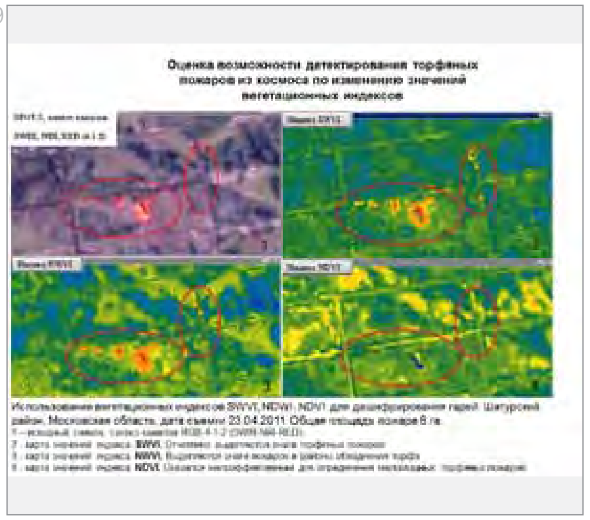

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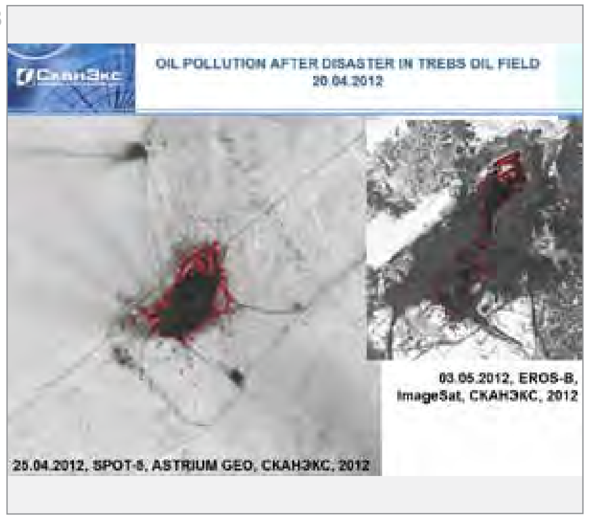

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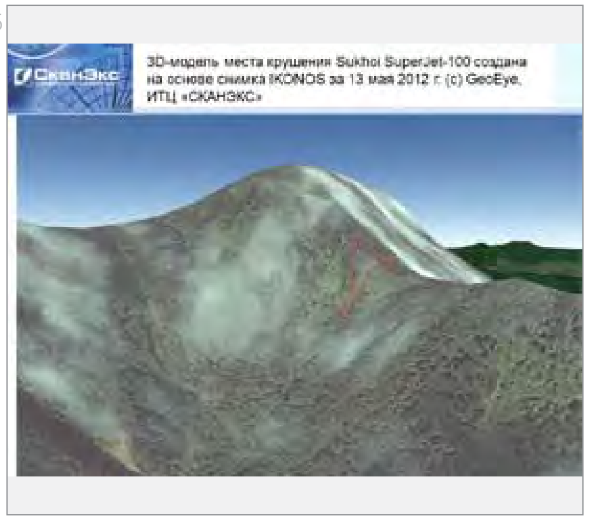

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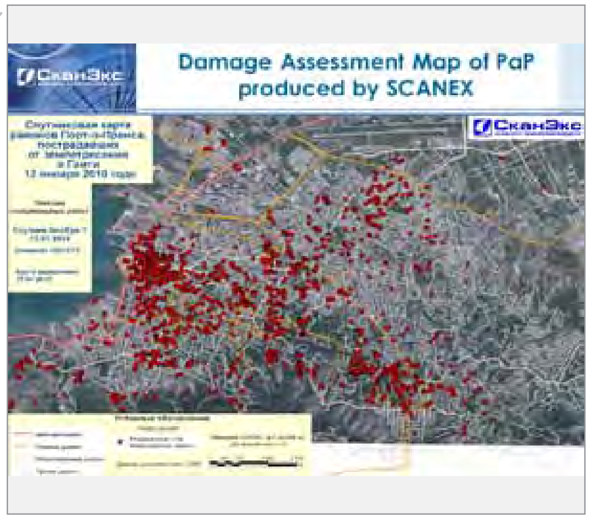

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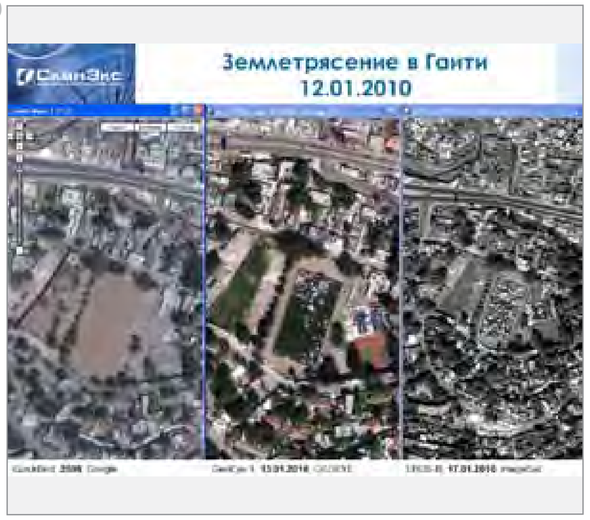

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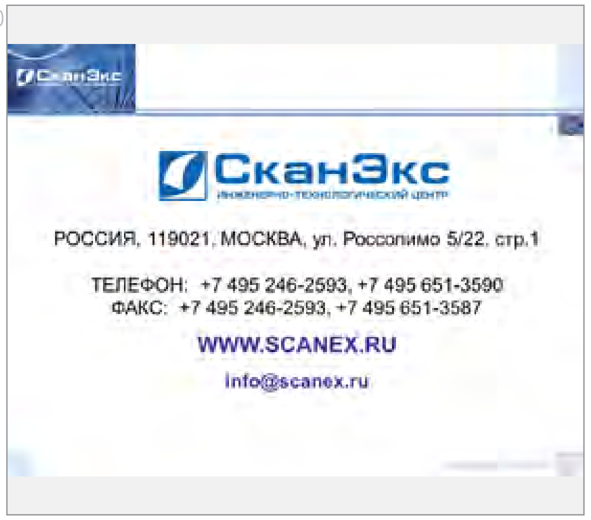

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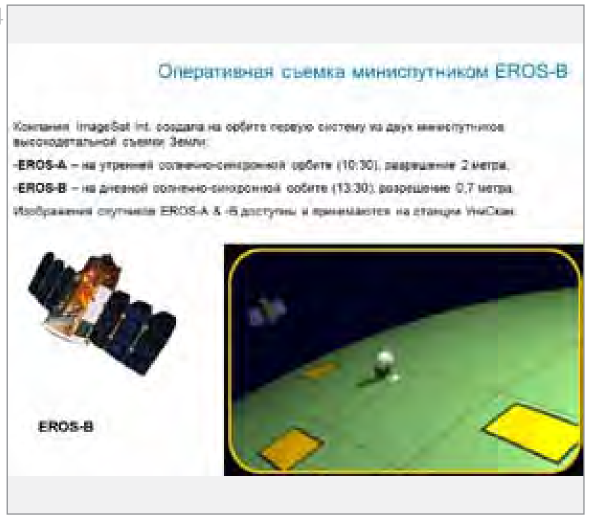

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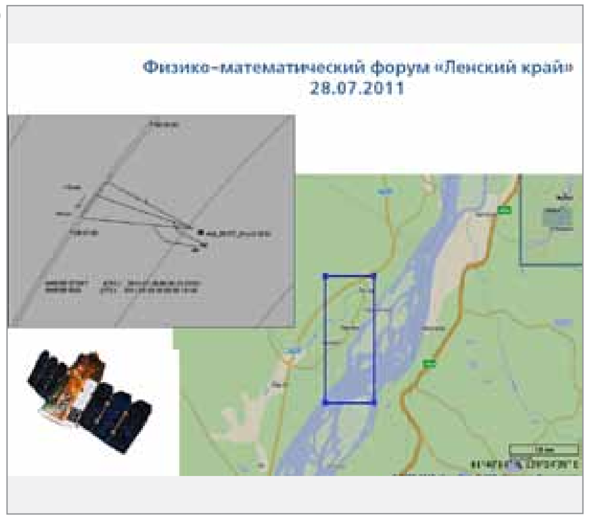

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Space Technology Application for Disaster Management in China

Dr. Zhang Wei, Department of Satellite Remote Sensing, National Disaster Reduction Center of China, MCA, China National Committee for Disaster Reduction

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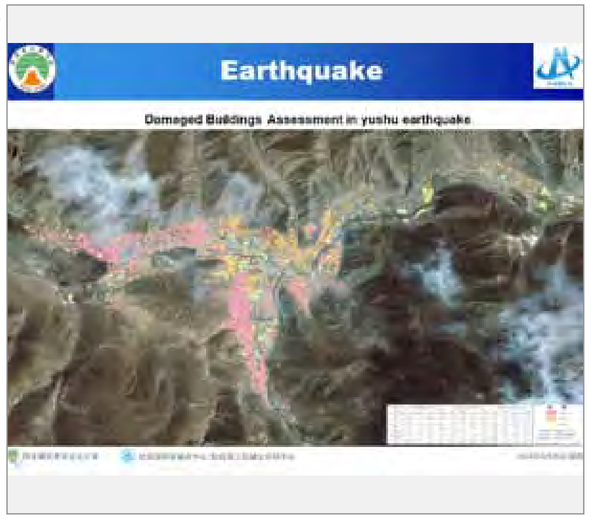

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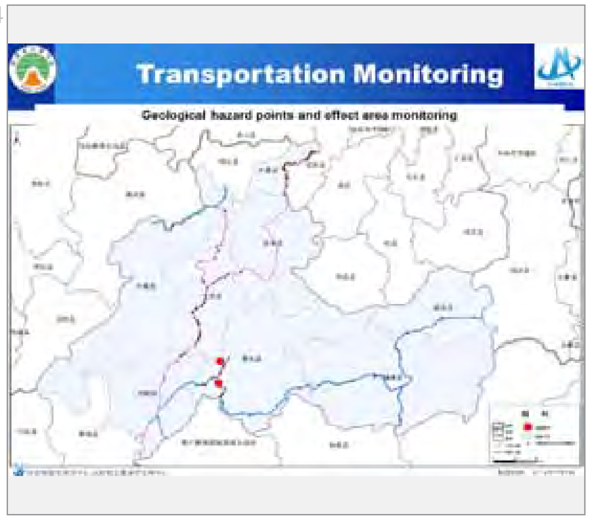

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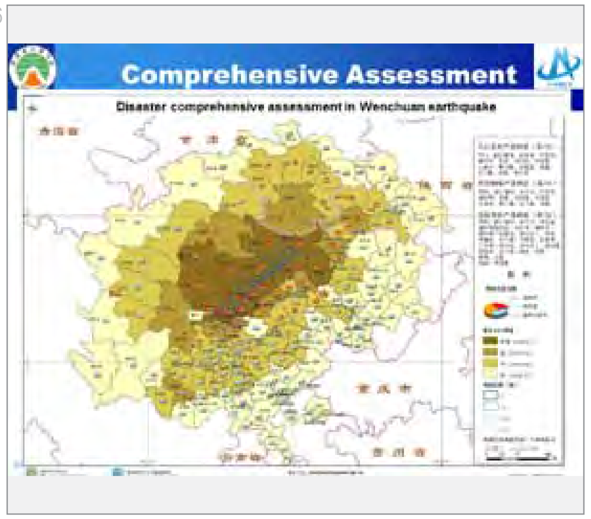

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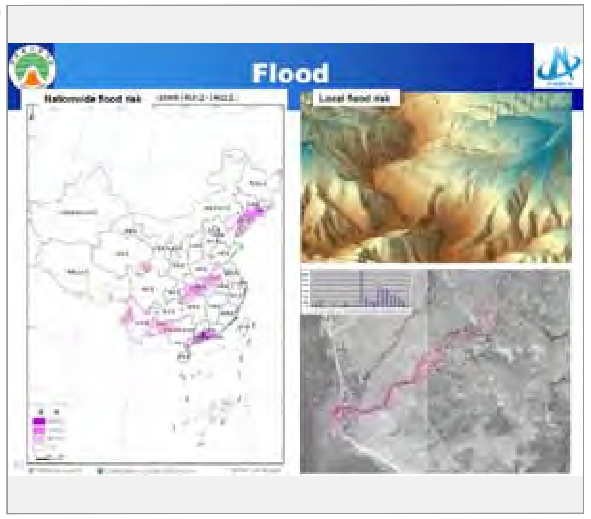

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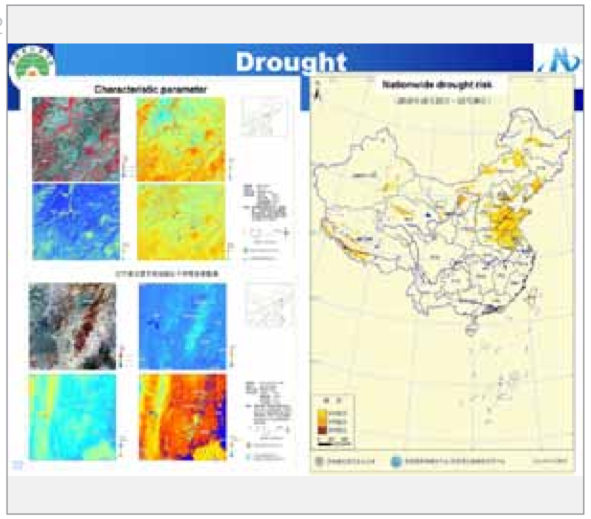

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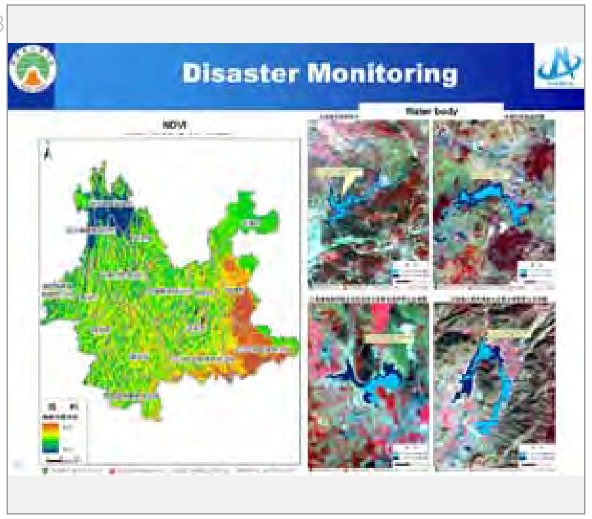

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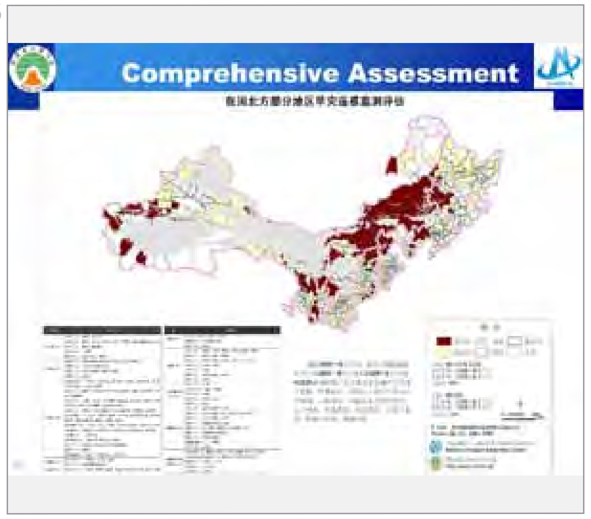

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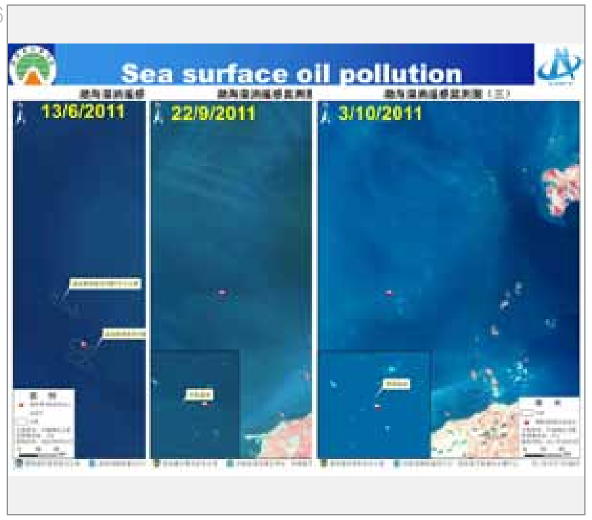

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Services for Australia Wide Fire
crc•si
"thank you, and through you, to thank other Chinese agencies and the Chinese government, for your wonderful support for fire-fighting over the last four weeks in Victoria, Australia, by providing HJ and other satellite imagery and analysis reports."
"The tremendous support Australia received from China in accessing your satellites has demonstrated to us the potential for great gains to Australia in growing the Australia-China friendship."
Dr. Peter Woodgate

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Services for Australia Wide Fire 2013
19 Oct, 2013,NDRCC received the Australia fire requirement, immediately started up "Working Procedure for Emergency Response with Space Technology Application" and arranged satellite observation plan.
At 7 am Beijing time, 20 Oct, 2013,NDRCC successfully imaged disaster area. At the same ,NDRCC offer data and products to Australia.
By now, NDRCC has arranged 7 tracks of HJ-1, provided 14 data and 5 products. This work is still ongoing.

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Services for Mexico sea oil
Monitor in 10th.May
Monitor in 13th.May

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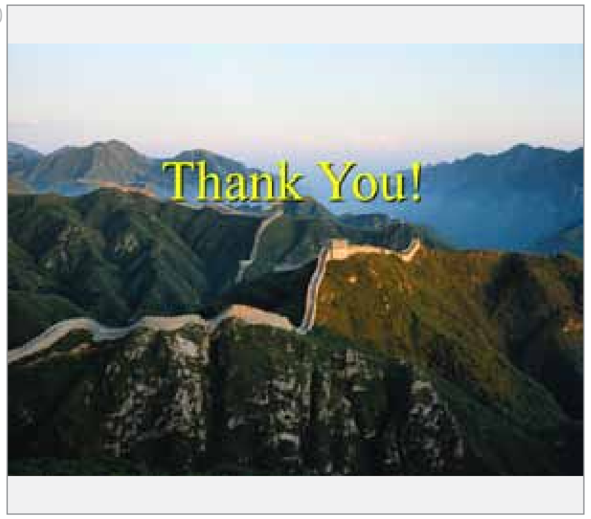
Thank You!

The use of GIS data for the projection of the impact of an earthquake in Lima, Peru

Dr. Cesar Carcamo, School of Public Health and Administration, Universidad Peruana Cayetano Heredia

1

The use of GIS data for the projection of the impact of an earthquake in Lima, Peru

Cesar Carcamo
School of Public Health and Administration
Universidad Peruana Cayetano Heredia

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The project

- Title in Spanish: *"Diseño de escenario sobre el impacto de un sismo de gran magnitud en Lima Metropolitana y Callao"*
- Requested by: INDECI (Peruvian National Institute of Civil Defense)
- Carried out by: PREDES (Center for the study and prevention of disasters)
- Funded by: COSUDE (Swiss Agency for the for the Development and Cooperation)
- Full report at: http://www.predes.org.pe/predes/images/dis_esc_lima.pdf

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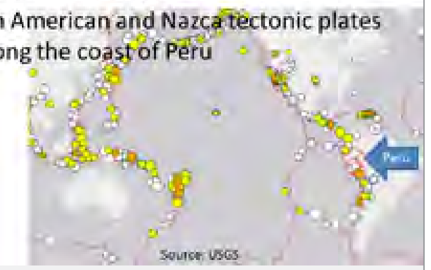
About Peru

- Population: 30'475,144
- Capital: Lima
- Located within the Ring of fire"
- The South American and Nazca tectonic plates collide along the coast of Peru



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About Lima

- Population of Lima: 8'021,630 (2007)
- A coastal city
- Affected by 19 big earthquakes and 117 tsunamis since 1552 – Thousands of deaths
- The soil in most of the city is alluvium (pebble, sand, silt)
- Some part of the city were built over sandy soil or former landfills
- Key for government, transportation and communications in the country

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Study objective

- To build the scenario of an earthquake (magnitude 8 in the Richter scale) and a Tsunami, in order to:
  - Estimate the potential damage
  - Plan and improve a response
  - Identify and minimize risk

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Methods

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Methods

- Secondary data
- GIS used to organize the data
- Limited to the Callao province and most districts (41 of 48) of the Lima Province
- Time: 4 AM (most people at their homes)
- Results at the district level (or smaller when possible)

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Estimation of damage by an Earthquake

- Based on:
  - Soil composition
  - Evaluation of seismic amplification
  - Estimation of vulnerability of the buildings (district level or smaller):
    - Construction material
    - Age
    - Height
    - Maintenance status
    - Intensity of use
    - Others
  - Population density

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Estimation of the delay and wave height of a tsunami

- Location: 70 Km west of the coast
- Intensity: VIII (Modified Mercalli)
- Depth: 33 Km
- Estimation based on:
  - Bathymetry of the ocean floor
  - Magnitude of the earthquake
  - Altitude on land (Google earth)

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Results

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Potential damage by an earthquake

- 51,019 deaths
- 686,105 wounded
- 200,345 (11%) homes destroyed
- 348,328 (19%) homes uninhabitable
- Some of the main hospitals would also collapse

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Soil composition

- Five risk zones identified:
  - Zone I: Low risk. Rock or solid alluvial soil
  - Zone II: Intermediate risk. Thin layer of fine material on top of solid ground
  - Zone III: High risk. Tick layers of fine material and sand
  - Zone IV: Very high risk. Thick layers of sand deposited by wind or the ocean
  - Zone V: Unmeasured risk. Landfills

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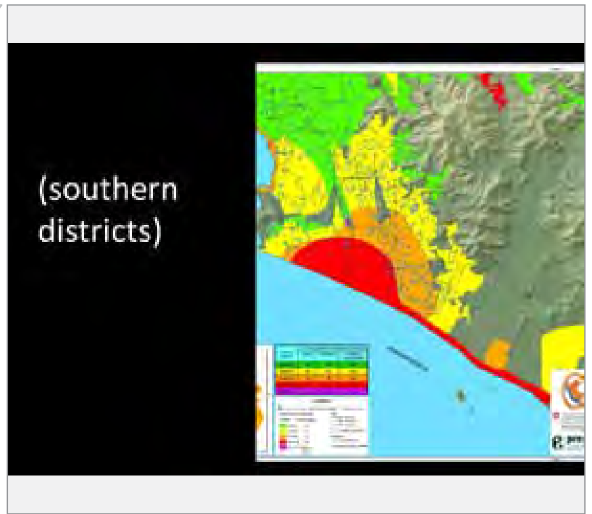

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Estimations for a tsunami

- Delay estimated in 11 to 20 minutes
- Height of the wave:
  - 4.73 (Yamaguchi method)
  - 5.53 (Silgado method)

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Conclusions

- The study identified areas of Lima at high risk of damage after an earthquake
- Some of these overlap with areas at high risk of damage by a tsunami
- These results should be used to formulate regulations on the characteristics of the building in the different areas of Lima
- More detailed data is required

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Application of Satellite Technologies for Emergencies Preparedness, Management and Response (EPMR) In Thailand

Kriengkrai Khovadhana, National Disaster Warning Center

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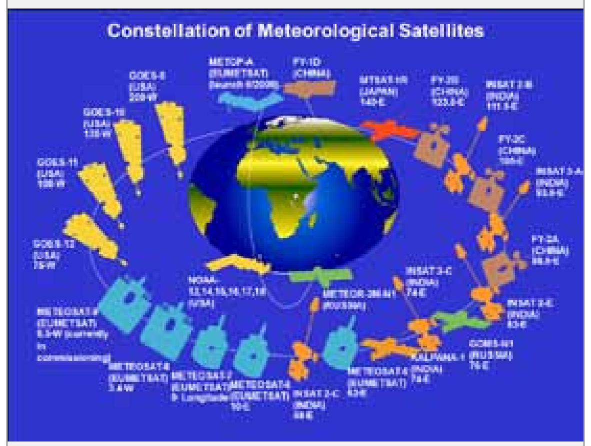

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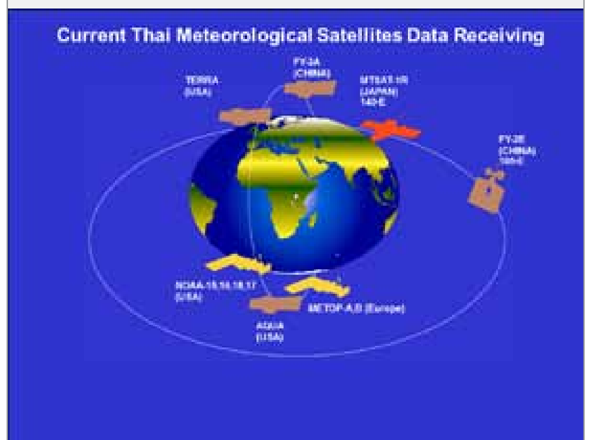

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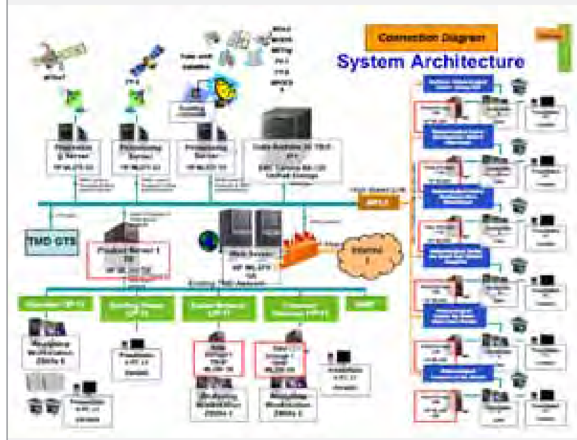

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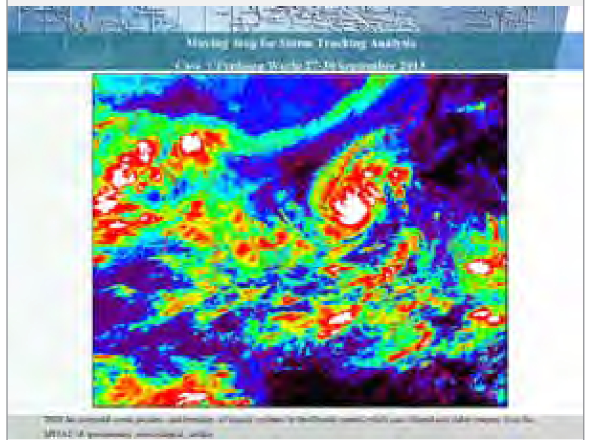

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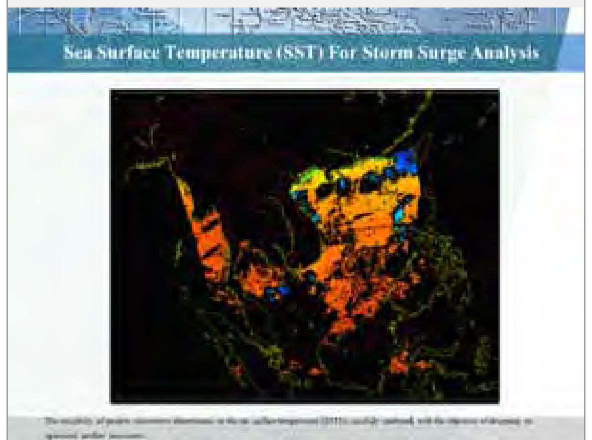

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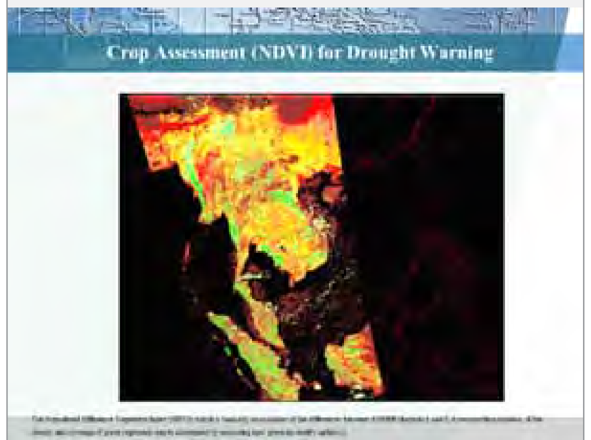

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Hot Spot for Forest Fire Warning
Hot Spot

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Hot Spot for Forest Fire Warning
Hotspots
Clouds
The satellite image above is an example of a multi-spectral TERRA image that depicts the various features, such as clouds, hotspots and smoke plumes/haze.

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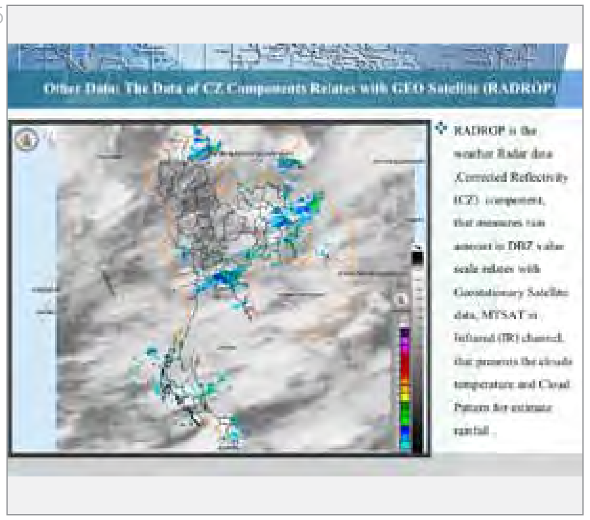
Other Data: The Data of CZ Components Relates with GEO Satellite (RADROP)
RADROP is the weather Radar data ,Corrected Reflectivity (CZ) component, that measures rain amount in DBZ value scale relates with Geostationary Satellite data, MTSAT in Infrared (IR) channel, that presents the clouds temperature and Cloud Pattern for estimate rainfall .

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Data On Web : http://www.tmd.go.th/newversion/mergesat.html

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Space technology application on disaster management in Vietnam

Dr. Bui Quang Huy, Head of Disaster Information and Statistic Division Disaster Management Center

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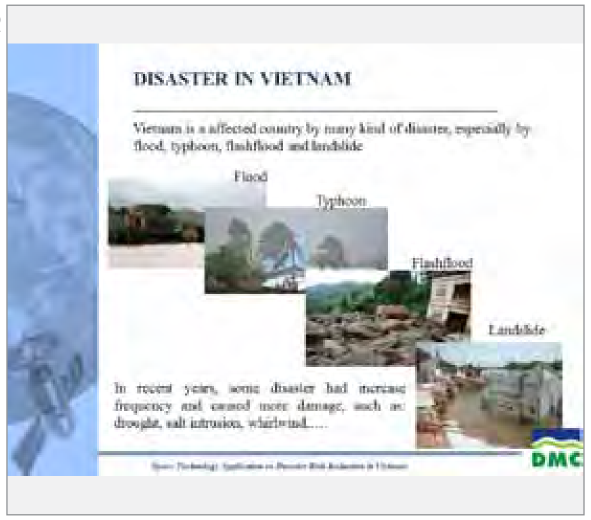

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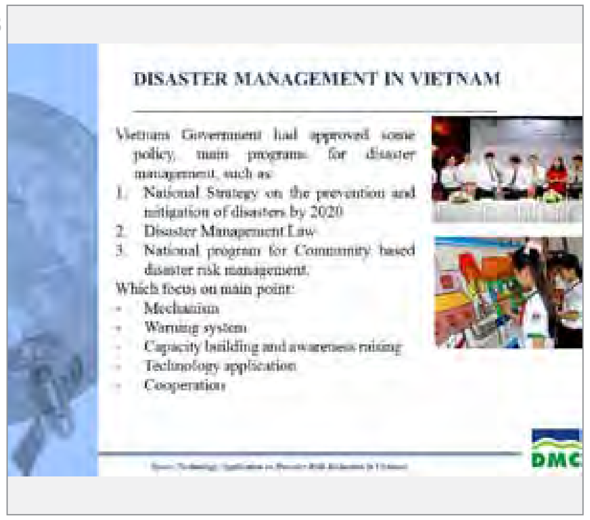

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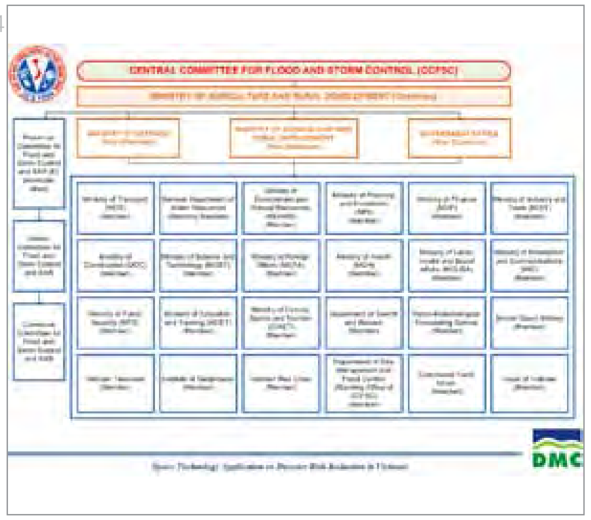

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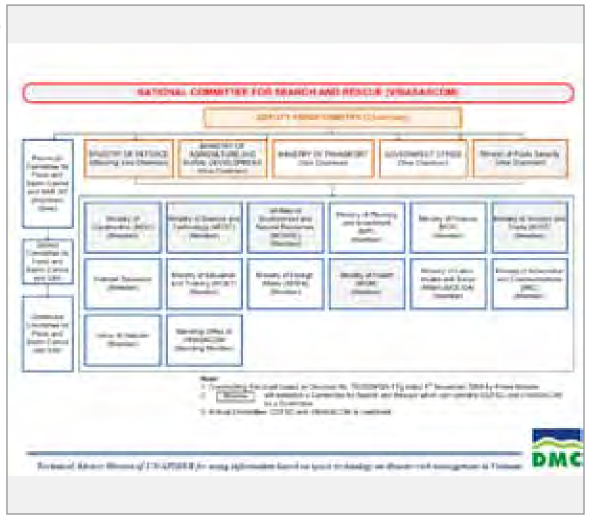

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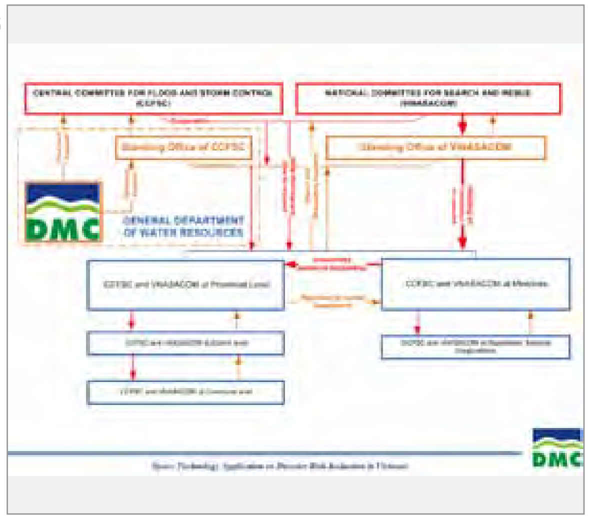

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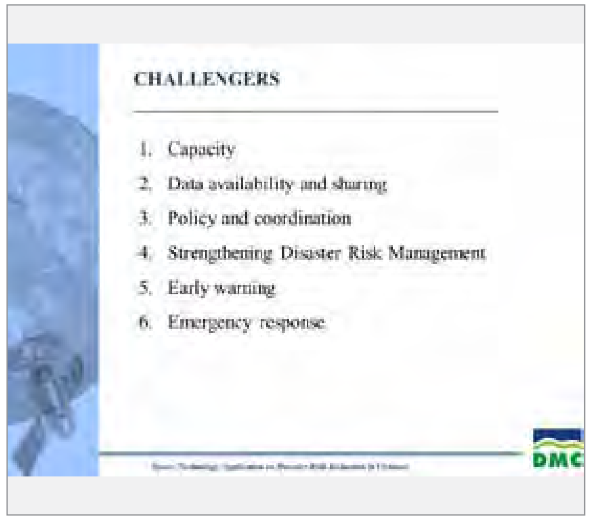

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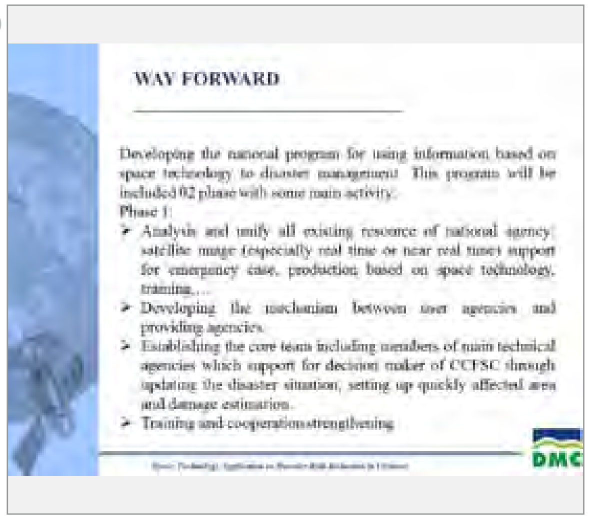

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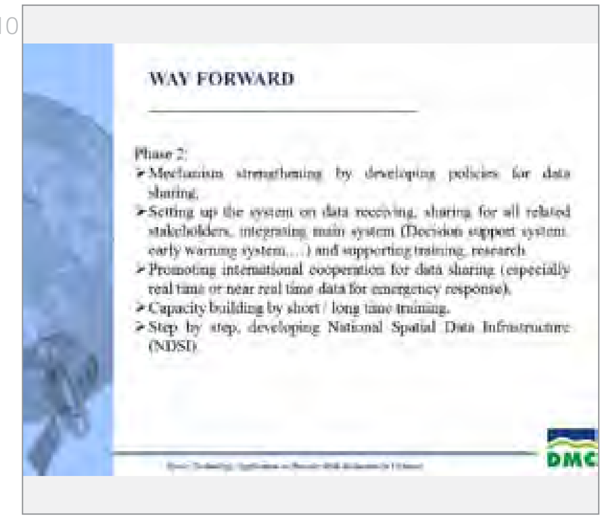

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Space Technologies & Disaster Management: a U.S. Perspective

Dr. Fernando R. Echavarria, Bureau of Oceans, Env. & Science, Office of Space & Advanced Technology, OES/SAT, U.S. Dept. of State

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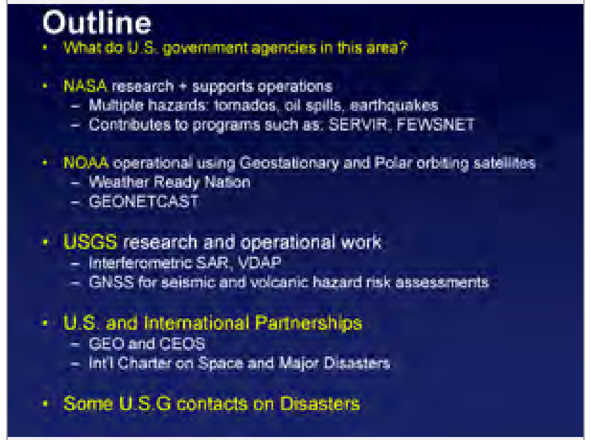

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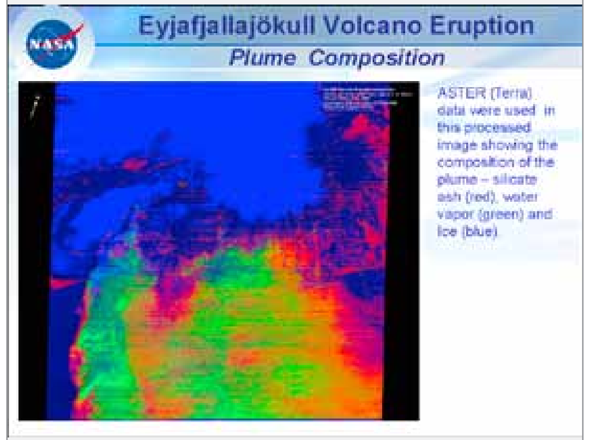

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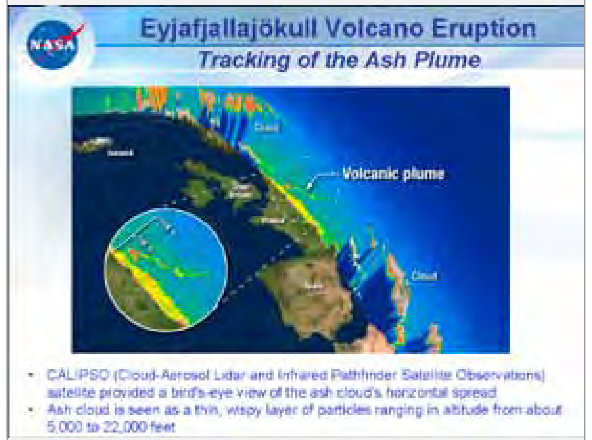

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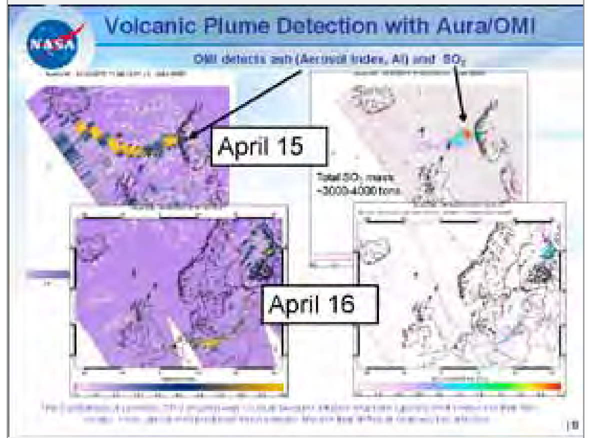

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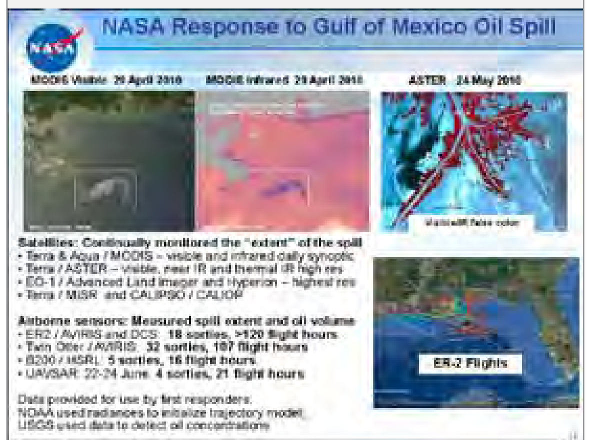

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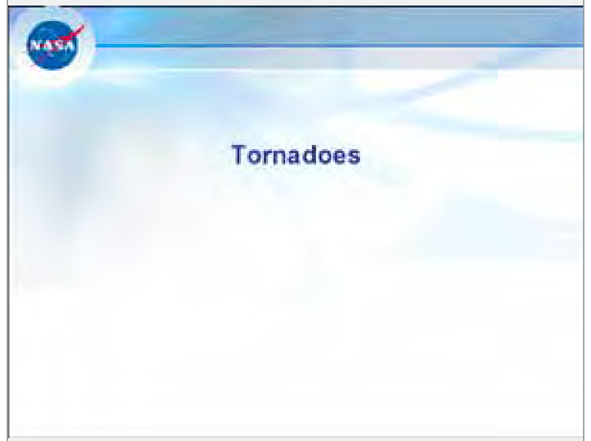

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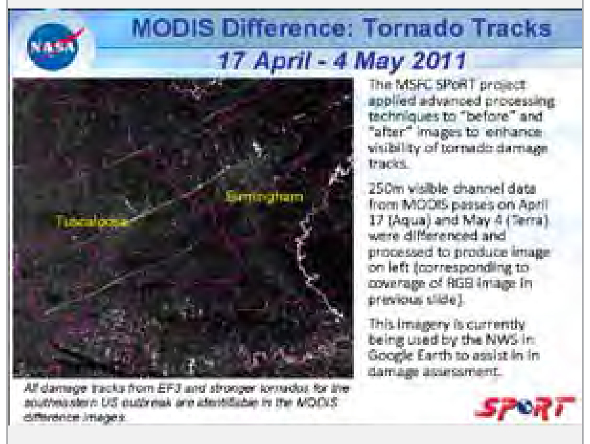

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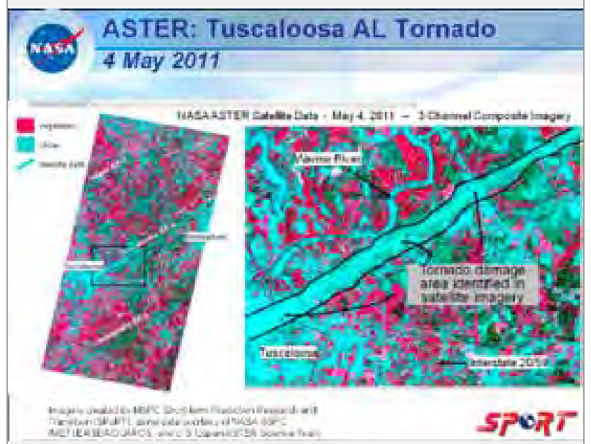

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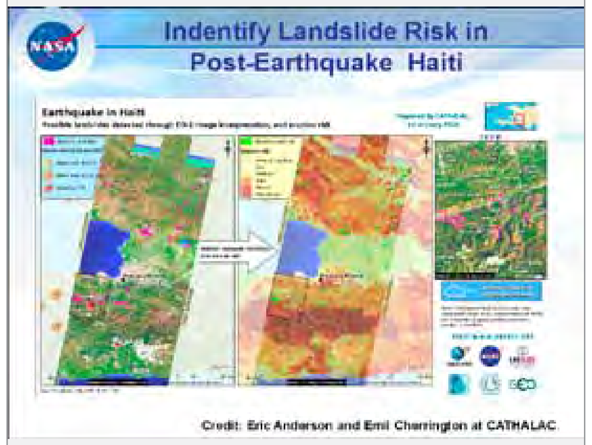

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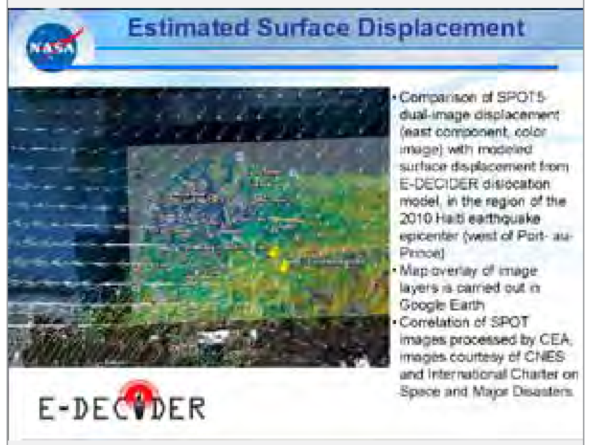

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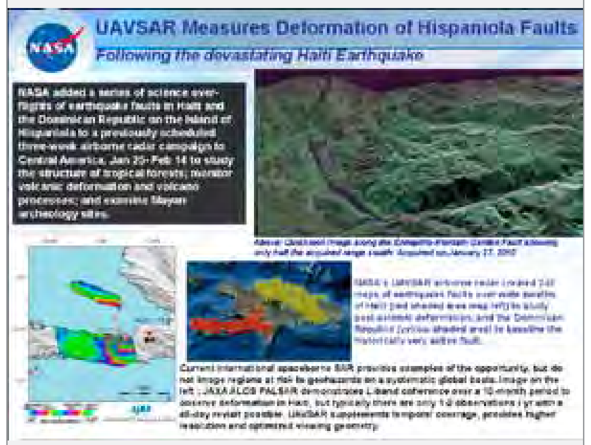

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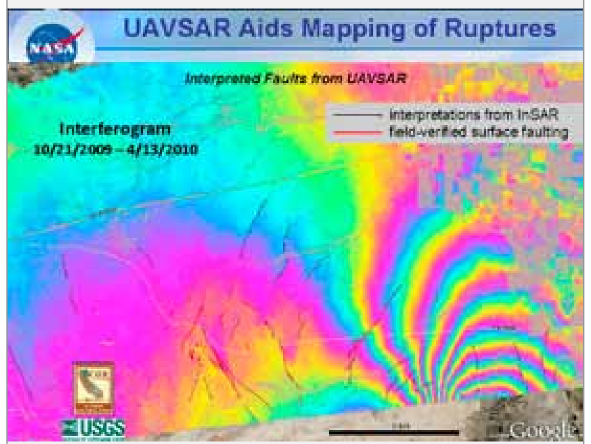

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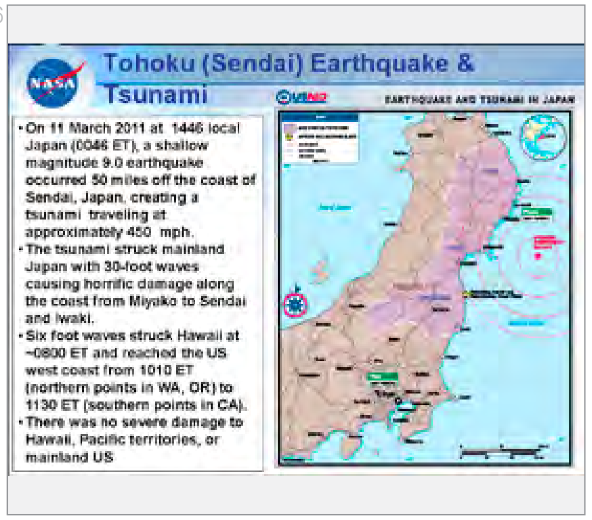

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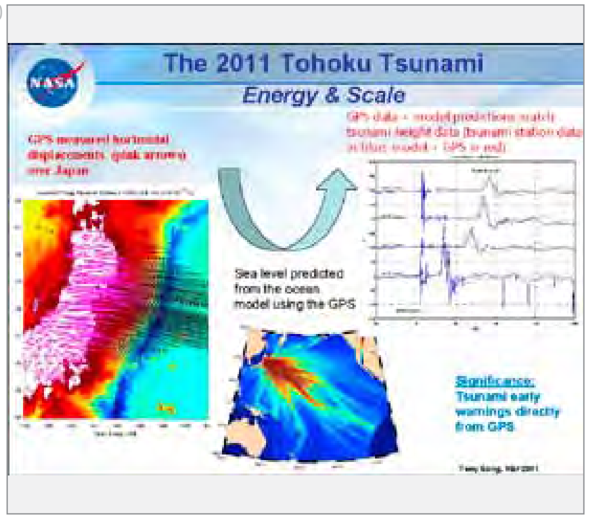

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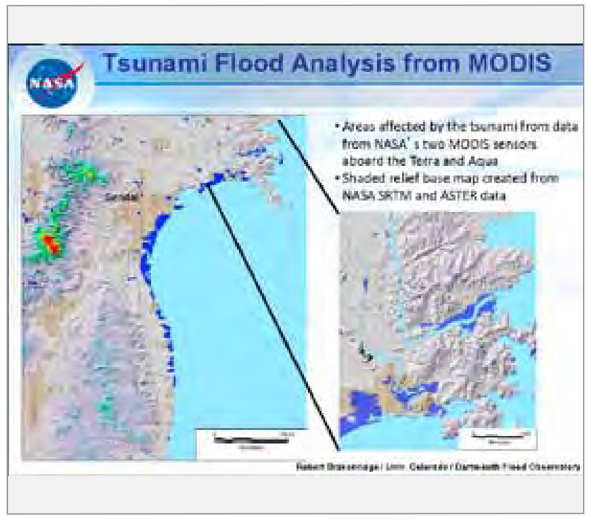

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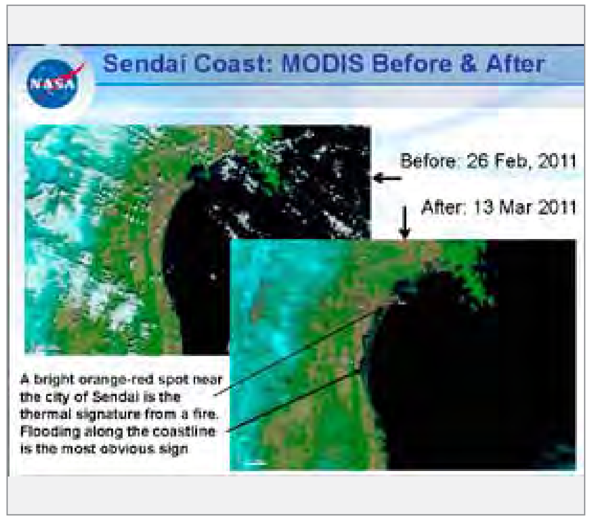

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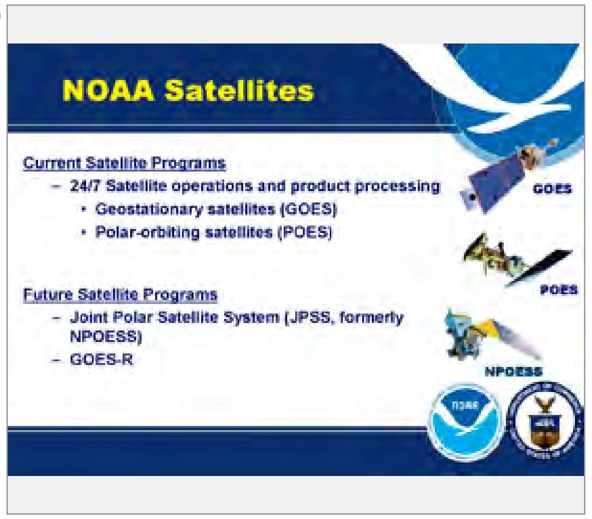

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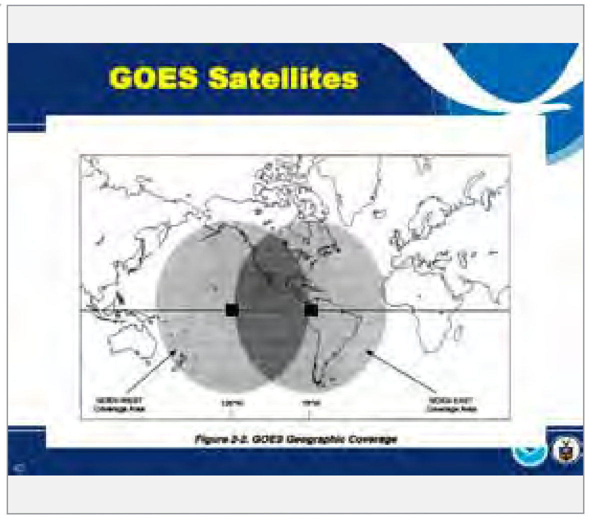

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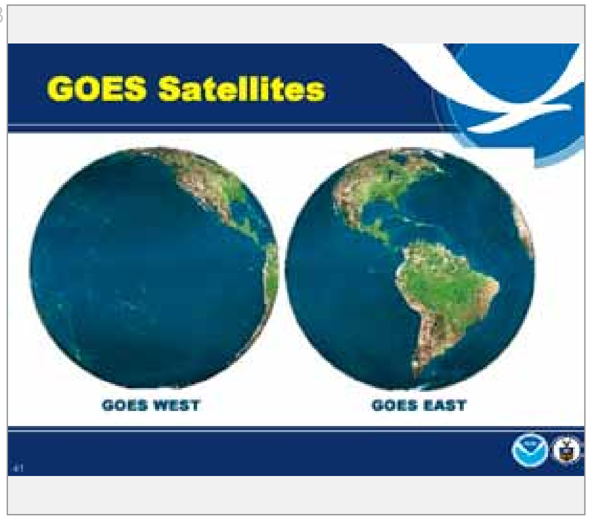

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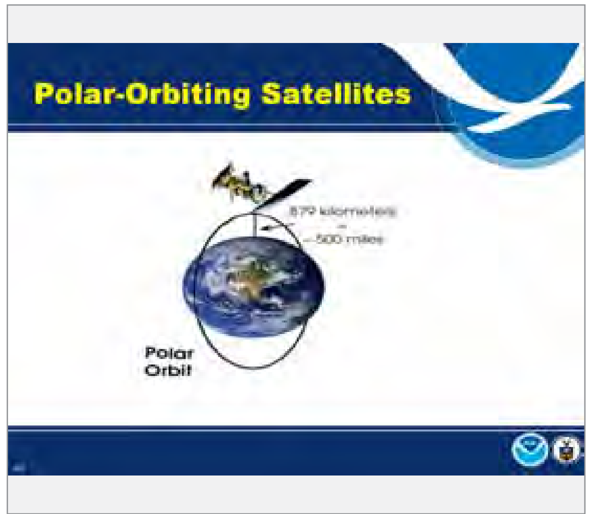

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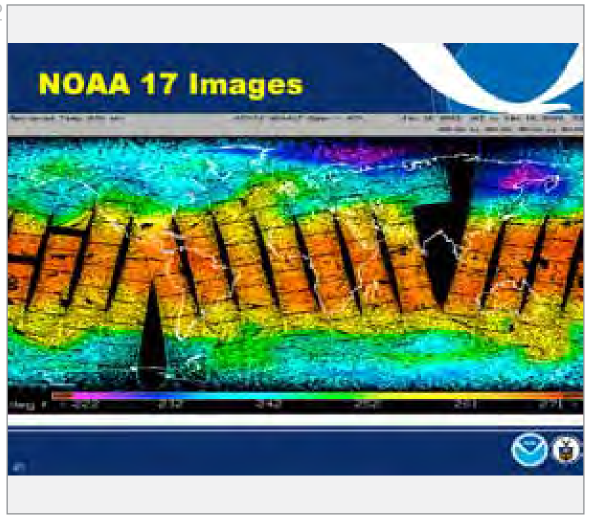

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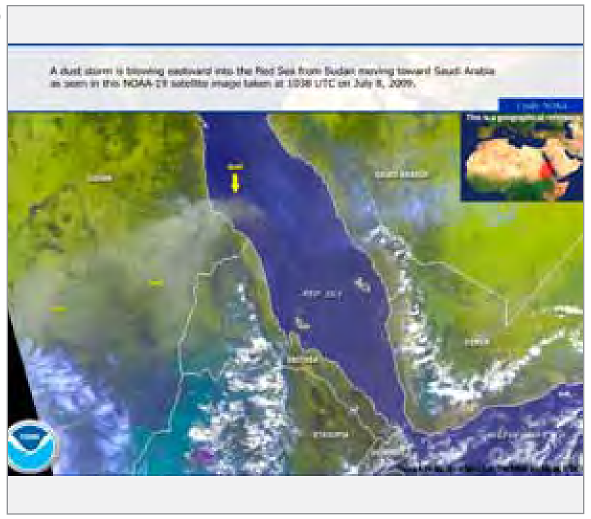

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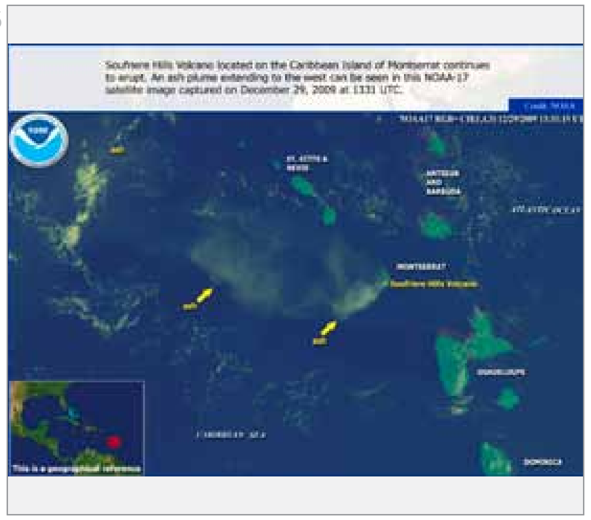

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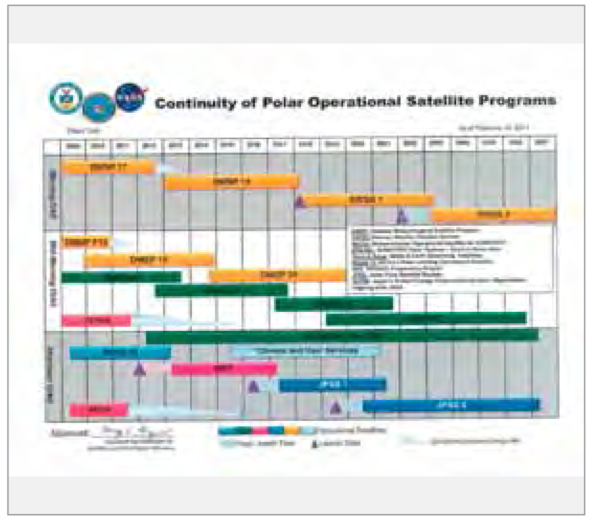

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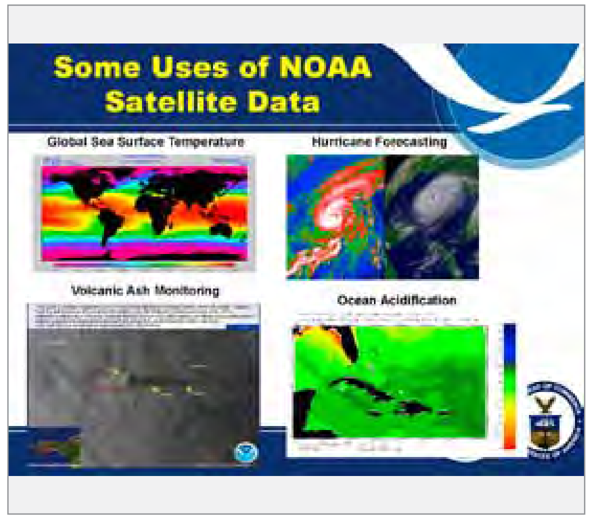

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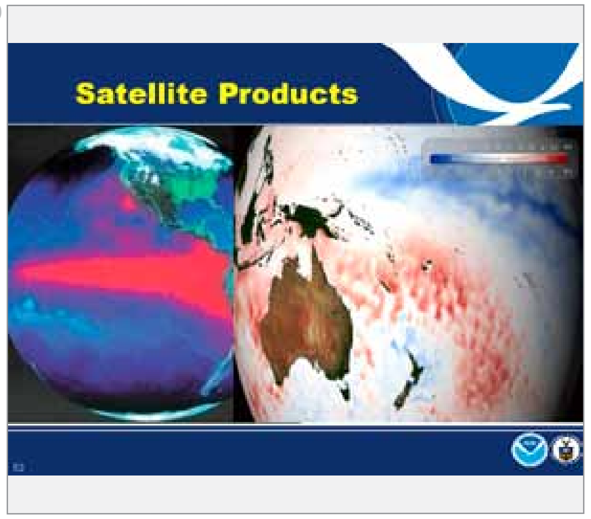

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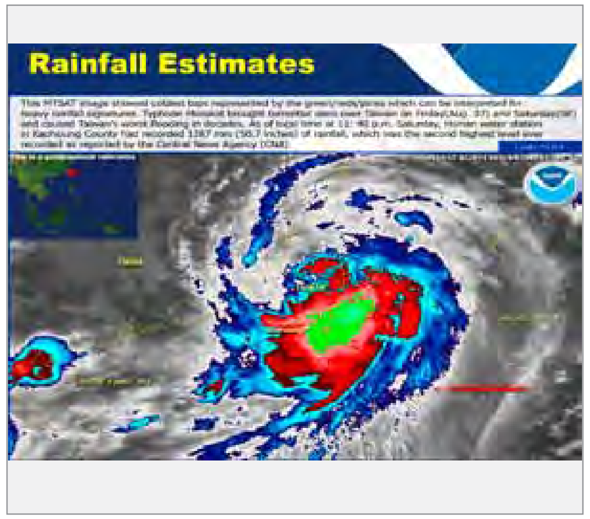

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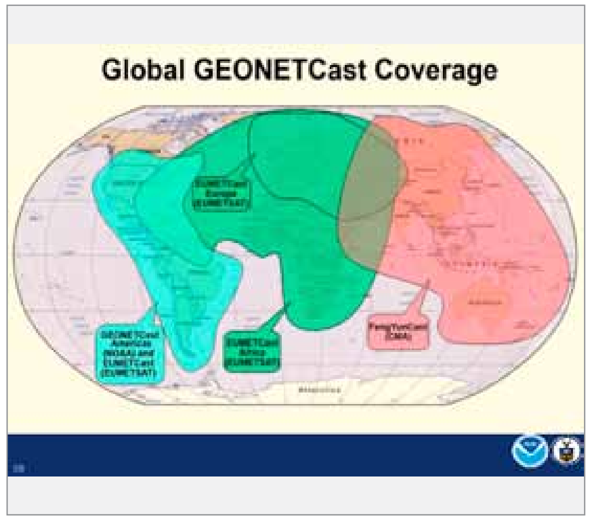

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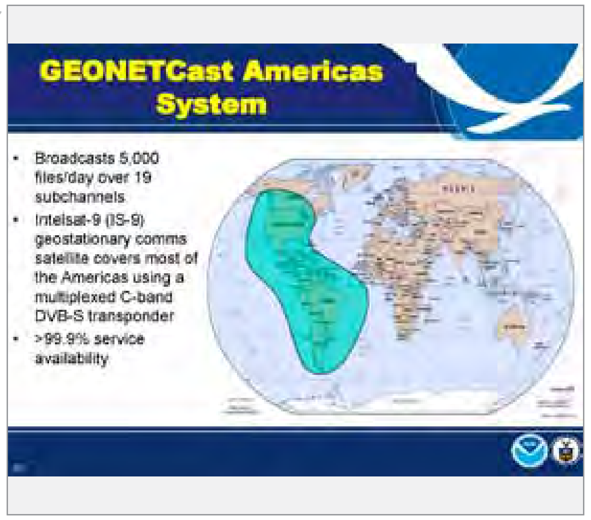

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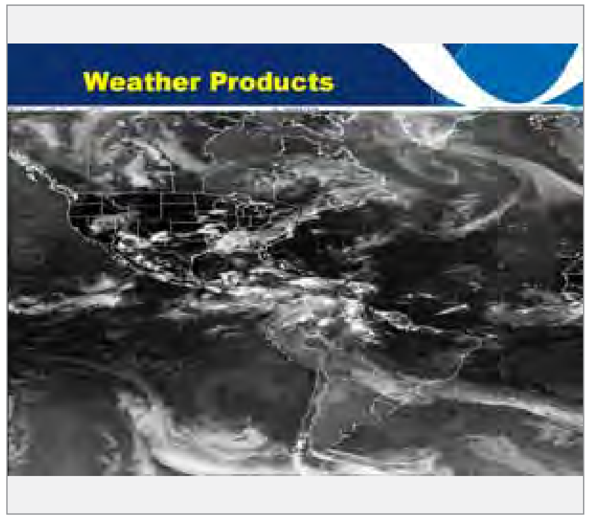

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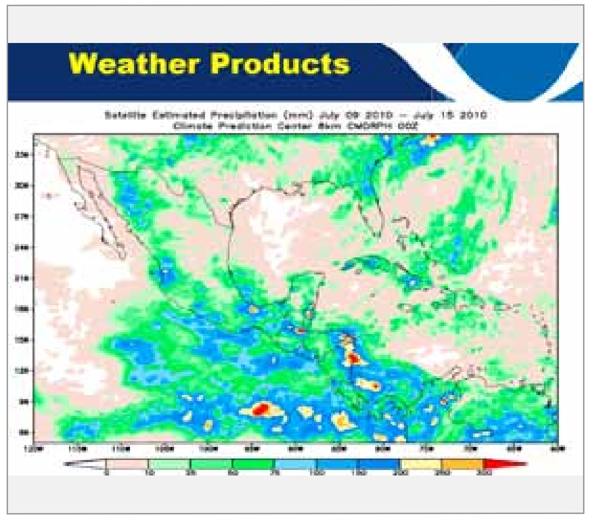

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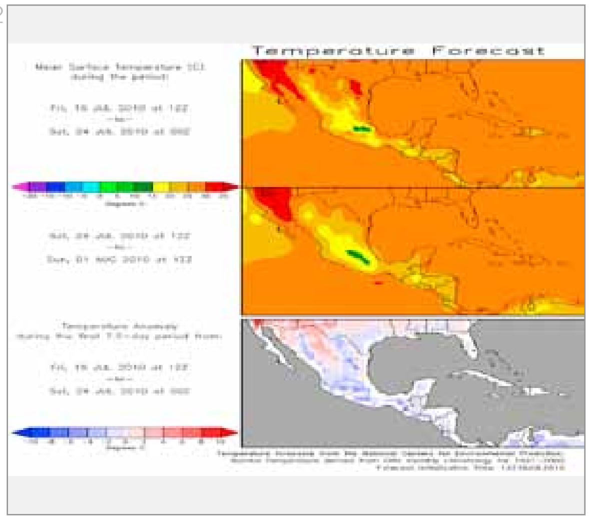

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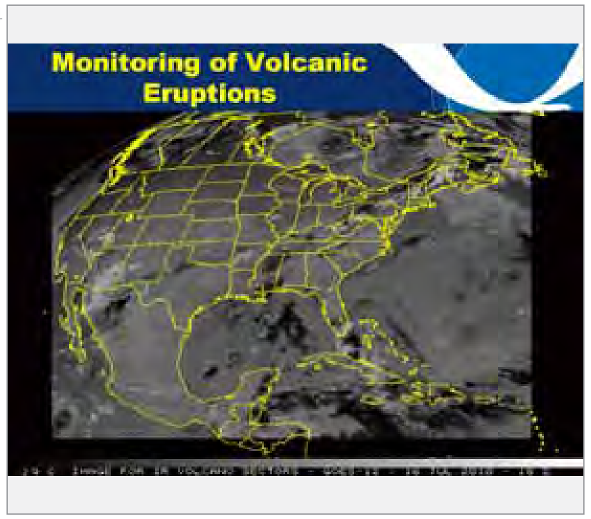

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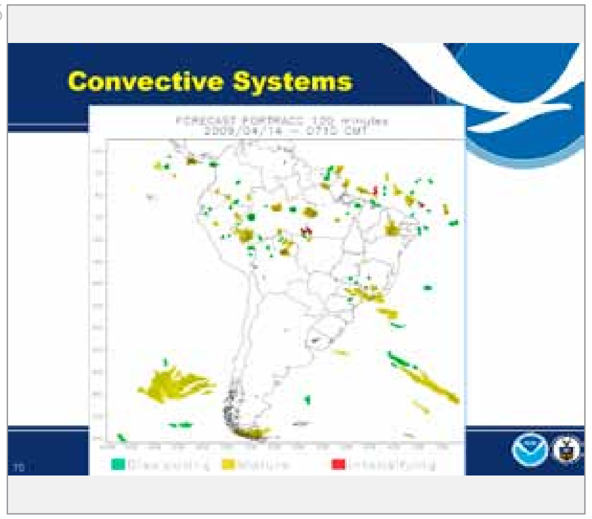

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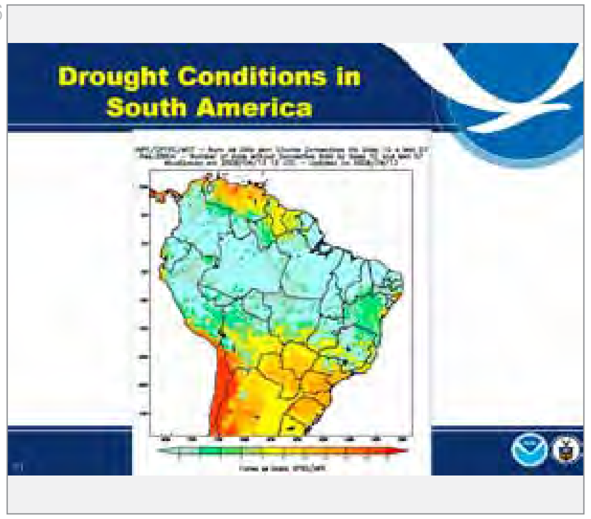

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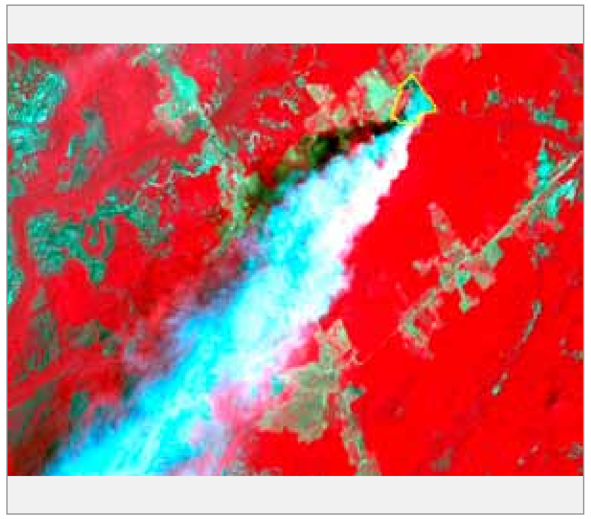

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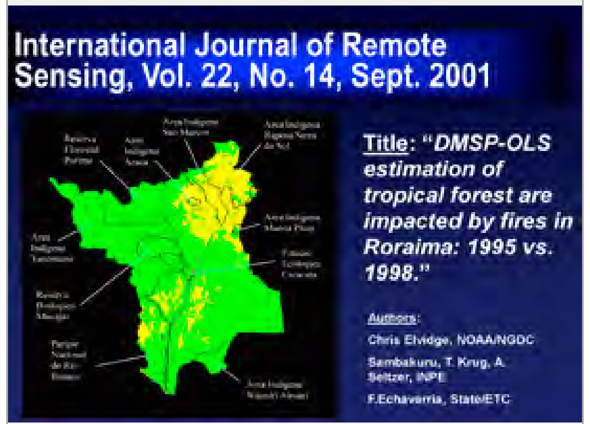

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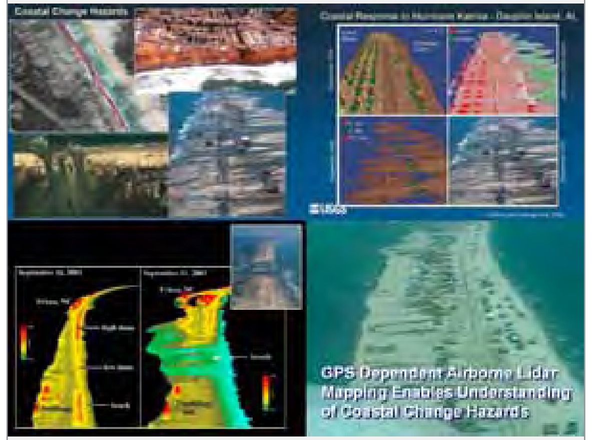

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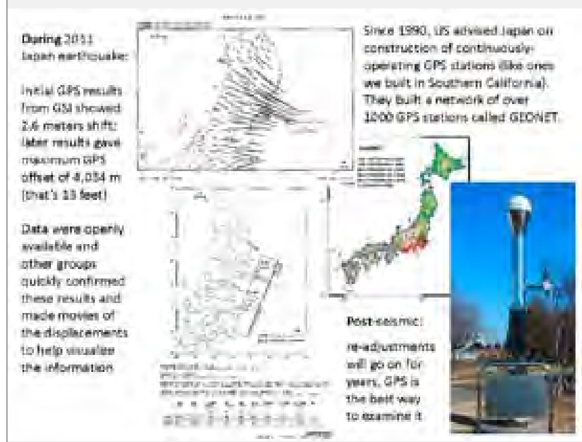

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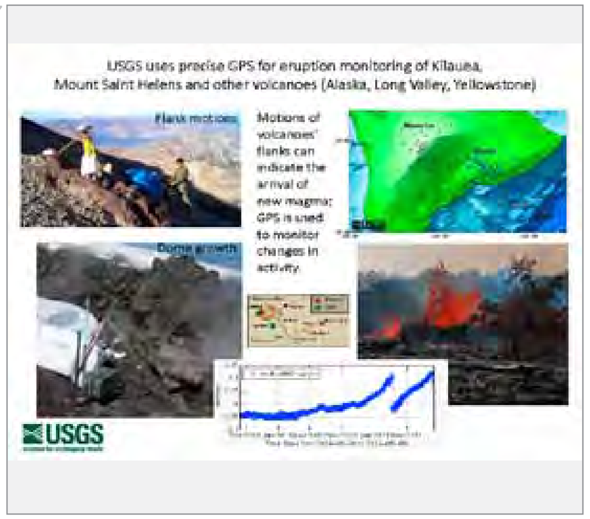

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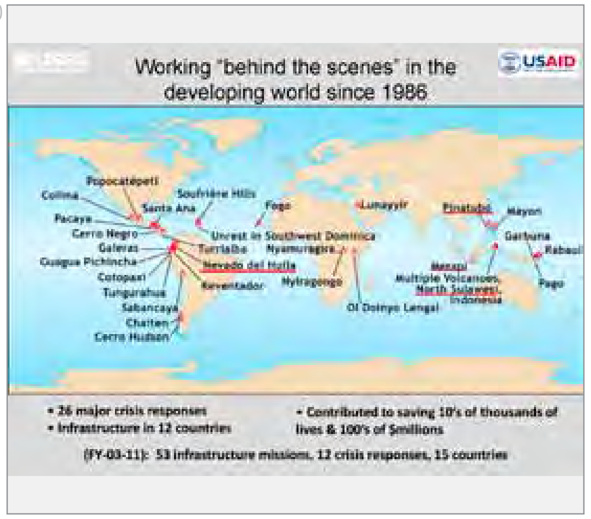

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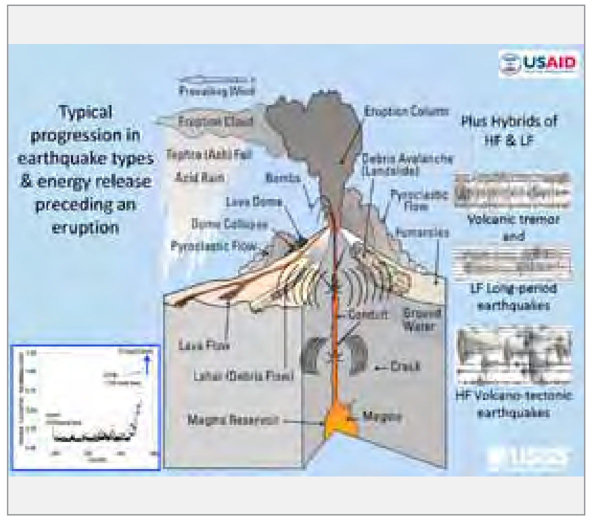

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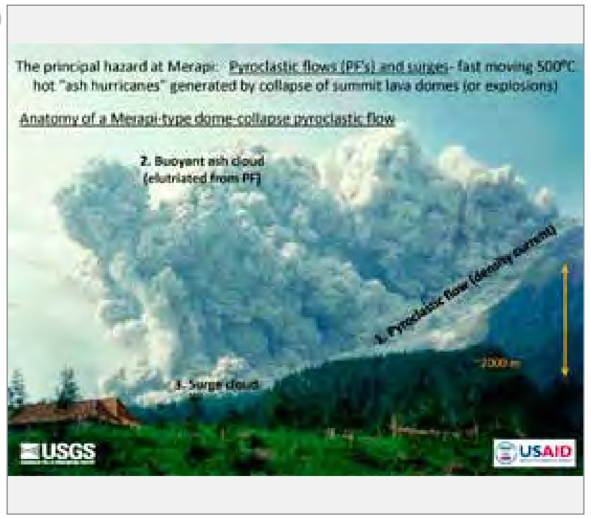

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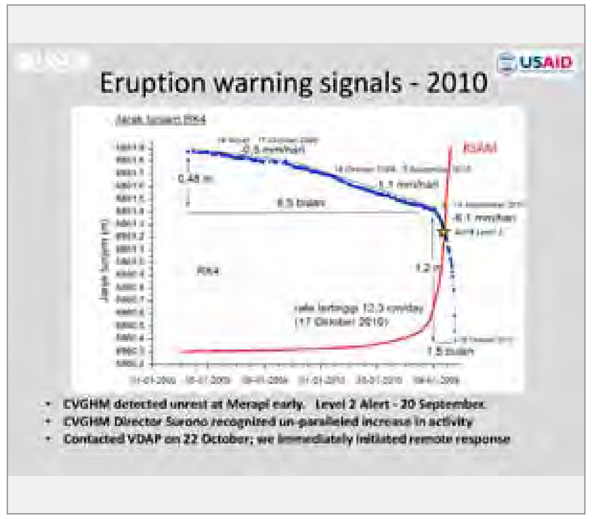

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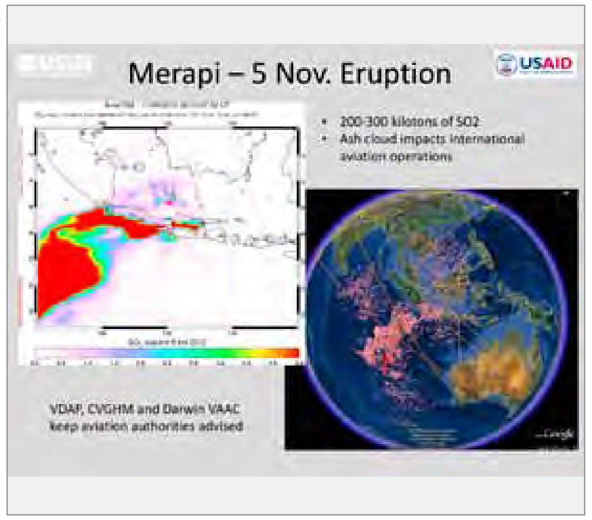

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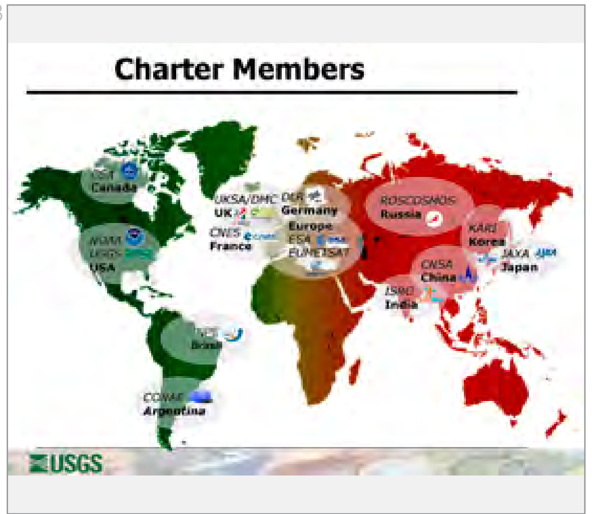

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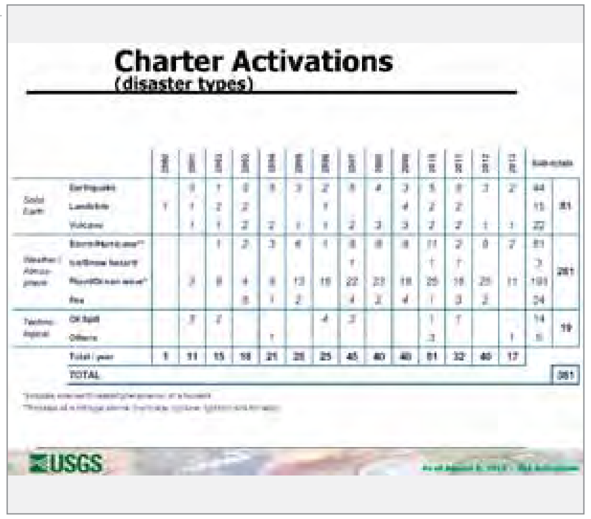

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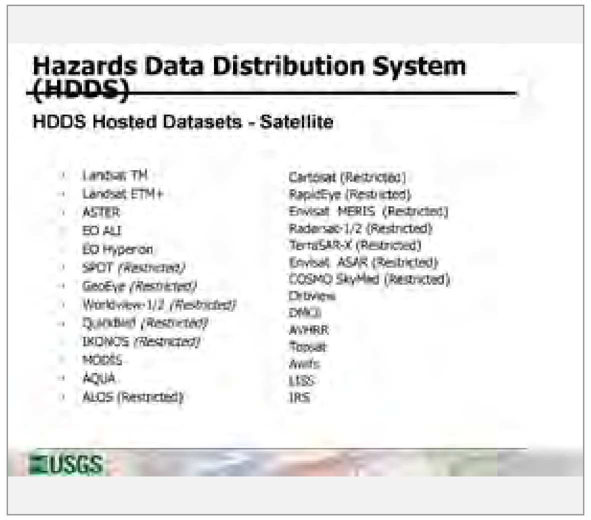

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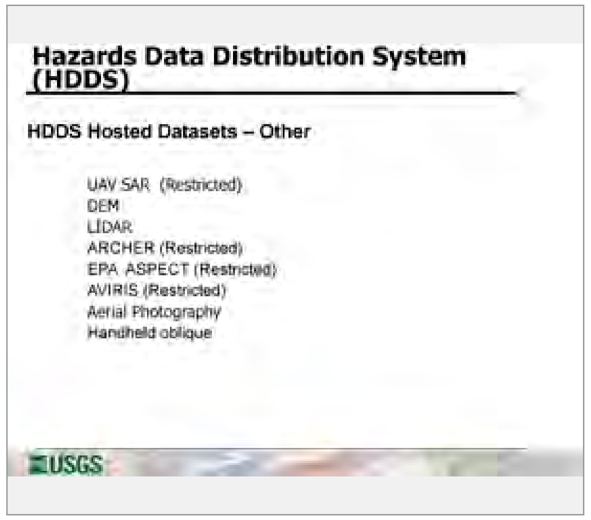

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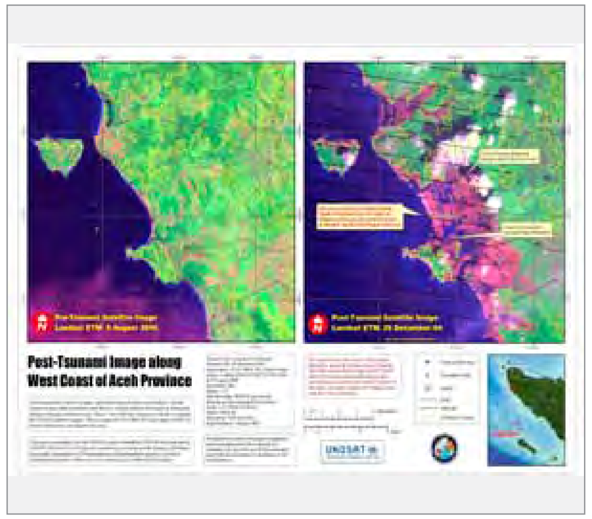

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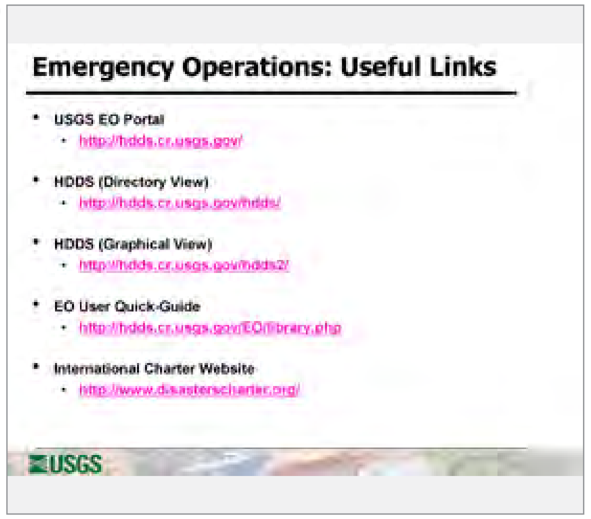

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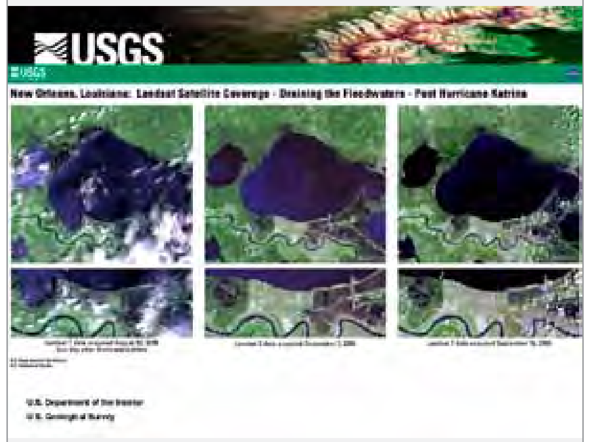

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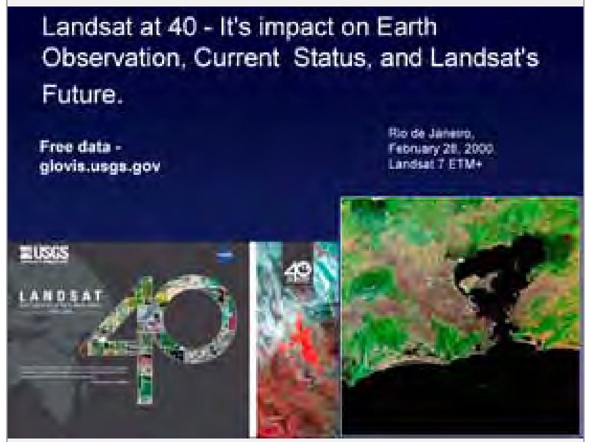

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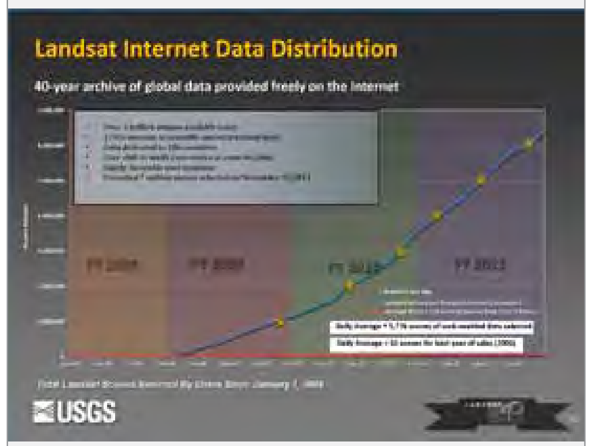

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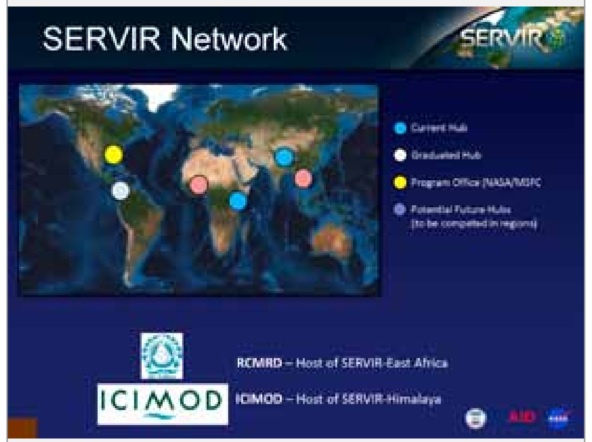

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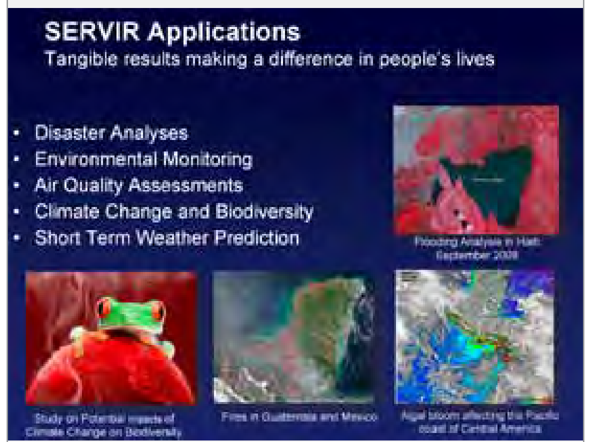

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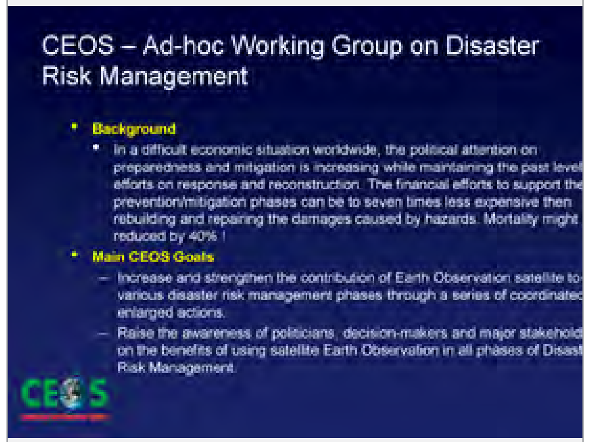

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Application of Geospatial Data and Remote Sensing Techniques for Disaster Surveillance in Chinese Taipei

Dr. Tzu-Yin CHANG, Assistant Researcher, National Science and Technology Center for Disaster Reduction

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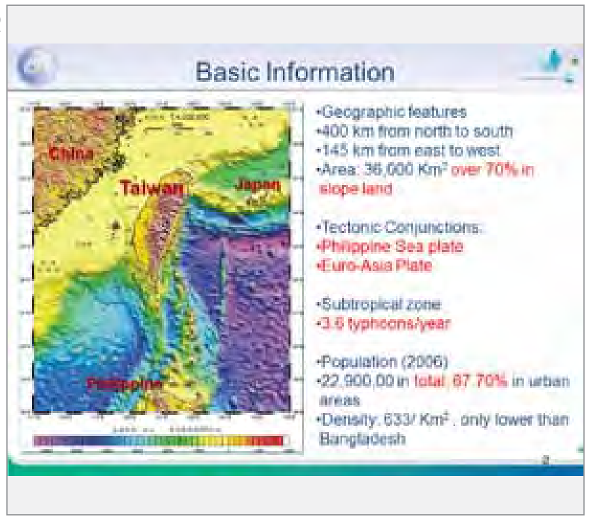

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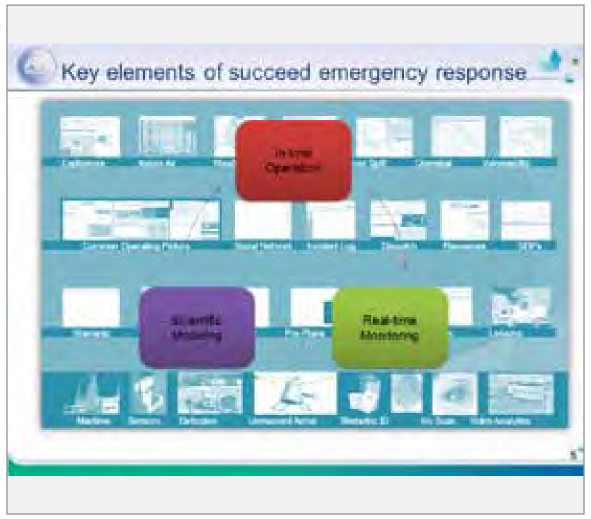

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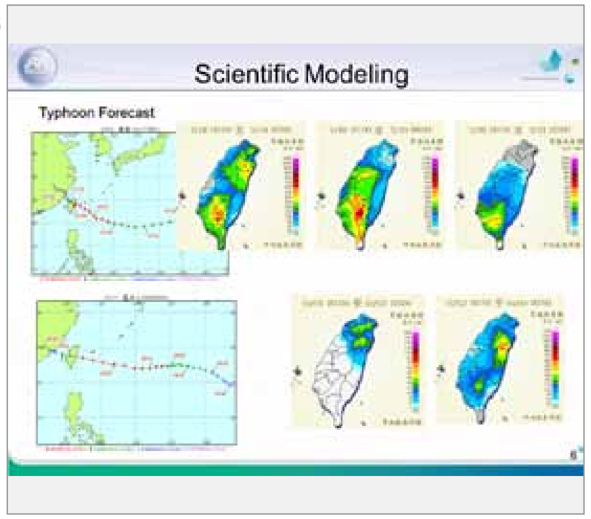

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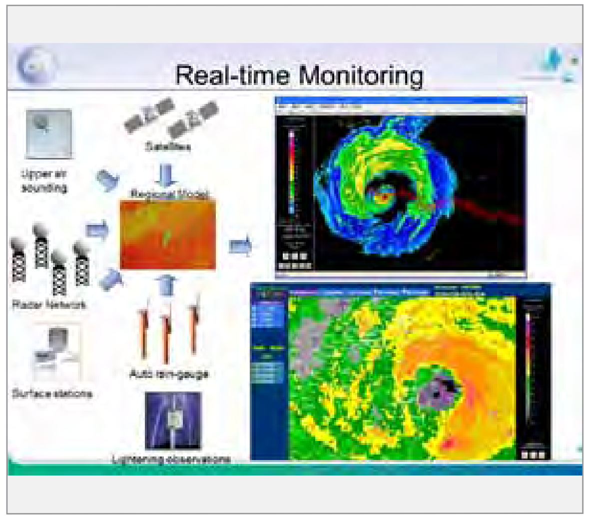

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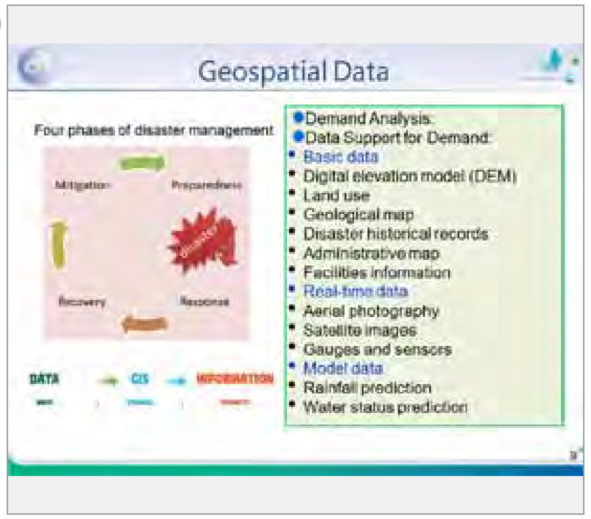

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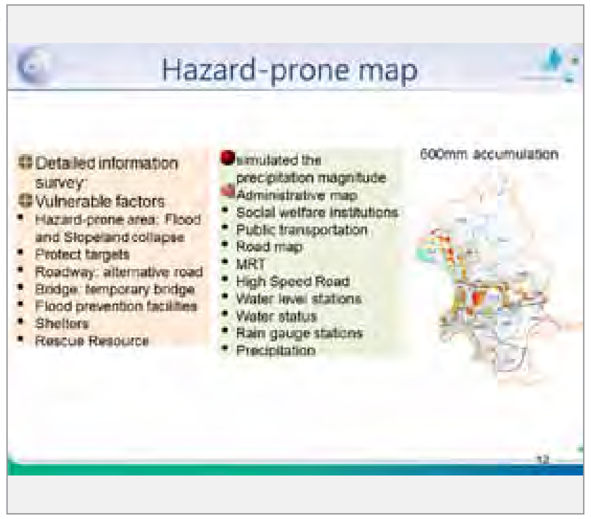

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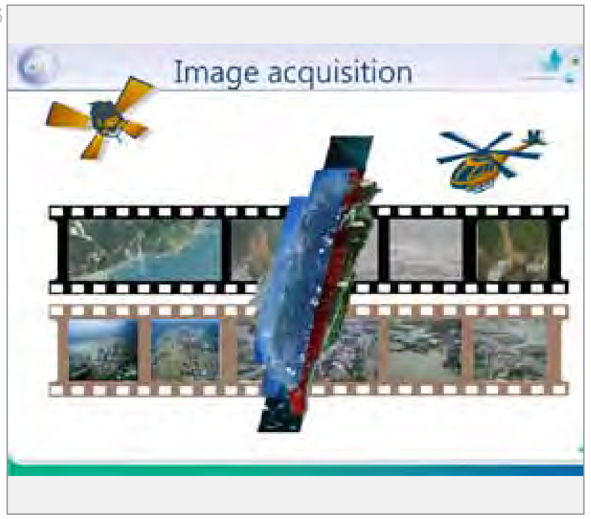

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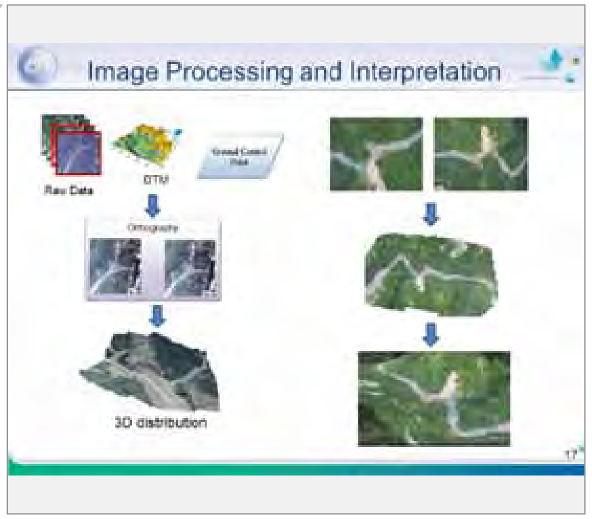

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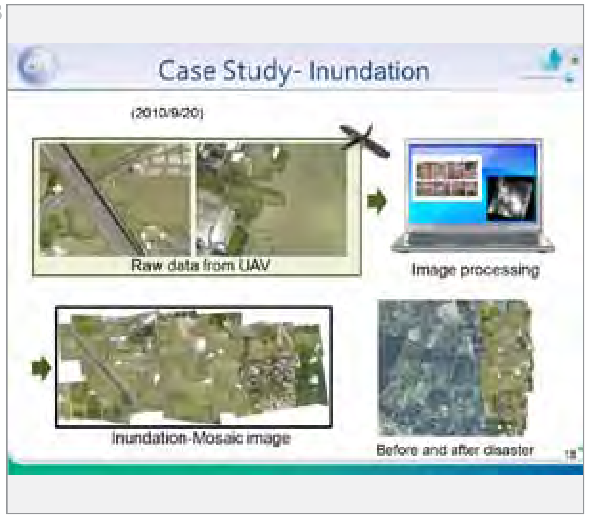

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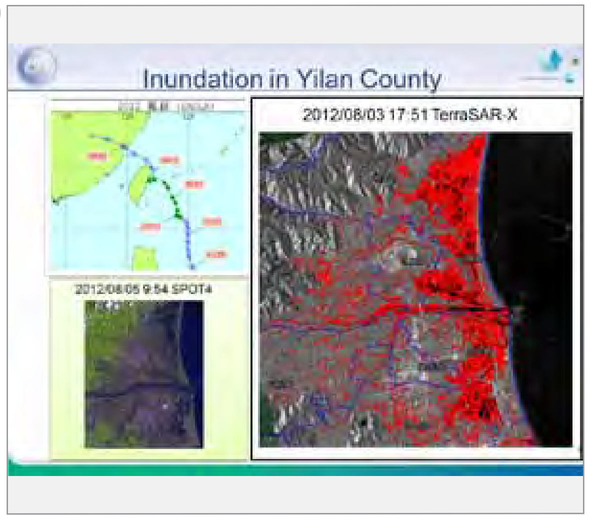

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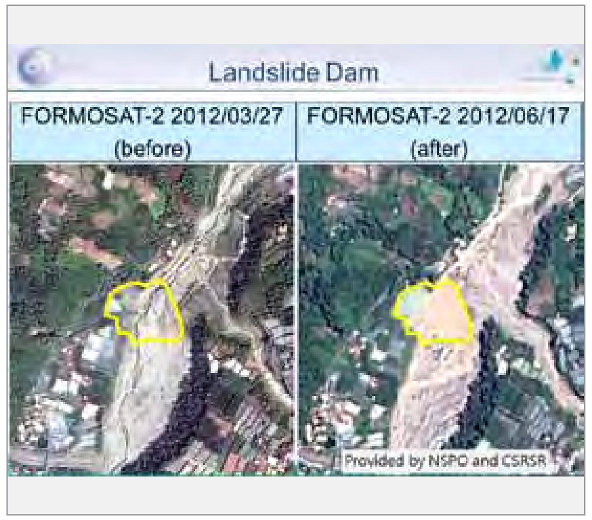

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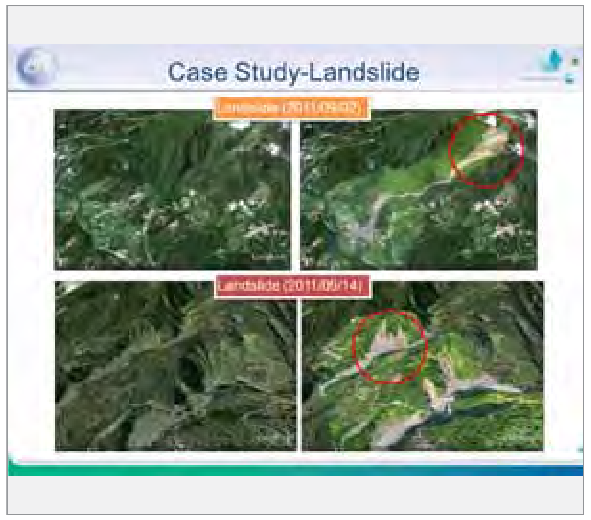

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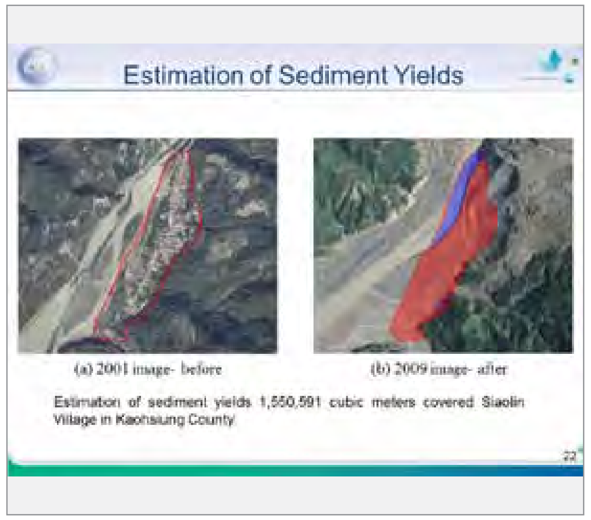

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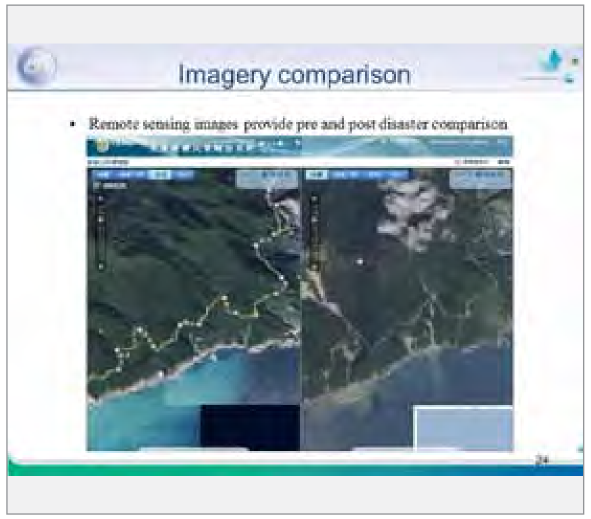

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Disaster Surveillance

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Summary

- Satellite imagery and aerial photography incorporated with GIS can give emergency officials useful information for assessment, analysis and monitoring of natural disasters from small to large regions. Therefore, to organize an emergency remote sensing group which invite related institutes join in can effectively accelerate image processing work and allow each institute to interpret based on its own specialties.
- Different disaster management phases need different geo-information. For the disaster prevention, there geo-information and remote sensing imagery can be used to detect land overuse and illegal development on hill slopes. It is also helpful to regular environment surveillance in disaster mitigation.

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Dr. Mikhail Zimin, Head of the department of geodesy and cartography, RDC SCANEX

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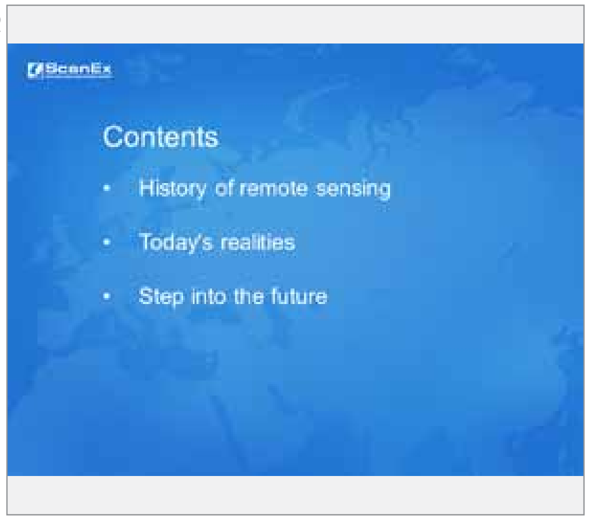

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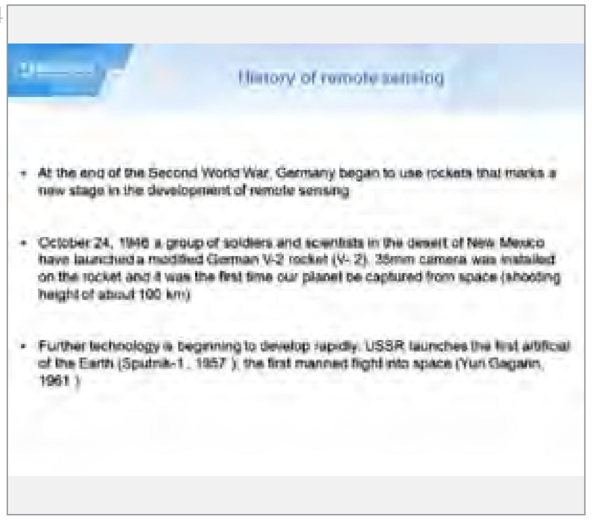

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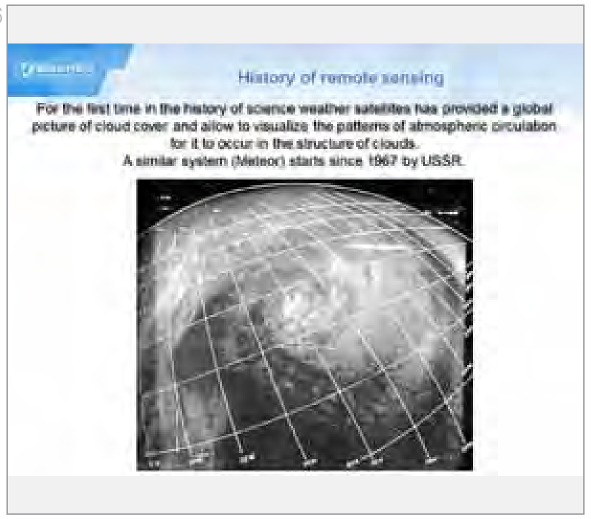

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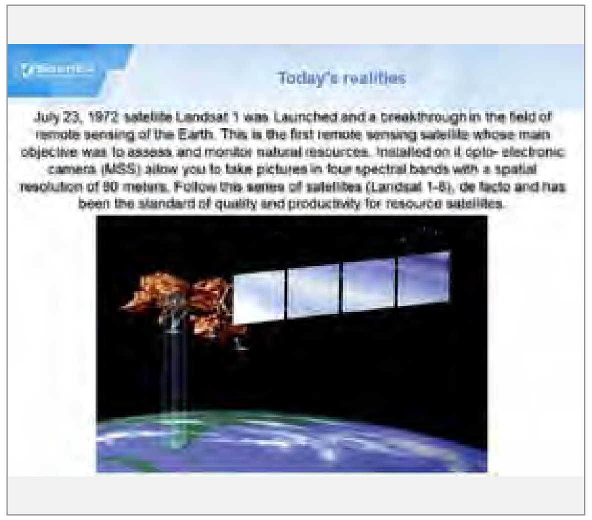

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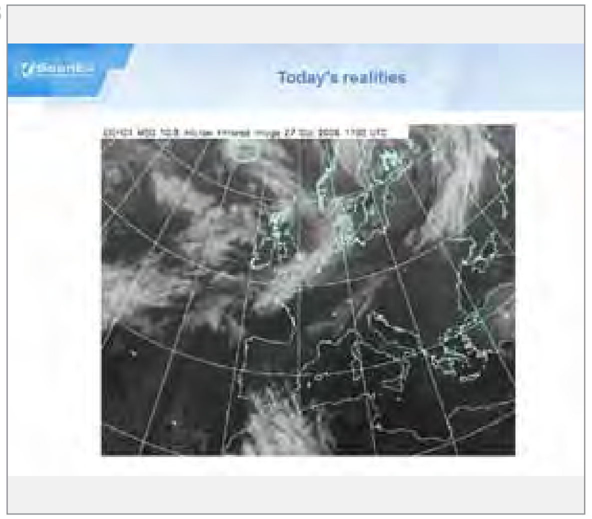

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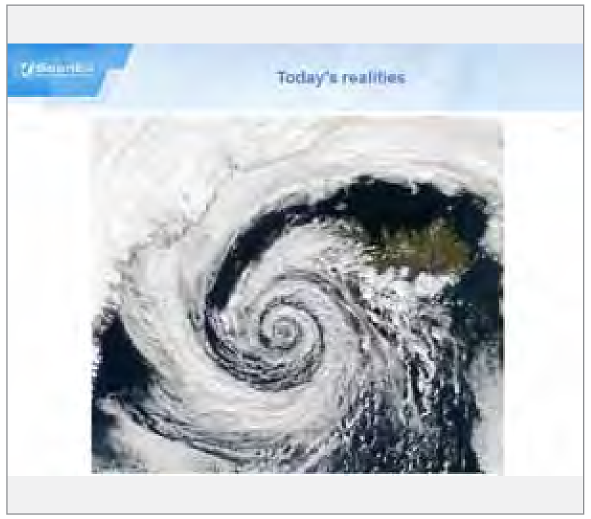

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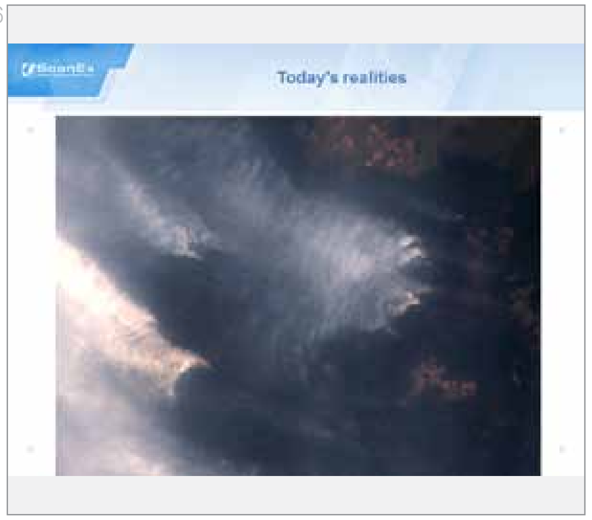

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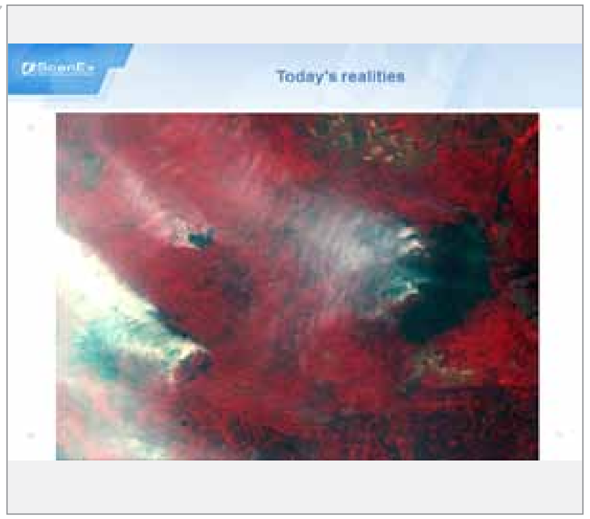

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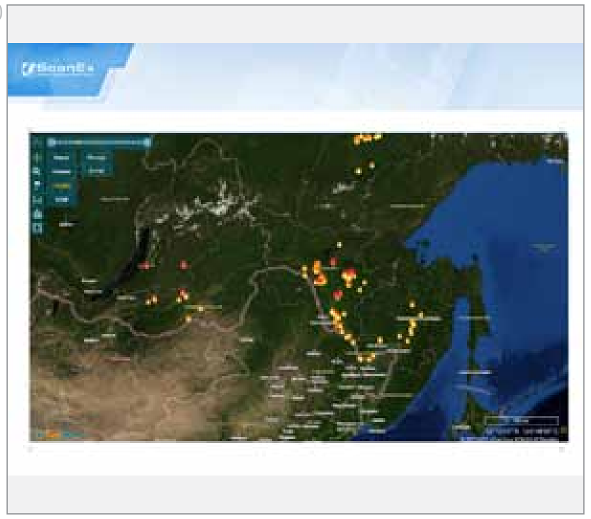

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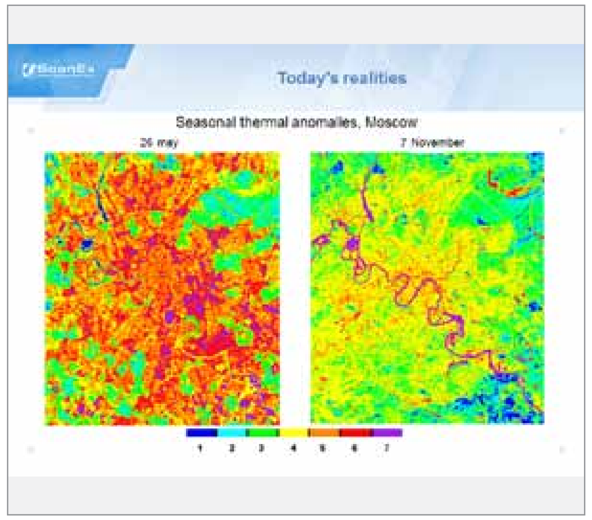

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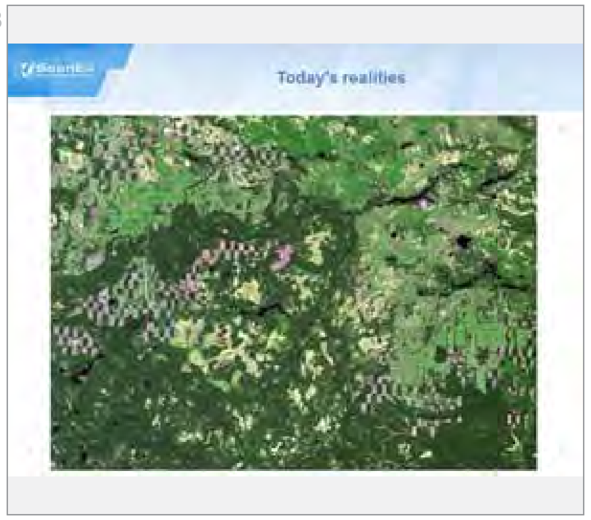

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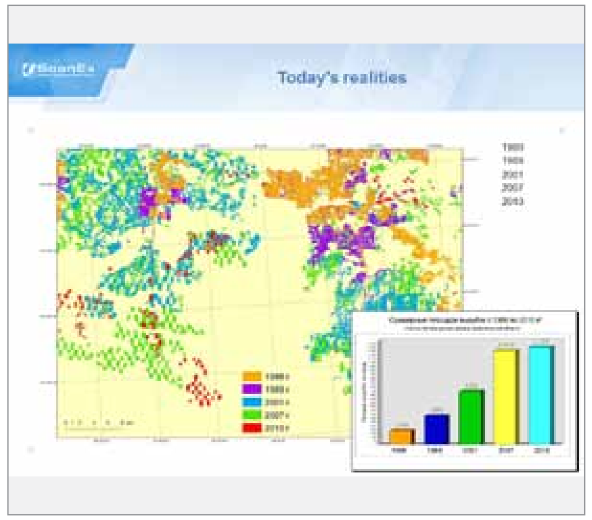

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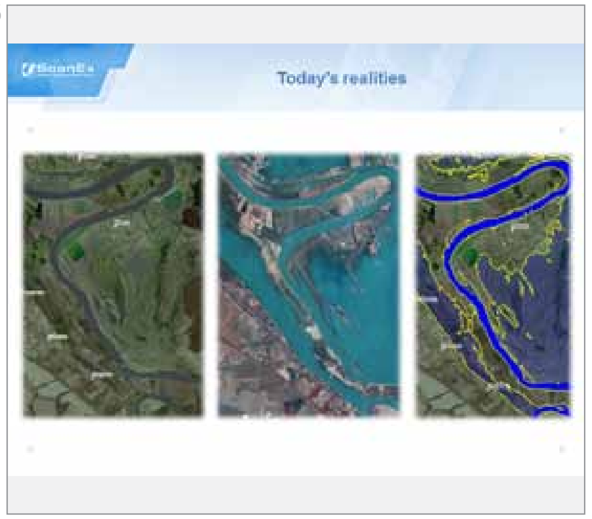

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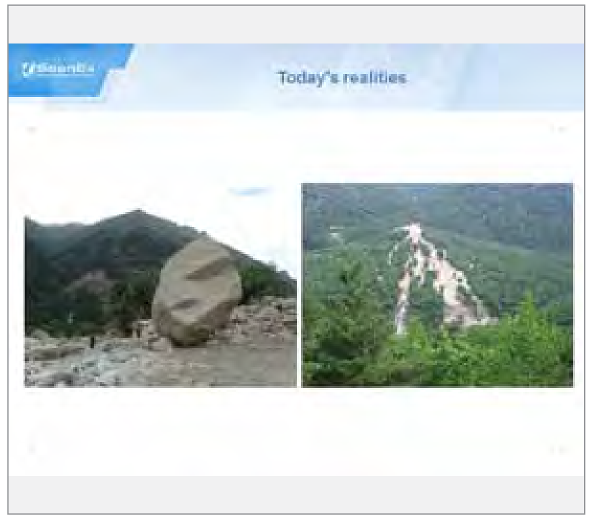

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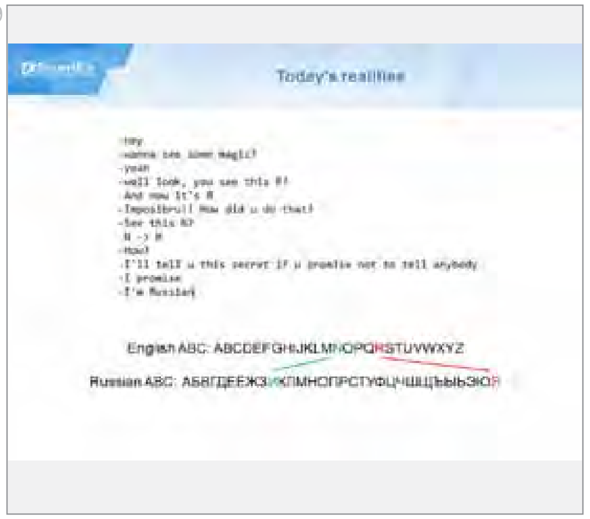

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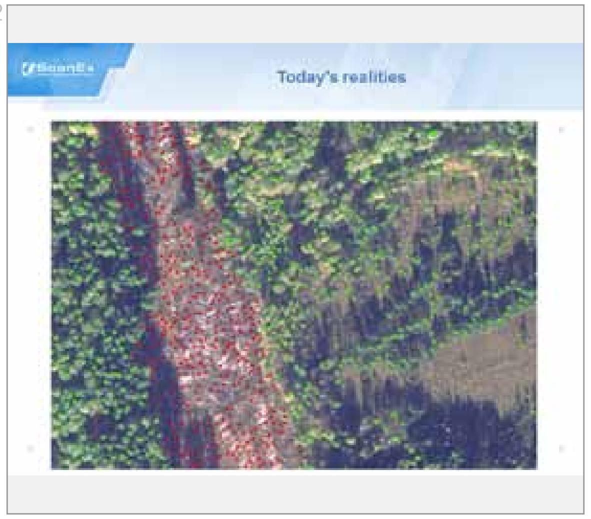

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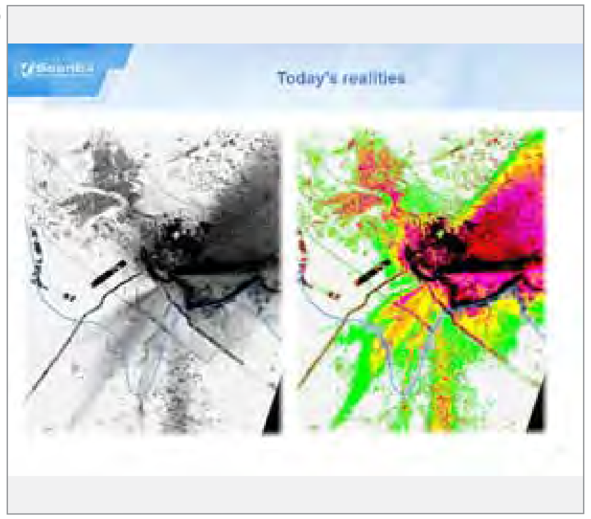

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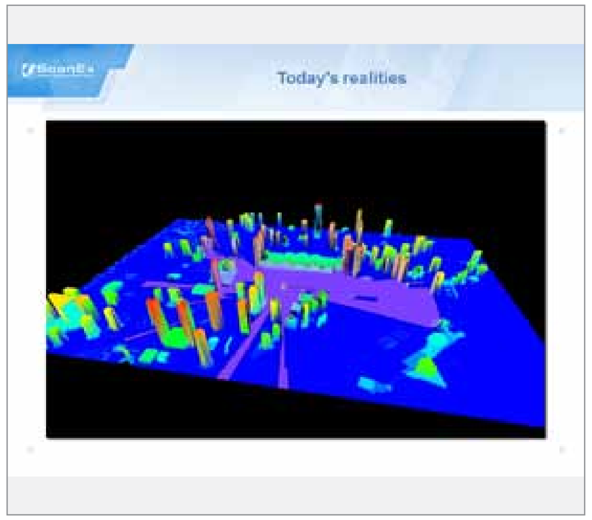

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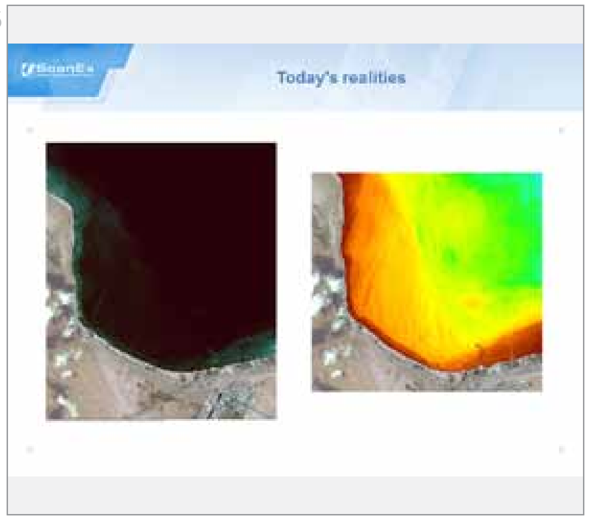

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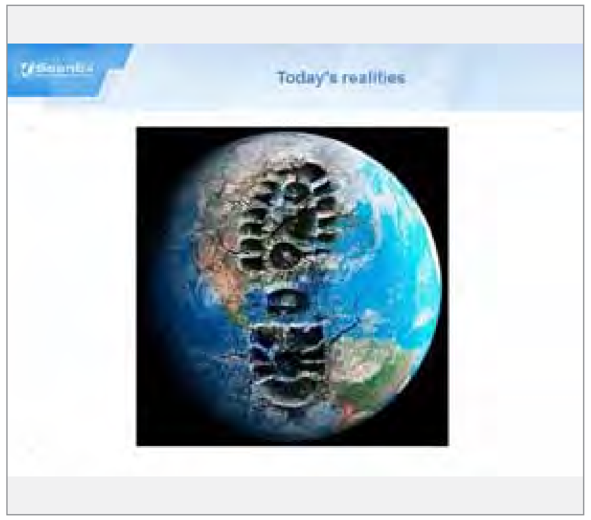

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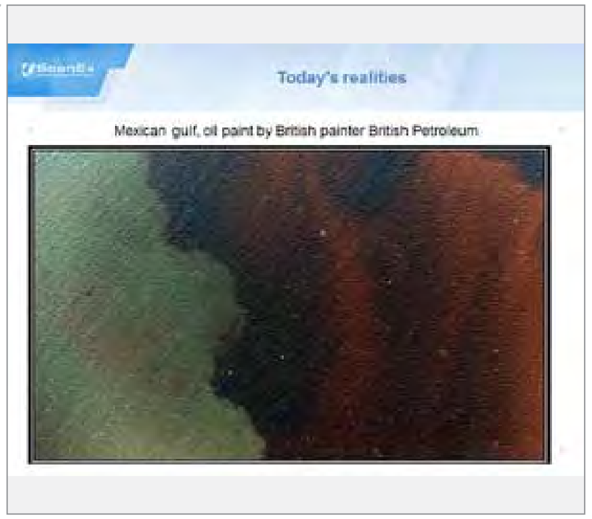

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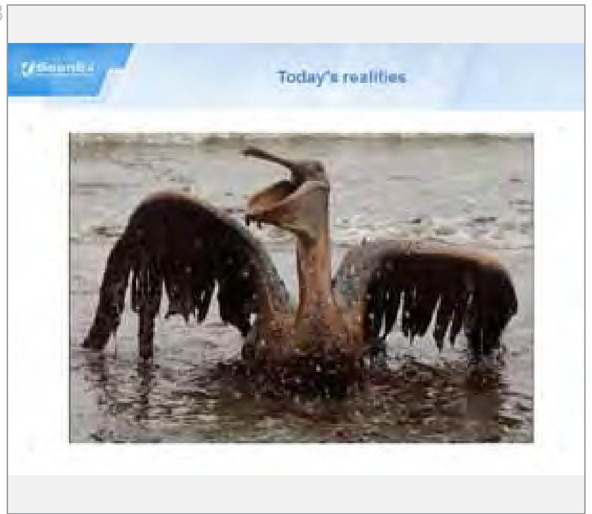

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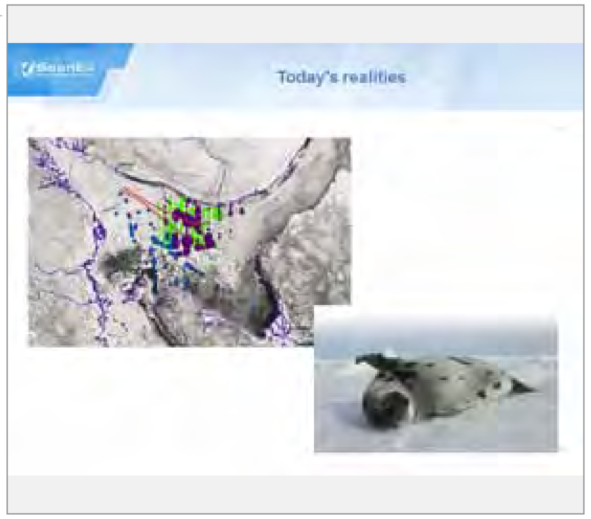

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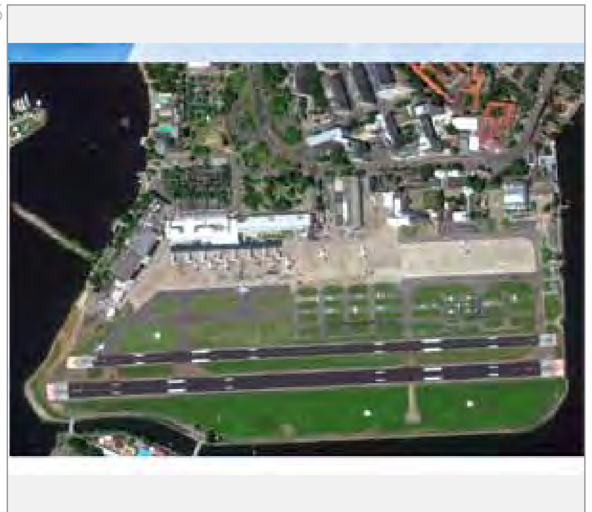

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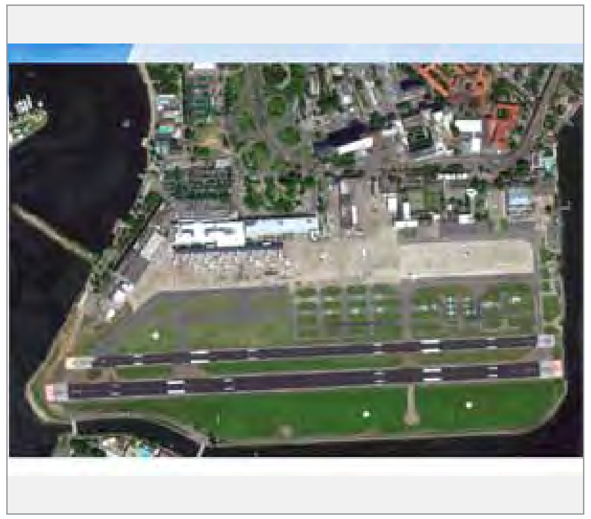

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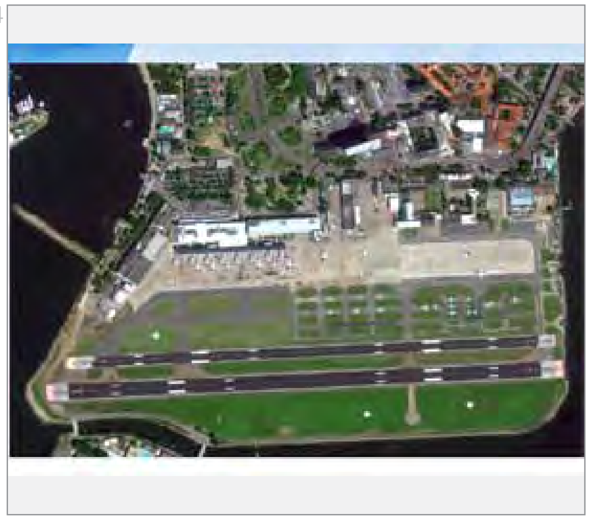

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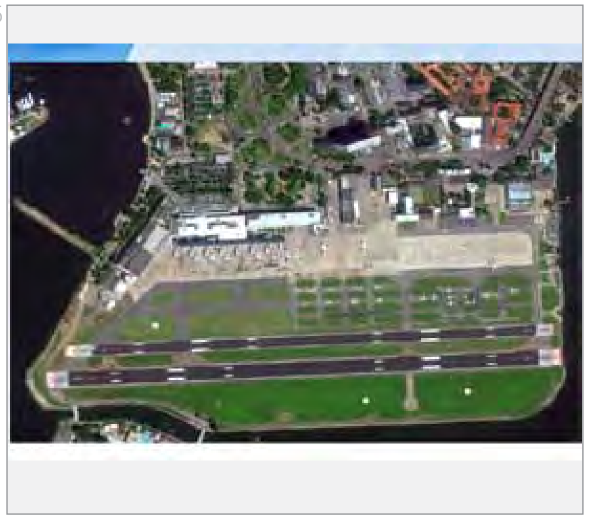

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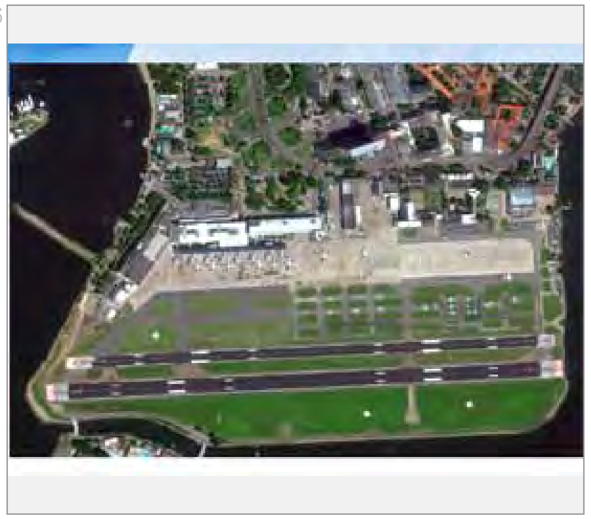

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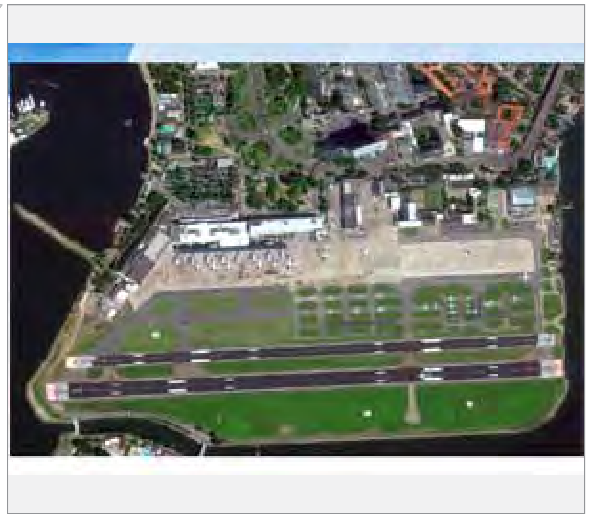

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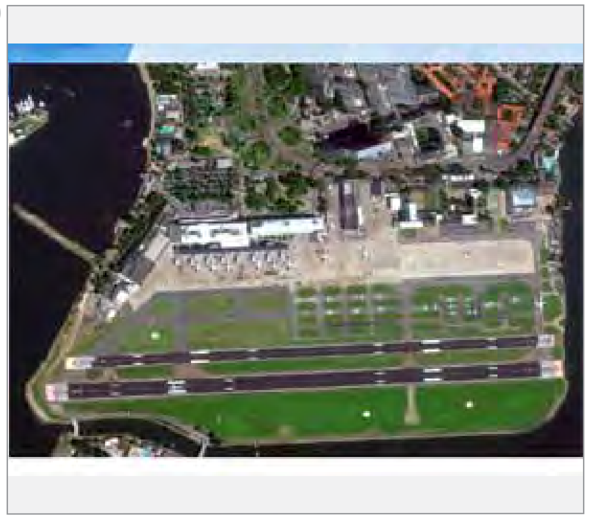

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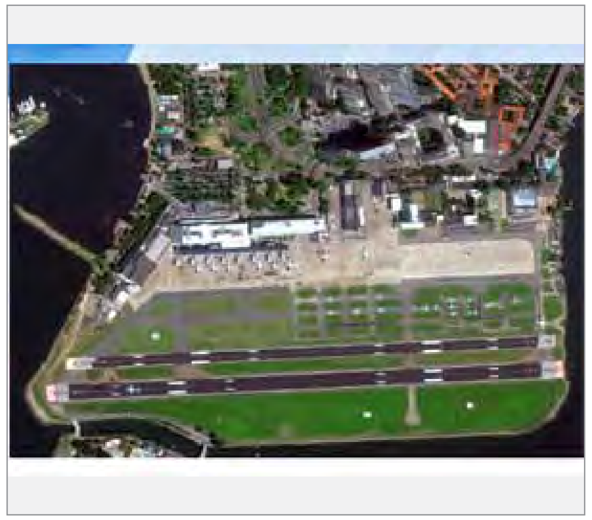

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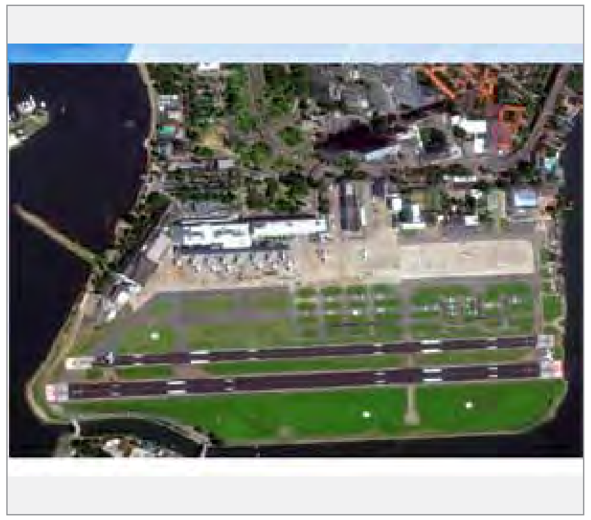

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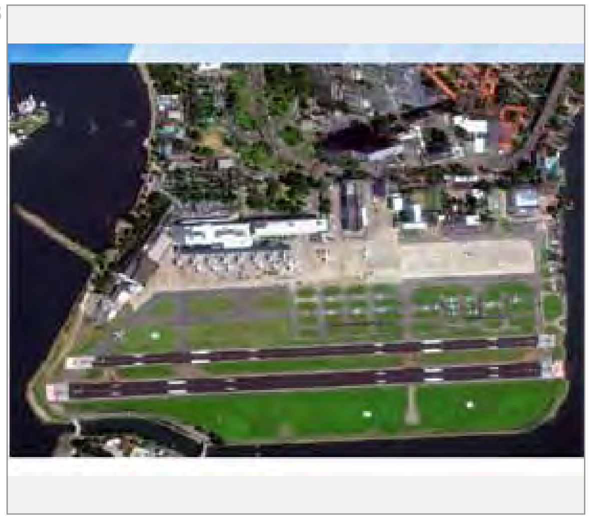

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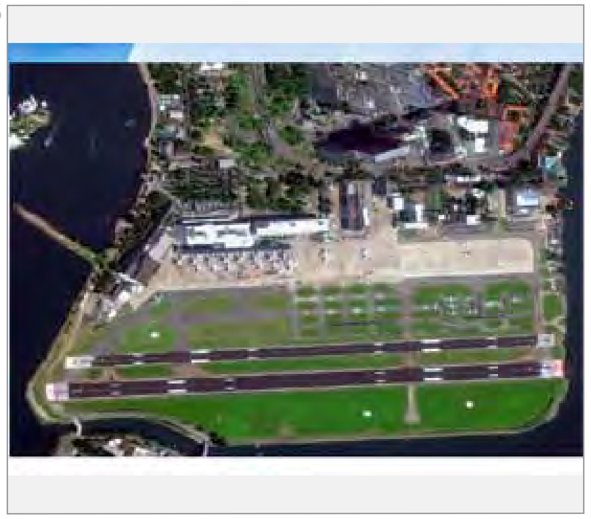

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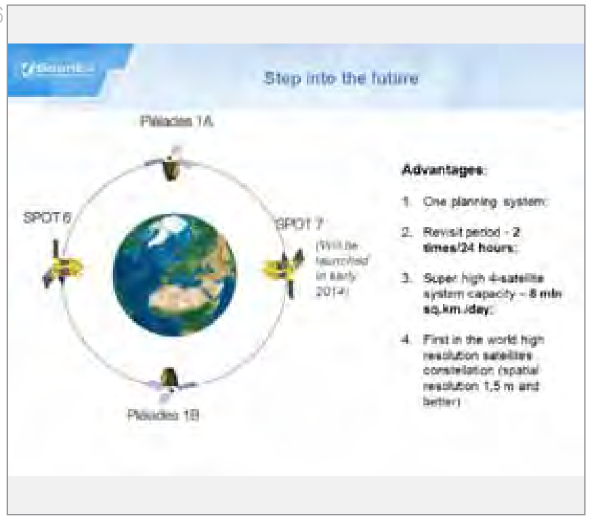
Step into the future
Pléiades 1A
SPOT 6
SPOT 7
(Will be launched in early 2014)
Pléiades 1B
Advantages:
1. One planning system;
2. Revisit period - 2 times/24 hours;
3. Super high 4-satellite system capacity – 8 mln sq.km./day;
4. First in the world high resolution satellites constellation (spatial resolution 1,5 m and better)

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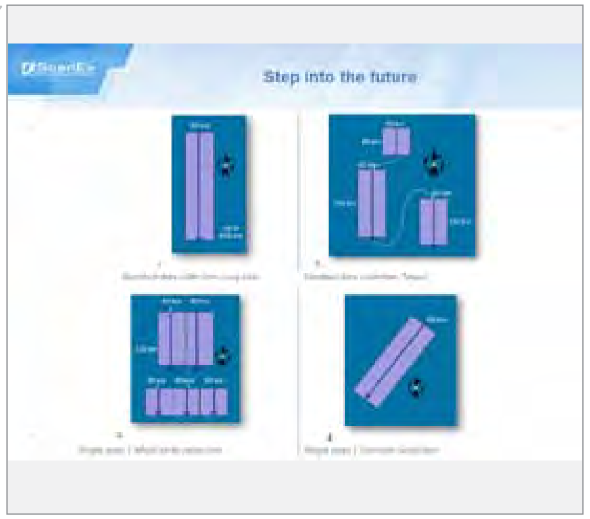
Step into the future

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Step into the future
Moscow
Megion
Irkutsk
Magadan

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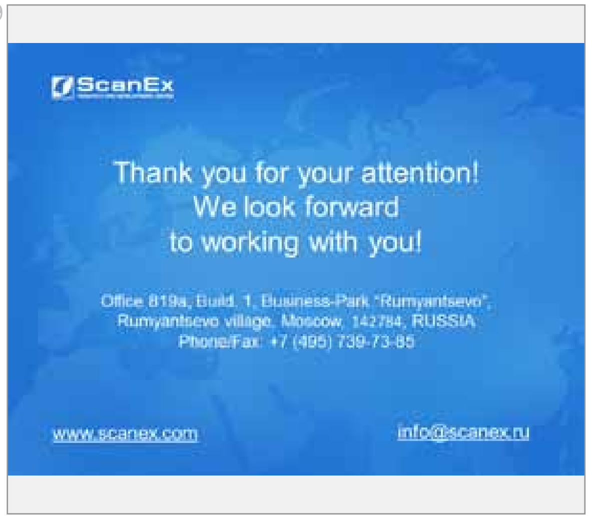
ScanEx
Thank you for your attention!
We look forward
to working with you!
Office 819a, Build. 1, Business-Park "Rumyantsevo",
Rumyantsevo village, Moscow, 142784, RUSSIA
Phone/Fax: +7 (495) 739-73-85
www.scanex.com
info@scanex.ru

Predicting natural disasters in agriculture using remote sensing data

Andrey Sarychev, Head of the department of the thematic mapping, RDC SCANEX

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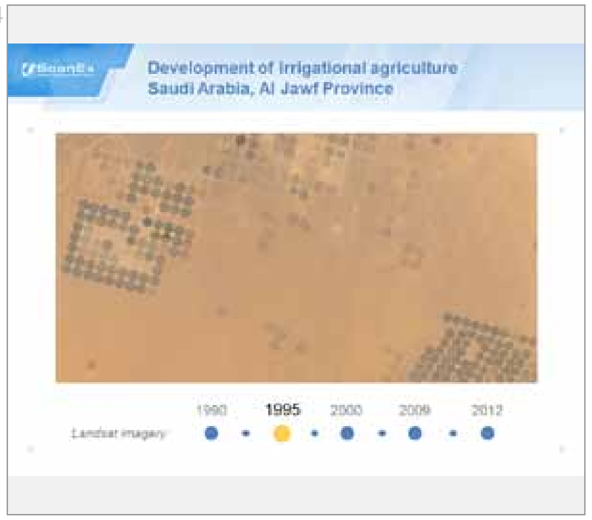

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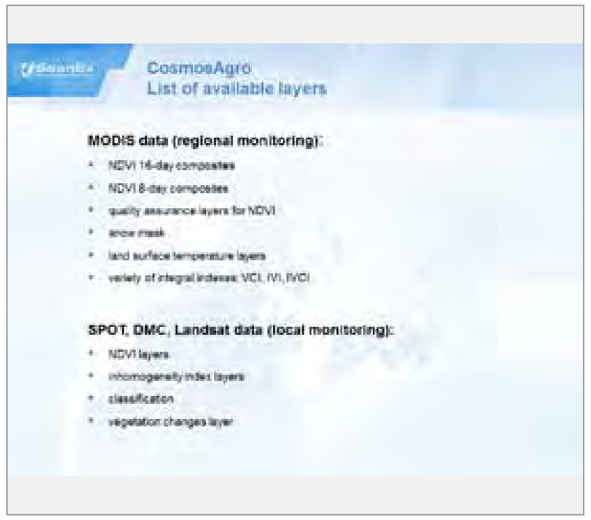

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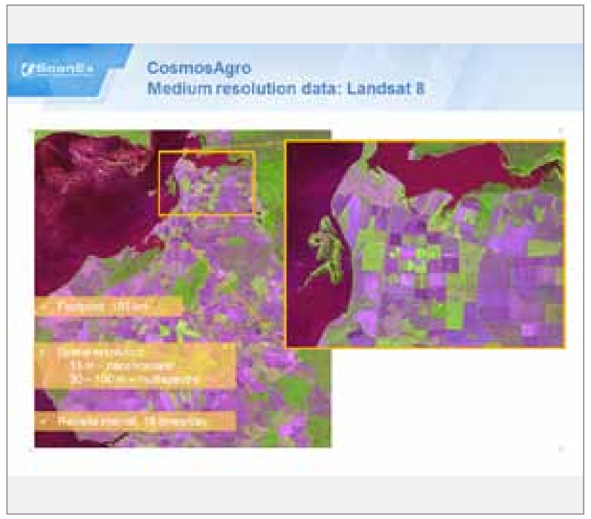

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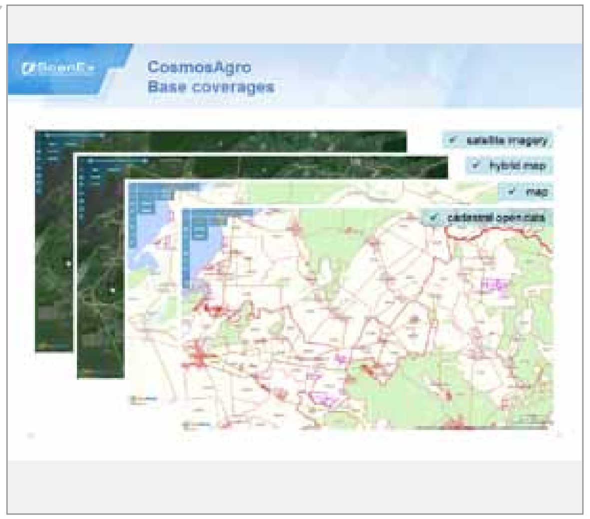

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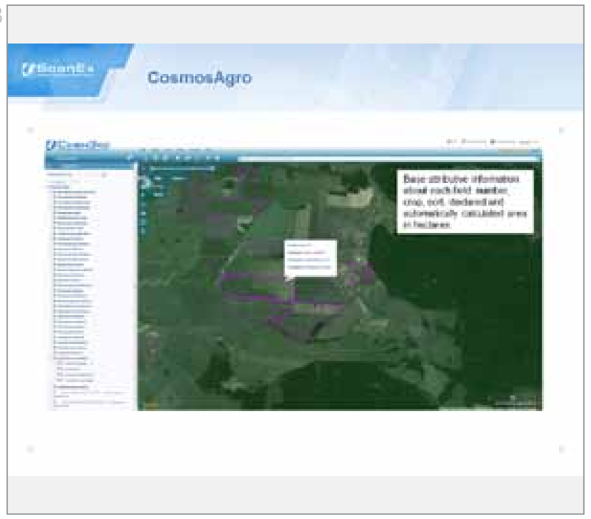

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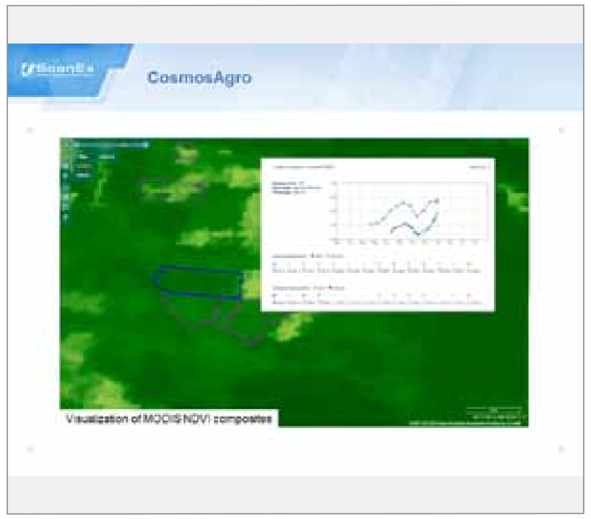

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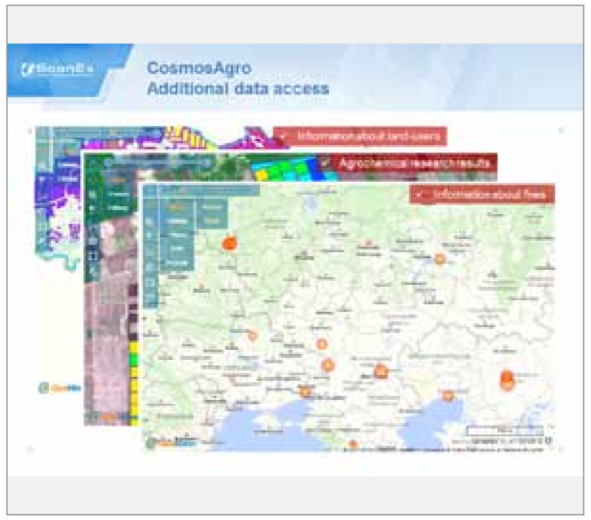

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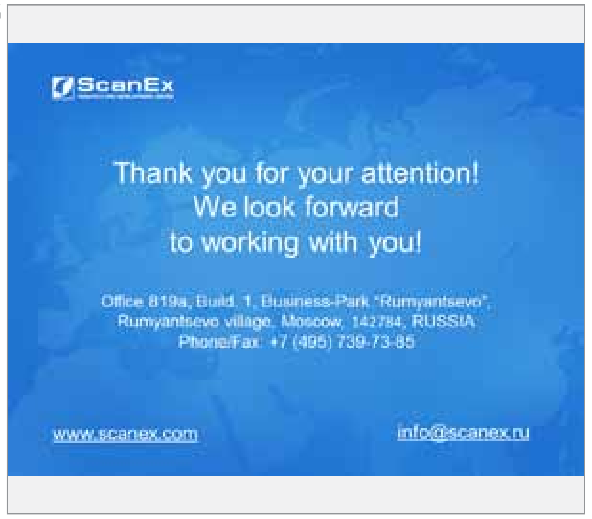

Mexican Early Warning System for Disasters

JULIO CASTILLO URDAPILLETA, Director of Space Security, Mexican Space Agency
DR. BENITO OROZCO SERNA, Director of Scientific Space Research, Mexican Space Agency

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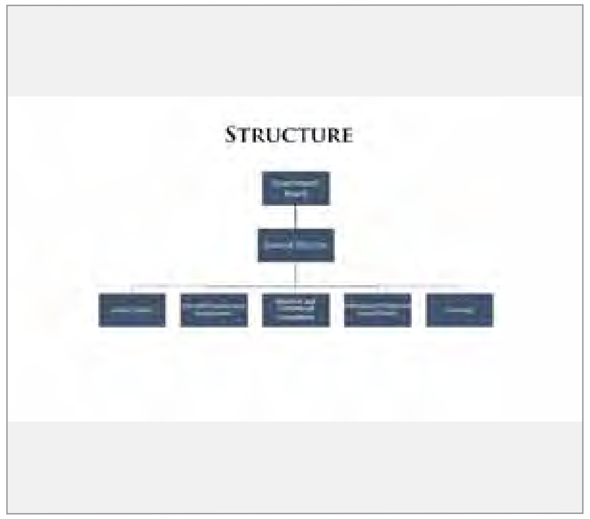

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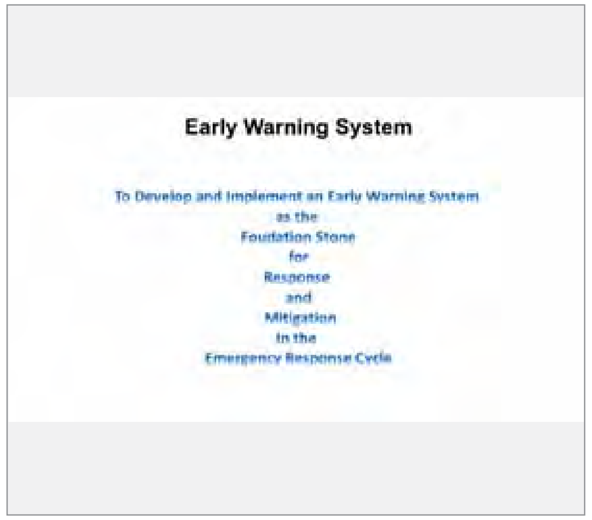

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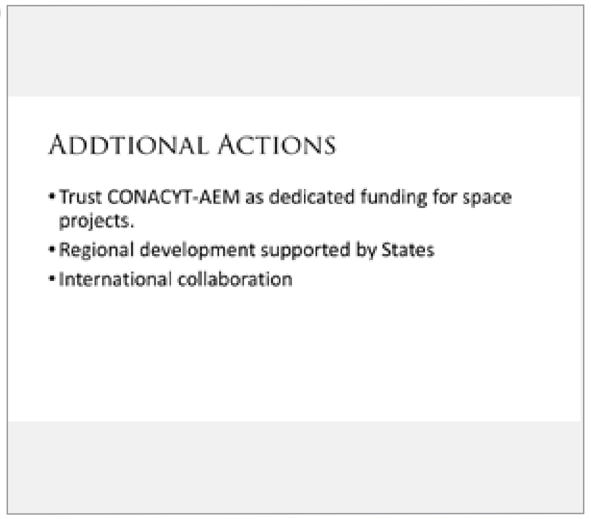

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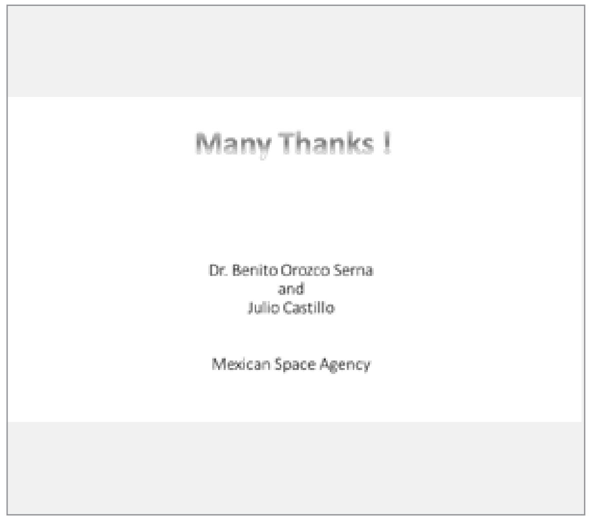

Modern and Prospective Satellite Systems and Their Application for Emergencies Preparedness, Management and Response (EPMR)

Maria Dorofeeva, Lead Specialist, Operational Satellite Monitoring Group, RDC SCANEX

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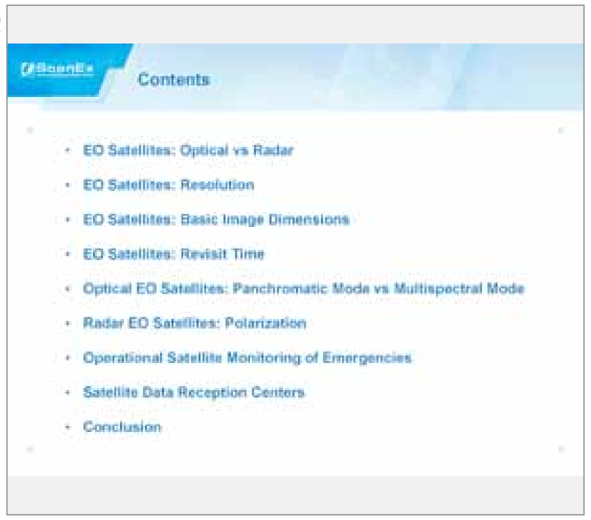

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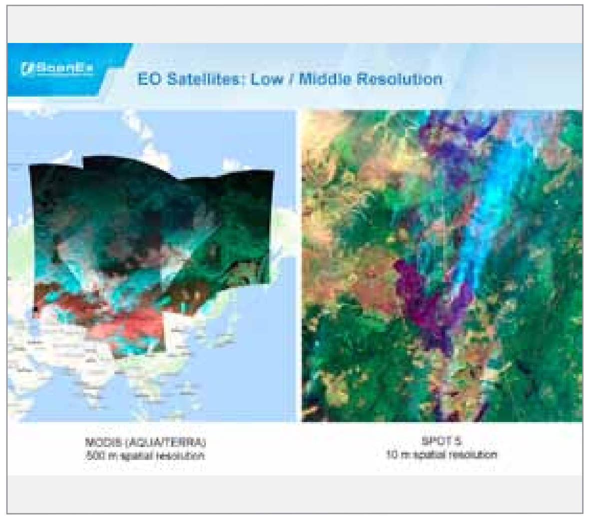

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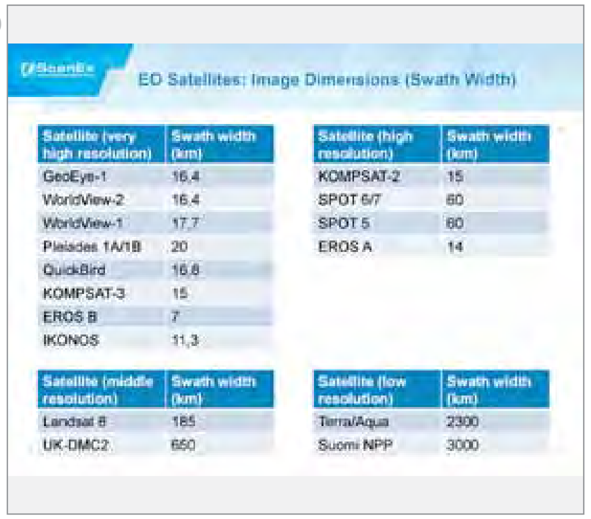

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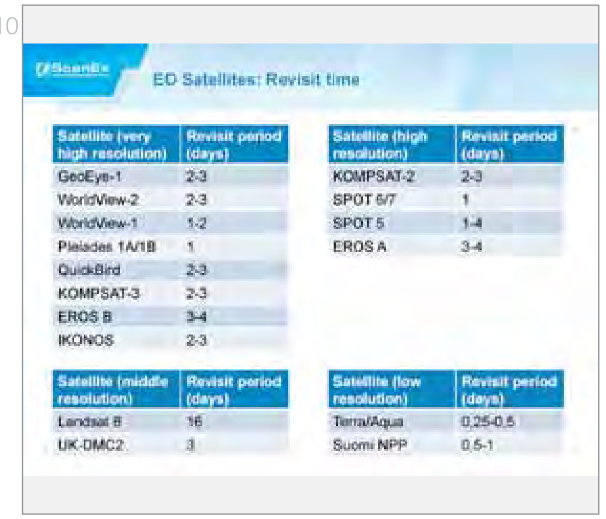

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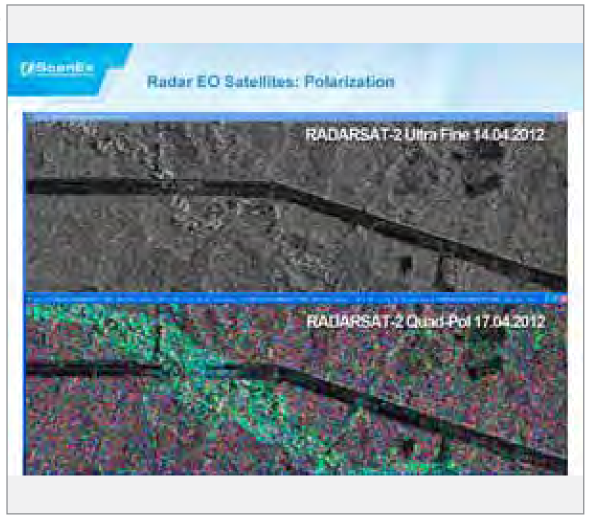

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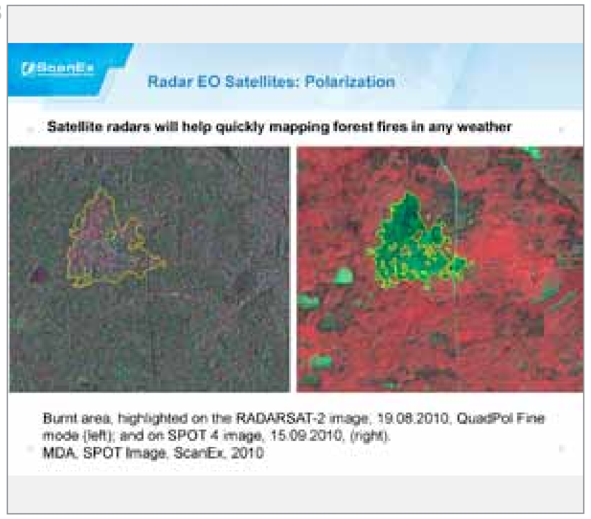

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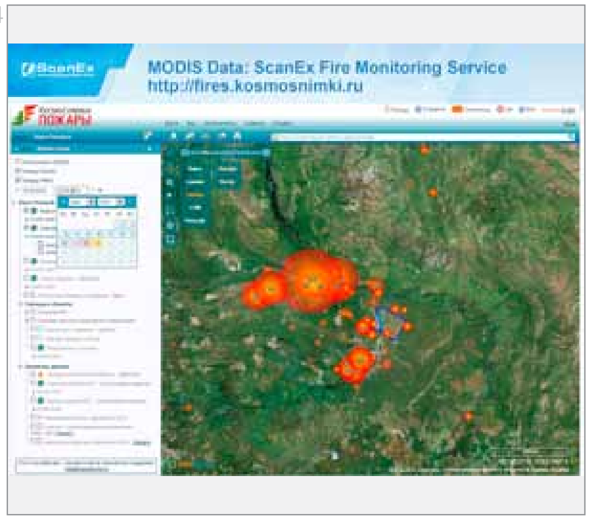

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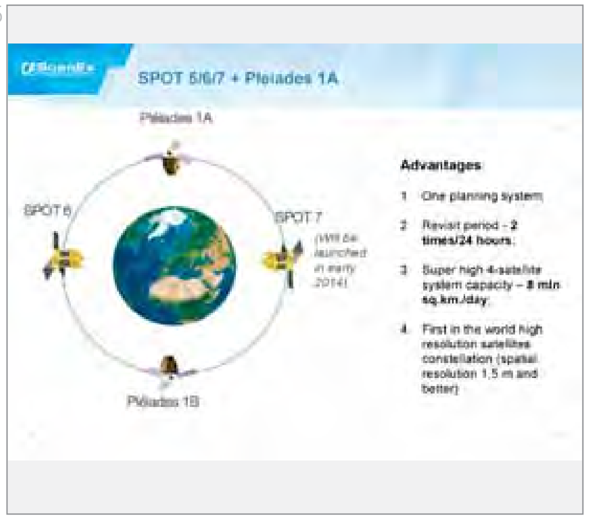

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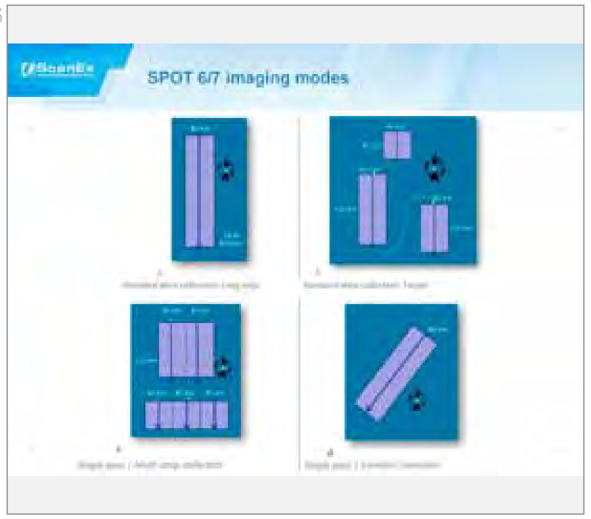

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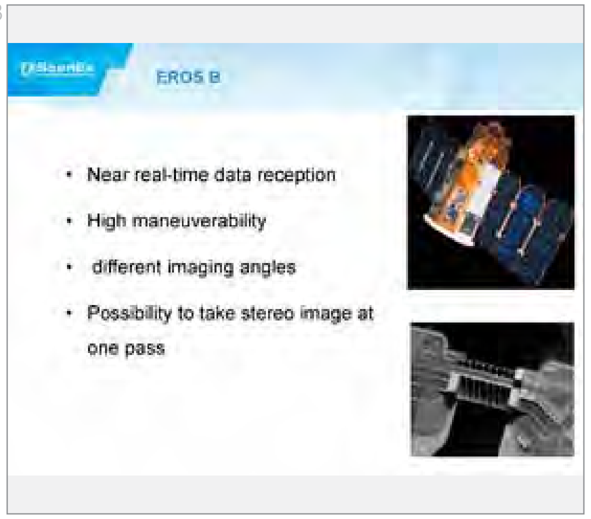

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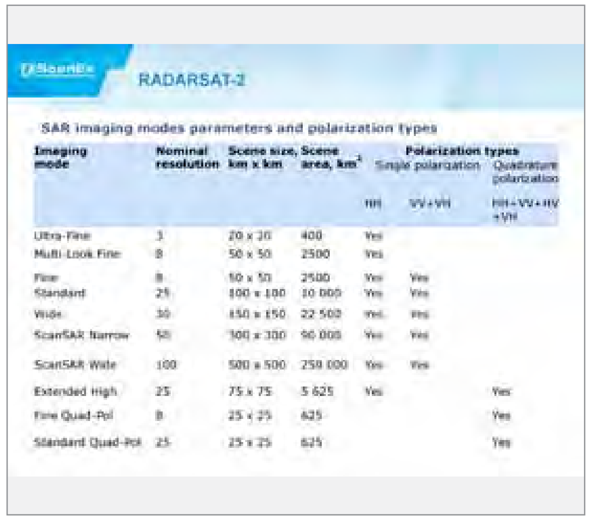

Imaging mode	Nominal resolution	Scene size, km x km	Scene area, km^2	Polarization types: Single polarization HH	VV+VH	Quadrature polarization HH+VV+HV+VH
Ultra-Fine	3	20 x 20	400	Yes		
Multi-Look Fine	8	50 x 50	2500	Yes		
Fine	8	50 x 50	2500	Yes	Yes	
Standard	25	100 x 100	10 000	Yes	Yes	
Wide	30	150 x 150	22 500	Yes	Yes	
ScanSAR Narrow	50	300 x 300	90 000	Yes	Yes	
ScanSAR Wide	100	500 x 500	250 000	Yes	Yes	
Extended High	25	75 x 75	5 625	Yes		Yes
Fine Quad-Pol	8	25 x 25	625			Yes
Standard Quad-Pol	25	25 x 25	625			Yes

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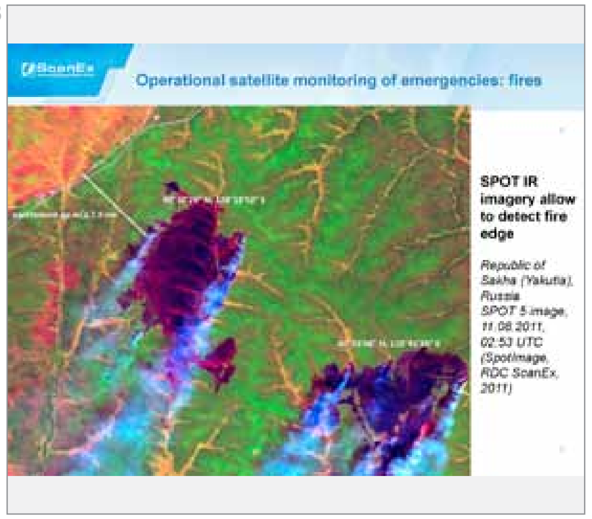

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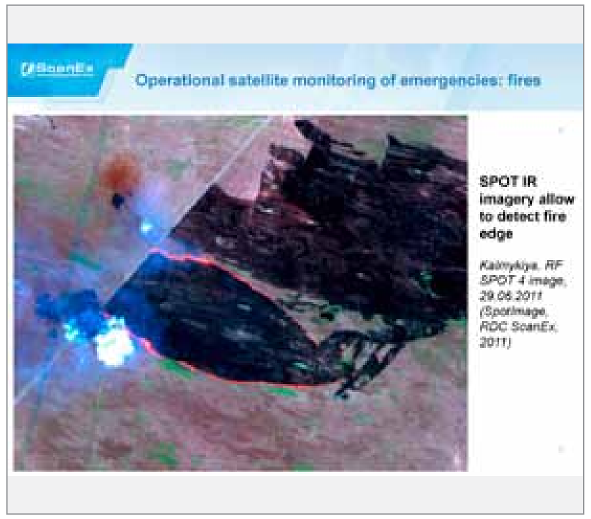

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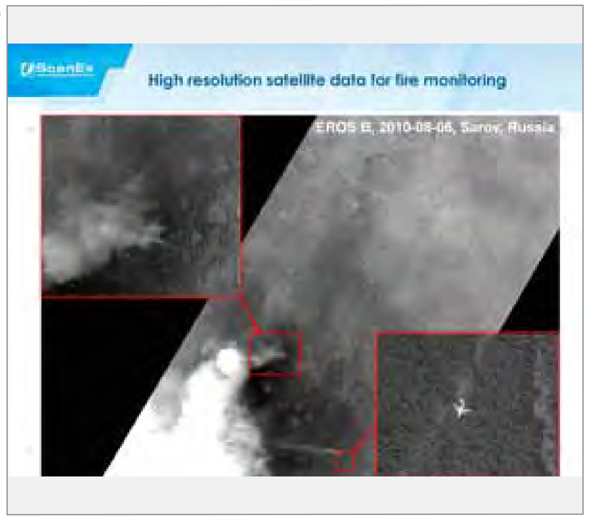

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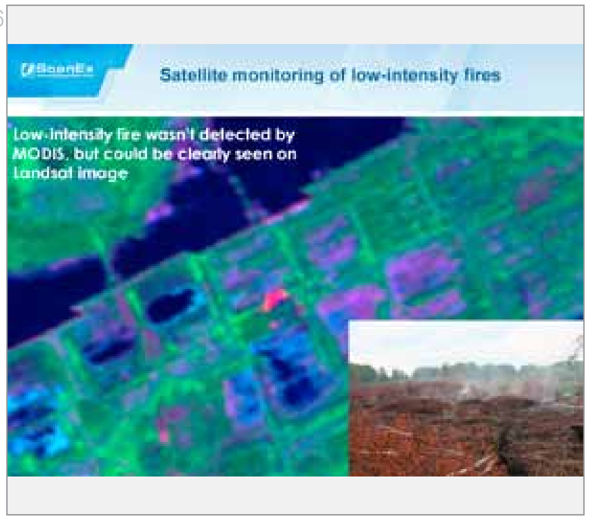

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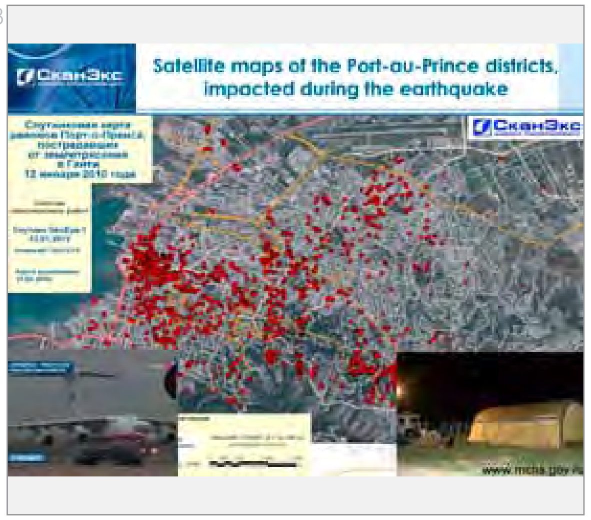

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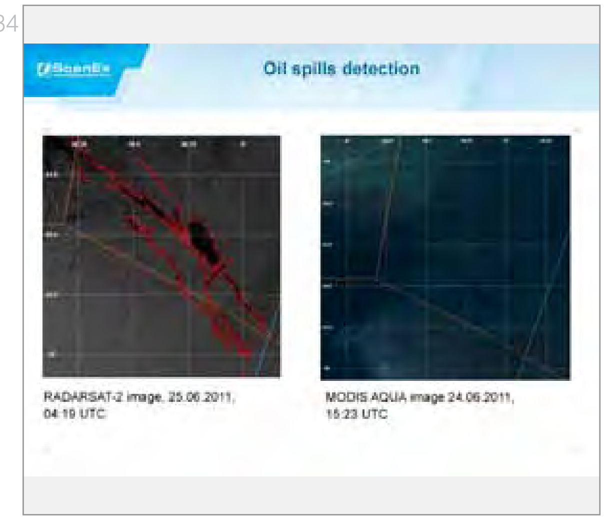

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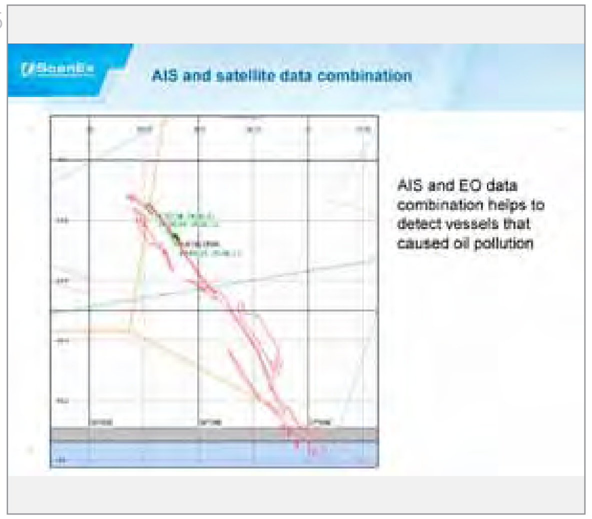

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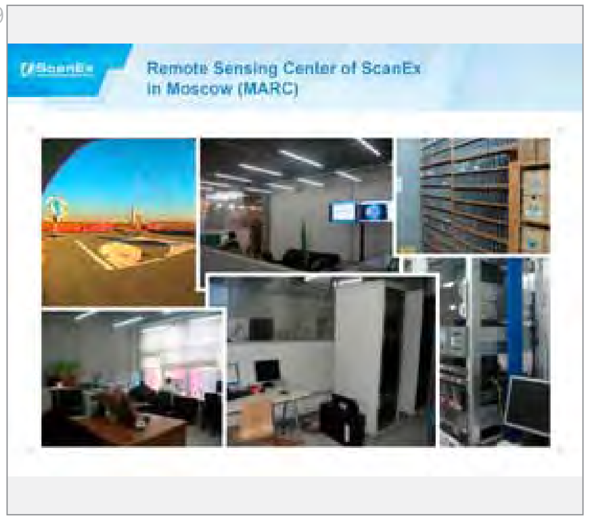

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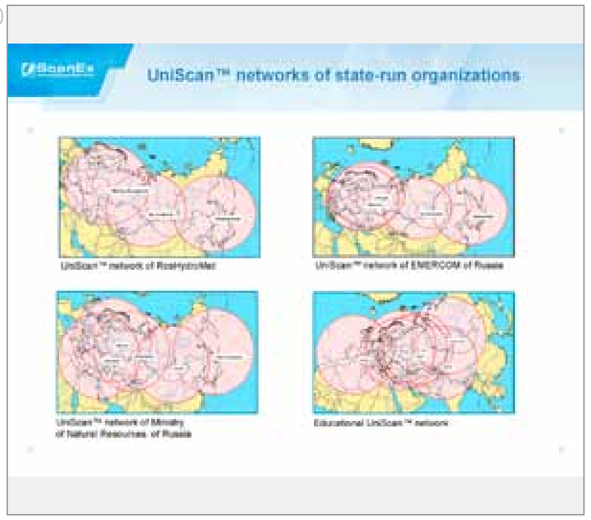

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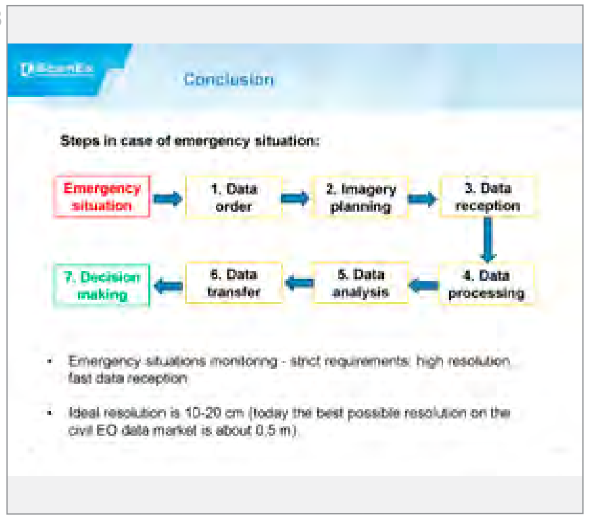

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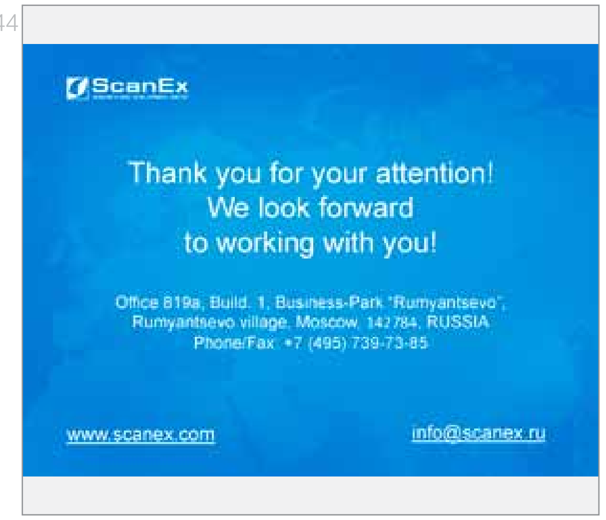

Satellite monitoring as basis of expeditious control of sea water areas

Natalia Filimonova, Unit head, RDC SCANEX

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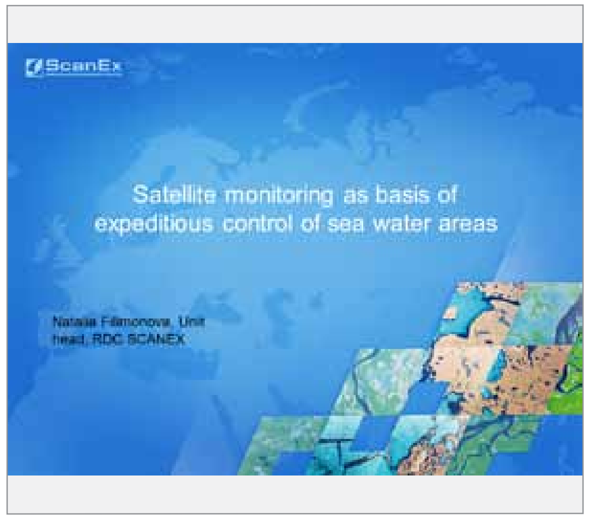

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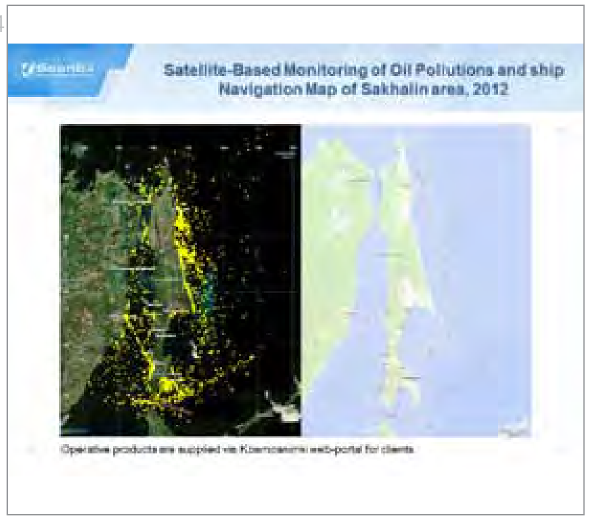

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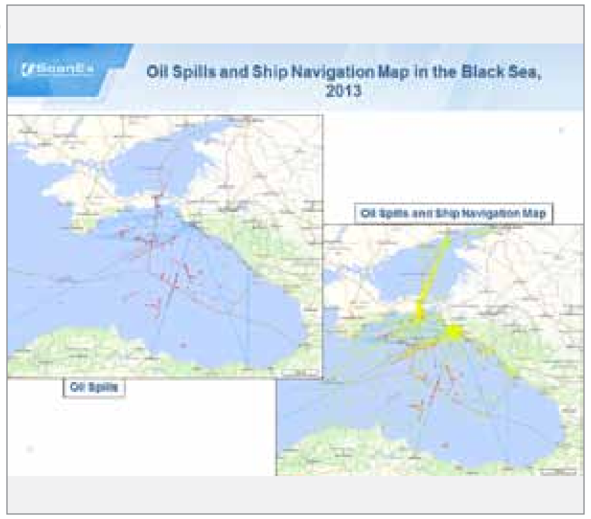

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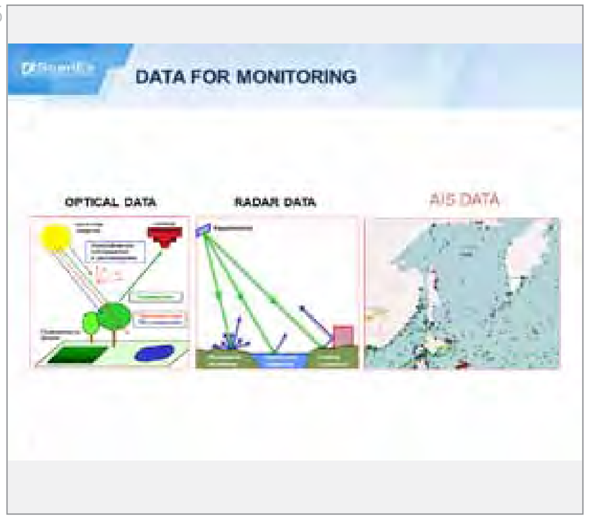

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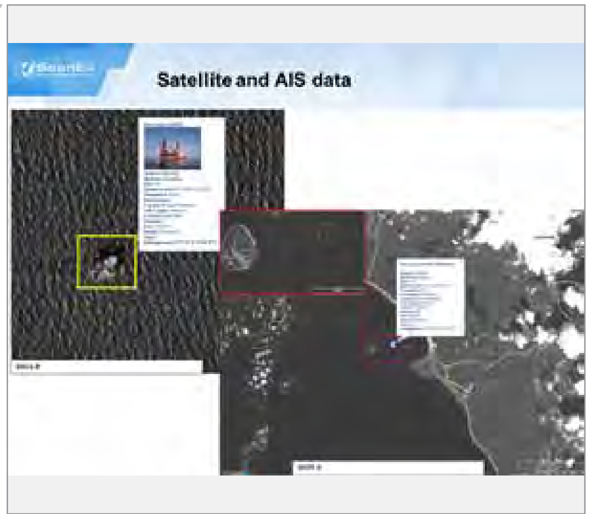

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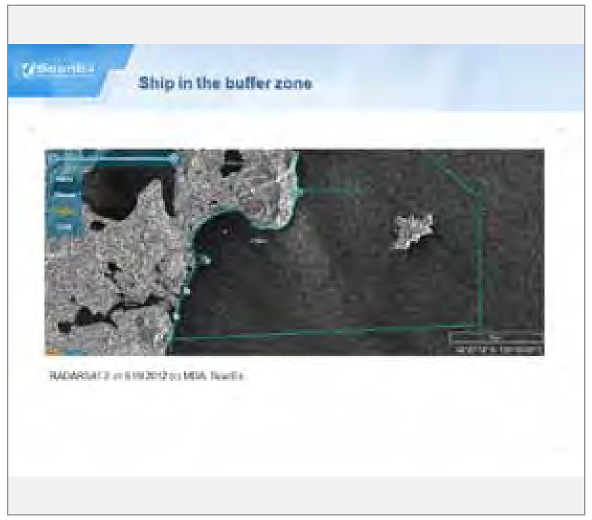

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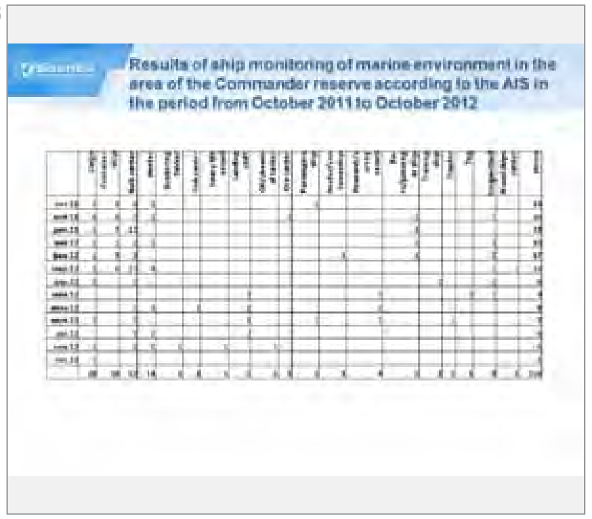

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The program interface Global Scan-Drifter-
"SCAN-DRIFTER"

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Oil Spill Modeling
Oil Slick RADARSAT-1
Oil Slick _ENVISAT-1
The combination of data:
Red –oil slick at 03:43UTC
Green at 07:52UTC,
Pink points – oil slick modeling after 5 hours.

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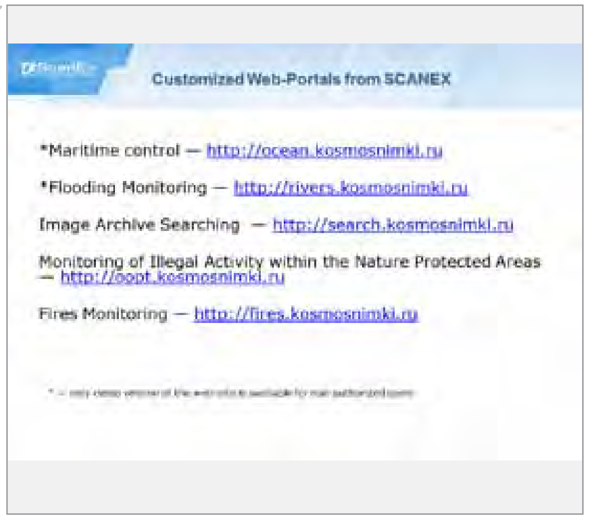

Customized Web-Portals from SCANEX
*Maritime control — http://ocean.kosmosnimki.ru
*Flooding Monitoring — http://rivers.kosmosnimki.ru
Image Archive Searching — http://search.kosmosnimki.ru
Monitoring of Illegal Activity within the Nature Protected Areas — http://oopt.kosmosnimki.ru
Fires Monitoring — http://fires.kosmosnimki.ru

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Conclusions
✓ ScanEx makes extensive use of satellite imagery for operational monitoring of sea areas
✓ ScanNet technology and GeoMixer significantly improve its efficiency and effectiveness
✓ WEB - interface organizes indoor multi-user access to timely and objective information
✓ Integrated use of the data to minimize the risks.
✓ Satellite monitoring is an effective source of information about the marine waters

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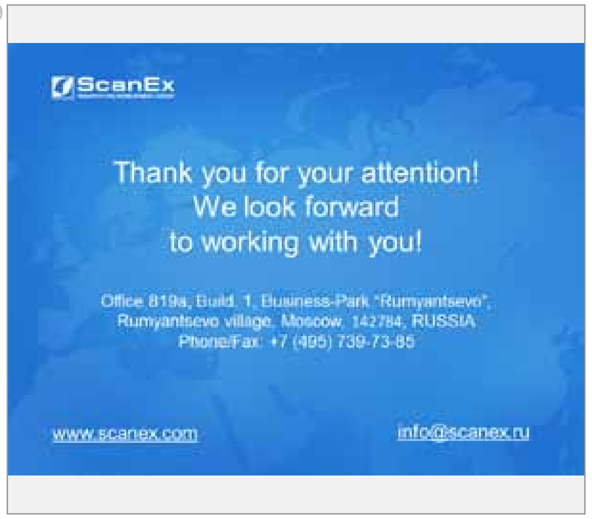

ScanEx
Thank you for your attention!
We look forward
to working with you!
Office 819a, Build. 1, Business-Park "Rumyantsevo",
Rumyantsevo village, Moscow, 142784, RUSSIA
Phone/Fax: +7 (495) 739-73-85
www.scanex.com
info@scanex.ru

Near real-time identification of adverse forest effect using remote sensing data

Andrey Sarychev, Head of the department of the thematic mapping, RDC SCANEX

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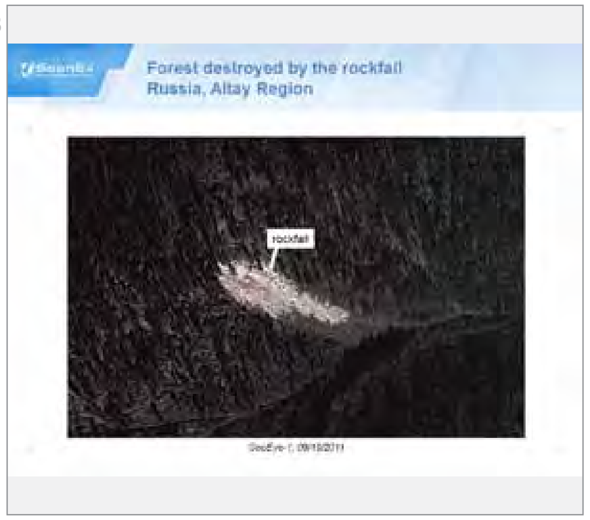

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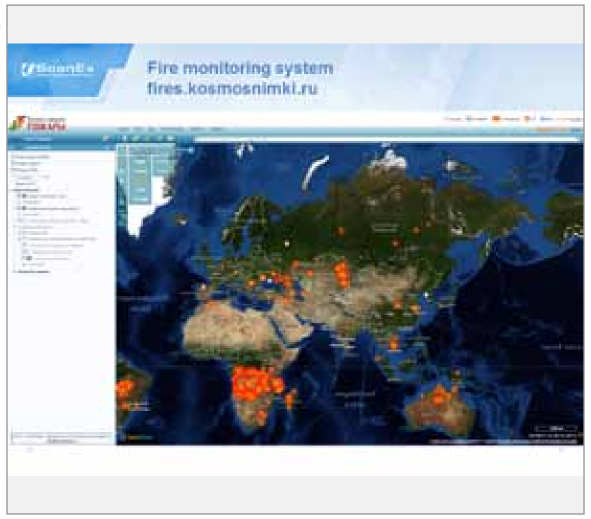

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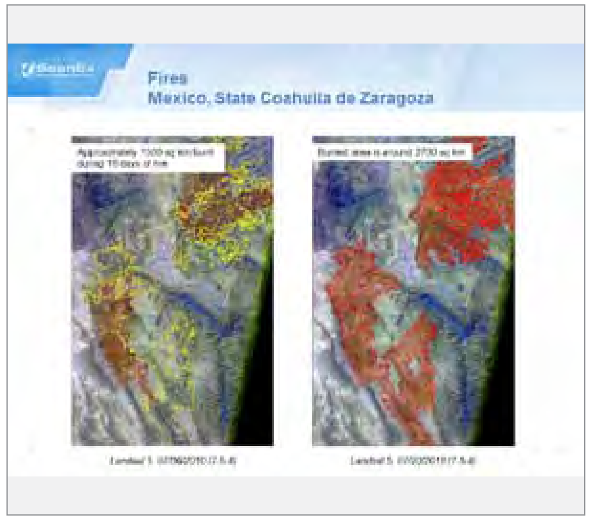

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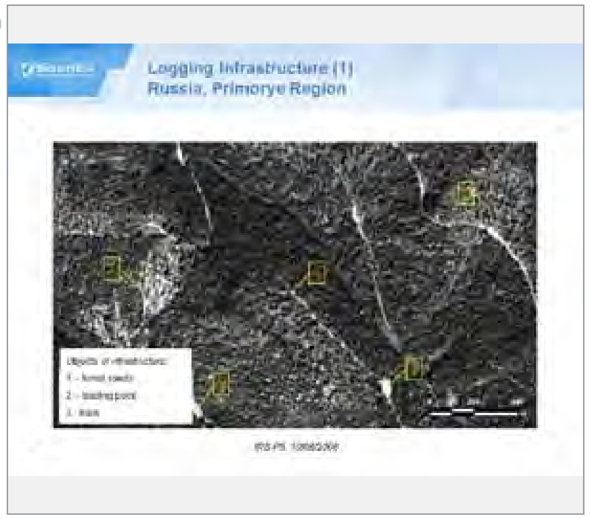

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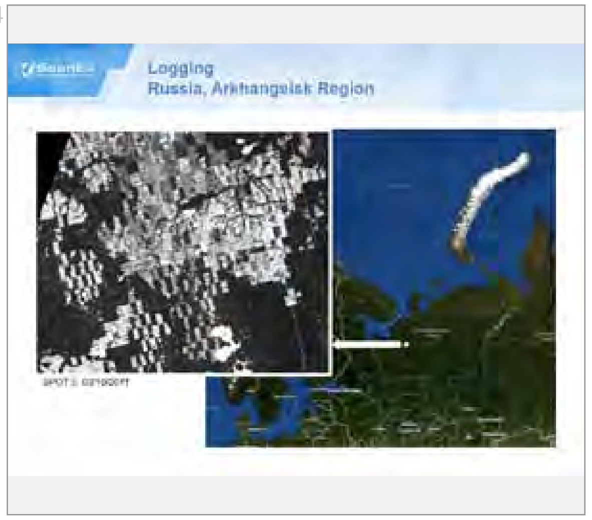

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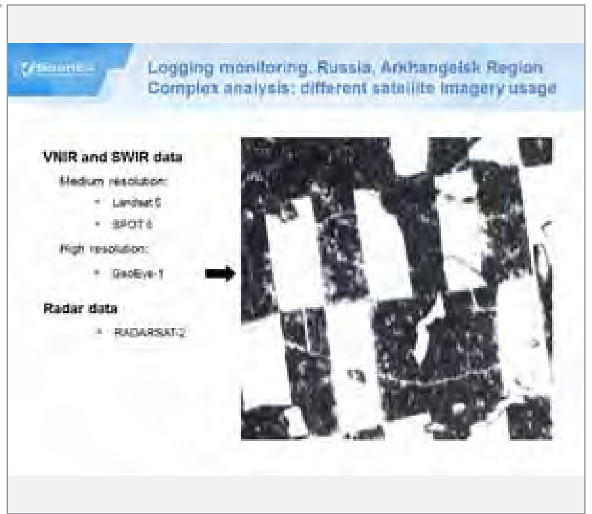

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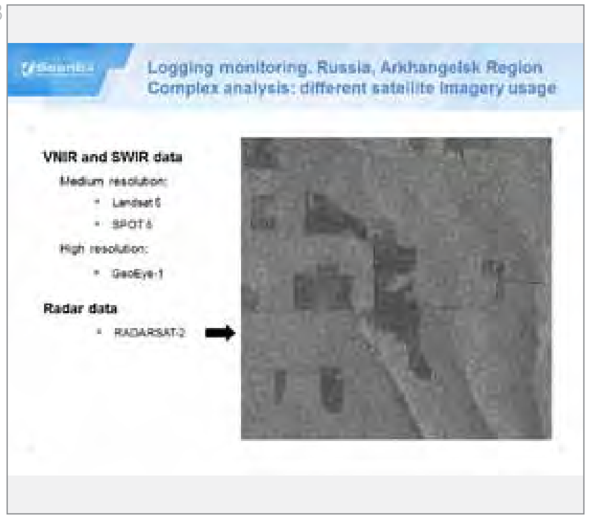

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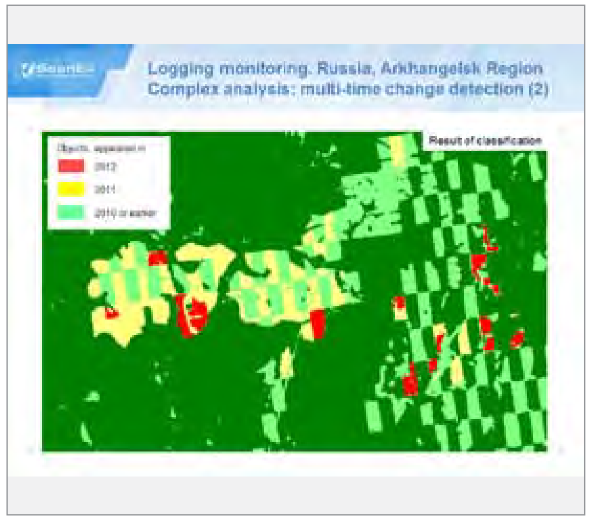

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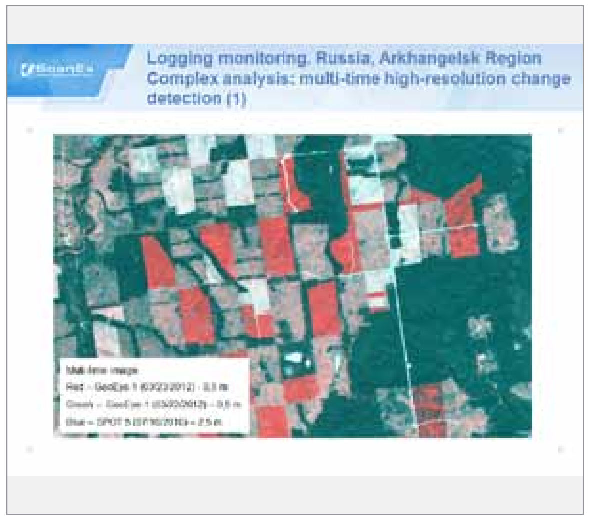

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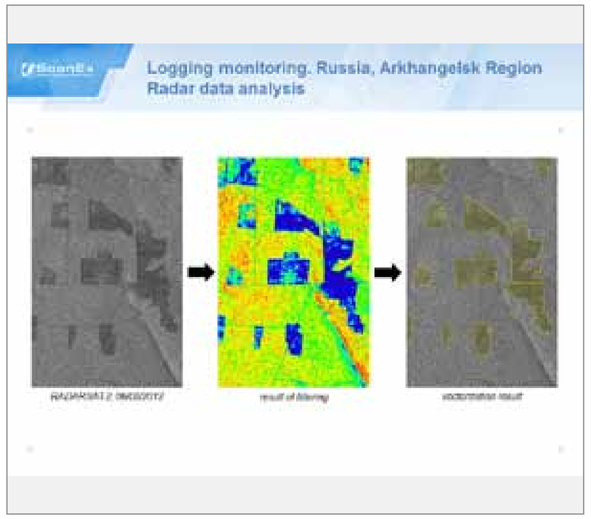

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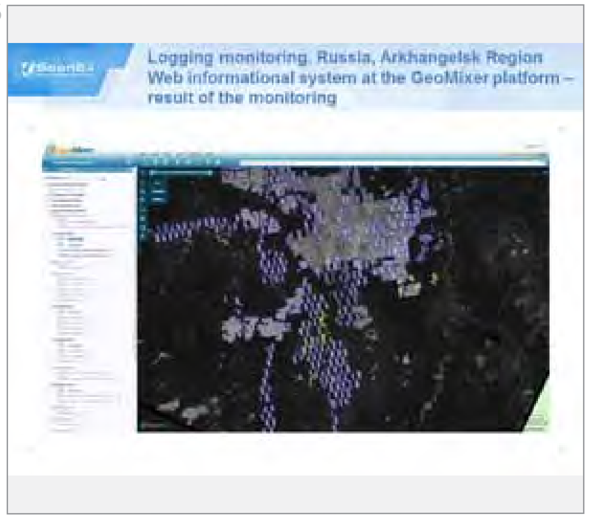
Logging monitoring. Russia, Arkhangelsk Region
Web informational system at the GeoMixer platform – result of the monitoring

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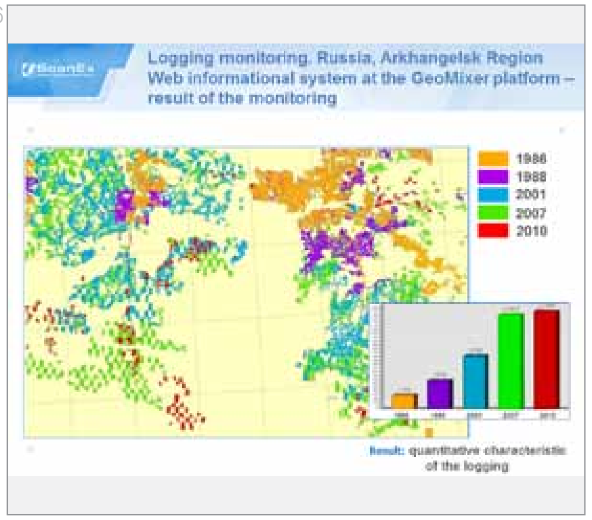
Logging monitoring. Russia, Arkhangelsk Region
Web informational system at the GeoMixer platform – result of the monitoring
1986
1988
2001
2007
2010
Result: quantitative characteristic of the logging

27

Environmental challenges to be faced today
What does current amount of logging mean for us?
every 2 seconds we lose the forest area equal to the football field
every day – area more than Pinar del Rio city and it's surroundings
every month – area more than Pinar del Rio province
every year – area equal to Cuba
Google earth

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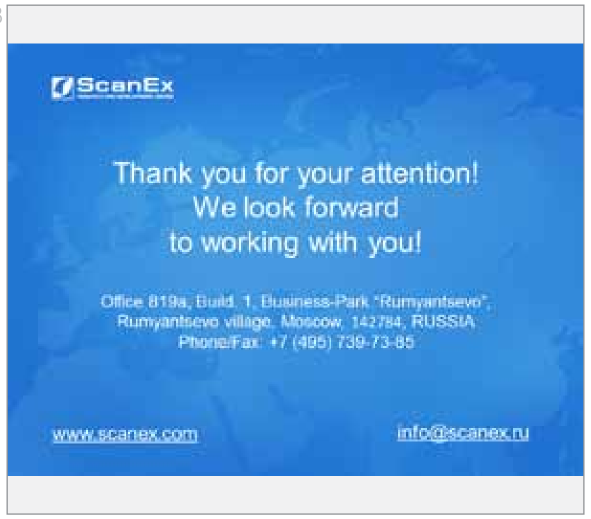
ScanEx
Thank you for your attention!
We look forward
to working with you!
Office 819a, Build. 1, Business-Park "Rumyantsevo",
Rumyantsevo village, Moscow, 142784, RUSSIA
Phone/Fax: +7 (495) 739-73-85
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info@scanex.ru

Indonesian Experience on Optimizing Satellite Technology for Coastal Disaster Mitigation: Case Study of North Coast of Java

Enggar Sadtopo, **Deky Rahma Sukarno**, Ministry of Marine Affairs and Fisheries
INDONESIA

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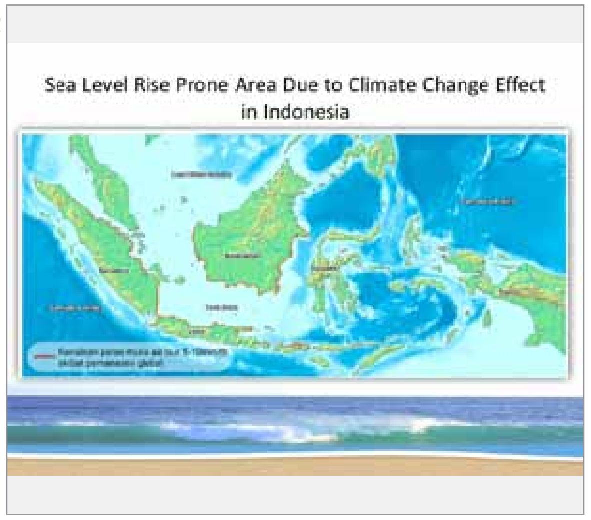

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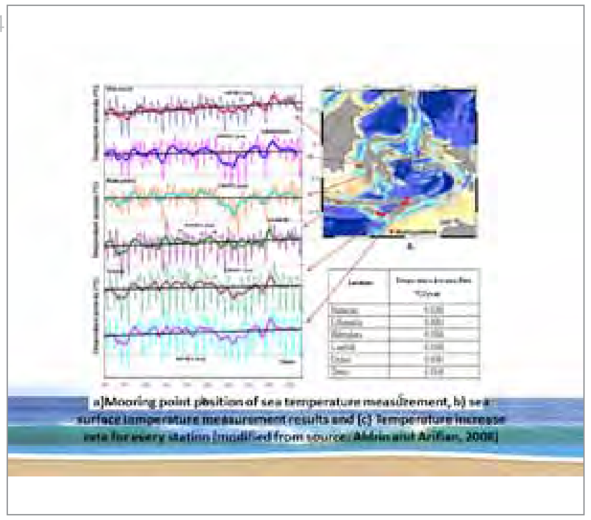

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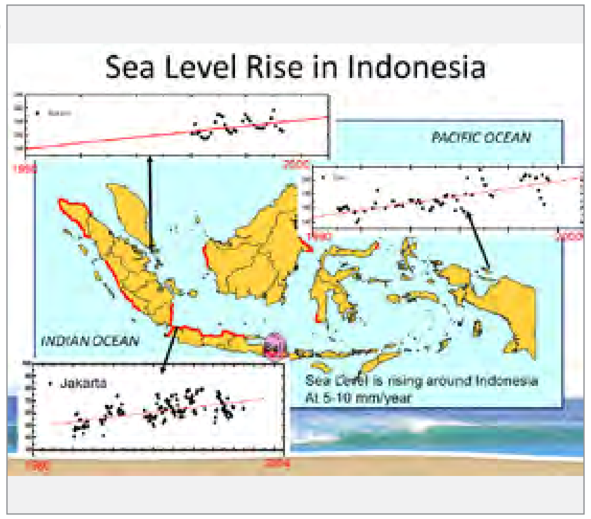

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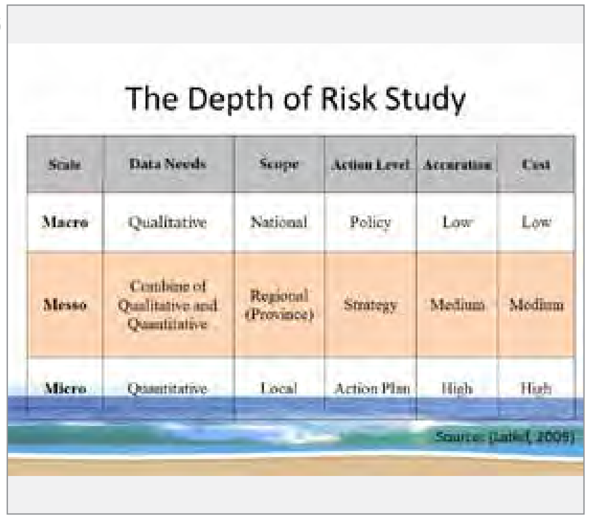

Scale	Data Needs	Scope	Action Level	Accuration	Cost
Macro	Qualitative	National	Policy	Low	Low
Messo	Combine of Qualitative and Quantitative	Regional (Province)	Strategy	Medium	Medium
Micro	Quantitative	Local	Action Plan	High	High

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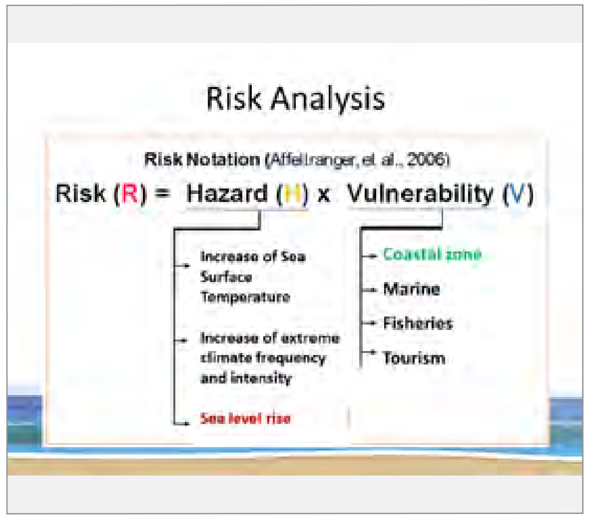

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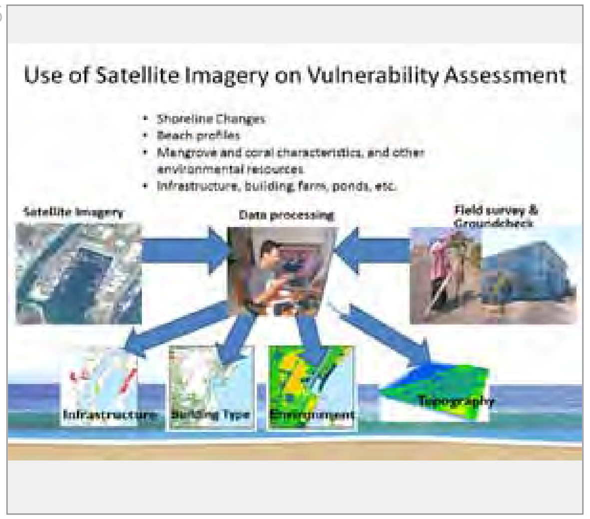

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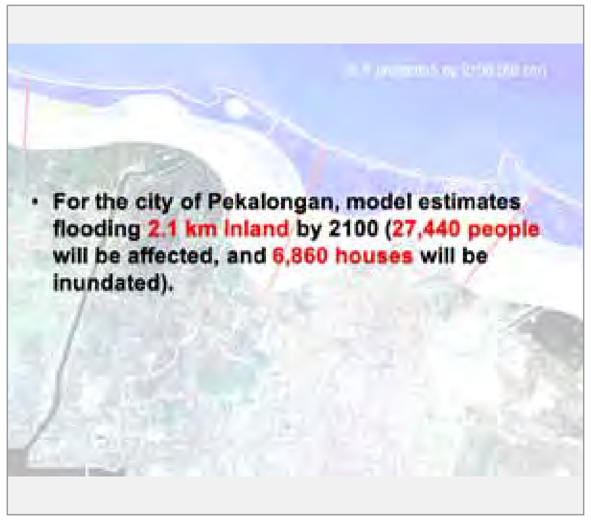

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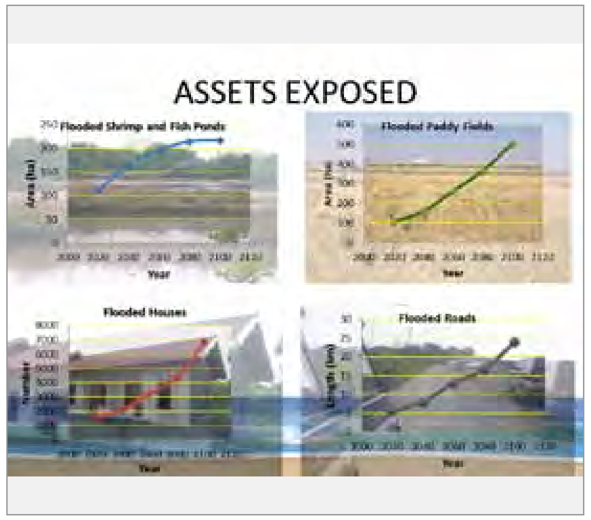

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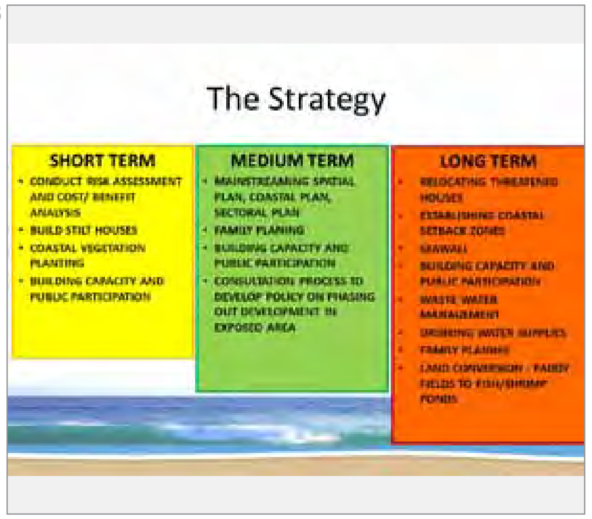

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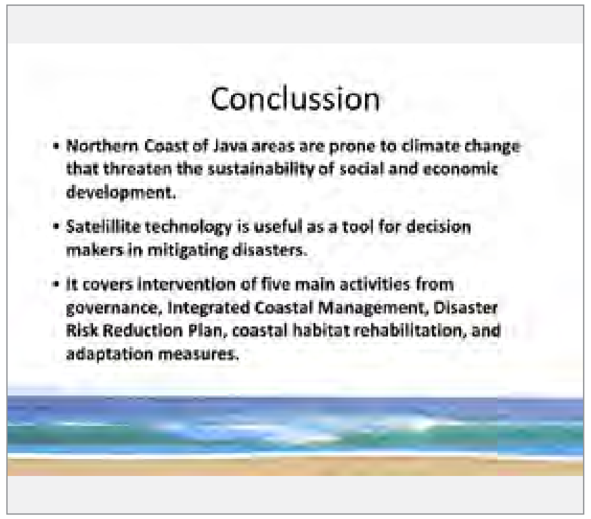

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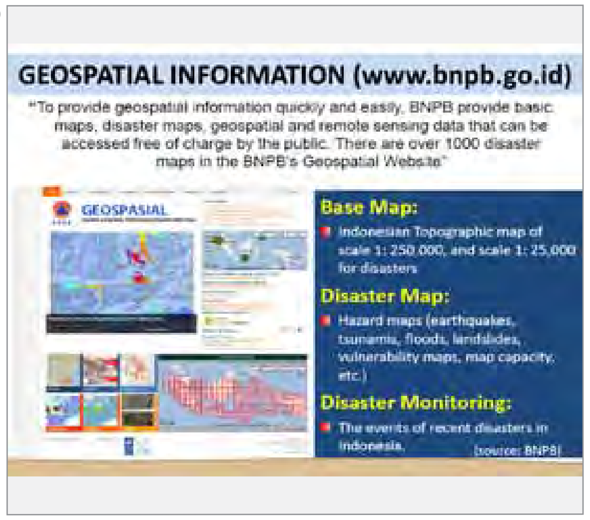

GEOSPATIAL INFORMATION (www.bnpb.go.id)
"To provide geospatial information quickly and easily, BNPB provide basic maps, disaster maps, geospatial and remote sensing data that can be accessed free of charge by the public. There are over 1000 disaster maps in the BNPB's Geospatial Website"
GEOSPASIAL
Base Map:
Indonesian Topographic map of scale 1: 250,000, and scale 1: 25,000 for disasters
Disaster Map:
Hazard maps (earthquakes, tsunamis, floods, landslides, vulnerability maps, map capacity, etc.)
Disaster Monitoring:
The events of recent disasters in indonesia.
(source: BNPB)

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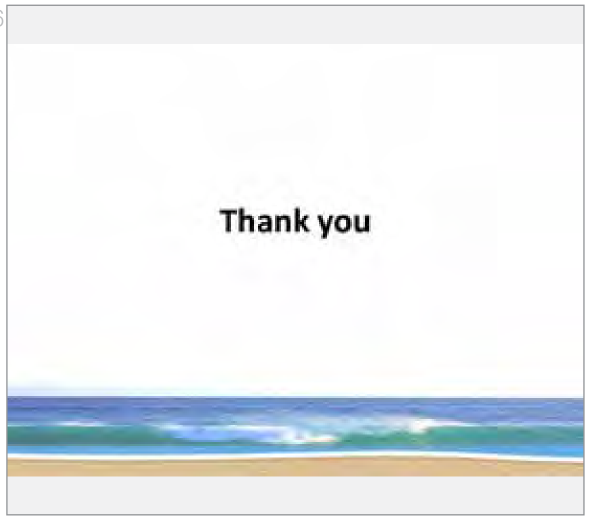

Thank you

Roscosmos Participation in the International Charter on Space and Major Disasters
Vasily Gudnov, Head of International Legal Department, International Contractual Directorate, Roscosmos

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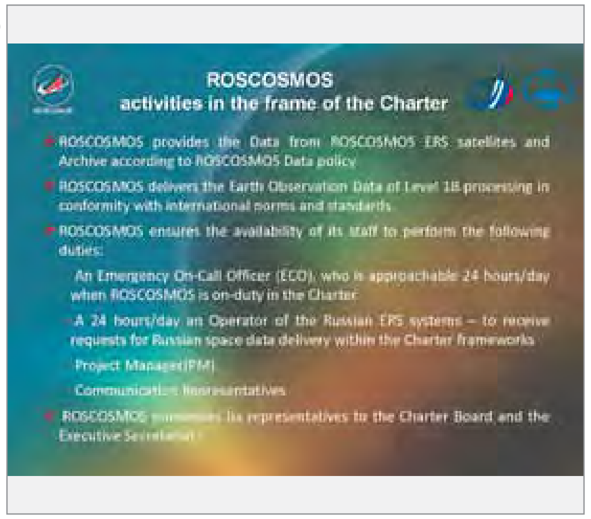

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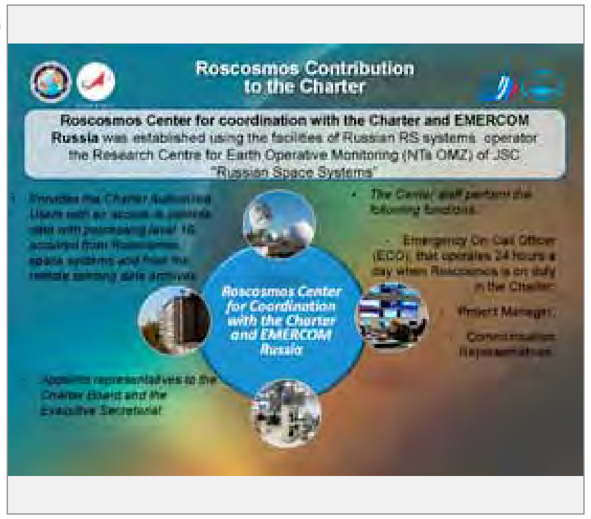

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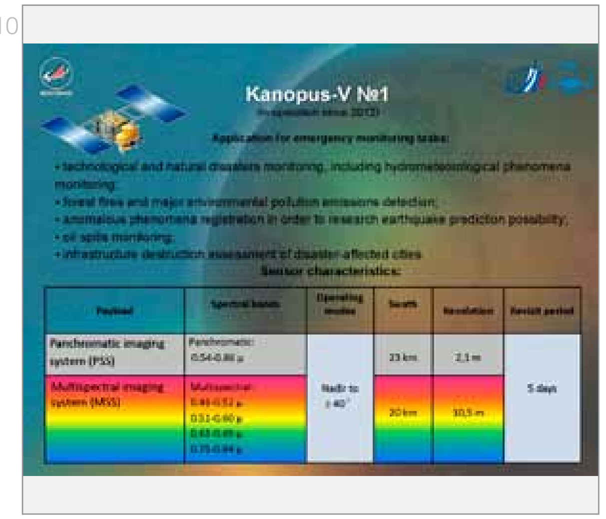

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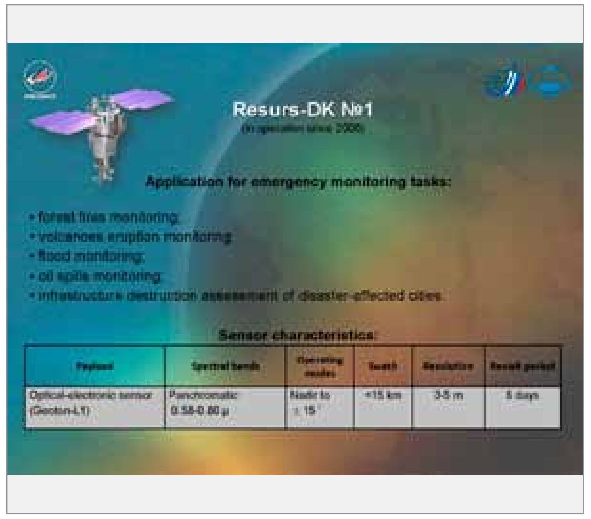

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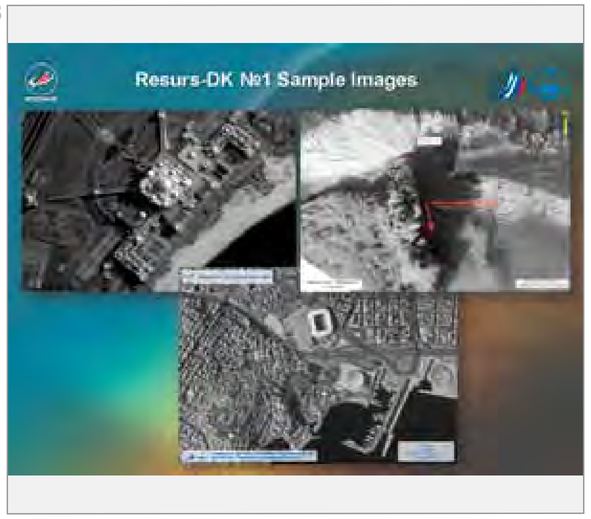

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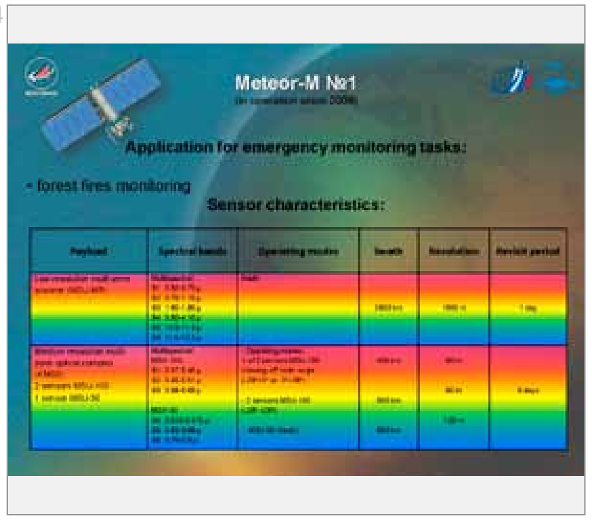

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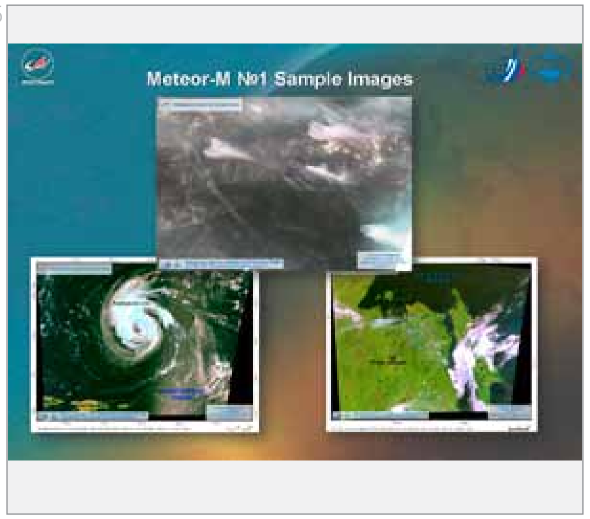

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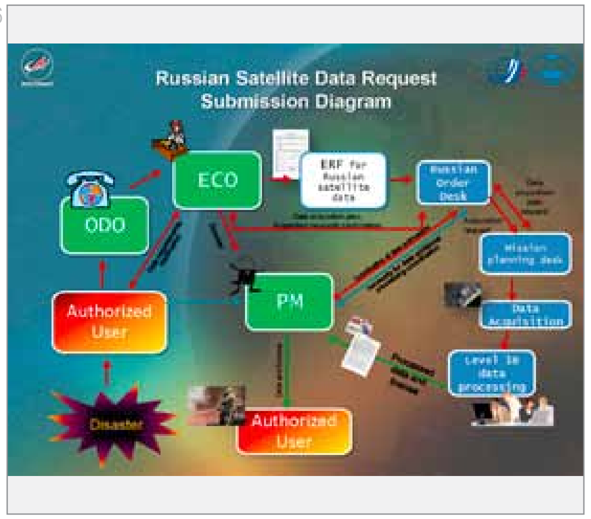

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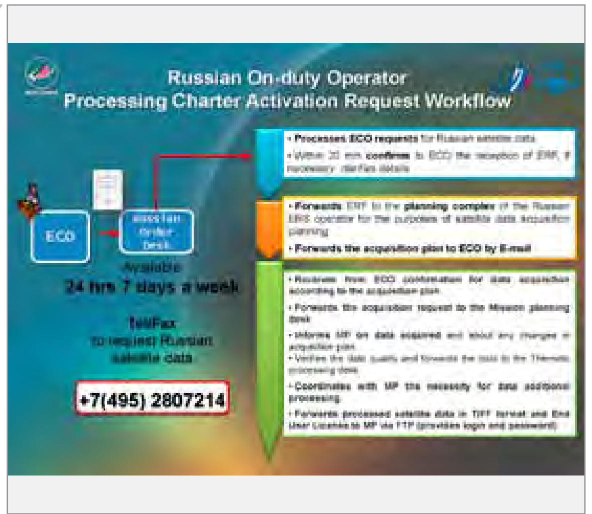

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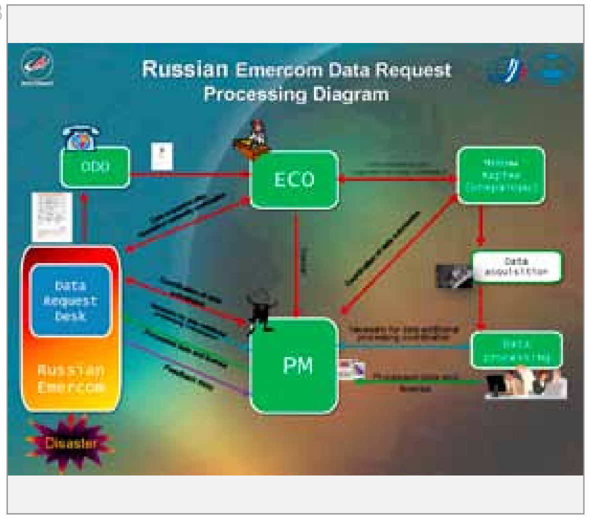

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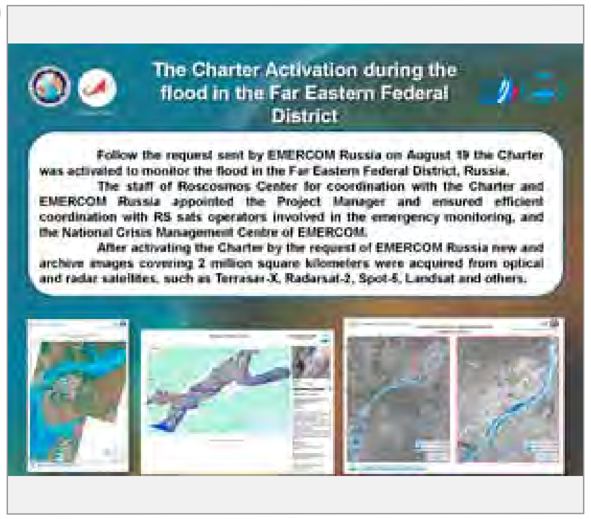

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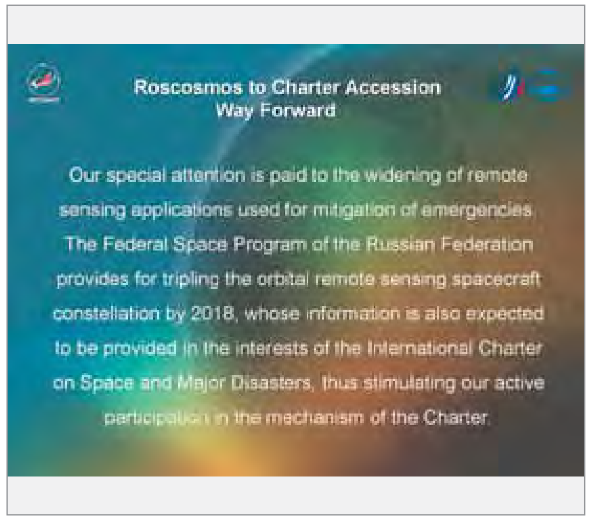

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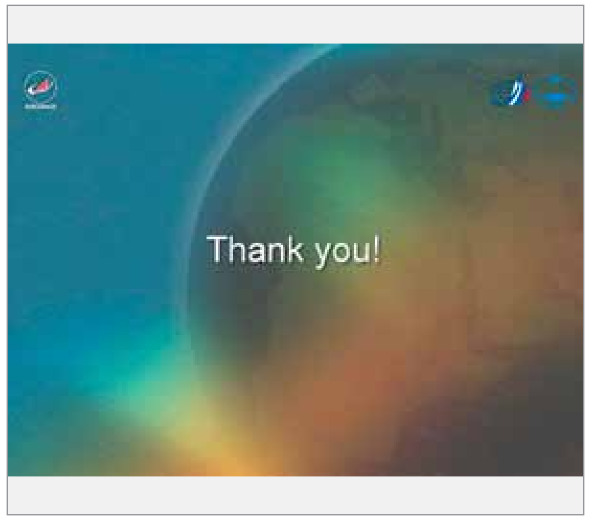

UN-SPIDER: A model approach to reduce vulnerabilities to hazards through good practices in geospatial information management

Dr. Luc St-Pierre, Senior Programme Officer, United Nations Office for Outer Space Affairs (UNOOSA)

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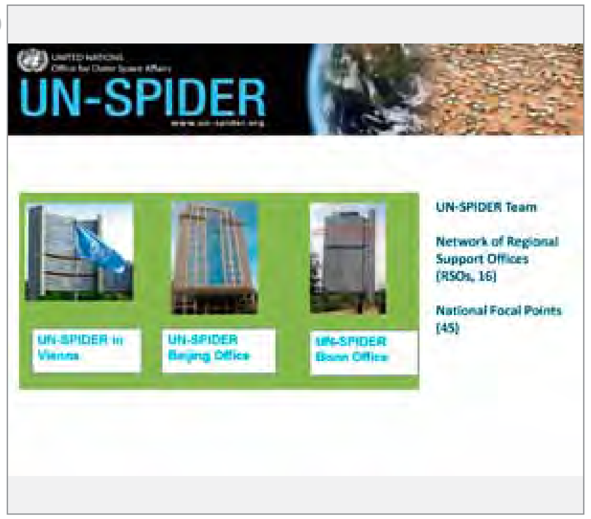

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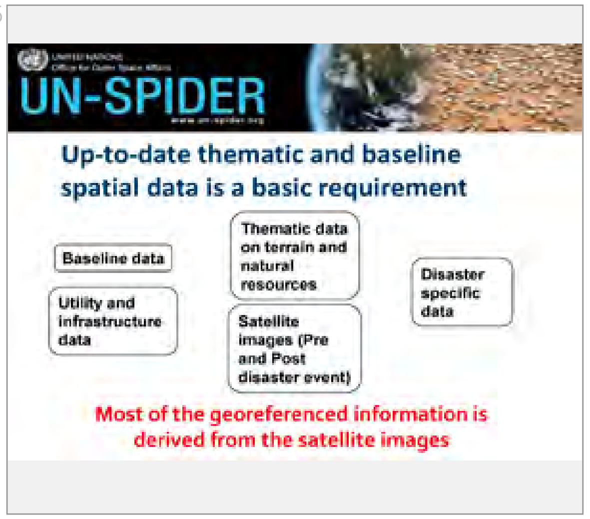

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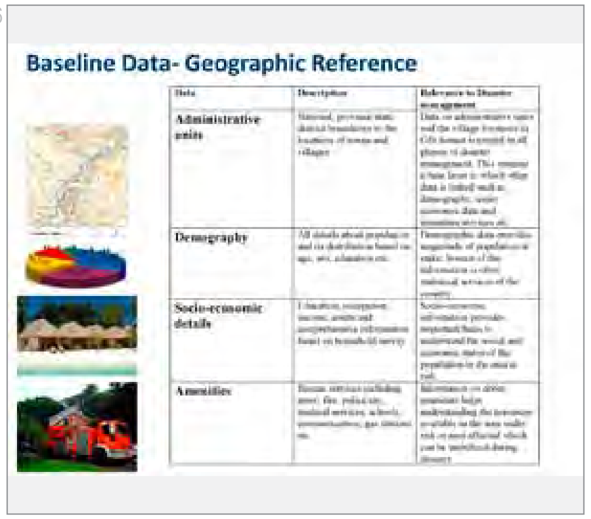

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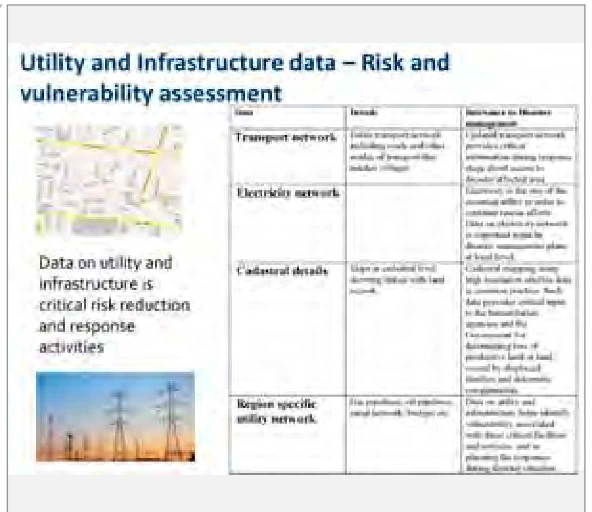

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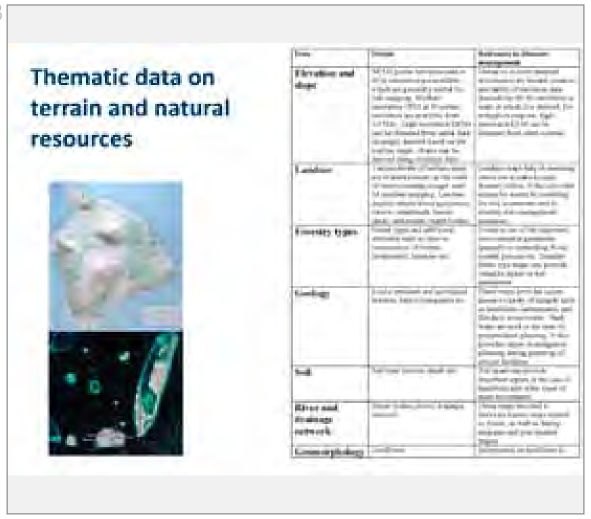

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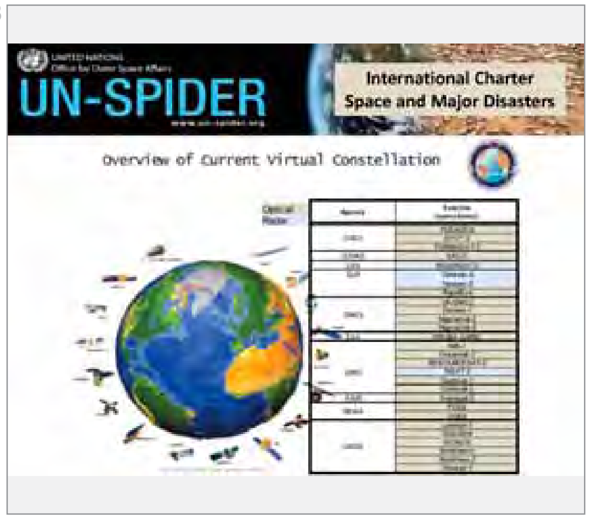

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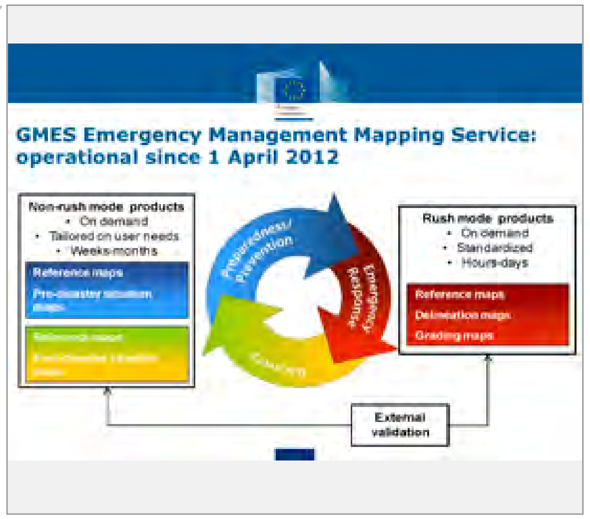

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Using the Information of Space Monitoring System for Operational Control in EMERCOM of Russia

Maksim Zayko, Head of International Organizations unit, EMERCOM of Russia,
Andrey Kudinov, Head of Space Monitoring unit, Russian National Emergency Management Centre, EMERCOM of Russia

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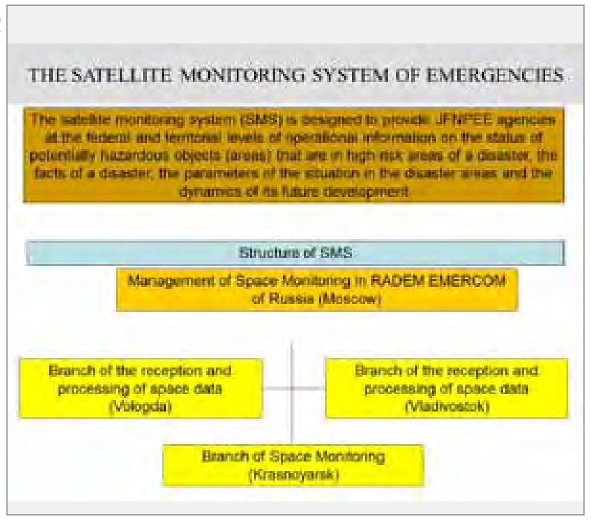

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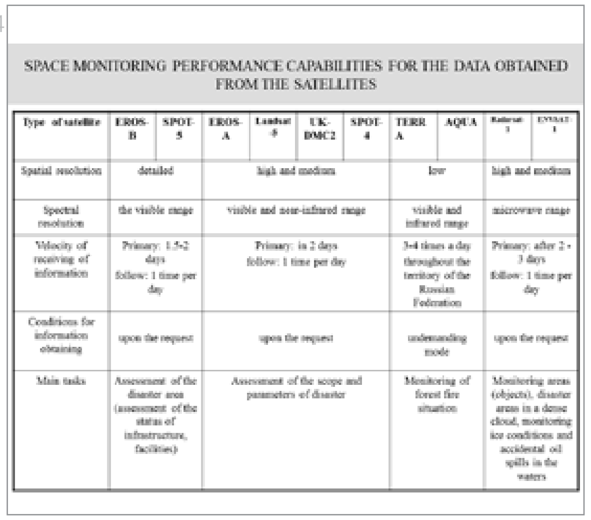

Type of satellite	EROS-B	SPOT-5	EROS-A	Landsat-5	UK-DMC2	SPOT-4	TERRA	AQUA	Radarsat-1	ENVISAT-1
Spatial resolution	detailed		high and medium				low		high and medium	
Spectral resolution	the visible range		visible and near-infrared range				visible and infrared range		microwave range	
Velocity of receiving of information	Primary: 1.5-2 days follow: 1 time per day		Primary: in 2 days follow: 1 time per day				3-4 times a day throughout the territory of the Russian Federation		Primary: after 2 - 3 days follow: 1 time per day	
Conditions for information obtaining	upon the request		upon the request				undemanding mode		upon the request	
Main tasks	Assessment of the disaster area (assessment of the status of infrastructure, facilities)		Assessment of the scope and parameters of disaster				Monitoring of forest fire situation		Monitoring areas (objects), disaster areas in a dense cloud, monitoring ice conditions and accidental oil spills in the waters	

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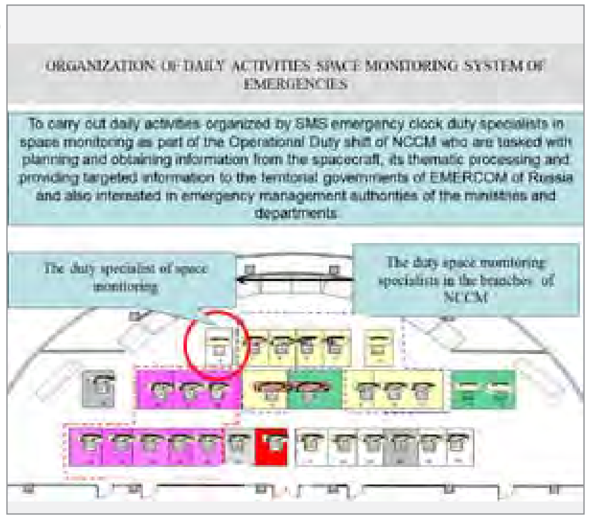

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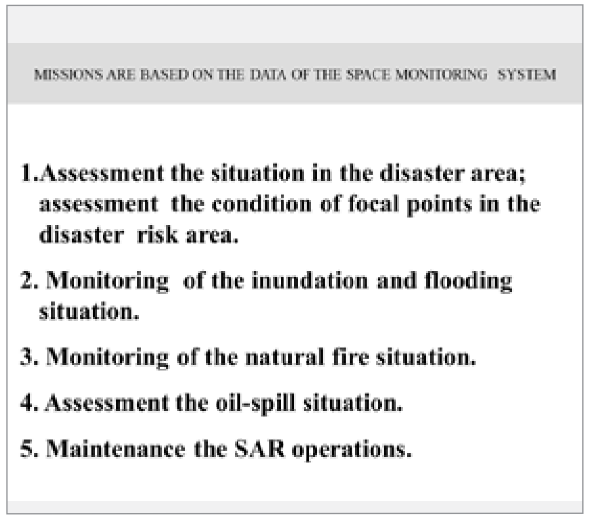

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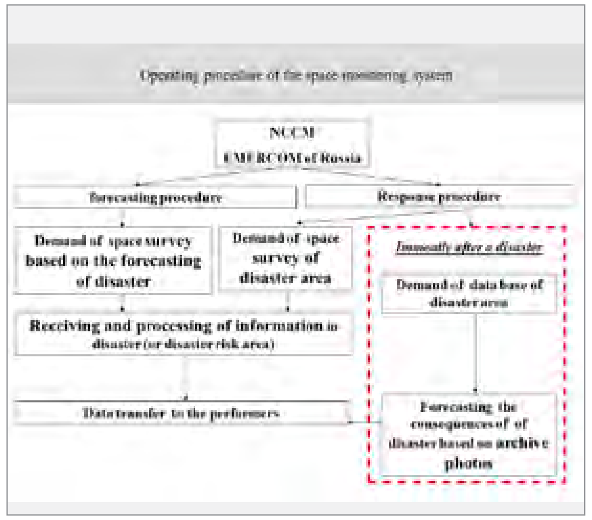

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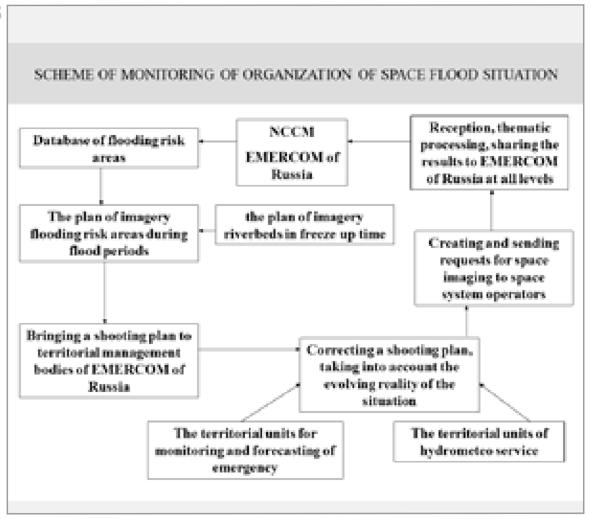

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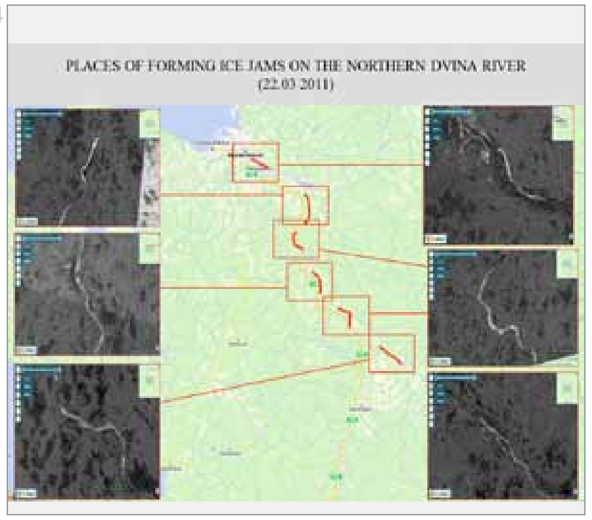

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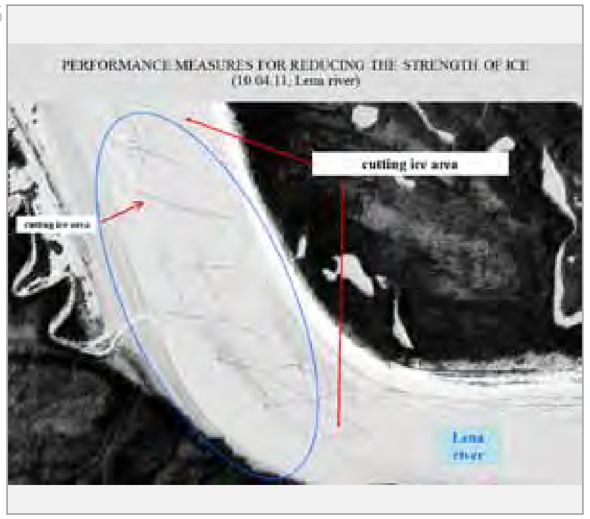

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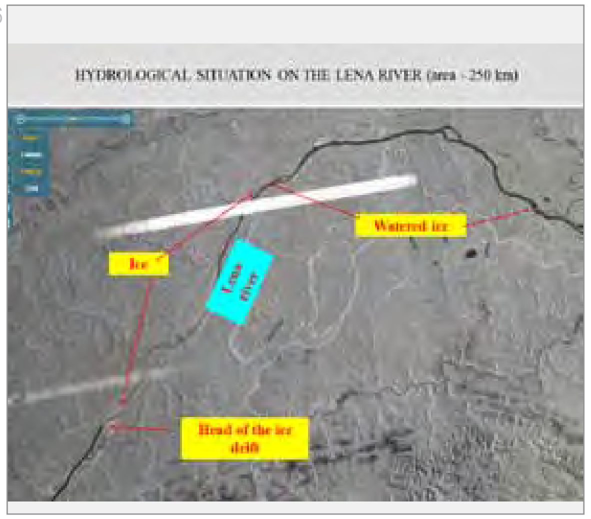

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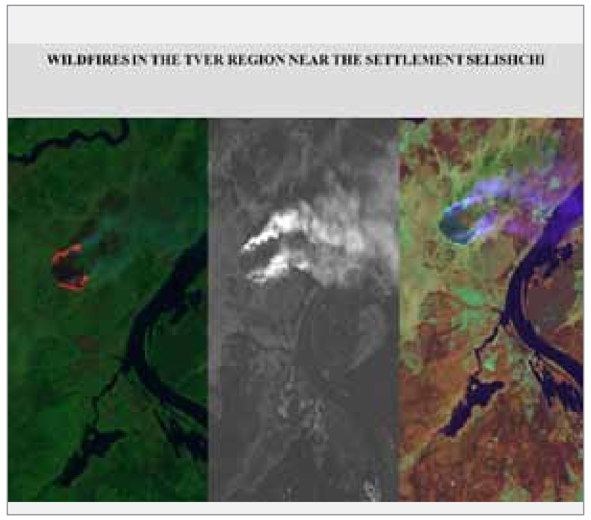

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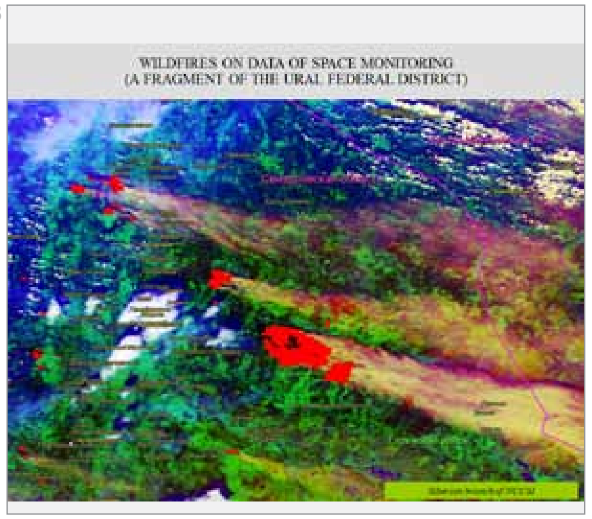

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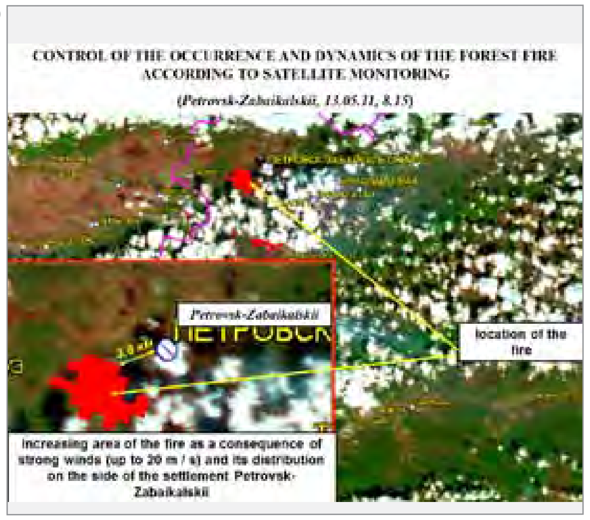

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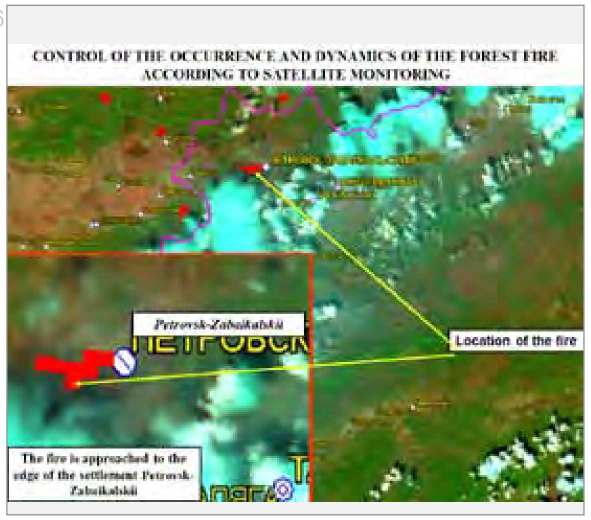

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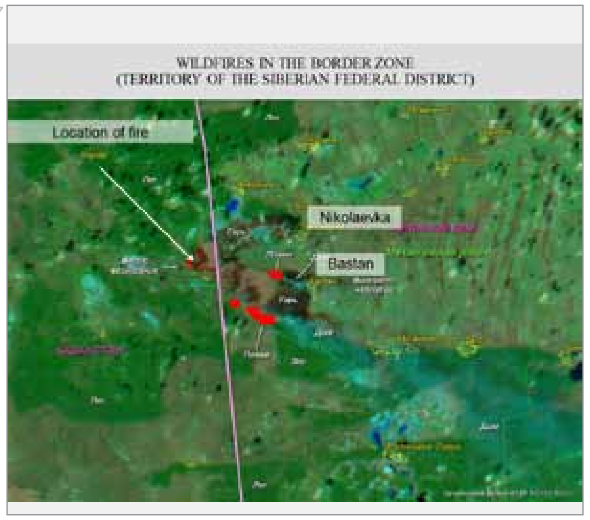

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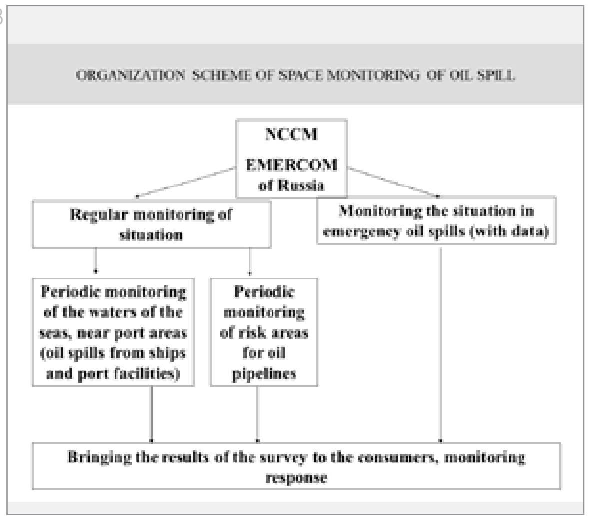

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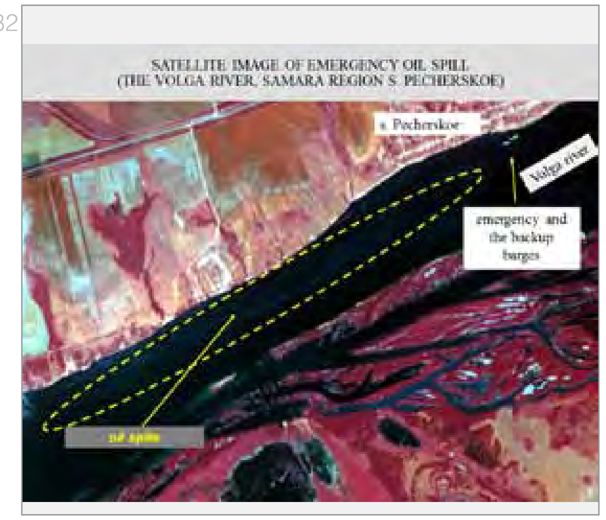

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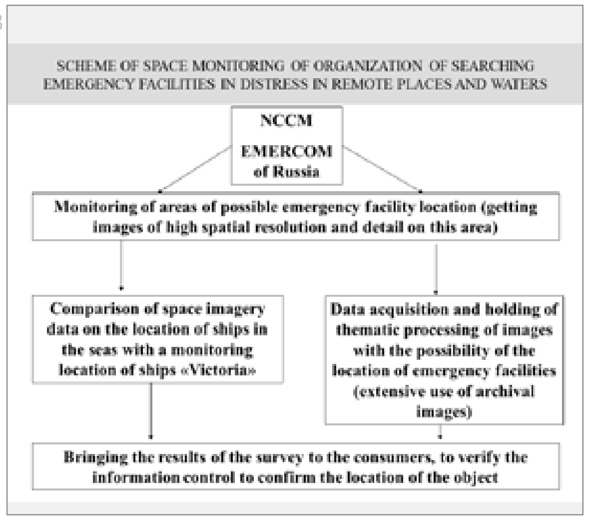

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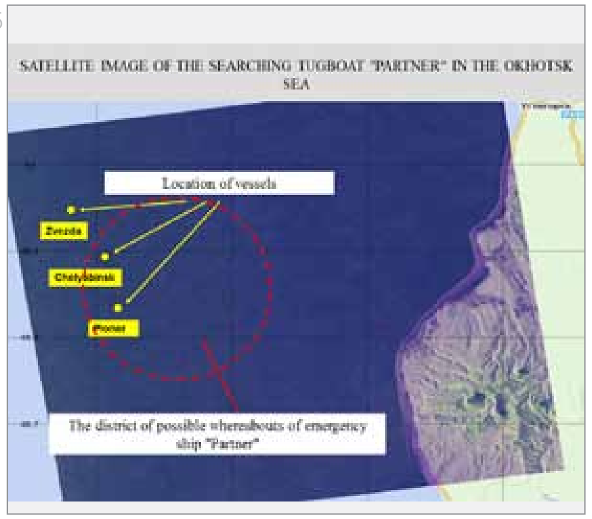

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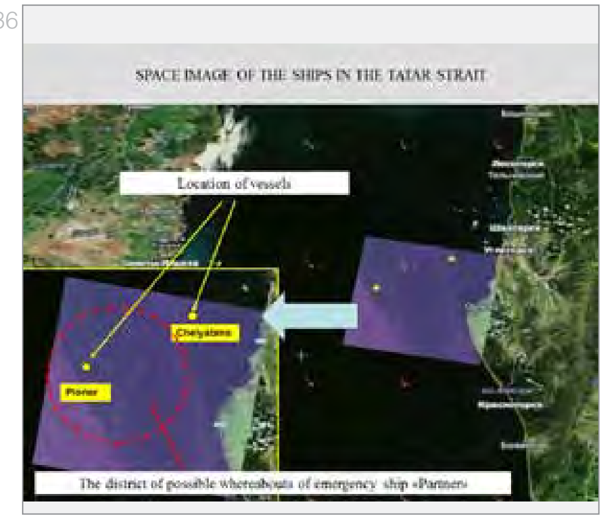

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Information resources based on space monitoring system of EMERCOM of Russia

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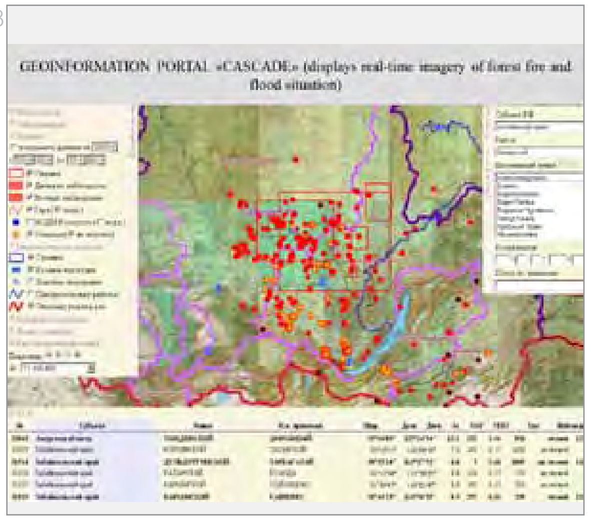

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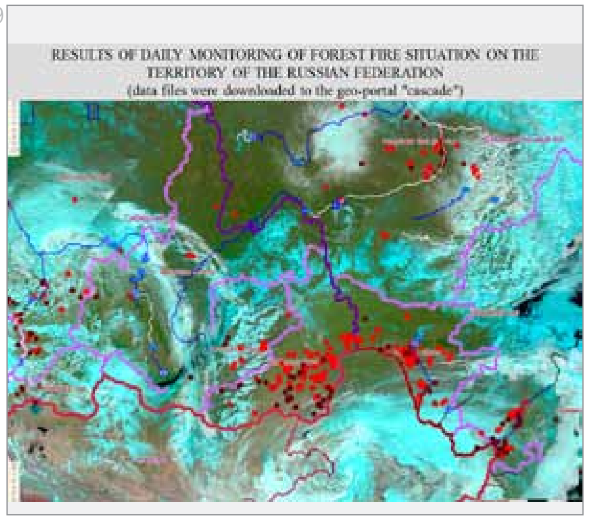

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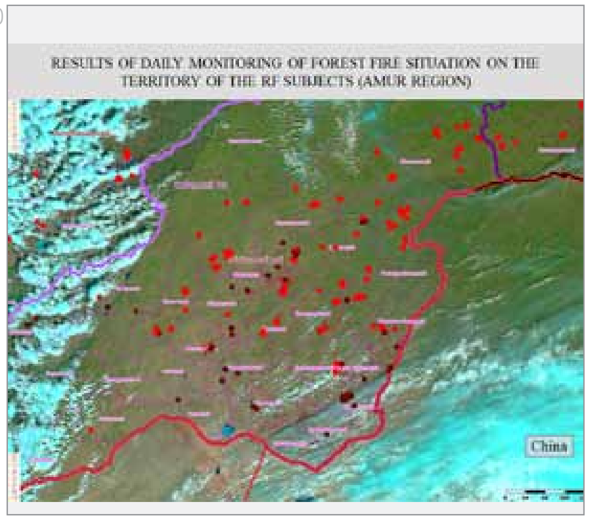

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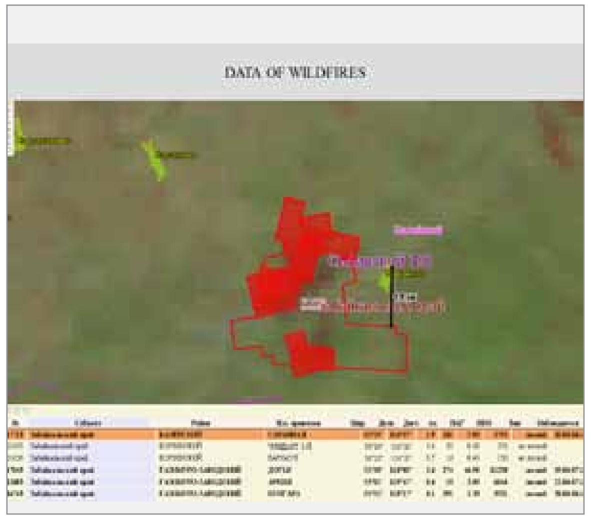

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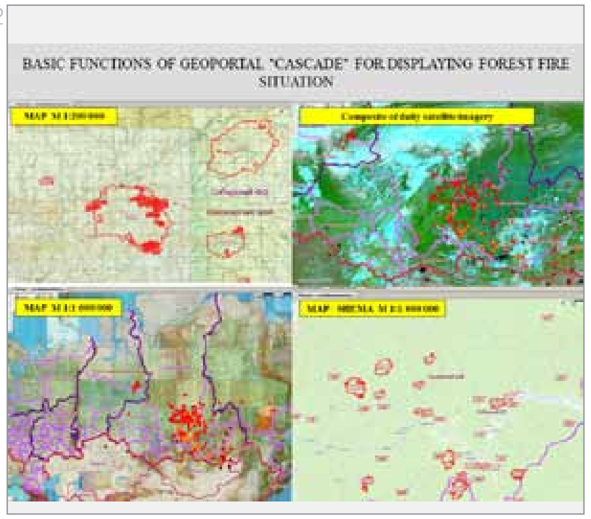

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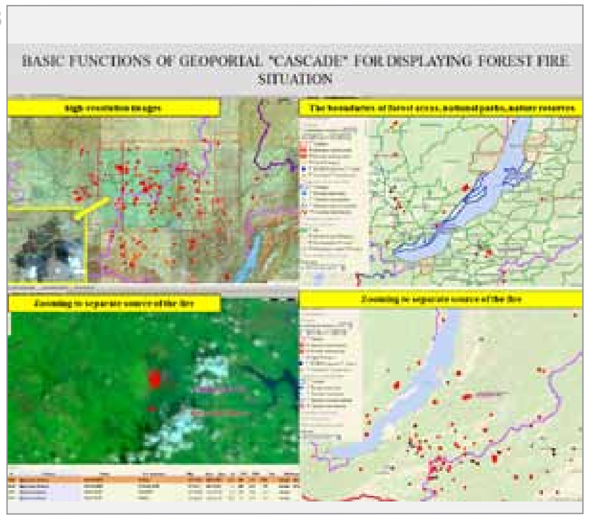

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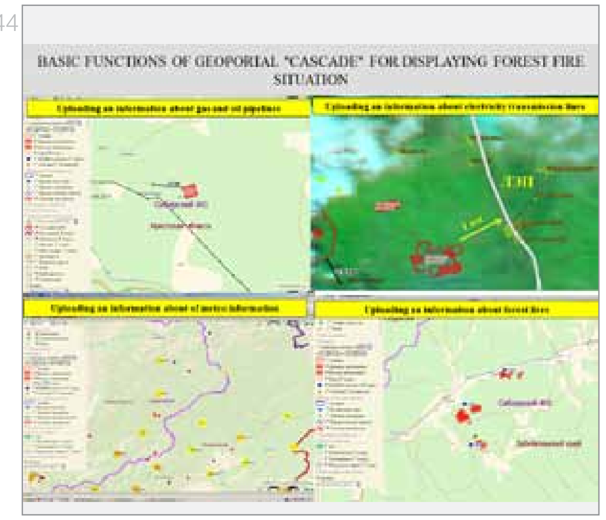

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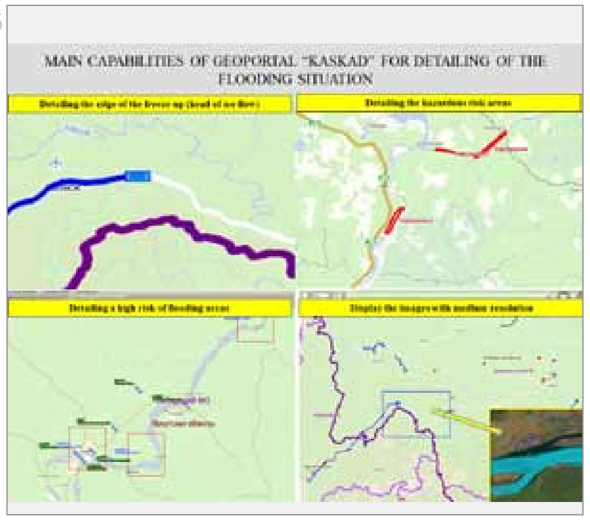

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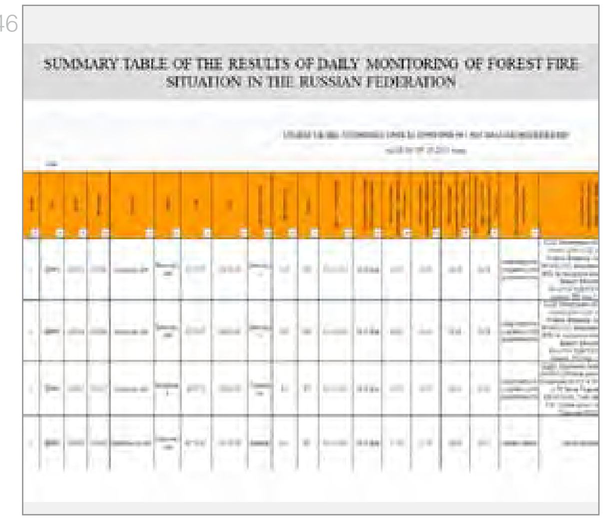

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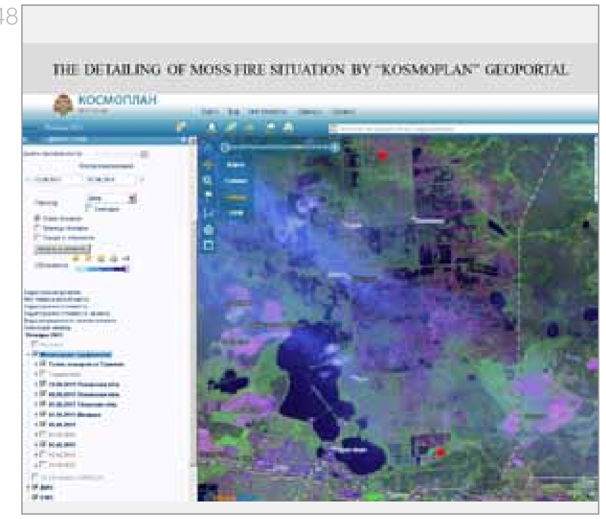

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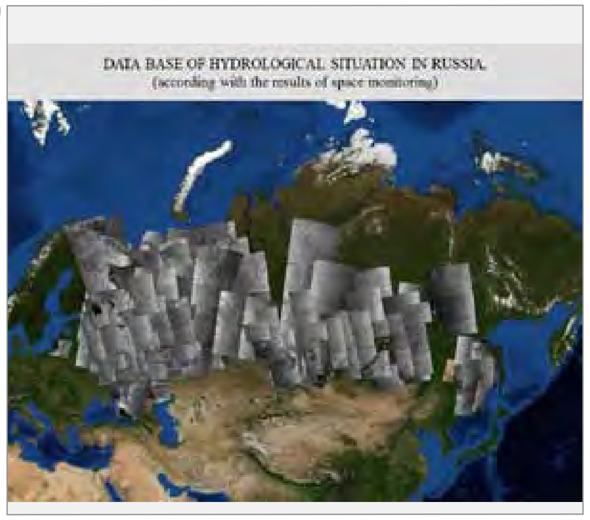

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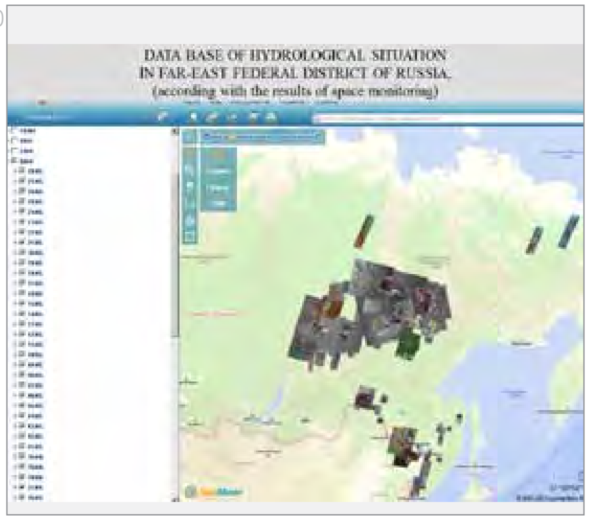

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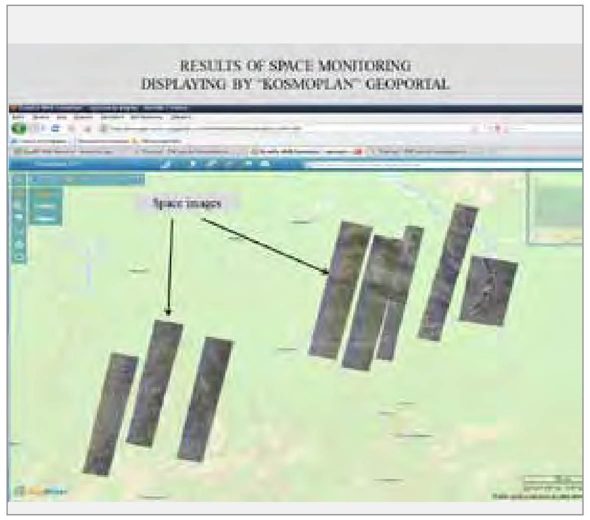

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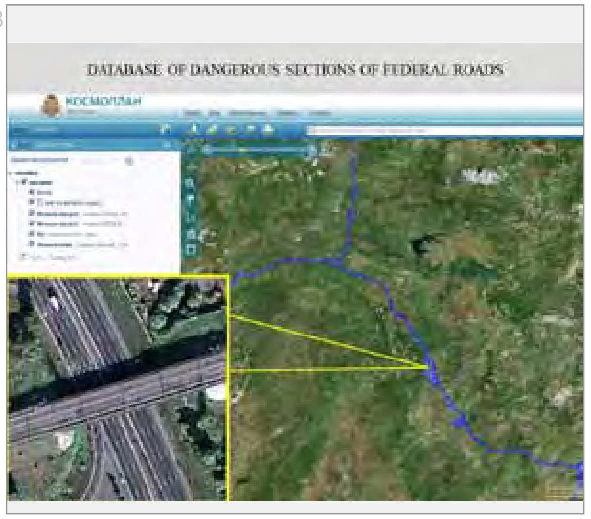

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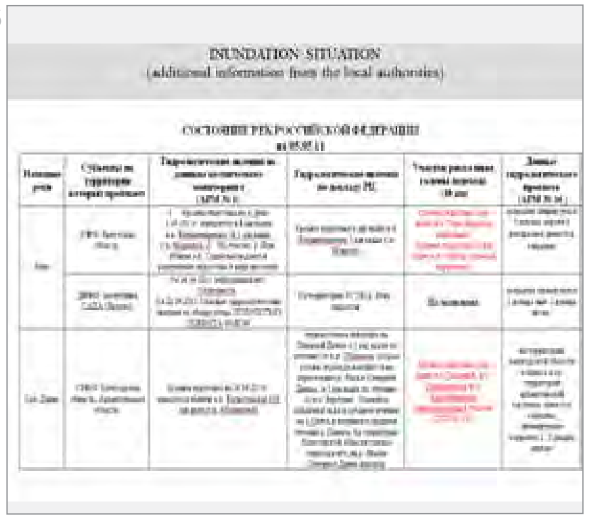

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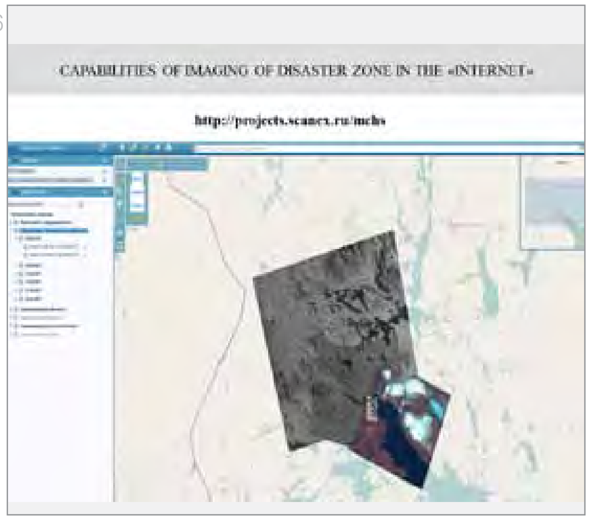

57

Current Status and Future Needs of Space-based Information for Regional Disaster Monitoring and Response at AHA Centre

Dr. Janggam Adhityawarma, Senior Disaster Monitoring and Analysis Officer, ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre)

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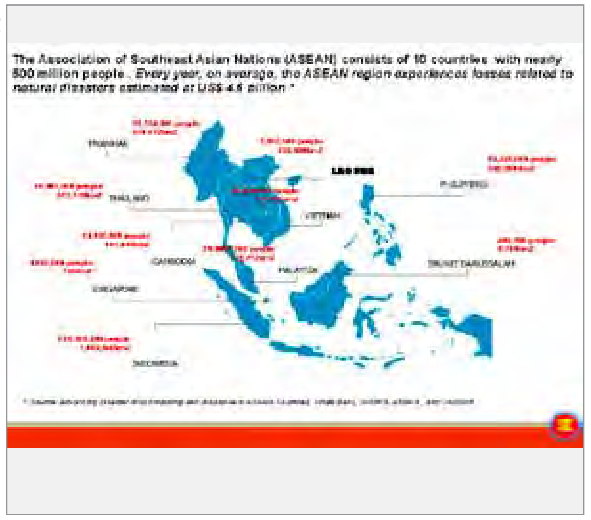

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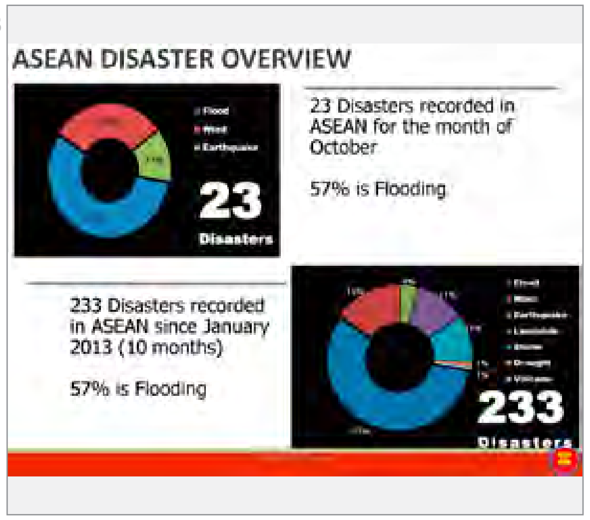

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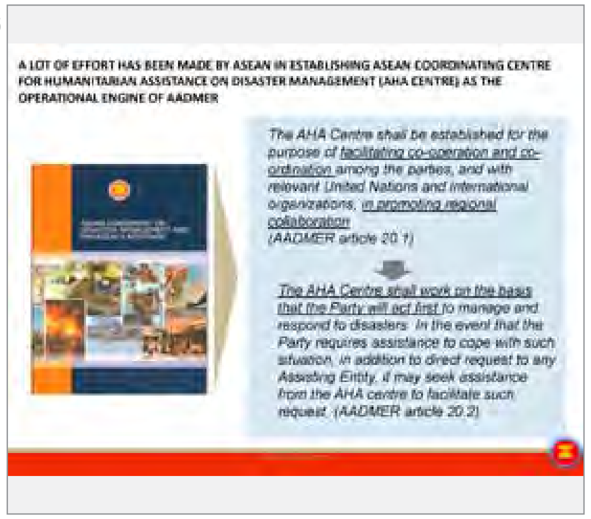

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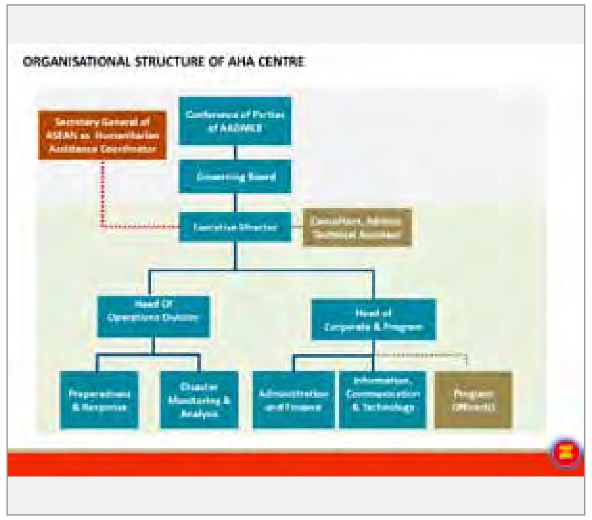

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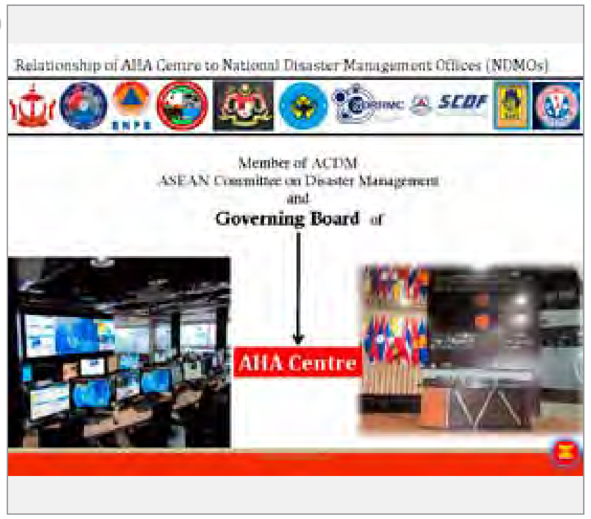

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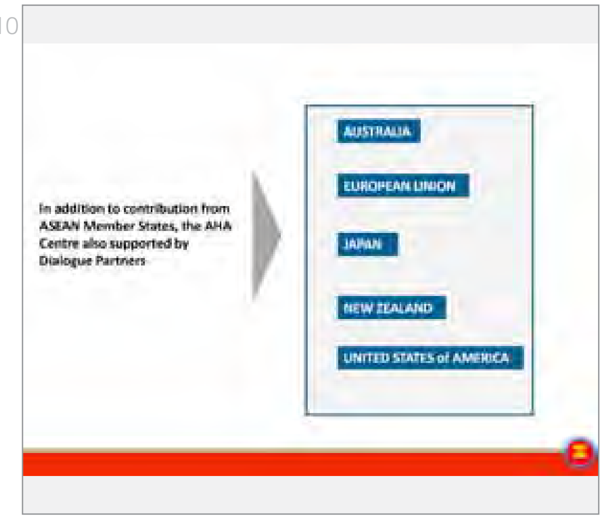

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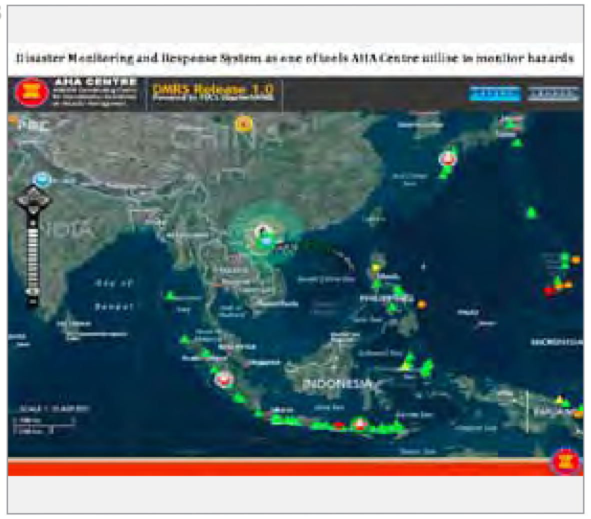

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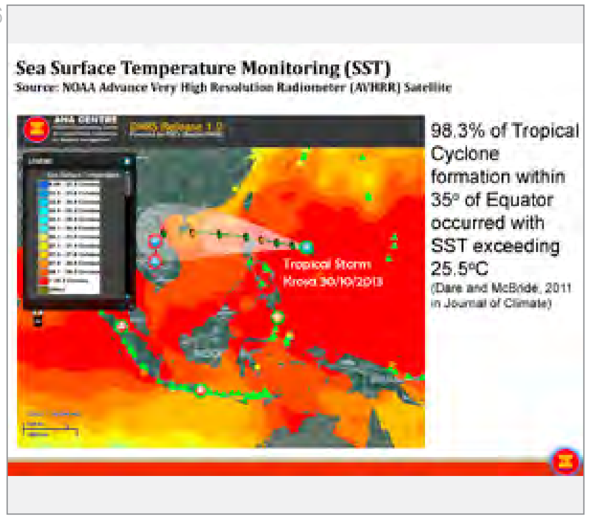

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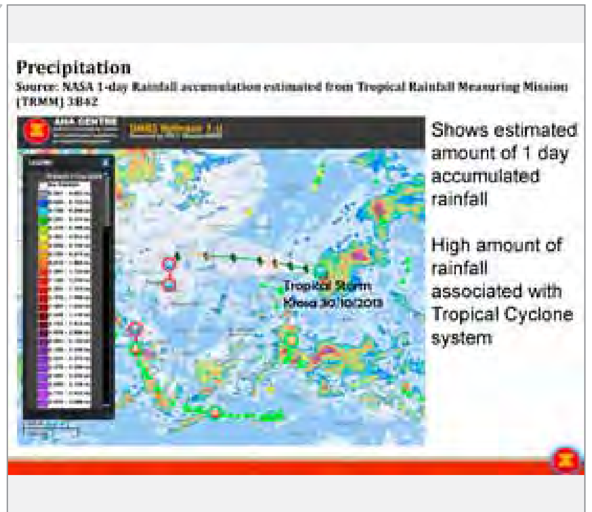

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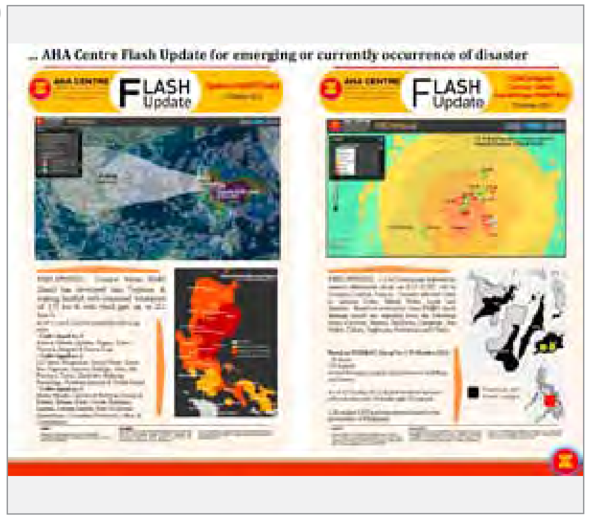

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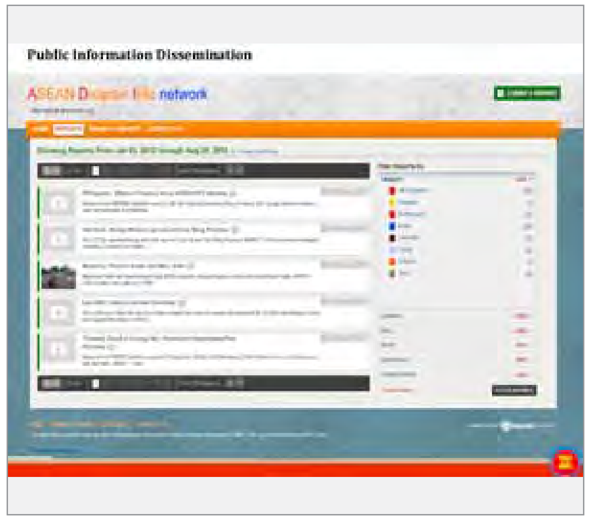

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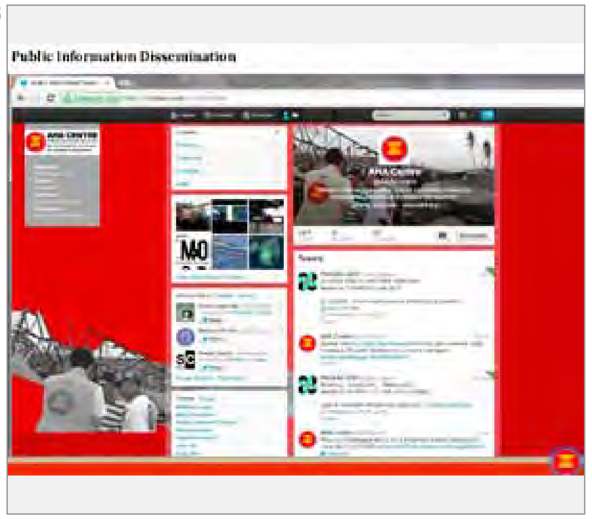

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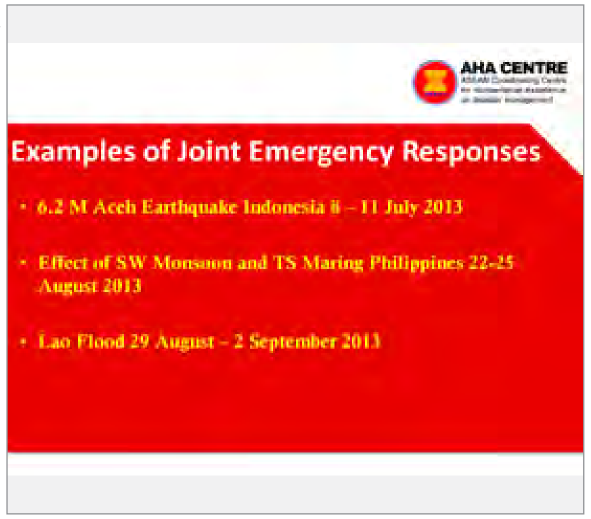

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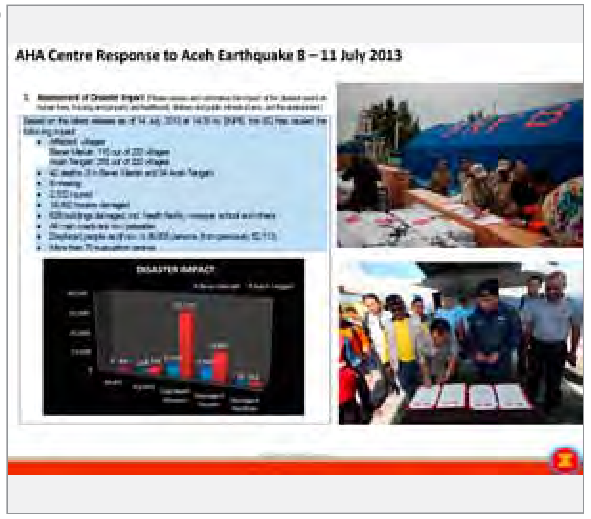

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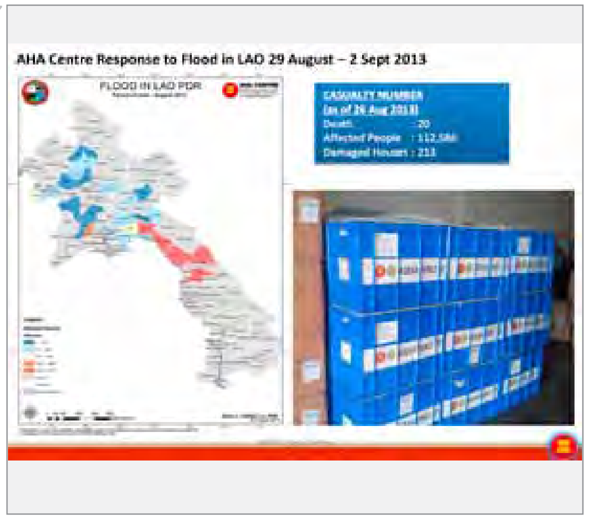

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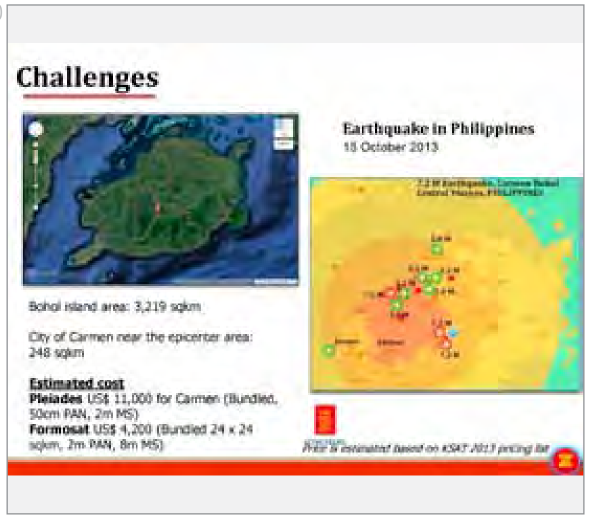

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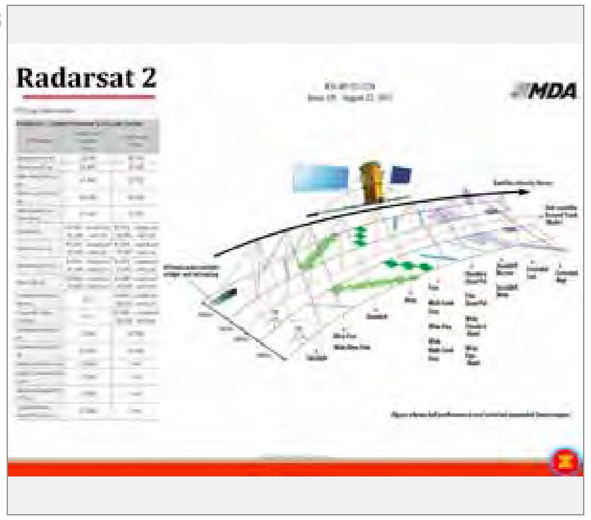

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Results of the work on the creation of centers for Crisis Management unified state system of prevention and liquidation of emergency situations and objectives for their development

Andrey Kudinov, Head of Space Monitoring unit, Russian National Emergency Management Centre, EMERCOM of Russia, **Maksim Zayko**, Head of International Organizations unit, EMERCOM of Russia

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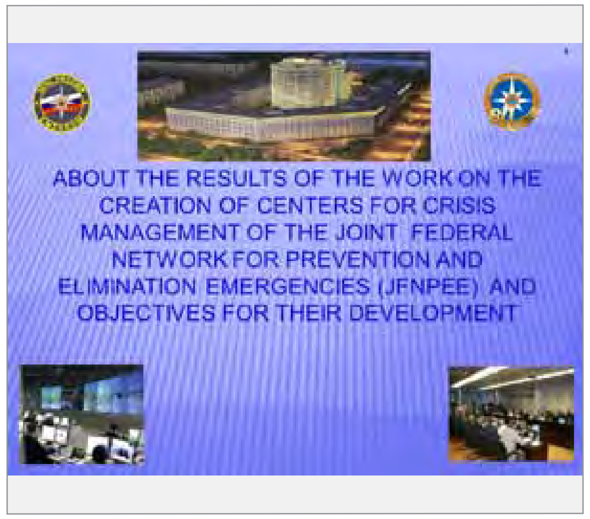

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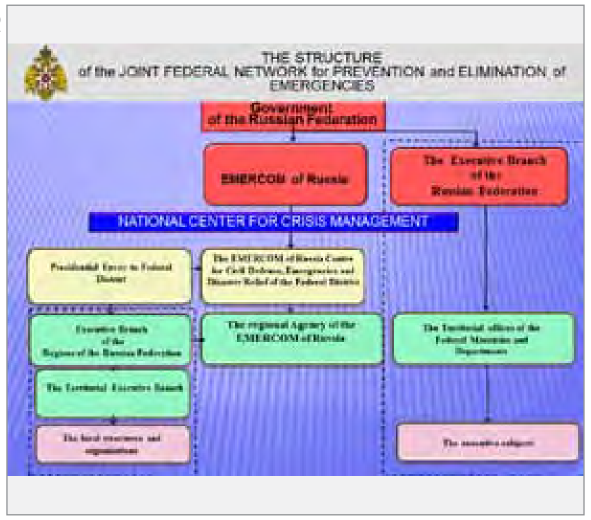

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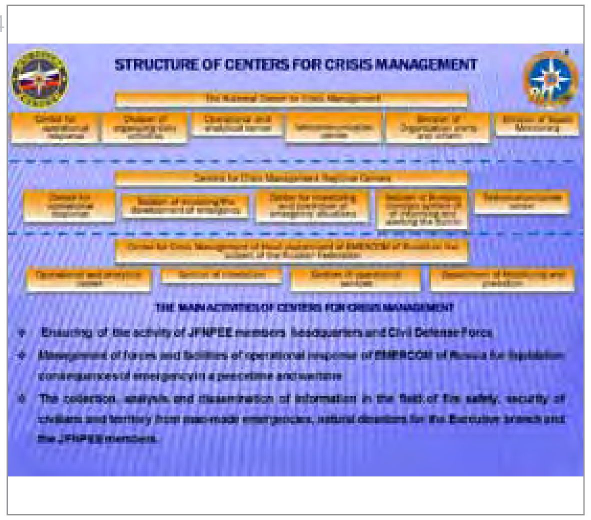

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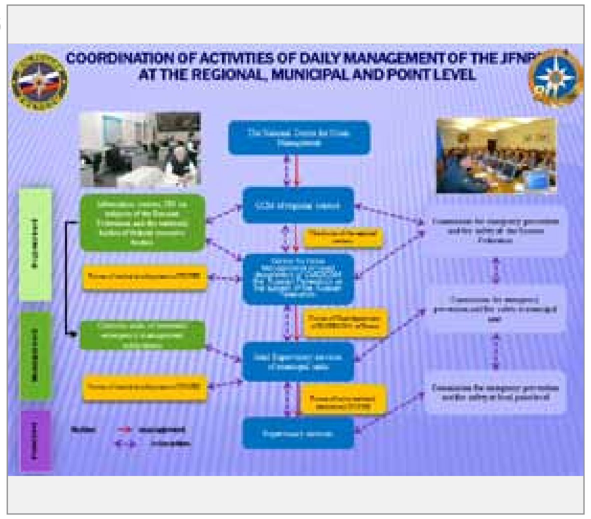

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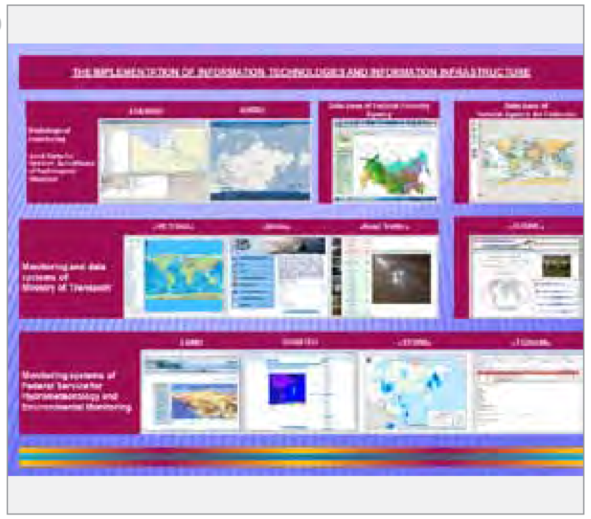

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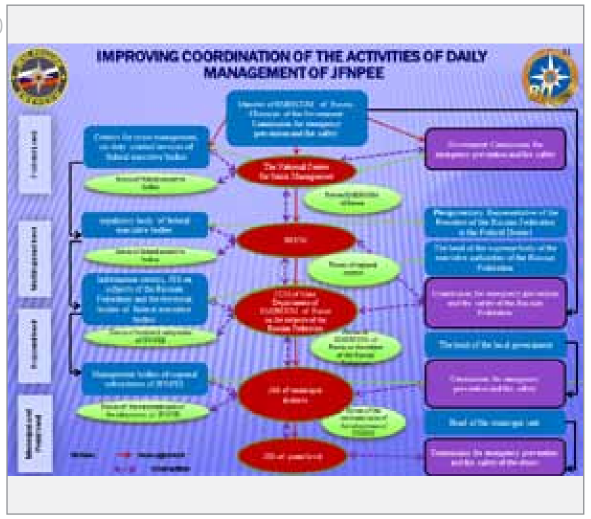

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"Space Watch" — a system of public monitoring from space

Maria Dorofeeva, Lead Specialist, Operational Satellite Monitoring Group, RDC SCANEX

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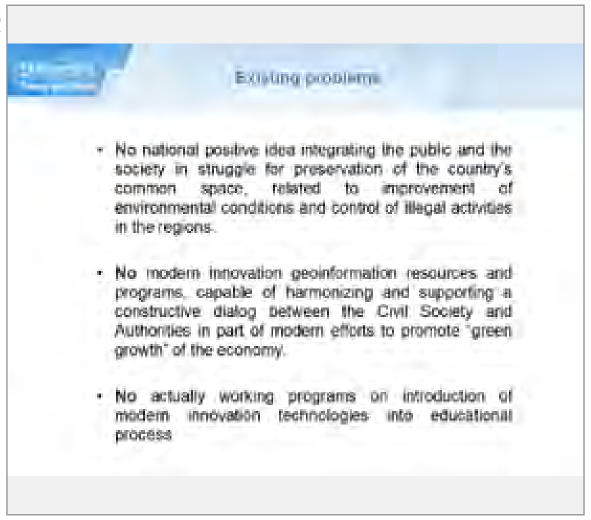

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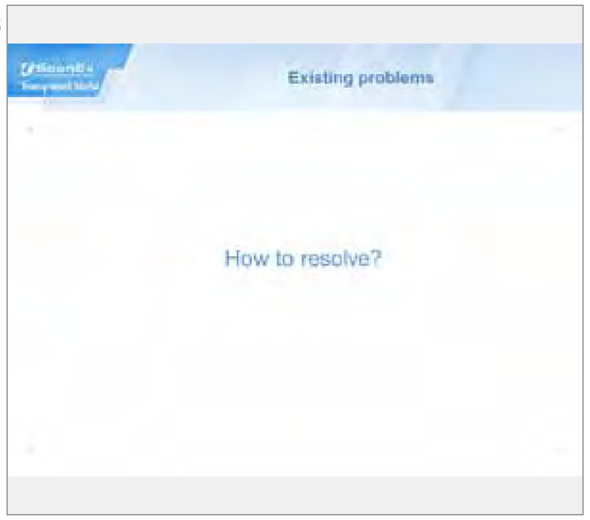

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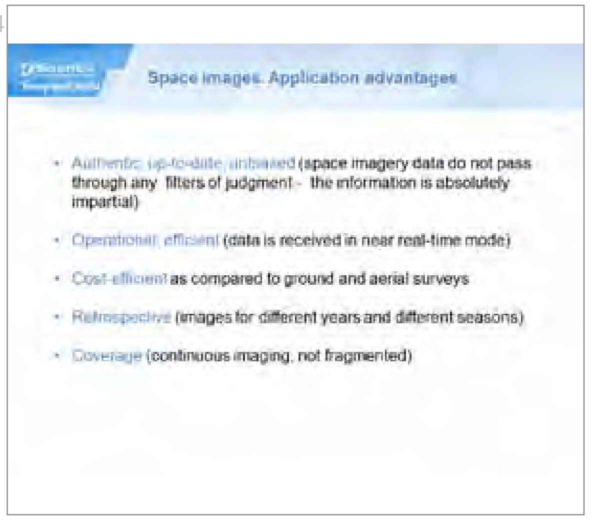

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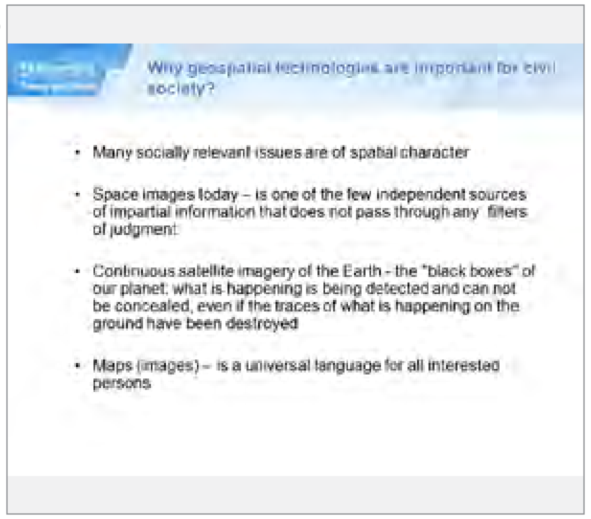

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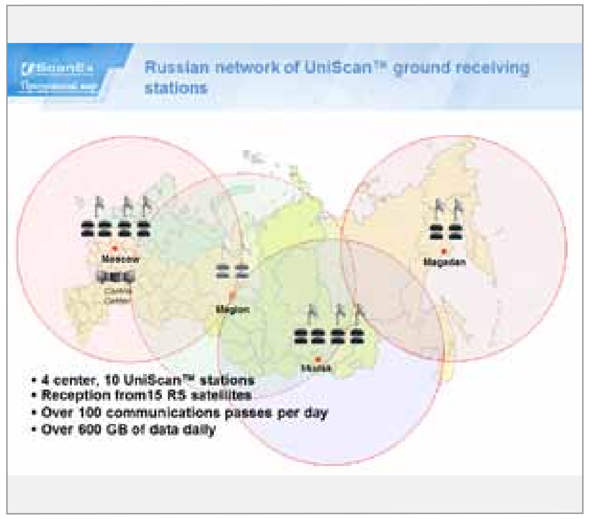

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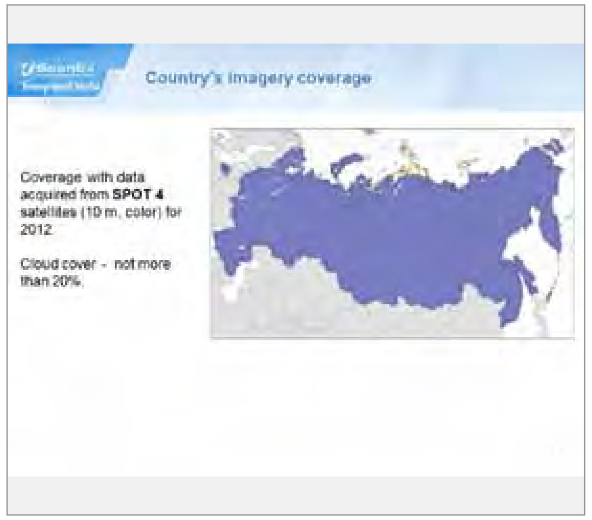

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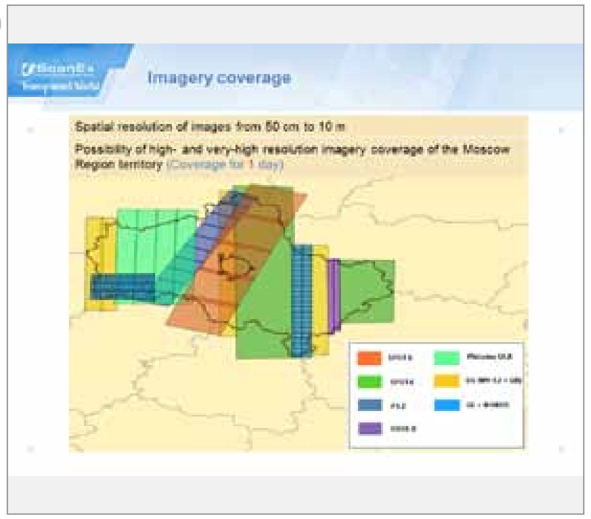

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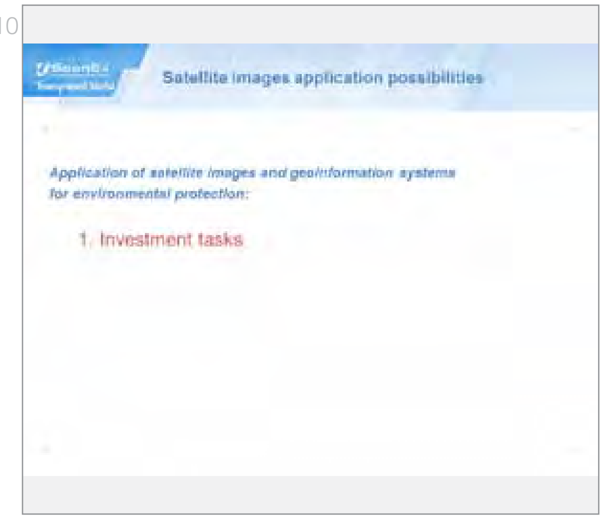

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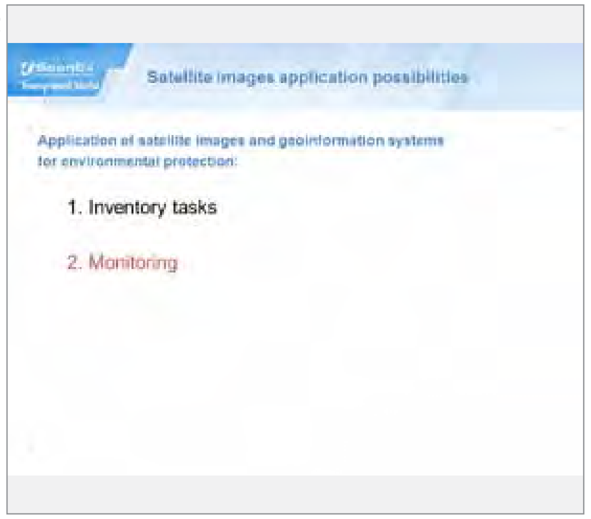

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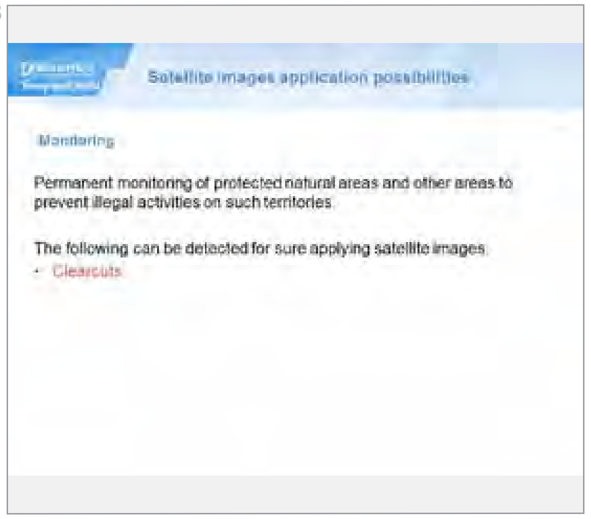

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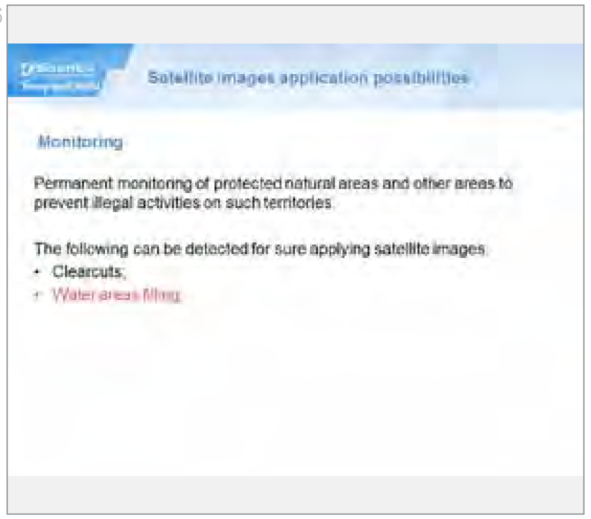

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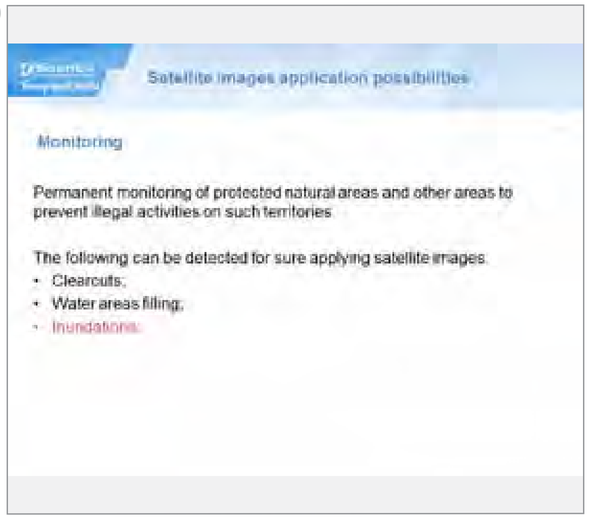

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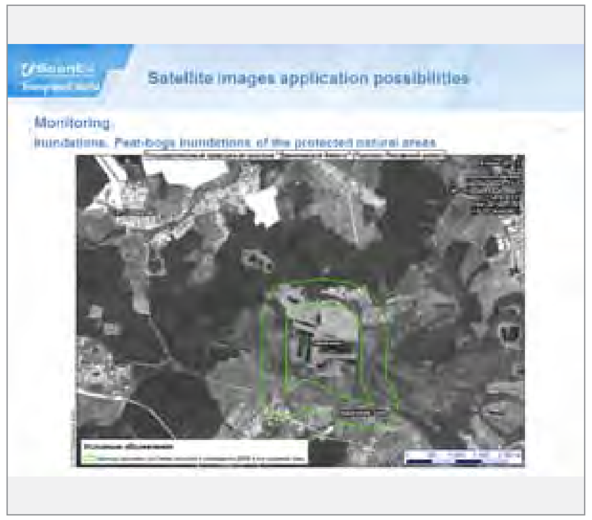

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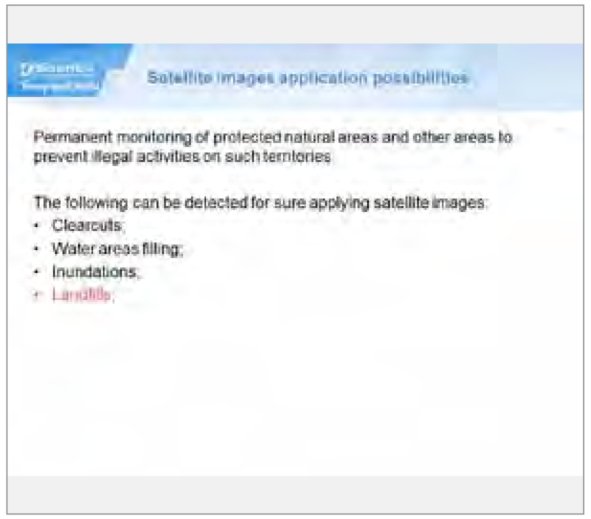

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Satellite images application possibilities

Monitoring.
Solid domestic wastes landfill

26

Satellite images application possibilities

Permanent monitoring of protected natural areas and other areas to prevent illegal activities on such territories

The following can be detected for sure applying satellite images:
- Clearcuts;
- Water areas filling;
- Inundations;
- Landfills;
- Natural resources production

27

Satellite images application possibilities

Monitoring.
Natural resources production. Sand pit

28

Satellite images application possibilities

Monitoring.
Natural resources production. Sand pit

29

Satellite images application possibilities

Permanent monitoring of protected natural areas and other areas to prevent illegal activities on such territories

The following can be detected for sure applying satellite images:
- Clearcuts;
- Water areas filling;
- Inundations;
- Landfills;
- Natural resources production;
- Fires

30

Satellite images application possibilities

Monitoring.
Fires. Automatic detection based on satellite images in near real-time mode

31

Satellite images application possibilities

Permanent monitoring of protected natural areas and other areas to prevent illegal activities on such territories

The following can be detected for sure applying satellite images:
- Clearcuts;
- Water areas filling;
- Inundations;
- Landfills;
- Natural resources production;
- Fires;
- Construction.

32

Satellite images application possibilities

Monitoring.
Construction. Urban sprawl

33

Satellite images application possibilities

Monitoring.
Construction activities on the protected nature area

34

Satellite images application possibilities

Monitoring.
Construction activities on the protected nature area

35

Satellite images application possibilities

Permanent monitoring of protected natural areas and other areas to prevent illegal activities on such territories

The following can be detected for sure applying satellite images:
- Clearcuts;
- Water areas filling;
- Inundations;
- Landfills;
- Natural resources production;
- Fires;
- Construction;
- Pests attacks on vegetation

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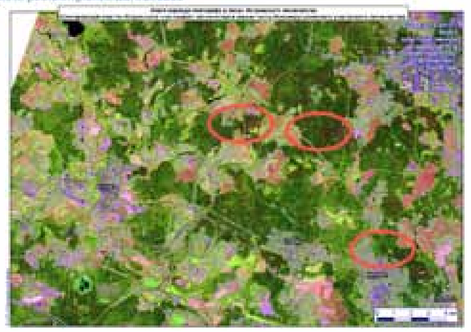
Satellite images application possibilities

Monitoring.
Attacks of pests on plants. Bark beetles



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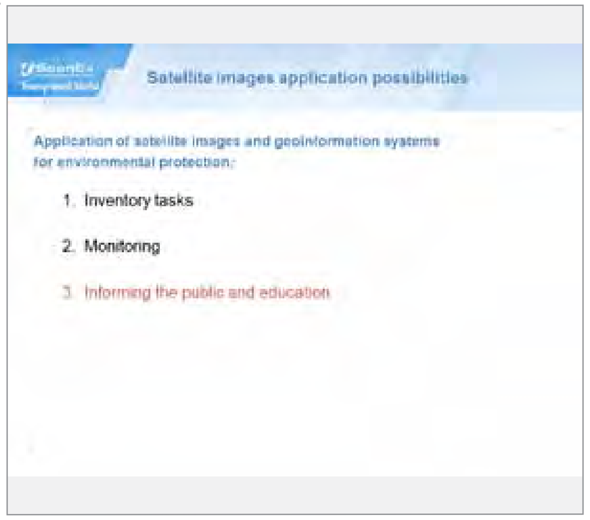

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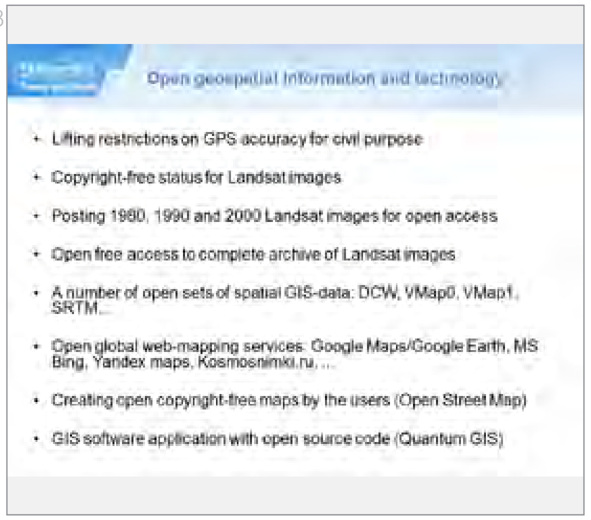

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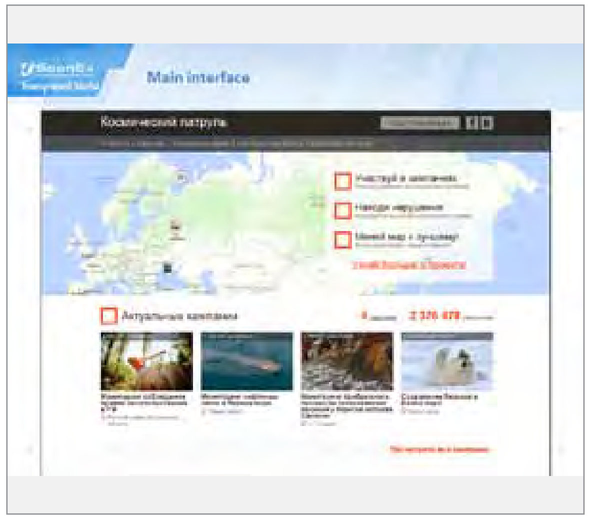

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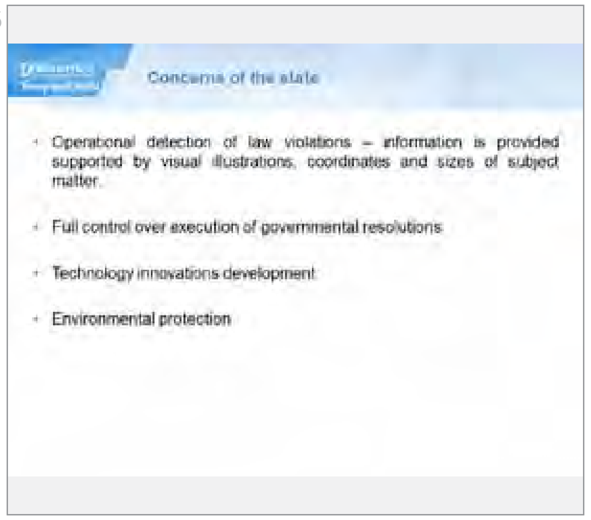

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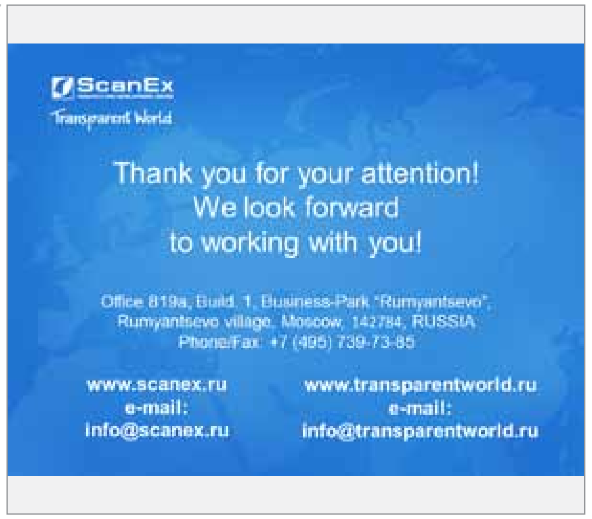

Prevention and Management of Natural Disasters

Dr. Philippe Courrouyan, Director, Asean CLS

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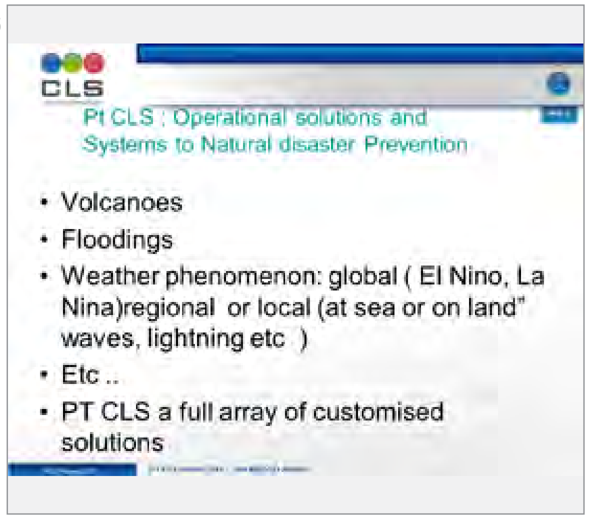

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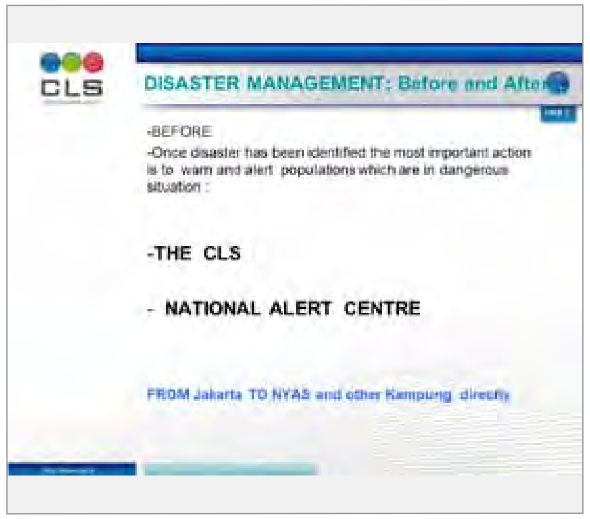

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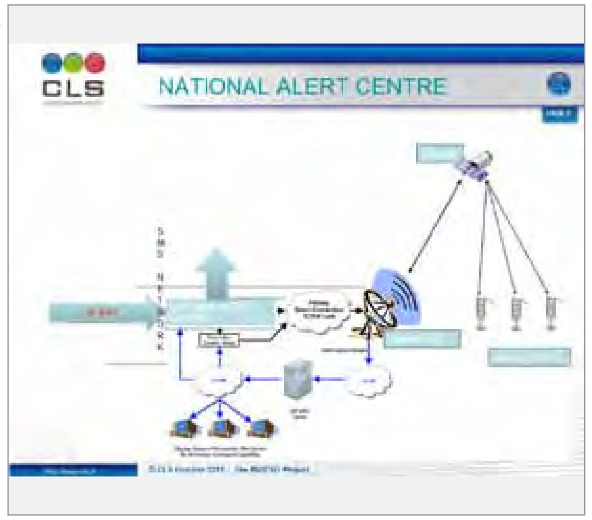

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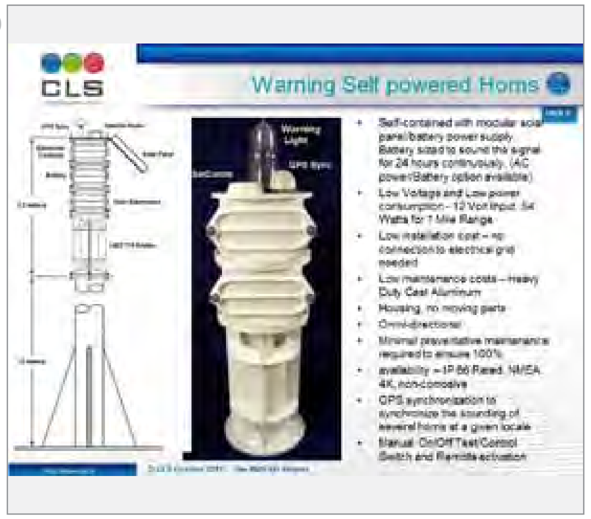

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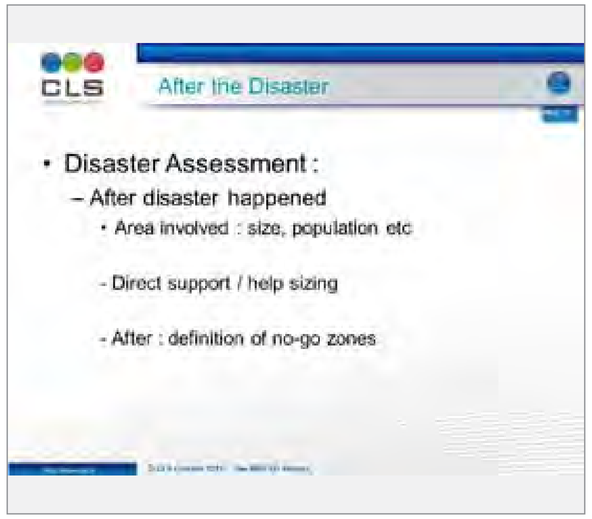

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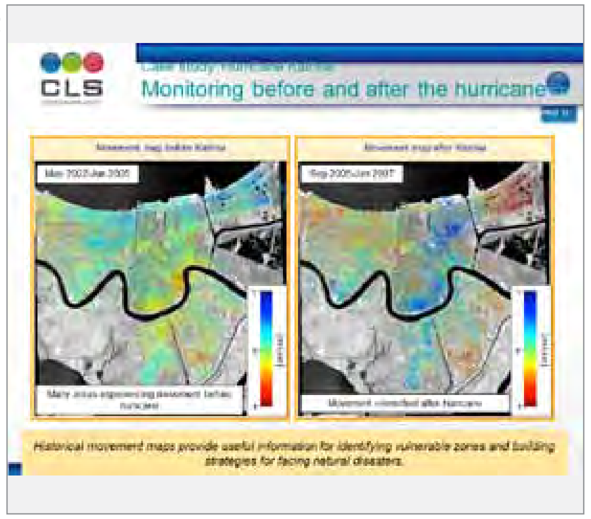

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Closing Remarks

Maksim Zayko
Head of International organizations unit, International Cooperation Unit,
EMERCOM of Russia

Dear colleagues!

Firstly, I would like to thank everybody present for the fruitful work during the seminar. In these two days, we have gained an understanding not only about the various methods of remote sensing of Earth, but of further ways of developing this prospective technology. Representatives of different countries have presented us their plans of building groups of future satellite groups, as well as giving a detailed classification of already existent satellite systems.

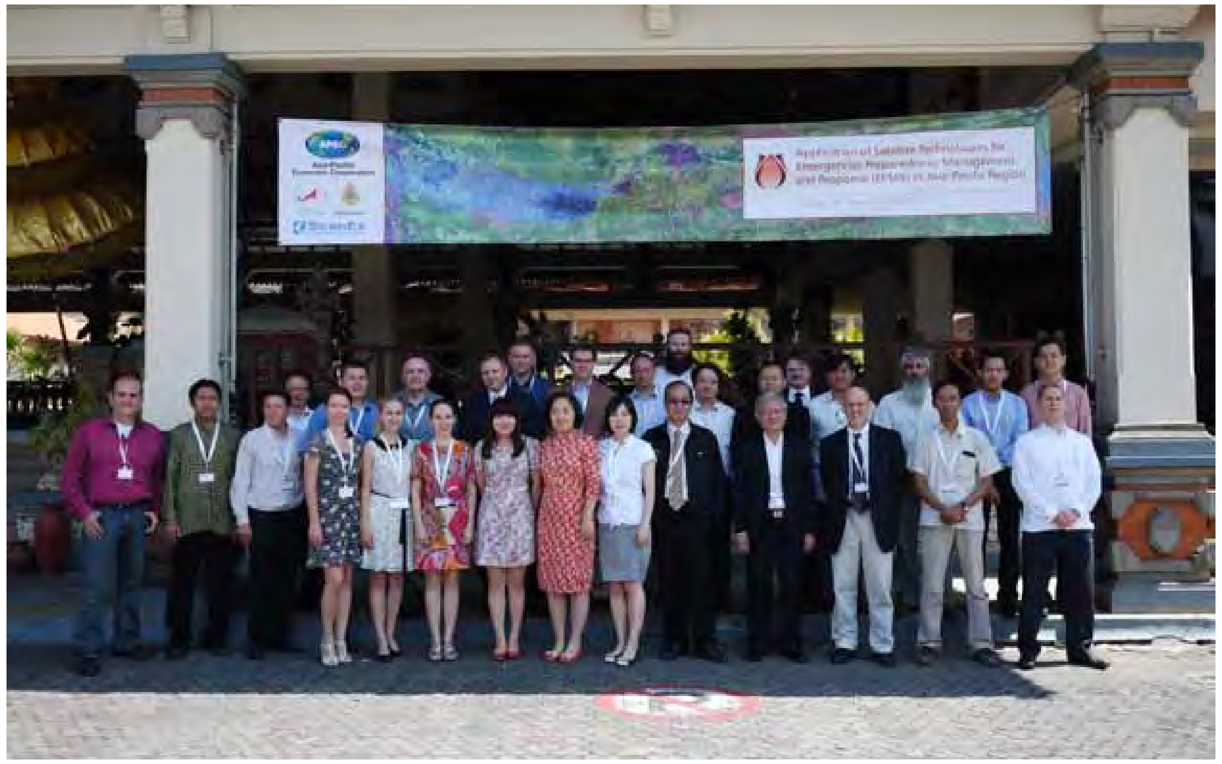
EMERCOM of Russia has demonstrated practical methods of application of cosmic monitoring with the purpose of prevention and elimination of consequences of natural disasters - thanks to which, largely, it was possible to prevent losses of human lives, through real-life examples, including the example of the full-scale flooding in the Far Eastern region of the Russian Federation.

The results of the fruitful work in the working groups will be the recommendations, which EMERCOM of Russia, together with Roscosmos and SCANEX company, will send to APEC Secretariat. It is evident to us already, that on must continue to meeting s and exchange of experience on the topic at hand. However, EMERCOM of Russia believes, that it is necessary to widen the circle of participants for such events and attract not only experts that deal with the issue of practical applications of cosmic monitoring, but also mid- and top-managers. Only through common efforts can we widen the spheres of application of remote sensing of Earth, and improve regular information exchange.

Russian Federation, represented by EMERCOM of Russia, is always open for cooperation and exchange of practice in the area of prevention and elimination of all types of natural and man-made disasters, as well as other types. Once again, thank you to all the participants!

We wish you great cosmic weather!

Pictures




Application
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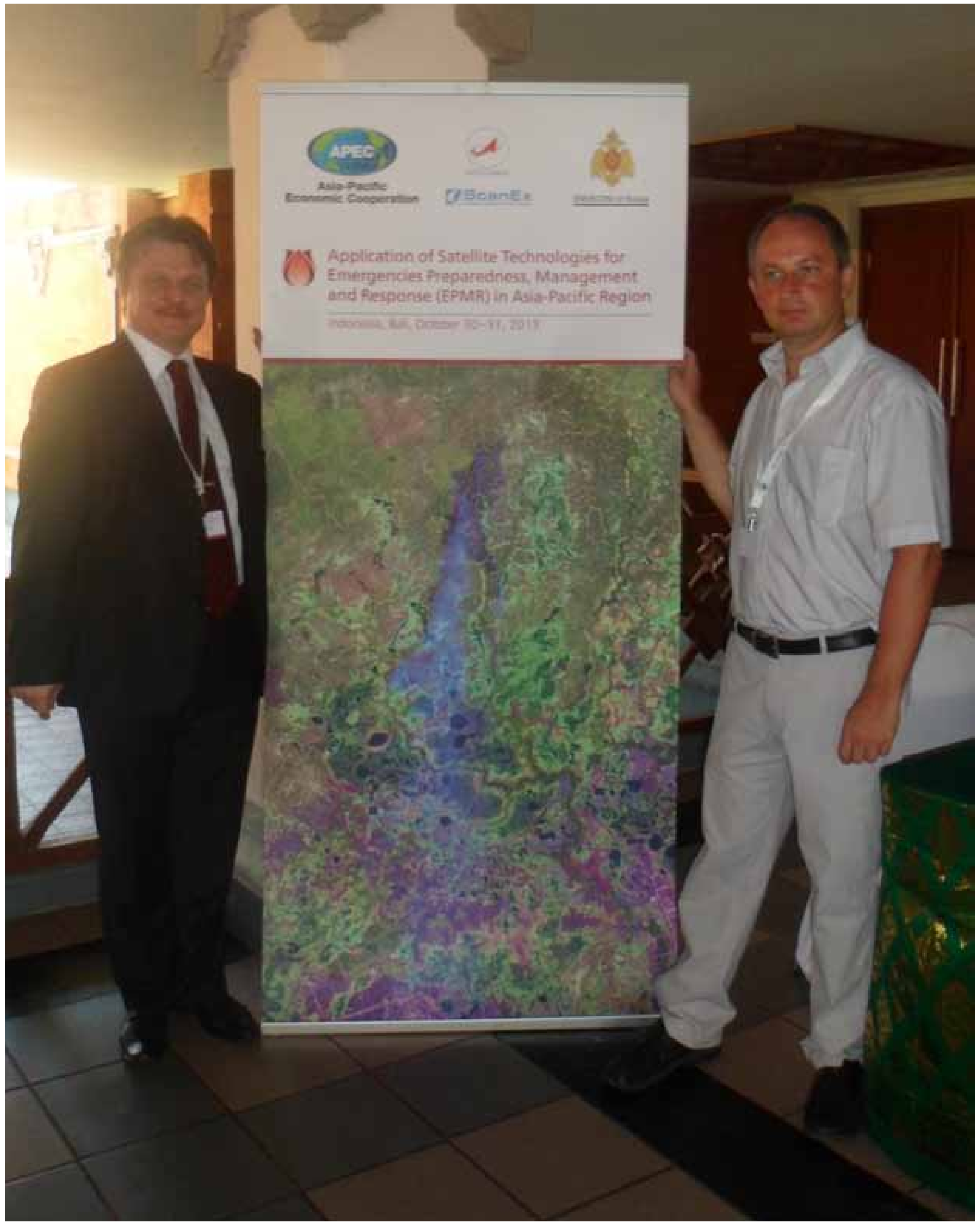
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Economic Cooperation
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Indonesia, Bali, October 30-31, 2013


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The Depth of Risk Study


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