German Aerospace Center (DLR)

Bringing Disaster Management Information to the Web: Efforts at the German Remote Sensing Data Center

Stefan Plattner

DLR-DFD
The German Remote Sensing Data Center (DFD)

Staff: ~200 People in 7 Departments

- National Ground Segment (Neustrelitz)
- International Ground Segment
- Information Technology
- Atmosphere
- Land Surface
- Civil Crisis Information and Geo Risks
- Scientific Communication and Visualization (GeoVIS)
The German Remote Sensing Data Center (DFD)
International Charter ‘Space and Major Disasters’

- DLR joined in 2010
- TerraSAR-X/TanDEM-X
- up to 1m resolution

- ~250 scenes delivered (archived and newly acquired)
The Center for Satellite Based Crisis Information (ZKI)
The Center for Satellite Based Crisis Information (ZKI)

Technical Expertise

- Data Reception
- Data Archiving
- Data Management

Applications Competence

- Geo Risks
- Crisis Information

- Political Decision Makers
- Situation Centers

- Relief Organisations
- Public
Publishing ZKI Products via the Web
Welcome to the Center for Satellite Based Crisis Information

The Center for Satellite Based Crisis Information (ZKI) presents a service of the German Remote Sensing Data Center (DLR) of DLR. It provides a 24/7 service for the rapid provision, processing and analysis of satellite imagery during natural and environmental disasters, for humanitarian relief activities and civil security issues worldwide. The resulting satellite based information products are provided to relief organisations and public authorities and are also freely available on the ZKI website.

Read more

Tropical storm in Mozambique

2 March 2012, 23:59 CET

On March 2, 2012, Tropical storm IRINA struck Madagascar at about 00:00 GMT and is forecasted to strike Mozambique as a tropical cyclone at about 20:00 GMT on March 3.

According to the information supplied by the Joint Typhoon Warning Center (JTWC), the point of landfall will be north the border of Mozambique and South Africa. IRINA is expected to bring 1-minute maximum sustained winds to the region of around 125 km/h (80 mph). The cyclone is expected to cause heavy rain and flash flooding in Mozambique, and storm surges generally between 1.2 and 1.5 metres (4-5 feet).

Full article
**Earthquake in Turkey on October 23, 2011**
23 October 2011, 23:17 CEST - last update on 26 October 2011, 23:52 CEST

On Sunday October 23, 2011 an earthquake with a magnitude of 7.3 at 5 km depth hit the province of Van in eastern Turkey, followed by a series of powerful aftershocks of magnitudes up to 5.6. The epicentre was located at 39° 37' 40.85"N, 44° 29' 5.60"E, at the village of Tabanli 19 km Northeast of the city of Van between the Van Lake and the Iranian border.

**Earthquake in the Qinghai province in China on April 14, 2010**
14 April 2010, 15:45 CEST - last update on 22 April 2010, 17:02 CEST

On April 14, 2010, an earthquake with a magnitude of 6.9 hit the Yushu prefecture in the Qinghai province of China, followed by several aftershocks. Many hundred people were reported dead, injured or missing. Buildings collapsed or were severely damaged. Road network and communication lines were interrupted.

**Earthquake in Turkey on March 8, 2010**
10 March 2010, 10:51 CET - last update on 10 March 2010, 13:30 CET

On March 8, 2010, an earthquake of magnitude 6.0 struck the eastern part of Turkey near the city of Elazig. Many aftershocks followed. Numerous residential buildings in the adjacent villages were destroyed, according to press reports 51 people were killed and hundreds became homeless.

**Earthquakes in Haiti on January 12, 2010**
13 January 2010, 12:40 CET - last update on 12 February 2010, 10:24 CET

On January 12, 2010 a severe earthquake took place at the coast of Haiti with a magnitude of 7.0 causing major damage. The epicentre was registered about 10 km deep and 16 km southwest of the capital city Port-au-Prince. In the city a large number of buildings such as the palace, government and UN-buildings, embassies and hospitals were affected or destroyed.
World Map of ZKI Activations
<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Topic</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 March 2012, 23:59 CET</td>
<td>Tropical storm in Mozambique</td>
<td>Severe Storm and Hurricane</td>
<td>Mozambique</td>
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<tr>
<td>10 February 2012, 20:39 CET</td>
<td>Flood in Bulgaria</td>
<td>Flood</td>
<td>Bulgaria</td>
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<tr>
<td>24 January 2012, 23:33 CET</td>
<td>Flood in Mozambique</td>
<td>Flood</td>
<td>Mozambique</td>
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<td>3 January 2012, 22:10 CET</td>
<td>Fires in Chile</td>
<td>Wild Fire and Burn Scars</td>
<td>Chile</td>
</tr>
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<td>23 November 2011, 16:35 CET</td>
<td>Forest fires in Bulgaria</td>
<td>Wild Fire and Burn Scars</td>
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<td>6 November 2011, 21:30 CET</td>
<td>Forest fires in Romania</td>
<td>Wild Fire and Burn Scars</td>
<td>Romania</td>
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<td>23 October 2011, 23:17 CET</td>
<td>Earthquake in Turkey on October 23, 2011</td>
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<tr>
<td>27 September 2011, 20:39 CET</td>
<td>Parking occupancy at the NRW-Day and German Unity Day, Bonn 2011, Germany</td>
<td>Exercise</td>
<td>Germany</td>
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<td>14 September 2011, 11:00 CET</td>
<td>P-16 CAPSHEX exercise on CBRN threats held in the Podkarpackie Region, Poland</td>
<td>Exercise</td>
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<td>Floods in Pakistan</td>
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<td>28 July 2011, 11:40 CET</td>
<td>Famine in East Africa</td>
<td>Humanitarian Crisis</td>
<td>Ethiopia, Somalia</td>
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<td>8 June 2011, 17:40 CET</td>
<td>Volcanic eruption in Chile</td>
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<td>5 May 2011, 00:32 CET</td>
<td>Dune fires in the Netherlands</td>
<td>Wild Fire and Burn Scars</td>
<td>Netherlands</td>
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<td>11 April 2011, 19:23 CET</td>
<td>Forest fires in Bulgaria</td>
<td>Wild Fire and Burn Scars</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>11 March 2011, 15:27 CET</td>
<td>Earthquake and Tsunami in Japan</td>
<td>Tsunami</td>
<td>Japan</td>
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<tr>
<td>24 February 2011, 18:56 CET</td>
<td>Civil unrest in Libya</td>
<td>Humanitarian Crisis</td>
<td>Egypt, Libya, Malta</td>
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</tbody>
</table>
**Tropical storm in Mozambique**  

On March 2, 2012, Tropical storm 'Toto' affected Mozambique with 1-minute maximum sustained winds between 12 and 15 metres (4-5 ft).

**Flood in Bulgaria**  
Freitag, 10. Februar 2012 20:55

Due to heavy snow that has covered the roads and limited conditions and the water released from reservoirs and melted snow, flooding occurred.

**Flood in Mozambique**  

On January 24, 2012, Mozambique’s coast was hit by the tropical depression ‘Dando’ followed by cyclone ‘Funso’. With wind speeds up to 220 km/h and torrential rains, storms have caused severe damages and floods.
Fireservice Map

Special Service:
- Get fires of last seven days as a Web Feature Service (WFS) or a Web Map Service (WMS).
- Get today’s fire hotspots as a Google Earth KML file.
Fire service overpasses

This is a table of the last 50 overpasses, with one or more fires detected. Click on the magnifier icon to zoom into the image.

<table>
<thead>
<tr>
<th>Icon</th>
<th>No. of fires</th>
<th>Time (UTC)</th>
<th>Date</th>
<th>Platform and sensor</th>
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<tr>
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<td>3</td>
<td>13:07:00</td>
<td>2012-04-22</td>
<td>MODIS - aqua-1</td>
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<td>2012-04-22</td>
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<td>08:07:00</td>
<td>2012-04-22</td>
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<td>12:23:00</td>
<td>2012-04-21</td>
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</table>
Fireservice statistics predefined

Fires detected in 'Russia' over the period of last 7 day(s)

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of fire detections</th>
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<tbody>
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<td>2012-04-16</td>
<td>113</td>
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<tr>
<td>2012-04-17</td>
<td>24</td>
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<tr>
<td>2012-04-18</td>
<td>64</td>
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<tr>
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<td>12</td>
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<tr>
<td>2012-04-20</td>
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<tr>
<td>2012-04-21</td>
<td>40</td>
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<tr>
<td>2012-04-22</td>
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</table>

Number of fire detections

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<tr>
<th>Status</th>
<th>Country</th>
<th>Region</th>
<th>Province</th>
<th>CLC type</th>
<th>Date</th>
<th>Time</th>
<th>Lat, Lon.</th>
<th>Sensor</th>
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<tr>
<td>486701</td>
<td>Russia</td>
<td>Russia</td>
<td>Nordkaukasus-Gebiet</td>
<td>Cultivated and managed areas</td>
<td>2012-04-18 08:31:00 41.694448.0841</td>
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<td>Mosaic: Cropland / Shrub and/or grass cover</td>
<td>2012-04-18 08:31:00 41.631246.7257</td>
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<tr>
<td>486708</td>
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<td>Nordkaukasus-Gebiet</td>
<td>Tree Cover, broadleaved, deciduous, closed</td>
<td>2012-04-18 08:31:00 37.804745.6742</td>
<td>MODIS-terra-1</td>
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<td>486709</td>
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<td>Nordkaukasus-Gebiet</td>
<td>Regularly flooded shrub and/or herbaceous cover</td>
<td>2012-04-18 08:31:00 38.352145.3796</td>
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<td>486710</td>
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<td>Nordkaukasus-Gebiet</td>
<td>Tree Cover, needle-leaved, evergreen</td>
<td>2012-04-18 08:31:00 37.987345.2251</td>
<td>MODIS-terra-1</td>
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<td>486711</td>
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<td>Nordkaukasus-Gebiet</td>
<td>Mosaic: Cropland / Tree Cover / Other natural vegetation</td>
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Earthquake and Tsunami in Japan

11 March 2011, 15:27 CET - last update on 13 March 2011, 18:15 CET

An earthquake of magnitude 9.0 hit north-east Japan followed by a series of powerful aftershocks and Tsunamis. The epicentre of the earthquake is located 400 km away from the capital Tokyo at a depth of 32 km. The earthquake occurred at 14:46 local time (05:46 GMT) on March 11. The areas most affected are the prefectures of Miyagi, Fukushima, and Ivate.

The town of Sendai was severely affected and a tsunami of more than 10 m height hit the coastline. Massive surges of debris-filled water swept away buildings, cars and ships and were reaching far inland. Fires occurred in several cities, and nuclear power plants, refineries, airports, and parts of the transport networks were shut down.

Apart from the downloadable maps below, ZKI also provides an interactive web mapping component showing selected satellite imagery, making it possible to compare pre- and post disaster images. As work progresses, more interactive images will become available. Click here to get to the application.

Click here to get an overview of recent map products (KMZ-file for Google earth - 20.84 MB).

Click here to get an overview of recent map products as map extents (KMZ-file for Google earth - 6.92 KB)

Products

Disaster Extent Map - Japan - Sendai Region
16 March 2011, 17:42 CET
Map type: Satellite Map
Producer: DLR
Scale: 1:150 000
Print size: DIN A1
Full view

TerraSAR-X Change Analysis of Sendai Area, Japan
Map type: Satellite Map
Producer: DLR
Scale: 1:75 000
Print size: DIN A1
Full view

Estimated directly affected inhabitants by tsunami inundation and debris - Japan, Honshu
18 March 2011, 16:04 CET
Map type: Satellite Map
Producer: DLR
Scale: 1:85 000
Print size: DIN A1
Full view
TerraSAR-X Change Analysis of Sendai Area, Japan


Map type: Satellite Map
Producer: DLR
Scale: 1:75 000
Print size: DIN A1

Downloadable products:
- Low resolution map (JPEG, 1.03 MB)
- Medium resolution map (JPEG, 3.39 MB)
- KMZ file for Google Earth (1.03 MB)

Please login in order to download the following products:
- High resolution map (JPEG, 10.34 MB)
- ESRI world file for high resolution map (91 bytes)

Login/Registration
Downloadable Crisis Map

Pros:

• large print format
• no computer, no internet needed when printed

Limitations:

• scale
• extent
• content
• time

Field work: printed maps ✅

Office: better solution ❓
Interactive Web Mapping
Interactive Web Mapping
Interactive Web Mapping
Interactive Web Mapping
Interactive Web Mapping
Interactive Web Mapping
Publishing Risk Information via the Web

Indian Ocean

Coastal Regions
(broad scale assessment, 100k)

Pilot Areas
(detailed assessment, 25k)

4 available risk products:
- hazard maps
- vulnerability maps
- evacuation time maps
- risk maps
Publishing Risk Information via the Web

ETA min: 20 min
ETA med: 80 min
Publishing Risk Information via the Web
Publishing Risk Information via the Web
Publishing Risk Information via the Web

Tsunami Risk Indonesia
Application based on ArcGIS for Flex

Legend
- Evacuation Time Java Bali
  - 0-20
  - 20-40
  - 40-60
  - 60-80
  - > 80
- Safe Areas (major warning)

- Munich
- Germany
- Europe
- Indonesia
- Bali
- Cilacap
- Padang
- Japan

Tsunami Risk Assessment Data
- Bali
  - Hazard
  - Exposure Bali
- Evacuation Time
- Risk
- Cilacap

GITEWS
DLR
Ongoing Research and Development (Examples)
Disaster and Civil Security: The VABENE Project

**Airborne Platform (FX)**
- 3K Camera System (MF)
- SAR (HR)
- Microwave Link (KN/MF) 20 MBit/s
- Optical Link (KN) 1.25 GBit/s

**Data Transmission**
- Microwave Link (KN/MF)
- Optical Link (KN)

**EmerT-Portal (TS)**

**ZKI Portal (DFD)**

**DMT (KN)**

**Mobile Ground Station (KN)**
Disaster and Civil Security: The VABENE Project

downloadable maps and map series
services and interactive web applications
EOC Geodata Access (GDAS)
3D/4D Visualization of Disaster Management Information
Thank you for your attention!