



© 2005 Space Imaging Middle East (LLC) / Distributed by European Space Imaging

Pakistan: pre- and post-earthquake assessment
 High-resolution imagery draped over a digital elevation model can give a realistic, three-dimensional view of terrain to aid in assessment and mission planning. Pre- and post-event imagery of the area affected by the Kashmir-region earthquake of October 2005 has been combined with vector layers showing areas of landslide, waterways, lines of communication and assessed serviceability of bridges. When produced in softcopy as a geographical information system, this provides a valuable planning tool that can be easily updated with information from teams on the ground.

IMPROVING precision

THE EUROPEAN UNION SATELLITE CENTRE (EUSC)

IS CONTINUOUSLY SEEKING TO IMPROVE THE PRODUCTS IT DELIVERS AS MANDATED BY ITS STAKEHOLDERS. ITS REMIT INCLUDES TECHNICAL DEVELOPMENT ACTIVITIES IN SUPPORT OF ITS OPERATIONAL ACTIVITIES, AS WELL AS SPECIALIZED TRAINING FOR ITS IMAGE ANALYSTS AND EXTERNAL PARTICIPANTS FROM MEMBER STATES AND THIRD-PARTY NATIONS.

As part of its operational activities, notably European Union crisis management operations, the EUSC provides products derived from the analysis of satellite imagery and collateral data, including aerial imagery and related services.

Digital elevation models are used to generate numerous products, including:

- relief maps ■ basemaps ■ rendering of 3D visualizations ■ rectification of satellite imagery
- geographic information systems (SATCEN EARTH, Web map services) ■ line-of-sight analysis
- surface analysis.





The EUSC in Torrejón de Ardoz, Spain.

► To obtain the abovementioned products in a reliable, efficient, consistent and accurate manner; a Data Preparation section was formed to handle raw data before they are delivered to image analysts for further exploitation. Whether a brand new area is being looked at, located anywhere on the globe, or an area of interest is being monitored where image registration is a must, the highest level of geographic accuracy and consistency can only be obtained through orthorectification.

To this end, a low-cost, efficient approach was adopted and implemented using Landsat 7 orthorectified imagery as a horizontal reference and SRTM data as a vertical reference. Landsat 7 global coverage of Earth's surface provides a ground sample distance of 15 metres. SRTM data offer a post spacing of 90 metres. Both are available on line via the Operations network. Using this process, it is safe to state that the delivered orthorectified image offers an accuracy of 50 metres rms.

The European Union Satellite Centre (EUSC)

FOCUS

The European Union Satellite Centre (EUSC) was founded in 1992 and incorporated as an agency into the European Union on 1 January 2002. In line with the European Security Strategy, the centre supports EU decision-making with regard to the Common Foreign and Security Policy (CFSP) and in particular the European Security and Defence Policy (ESDP). The centre's staff, headed by the Director Mr. Frank Asbeck, consists of experienced image analysts, geospatial specialists and supporting personnel, recruited from EU member states. The centre also hosts experts on secondment from member states and third-party nations.

The EUSC is located in Torrejón de Ardoz, near Madrid, Spain.

[ADVERTISEMENT]

Geospatial Intelligence

Comprehensive and tailored solutions for Intelligence Systems

- Ground segments for satellites and UAVs
- GeoSpatial Data production and exploitation
- Advanced interpretation tools
- Archiving and dissemination systems

EADS Defence & Security – Networking the Future

www.eads.com

Nevertheless, cases have been observed where the horizontal accuracy has exhibited a discrepancy of 200 metres, even in an area with low slope values. Equally, SRTM coverage is limited to 80% of Earth's surface, leaving a considerable area not covered.

Due to the limitations of SRTM and Landsat 7 coverage, and the growing requirements from EUSC stakeholders for better accuracy, the only choice is to adopt more reliable and more accurate reference data. SPOT Reference 3D products have now been used in several areas of the world where the EUSC considers that it is crucial to satisfy the ambitious requirements laid down by its users.

The experience EUSC has already gained with SPOT Reference3D means it is ideally placed to draw some conclusions about the product. Advantages include available coverage (42 million data points), guaranteed and uniform horizontal accuracy of 15 metres CE90, and DEM quality masks. Higher detail thanks to the 30-metre DEM post spacing solves the misregistration problems that can often occur. Furthermore, there are no gaps in the data (a problem frequently encountered with SRTM data) and quality and traceability are assured.

There are some disadvantages, due to the higher detail of the elevation model. At steep acquisition angles it is possible to observe after orthorectification 'irregular-shaped' buildings that were originally straight. To compensate for this effect, a bare-earth elevation model is required and not a surface model, which is what is normally obtained through stereopair correlation.

It is a time-consuming but necessary evil to go through the quality masks to ascertain the real percentage of generated DEM data and exogenous data (which cannot exceed 10% of product coverage).

In conclusion, we can say that the Reference3D database is of great value in terms of the horizontal accuracy of the orthoimagery. This could greatly improve the geographic consistency of EUSC products, particularly with the use of an elevation model that either already exists or could be generated at practically any part of the globe from the 117 sq.km of HRS data. ■

MORE INFORMATION

■ info@eusc.europa.eu

■ www.eusc.europa.eu

