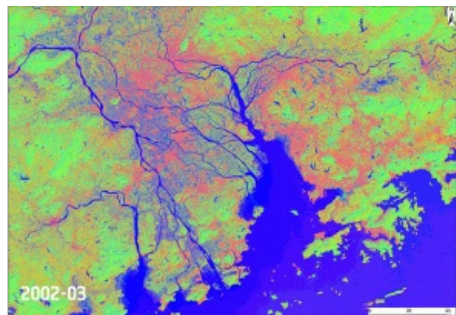# New Data Processor Boosts Urban Monitoring

A new processing tool has been developed to bundle information contained in large amounts of satellite data, paving the way for the wealth of Copernicus Sentinel satellite data to be more easily incorporated into online environment-monitoring services. ESA's online Urban Thematic Exploitation Platform (U-TEP) makes information from satellite data available for the non-expert user for urban environment monitoring. To do this, it processes hundreds of terabytes of data gathered by Earth-observing satellites, and translates them into easy-to-use products for scientists, urban planners and decision-makers.

U-TEP reached a milestone recently with the integration of some 450,000 scenes from the US Landsat-8 mission acquired between 2013 and 2015. The 500TB was reduced to about 25TB thanks to the TimeScan processor developed by the DLR German Aerospace Center. The resulting TimeScan Landsat 2015 product is already available on the U-TEP geobrowser. This novel tool that distils a single information product from a multitude of satellite scenes is a step towards more efficient access, processing and analysis of the massive amount of high-resolution image data provided by the latest satellites.

Cloud computing

The Copernicus Sentinel satellites, for example, are supplying an unprecedented wealth of measurements. By the end of 2017, the operational Sentinel-1, -2 and -3 satellites alone will continuously collect a daily volume of about 20TB of open and free satellite imagery. In the past, users had to individually download and process data on their own computers. Now, mass data can be directly archived and processed at the point of reception for maximum speed and efficiency.

Within U-TEP, user algorithms are brought to the data where they run in cloud computing environments. This avoids the transfer of large amounts of input data and makes it unnecessary for the individual user to set up inhouse computing services.

Pearl River Delta (TimeScan)

In the near future, the TimeScan approach will be used by the U-TEP team to process both Landsat optical imagery and Sentinel-1 radar data to automatically map human settlements with unprecedented precision: 10 m resolution. This will help entities such as scientists, urban planners, environmental agencies or development banks to better understand urbanisation, as well as respond to the challenges posed by growing cities, population increase, climate change and loss of biodiversity.

Data applications

The data processed by TimeScan will not only benefit urban monitoring, but also land use/land cover mapping, agriculture, forestry, the monitoring of polar and coastal regions, risk management and disaster prevention, or natural resource management.

The TimeScan processor is being used at the DLR, IT4Innovation and Brockmann Consult processing centres to create products based on Sentinel-1, Sentinel-2 and Landsat data.

U-TEP is one of six Thematic Exploitation Platforms developed by ESA to serve data user communities. These cloud-based platforms provide an online environment to access information, processing tools and computing resources for collaboration. TEPs allow knowledge to be extracted from large environmental datasets produced through Europe's Copernicus programme and other Earth observation satellites.

The animation (Click on the image above) shows the TimeScan Landsat data derived for the Pearl River delta in China for 2002–03 and 2014–15. The illustrated TimeScan RGB images are composed of the temporal maximum built-up index in red, the maximum vegetation index in green and the temporal mean value of the water index in blue. A specific image analysis algorithm developed by DLR in ESA's SAR4Urban project uses the TimeScan data to map the extent of the built-up area (highlighted in black in the animation) in order to finally pinpoint the urban growth that took place in the region over the last 10 years. (Copyright: DLR)

Source: ESA.