

News Archive

German TanDEM-X radar satellite now complete

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Animation: TanDEM-X and TerraSAR-X

In early 2009, Friedrichshafen-based aerospace company Astrium completed construction of the German radar satellite TanDEM-X. This satellite was created in collaboration with the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR). The satellite, five metres in length and weighing 1.3 tons, has now been transported to Ottobrunn, a town near Munich. In special-purpose test facilities operated by Astrium and IABG, the satellite will undergo trials until mid-September 2009 to confirm its suitability for operation in outer space. It will be subjected to extreme temperatures and radiation and, in particular, the loads experienced during launch will be simulated. Once the tests are completed, the satellite will be transported to the Baikonur Cosmodrome in Kazakhstan.

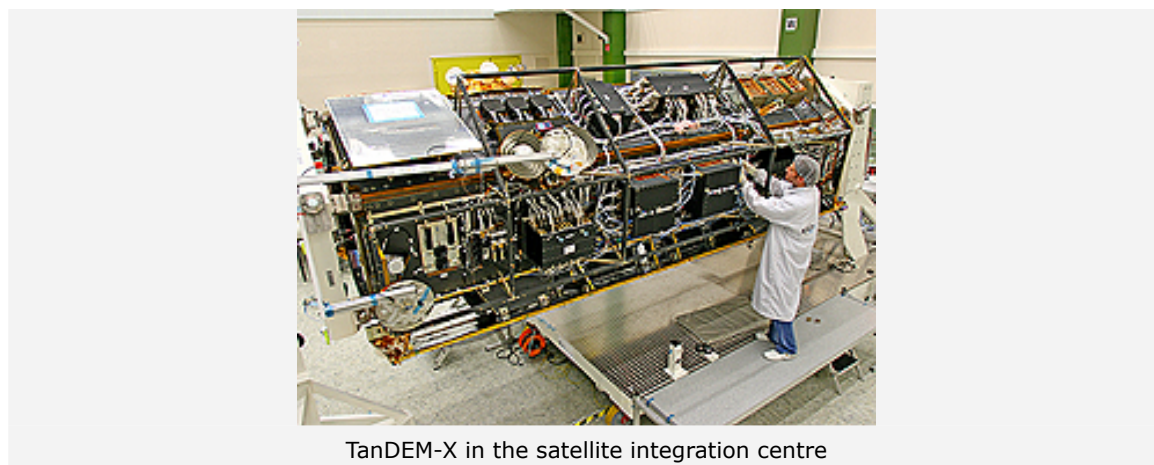
The provisional launch date, on board a Russian Dnepr rocket, is October 2009. TanDEM-X stands for "**T**erraSAR-X **a**dd-**o**n for **D**igital **E**levation **M**easurement".

Close-formation flight scheduled with the successful German satellite TerraSAR-X

TanDEM-X will be working together with its virtually identical twin, the German radar satellite TerraSAR-X, which has been operating for the last two years. Within three years, their combined efforts should culminate in a digital relief model of all the landmasses on Earth, to a level of precision never previously achieved. To accomplish this, the two satellites work in combination to create a radar interferometer, flying in close formation – separated by distances of between 200 metres and a few kilometres.

With the help of the double satellite formation TerraSAR-X/TanDEM-X, it will be possible accurately to measure the entire land surface of the Earth, an area of some 150 million square kilometres, within a period of just three years. This will involve the use of a 12-metre grid (the width of a road) to obtain information on physical relief (altitude), accurate to within just two metres.

Operation right round the clock, under cloud cover and at night



TanDEM-X in the satellite integration centre

The key benefit of satellite-assisted measurement of Earth is the ability to create a globally consistent terrain model without any breaks at regional or national boundaries and free of the inhomogeneities that can arise when different measuring processes are employed, or when measuring 'campaigns' are

run over staggered time periods. Different times or varying techniques cause the recorded segments, known as 'mosaics', to have the equivalent of fracture lines or breaks at their intersection points. The use of radar has a decisive role to play here, since it operates completely independently of weather and clouds, and can also be operated day and night.

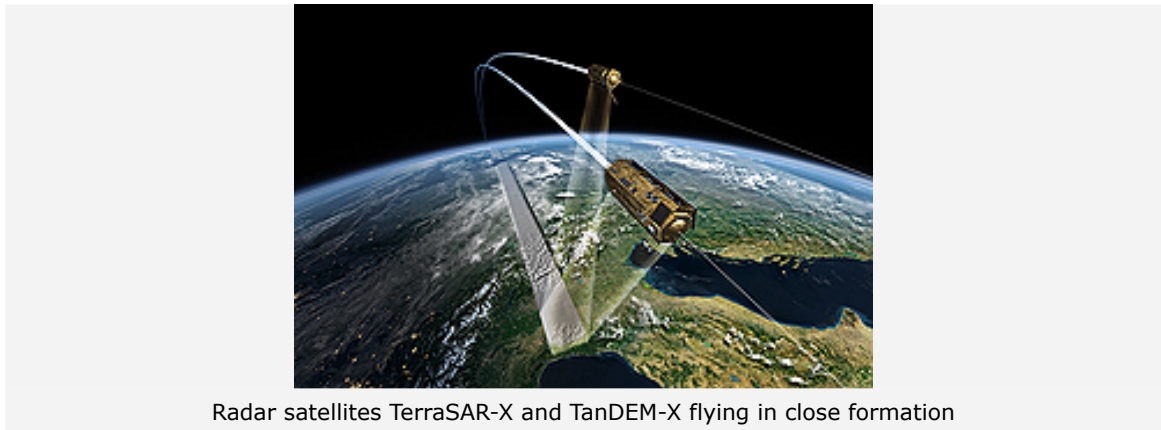
At the present time, this process is entirely free of competitors, and enjoys considerable respect around the globe, especially in the USA. TanDEM-X is a key project, which is intended to demonstrate, refine and further develop German expertise and ability to compete in the field of satellite-assisted radar technology.

When Germany produces its digital terrain model of the Earth in about 2012, it will have an attractive and globally unique data product which – alongside many potential scientific applications – can be employed in initiatives and programmes such as ZKI (the DLR centre for satellite-assisted crisis information), GMES (Global Monitoring for Environment and Security) and GEOSS (Global Earth Observation System of Systems), as well as being incorporated in security-related cooperation agreements.

Project is being implemented in a public-private partnership between DLR and Astrium

The TanDEM-X project – just like its 'sister' mission, TerraSAR-X – is being implemented on a joint basis by DLR and Astrium, in an arrangement known as a Public-Private Partnership (PPP). This PPP agreement defines many aspects of TanDEM-X, including the financing arrangements and the intended use of the data. The partners (DLR and Astrium) are funding the almost 85 million Euro price tag of the satellite jointly: DLR is contributing 59 million Euro, while Astrium is putting in 26 million Euro. DLR is also developing the ground-based infrastructure required for this mission. It is responsible for planning and executing the mission, for controlling both satellites and for generating the digital relief map of Earth. The use of data for scientific purposes is being coordinated by the DLR Institute for High-Frequency Technology and Radar Systems, based in Oberpfaffenhofen. All commercial marketing is being handled exclusively by Infoterra GmbH (Friedrichshafen), a wholly owned subsidiary of Astrium.

About TanDEM-X



Radar satellites TerraSAR-X and TanDEM-X flying in close formation

The primary goal of the TanDEM-X mission is to generate a global digital elevation model. To achieve this, two satellites – TanDEM-X and TerraSAR-X, a satellite of almost identical construction, which has been in orbit since 2007 – will form the first configurable SAR (Synthetic Aperture Radar) interferometer in space with a separation of only a few hundred metres. A powerful ground segment, which is closely interfaced with that of TerraSAR-X, completes the TanDEM-X system. The satellites will fly in formation and operate in parallel for three years to cover the entire surface of the Earth.

DLR is responsible for the scientific exploitation of the TanDEM-X data as well as for planning and implementing the mission, controlling the two satellites and generating the digital elevation model. Astrium built the satellite and shares in the cost of its development and exploitation. As with TerraSAR-X, the responsibility for the commercial marketing of the TanDEM-X data lies in the hands of Infoterra GmbH, a subsidiary of Astrium.

TanDEM-X is being carried out on behalf of the German Aerospace Center (DLR) with funds from the Germany Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie; BMWi) within the context of a Public-Private Partnership with Astrium GmbH bearing the reference code 50 EP 0603.

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