



TanDEM-X: Science Activities and Proposal Submission

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für Luft- und Raumfahrt e.V.
in der Helmholtz-Gemeinschaft

 TANDEM

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Outline

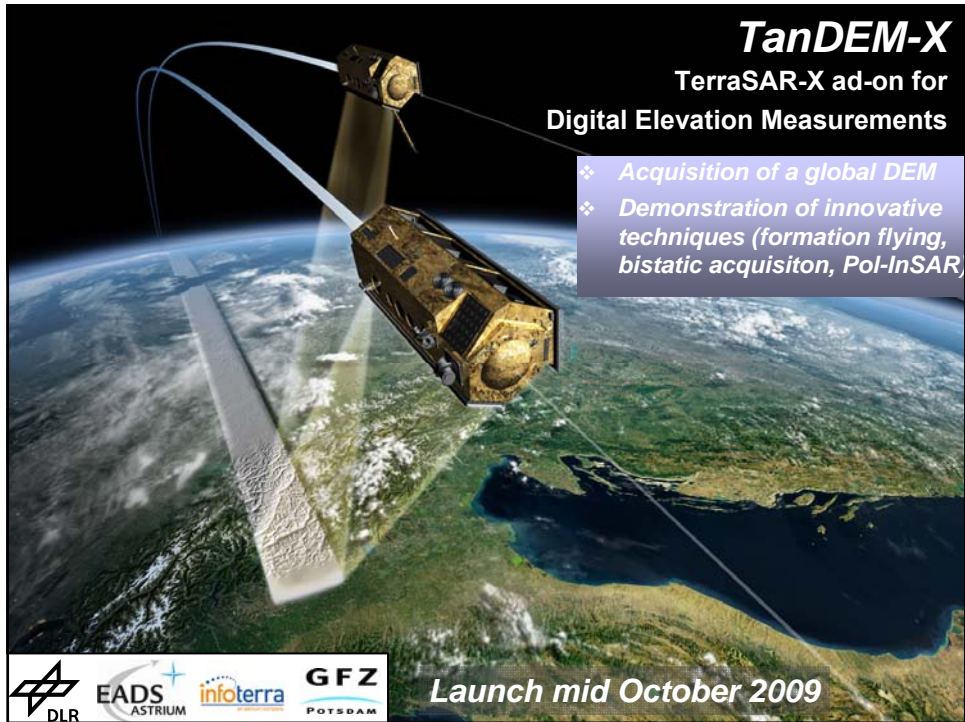
Preparation for the pre-launch ***Announcement of Opportunity*** for TanDEM-X

- What is TanDEM-X?
- What are the capabilities of TanDEM-X?
- Which are the provided products?
- What is the mission status of TanDEM-X?
- How can I submit a proposal?
- What is the time plan?

➤ ***Science Server is opening soon !***

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TanDEM-X

TerraSAR-X ad-on for
Digital Elevation Measurements


❖ Acquisition of a global DEM
 ❖ Demonstration of innovative techniques (formation flying, bistatic acquisition, Pol-InSAR)


Launch mid October 2009

Key Features of TanDEM-X

- TanDEM-X space segment consists of TerraSAR-X satellite (TSX) and the nearly identical TanDEM-X satellite (TDX)
- Launch TSX was June 2007, launch TDX in mid October 2009
- Radar interferometer, flying in a very precise formation for at least 3 years of joint operation
- Mission duration > 5 years
- TanDEM-X ground segment merges with the already operational TerraSAR-X G/S
- Public-private Partnership / co-funding;
- Commercial and scientific usage

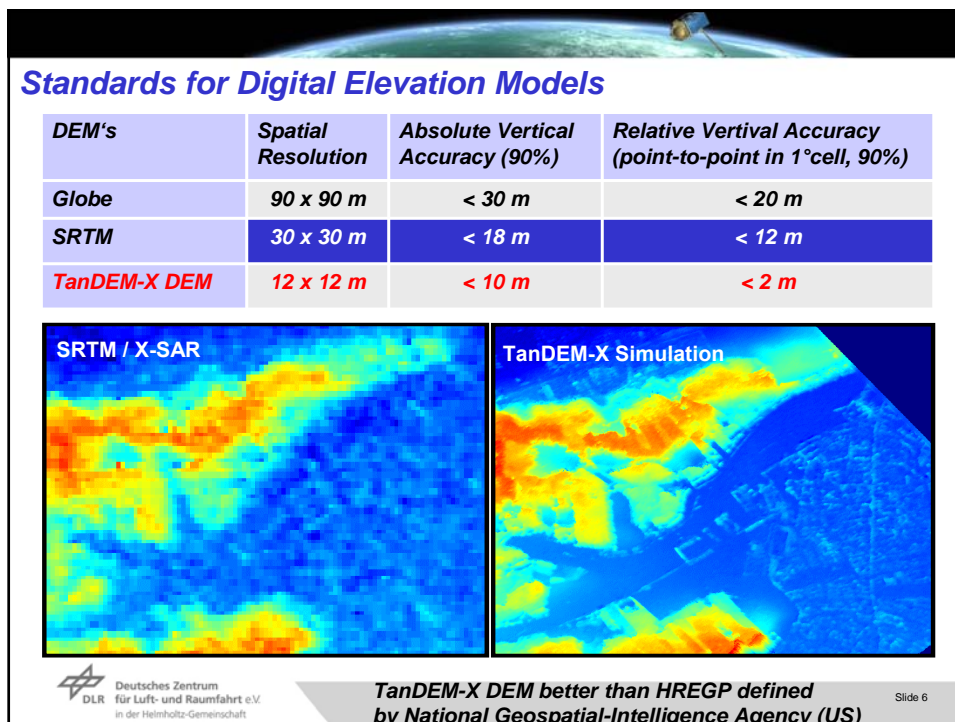
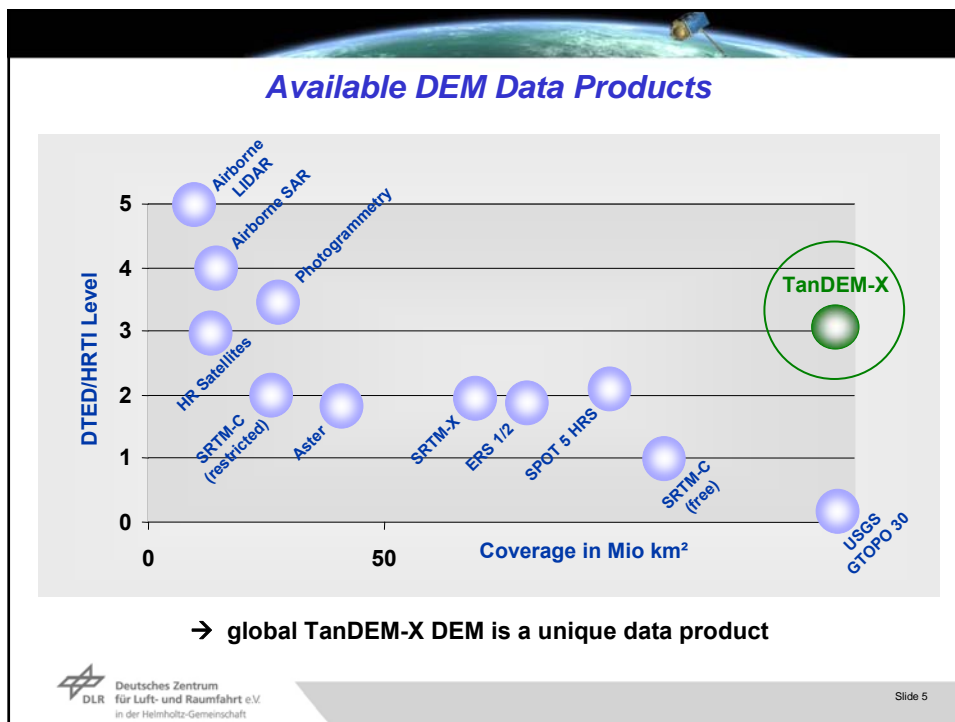



2 years birthday of TSX with a continuously good operation performance



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Identified Scientific Needs

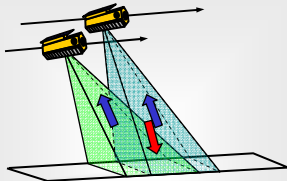
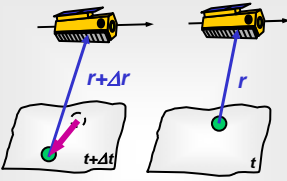
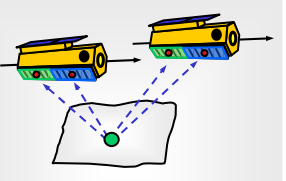
- **Across track InSAR (Digital Elevation Model)**
 - **Development & improvement of algorithm for validation of heights derived from InSAR; Input parameter for a variety of different applications** (e.g. the safety critical aviation terrain database, crisis management (determination of infrastructure), glacier/ice mass changes & retreat, hydrodynamical models, coastal zone lineation, wind fields determination, geological maps, etc.)
 - **Added values and generation of scientific products**
- **Along track InSAR (Velocity Measurements)**
 - **Exploitation of innovative applications** and development of algorithm for velocity measurements for traffic flow monitoring, ocean currents, river flow monitoring
 - **New application and scientific product development**
- **New SAR Techniques (First Technical Demonstrations)**
 - **Demonstration and exploitation of new SAR techniques**, understanding and development of new algorithms for multistatic SAR, polarimetric SAR interferometry, super resolution, digital beamforming, InSAR processing, formation flying
 - **New perspectives for future SAR systems and development of new applications**

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Capabilities of TanDEM-X

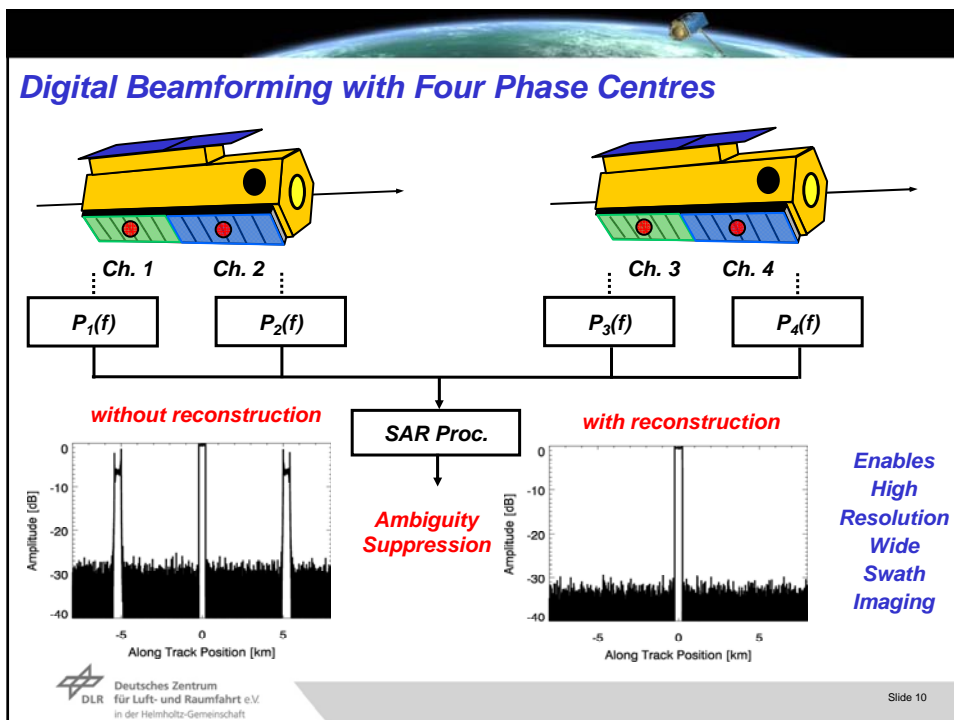
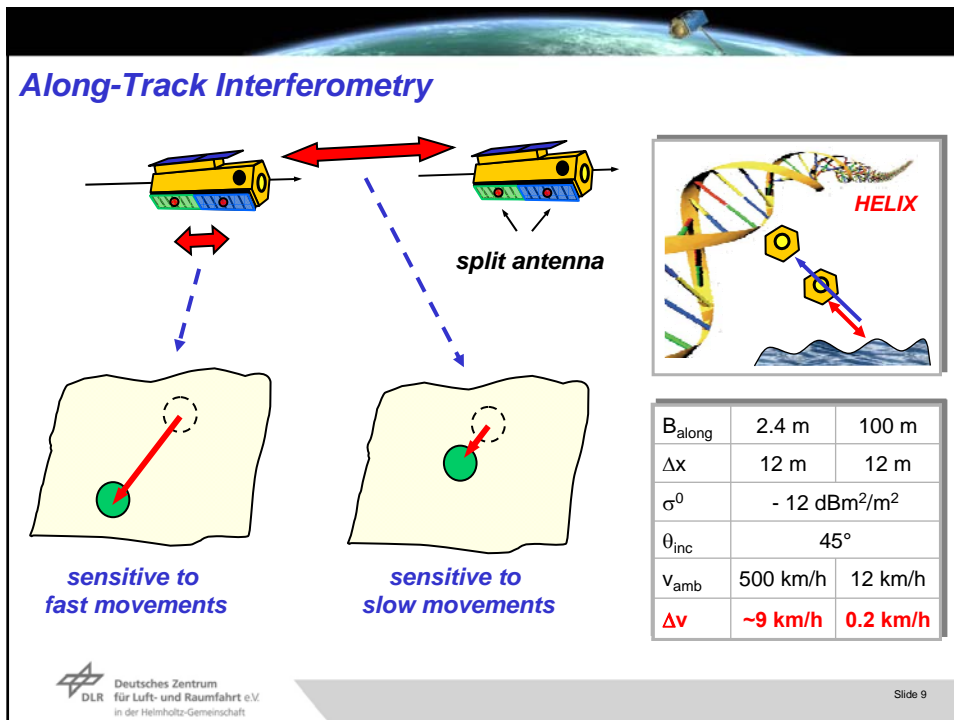
Cross-Track Interferometry	Along-Track Interferometry	New Techniques
 <ul style="list-style-type: none"> → Digital Elevation Models → Spatial Coherence (forest, ...) → Double DInSAR (change maps, ...) → High Resolution SAR Images 	 <ul style="list-style-type: none"> → Large Scale Velocity Fields (ocean currents, ice drift, ...) → Moving Object Detection → Temporal Coherence Maps 	 <ul style="list-style-type: none"> → 4 Phase Center MTI (traffic, ...) → PolInSAR (vegetation height, ...) → Digital Beamforming (HRWS, ...) → Bistatic Imaging (classification, ...)

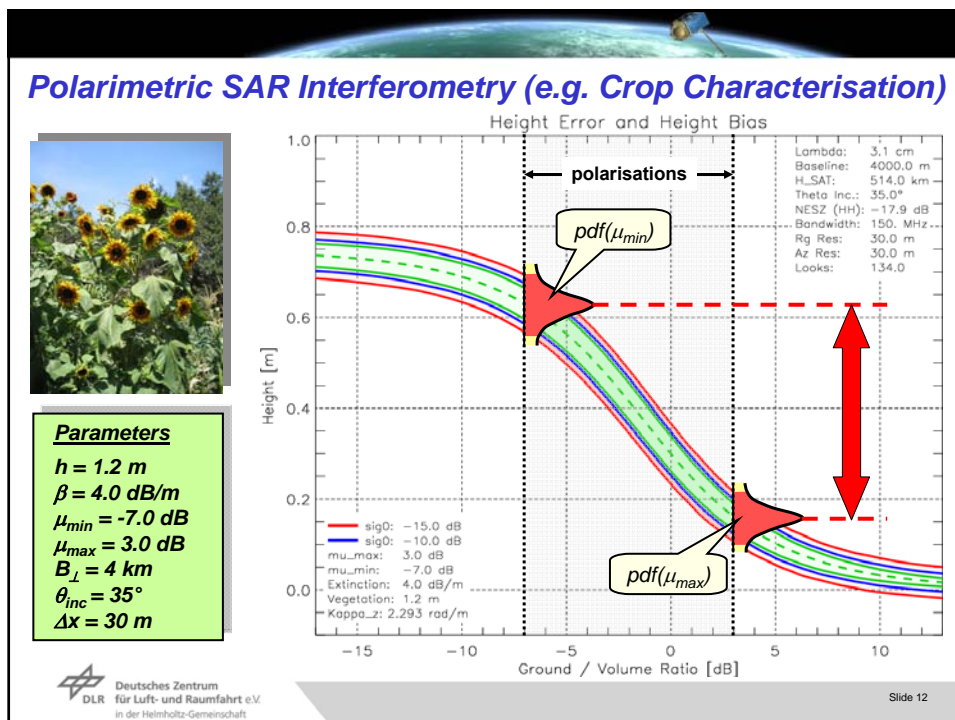
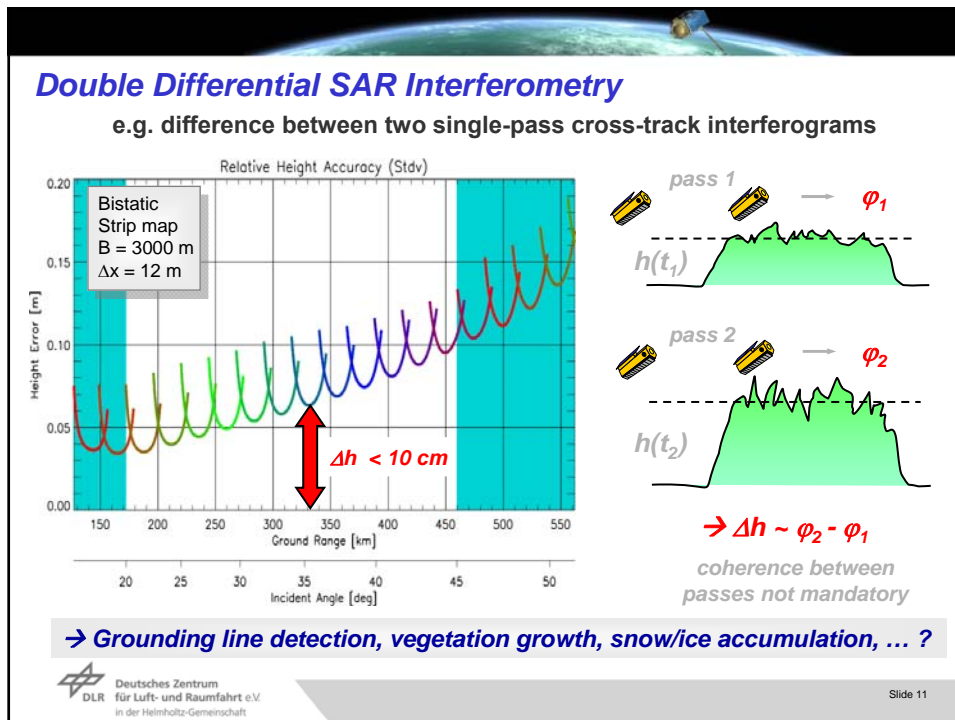
TanDEM-X is a highly flexible sensor enabling multiple powerful imaging modes

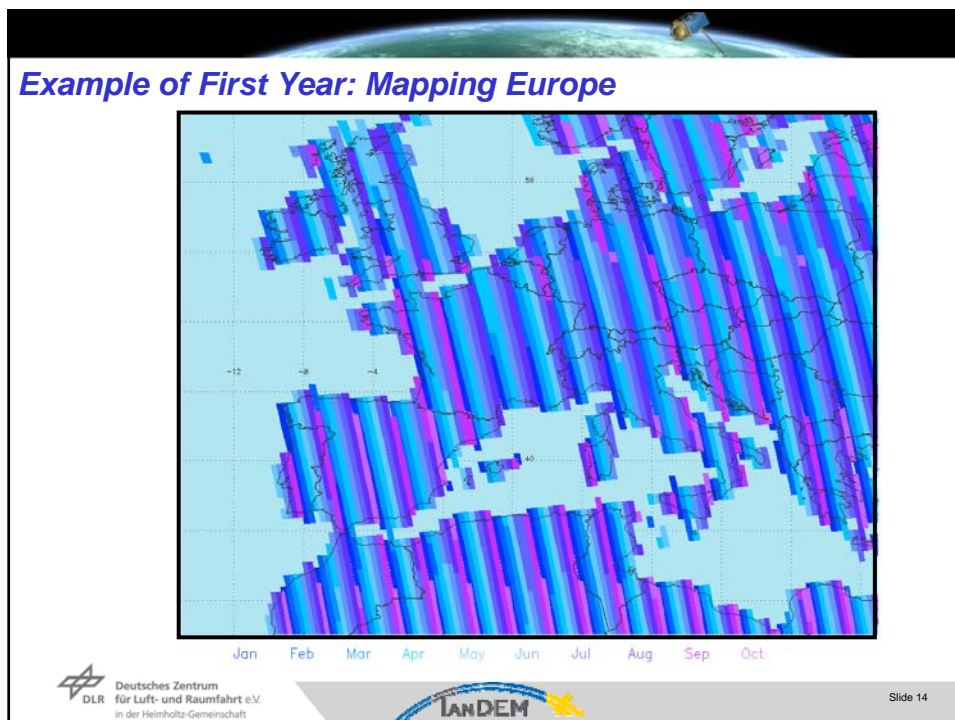
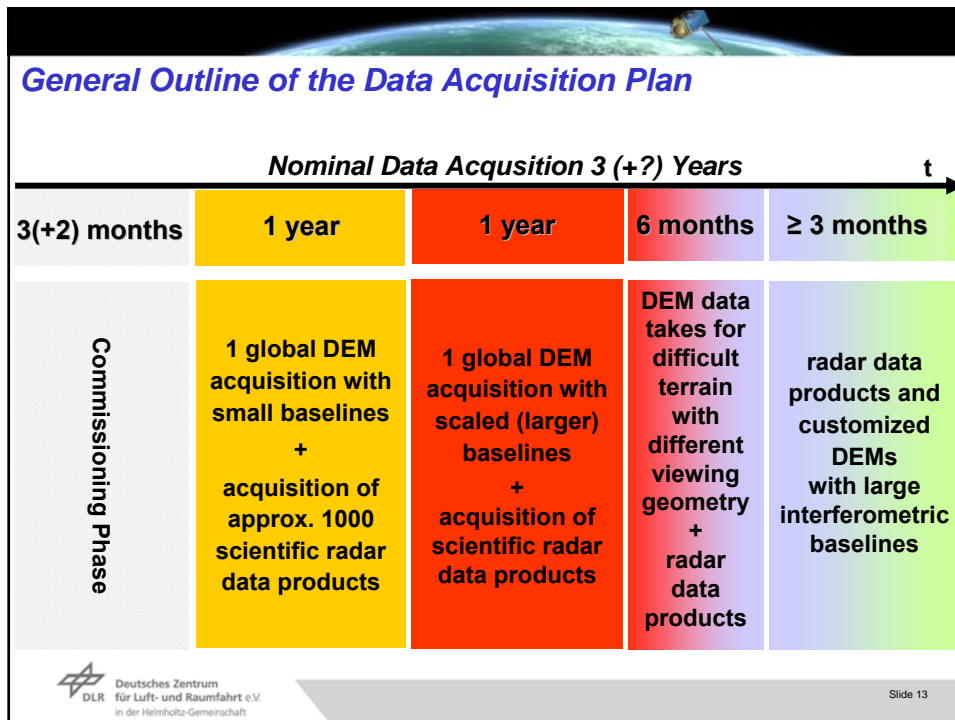
<ul style="list-style-type: none"> ▪ cross-track baselines (0 km to several km) ▪ along-track baselines (0 km to several 100 km) 	<ul style="list-style-type: none"> ▪ interferometric modes (bistatic, alternating, monostatic) ▪ SAR modes (ScanSAR, Stripmap, ...) 	<ul style="list-style-type: none"> ▪ bandwidth / resolution (0 ... 150/300 MHz) ▪ incident angles (20° ... 55°) 	<ul style="list-style-type: none"> ▪ polarisations (single, dual, quad) ▪ ...
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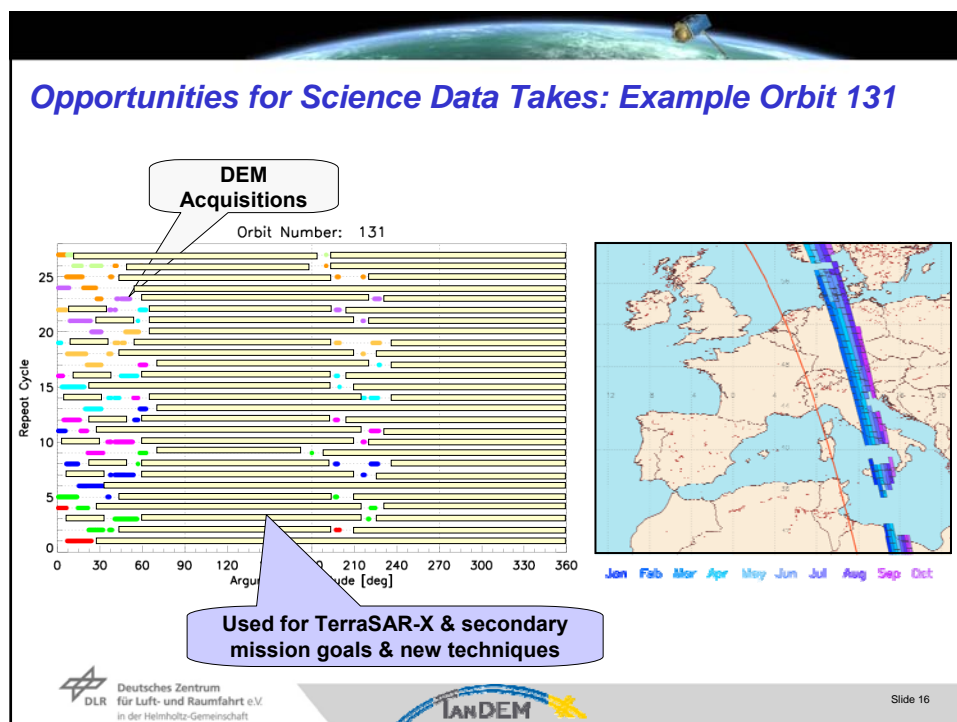
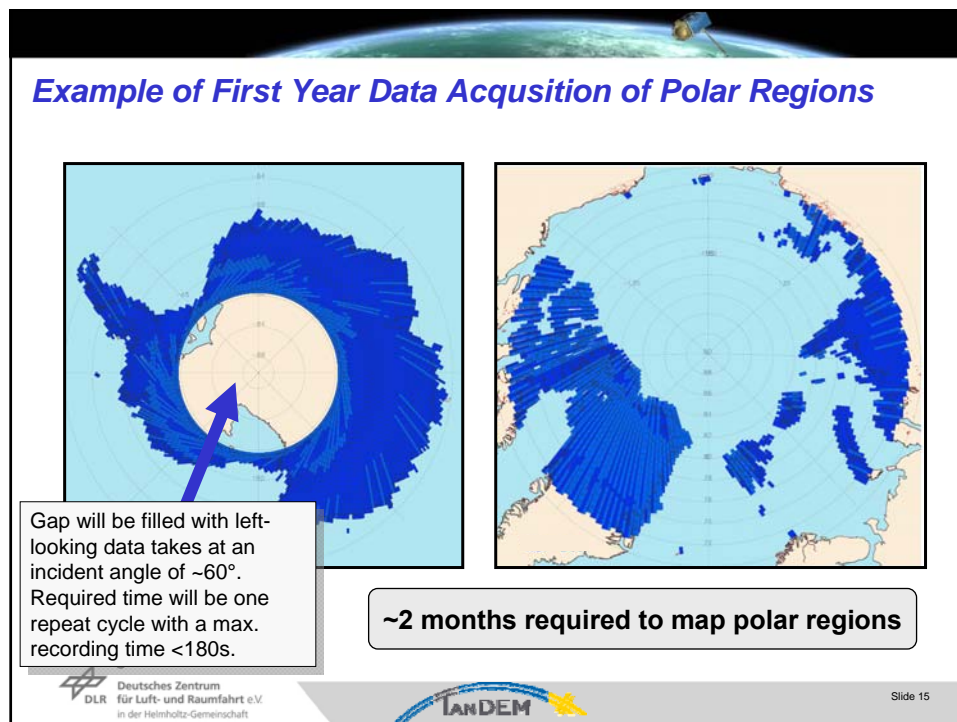
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TanDEM-X Data Products


SAR products:

- **experimental products** from operational modes (co-registered complex images – “CoSSCs”)
- **experimental mode raw data** (processing with help from DLR contact scientist)
- **TS-X mission basic products*** from selected TanDEM-X raw data sets
- **„byproduct“ of operational DEM processing chain:** archive of CoSSCs from all acquisitions for DEM generation (multi-temporal global coverage)

*: TS-X basic product performance parameter specification does not apply

DEM products:


- **TanDEM-X DEM** specified DEM better than HREGP (after 4 years of launch)
- **Intermediate DEM:** close to TanDEM-X DEM (after 2.5 years of launch)
- **FDEMs:** DEMs processed to finer pixel spacing and higher random height error (6m pixel spacing & 4-8 m vertical accuracy)
- **HDEMs:** high resolution DEM (high resolution DEM, were additional acquisitions are needed with 6m pixel spacing & 0.8m vertical accuracy)



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TanDEM-X Proposal Submission



The screenshot shows the TanDEM-X Science Service System homepage. It includes a search bar, navigation menus for Entry Points, User Access, Proposals, Documentation, and Data, and a login section for registered users. The main content area provides information about proposal submission and evaluation.

Search

Entry Points

- Investigator
- Evaluator
- Coordinator

User Access

- Investigators Registration
- Change Password

Proposals


- Proposals Pre-launch

Documentation

- Science Plan
- Basic Products
- Level 1b Products
- Experimental Products
- User License Agreement

Data

- Price List (scientific use)
- EOWEB TSX-Version
- FAQ
- Impressum
- Print version
- PDF version



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TanDEM-X Science Service System - Mozilla Firefox

Science Service System

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Search

You are here: Home - Investigator's Registration

Dear Investigator,

you can start your registration as a new investigator by using this form. After filling out you will receive an e-mail as a confirmation of your registration. Follow the link in this e-mail and enter the user name and password again to finalise the e-mail verification. After verification of your e-mail address you may login with your new credentials and you will be requested to enter your contact details first.

Personal Contact Details

User Name: (no blanks, min length 4, max length 8)

eMail:

Password: (min length 6, max length 10)

Retype Password: (enter your password twice)

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TanDEM-X Science Data Take Request - Mozilla Firefox

TanDEM-X Science Data Take Request

Find Find and set Placemark

Karte Satellite Hybrid Gelände Earth

Imaging Geometry

Data Take Name: OP StripMap

Center Coordinate: 48.083, 11.28

Imaging Mode: StripMap

Interferometric Mode: Bistatic

Polarisation Mode Sat Transmit: Single

Polarisation Mode Sat Receive: Single

Pass Direction: Any

Looking Direction: Right (Default)

Please insert a number between 20 and 200

Data Take Length Unit: ☒ km ☐ sec

Data Take Length: 50

Beam: ☐ exact ☒ flexible

Incidence Angle Minimum [deg]: 28°

Incidence Angle Maximum [deg]: 46°

Beam ID	Looking Dir	Polar Dir	Rel Cycle Start	Rel Cycle Second End	Rel Orbit Start	Rel Orbit End	Rel Orbit Second Start	Rel Orbit Second End	Incidence Angle Min	Incidence Angle Max	Look Angle Min	Look Angle Max
strip_012	right	descending	7775.01	7782.21	undefined	2	2084.03	2091.19	39	43	36	38
tanDEM_a1_000	right	descending	7775.05	7782.21	undefined	2	2084.03	2091.19	39	41	35	38
tanDEM_a2_055	right	descending	7775.05	7782.21	undefined	2	2084.03	2091.19	40	42	36	38
tanDEM_a1_satartica	right	ascending	137326	137333	undefined	25	741.841	749.004	61	62	54	55
tanDEM_a2_satartica	right	ascending	137326	137333	undefined	25	741.841	749.004	61	62	54	55
tanDEM_a1_090	right	ascending	222697	222704	undefined	40	787.577	754.34	46	48	42	43

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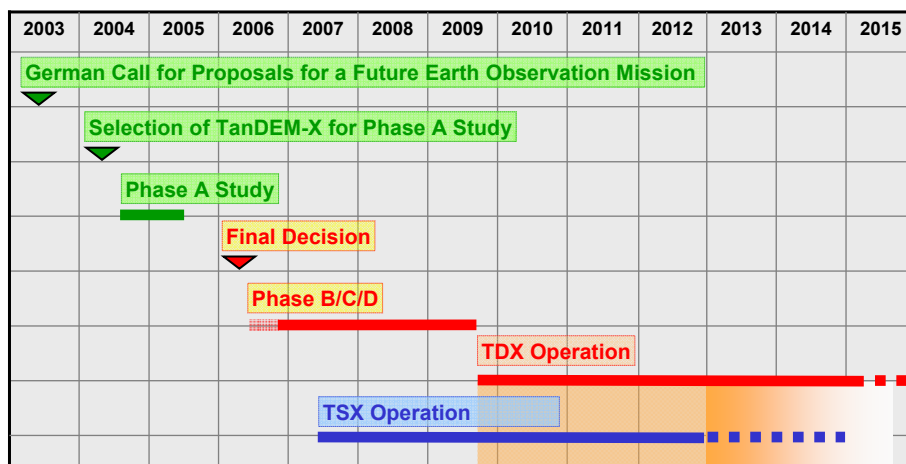
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Status of the Mission

Spacecraft was transported to the test facility in Munich for environmental tests end of June 2009



TanDEM-X Timeline



At least 3 years of joint operation