

TERRASAR-X LIKE PRODUCTS FROM THE TANDEM-X PURSUIT MONOSTATIC PHASE

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1. TANDEM-X SCIENCE PHASE

After completion of the global DEM data acquisition in 2014, the TanDEM-X mission entered the so-called Science Phase with focus on the secondary TanDEM-X mission goal, the provision of radar data products [1] for a number of new science and technology related applications. Specific flight configurations realizing various along-track and across-track baseline conditions are applied.

From September 2014 until March 2015, TSX and TDX were flying in a pursuit monostatic (PSM) configuration with an along-track separation of about 76 km (10 sec). This separation is large enough to avoid any mutual interaction between the two SARs, i.e. the instruments may be operated in active mode simultaneously.

In December 2014 the dual-receive antenna (DRA) configuration was enabled allowing the acquisition of fully polarized and along-track interferometric data.

2. TERRASAR-X LIKE PRODUCTS

A PSM TanDEM-X acquisition actually consists of two single independent data takes taken over the same scene or in other words, it just consists of two TerraSAR-X acquisitions. Consequently, each satellite channel can be processed independent from its counterpart into a SAR product. Therefore, the TerraSAR-X product portfolio (SSC, MGD, GEC, EEC) is offered in addition to the standard TanDEM-X experimental CoSSC products for these data takes. The products are named *TerraSAR-X Like* to express their commonality with the TerraSAR-X basic [2] and experimental [3] products w.r.t. to product format and content, but to stress in parallel that there might be differences in product performance and / or characterization parameters.

Over 8000 TerraSAR-X Like data takes are available. Their acquisition mode distribution is shown in Fig. 1.

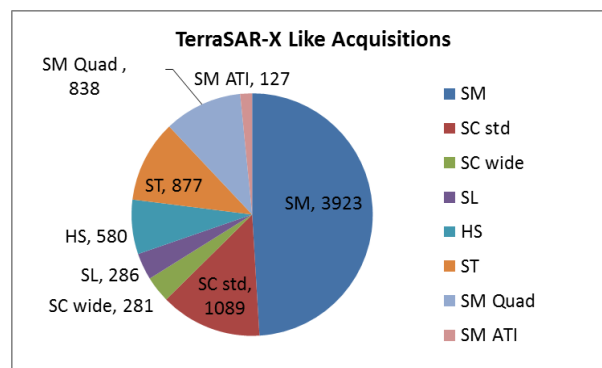


Fig. 1. Acquisition mode distribution of TerraSAR-X like products

3. EOWEB ORDERING OF TERRASAR-X LIKE PRODUCTS

The *TerraSAR-X Like Products* are offered for catalogue ordering to both the TerraSAR-X and TanDEM-X science user community in dedicated EOWEB product collections as shown in Fig. 2. These product collections are structured in the same way as the ones for the nominal TerraSAR-X basic and experimental products.

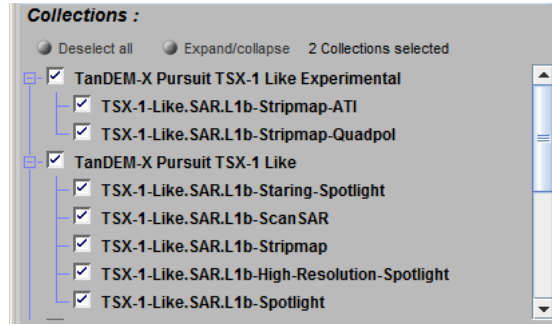


Fig. 2. EOWEB product collections for catalog ordering of *TerraSAR-X Like Products*

4. BUILT UP OF EOWEB CATALOG FOR TERRASAR-X LIKE PRODUCTS

A TanDEM-X CoSSC product contains both satellite channels for a given TanDEM-X acquisition, i.e. it consists of both a TSX and TDX data set, also in the case of a pursuit monostatic acquisition. A *TerraSAR-X Like Product* however is generated based on the data take of one satellite only, independent of the data taken from the other satellite 10 seconds apart. Accordingly, the single data takes are offered in EOWEB independent if the partner data take is available (which is usually the case). Two separate products have to be ordered by the user to get an image pair. The screen shot in Fig. 3. shows a sample EOWEB candidate list as taken on January 1st, 2015. The data takes are listed according to their increasing acquisition time. See the pairs of data takes, the first over a given scene taken by the TSX-1 satellite, the second taken by TDX-1 about 10 seconds later.

ID	Avail.	Abstract	Mission	Start Date	Sensor Mode	Polarization	Polarization	Relative	Beam	SA
00	●	TSX-1-Like SAR L1b-Staring-Spotlight	TSX-1	2015-01-01T01:20:19.6	StaringSpotlight	Single	HH	106	spot_002	SA
01	●	TSX-1-Like SAR L1b-Staring-Spotlight	TSX-1	2015-01-01T01:20:29.4	StaringSpotlight	Single	HH	106	spot_002	SA
41	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T03:07:12.6	Stripmap	Single	HH	107	tanDEM_a1_0	SA
27	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T03:07:22.3	Stripmap	Single	HH	107	tanDEM_a1_0	SA
29	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T03:09:19.7	Stripmap	Single	HH	107	tanDEM_a1_0	SA
31	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T03:09:29.6	Stripmap	Single	HH	107	tanDEM_a1_0	SA
33	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T04:04:29.0	Stripmap	Single	HH	107	strip_014	SA
35	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T04:04:48.9	Stripmap	Single	HH	107	strip_014	SA
22	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T04:56:45.6	Stripmap	Single	HH	108	strip_019	SA
28	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T04:56:55.7	Stripmap	Single	HH	108	strip_019	SA
14	●	TSX-1-Like SAR L1b-High-Resolution-Sp.	TSX-1	2015-01-01T05:03:03.2	HighResSpotlight	Single	HH	108	spot_081	SA
13	●	TSX-1-Like SAR L1b-High-Resolution-Sp.	TSX-1	2015-01-01T05:03:13.4	HighResSpotlight	Single	HH	108	spot_081	SA
51	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T05:03:45.3	Stripmap	Single	HH	108	strip_013	SA
30	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T05:03:56.4	Stripmap	Single	HH	108	strip_013	SA
0	●	TSX-1-Like SAR L1b-Stripmap-Quadpol	TSX-1	2015-01-01T05:13:33.4	Stripmap	Quad	HHHV/VHVV	108	stripFar_006	SA
1	●	TSX-1-Like SAR L1b-Stripmap-Quadpol	TSX-1	2015-01-01T05:13:43.6	Stripmap	Quad	HHHV/VHVV	108	stripFar_006	SA
52	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T08:40:29.8	Stripmap	Single	HH	110	strip_003	SA
38	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T08:40:39.8	Stripmap	Single	HH	110	strip_003	SA
32	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T09:03:05.7	Stripmap	Single	HH	110	strip_007	SA
34	●	TSX-1-Like SAR L1b-Stripmap	TSX-1	2015-01-01T09:03:15.4	Stripmap	Single	HH	110	strip_007	SA

Fig. 3. EOWEB product collections content

5. GEOGRAPHICAL LOCATIONS OF TERRASAR-X LIKE DATATAKES

For a first orientation over which areas *TerraSAR-X Like Products* are available, the screen shots below show the geographical location of acquired data takes. The EOWEB search has to be performed by the user in the standard way to identify acquisitions of interest (e.g. for a given area or for a given acquisition mode).

StripMap Mode

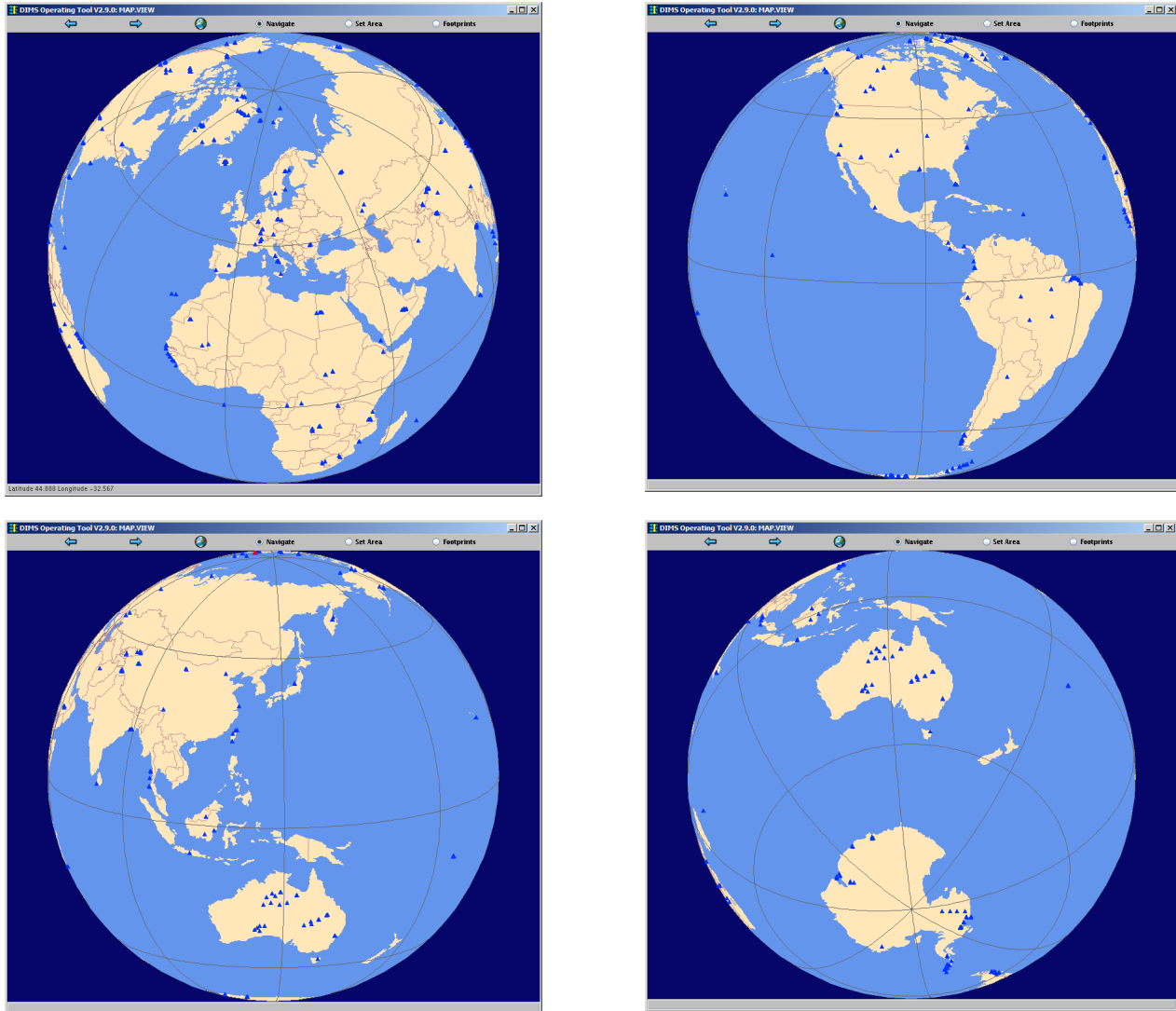


Fig. 4. TerraSAR-X Like Acquisitions in Strip Map Mode (**SM**)

ScanSAR Mode

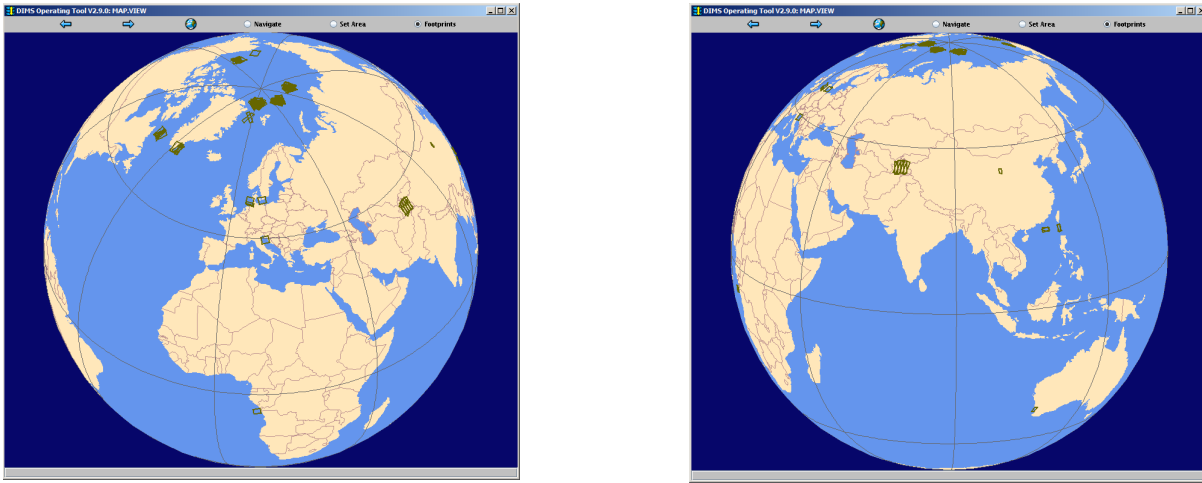


Fig. 5. TerraSAR-X Like Acquisitions in ScanSAR Mode (SC), both standard and wide

Spotlight, High-Resolution Spotlight and Staring Spotlight

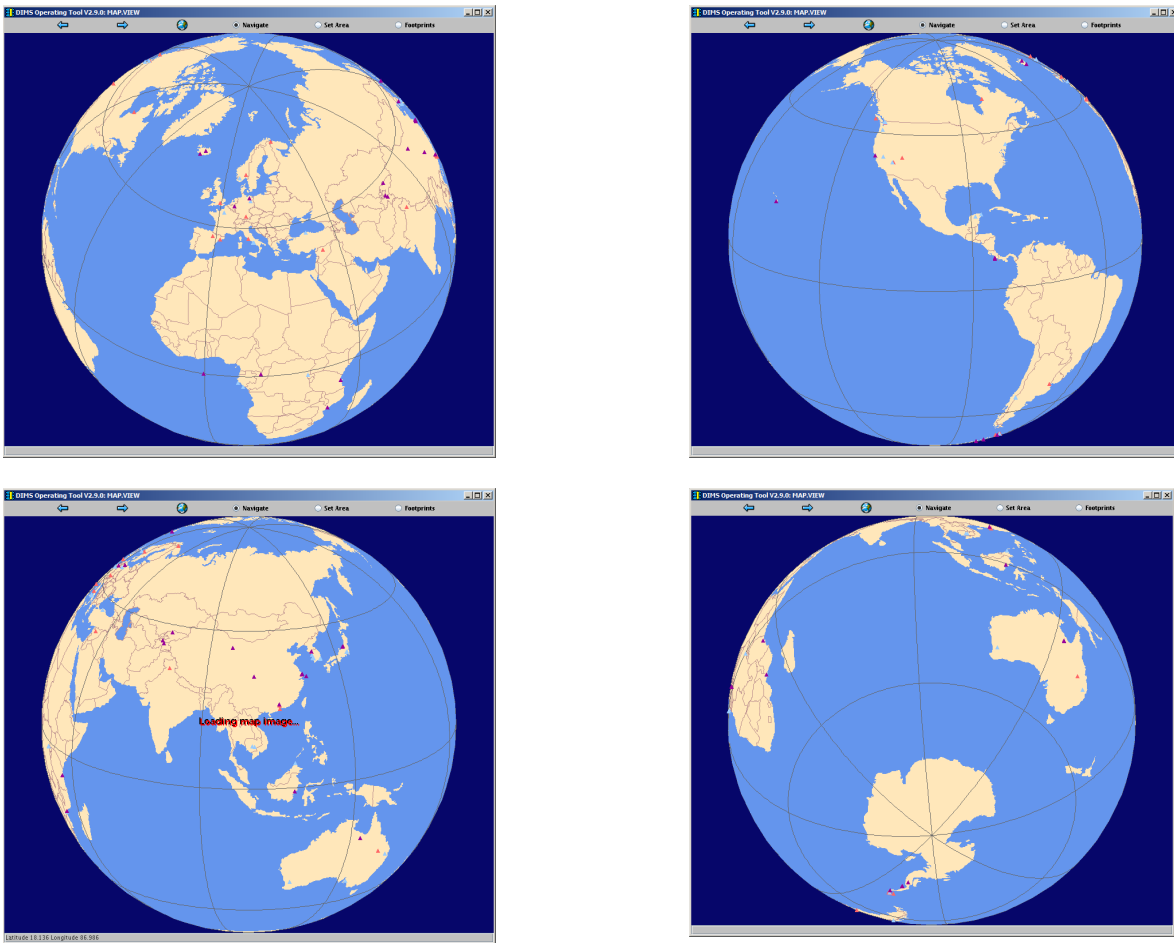


Fig. 6. TerraSAR-X Like Acquisitions in Spotlight (SL), High-Resolution Spotlight (HS) and Staring Spotlight (ST) Mode

Experimental StripMap Quad Pol and ATI

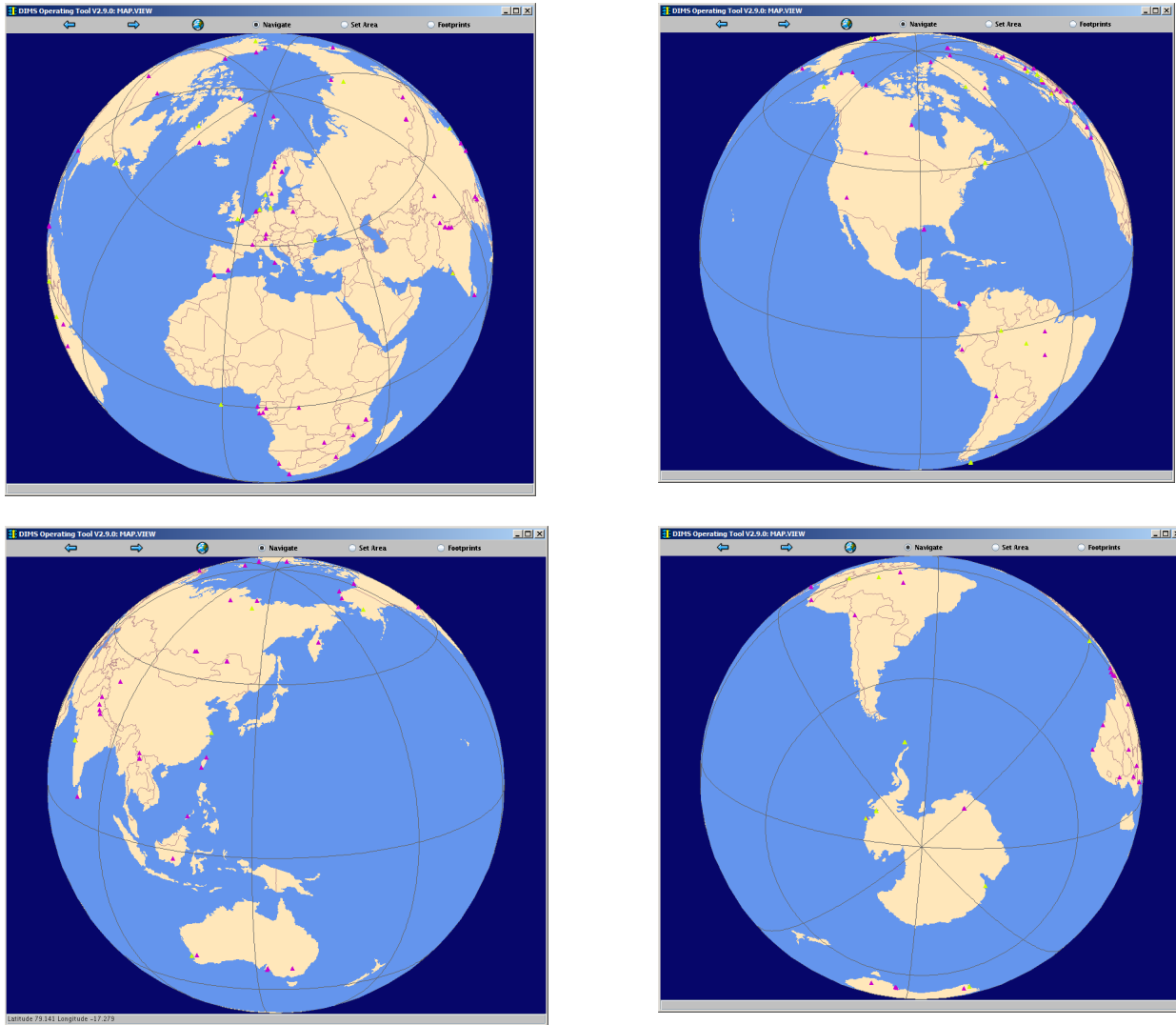


Fig. 7. TerraSAR-X Like Acquisitions in Experimental Strip Map Quad Pol (**SM Quad**) and Along-Track Interferometry Mode (**ATI**)

6. REFERENCES

- [1] Th. Fritz, "TanDEM-X Experimental Product Description", https://tandemx-science.dlr.de/pdfs/TD-GS-PS-3028_TanDEM-X-Experimental-Product-Description_1.2.pdf
- [2] Th. Fritz, M. Eineder, "TerraSAR-X Basic Product Specification", TX-GS-DD-3302, Issue 1.9, 09.10.2013, http://sss.terrasar-x.dlr.de/pdfs/TX-GS-DD-3302_1.9.pdf
- [3] Th. Fritz, M. Eineder, "Experimental Product Description", TX-GS-DD-3303, Issue 1.3, 06.10.2006, <http://sss.terrasar-x.dlr.de/pdfs/TX-GS-DD-3303.pdf>
- [4] B. Schättler, F. Mrowka, E. Schwarz, "The TerraSAR-X Ground Segment in Service for Nine Years: Current Status and Recent Extensions", submitted to IGARSS 2016