11th ITS EUROPEAN CONGRESS
DELIVERING FUTURE CITIES NOW
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DriveMark

Generation of High Resolution Road Maps with Radar Satellites

Hartmut Runge
Ulrich Balss, Steffen Suchandt, Robert Klarner, Xiaoying Cong

DLR German Aerospace Center

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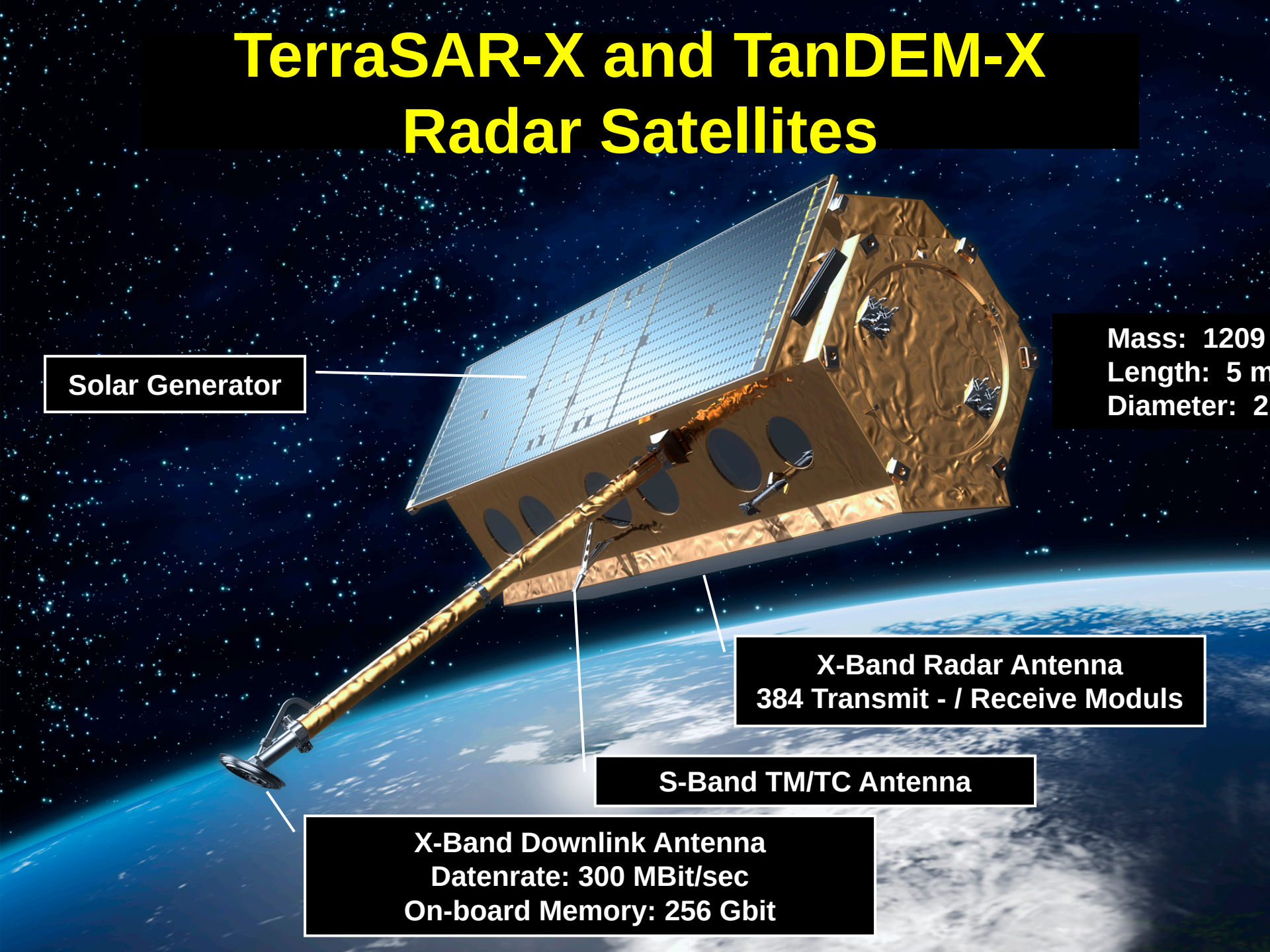
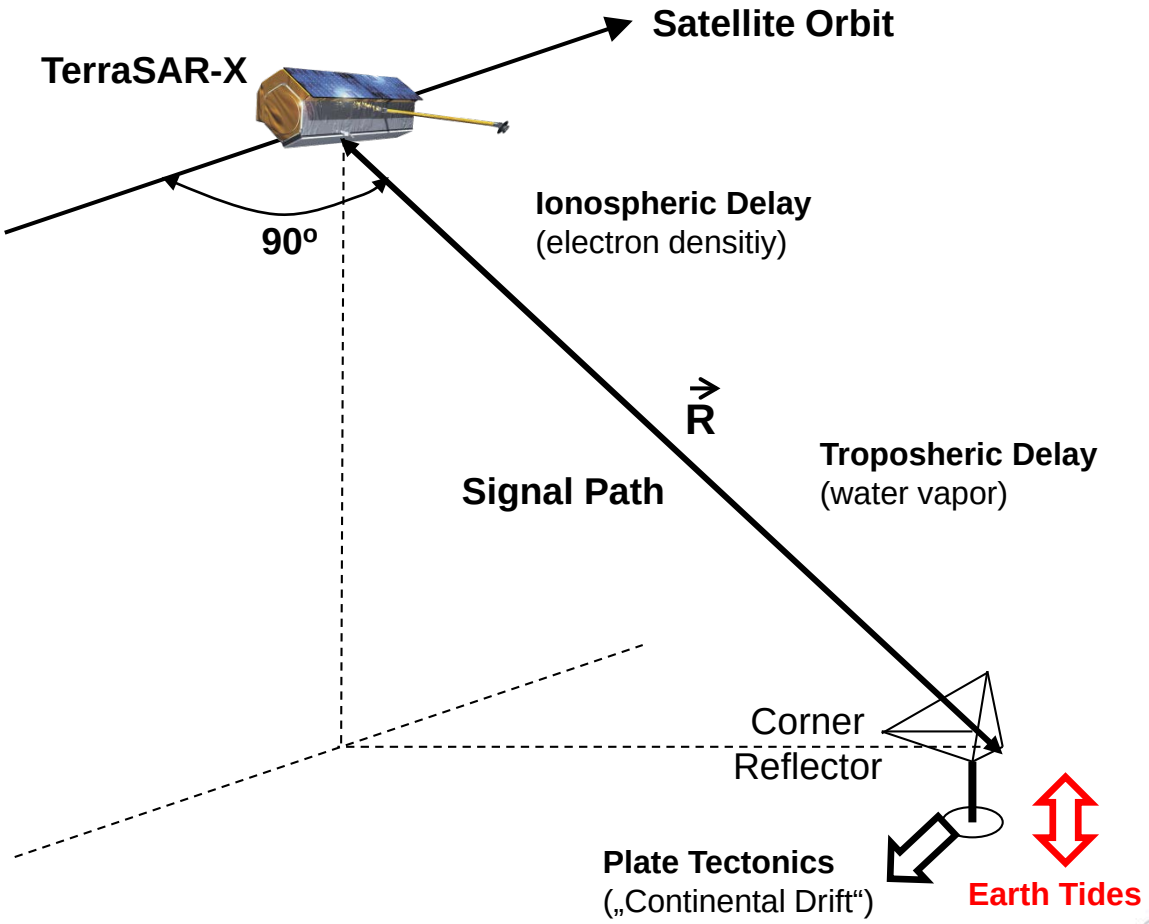
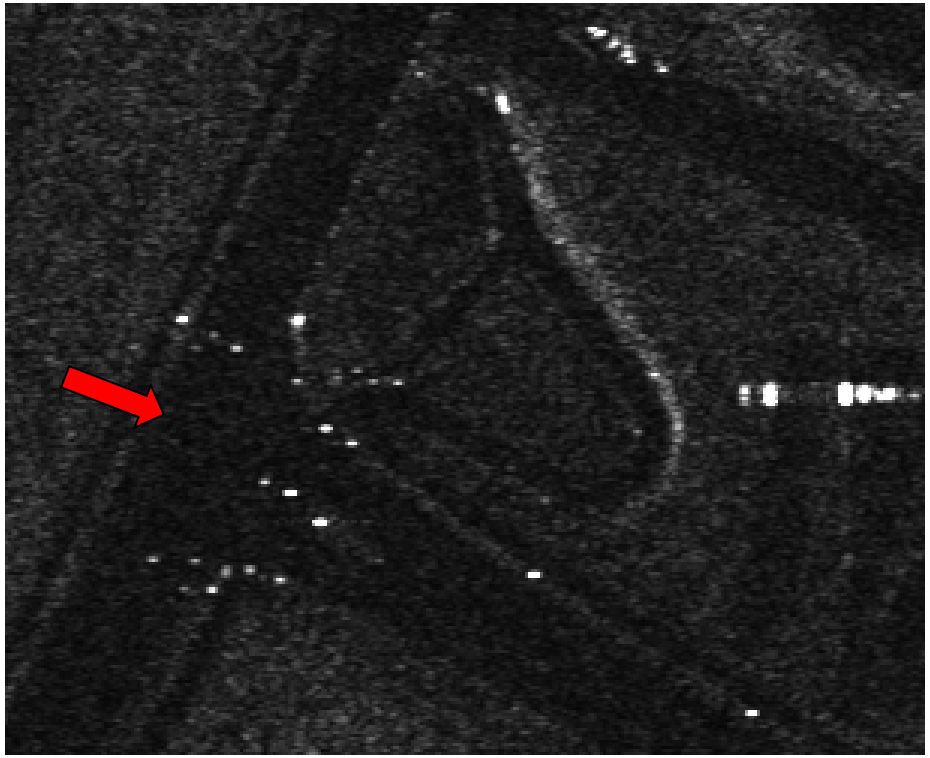
TerraSAR-X and TanDEM-X Radar Satellites



The Correction Of The Atmospheric Path Delay Allows For cm-Precision For the Range Measurement



In Radar Images Lamp Poles Appear As Bright Focused Dots



Small part of a TerraSAR-X radar image

Deviation of the measurements from the radar satelite from in-situ measurements

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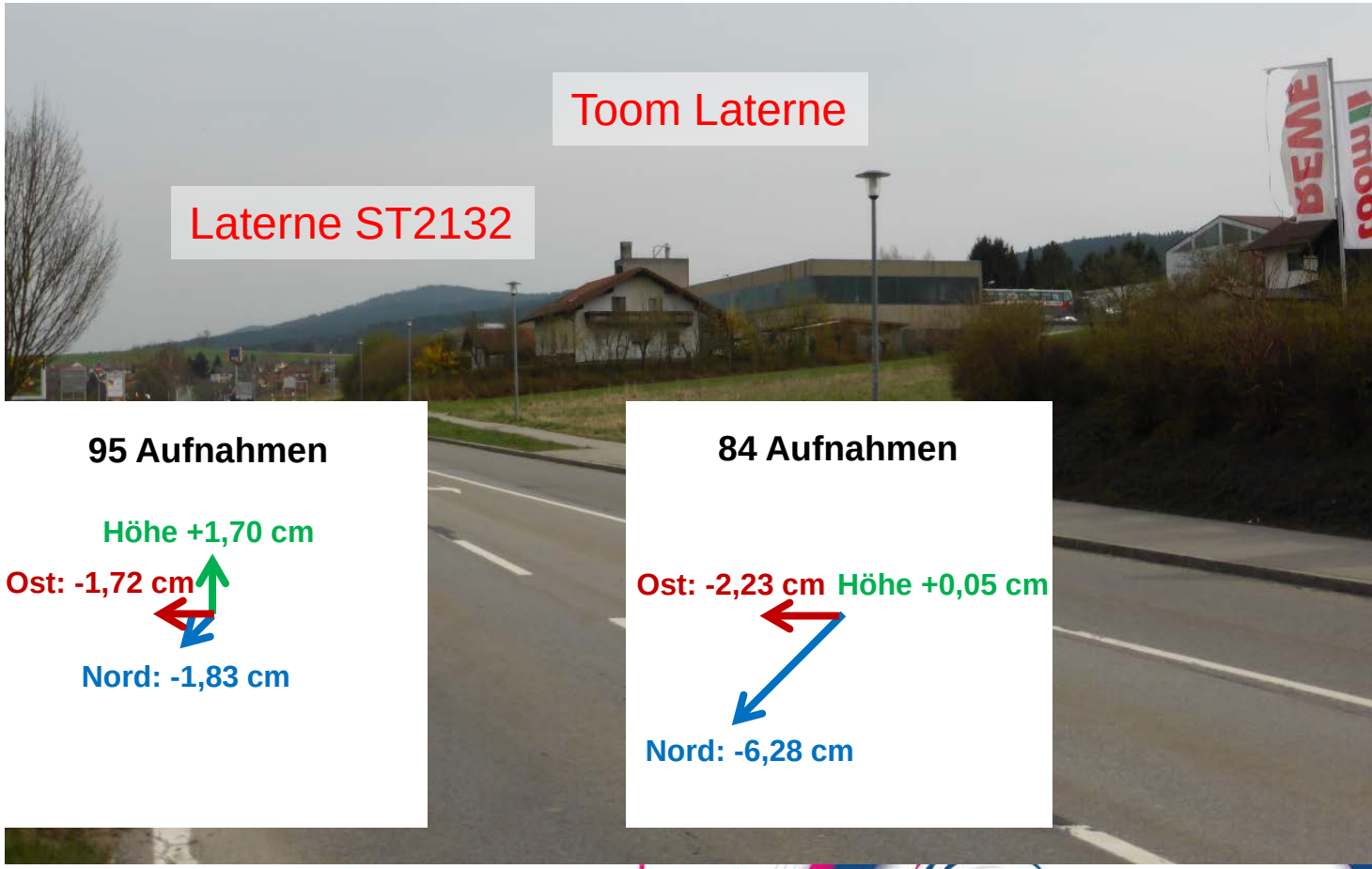

Results from the Testsite Wettzel / Germany:

Deviation between Radar Satellite and GPS in-situ measurements

Absolute Value Of the Difference Vector SAR – GPS (im cm):

Target ID		Betrag	Target ID		Betrag
Aldi Straßenlaterne Nord	Desc	3,26 cm	#38, Laterne; Arnbrucker Str., Bad Kötzting	Desc	17,87 cm
#16, Laterne; Wettzeller Str; Wettzell	Desc	6,53 cm	Toom Laterne	Desc	18,62 cm
Phasenzentrum, Corner Reflektor West	Asc	6,96 cm	#7, Laterne; Weißenregener Str.; Bad Kötzting	Desc	18,82 cm
# 355 , Laterne	Asc	11,01 cm	#44, Verkehrsschild; Arnbrucker Str., Bad Kötzting	Desc	20,36 cm
Phasenzentrum, Corner Reflektor Ost	Desc	11,33 cm	Toom Mast	Desc	21,82 cm
#27, Holzmast; Grubmühle, Bad Kötzting	Asc	11,68 cm	#41, Mittlerer Lichtmast, Toom, Bad Kötzting	Desc	22,18 cm
#30, Laterne; Arnbrucker Str., Bad Kötzting	Desc	13,63 cm	#45, Verkehrsschild (40 km/h); Weißenregener Str.; Bad Kötzting	Desc	22,35 cm
Aldi Verkehrsinsel Südost	Asc	13,95 cm	#8, Mast hinterer Parkplatz; Toom, Bad Kötzting	Desc	23,36 cm
Laterne ST2132	Desc	14,79 cm	Verkehrsschild am südlichen Ende des Wölkersdorfer Mühlweg	Desc	33,95 cm
#14, Laterne; Zur Point; Wettzell	Desc	16,10 cm			

Components Statistic (in cm):

Target ID	ΔX	ΔY	ΔZ	ΔNord	ΔOst	ΔHöhe	ΔRange	ΔAzimuth	ΔElevation	Betrag
Mittelwert	-1,3 cm	3,6 cm	-9,7 cm	-6,0 cm	3,8 cm	-7,7 cm	-3,5 cm	7,4 cm	7,0 cm	16,2 cm
Standardabweichung	8,3 cm	6,6 cm	10,1 cm	9,7 cm	6,8 cm	8,6 cm	6,0 cm	7,8 cm	10,5 cm	7,2 cm
RMS	8,4 cm	7,5 cm	14,0 cm	11,4 cm	7,8 cm	11,5 cm	7,0 cm	10,7 cm	12,7 cm	

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Ground Control Point #201 Berkeley

Ground Control Point #206 Berkeley

Conclusion

We can deliver worldwide precise Ground Control Points from lamp poles, which can be used

- in the production process or for the final quality control of new road maps
- to correct data from other data sources like from mobile mapping or aerial images