

EuroSDR Benchmark 2013

P.Nonin

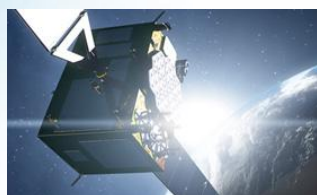
All the space you need



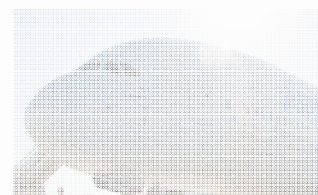
The Power of the EADS Group

EADS

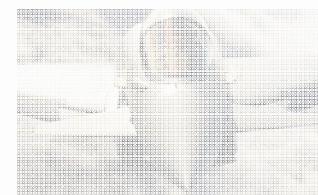
€ 56.5 billion revenue
140,000 people



 **ASTRIUM**



 **AIRBUS**



 **CASSIDIAN**

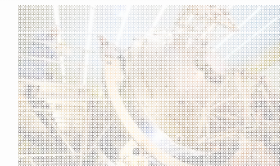


 **EUROCOPTER**

€ 5.8 billion revenue
18,000 people



Astrium Services



Astrium Satellites



**Astrium Space
Transportation**

Business Communications Services

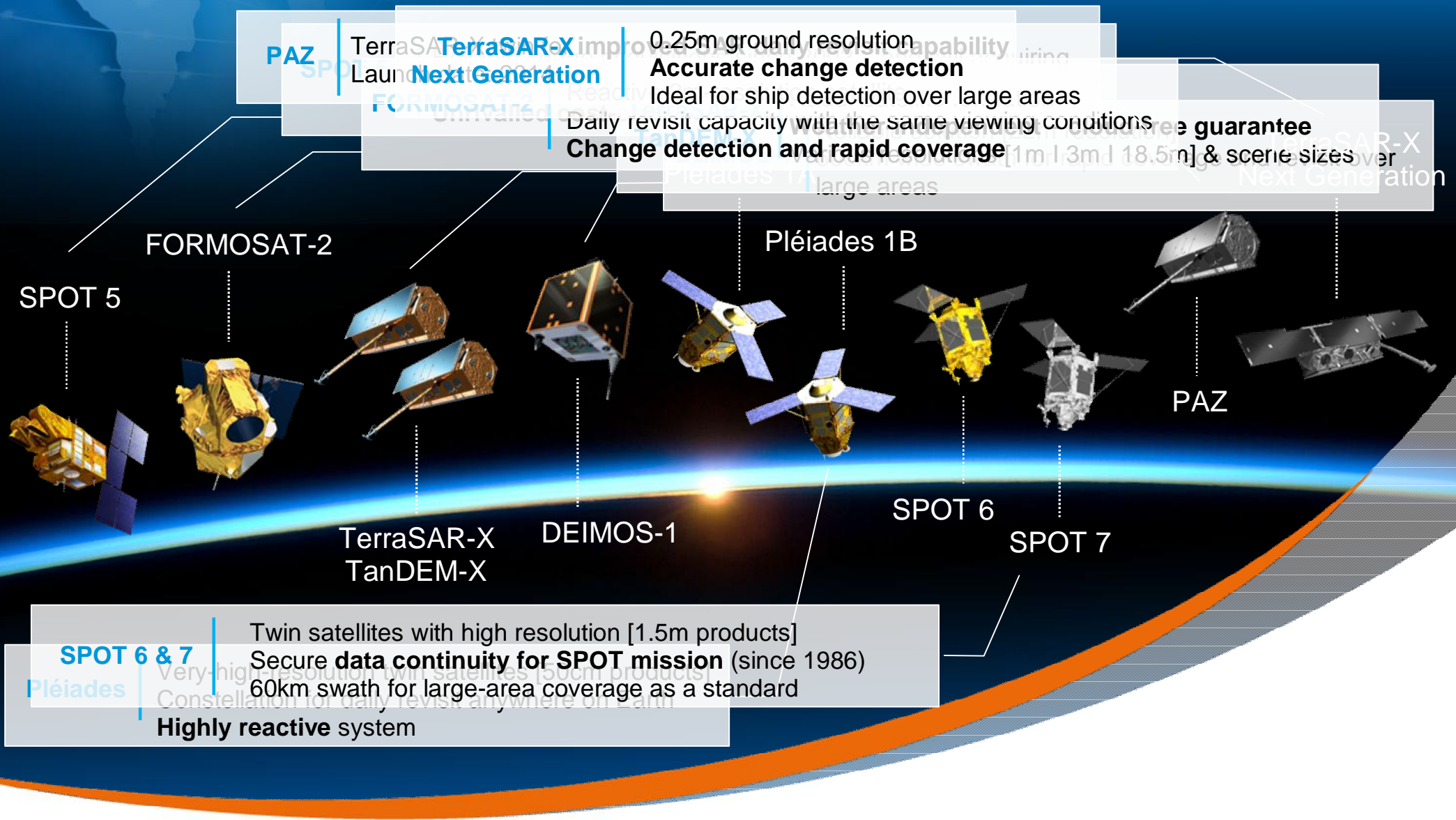
Government Communications Services

GEO-Information Services

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2012 Information

A Unique Satellite Fleet



PixelFactory

§ Multi-sensors processing suite

- § Aerial frame cameras
- § Aerial push-broom
- § Satellite push-broom
- § Satellite SAR

§ Designed for mass production

- § Dense DEM
- § Ortho images
- § True Ortho images

§ Part of Spot6/7 and TerraSAR receiving stations

Images stereo matching

§ D.Scharstein and R.Szeliski taxonomy

§ 3 components

- § Similarity measure

- § Aggregation scheme

- § Optimization process

§ Optional constraints

- § Unicity

- § Order

- § Smoothness

PixelFactory matching tools

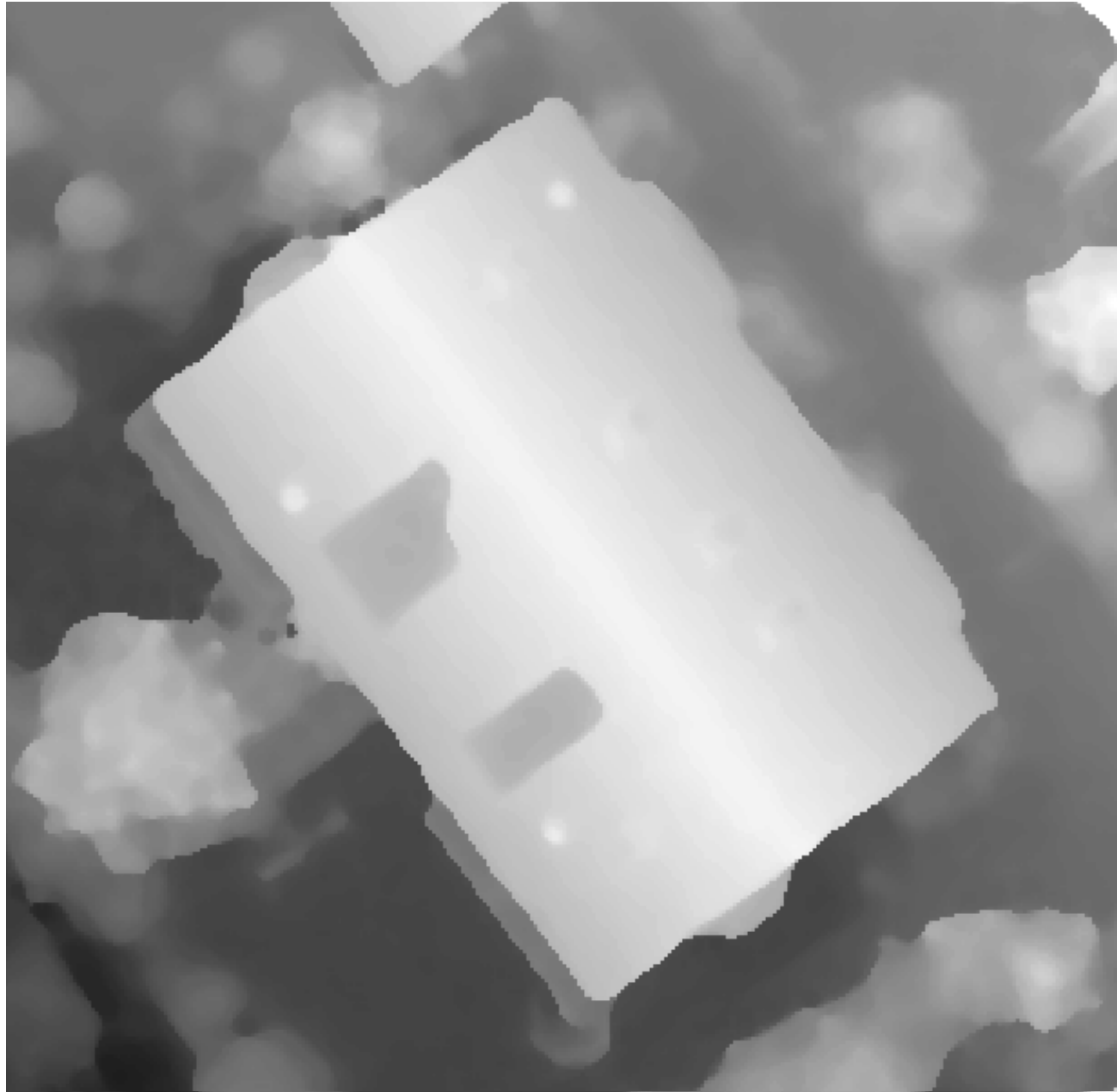
§ Previous version

- § Normalized correlation
- § Dynamic programming along the parallax
- § Order constraint

§ Current version

- § Modular architecture
- § Specific similarity measures for optical and SAR
- § Generic aggregation on an acyclic graph
- § Belief propagation
- § Optional constraints (unicity, order, smoothness)

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All the space you need

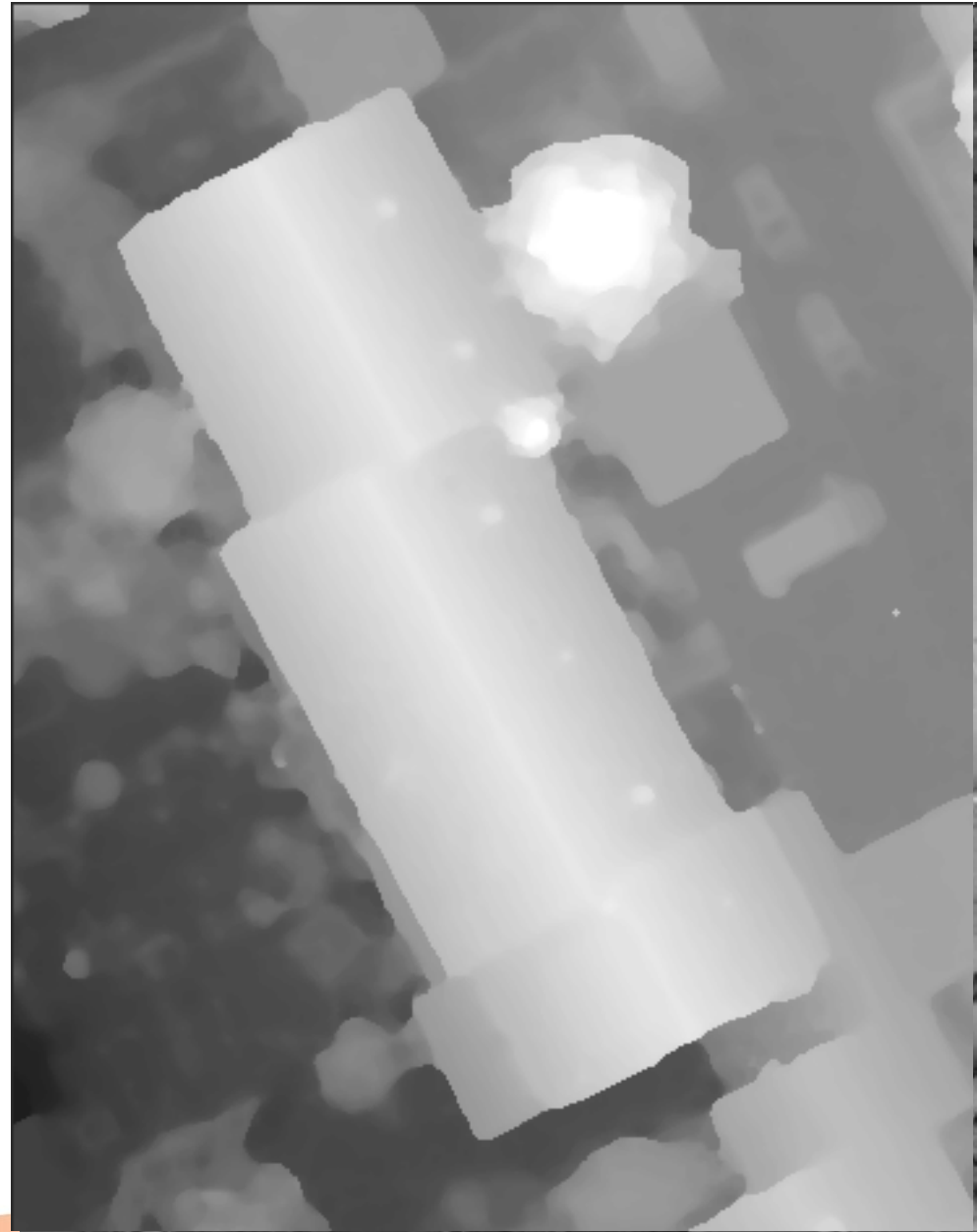
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Tests

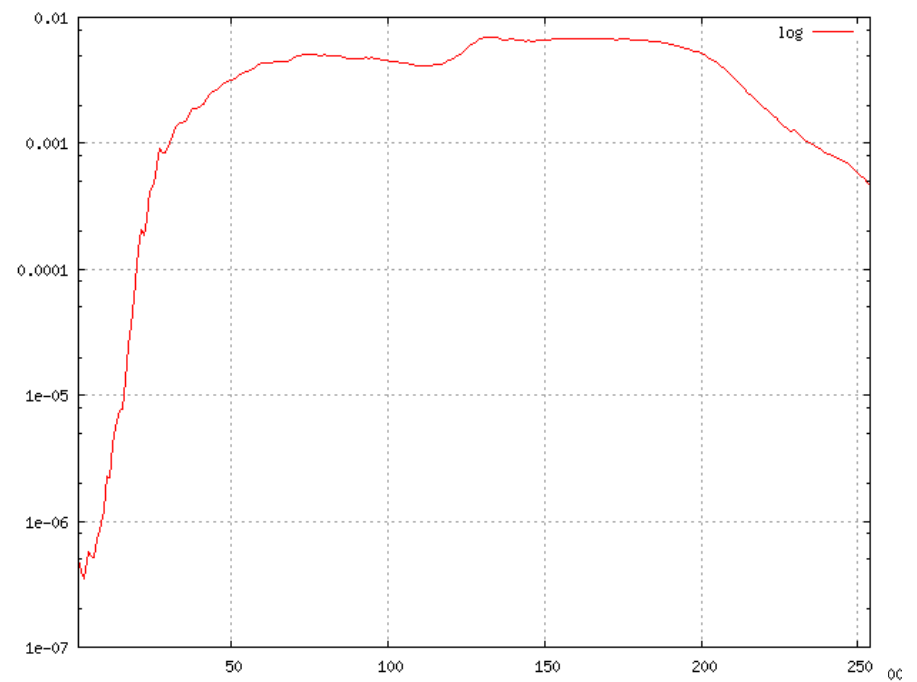
§ Vexcel UCX

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Similarity measure

§ Must deal with linear and logarithmic response



DEM workflow

§ Epipolar resampling

- § Multisensor (frame camera, push-broom, SAR)

§ Stereo pairs matching

- § Pairwise

§ Disparity maps conversion to XYZ

- § 2.5D raster (PixelFactory)

- § 3D points cloud (StreetFactory)

§ DEMs fusion

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Hardware configurations

§ Munchen

- § 2 Xeon E5-2640, 2.5 GHz
- § 2 x 6 cores
- § 16 GB RAM
- § 88 GB of SAS disk (10000 rpm)

§ Vaihingen

- § 2 Xeon X5650, 2.67 GHz
- § 2 x 6 cores
- § 16 GB RAM
- § 4 TB on SAN

Munich

§ 12 stereo pairs processed

§ No cross-track matching
(moving shadows)

§ Small baseline ($B/H = 0.12$)

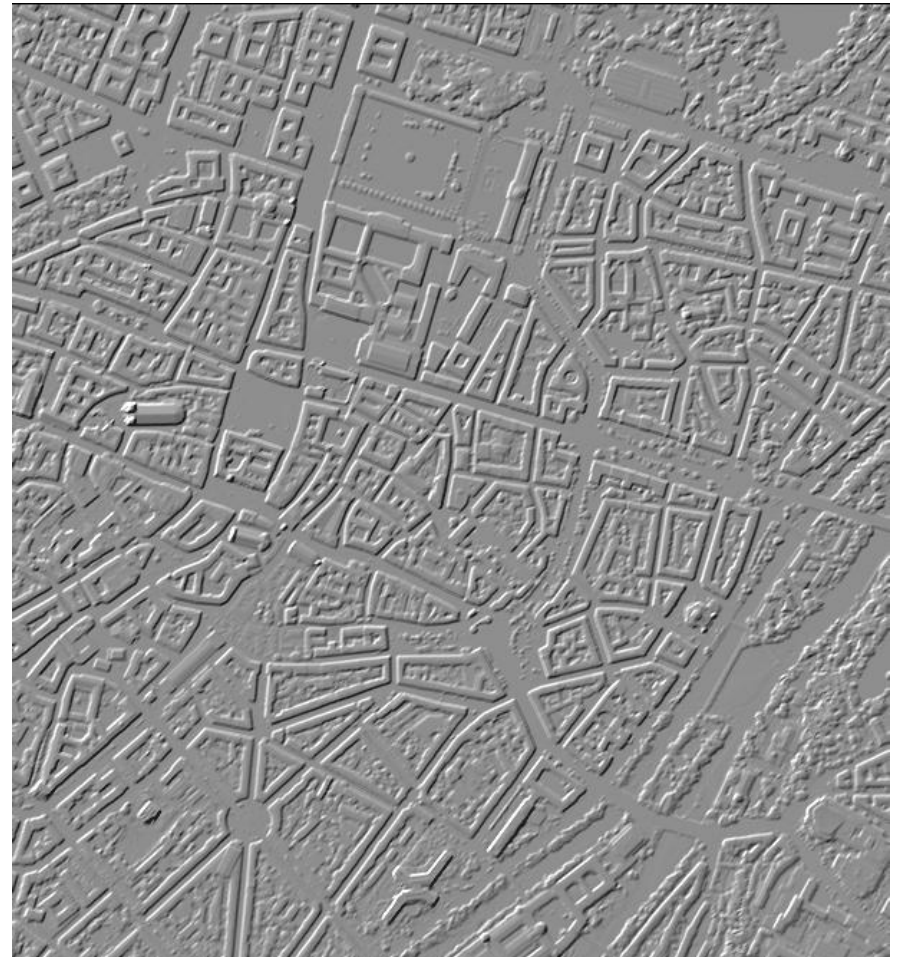
§ Linear sensor assumption

§ Might be not accurate ?

§ Total time: 172 minutes

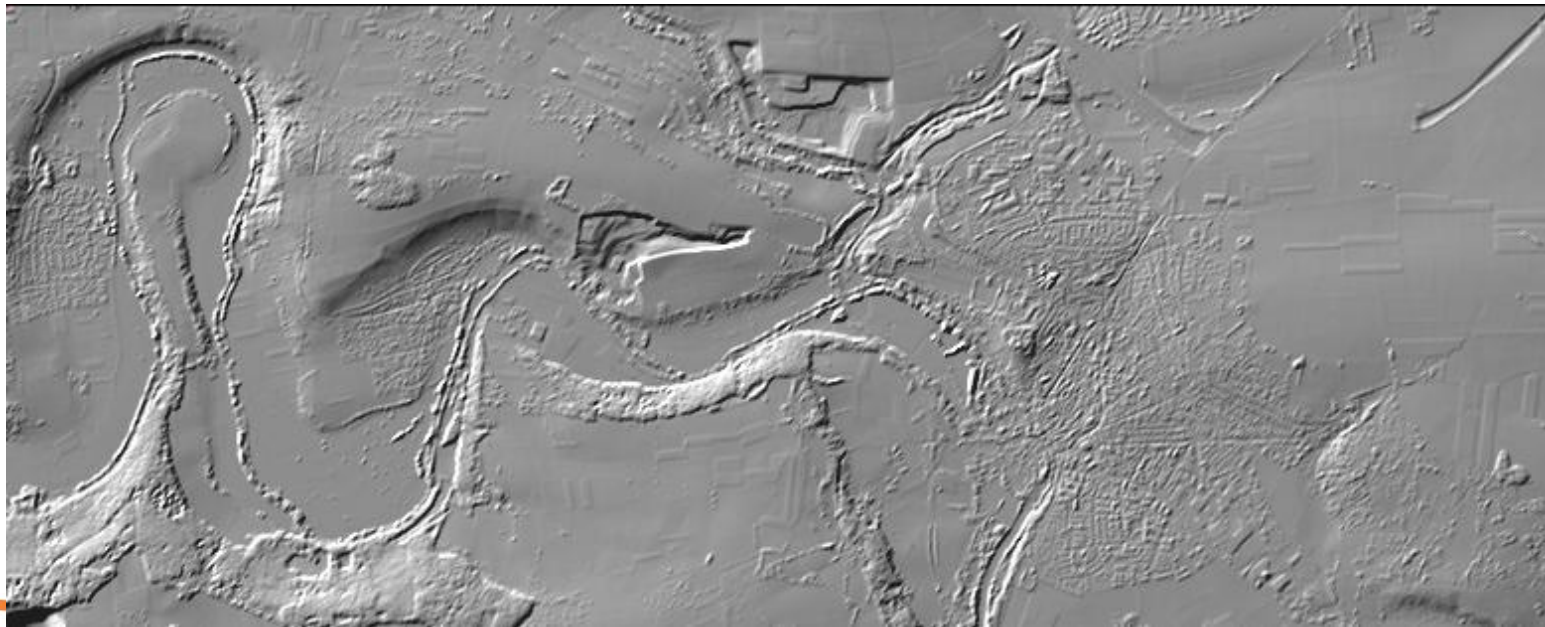
§ Matching: 132 to 155 min.

§ Average: 142 min.



Vaihingen

- § 57 stereo pairs processed
- § Logarithmic sensor assumption
- § Total time: 189 minutes



Vaihingen

§ Matching time (minutes) per stereo pair

	Along track	Cross track	All
Nb of pairs	33	24	57
Overlap	60%	72%	NA
B/H	0.23	0.29	NA
Minimum	17	15	15
Maximum	19	39	39
Average	22	29	25