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Visionmap A3 | Practical Experience

Our WEB-Site

www.visionmap.com

Aerial Photogrammetric System Visionmap A3

- **Aerial Survey Digital Large Frame Camera**

and

- **Ground Processing System for fully automatic Orthophoto production**

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Visionmap A3 Differentiators

- **Very High productivity** of Aerial Survey
- **Vertical and Oblique** images in one flight by one camera
- Fully automatic **Orthophoto** production (including all computational processes)

Large Aerial Survey Area

Long Focal length

High Ground Resolution from Large Flight Altitude

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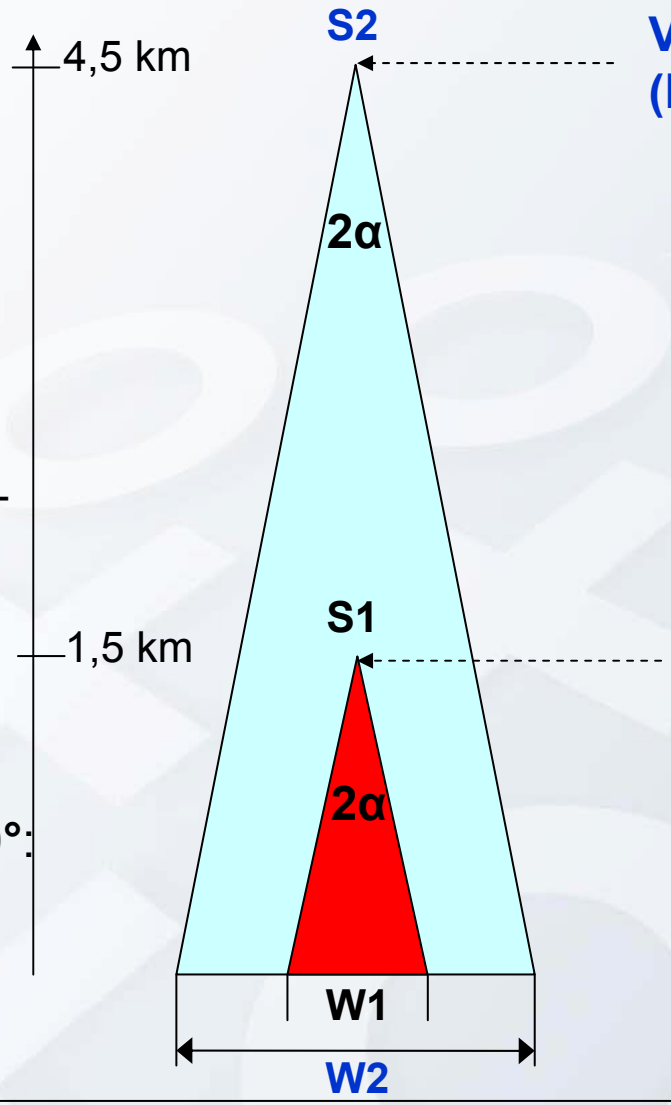
15 cm – ground resolution

2α – orthophoto angle

Orthophoto coverage for **2α=40°**:

W1 = 1092 m

W2 = 3276 m



VisionMap A3 (F=300 mm)

Typical Large Frame Digital Cameras (F≈ 60-120 mm)

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Visionmap Practical Experience

Aerial Survey Productivity

Processing Productivity

Accuracy Results

A3 Aerial Survey Productivity

Camera Parameters	A3	Typical Digital Large Frame Camera	Standard Analog Camera
Focal length (mm)	300	100	150
CCD Pixel size / scanning	9	7	15
Frame size (pix)	~62,500 7,850	15,000 10,000	15,000 15,000
GSD = 5 cm; 2α = 20°			
Productivity (sq.km /hour)	**158**	71	50
Productivity comparison	**316%**	142%	100%
GSD = 25 cm; 2α = 50°			
Productivity (sq.km /hour)	**3,363**	1,524	1,067
Productivity comparison	**316%**	143%	100%

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A3 Processing productivity

Ground resolution (cm)	12	30	30	15	15
Area (sq. km)	195	247	247	700	2100
Image volume (GB)	31	23	13	80	235
Number of flight lines	8	7	4	8	15
Side overlap (%)	57	84	66	70	70
Independent processing (hour)	9	8	4	31	133
Simultaneous processing (hour)	11.5		-	-	-
Productivity for Independent processing (sq. km / 24 hours)	**506**	**749**	**1482**	**538**	**379**
Productivity for Simultaneous processing (sq. km / 24 hours)	**1133**		-	-	-
Operator time (hour)	0.5		0.5	0.5	0.5

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A3 Accuracy results

Pilot Project	Height (m)	Area (sq.km)	GSD (cm)	Number of lines	GCP/ChP	RMSx (m)	RMSy (m)	RMSz (m)
Hagerstown	2500	215	8	5	13/39	0.17	0.19	0.16
Hagerstown	2500	215	8	5	16/22	0.06	0.08	0.10
Netania	3500	195	11	8	0/22	0.30	0.27	0.26
Netania	3500	195	11	8	11/11	0.19	0.11	0.23
Netania	8500	247	26	7	0/27	0.54	0.44	0.47
Netania	8500	247	26	7	11/14	0.21	0.35	0.44

GCP 0 – block adjustment without Control points

Forward overlap – 55-65%, Side overlap – 50-80%

No cross strips (flights)

Visionmap A3 Camera

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A3 - Light weight camera

- Computer:
  Weight – **10 kg**;
  Size - **25*40*40 cm**;
- Camera:
  Weight – **15 kg**;
  Size - **50*50*40 cm**;
- Installation time – **15-30 min**;
- No need in special airport transportation;

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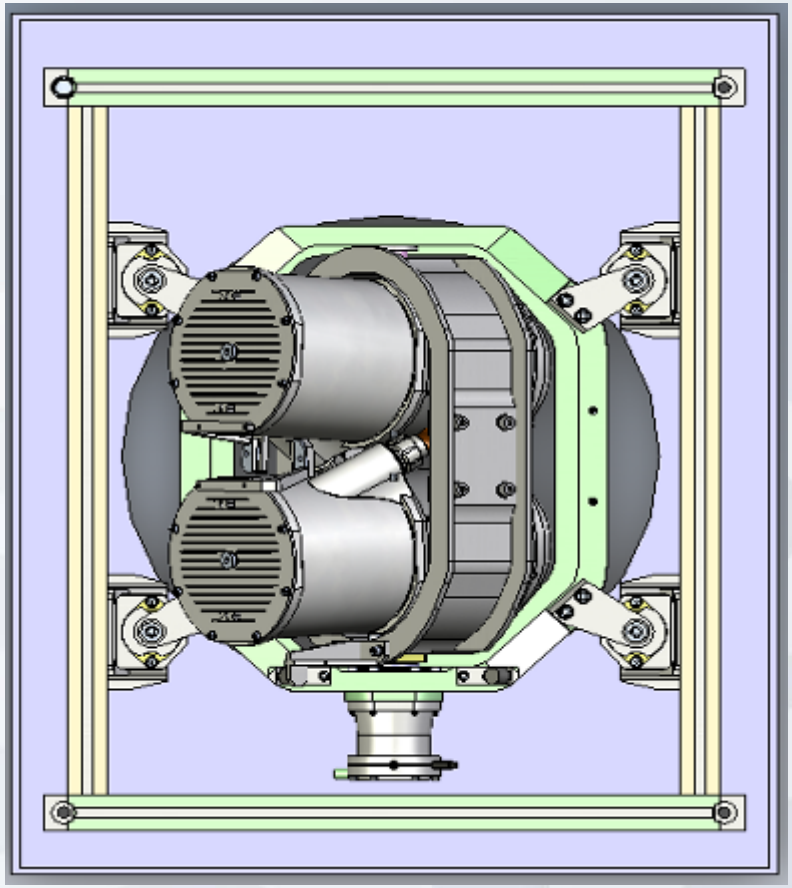
A3 camera design

- Digital sweep-framing double lens metric camera;
- Cross-track sweep motion;
- Focal lens – **300 mm**;
- Folded optics;
- Maximal sweep FOV–**104** degree;
- FMC, SMC, Vibration - mirror based optical compensation and stabilization;



Flight direction

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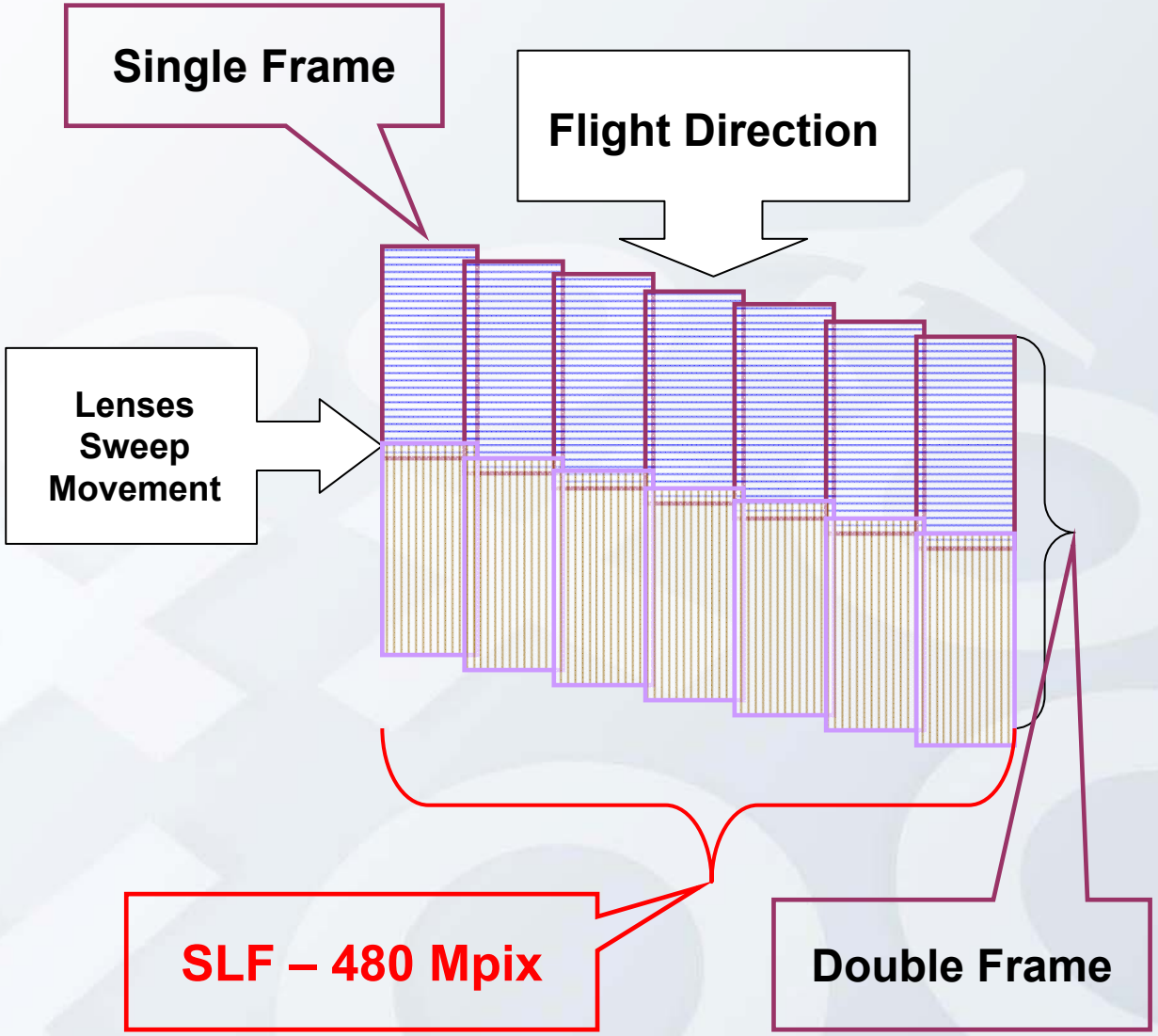
A3 on-board computer

- Intel based computer;
- On-board **JPEG 2000** compression;
- Dual frequency GPS (Omni Star supported);
- Internal power supply;
- Snap-on **0.4 TB** solid state flash storage;
- Weight – **10 kg**;
- Size – **25*40*40 cm**.

Super large frame - SLF

- Up to **29** double frames in one sweep;
- Forward overlap between single frames - **2%;**
- Side overlap between single frames - **30%;**
- **SLF** – quasi-panoramic frame for stereo compilation;
- High accuracy. **SLF** – for visualization only. All photogrammetric measurements are calculated through the single frame.



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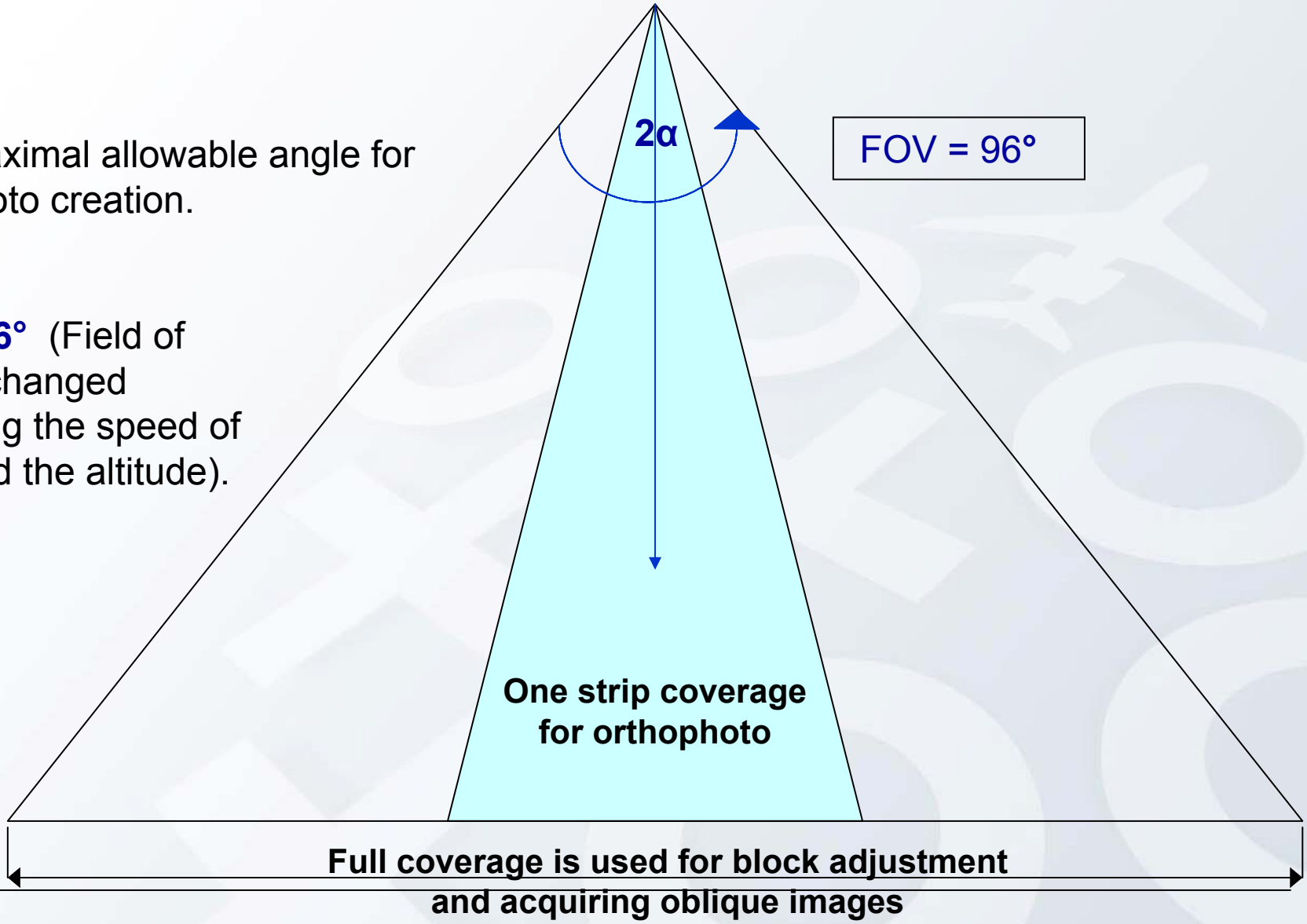
A3 Flight Principles

2α – maximal allowable angle for orthophoto creation.

FOV - 96° (Field of view is changed according the speed of flight and the altitude).



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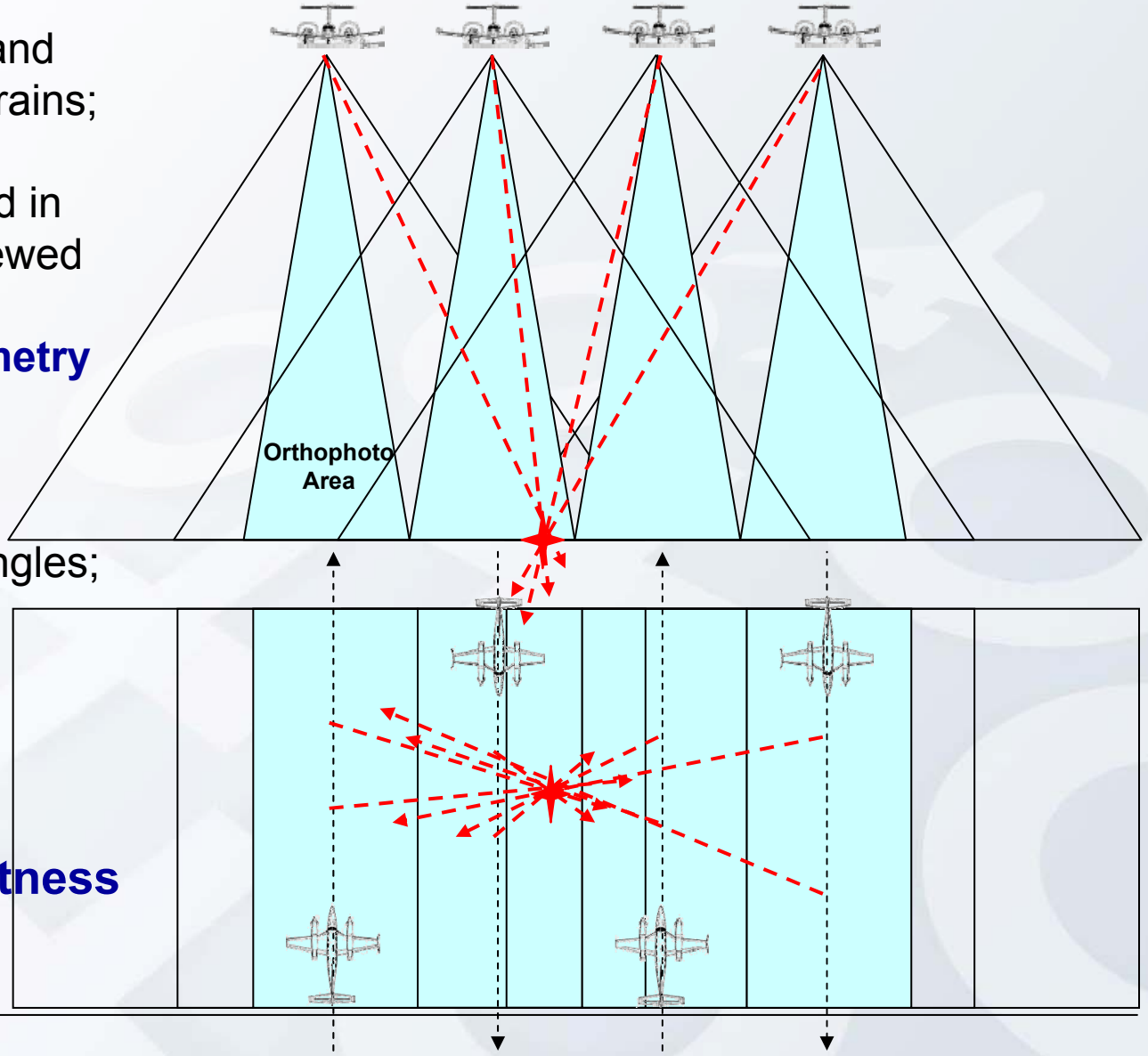
Ensuring accuracy & robustness

- **Millions of tie points** and photogrammetric constrains;
- Every point is measured in many images and is viewed from many directions – **multi-ray photogrammetry and multi-directional imagery;**
- Different intersection angles;



High Accuracy, Robustness and Reliability

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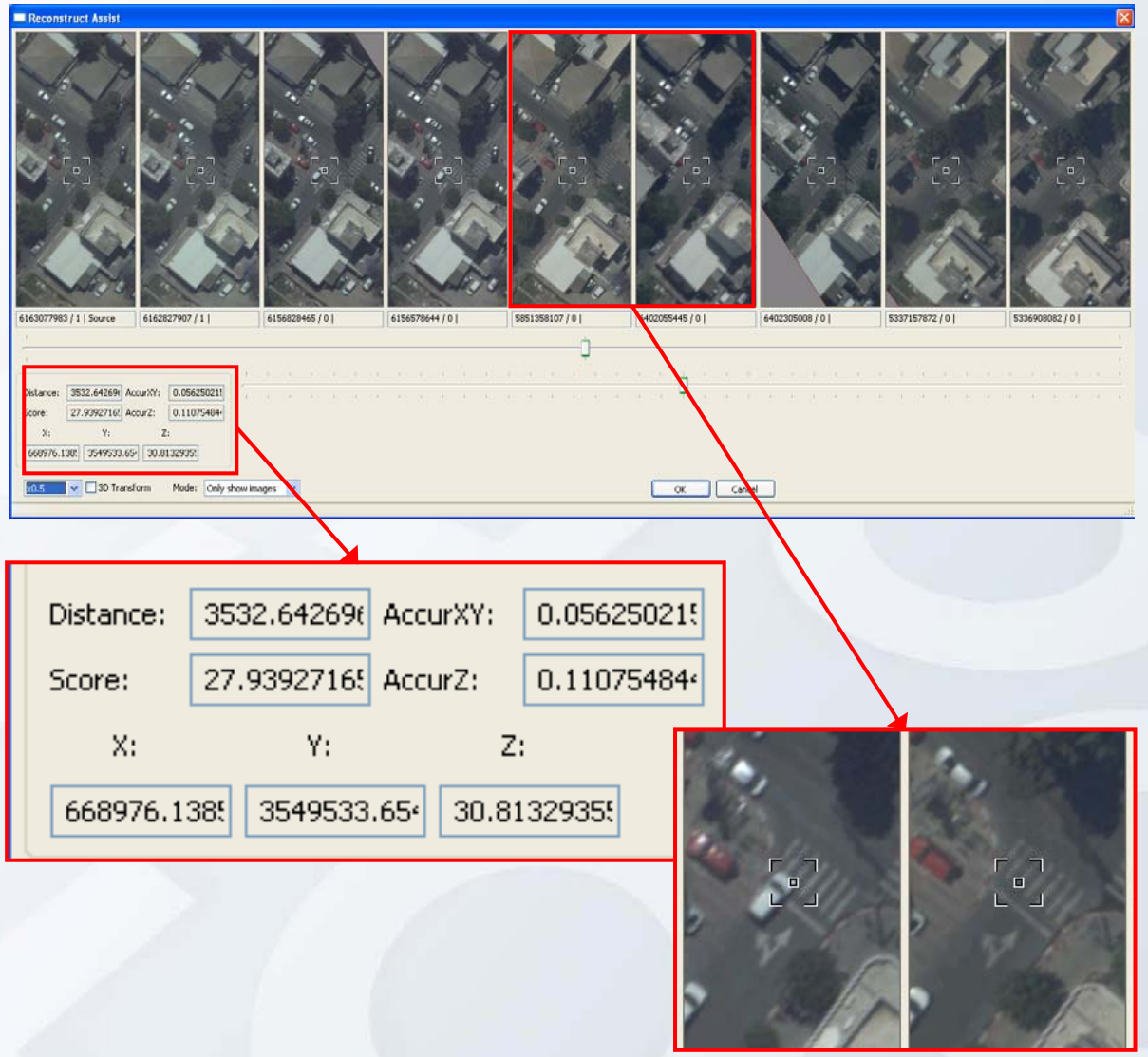
Bundle block adjustment

- Self-calibration
- Millions of tie points
- Special tools for QC
- **No need in IMU**
- **No need in Control Points**
- **Fully automated process**



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Conclusion

Aerial Survey Cost Reduction

- **Pre-flight** preparation time reduction;
- **Flight time** reduction;
- **Good weather** time maximal utilization;
- Very effective aerial survey in **urban area**;
- Number of **planes, cameras and project execution time** reduction.

Photogrammetric processing cost reduction

- Fully automatic **triangulation, DTM, orthophoto and mosaic**;
- Very high **processing productivity**;
- **One program** processing workflow;
- Computer system **scalability**;
- **Multiple projects** parallel execution;
- Generally – **no need in Control Points**;
- Effective stereo-compilation **with SLF**.

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Thank you for your attention !

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