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OBLIQUE IMAGE COLLECTION – CHALLENGES AND SOLUTIONS

54th Photogrammetric Week

Stuttgart, Sept/10, 2013

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Productivity (-> footprint size)

UCD/ UCLp	UCX	UCXp	Eagle
90	136	196	260 MPixel

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UltraCam L (Lp) 2008
4 cone camera concept
Nadir Pan / RGB and NIR

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Combine Nadir and Oblique

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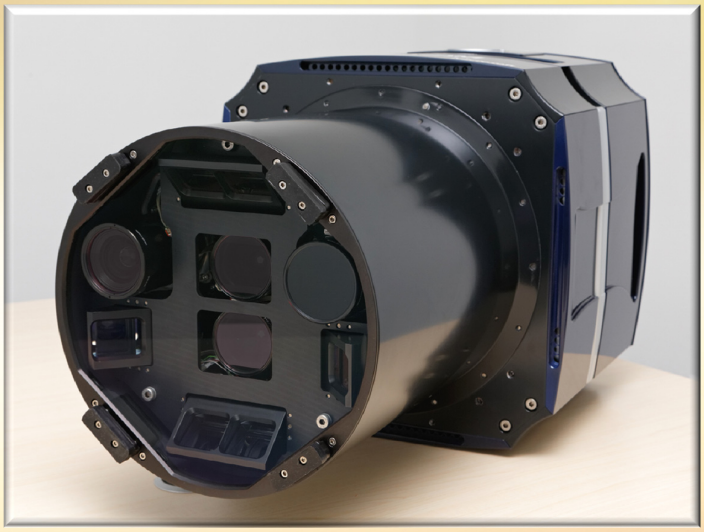
UltraCam Osprey



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UltraCam Osprey

- Camera design
  - 3rd generation UltraCam architecture
  - 2.0 seconds frame rate
  - 3.3 TB SSD storage
  - Optional UltraNav
  - 75kg, 350watts
- Camera Operation
  - 10cm GSD (nadir) @ 850m AGL
  - Wing image GSD between 7.5cm (inner) and 12.5cm (outer) on a flat terrain
  - 80% frontlap @ 145kts

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UltraCam Osprey

Focal Lens/ Pixel Size

Nadir PAN	51.0 mm	6.0 µm
Nadir RGB and NIR	25.5 mm	5.2 µm
Oblique Sensor Heads	80.0 mm	5.2 µm

Frame Format / Pixel Size

Nadir PAN	11674 * 7514	6.0 µm
Nadir RGB and NIR	6735 * 4335	5.2 µm
Oblique Sensor Heads	6870 * 4520	5.2 µm
Fwd/Bwd (together)	13490 * 4520	

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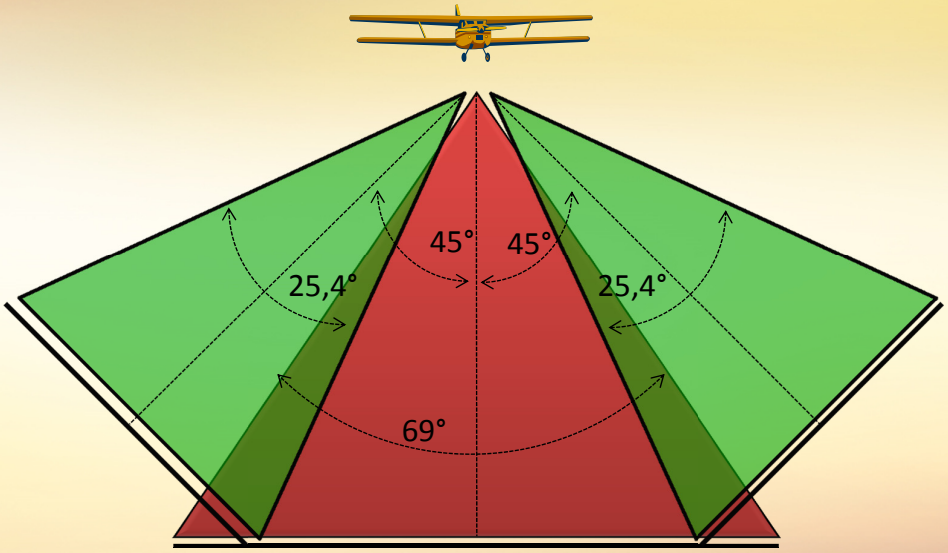
UltraCam Osprey

Nadir and L/R wing cross flight direction



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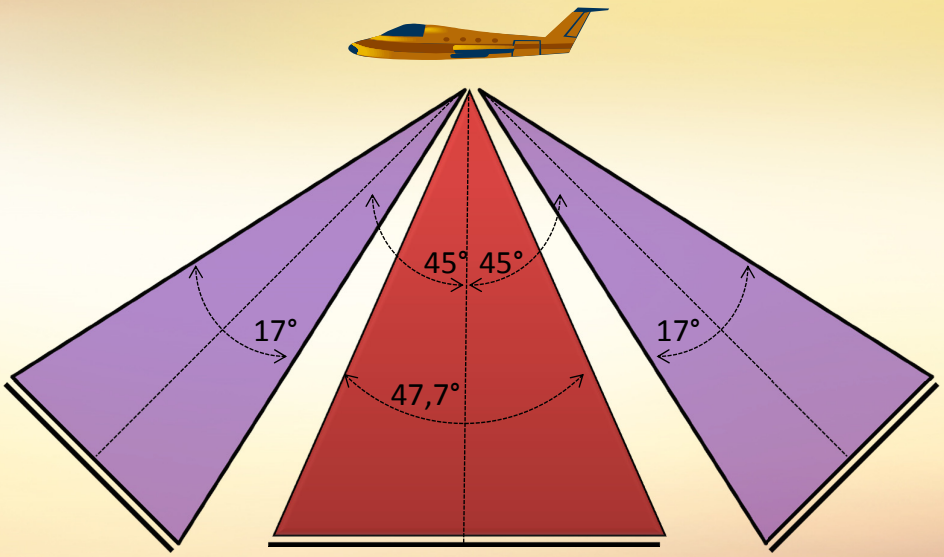
UltraCam Osprey

Nadir and F/B wing along flight direction



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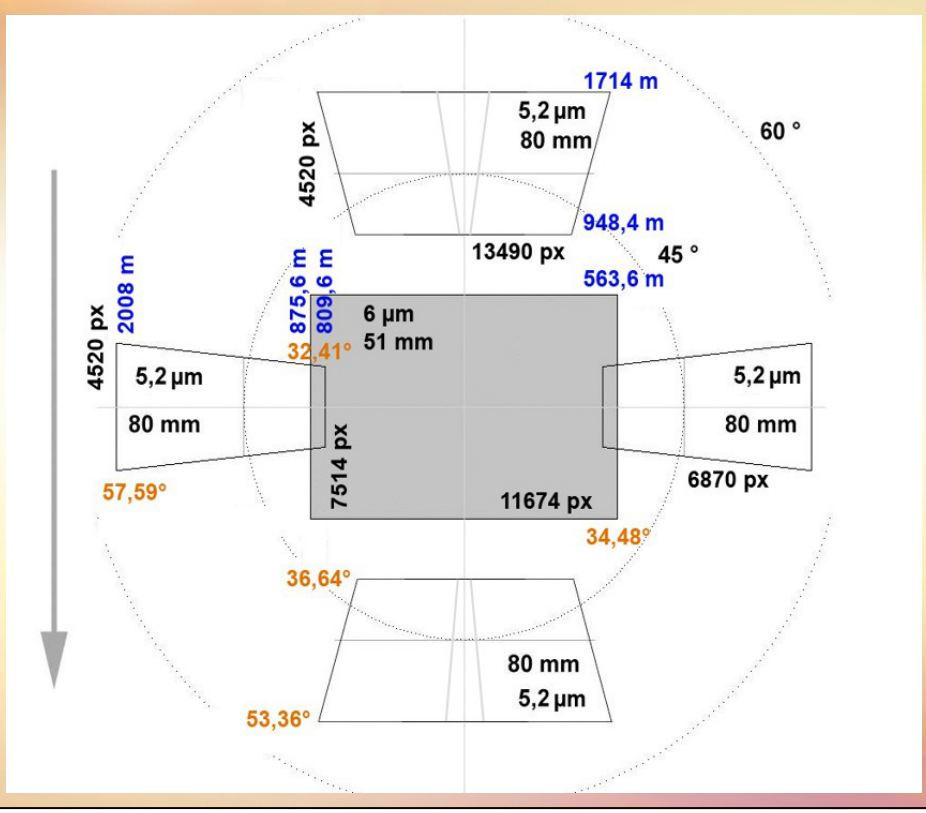
UltraCam Osprey @ 1250 m AGL



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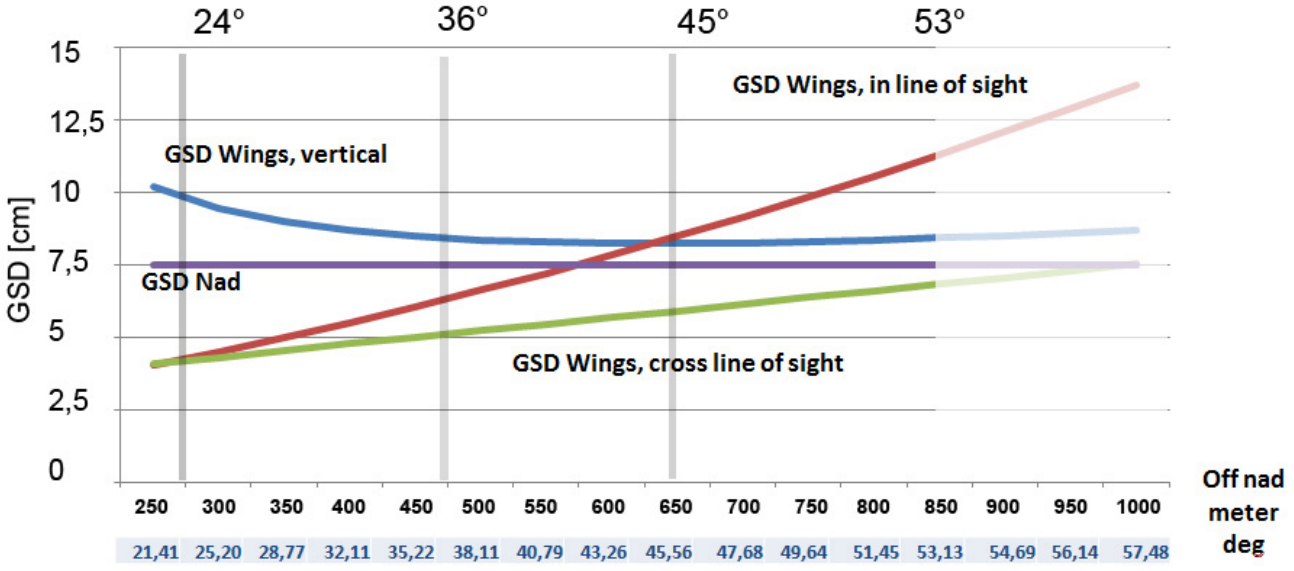
Spacial Resolution UltraCam O
GSD Nad = 7,5 cm, H_agl 637 m



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City of Graz, 900 m AGL, Nadir GSD 10,5 cm
Footprint 1230 m by 800 m

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Forward Wing, 13490 Pixel cross track
Footprint ~1100 m cross track

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GSD NADIR 7,5 cm

Right Wing,
6870 Pixel cross track
Footprint
~850 m
cross track

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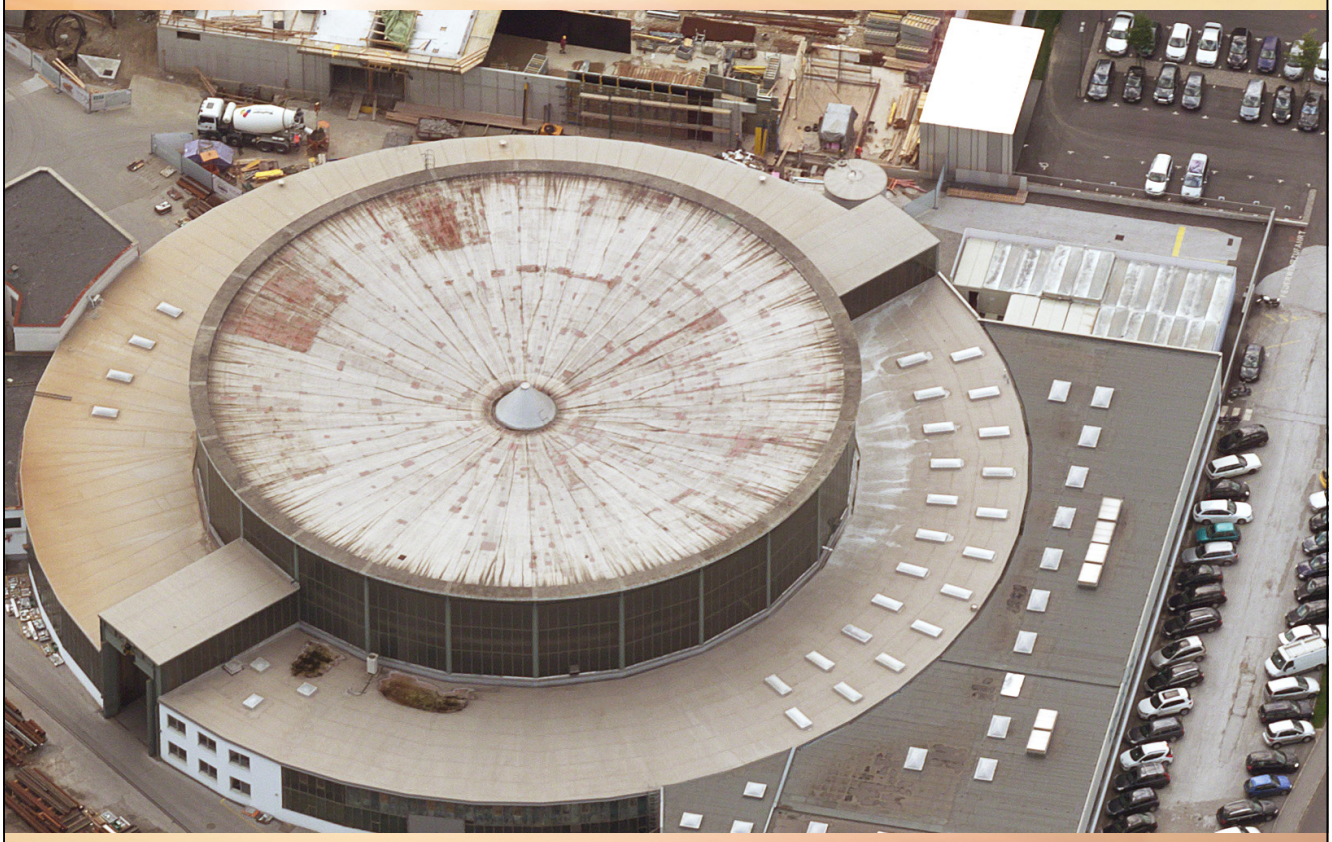

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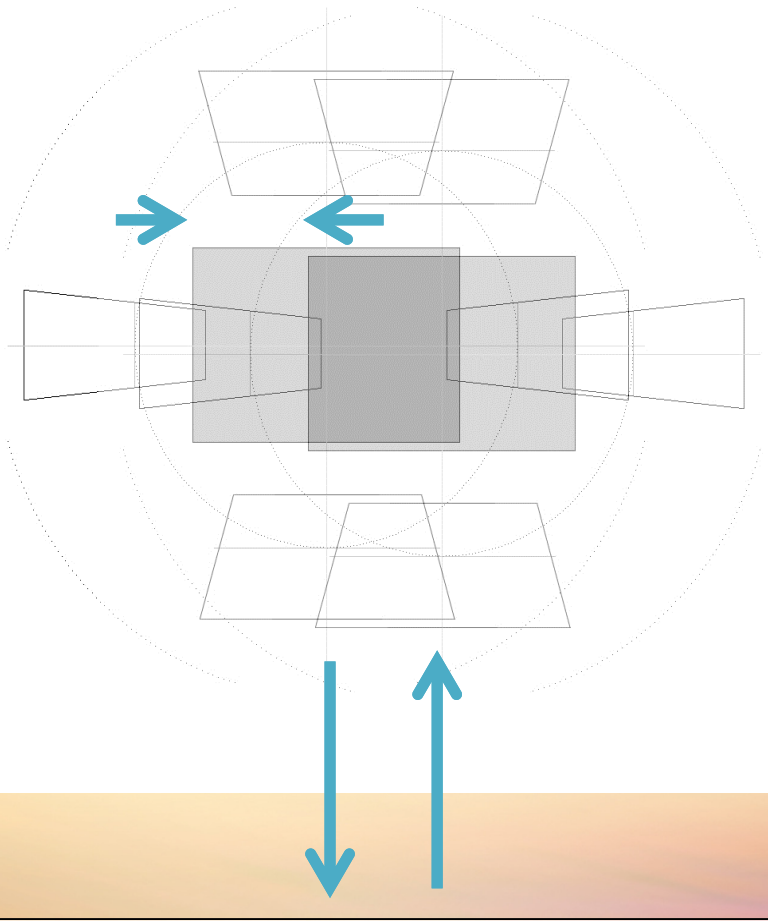

Ideal Flightpattern
60% cross track (Nadir)

Linespacing 500m
@ 900 m AGL

Urban,
True Ortho
3D Modelling

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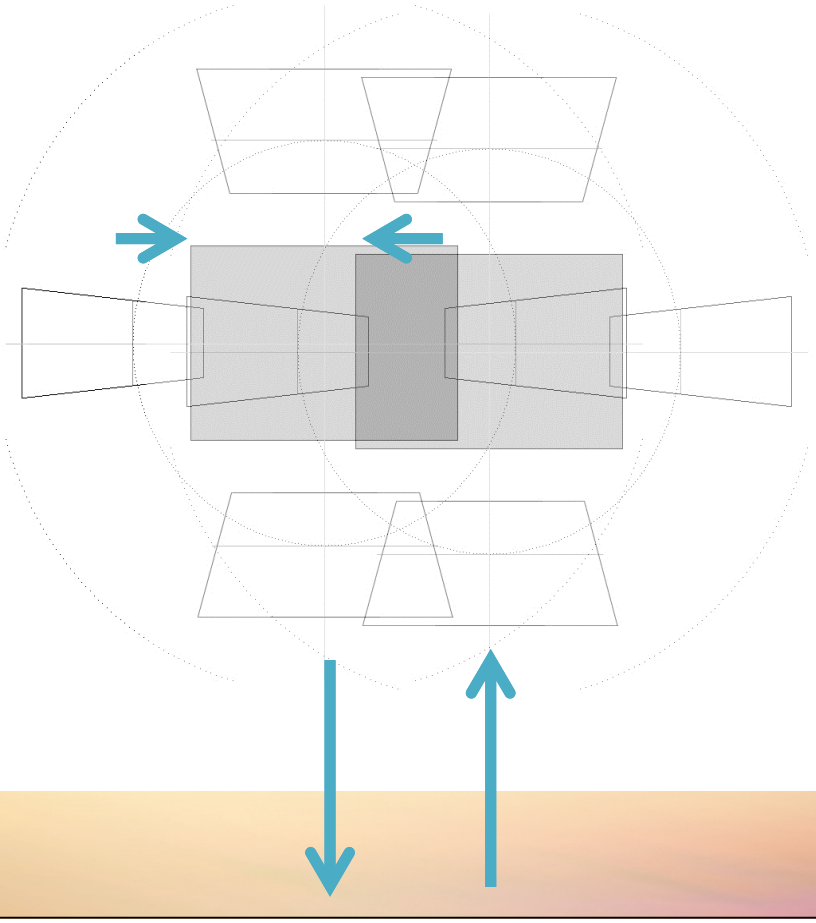

Flightpattern
40% cross track (Nadir)

Linespacing 1000 m
@ 750 m AGL

Sub Urban,

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UltraCam Osprey Calibration

Extendet Calibration Lab
RMSE of Image Points < 0,5 Pixel
Redundant set of images
Single Head Calibration and Platform Calibration

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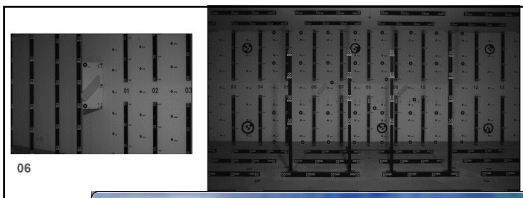

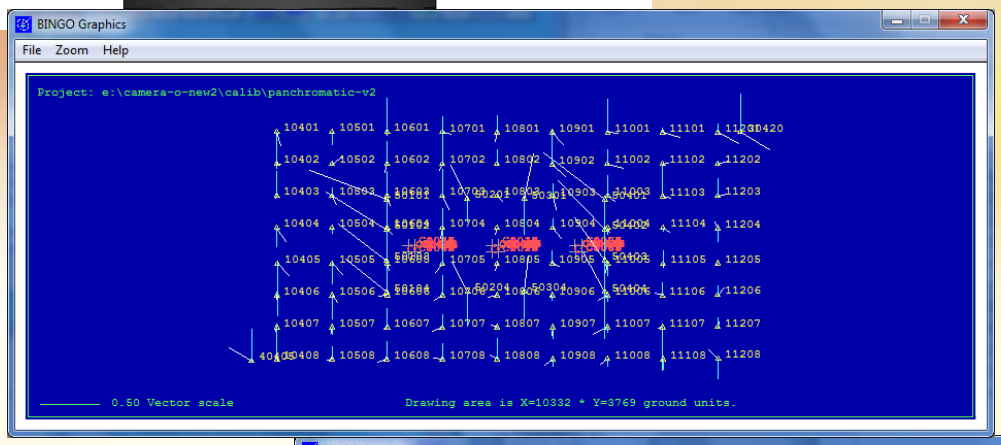

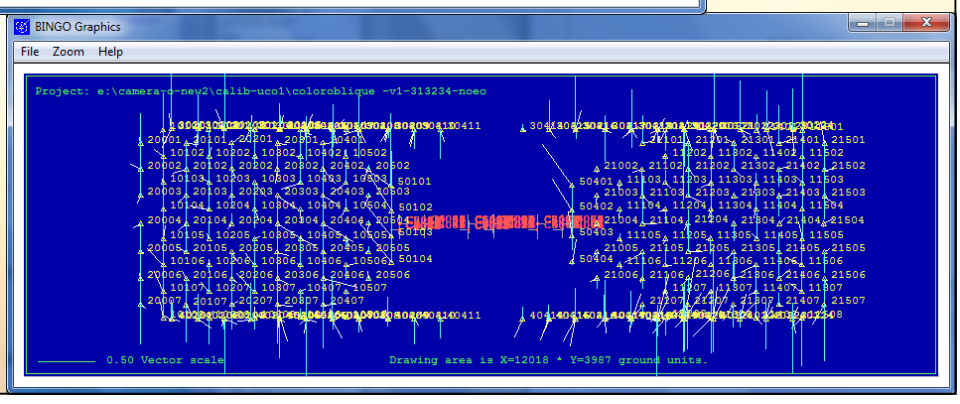

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RESULTS OF ADJUSTMENT           SIGMA 0 =        2.48 (1/1000)

RMS precision values of photo orientations from Qxx matrix
(X,Y,Z,phi,omega,kappa): (1/1000)
390.         137.       414.       7.5       1.0       1.8

Poorest precision values of photo orientations from Qxx matrix
(X,Y,Z,phi,ome,kap): (1/1000)
498.         157.       506.       8.9       1.1       2.0

ECCA     C4  -38.2606  123.3976 -108.7795   -0.0242  -49.9293   -0.0105
ECCA     C5   37.7175  123.4403 -106.6724    0.1944  -50.1714   -0.1031
ECCA     C6 -124.9420  -37.9629 -107.4386  -50.0001   -0.0323   -0.0199
ECCA     C7  125.1048  -37.8432 -107.1659   49.9729    0.0680    0.0156
ECCA     C8  -38.0590 -123.2497 -108.7912   -0.1935   49.9996   -0.1461
ECCA     C9   37.4850 -123.2268 -106.4709    0.0468   49.9850   -0.1576
```

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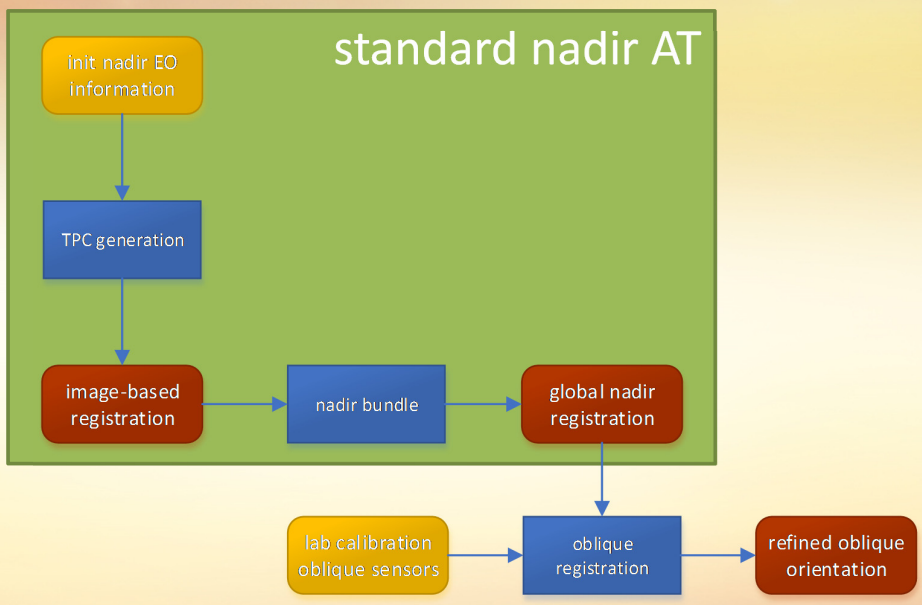
UC-Osprey AT Workflow



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Additional Notes

Relies on a solid nadir AT

Works fully automated

Fully exploits UltraMap Framework

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UltraCam Osprey Project Results

Flight Mission Salzburg, May 2013
GSD (nadir) 10,5 cm, Height AGL 890 m

Flight Pattern 75% fwd OL, 65 % sdw OL
Base 142 m, line distance 305 m

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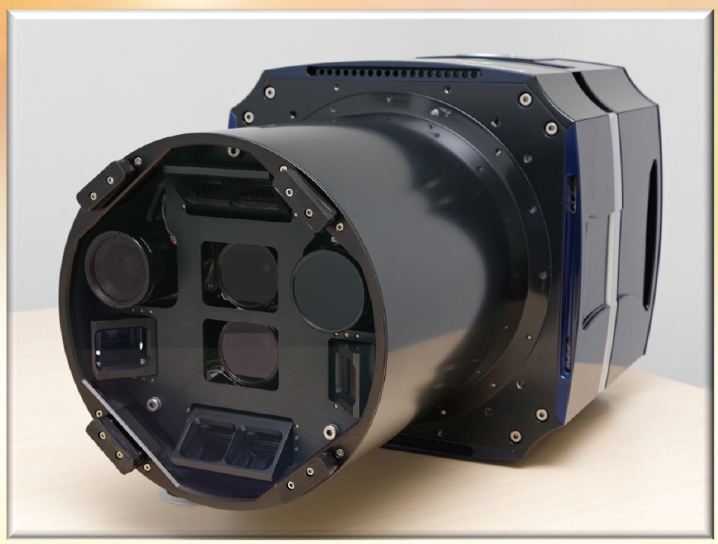

Thank you very much

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