

# **AUTOMATIZOVANÉ MAPOVACIE SYSTÉMY Z POHĽADU HW-VÝROBCOV A SW-APLIKÁCIÍ**

# Automatizované mapovacie systémy z pohľadu HW-výrobcov a SW-aplikácii

1. Letecké fotogrametrické mapovacie systémy Vexcel Imaging
2. UAV laserové skenovacie systémy Riegl
3. Mobilné laserové mapovacie systémy Riegl
4. IMU Applanix
5. Spracovateľský softvér
6. Záver

# 1. Letecké fotogrametrické mapovacie systémy Vexcel Imaging



## Aerial products

### Kamery 4. generácie



UltraCam Condor  
4.1

The ideal solution for wide-area  
and high-altitude mapping at fast  
airspeed.

nová optika pre CMOS  
nová elektronika



UltraCam Osprey  
4.1

Your first choice for  
photogrammetry-grade nadir and  
oblique image capture.



UltraCam Eagle  
Mark 3

An ultra-efficient, ultra-flexible,  
ultra-reliant camera for all your  
mission needs.



UltraCam Falcon  
Mark 2

Optimized productivity capturing  
large areas in a short time at first  
rate image quality.

# 1. Letecké fotogrametrické mapovacie systémy Vexcel Imaging (pok.)

UltraCam Condor 4.1



48,462 pixels across the flight strip

FOOTPRINT

PAN

NIR

RGB



Najvyššia mapovacia produktivita – na mapovanie celých kontinentov v rozlíšení GSD 10-30cm

# 1. Letecké fotogrametrické mapovacie systémy Vexcel Imaging (pok.)

UltraCam Osprey 4.1

New perspectives on 3D aerial mapping.

30 YEARS OF VEXCEL IMAGING



1. UCOv4.1 na Slovensku  
– prezentácia na SGD 26.10.2022

Najlepšia možná kvalita šikmých snímok - na 3D mapovanie miest a hôr v rozlíšení GSD 5-15cm

# 1. Letecké fotogrametrické mapovacie systémy

## Vexcel Imaging (pokr.)

### Kamery 4. generácie – Adaptive Motion Compensation



## 2. UAV laserové skenovacie systémy Riegl



- **Hardwarové novinky**
  - *RIEGL VUX-1UAV<sup>22</sup>*
  - *RIEGL miniVUX-1LR*
  - *System: VUX-SYS with AP+ board for ULS/MLS applications*
  - *RIEGL (mini)VUX-SYS: APX-20 UAV with smaller and lighter IMU type*
- **Príslušenstvo**
  - *Integration Kit 300 (IK300) for DJI Matrice M300 RTK*
  - *“Industrial-grade” camera solution*
- **Softwarové novinky**
  - *RiACQUIRE-Embedded webinterface*



## 3. Mobilné laserové mapovacie systémy Riegl



### System comparison VMX-2HA / VMQ-1HA / VMY-2



11 cm line spacing  
8 mm point spacing  
acc, prec: 5/3mm

precise object and  
edge detection in a  
single run



11 cm line spacing  
8 mm point spacing  
acc, prec: 5/3mm

object edges may be  
missed in a single run  
due to parallel scan  
line orientation wrt.  
object



27 cm line spacing  
15 mm point spacing  
acc, prec: 15/10 mm

object edges may be  
fuzzy due to coarse  
line and point spacing



Point Pattern Comparison @ 100 km/h; 5m range

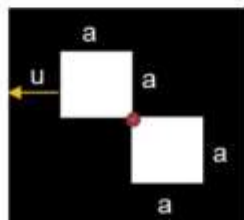


# 3. Mobilné laserové mapovacie systémy Riegl (pok.)

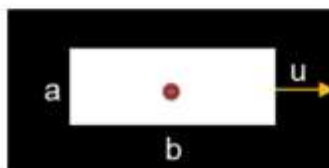
## Automated Detection of Ground Control Markers

**Ground control is essential to reach utmost accuracy in post-processing**

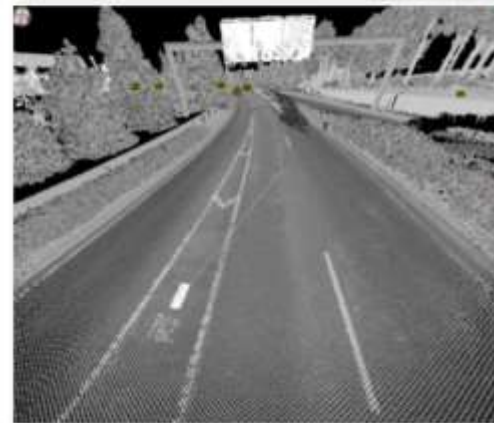
- Identification and linking of ground control markers to reference points is one of the most labor intensive tasks in post-processing
- In a first step, rectangular and checker board markers have been implemented for automated control object detection



checker board



rectangle



## 4. IMU Applanix



Súčasti systému na priame georeferencovanie:

- Vysokovýkonný viacfrekvenčný GNSS prijímač geodetickej triedy
- Inerciálna meracia jednotka (IMU)
- Vysokovýkonná GNSS anténa s nízkym šumom
- Software na spracovanie meraní v reálnom čase aj postprocessingom

**POSPac MMS, POSPac UAV**

- možnosti spracovania

*Single Base, Multi-Single Base, SmartBase, RTX, PPK-online*



Hore: Súčasti riešenia IMU a GNSS určené pre použitie v oblasti UAV – HW (riadiaca jednotka a IMU, GNSS anténa a SW, s využitím viacerých globálnych systémov GNSS [A1]

## 4. Možnosti spracovania a čistenia dát LS softvérom Riegl RiScanPro a RiProcess až po výstup v Riegl RiPANO.

**Automatizované postupy**

**Filtrovanie, export**

The screenshot displays the Riegl RiScanPro 2.14.1 software interface. The main window is the 'One-Touch Processing Wizard', which lists 12 tasks for processing point cloud data. Task 7, 'Mark Single Source Points', is selected with a checkmark. The progress bar for Task 7 shows 69% completion. The interface also shows a project manager on the left and a message list at the bottom.

Task selection  
Select the tasks to be performed

- ☐ Task 1: Convert Scans  
Convert raw RXP scan data into to RDB 2 database file format
- ☐ Task 2: Filter Scans  
Keep one echo per laser shot. Delete points with a Reflectance below -25.00...
- ☐ Task 3: Register Scan Positions  
Register Scan Positions with Automatic Registration 2
- ☐ Task 4: Fine Adjust Project  
Adjust Scan Positions with Multi Station Adjustment 2
- ☐ Task 5: Calibrate Camera Mounting  
Calibrate Camera Mounting by using data from first 3 Scan Positions
- ☐ Task 6: Colorize Scans from Photos  
Colorize Scans from Photos
- ☒ Task 7: Mark Single Source Points  
Mark points that are scanned from one Scan Position only with the "Single S...
- ☐ Task 8: Mark Dynamic Objects  
Mark points caused by dynamic objects with the "Dynamic Object Point" Point...
- ☐ Task 9: Generate Octree based Point Clouds  
Generate combined point clouds with the following resolutions: 0.015 m)
- ☐ Task 10: Create 3D Views  
Create 3D view with generated combined point clouds
- ☐ Task 11: Create Ortho Plots  
Create orthoplots as GeoTIFF images from the top
- ☐ Task 12: Export as RiPANO

69% Remaining: 42m  
Mark Single Source Points in 97 Point Clouds

Message list - Thread list - Info

- [26512] Calculate StdDev of 30 tiepoint(s) - Finished!
- [36308] Combined pointcloud: Single Source Point Octree 0.030 m (POINTC...
- [37540] Apply Point Flags from "Single Source Point Octree 0.030 m" - Start...

Save requested - project will be saved after all tasks are completed  
Save requested - project will be saved after all tasks are completed

# Expert\_for\_3D\_Landscape, spol. s.r.o.

Systémová integrácia a expertné poradenstvo v oblastiach:

- digitálna fotogrametria
- laserové skenovanie
- hyperspektrálne skenovanie
- MOBILNÉ MAPOVANIE
- UAV a LETECKÉ MAPOVANIE
- Management a spracovanie 3D dát
- 3D modelovanie a analýzy
- 3D vizualizácia
- distribútor pre SR, od roku 2004 na trhu –  
**ponúkame 18+ rokov skúseností**



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IMAGING



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meracie a mapovacie multikamerové a multisenzorové systémy



laserové skenovanie

RIEGL



ULS



ALS



TLS VZ400i



MLS VMY-2



VMX-RAIL



VEXCEL  
IMAGING

fotogrametria



ULTRAMAP



UCO 4.1



UCE M3



HySpex  
by neo

hyperspektrál



UAV



Airborne



Lab



applanix

IMU



APX-15 UAV



Bentley

SW



Orbit 3DM