**Reality Capture:
Sensors to Information**

Providing accurate answers is crucial

John Welter, President Leica Geospatial Solutions Division
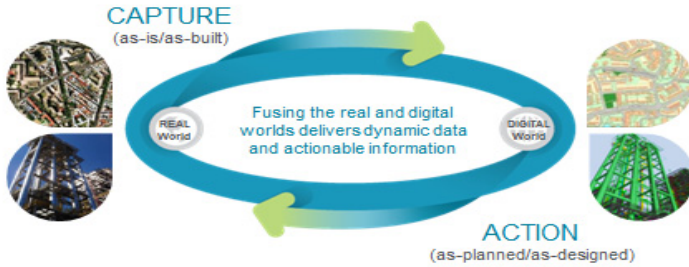
PhoWo Stuttgart, September 7, 2015

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"In the future nobody will ask
with which method data was captured.
Today, and even more within the next years,
it will be crucial to provide accurate data
fast and make them easily available –
including mobile devices."

Juergen Dold, President Hexagon Geosystems

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Introduction to Hexagon
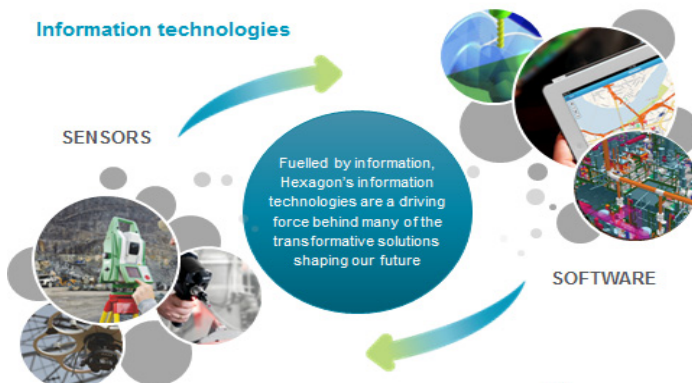
Fusing the real and digital worlds

CAPTURE
(as-is/as-built)

REAL World

Fusing the real and digital worlds delivers dynamic data and actionable information

DIGITAL World

ACTION
(as-planned/as-designed)

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Reality Capture: Sensors to Information

Information technologies

SENSORS

Fuelled by information, Hexagon's information technologies are a driving force behind many of the transformative solutions shaping our future

SOFTWARE

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An Overview

Reality Capture: Sensors to Information

Airborne Imaging	Airborne LiDAR	Mobile Mapping	UAV

Airborne Imaging & LiDAR

Leica Geosystems Airborne Reality Capture

Airborne Imaging Sensors

DMC III

- 50% performance +
- 26,112 px in swath
- 25% more area
- CMOS technology
- 5cm GSD at 1,180m

ADS 100 / 120

- Full multispectral color swath width
- 20,000 pixels
- Select TDS stages
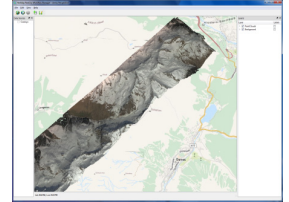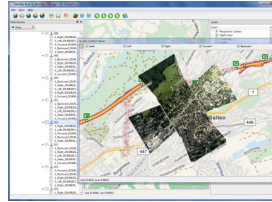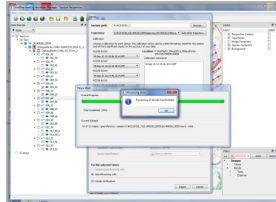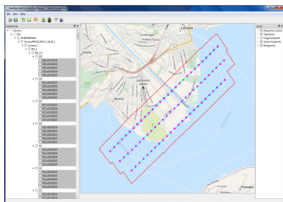- Full color RGBN

RCD30 Penta Oblique

- World's first 80MP multi-spectral MFC
- High accuracy urban and 3D corridor map
- CH82 multi-spectral

RCD30

- Only one: 80MP RGBN co-registered
- FMC along two axis
- Rugged and thermal stabilised lenses

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Sensor Workflow & Solutions - HxMAP Production Workflow

- **Enabler:**   Pushbroom/Frame/Oblique
- **Provider:**   Image Ingest, RawQC
- **Core:**   APM Triangulation, Ortho
- **3D Modeller:**   TextureMapper, 3D Editor
- **3D Presenter:**   3D Viewer, Geospatial Portal

Optional:

Stereo Mapping: Photogrammetry Workstation

3D Modeller: BuildingFinder 3D Mesh

3D SDK: HxMAP SDK

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Solutions - HxMap RealCity
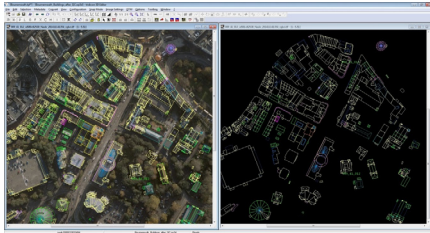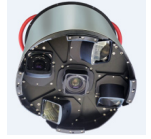
Leica BuildingFinder

- Automatically generates high quality Digital Surface Models
- Automated footprint detection, building recognition and 3D textures from pointclouds
- Does not require the input of existing building footprints for detecting buildings
- Scalable from Village to MegaCity

Leica CityModeller

- Automatic generation of 3D city models in LoD1 + 2 from building footprints and stereo aerial imagery and/or airborne LiDAR and/or other point clouds

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Airborne LiDAR Sensors – A comprehensive Product Portfolio

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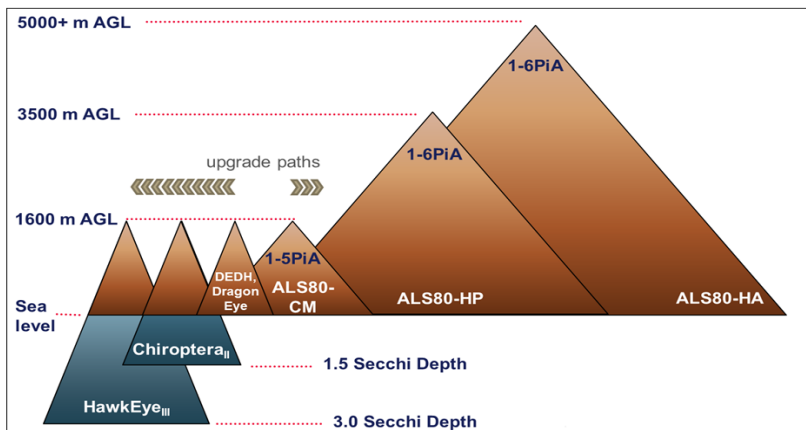
Airborne Imaging Sensors

Topo LiDAR
ALS80 – HA, HP, CM

- 1,0 MHz pulse rate
- Nearly 8km swath
- 50% less flight time
- Max height: 5,000m
- FOV 0-75 deg (HA)

Topo LiDAR
DragonEye DH

- 2 oblique scanners
- RCD30
- Capture, digitise and analyse full waveform in real time
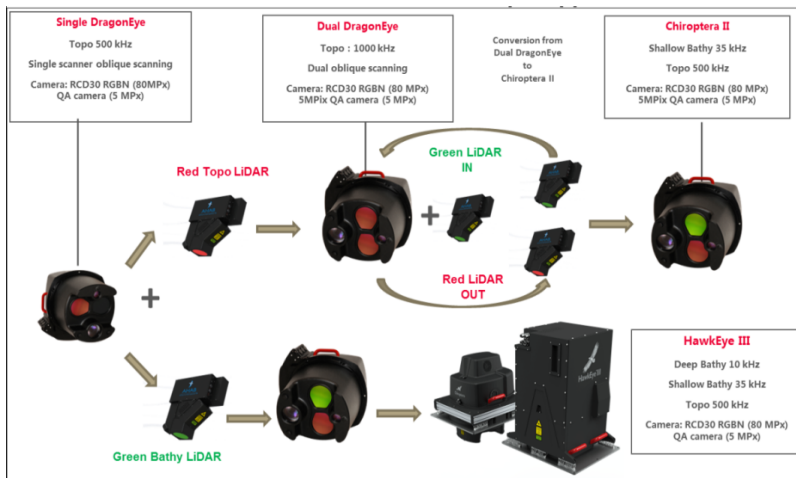
Topo, Shallow Bathy
Chiroptera II

- Down to 15m
- Record Japan: >31m
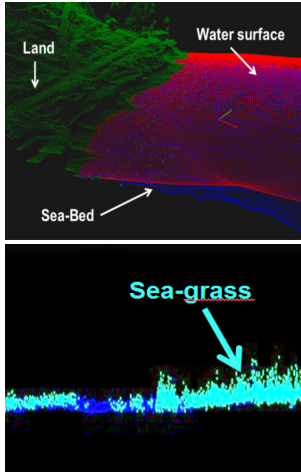- Simultaniously full waveform 35kHz bathy + 500kHz topo

Deep Sea Bathy
HawkEye III

- Down to 50m
- 2 bathy channels: 10kHz, 35kHz
- Optional 500kHz topo or RCD30

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Conversion between sensors – allows multiple applications use

Single DragonEye
Topo 500 kHz
Single scanner oblique scanning
Camera: RCD30 RGBN (80MPx)
QA camera (5 MPx)

Dual DragonEye
Topo : 1000 kHz
Dual oblique scanning
Camera: RCD30 RGBN (80 MPx)
5MPix QA camera (5 MPx)

Conversion from Dual DragonEye to Chiroptera II

Chiroptera II
Shallow Bathy 35 kHz
Topo 500 kHz
Camera: RCD30 RGBN (80 MPx)
5MPix QA camera (5 MPx)

Red Topo LiDAR

Green LiDAR IN

Red LiDAR OUT

Green Bathy LiDAR

HawkEye III
Deep Bathy 10 kHz
Shallow Bathy 35 kHz
Topo 500 kHz
Camera: RCD30 RGBN (80 MPx)
QA camera (5 MPx)

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Workflow Solutions - LiDAR Survey Studio - LSS

- Analysis of bathymetric and topographic elevation data

- Multiple sensor windows for simultaneous review

- Waveform visualisation

- Automatic sea surface detection

- Convervsion all LiDAR waveforms to LiDAR returns

- Flight trajectory import and transformation

- Automatic water refraction correction

- Automatic data classification

- Turbid water enhancement
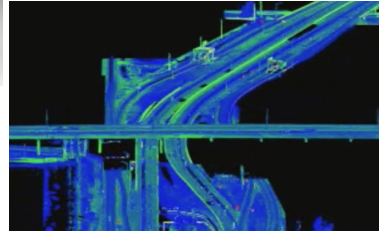
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Mobile Mapping

Leica Pegasus – Mobile Reality Capture

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Platform Independent + Wearable Mobile Mapping

Pegasus:Two

- Vehicle independent, data economical, mulitple sensor platform

- Fully calibrated imagery and point cloud

- 7 cameras for full dome imagery

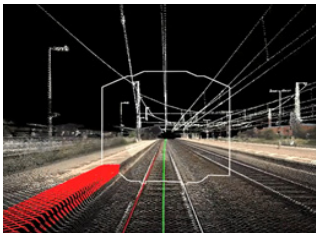- Easily extract features and line work from imagery AND pc data

Pegasus:Backpack

- Indoor and outdoor mapping in one single solution

- Full calibrated spherical view

- Software enables access to ESRI ArcGIS for d-top

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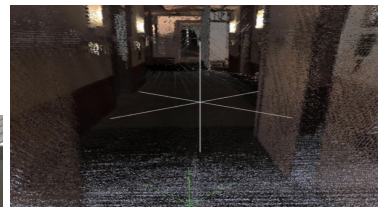

Railway + Ground Penetrating Radar Applications

Technet-Rail

- Automated rail line extraction with accuracy and reliability values

- Collision detection with any structure gauge profile

- Axis based section profiles and vectorisation of detected objects

Pegasus:Stream   -   Ground Penetrating Radar

- Underground and above-ground 3D digitalisation solution in one platform

- Speed – can be towed by a vehicle up to 15km/h and can be run continously without blocking traffic

- Accurate to 5cm – provides accurate geolocalisation of pipes, cables and anomalies detected.

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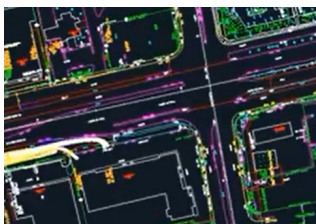
UAV – Unmanned Airborne Vehicles

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Aibotix - Swissdrones

Aibot X6

- Fully integrated geo-referencing
- 3D models, point clounds, ortho-photos, high precision GNSS
- Inspections: power lines, bridges, facades, dams, TPS navigation
- Indoor inspections with TPS navigation; payload 2 kg

Dragon 50

- Payload: 50kg; rotor diameter: 2x2,80m
- Max time of flight: up to 2,5h; max airspeed: 54 km/h
- Service ceiling up to 10,000 feet MSL
- Pipeline, power line, wind turbine inspections
- Roadwork, ramp, bridge, canal inspections

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HxIP – The Hexagon Imagery Program

- Aerial imagery program for industry professionals

- Partnering with some of the most notable aerial acquisition firms across the globe

- Providing on-demand aerial imagery and content streams as orthorectified basemap or multispectral service plus point clouds and stereo:

  - 30cm resolution; four-band (RGB and NIR); metadata; planned refresh schedule

- HxIP is available through the cloud via multiple content providers

  - ESRI's ArcGIS Marketplace; Hexagon Geospatial's Power Portfolio; Valtus

- Unlimited use in all applications

- Annual subscription basis

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Content as a Service – HxIP

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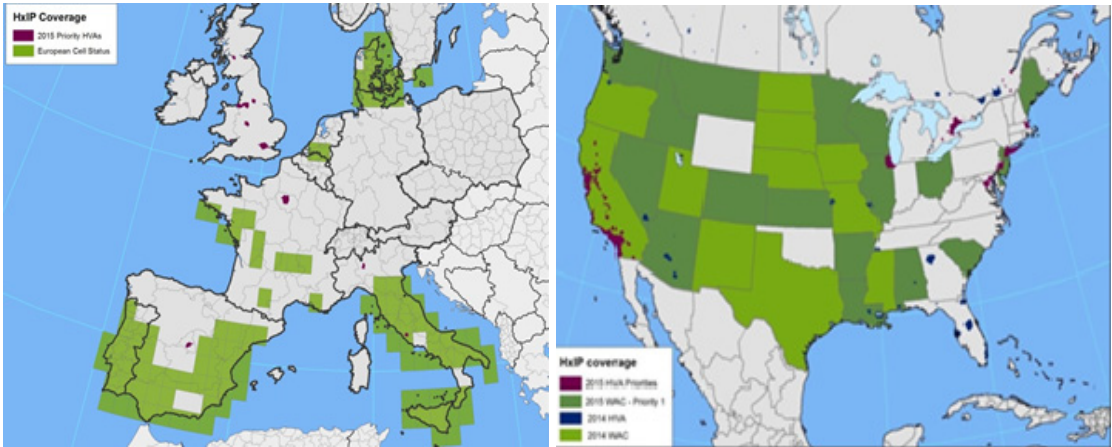
"The only thing that is constant is change."   **Heraclitus of Ephesus**

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Thanks.

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