

塑造智慧变革



HEXAGON

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Introducing Pegasus:Two

徠卡车载移动激光扫描系统国外应用案例介绍

Aldo Facchin – R&D Manager Mobile Mapping/移动测量研发部经理

2018, September 11th





from Hardware to Actionable Information

从外业采集 到 获取准确的三维数据



Pegasus:Two Ultimate



From GIS to high accuracy
surveying applications
从GIS应用到高精度测量应用

New Leica 360deg panoramic
camera
全新徕卡360° 高清全景相机

High resolution side cameras
High accuracy and low noise
Lidar system
高分辨率侧边相机
高精度激光扫描系统

Removable Hard Drive
抽取式硬盘设计

Pegasus:Two Ultimate



From GIS to high accuracy surveying applications

New Leica 360deg panoramic camera

High resolution side cameras
High accuracy and low noise Lidar system

Removable Hard Drive

OPTIONS

Dual scanner
双激光扫描仪

Thermal camera system
热红外成像系统

Ground Penetrating Radar
探地雷达

Dual pavement camera system
双路面相机系统

Where it's used today around the world

全球应用领域及热点

<http://blog.hexagongeosystems.com/>

- Roads/Rails asset management and inventory
- Roads/Rails geometry extraction
- Roads/Rails clearance analysis
- Roads pavement condition

- 道路/铁路资产管理和数字化
- 道路/铁路地理要素提取
- 道路/铁路净空分析
- 道路路面病害分析

- Roads/Rails as built
- Roads/Rails high accuracy surveying
- General purpose corridor mapping
- Autonomous drive basemaps
- Autonomous drive simulation

- 道路/铁路竣工测量
- 道路/铁路高精度测绘
- 常规道路测绘
- 自动驾驶基础地图
- 自动驾驶模拟

- Smart cities
- 3D city modelling
- Roads and rails cadastre
- Power lines surveying
- Ports and harbours
- Tunnel inspection

- 智慧城市
- 数字城市建模
- 道路和铁路地形图
- 电力线测量
- 港口和港湾测量
- 隧道检测

Reality Capture: Ayacucho, the Smart Digital City 数字城市应用案例: 秘鲁阿亚库乔实景获取

<http://blog.hexagongeosystems.com/transforming-ayacucho-into-a-digital-city/>



“C95 has found with Leica Geosystems reality capture solutions, the perfect tools for its BIM work flow.

The Pegasus:Two allows to generate data of big areas in a short amount of time.

The P40 is used for interior design, rehabilitation, restoration, refurbishment, engineering and architecture for its scan precision and speed. It is used together with the BLK360 to generate data of different landmarks of a site and obtain as-built models.

In addition, the point clouds are used for any kind of digital surveys, data collection for simulations, reports, VR and AR,” said Pascual.

C95建筑与设计公司发现在徠卡测量系统现实捕捉解决方案的帮助下，他们的BIM工作效率大大提高。

Pegasus:Two可以在短时间内采集和生成大范围的城市数据。

P40扫描精度高、速度快，主要用于室内设计、维护、复原、翻新和建筑工程等。它与BLK360联合使用不仅能够采集记录下建筑物的每个细节，而且还能够获取到竣工三维模型

此外，点云数据还能够应用到其他应用平台，比如仿生模拟、VR和AR等

Railways: 26km railway captures in 15 minutes and delivered next day 铁路应用案例: 26km的铁路采集时间15分钟

<http://blog.hexagongeosystems.com/reality-capture-to-gear-up-for-melbournes-rail-network/>



Using the Leica Pegasus: Two mobile mapping solution, Heading and Associates conducted the surveys for the 26-km rail line in just 15 minutes and delivered the data to the client next day. To put this into perspective, using traditional methods the same project would have taken an additional two months in the field to complete with the same amount of detail. By mounting Pegasus: Two to the hi-rail, the project team could eliminate danger zones and significant health and safety risks, capture high-level detail and provide the client additional data such as wire locations and overhead power lines without disruption to the network.

采用徕卡Pegasus:Two移动测量解决方案后，当地的测量公司仅使用了15分钟的时间就完成了26km的铁路线路测量，并在第二天就将成果提交给了客户。客观来讲，如果使用传统测量方法同样的项目将花费至少两个月的时间来进行数据采集，才能够达到如此精细的数据采集。通过将Pegasus:Two安装在火车上进行扫描，项目团队能够消除安全隐患，避免发生危险，而且还能够同时获取到高质量的地形数据。除此之外，在点云数据中还能提取出电力线和接触网的位置等信息，无需断电测量。

Capturing Fast and Accurate Data for Highways England Area 3 英格兰地区高速公路高效、精确的数据采集

<http://blog.hexagongeosystems.com/capturing-fast-and-accurate-data-for-highways-england-area-3/>



Mobile mapping provided a rapid data capture solution for Kier, saving them time, reducing safety risks and maximising value by reducing a 200 plus field day project to only 12 days with no traffic management. Furthermore, all 119 sites were surveyed and delivered to Kier a week before the final deadline, thanks to the speed of accuracy delivered by using the Leica Pegasus:Two. Sun Hill was able to deliver this project with less than 20mm absolute accuracy. The surveys were then delivered in a staggered program, allowing sites to be prioritised.

徕卡移动测量给客户提供了一个高效的高速作业方案，节省时间、减少交通事故，统计下来原本200天的工作降低到12天安全的完成。此外，使用徕卡Pegasus:Two移动扫描方案不仅提前完成任务，而且精度质量高，最终交付项目成果绝对精度由于20mm。

Protecting the Netherlands against floods with mobile mapping technology 运用移动扫描技术保护荷兰免受洪水侵害

<http://blog.hexagongeosystems.com/protecting-the-netherlands-against-floods-with-mobile-mapping-technology/>

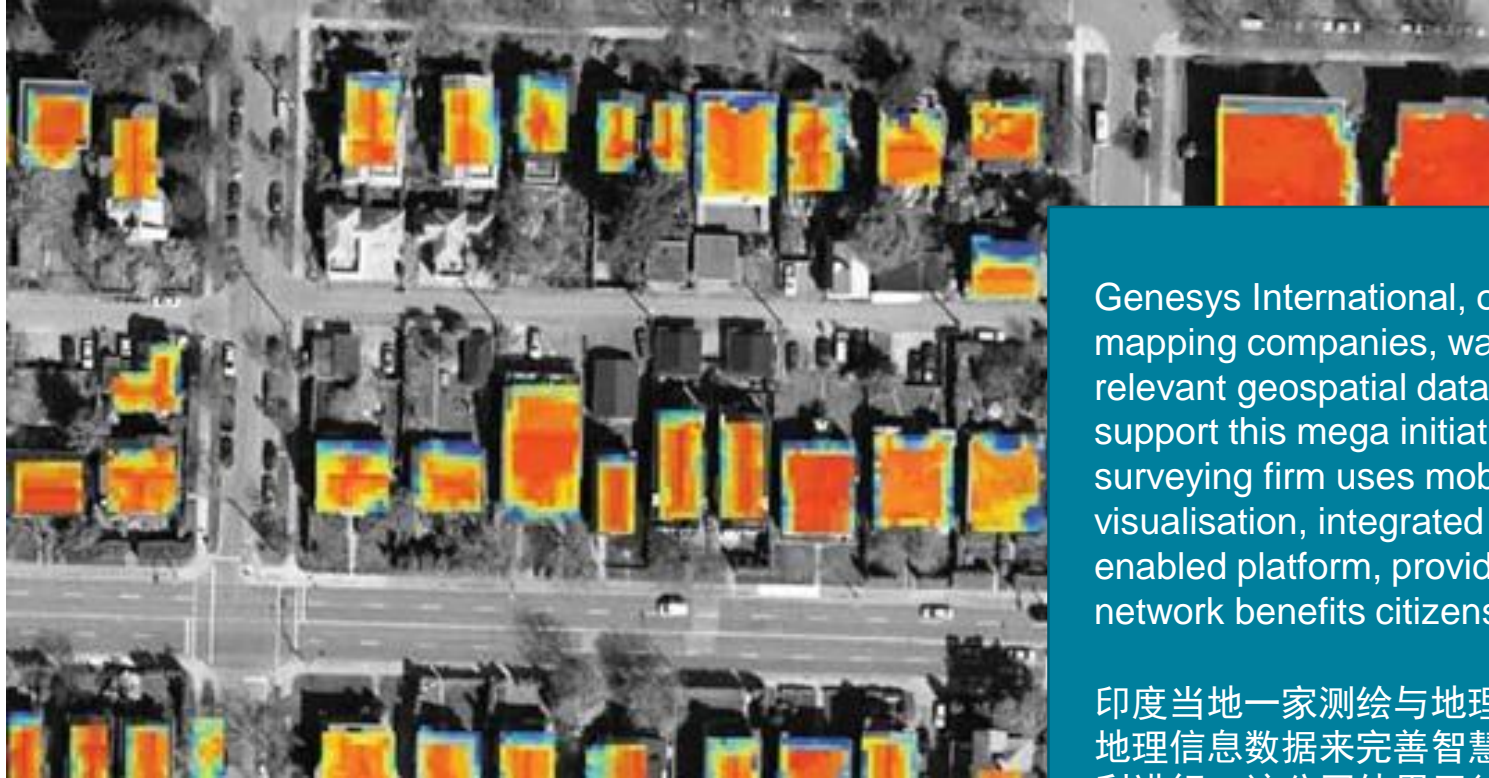


Besides the end result that was mandatory for the assignment, Waterboard Rivierenland is now also able to use all extra gathered data, like the 360-degree sphere photos collected with the Pegasus:Two. Thanks to the amazing source of extra information, there is no need to go outside. Where in the past the surveyor had to go back into the field, an extra cross profile can be easily generated on a location. This is quicker, safer and a perfect basis to make easier and better-informed decisions in daily processes.

当地水务局除了提交最终结果外，还使用了其他多源数据进行分析，如Pegasus:Two采集的360度全景照片。得益于其丰富的实景三维信息，工作人员无需返工复查，通过点云数据轻松实现断面的提取，这种方法高效、简单，并且在日常处理中也为客户快速精确的做出决策提供了重要的基础数据。

How to turn 109 indian urban centers into smart cities 如何将109个印度城市变成智慧城市

<http://blog.hexagongeosystems.com/facilitating-smart-city-developments-with-geospatial-data-collection/>



Genesys International, one of India's leading geospatial survey and mapping companies, was tasked by the Indian government to provide the relevant geospatial data to complete the digitisation of the cities. In order to support this mega initiative, Genesys acquired a Leica Pegasus:Two. The surveying firm uses mobile LiDAR mapping, 3D rendering and visualisation, integrated with existing mapping systems into a common 3D enabled platform, providing a smarter spatially connected information network benefits citizens and enhance revenue generation for the city.

印度当地一家测绘与地理信息公司接到了一项政府的项目，需要提供完整的地理信息数据来完善智慧城市的数字化工作。为了能够保证该大型项目的顺利进行，该公司使用了徕卡Pegasus:Two移动扫描系统，将三维点云、三维可视化等技术整合到了现有的地图系统中，变成一个全新三维的工作平台，通过互联网技术提供更加智能的空间信息，即为市民提供福利也为城市发展带来经济效益。



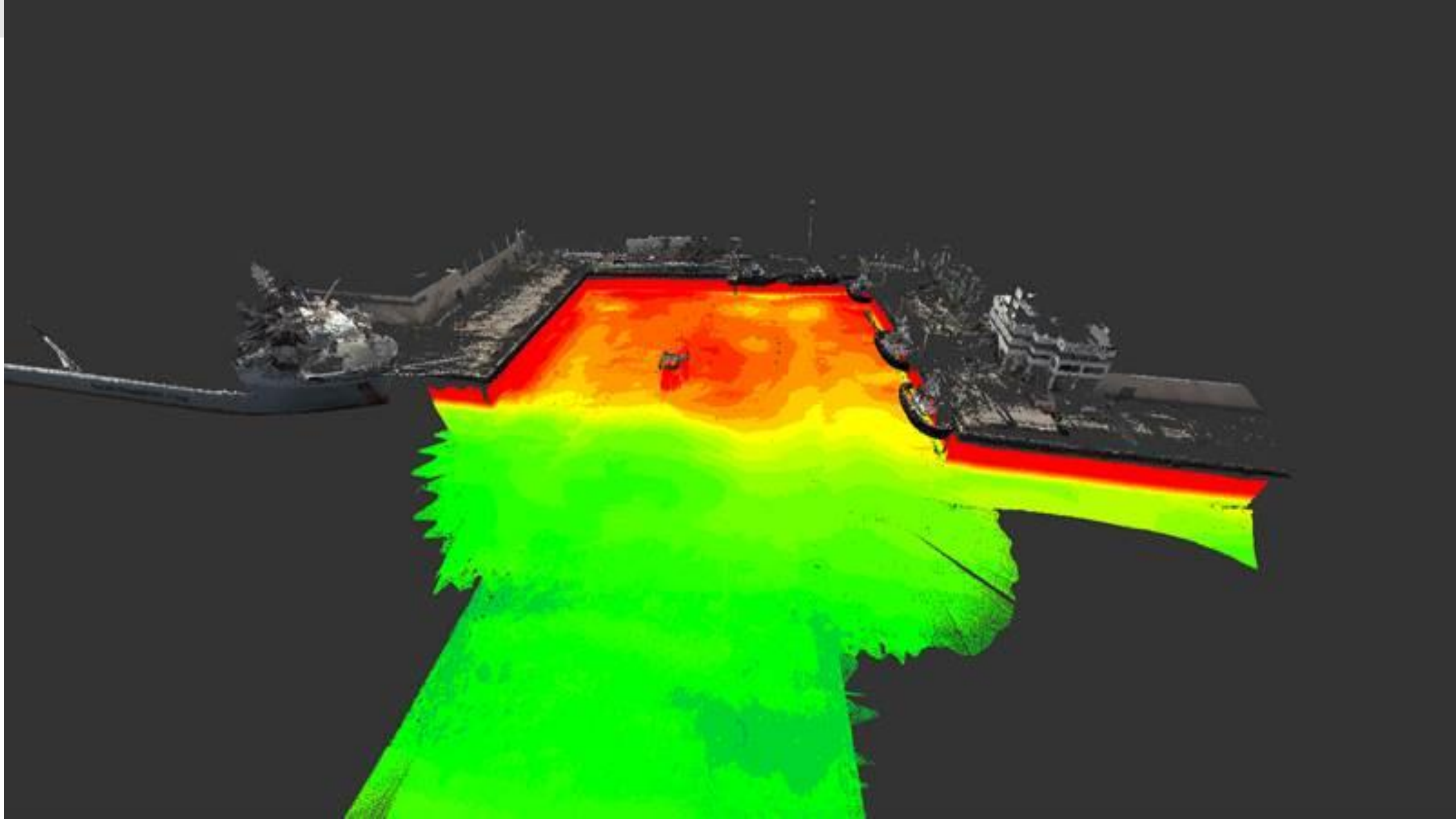
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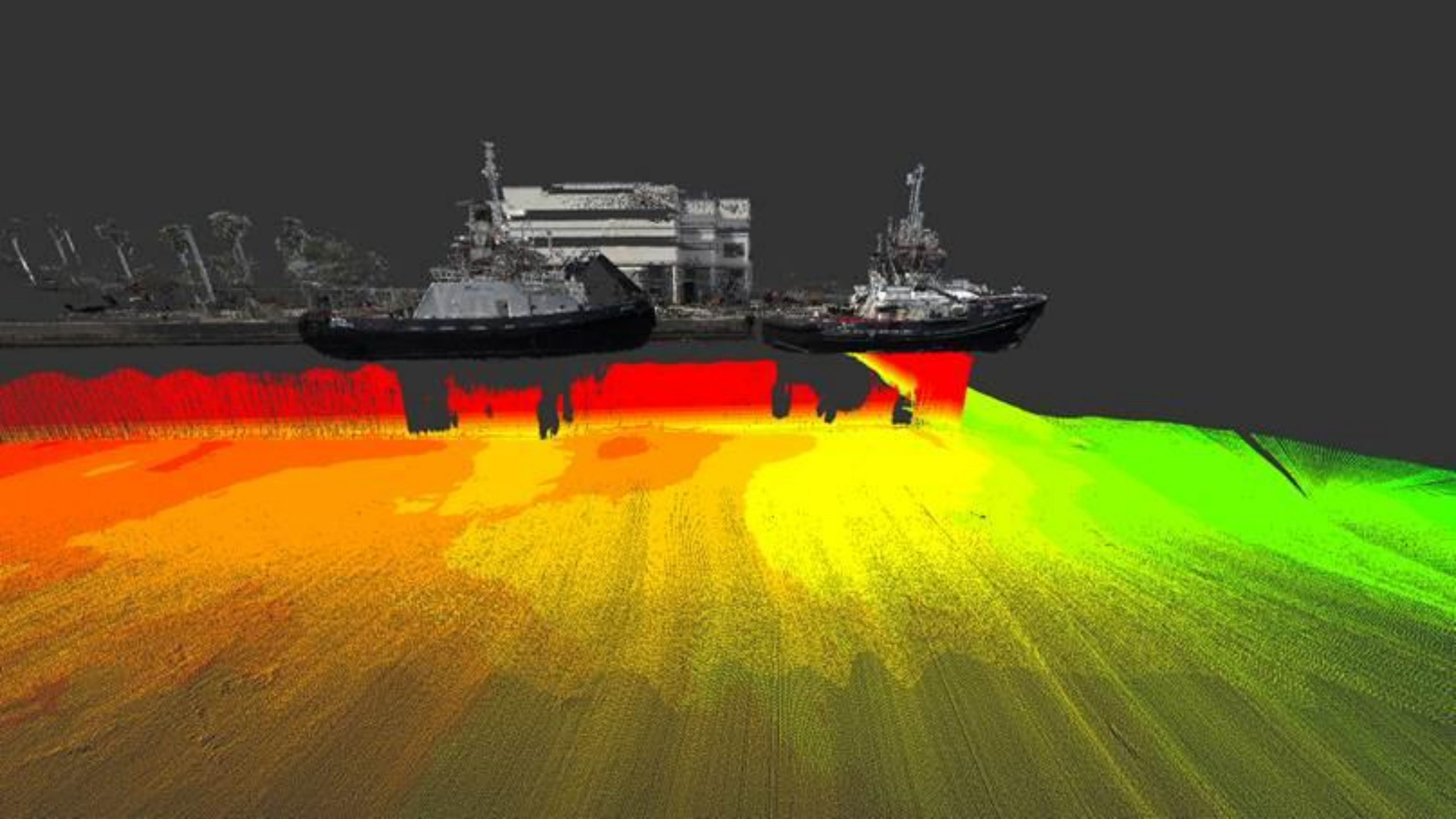
Insight : surveying a port 港口测量

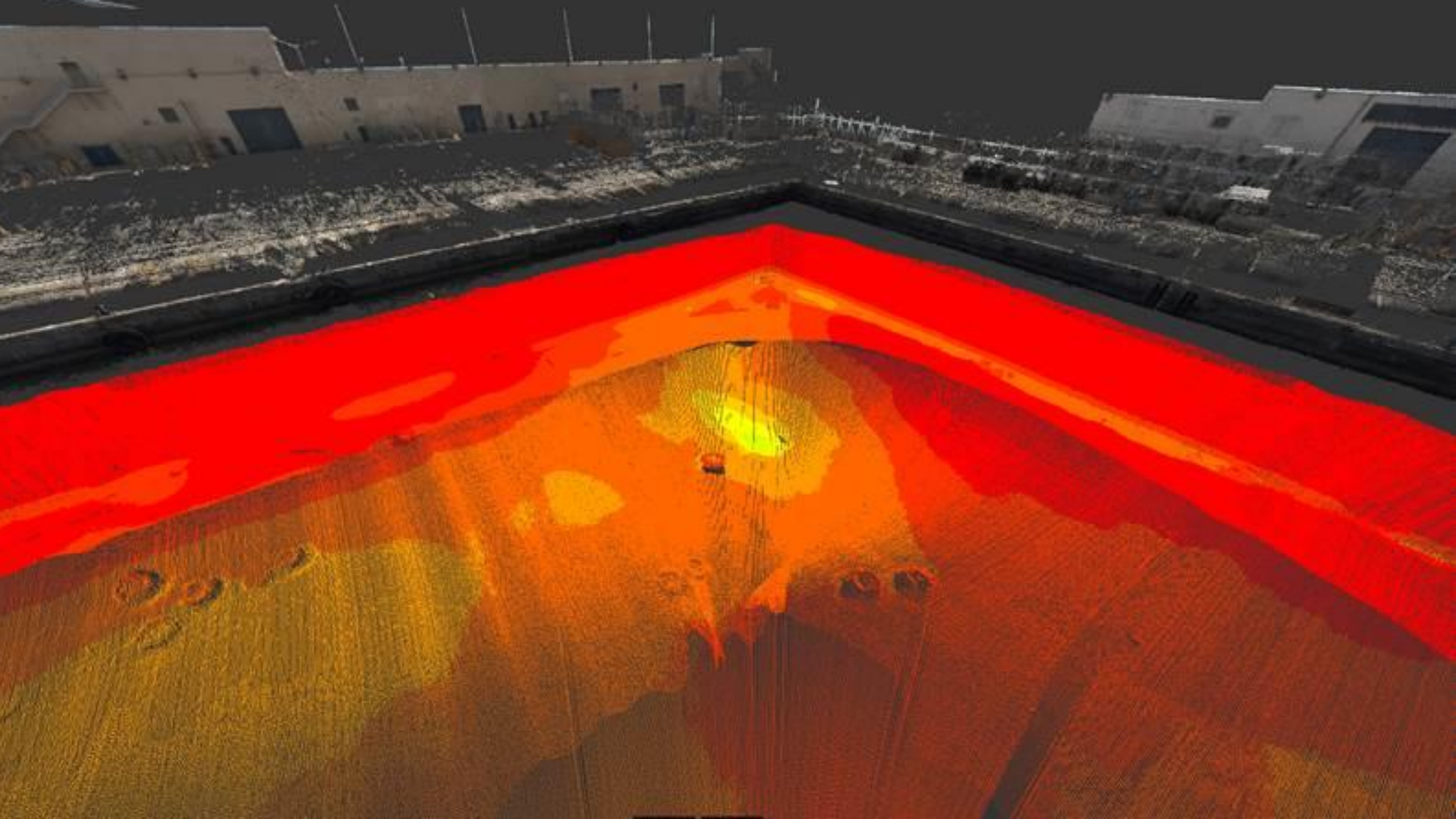
Above and below the water

水上水下测量









Conclusion : the key points 总结

- Form factor is the key for the flexibility
 - Worldwide service organization
 - Best trajectory processing, (including BEIDOU support and multi-pass SLAM) allows to extract the best accuracy all the time
-
- 简练的外形是其灵活应用的前提
 - 提供全球的售后服务
 - 最佳的轨迹解算（包括支持BEIDOU解算和Multi-pass的SLAM算法）使得能够生成最佳的数据



- Comprehensive and mature processing workflow
 - Ability to expand and support other sensors
 - Higher flexibility in the application domain enable faster ROI
-
- 完整而成熟的处理流程
 - 可扩展性强，支持其他传感器
 - 广泛的应用领域，投资回报快



Thank you !

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