SABRE

ADVANCED 3D SURVEYING SYSTEMS

SABRE SKY-3D™ LiDAR Payload

with FARO Focus High-Resolution 3D Point Cloud Data

Introduction

The SABRE SKY-3D™ is an integrated 3D high-resolution airborne mobile mapping system specifically used for a diverse range of applications including geospatial, security, defence, law enforcement, coast guard, construction, maintenance of existing infrastructure.

The SABRE SKY-3D™ supports the interface with the FARO high precision laser scanners, enabling the LiDAR system to capture high-resolution data of up to 2 million points per second. The system is complemented with high-resolution imagery using an optional FLIR camera system.

The SABRE SKY-3D™ system is fully-interoperable and compatible with the range of FARO Focus S model laser scanners, and has been designed to complement the characteristics of the FARO Focus S model laser scanners to deliver the best in market airborne mobile mapping solutions.

UAV LIDAR - A View from Above - Advantageous airborne operated LIDAR

Airborne LiDAR systems offer Rapid survey of areas within difficult, inaccessible or dangerous situations for ground-based survey.

- ☑ Compatible with FARO Focus S Models S350 Plus, S150 Plus, S350, S150, S70
- ☑ High-Resolution High-Quality 3D Data
- ☑ Enabling Rapid Deployment Capability
- ☑ Up to - 2 million points per second
- ☑ High Productivity for Optimising ROI

Fig 1. SABRE SKY-3D LiDAR Payload deployed on Multirotor Drone Platform.

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Mounting of LiDAR systems on Drone Platforms provides enhanced results with the coverage being improved by the LOS (line-of-sight). This is achieved by having a high-angled view-point from above reducing blind-spot areas when compared against the view-point seen from ground level using conventionally operated vehicle mounted LiDAR systems. The perspective of data acquisition at height also maximises the range capabilities of the utilised laser using a more ideal perpendicular angle of incidence encountered by the laser-beam.

SABRE Sky-3D UAV/Drone LiDAR

The SABRE Sky-3D UAV LiDAR is a remote sensor payload that can attach to an aerial platform UAV/Drone. The Sky-3D remote payload sensor system has further benefit in that it can be deployed on a wide range of drones capable of carrying the payload weight and dimensions.

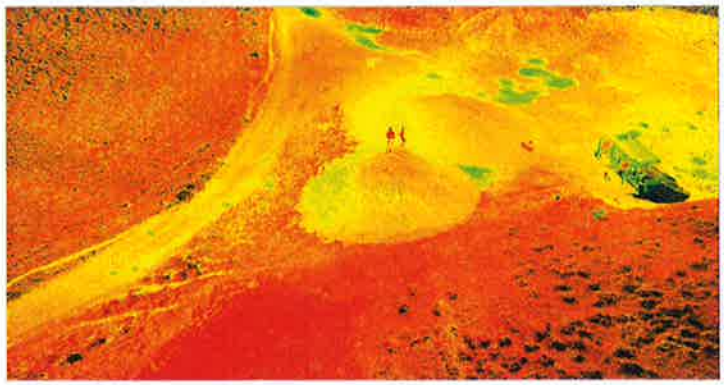

Fig 2. SABRE SKY-3D™ LiDAR Data 3D Point Cloud

Single-Beam LiDAR for Precise Results

The Airborne LiDAR SABRE SKY-3D F-S system uses a single-beam which is accurately calibrated, delivering survey-grade results superior to other comparative airborne LiDAR equipment on the market.

Airborne Deployment

Using the SABRE SKY-3D™ airborne mobile mapping enables high-resolution laser scanning capability for areas inaccessible to conventional techniques.

- SABRE SKY-3D™ Airborne Mobile Mapping Equipment enables the generation of High-Definition 3D point clouds with high-precision and absolute accuracy.
- Rapidly Survey Large Areas / opening up new opportunities.
- Providing accurate 3D information that can be measured.
- **Risk Reduction:** Increased safety by survey from the air.
- **High-Resolution:** Detailed 3D Point Cloud data allowing quality assurance of repeatable results for supporting confident information extraction.

Fig 3. SABRE SKY-3D LiDAR Payload Deployed on Multirotor Drone Platform.

Key Features and Functionality

- Compatible with FARO Focus S laser scanner models: Focus S350 Plus, S150 Plus, S350, S150, S70 FARO Focus S 'A' Type laser scanner required.
- Up to - 2 million points per second for FARO Focus S350 Plus and Focus S150 Plus Laser Scanners.
- Quick-Release to allow FARO Focus Laser Scanner to be used for static tripod base laser scanners.
- Auxiliary expansion ports for Georeferenced imagery for Positioned and Orientated Imagery.

- Distance Range:
  up to 350 metres (Focus S350 / S350 Plus)
- Resolution:
  up to - 2 million points per second

Key Benefits

- Universal LiDAR payload system attachable for UAV/Drone deployment
- Rapidly Survey Large Areas / Opening up New Opportunities
- Accessibility to 3D mapping of difficult or inaccessible areas
- Accelerate Productivity and Project Delivery
- Easy Deployment
- Effective and Efficient 3D Data Collection
- Providing you with Accurate 3D Information you can measure
- Risk Reduction: Increased Safety by survey from the security of a vehicle
- **High-Resolution:** Detailed 3D Point Cloud Data allowing confident information extraction
- FARO Focus S compatible
- **High-Resolution:** Detailed 3D Point Cloud data allowing confident information extraction.

Technical Specification

General Specification

- Payload Weight: 5.5 Kg
- Input Voltage: 14 - 20 VDC
- Power Consumption: 140 W, Max 10 A
- External Logging USB 2.0 Device Port
- PC Memory Storage

Typical Survey Parameters

- Typical Survey Flight Speed: 5 m/s
- Typical Altitude: 40 m

Environmental Characteristics

- Operating: 0° - +50° C
- Storage: -10°- +60°C
- IP Rating: IP 54

3D Point Cloud Data Output

- Export File Formats: PTS, LAS, E57

GNSS-Inertial Navigation System

- Manufacturer: Applanix
- System/Model: APX-20 UAV
- Provides High Performance Direct Georeferencing

LiDAR / Laser Scanner

- Compatible Laser Scanners FARO Focus S 'A' Type Models: S350 Plus, S150 Plus, S350, S150, S150, S70
- Ranging Distance: up to 350 m (Focus S 350)
- Ranging Error(1): ±1 mm (Focus S)
- Resolution: up to 2 million Points/Sec (Focus S Plus)
- Vertical Field of View: 300° (Focus S)
- Angular Accuracy: 19 arcsec for vertical/horizontal angles
- Beam Divergence 0.3mrad (1/e)
- Max. Scan Speed: 97Hz (vertical)
- Environmental IP Rating: IP 54
- Wavelength 1550nm
- Safety: Class 1 (Focus S)
- See manufactures latest technical data sheet for performance specification.

See manufactures technical data sheet for full performance specification.

Software

- Post-Processing Software: POSPac UAV
- Post-Processed Differential GNSS-Inertial SW for the APX-20 UAV INS.
- Post-Processing software is used to import the raw INS data and either base station or third-party RTK correction data to generate a precise post-processed solution.

High-Lighted Performance Specification

Performance PP(2) Specifications (RMS Error):

- Position Vertical (m): 0.05
- Velocity (m/s): 0.010
- Roll & Pitch (deg) 0.015
- True Heading (deg) 0.035
- Supports GPS, GLONASS, BeiDou, Galileo, QZSS, SBAS
- Type of positioning system: MEMS IMU (MICROELECTROMECHANICAL GYRO)

Data Logging

- IMU Data rate: 200 Hz
- Internal Logging 6GByte Flash memory

See manufactures technical data sheet for full performance specification.

Kit Contents

Main Components of the SABRE Sky-3D :

- FARO Focus S laser scanner compatible interface
- Survey-Grade GNSS-INS
- Power Unit / Pack
- Internal memory Data Storage
- Embedded PC.
- SABRE Processing Software License (USB Dongle)
- Optional Payload Dampener.

- Optional Camera system for High-Resolution Georeferenced Imagery.
- Survey-Grade INS for Accurate Positon and Orientation for capture camera images.
- 3D Point Cloud colourisation

Camera Imaging System

SABRE SKY-3D™ Georeferenced Camera Imagery, for Photogrammetry and 3D Point Cloud Colourisation.

Accessory (Optional) Camera Kit for SABRE SKY-3D™ for SABRE Georeferencing for Positioned and Orientated Imagery.

- Manufacture: FLIR
- Camera Family: Grasshopper*3
- Model Number: GS3-U3-120S6C-C
- Imaging Device: Sony ICX834
- Type: Colour Camera
- Type of Shutter: Global
- Resolution (MegaPixels): 12.00
- Pixels (H x V): 4,240 x 2,824
- Pixel Size, H x V (µm): 3.1 x 3.1
- Frame Rate (fps): 7
- Camera Sensor Format: 1"

Notes:

1. Ranging error is defined as a systematic measurement error at around 10m and 25m.
2. Outage Duration 0 sec, Typical performance – actual results are dependent upon satellite configuration, atmospheric conditions and other environmental factors.

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Subject to change without prior notice.

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