TRIMBLE DIGITAL SENSOR SYSTEM (DSS)

A complete solution for high-efficiency aerial mapping and orthophoto projects, at one low cost.

The DSS is a directly georeferenced, medium format imaging solution for producing highly accurate orthophotos.

Trimble®

Image courtesy of PhotoScience

Image courtesy of Tuck Mapping

WORLDWIDE SUPPORT

Your application is critical and you can't afford to take chances – you need reliable, reproducible results day after day. Count on Trimble's years of in-field experience and support expertise. DSS includes professional installation in your aircraft, 7 days of on-site training, and emergency customer support for the entire solution whenever you need it. And there's only one number to call for support on the complete solution, all hardware and software.

Be with the industry leader. With years of proven technological innovation, over 1000 products delivered, Trimble continues to transform the world of direct georeferencing of airborne spatial data.

CUSTOMIZED TO PERFECTION: HEAR IT FROM A DSS CUSTOMER

Trimble builds, installs, and trains your staff with the solution you need.

"Applanix, a Trimble company, modified their POSPac software to support our lidar scanners, creating one integrated system. We can now flight plan the DSS camera and scanner and utilize one plan to acquire both imagery and point clouds. The staff at Applanix has been instrumental in the success of Tuck Mapping and together we are constantly trying to find ways to improve our accuracy and efficiency of operations even further. As the technology evolves, the staff of Tuck Mapping and Applanix are working together to determine future integrated systems that will provide high quality products for the engineering marketplace."

- Bobby Tuck, President of Tuck Mapping Solutions


Image courtesy of Fuchyu Air Service

CASE STUDY: Earthworks Monitoring, Dubai Canal Project

The Client

An integrated global real estate developer delivering distinctive, sustainable developments with three specific areas of expertise: master planning large urban communities, waterfront development and the implementation of large scale balanced projects.

The Challenge

An earthworks project would see 1.5 million cubic meters of earth (equivalent to excavating an area of 5 km by 300 m with 1 m depth) moved each and every day. To monitor the extensive land changes caused by this massive excavation, it sought the world's most sophisticated mobile mapping technology available.

The Solution

Two mobile mapping platforms were chosen: a helicopter based Applanix DSS with LMS-Q240i LIDAR option, and a land vehicle utilizing a LMS-Q240i LIDAR, video cameras and the POS LV system. Trimble DSS produces directly georeferenced high-resolution orthomosaic color image maps and high-accuracy 3D terrain measurements in the form of laser point clouds and digital surface models. Similarly, the land vehicle produces georeferenced oblique video imagery and high density laser point clouds. The land and airborne data sets are combined to produce a high-accuracy, high-density 3D terrain model of the dig with built-in redundancy.

THE TRIMBLE DSS™: A COMPLETE, RAPID, MAPPING-GRADE IMAGING SOLUTION

Trimble DSS is an "end-to-end" solution for producing highly accurate, high-resolution color and color-infrared digital orthophotos and orthomosaics. Certified by the USGS, this out-of-the-box solution is THE digital imaging answer for aerial survey and remote sensing applications requiring a rapid, cost-effective solution.

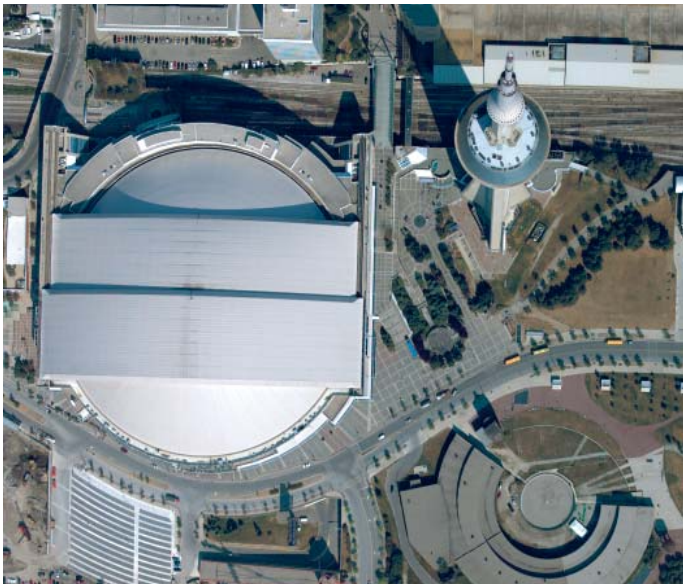
The complete solution – Installed and operational in under an hour, the DSS is the optimal fusion of GPS, inertial, and digital photogrammetry for direct georeferencing. The system captures and generates high-resolution color and color-infrared digital orthophotos and orthomosaics, producing a geometrically accurate and radiometrically consistent product with 0.033 m to 1m GSD (ground sample distance, or size of each pixel on the ground). The DSS is ideal for GIS analysis and feature identification, 3D photogrammetric mapping, and remote sensing applications. Engineered from ruggedized, off-the-shelf components and designed for the airborne environment, the DSS combines a fully integrated Applanix POS AV system (aided inertial/GPS technology) with a precision digital metric camera. It is modular, scalable, and designed to accommodate component-based upgrades, so it can grow as your business grows. With software for mission planning through to image development, the DSS is designed from first principles as a complete mapping solution.

Optimized for rapid, high-efficiency mapping – Orthophotos are created using raw imagery captured by the camera combined with the Applanix POS AV™ direct exterior orientation and a digital elevation model, without the need for expensive and time-consuming aerotriangulation. With options for pilot-only operation and easy integration on single-engine aircraft and helicopter platforms, the DSS offers high performance with low operating costs.

Image courtesy of Tuck Mapping

WHY CHOOSE TRIMBLE DSS?

Trimble DSS is all you need for high-efficiency mapping. It is an end-to-end solution; it is customizable, accurate, and easy to use. And it comes professionally installed and fully operational.



DSS integrates a complete set of hardware and software components, all harmonized to work seamlessly together. These components have been custom-designed and engineered to allow for very tight integration. And the workflow from data capture to georeferenced and calibrated imagery is optimized by Applanix' own software, giving you an efficient and accurate way of rapidly producing product without recalibrating before every mission.

Trimble DSS combines all the benefits of Applanix aided inertial technology, systems integration and innovative engineering expertise to deliver significant benefits:

- Simple to use, yet highly accurate: Rugged system architecture is shock, vibe and pressure tested, perfect for the airborne environment
- Mapping grade camera: USGS certified, calibrated, stable over time
- Direct georeferencing: AT (Aerial Triangulation) not required
- Choice of Inertial Measurement Units (IMUs)
- Professional installation, crew training, and 2 years of ongoing customer support included with every system
- Flexibility: Custom lenses and lens-mount configuration allows for easy removal and replacement, in flight
- Modular, expandable, customizable. Can be flown with:
    - Dual cameras for greater productivity
    - Simultaneous CIR/NIR, or VIS/Hyperspectral
    - Lidar
    - Oblique camera
    - Rapid ortho development
- Pilot controlled operation: Built-in automated Flight Management System (FMS)
- Quick data turnaround: End-to-end digital processing and direct data import into photogrammetric and GIS systems

APPLICATIONS

Trimble DSS is a highly productive, low-cost solution for medium-sized mapping and orthophoto projects. Typical applications include:

Rapid Response Mapping
- Rapid mobilization for emergencies and disaster management
- Time-dependent image acquisition, change detection
- Homeland security
  - o Situation assessment
  - o Border security

Tactical/Reconnaissance Mapping
- Threat assessment and preparedness
- Mission planning and operations preparation
- Damage assessment
- Personnel and equipment movement monitoring

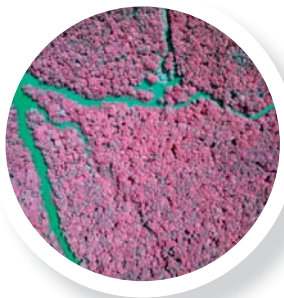
Corridor Mapping
- Linear mapping projects
- Pipeline surveys
- Power line corridors
- Transportation routes

GIS
- Orthophoto base maps
- Rapid image acquisition
- Urban and regional planning

Remote Sensing
- Color-Infrared imaging
- Object classification
- Environmental assessment
- Coastal zone monitoring
- Forestry
  - o Species identification
  - o Timber value assessment
  - o Disease control

Agriculture
- Recurrent image acquisition and analysis
- Disease monitoring

GIS



Remote Sensing

Corridor Mapping

Tactical/Reconnaissance Mapping

Rapid Response

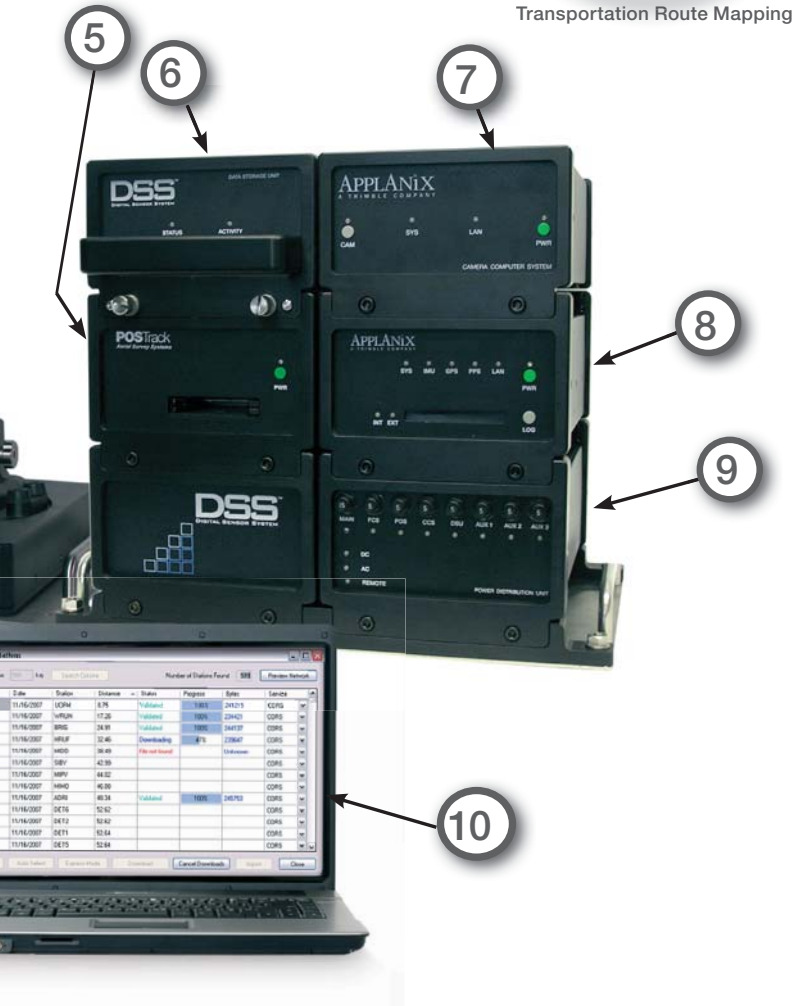
COMPONENTS

Trimble DSS integrates all the hardware and software components required for high accuracy, reliability, and ease-of-use at one low price. But remember – DSS is also customizable to suit your specific requirements! A typical configuration includes:

1. **POSTrack touch screen:** Allows users to pre-plan flight paths and reduce flight times to fly missions
2. **Camera:** Mapping grade quality, USGS certified. Camera Sensor Head (CSH) has fully calibrated camera/digital back/exoskeleton assembly
3. **Inertial Measurement Unit (IMU)**
4. **Azimuth Mount:** Single axis, automatically controlled mount; 3-axis stabilized mount also available with built-in Inertial Measurement Unit
5. **Flight Management System:** Integrated POSTrack Flight Management System (FMS)
6. **Data Storage Unit (DSU)** Removable, pressurized and temperature - controlled ruggedized disk drive, 7000 image capacity per drive (2 supplied, 500 GByte each)
7. **Camera Computer System (CCS)** electronically guides all assets for airborne environment
8. **POS AV Direct Georeferencing System:** Specifically designed for direct georeferencing of airborne sensor data

Photogrammetry

Transportation Route Mapping



TECHNOLOGY

- **Direct Georeferencing** for faster production of quality orthorectified imagery without the need for expensive, time consuming AT (Aerial Triangulation)
- **POSPac™ MMS software**, providing a complete directly georeferenced based mapping workflow capability within a single GUI – allowing users to launch commands and adjust parameters within a single software suite
- **Applanix POSTrack™** Integrated Flight Management and Direct Georeferencing System
- **Three Applanix AeroLens™ options:** 40 mm, 60 mm, 250 mm. User interchangeable without recalibrating. Built specifically for the airborne environment, by Carl Zeiss. AeroLens™ 250 mm enables the collection of rapid directly georeferenced digital aerial imagery at high altitudes
- **Focal Plane Shutter** with shutter speeds up to 1/4000 sec enabling automatic exposure control, minimizing motion smear
- **TrueSpectrum Image Chain Analysis** for color and color infra-red (CIR) imagery, producing seamless mosaics
- **Radiometric Calibration** for optimum color balancing
- **Seamless integration with INPHO Image Processing Technology** (supplied), giving users high processing speed and automation in orthophotos and mosaic production
- **RapidOrtho workflow** option, generating orthophotos within seconds per image upon landing
- **LIDAR integration options,** for both fixed wing and helicopter configuration, including turn-key hardware and software workflow kits for producing digital terrain and ortho-imagery products
- **Dual camera option**, producing **4-band ortho-imagery** in a single pass. The DSS 439 RapidOrtho DualCam adds a second DSS camera with a monochromatic CCD array specifically configured to capture Near Infra Red (NIR) imagery

9. **Power Distribution Unit (PDU)**: Controls power to all systems and provides an LED display to the operator
10. **INPHO image processing software:** High processing speed and automation in orthophoto and mosaic production, DEM extraction, and seamlessly integrated with the DSS workflow
11. **POSPac MMS software:** Post-processing software bundle;includes mission planning software, Carrier Phase DGPS processing, Integrated Inertial/GPS processing, Photogrammetry tools for EO generation, IMU boresight calibration and quality control, DSS tools for mission management and image development

Image courtesy of NOAA Geodetic Survey

Products and Solutions for Mobile Mapping and Positioning. ***Capture Everything.***

www.trimble.com/geospatial/aerial-mapping

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