

# DSS™ RapidOrtho™

Trimble DSS™ RapidOrtho™ Solution

Because your mission demands decision-ready images fast, DSS RapidOrtho delivers precise rapid orthophotos and full situational awareness in hours, not days.

Trimble's DSS Digital Sensor System is a complete airborne digital imaging system field proven in the front-lines of emergency response and the modern battlefield. It is THE digital imaging answer for aerial survey and remote sensing applications requiring a rapid, cost-effective solution.





## Trimble DSS™ RapidOrtho™ System

The Trimble DSS (Digital Sensor System) RapidOrtho system is a complete ready-to-use digital aerial imaging solution for emergency first responders and military operations that includes the fusion of a medium-format aerial camera, a flight management system, a GNSS-Aided INS Direct Georeferencing system and a full suite of processing software. Rugged and lightweight for use in the most adverse conditions, DSS is purpose built for the airborne environment. Components have been custom-designed and engineered to tightly integrate all of the enabling technologies that make up the system.

### Key Applications

#### Emergency Rapid Response and Disaster Management:

- Gathering baseline data, identifying potential hazardous sites, monitoring high risk areas, and assessing the availability of facilities and equipment necessary to assist in emergency response activities.
- **Immediate post-event applications:** image acquisition for damage assessment, search and rescue, reconnaissance, critical infrastructure mapping.
- **1-2 weeks post event:** acquire imagery for more fully developed data designed for recovery, infrastructure assessment, rebuild planning etc.
- **Longer term:** complete data for insurance references, studies of the event, evaluation of recovery efforts and overall disaster management, catalog and archive for future access.

#### Battlefield Awareness and Operations

- Threat assessment and preparedness
- Mission planning and operations preparation
- Damage assessment
- Personnel and equipment movement monitoring

#### Homeland Security Digital Imaging

- Border monitoring
- Change detection

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### Benefits

Trimble DSS captures and generates high-resolution colour and colour-infrared digital orthophotos and orthomosaics from the air, producing an accurate and radiometrically consistent product with 0.033m to 1m GSD (ground sample distance, or size of each pixel on the ground). Orthophotos are created using raw imagery captured by the camera combined with the Applanix POS AV™ direct exterior orientation and a digital elevation model (DEM). The DEM can be existing or can be automatically extracted from the DSS stereo imagery. Additionally, the DSS optimized workflow from data capture to georeferenced and calibrated imagery is optimized by Applanix software resulting in an efficient and accurate way of rapidly producing product without the need to recalibrate before every mission. The benefits of DSS are extensive:

- **Ultra-fast image delivery:** On-board processing and our unique direct georeferencing allow for the rapid generation of map-ready ortho products within hours of landing.
- **Consistent, reliable, highly accurate mapping-grade results:** Mapping-grade system, as characterized by NASA Stennis, meets USGS and NASA image geometry and standards for mapping applications.
- **High resolution images from safe flying heights:** 250mm lens option allows centimeter-scale GSDs (ground sample distances).
- **Field-proven:** deployed in Afghanistan and Iraq, in use with NOAA, NRL, FBI, and the Canadian DND.
- **Rapid deployment:** DSS equipment is portable, rugged, tested for pressure, temperature and vibrations. DSS can be operated by either one person or two, minimizing the risk of in-field downtime. Installation on single engine aircraft or light helicopter platforms can be completed within 1 hour.
- **Rugged, battle-hardened complete solution:** Ruggedized hardware, flight planning software, ortho software, DEM generation, and more ... all customizable to your needs. Integrated computer-controlled azimuth mount for improved efficiency and automatic DEM extraction. Integrated direct georeferencing and sensor calibration. Field changeable metric lenses with various focal length options, providing maximum flexibility for all flying scenarios.



Hurricane Ike - image courtesy of NOAA  
National Geodetic Survey

### NOAA uses DSS for response to Hurricane Ike

NOAA collected post storm imagery in response to Hurricane Ike using both the Trimble 439 Digital Sensor System (DSS) and an Trimble 439 Dual Cam DSS. Over 5,500 color aerial images of the hardest hit areas in Texas and Louisiana after Hurricane Ike made landfall were taken. These images, made available to emergency personnel and the public on the NOAA/NGS web site within 24 hours of acquisition (<http://www.ngs.noaa.gov/>), were geo-referenced from post processed POS AV GPS- Aided Inertial Navigation Solution parameters, and ortho-rectified using Applanix's RapidOrtho™ software.



## DSS delivers “near real-time hi-res” imagery in response to the New Brunswick Flood of 2008

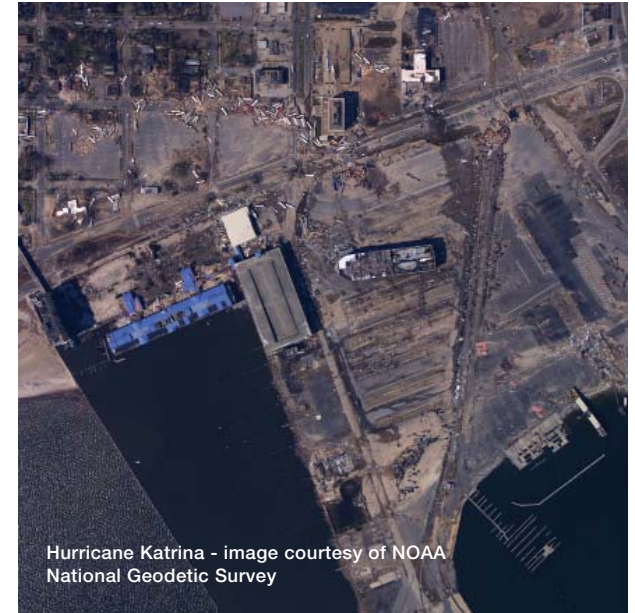
In 2008 the Government of New Brunswick contacted Leading Edge Geomatics (LEG) with a request for aerial survey support to assist in flood relief efforts. Using the Trimble DSS 322 and POSPac software, LEG acquired over 7000 square kilometers, processing more than 5500 orthophotos. Collected at 50cm resolution, the high-resolution imagery assisted the New Brunswick Government in immediately providing aid to flood affected residents and determining damage to infrastructure and property.



## Technology

As a complete system, DSS features significant value-added technologies including:

- **Direct Georeferencing** for faster production of quality orthorectified imagery without the time cost or potential risk of placing personnel in dangerous environments.
  1. **RapidOrtho Output:** Achieve situational awareness in minutes instead of hours; using pre-existing DEM data. Individual 39MP orthophotos within 12 seconds per image!
  2. **High-Precision RapidOrtho Output:** Perform high accuracy mapping, change detection, and more; using self-extracted DEM; postprocessed for extremely high orthophoto accuracy
- **TrueSpectrum Image Chain Analysis** for colour and colour infra-red (CIR) imagery, producing seamless mosaics.
- **Focal Plane Shutter** with shutter speeds up to 1/4000 sec enabling automatic exposure control over most demanding scenes and minimizing motion smear.
- **Radiometric Calibration** for optimum colour balancing
- **Three Applanix AeroLens™ options:** 40 mm, 60 mm, 250 mm. Designed and manufactured specifically for airborne environment by Carl Zeiss.
- **250mm Tactical lens option** allows centimeter-scale images from safe flying heights (over 10000 feet)
- **Applanix POSTrack™** Integrated Flight Management System.
- **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.
- Seamless integration with **INPHO Image Processing Technology** (supplied), giving users high processing speed and automation in orthophotos and mosaic production.



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