Using the latest in digital data acquisition and processing technologies, Fugro offers fast delivery of high-accuracy aerial orthoimagery products. These geospatial solutions form the basis for a variety of applications in the public and private sector, from urban planning to emergency response.

Our imagery-based mapping solutions are founded on 60+ years of aerial imagery acquisition for clients who rely on highly accurate geospatial data for a variety of photogrammetric mapping activities. Our aerial acquisition and processing capabilities are supported by a highly experienced team of pilots, sensor operators, field crews, production staff and project managers who have the necessary expertise to meet client needs. We own and operate both sweep (‘pushbroom’) and frame-based digital sensors and will deploy the appropriate sensor type for any given project, depending on requirements.

One of the first firms in the United States to produce digital orthoimagery and the first to produce it in black and white, colour and colour-infrared, our technical expertise has evolved alongside developments in digital orthoimagery technology. We combine this extensive knowledge with our understanding of the inherent complexities of aerial imagery projects (like weather, terrain and topology) to create a customised project plan that incorporates the appropriate acquisition platform (aircraft and imagery sensor), airspeed, altitude and sensor settings to meet even the most stringent requirements.

We have successfully delivered more than 2.5 million square miles of digital imagery products over the last 13 years, using a variety of digital imagery sensors. This experience includes multiple countywide and statewide orthophotography projects with common pixel resolutions ranging from 3” to 1 m ground sample distance (GSD). As an ISO 9001:2008-certified organisation, all our production processes are governed by high standards for quality assessment, which in turn drive company-wide efficiencies and continuous improvement.
ORTHOMAGERY PRODUCTS

Aerial imagery serves a full range of mapping applications, including infrastructure planning, public works, agricultural monitoring, disaster response, property assessment, national security and coastal resources management. Our digital mapping approach supports the following products:

- **Orthoimagery** – at scales from 1:600 (1" = 50') to 1:12,000 (1" = 1,000’) and pixel resolutions of 3" to 12". We offer in two formats: ground orthoimagery and true orthoimagery.

- **3-band imagery** – offering the standard RGB combination of red, green, and blue bands to produce a natural colour image. We also offer false colour infrared (CIR) imagery, which combines the near infrared, red and green bands. CIR is typically used for vegetation analysis, ideal for deducing crop and forest health.

- **4-band imagery** – Fugro’s 4-band imagery combines red, green and blue bands with the near infrared band on the fourth channel. This allows for flexibility in displaying the image in natural or false colour.

- **True ortho** – this product uses increased side lap during acquisition, combined with rectification of a high-resolution digital surface model to remove building lean from the images. The resulting product provides an unobscured view of the ground - ideal for transportation and utility networks.

- **Contours** – stereo pair images and manually compile mass points and breaklines, generate contours ranging from 1’ to 8’ intervals.

- **Planimetric and topographic data** – we use imagery to compile planimetric and topographic data, including building rooftops or footprints, transportation networks, hydrography and breaklines and spot heights.

- **Land-use/land-cover and impervious surfaces data** – using photointerpretation and/or automated classification methods (including pixel-based and object-oriented classification), we can derive land-use or land-cover classification and impervious surface data from the digital imagery.

FUGRO ACCESS

To facilitate an interactive project tracking environment and improve communication with our clients, we developed Fugro Access, a robust web application that provides both project tracking and quality-control review tools. Fugro Access allows for real-time project tracking and can also be used as a tool for streamlining and expediting the data review process. We use Fugro Access to communicate project-relevant details, while also allowing clients to update their stakeholders throughout the project. The tracking capabilities of Fugro Access make project-relevant milestones easily accessible to all partners. Before delivery, clients use Fugro Access to review the orthoimagery and shapefiles (including boundaries, tiles, flight lines and seam lines) in a standard web browser, to ensure that all products meet their specifications.
ADVANTAGES

We use a number of different camera and platform combinations to deliver products that meet client specifications. From pushbroom sensors to oblique systems and digital frame cameras, our customised solutions provide unique advantages, including:

- **Increased flexibility** – offering a range of sensors, we expand customer options for data specifications and affordability
- **Superior image quality** – using the latest in aerial acquisition technology and processing techniques, we provide sharp and detailed imagery that results in precise measurements of ground features
- **Fast project turnaround** – highly automated processing systems deliver projects in half the time required by traditional photogrammetric methods. Our wholly owned assets and large production capacity enable flexible scheduling to meet customer needs
- **Rigorous quality control** – all our acquisition and processing procedures are ISO 9001:2008-certified. These standards ensure that our customers receive on-time, first-time-right deliveries

IMAGERY APPLICATIONS

- Public works and infrastructure development
- Agricultural monitoring
- Natural resource management and engineering
- Disaster response
- Property assessment
- National security
- Forestry
- Land use/land cover
- Flood risk management
- Coastal resources management
- Tax assessment
- Emergency law enforcement
- Facility management
- Asset inventory
Orthoimagery product accuracy

<table>
<thead>
<tr>
<th>Orthoimagery pixel size (inches)</th>
<th>Horizontal accuracy/image RSME*</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'/7.5 cm</td>
<td>6'/15 cm</td>
</tr>
<tr>
<td>6'/15 cm</td>
<td>1'/30 cm</td>
</tr>
<tr>
<td>1'/30 cm</td>
<td>2'/60 cm</td>
</tr>
</tbody>
</table>

*RMSE - Root mean square error

Additional sizes (4', 8') can be acquired.
The horizontal accuracy is 2 pixels and is recommended for standard mapping and geographic information system (GIS) applications.

Deliverable formats:
Compressed (MrSID, ECW, JPG2000) or non-compressed (GeoTiff, Tif/Tfw) formats.

Additional deliverables:
Compressed mosaics, seamline shapefile, image footprint shapefile