Diamond AIRCRAFT

SPECIAL MISSION AIRCRAFT

precision from above

About the company.

Diamond Aircraft is an Austrian composite aircraft manufacturer serving customers all over the world. The company builds the safest, most efficient piston aircraft flying today, for flight schools, private operators, govermental organisations and remote sensing companies. With the DA42 MPP Diamond Aircraft suceeded in building the ultimate surveillance aircraft.

The MPP mission solutions comprise a low-cost fixed wing platform, airborne sensors, data-links, command and control centres as well as the corresponding pilot, operator and maintenance training. The cooperation with renowned industry experts and a strong partner network guarantees the employment of cutting-edge technology as well as a competent and reliable project implementation. As your single point of contact we provide you with quality, service, convenience and value, allowing you to focus on your business.

Diamond Aircraft headquarters in Austria

A powerful and cost-effective solution.

Based on the award-winning DA42 NG, the DA42 MPP (Multi Purpose Platform) is the ultimate special mission aircraft with an endurance of up to 12 hrs while burning only 6.4 US gallons (24.2 litre) per hour. With a DA42 MPP GUARDIAN and DA42 MPP GEOSTAR you have a proven and fully certified remote sensing system at your disposal. Powerful and cost efficient, it delivers accurate results with hawk-eyed precision for ISR (Intelligence, Surveillance and Reconnaissance) missions, geo surveys or TV broadcasting.

DA42 MPP GUARDIAN

Tomorrow's mission is different than yesterday's? No problem for the twin engine, four-seater DA42 MPP GUARDIAN remote sensing platform. Your flexible and cost-efficient turnkey solution with outstanding performance.

DA42 MPP GEOSTAR

Collect laser-scanning and photo-grammetry data during one single flight or benefit from unparalleled hyper spectral detection capabilities. The DA42 MPP Geostar is perfectly suited for surveying cities, land areas, critical infrastructure, glaciers or snow fields, but also for mapping damages caused through natural disasters. The hyperspectral variant fits for ISR, mineralogy or environmental applications.

Multi Purpose Platform (MPP).

Expect more than airplanes. The aircraft has been specially designed for carrying multi-functional aerial sensors, like EO/IR cameras for surveillance and reconnaissance missions, land and sea radars, COMINT solutions, airborne laser scanners or large format digital aerial cameras.

Mission kits can be mounted on the nose and under the belly of the aircraft as well as in the cabin and nose luggage compartments.


COMINT


EO/IR cameras


SAR Radar


Maritime Radar


Data Transmission


Laser Scanner


Hyperspectral


Photogrammetry


Oil Spill detection


HD cameras

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"Diamonds DA42 MPP is a highly innovative and efficient twin engine plane which makes the perfect carrier for our advanced LiDAR sensors to offer a turnkey, cutting-edge airborne LiDAR solution for the surveying market. RIEGL has been working closely with Diamond for many years and is proud to operate its own Diamond DA42 MPP as an excellent choice for system integration, testing, and customer demonstrations."

Dr. Johannes Riegl, CEO RIEGL Laser Measurement Systems, Austria.

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Why Diamond?

GARMIN G1000 COCKPIT.

The standard installed Garmin G1000 glass cockpit, similar to those used in large airliners, offers unparalleled situational awareness and flight monitoring. It meets the highest expectations regarding operator convenience and better safety.

COMMITMENT TO SAFETY.

The company's aircraft are verifiably the safest in their class: the incredible overall accident rate of about just one sixth of the General Aviation average proves it (Source: Aviation Consumer).

FUEL AVAILABLE EVERYWHERE, LOW CONSUMPTION

For Diamond Aircraft, building incredibly fuel efficient airplanes has always been a cornerstone of our strategy. All of our aircraft are best in class in their fuel efficiency, saving you money whenever you fly. And with our Austro Engines AE300 Turbo Diesel with EECU you save even more fuel.

UAV + OPV CAPABILITY.

Manned or unmanned, the ideal platform.

OUR MONOCOQUE CABIN.

We use all the advantages of the solid carbon composite construction for building extremely safe aircraft.

DE-ICING.

You can equip the DA42 MPP Guardian with a certified de-icing system which allows you to operate the aircraft in any weather conditions.

Unique Features.

With its line of cost effective and efficient fixed-wing aircraft, Diamond Aircraft has taken remote sensing in a new direction.

LOW OPERATING COSTS

- Low fuel consumption at 35% power: 24.2 lt/hr (6.4 US gal/hr)
- Short downtimes
- Endurance up to 12 hours for less than 100 Euros per hour

POWERFUL ENGINE

- Worldwide fuel availability, multi-fuel certified (Jet A, Jet A1, TS-1, RT , No. 3 Jet Fuel, JP-8)
- Two turbocharged engines with 168 HP give exceptional "Hot and High" performance
- Low fuel consumption based on advanced direct fuel injection system
- "State of the art" engine management system (EECU), single lever control

SAFETY FEATURES

- All weather capability day and night (certified icing protection)
- Garmin 1000 'Synthetic Vision' feature - airliner standard
- Fully integrated GFC700 autopilot reduces pilot workload/fatigue
- EASA/FAA single pilot certified
- Damage tolerant airframe: 26 g crash tested, 10 g flight tolerance
- Fuel protection system
- Positive rate of climb at MTOM with one engine inoperative, single engine service ceiling 14,000 ft

LOW NOISE AND IR FEATURES

- Virtually undetectable at 1000 metres/3280 feet in suburban areas , 60 dB at 150 metres/500 feet AGL at loiter speed

MINIMUM DOWNTIME

- Overnight on-site maintenance for engines and airframe
- Worldwide support and service centre network, scheduled maintenance intervall 100 hours
- Unlimited life time for all composite components

TOMORROW'S TECHNOLOGY

- Advanced composite technologies developed by Diamond Aircraft; composite design offers high strength to weight ratio

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One Aircraft - many missions.

The nose of the aircraft is detachable for mounting nose pods. Pods can also be placed under the fuselage.

UNIVERSAL NOSE

TECHNICAL DATA:
- Max. equipment dimensions: square 400 mm (15.8"), height 300 mm (11.8")

APPLICATIONS:
- All EO/IR and Multi Media turrets up to 15.5“ and 65 kg (143 lbs)
- Airborne Laser Scanner Systems
- Ash Sensors • ILS Flight Calibration

NOSE POD

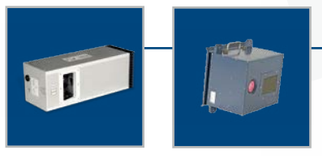
TECHNICAL DATA:
- Max. payload weight: 85 kg (187 lbs)
- Max. equipment dimensions: 670 mm (26.4") x 530 mm (20.9") x 640 mm (25.2") (L x W x H)

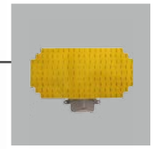
APPLICATIONS:
- Photogrammetry • Hyperspectral Sensors
- SAR & Maritime Radar
- Airborne Laser Scanner Systems

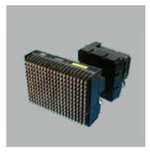
BELLY POD

TECHNICAL DATA:
- Max. payload weight: 80 kg (177 lbs)
- Max. equipment dimensions: 2510 mm (98.8") x 510 mm (20.1") x 430 mm (16.9") (LxWxH)

APPLICATIONS:
- Oil Spill Detection
- Airborne Laser Scanner Systems







SATCOM/UPLINK RADOME

TECHNICAL DATA:
- Max. payload weight: 2,5 kg (5.5 lbs)
- Max. equipment dim.: Ø 255 mm (10"), height: 245 mm (9.7")

APPLICATIONS: SATCOM data transmission

RADAR POD

TECHNICAL DATA:
Max. equipment dim.: Ø 990 mm (38.9"),
height: 375 mm (14.8")

APPLICATIONS:
- Maritime patrol • Boarder Patrol • Search & Rescue
- Surveillance

GEO POD

TECHNICAL DATA:
Max. equipment dim.: length: 500 mm (19.7"),
width: 330 mm (12.9"), height: 280 mm (11")

APPLICATIONS:
- Laserscanning • Photogrammetry (medium size)

UNDERFLOOR POD

(not shown on the aircraft)
TECHNICAL DATA:
Max. equipment dim.: Ø 550 mm (21.7“),
height: 250 mm (9.8“)

APPLICATIONS:
- Airborne ground surveillance • COMINT

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DA42 MPP General Features.

BUBBLE CANOPY

Bubble shaped canopy allows a better view downward for the pilots while wearing helmets.

GLOBAL OPERATION

- Fuel availability due to world-wide support of jet fuel or other fuel types
- In-house designed turbo diesel engines
- 168 hps per engine • Ultra low fuel consumption

EXHAUST SYSTEM

The on-top Exhaust System includes a Noise Reduction Kit and an Infra-Red Reduction Kit.

LARGE ELEVATOR TIPS

To increase yaw stability for precision flights.

POWER

Additional wiring tunnels connect the hard points of the equipment compartments. Dedicated power source of 28V, 40A for mission equipment provides mission power for 4x28V-busses and 2x14V-busses. Additional generators available (28V, 70A).

GARMIN G1000 COCKPIT

- Fully integrated glass cockpit / flight management system
- Synthetic Vision Technology
- GFC 700 Autopilot , incl. YD, IAS, LNAV / VNAV, FD

DA42 MPP ISR Configuration.

1) Sensors can be mounted on the Nose and Belly of the Aircraft 2) SATCOM is placed on top of the aircraft cell

SENSOR OPTIONS [1)]

HiDef EO/IR turret, Synthetic Aperture Radar, Mission Management System, COMINT

SATCOM [2)]

Beyond line of sight Up- and Downlink: up to 2 x 432 kbps for video, audio and screen shots

SURVEILLANCE PAINTING

Surveillance painting reduces sun reflections to a minimum level of recognition.

MICROWAVE LINE OF SIGHT DOWNLINK

Guaranteed stable encrypted data transfer in HD quality up to 100NM (180 km).

OPERATOR STATION

Modular interior configuration. Co-Pilot seat can be replaced by an equipment rack. It is also possible to remove the rear seats to increase payload up to 77 kg (170 lbs) and replace it with equipment.

COMPARTMENTS

Hard points are located in the standard luggage compartmens for mounting equipment racks. Up to 45 kg (99 lbs) in the rear- and up to 30 kg (66 lbs) in the nose compartement.

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Intelligence, Surveillance & Reconnaissance missions:

COVERT SURVEILLANCE:
• Smuggling • Drug Interdiction • Human Trafficking
• Terrorist Activity

GENERAL SURVEILLANCE:
• Event Protection (marches, demonstration, etc.)
• Public Order & Riot Control • VIP Protection

BORDER CONTROL:
• Smuggling • Drug Interdiction • Human Trafficking
• Terrorist Activity • Population Migration

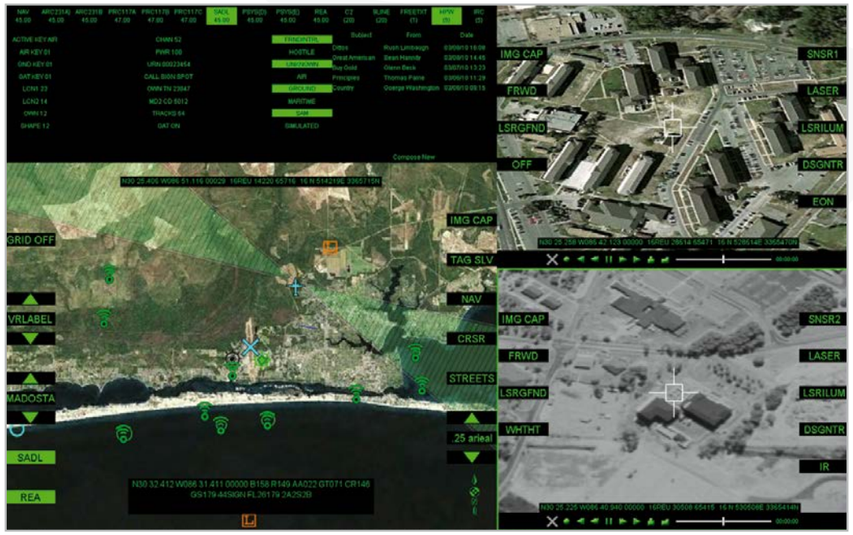
MARITIME PATROL:
• Coastal Patrol • Illegal Fishing • Pirate Activity
• Search and Rescue

DISASTER MANAGEMENT:
• Fire Management • Chemical Spills • Flood Management
• Road, Rail and Air Crashes

ENVIRONMENTAL MONITORING:
• Chemical and Oil Spill Detection • Pipeline Leak Detection
• Pollution Control • Atmospheric Sampling • Animal Control

INFRASTRUCTURE MONITORING:
• Power Line Inspection (f.e. sagging, isolator)
• Pipeline Leak Inspection (f.e. leak, sagging)
• Monitoring of gas and oil storage, water supply systems
• Monitoring of critical buildings
• Railroad and Highway Monitoring

RADIO MONITORING
• Border Guard • Maritime rescue • Military missions



Application Example for Intelligence, Surveillance & Reconnaissance

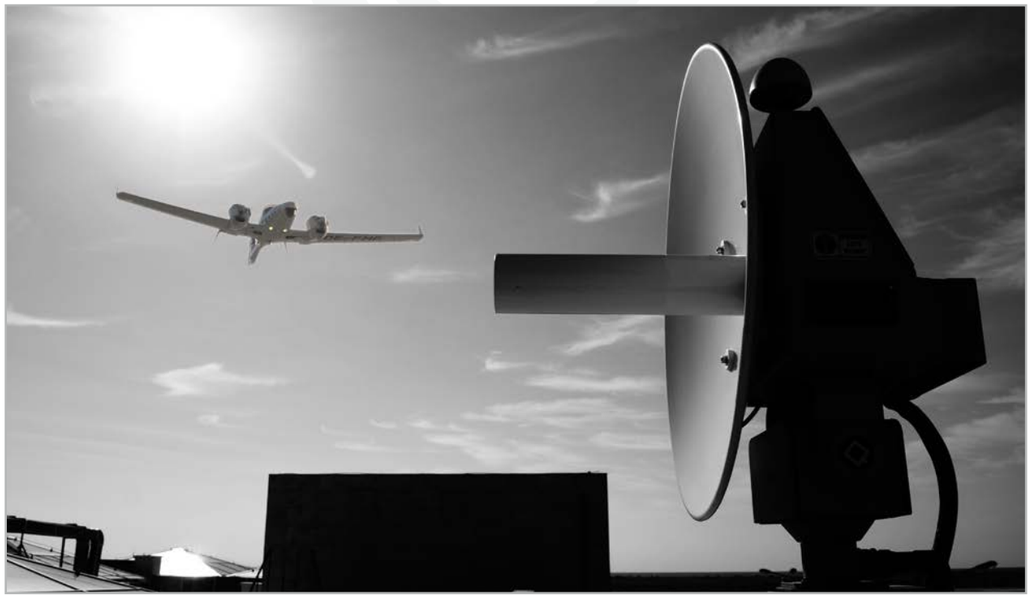
Principles of Data Transmission.

The DA42 MPP can be equipped with sophisticated Line of Sight and Beyond Line of Sight Systems for data transmission for Intelligence, Surveillance and Reconnaissance (ISR) missions. An on board Airborne Transmitter can deliver secure HD video, IP data and metadata from the most advanced sensors to Ground Operation Centers, enabling real time information for decision makers.

LINE OF SIGHT
(LOCAL)

Aircraft to
Ground Station
or Ground Station
to Aircraft

BEYOND LINE OF SIGHT
(WORLDWIDE)



Different Data Transmissions.

LINE OF SIGHT: FREQUENCY FROM 350 MHZ TO 5 GHZ UP TO 180 KM (100 NM).

Provides line-of-sight ranges up to 180km for ISR data transmission with multiple channels. Either simple one-way transmissions from the aircraft to the ground station or complete bi-directional encrypted IP gateway or bridge connectivity between aircraft and Ground Operation Centers is possible. The LOS Systems are available for transmissions in L-, S- or C-band.

BEYOND LINE OF SIGHT: SATCOM 2X 432 KBPS.

Complete airborne satellite terminal delivering IP communications on the move, secured phone calls, live video feed, and access to classified and public networks as well as providing critical communications during flight.

TACTICAL COMMUNICATIONS

Multiband radios with frequency ranges from HF up to UHF (2MHz to 400MHz). Tactical communications can ensure quality air-to-air communications plus air to ground communication with excellent RF characteristics and secure communications even during very low-level flights.

Real Time Information for Desicionmakers.

COMPUTER OR HANDHELD

Lightweight mobile rugged computer, providing high-speed data transfer, digital video recording and video conferencing. It also provides instant connectivity with VSAT, ISDN and NATO encryption devices.

MOBILE GROUND STATION

Diamond's mobile ground station is a 'fly-away' rack including ruggedized computers equipped with sophisticated software ideal for capturing all surveillance and communication information from the aircraft on the move. The Diamond ground station can also be integrated to a vehicle or naval vessel.

FIXED GROUND STATION

Diamond's fixed ground station is the ultimate center for real time information for decision makers. A number of dedicated computers in combination with large monitors and tactical communication radio devices providing the ground operators and commanders with crucial info about the ISR missions.

COMPUTER	MOBILE GROUND STATION	FIXED GROUND STATION
Industrial ruggedized PC	Fly-away Rack	Powerful working stations
Video recording	Video recording	Large monitors
Connectivity with various devices	Communication packages	Communication Packages and Surveillance packages

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DA42 MPP Range Map.

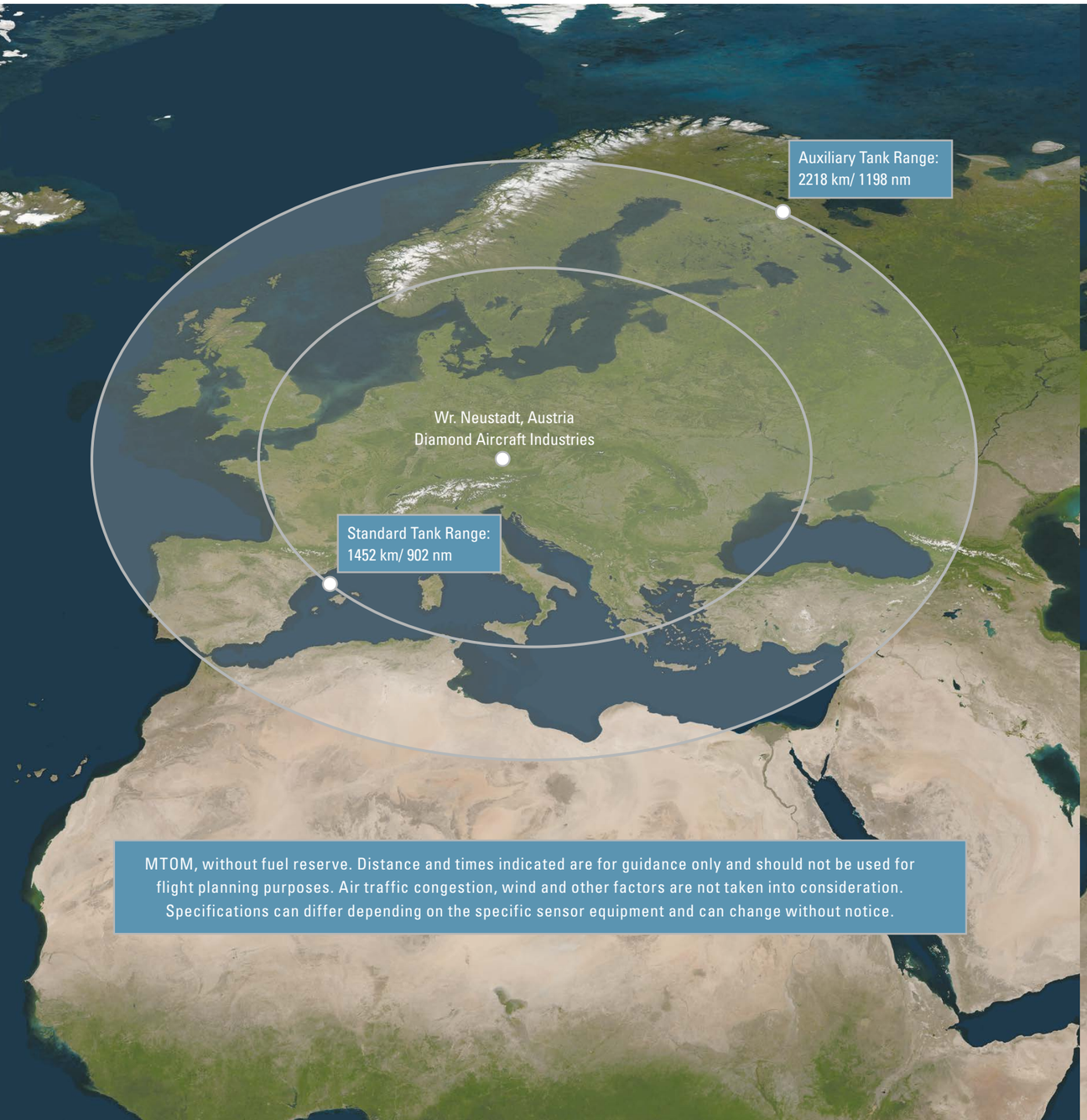
Consumption at 35%:
24.2 lt/h or 6.4 gal/h

Minimum Speed:
140 km/h or 76 kts

Max. Speed:
328 km/h or 177 kts

Max. Altitude:
5,486 m or 18,000 ft

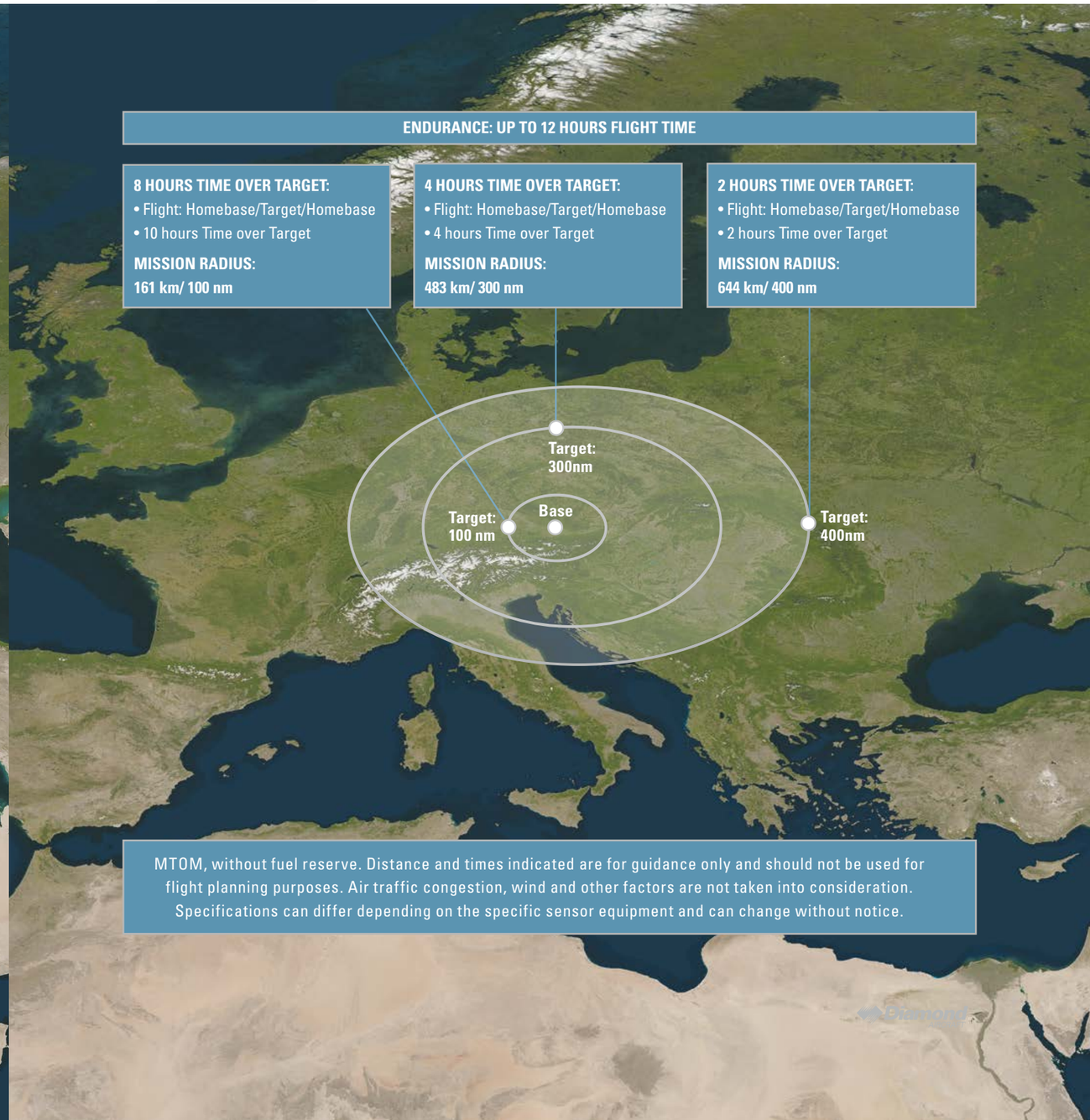
Payload:
634 kg or 1,398 lbs



MTOM, without fuel reserve. Distance and times indicated are for guidance only and should not be used for flight planning purposes. Air traffic congestion, wind and other factors are not taken into consideration. Specifications can differ depending on the specific sensor equipment and can change without notice.

DA42 MPP Mission Range.

Homebase for our mission examples is Wr. Neustadt, Austria. The mission range includes the flight to the target, shows the time over target to accomplish your mission and the flight back to the homebase.



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Geo Surveys & Media missions

INFRASTRUCTURE PLANNING
• Powerline Planning/Monitoring
• Pipeline Planning/Monitoring
• Railroad and Highway Planning/Monitoring
• Visualization of planned Projects (bridges, buildings, etc.)

INFRASTRUCTURE PLANNING
Natural Resource Exploration
• General Mine Support Operations
• Monitoring of Compliance with Mining Laws & Rules

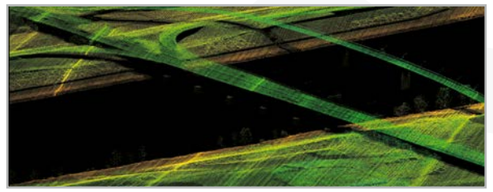
DISASTER PREVENTION
• Geo-hazard Prevention • Landuse Mapping
• Flood Prevention • Fire Fighting
• Mass Movement Detection • Detection of Ocean Pollution

VEGETATION ANALYSIS
• Landuse Mapping • Precision Farming
• Brownfield Monitoring • Forest Canopy Mapping

SECURITY MISSIONS
• Change Detection
• Detection of camouflaged vehicles
• Detection of illegal ship unloading
• Monitoring of Compliance with Mining and Building Law

MAPPING
• Urban and Rural Mapping • Cadastral Survey
• Landuse and Corridor Mapping
• Orthophotos
• 3D Mapping
• Topographic Maps
• Forest Canopy Mapping

MEDIA
• Live Newsgathering
• Live Coverage of Sporting and Mass Events
• Midpoint Relay
• High-Definition Videos


Application Example for Laser Scanning


Application Example for High Definition Video Broadcasting


Application Example for Photogrammetry

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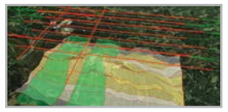
DA42 MPP GEOSTAR.

Collect laser-scanning and photogrammetry data during one single flight or benefit from unparalleled hyper spectral detection capabilities. The DA42 MPP Geostar is available in two variants. The LiDAR version is equipped with a long-range airborne laser-scanner and a high-format photogrammetric camera and allows to collect both data during one single flight. Perfectly suited for city and land area surveys, monitoring of critical infrastructure, glaciers or snow fields and mapping damages after natural disasters. The hyperspectral version comes with a full spectrum imager and a long-range laser-scanner. It is particularly suited for ISR (Intelligence, Surveillance and Reconnaissance), mineralogy or environmental applications.

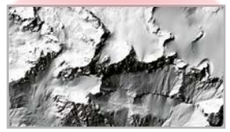
GEOSTAR Mission Profile: Combined Data Acquisition.

A photogrammetric camera, installed in a special pod on the aircraft's nose, delivers accurate representations of the Earth's surface, called ortho-photos (aerial photos). A laser-scanner captures the terrain topography by firing a laser and measuring the time it takes for the laser to be reflected back from a point. The result of the collected measurements is a digital terrain model in the form of a point cloud. The scanner is mounted on the belly of the aircraft in a specifically designed pod. By merging the ortho-photo with the point cloud you get a precise, realistic 3D model of the object.

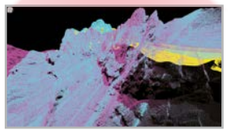


Flight Planning / Trajectory

Software Application Photos © by RIEGL



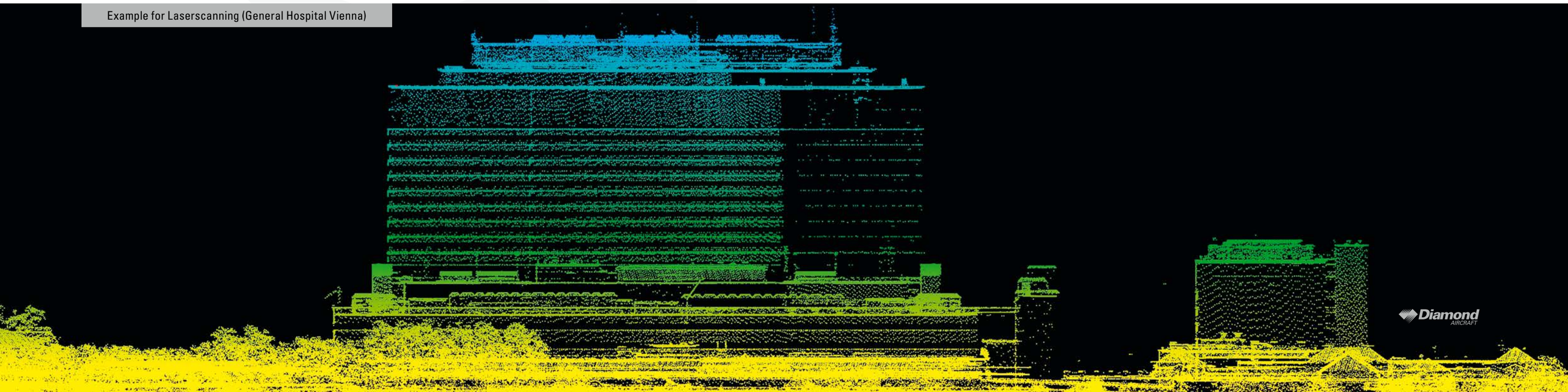
Orthophoto



ALS-3D Point Cloud

3D-Digital Terrain Model / 3D-Digital Surface Model

Example for Laserscanning (General Hospital Vienna)



DA42 MPP GEOSTAR Configuration.

FULL SPECTRUM IMAGER SPECIM SERIES [1)]

Example - SPECIM AISAFENIX 1K:

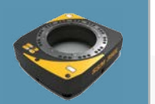
- Hyperspectral camera for detecting species, material and chemicals
- VNIR and SWIR wavelengths from 400 nm to 2500 nm
- Detect targets occupying only a fraction of a pixel

PHOTOGRAMMETRIC CAMRA ULTRACAM SERIES [2)]

Example - ULTRACAM HAWK:

- 92 megapixels footprint
- Ground sample distance < 4 cm
- Panchromatic, RGB & CIR images
- Forward Motion Compensation
- Wide field of view of 57°

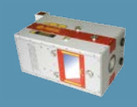
GYRO-STABILIZATION MOUNT SOMAG SERIES [3)]



Example - Somag SSM 350 L:

- Drastic movement reduction of the photogrammetric camera
- Electro-mechanical gimbal system
- Pitch/Roll stabilization angle up to 8.5°
- Yaw stabilization angle up to 10°

AIRBORNE LASER SCANNER SYSTEM RIEGL SERIES [4)]



Example - RIEGL LMS-Q780:

- High operating altitude up to 15,500 ft (4,700 m)
- High laser pulse repetition rate up to 400 kHz (>20 points/m²)
- Multiple Turn Around (MTA) up to 10 pulses simultaneously
- Wide scan field of view up to 60°
- Full Wave form analysis
- High ranging accuracy 20mm

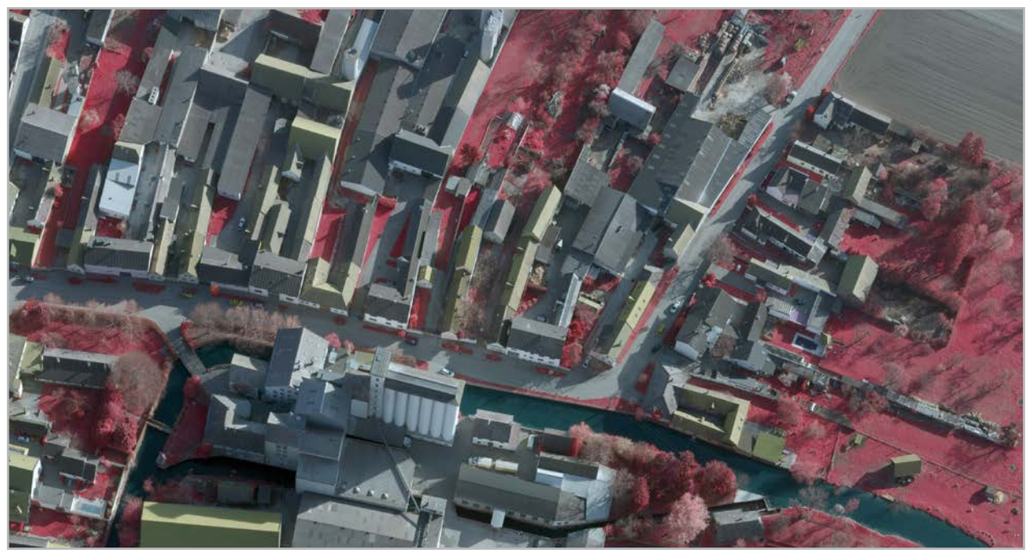
FLIGHT MANAGEMENT & GEO-ENCODING SOLUTION IGI

- Pilot & Operator screen with different views of surveying area
- Personalized Display Information
- Support for digital camera systems, LiDAR systems, SAR etc.
- Direct Georeferencing for all sensors, IMU export free

OPERATOR STATION

Modular interior configuration

1) or 2) and 3): placed in the nose pod of the aircraft 4): placed in geo pod of the aircraft



Example for a Color-Infrared (CIR) Orthophoto

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Monitoring the Health of the Earth.

Flood Prevention

Atmospheric Sampling (volcanic ash measurement)

Fire Fighting

Oil Spill Detection

Pollution Control

Glacier or snowfield survey

Landuse Mapping

Precision from Above

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