Austrian Show Case Disaster Relief

Diamond Aircraft,
Hanoi 20 – 21 February 2012

Multiple requirements → Multi Purpose Platform
1. Company Movie
2. Company presentation
3. Disaster relief
4. Security
5. One-stop shop solution
Welcome at Diamond Aircraft
Engineering and production of

Rotary engines

Piston engines for Jet Fuel
Jet A1 piston Engine

**Austro Engine AE300**

- 4 Cylinder inline engine
- 2 l displacement
- Compression Ratio 17,5:1
- 170 hp
- Gearbox (1:1,69)
- 2300 RPM
- EECU Controlled
- Liquid cooled
One Fuel : Jet Fuel available worldwide!
One fuel for all: Jet Fuel
Garmin G1000 Glass Cockpit
DIAMOND SIMULATION

full size replica of Diamond Aircraft
• original instruments, equipment,
• panels and controls
• enclosed (original Diamond) aircraft cockpit
• including an external 180-degree visual system
• including the assemblage of equipment and computer programmes necessary to represent the airplane in ground and flight conditions to the extent of the systems installed in the aeroplane
• certified as FNPT II or Level 5 FTD
Diamond Pilot training

DA40 NG

DA40 Tundra Star
One System !!!!!

Training and operation with one system:
- Same cockpit
- Same engine
- Jet Fuel

Decisive advantages for:
- Operational costs
- Maintenance
- Training
- Flying
1. Getting informed that something happened
2. Understand what is happening
3. Can we warn and still save lives and goods?
4. Which infrastructure can still be utilized?
5. How can we rescue the population affected?
   1. Immediately
   2. The next days
6. What priorities must be taken to control the crisis?
Understand what is happening: Aerial reconnaissance identify the threat
The extend of the damage is analysed from the air
Destroyed infrastructure

Priority: extinguish the fire in the refinery
Tremendous progress in electronic and software

High performance light sensors available: need to have optimised platforms
Gimbals nowadays are lighter, smaller and offer a higher performance

→ no need for big and expansive platforms

→ They are easy to integrate on smaller optimised aerial platforms

Cost efficient, light ISR Platform:

DA42 MPP
THE MULTI-PURPOSE PLATFORM
DA42 MPP
PAYLOAD PODS

188 lbs.
85 kg

177 lbs.
80 kg

144 lbs.
65 kg
Disaster relief with Diamond DA42NG MPP fully integrated systems:

1. Being prepared:
   - Mapping camera systems for precise mapping
   - Laser scanning for digital elevation models
     1. Flood prediction
     2. Definition of safe areas
     3. Optimise critical infrastructure positioning

2. Situation awareness
   - Multimedia high resolution camera systems
     - Electro / Optical Gimbals

3. Damage assessment
   - Based on the data collected with mapping cameras and Lidar system Assess the damage

4. Priority listing and
DA42 MPP with Microsoft UltraCamX

Mapping: Orthophotos for precise maps

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Laserscanning

Mapping and quantification of mass volumes, e.g. sand pits, quarries and waste disposal sites.

Mapping of costal areas. Flood inundation mapping. Management of fluvial zones.

City planning and other urban applications.
Laserscanning

The travel time of the reflected laser beam the intensity of the reflected signal is measured by the sensor. Using this information an image representing the reflection at a given wavelength can be generated. The acquired and filtered elevation data (x,y and z-coordinates) can be used for the generation of Digital surface models and Digital elevation models.

Digital Surface Model (DSM) generated from first return

Digital Terrain Model (DTM) generated by filter processes (last return)
Airborne Camera

- Easily available – fast deployment e.g. in crisis situations.
- High ground resolution depending on the used focal length and flight altitude.
- Central-perspective distortion. Correction difficult. Only visible and near-IR spectrum.

Flood Danube river – August 2002
Courtesy: Zeggl Film, Wien
Firefighting applications

Different sensors mounted on the DA42 MMP can be used to identify and locate areas prone to forest fires or sustain firefighting operations.

- Camera systems (optical and infrared) for identification and mapping.
- Video cameras to guide firefighting operations on the ground.
Principles of Data Transmission

- DA42MPP
- L3 FLIR Polytech Denel
- daylight & IR live pictures
- "usual targets"
- DA42MPP <-> ground
- * continuous *
  radio communication
- "line - of - sight" HD quality
- "beyond - line - of - sight" standard TV quality
- * live pictures from above *
- operation in the field
- headquarters
- airports
- IR observation
- infrastructure surveillance
- border crossing
- highway patrol
- daylight surveillance
Cineflex High-Definition Camera System

Cineflex V14 Magnum Multi-Sensor

- Highest detail in night/day scenarios
- Fully optical high-magnification lenses with motorized 2x extenders (84x optical zoom)
- Longest HD zoom capability available
- Five-axis gyro-stabilized HD gimbals
- Infrared capability
- WFOV – Wide-angle view in a separate window
Protection of critical infrastructure

Border protection

Migration monitoring

- Fishery protection,
- Maritime surveillance
- Search and rescue
One System !!!!!!

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Decisive advantages for:
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- Maintenance
- Training
- Flying
<table>
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<tr>
<th>Training</th>
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<td>Simulator</td>
<td>Training with the same modern cockpit on the simulator, the single engine and twin engine aircraft. Training for military pilots and commercial airline pilots</td>
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<td>Mapping</td>
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<td>ISR Surveillance</td>
<td>Electro / optical gimbal, maritime radar, various sensors…</td>
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Thank You!