GUARDIA di FINANZA

AIRBORNE ISR OPERATIONS SUPPORTING CUSTOM AND POLICE.

LESSON LEARNED.

Lt.Col. Domenico Tavone
Head of Personnel, Training and Flight Safety within Air Staff Office of GdF Head Quarter
GdF AIR NAVAL DEPARTMENT

PRIMARY TASKS:

• Economic financial maritime police
• Repression of any illegal sea-traffic
  • Illegal immigration
  • Drug Trafficking
  • Weapon Trafficking
• Maritime custom police
SECONDARY TASKS:

- Public order and security
- Environmental protection
- Search and Rescue ops
- In case of war military operations
LONG RANGE COMPONENT

Helicopter Flight Units
Fixed Wing Flight Unit
Operative Command

PERSONNEL

<table>
<thead>
<tr>
<th>OFFICERS</th>
<th>MILITARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>210</td>
</tr>
</tbody>
</table>
LONG RANGE AIR PLATFORMS
Maritime exploration and mountain operations

Fixed wing – One squadron based in Pratica di Mare - Rome

- ATR42: Nr. 4
- P166DP1: Nr. 8
- P180AII: Nr. 2

Rotary wing – 4 Flight Units

- AB412HP: Nr. 22
- AW139: Nr. 2
REGIONAL COMPONENT

Helicopters Flight Units

PERSONNEL

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<td>211</td>
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</table>
REGIONAL AIR PLATFORMS
Maritime exploration coastal surveillance

Rotary wing – 11 Regional Flight Units

A109N  A109AII  NH500
MAIN ILLICIT ACTIVITIES FROM SEA

- Drug trafficking
- Clandestine immigration
- Smuggling
- Weapons trafficking
- Pollution
COCAINE and CANNABIS
Tobacco and illegal immigration
International sea water Trans-shipping operation
AIR NAVAL OPERATION

- nature of illicit traffic
- ship’s nationality
- criminal strategy
Example of a maritime operation

Detection

Capture

Shadowing

Search area
Typical Internal Layout

1. Front Cargo Area
2. Work Area
3. Coordination and Rest Area
4. Bubble window
5. Galley
6. In flight openable door
EXTERNAL LAYOUT

- Esm antennas
- Search light pod
- Gun pod
- Electro optic turret
- Buble window
- Adelt
- Esm antennas
RADAR
Inverse Synthetic Aperture Radar (ISAR)
ISAR and InfraRed image
Main Sensors
Radar doppler
Functions
Visual identification of surface targets
classification of surface targets during
night operations

Capabilities
Triple sensors arrangement
High resolution IR Camera
(detection 5 nm, recognition 2 nm,
identification 1.5 nm - 2.3 x 2.3 m target)
High resolution colour acquisition TV
with high magnification lens
B/W long range TV
(character height 20 cm at 1.5 nm distance)
360° continuous azimuth scanning capabilities
Gyrostabilized three axis platform
(LOS stability £ 5 m Rad)
based on WESCAM M-20
Auto tracker

Galile Avionica EOST-23
Main Sensors
Electronic Support Measures

FUNCTIONS

- DETECTION OF LONG RANGE RADAR TARGETS
- RECORDINGS DATA AND LOADING LIBRARIES ON INTERCEPTED TARGETS

CAPABILITIES

- RADAR EMISSION DETECTION IN DENSE ELECTROM ENVIRONMENT
- RADAR EMISSION ANALYSIS, IDENTIFICATION AND LOCATION

ELETTRONICA ALR-733
LONG RANGE MPA
OPERATIVE IMPROVEMENTS
Improved action range
ATR42 MP coverage

Better strategy repression against criminal organizations
## COST EFFECTIVE

<table>
<thead>
<tr>
<th>PATROL SPEED</th>
<th>FLIGHT TIME</th>
<th>PATROL DISTANCE</th>
<th>CREW MEMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100kts</td>
<td>3H</td>
<td>300 NM</td>
<td>4</td>
</tr>
<tr>
<td>150kts</td>
<td>4 H</td>
<td>600 NM</td>
<td>4</td>
</tr>
<tr>
<td>180kts</td>
<td>7H</td>
<td>1.250 NM</td>
<td>6</td>
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</tbody>
</table>
REMOTE SENSING

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object. Use of sensor technologies to detect and classify objects on Earth (both on the surface, and in the atmosphere and oceans) by means of propagated signals (e.g. electromagnetic radiation).

Enviroment Pollution

Sea pollution by oil

Illegal dumps

Soil investigations
Remote sensing

Output’s area are grouped into electromagnetic homogeneous sectors for the characterization and the monitoring of natural and anthropized environment.
The spectral signature is the reflectivity characteristic of each material (natural or artificial), in function of incident radiation wavelength, in comparable environmental conditions. Being able to isolate the spectral ID of a material means to know his fingerprint, an element that clearly identify it.
Bilateral agreement Italy-Albania for remote sensing campaign in Albania with Airborne digital sensors Itres TABI-320 and CASI-1500, operated by Naples University personnel, to detect cannabis plants.

Attività di telerilevamento con i sensori Itres CASI 1500 e TABI 320 effettuata in Albania con il velivolo P166 DP1 dal 05/07/2012 al 20/07/2012
Airborne digital sensors: from left to right, Itres TABI-320 and CASI-1500, ready for remote sensing missions; Leica ADS40 during installation tests.

Four preliminary phases to the first flight of remote sensing: the electromagnetic test in an anechoic room, 3D point cloud model of the aircraft, the sensors calibration, the improvement of the installation components.
<table>
<thead>
<tr>
<th>Airborne sensors</th>
<th>scanning data</th>
<th>resolution</th>
<th>output data</th>
</tr>
</thead>
</table>
| **Leica ADS40**  | push-broom True Colors and NIR 3D Images | > 20 cm | - Digital Terrain Model  
- Digital Surface Model  
- 3D Cartography  
- 2D thematic Maps |
| **Leica ALS50II**| 3D Point Cloud models | > 20 cm | - Digital Terrain Model  
- Digital Surface Model  
- Urban 3D Model |
| **Itres CASI 1500** | push-broom Hyperspectral Images discretized from 369,8 to 1039,9 nm | > 40 cm | - Spectral thematic Maps  
- 3D spectral Models |
| **Itres TABI 320** | push-broom Thermal Images | > 0,5°C | - Thermal Maps  
- 3D Thermal Models |
Two spectral diagrams of cannabis, recorded in University (Benecon) Laboratory (A.Buondonno and G. Serroni)

Processing of Cannabis spectral signature, thanks to a seizure by Guardia di Finanza ().
Graphic of hyperspectral scanning flight. Cartography of cannabis plantations, detected in 2012, July.
A cannabis plantation, hidden by the surrounding vegetation, but clearly visible from above.
SPECIAL OPERATION

In 2011, the ATR42 was employed to detect the bunker of one of the most dangerous mafia criminals, Michele Zagaria, who had been arrested.
SHADOWING and CHASING
Immobile al di sotto del quale è stato rinvenuto il covo di Michele Zagaria
System Technology Requirements

• Usable recordings at Court;
• Long range sensors;
• Multi-target and while-scan radar;
• Interface btw main sensors (radar and cameras); 
• Real time data fusion (AOIS, data base, ISAR, etc...)
• Standardization and commonality of main systems communications
System Technology Requirements

• Radar Doppler capability;
• Modular concept of mission system;
• Deployable rescue raft;
• Night vision (HD vs Filters);
Thank you very much

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