Scientific flight limitations

SAFI RE 2010
Scientific Payload

Max take-off weight
16,900 kg

Max zero fuel weight
15,540 kg

Aircraft weight in basic configuration
11,800 kg

Endurance
Fuel weight
Scientific payload

Limitations
Scientific Payload

ATR endurance

- Flight time, normal conditions
- Flight time, difficult airfield (2 extra flight hours for security)

Scientific Payload [kg] vs. Flight hours [h]
ATC constraints

- The airspace is managed to regulate the civil and military flights and to facilitate the scheduled commercial flights.

- Commercial flight
  
  Aircraft flies on airways with fixed waypoints
  Aircraft flies at constant altitude

- Scientific flight
  
  anywhere in the area of interest
  different altitudes
  different flight patterns

negociation with ATC
ATC constraints

- Airways and restricted zones
ATC constraints

- Trajectories defined for departures and arrivals
Altitude limitations for low flight

- According to the ceiling

Minimum Safe Altitude from 1000ft (over sea) to 2000ft (over topography)
Altitude limitations for low flight

- Over town

The aviation rules limit the overflight of the built-up areas

<table>
<thead>
<tr>
<th>Typical Size</th>
<th>Min Altitude</th>
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<tbody>
<tr>
<td>Little town</td>
<td>&lt; 1200m</td>
</tr>
<tr>
<td>Medium town</td>
<td>1200m &gt; &lt; 3600m</td>
</tr>
<tr>
<td>Large town</td>
<td>&gt; 3600m</td>
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</tbody>
</table>
Get the permit to fly

- Prepare the flight project with the aircraft operator 6 months before at least
- Describe the trajectories with waypoints and altitude changes
- Trajectories and flight plans must be validated by the aviation authorities
- Authorizations and waivers are necessary to carry out a scientific flight
TETRAD-sea mission  200Nm

Sounding  500ft-10000ft

working area

Limitations

Sounding
TETRAD-land mission

working area

Sounding
500ft-19000ft
Flight type Flux

- Flux measurements on horizontal legs at different altitudes

2 min by turn

ground

Limitations

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Flight type  Stratus cloud

- Up and down in cloud at +/-600ft of the selected altitude. Vertical speed 300ft/mn

2 min by climb or descent
Flight type  Cumulus cloud

• Butterfly pattern at different altitudes

Limitations

2 min by turn
Total 8 min

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Estimate of the flight duration

- Butterfly pattern 4 levels
  Trajectory 200Nm/180kt = 1h06min
  Departure/Arrival procedure = 10min
  Sounding between 500ft-10000ft = 10min
  Butterfly pattern = 32min
  3 Level changes by 360° turns = 6min

Total 2h04min