14\textsuperscript{th} June: Tests Sky Arrow (2 hours)

15\textsuperscript{th} June: IOP01 (Sky Arrow and Piper Aztec) (4 hours each)

a) Objective:
Continuous coverage measurements on time of the afternoon evolution at different heights

b) Research flight plan

\begin{itemize}
  \item \textbf{Schedule (UTC) IOP-01 (15/06/11)}
  \begin{itemize}
    \item 13.00 \hspace{1cm} 15.15
    \item 14.30 \hspace{1cm} 16.45
    \item 16.00 \hspace{1cm} 18.30
    \item 17.45 \hspace{1cm} 20.00
    \item Sunset 19.30 UTC
  \end{itemize}
\end{itemize}

\begin{itemize}
  \item \textbf{Flight strategy}
  \begin{itemize}
    \item \textbf{C(N2052, E1IN1)}
    \item \textbf{Leg 1} \hspace{1cm} \textbf{W1}
      \begin{itemize}
        \item Inversion
      \end{itemize}
    \item \textbf{Leg 2 (Simultaneous PA)}
    \item \textbf{Leg 3}
    \item \textbf{Leg 4 (Simultaneous SA)}
    \item 500 ft
  \end{itemize}
\end{itemize}

c) Vertical structure

d) Boundary layer height, horizontal wind and clouds (UHF, ceilometer)
19th June: IOP02 (Sky Arrow and Piper Aztec) (4 hours each)

a) Objective: Spatial heterogeneity during the afternoon transition

b) Research flight plan

The same strategy was performed in flight 2 but changing the leg N2S2 by N3S3

c) Vertical structure
20th June: IOP03 (Sky Arrow and Piper Aztec) (4 hours each)
a) Objective: Vertical structure
b) Research flight plan
The same strategy was followed for the second flight of both planes.
c) Vertical structure
d) Boundary layer and horizontal wind (UHF and aerosol lidar)

24\textsuperscript{th} June: IOP04 (Sky Arrow) (4 hours)
a) Objective: Vertical structure of the atmosphere
b) Research flight plan

Schedule (UTC) IOP-04 (24/06/11)

Tethered Balloon/SUMO/RS

13.30 15.45 16.45 19.00 00.00

W1E1-N1S1(a) W1E1-N3S3(b) W3E3-N3S3(c) W4E1-N1S1(d) W3E3-N3S3(g) W3E3-N1S1(h)

Flight strategy (from 13:30-15:45 UTC) 8 profiles at the corners of the TRA (SA)

The same strategy was followed during the second flight.
c) Vertical structure
d) Boundary layer height, horizontal wind and clouds (UHF, ceilometer)

25th June: IOP05 (Sky Arrow and Piper Aztec) (4 hours)

a) Objective: Vertical structure and heterogeneity of the atmosphere.
b) Research flight strategy

Schedule (UTC) IOP-04 (25/06/11)

- Tethered Balloon/SUMO/RS
- Flight strategy (from 13:30-15:45 UTC)
  - 2 profiles at NISI-E3W3 Piper Aztec (begin & end)
  - W3(a) → C → Leg 1 (15 km) → E3
  - W3(b) → Leg 2 (0.9 zi) → E3(c)
  - W3(f) → Leg 3 (0.5 zi) → E3(d)
  - W3(g) → Leg 4 (0.3 zi) → E3(h)
  - W3(j) → Leg 5 (700ft) → E3(i)

- Flight strategy from NISI-E1W1 SA
  - W1(a) → C → Leg 1 (15 km) → E1
  - W1(b) → Leg 2 (0.9zi) → E1(c)
  - W1(f) → Leg 3 (0.5zi) → E1(d)
  - W1(g) → Leg 4 (0.3zi) → E1(h)
  - W1(j) → Leg 5 (700ft) → E1(i)

and the same strategy for the second flight of both planes.

c) Vertical structure of the atmosphere

![Vertical structure graphs]
d) Boundary layer and horizontal wind (UHF)

26th June: IOP06 (Sky Arrow and Piper Aztec) (4 hours)

a) Objective: Vertical structure and heterogeneity of the atmosphere.

b) Research flight strategy

**Schedule (UTC) IOP-06 (26/06/11)**

<table>
<thead>
<tr>
<th>12.15</th>
<th>14.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td></td>
</tr>
</tbody>
</table>

- 14.00 16.00
- PA    |

- 15.30 17.45
- SA    |

- 17.15 19.15
- PA    |

Sunset 19.40 UTC

**Flight strategy (I)**

- W1(a)  Leg 1  C
- W1(b)  0.9 zi  Leg 2 (PA & SA)  E1(c)
- W1(f)  0.5 zi  Leg 3 (PA & SA)  E1(d)
- W1(g)  0.3 zi  Leg 4 (PA & SA)  E1(h)
- W1(j)  700 ft  Leg 5 (PA & SA)  E1(i)

**Flight strategy (II)**

- Inversion  Leg 6 (PA & SA)  S1(n)
- N1(m)  0.9 zi  Leg 7 (PA & SA)  S1(k)
- N1(l)  0.5 zi  |

c) Vertical structure of the atmosphere
d) Boundary layer and horizontal wind (UHF)

27th June: IOP07 (Piper Aztec) (4 hours)
a) Objective: Flux integration
b) Research flight strategy
c) Vertical structure of the atmosphere

d) Boundary layer and horizontal wind (UHF)
30\textsuperscript{h} June: IOP08 (Piper Aztec) (4 hours)

a) Objective: Vertical description of the turbulence in the atmosphere

b) Research flight strategy

**Flight strategy (from 14-16 and 17-19)**

\[ \text{C W2(0)} \]

- After the lowest leg the pattern will be done again upwards

<table>
<thead>
<tr>
<th>Flight Level</th>
<th>Altitude (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1(a)</td>
<td>0.8 \text{z} 1000 m</td>
</tr>
<tr>
<td>W1(e)</td>
<td>0.6 \text{z} 700 m</td>
</tr>
<tr>
<td>W1(f)</td>
<td>0.4 \text{z} 400 m</td>
</tr>
<tr>
<td>W1(i)</td>
<td>700 ft</td>
</tr>
</tbody>
</table>

c) Vertical structure of the atmosphere

d) Boundary layer and horizontal wind (UHF)
1st July: IOP09 (Piper Aztec) (4 hours)
a) Objective: Vertical description of the turbulence in the atmosphere
b) Research flight strategy

Schedule (UTC) IOP-09 (01/07/11)

Flight strategy (12-14 and 16-18)

- W2(a) 0.8zi 1780m asl E2(c)
- W2(e) 0.6zi 1470m asl E2(d)
- W2(f) 0.4zi 1150m asl E2(g)
- W2(i) 800 ft E2(h)

c) Vertical structure of the atmosphere
d) Boundary layer and horizontal wind (UHF and Doppler lidar)
2nd July: IOP10 (Piper Aztec) (4 hours)

a) Objective: Vertical description of the turbulence in the atmosphere

b) Research flight strategy

Flight strategy (from 12:30-14 and 15:30-17:00)

<table>
<thead>
<tr>
<th>Inversion</th>
<th>W1(a) 0.8zi 4200ft</th>
<th>N3S3-E1W1(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N3(d)</td>
<td>0.8zi</td>
<td>N3S3-E1W1(c)</td>
</tr>
<tr>
<td>N3(e)</td>
<td>0.6zi 3700ft</td>
<td>N3S3-E1W1(f)</td>
</tr>
<tr>
<td>W1(h)</td>
<td>0.6zi</td>
<td>N3S3-E1W1(g)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inversion</th>
<th>W1(i) 0.4zi 3200 ft</th>
<th>N3S3-E1W1(j)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N3(l)</td>
<td>0.4zi</td>
<td>N3S3-E1W1(k)</td>
</tr>
<tr>
<td>N3(m)</td>
<td>2700 ft</td>
<td>N3S3-E1W1(n)</td>
</tr>
<tr>
<td>W1(p)</td>
<td>700ft</td>
<td>N3S3-E1W1(o)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Temperature (°C)</th>
<th>Moisture (g/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>295</td>
<td>300</td>
<td>15</td>
</tr>
<tr>
<td>300</td>
<td>305</td>
<td>10</td>
</tr>
<tr>
<td>310</td>
<td>315</td>
<td>5</td>
</tr>
<tr>
<td>320</td>
<td>325</td>
<td>0</td>
</tr>
</tbody>
</table>

C) Vertical structure of the atmosphere
d) Boundary layer height and horizontal wind (UHF)

5th July: IOP11 (Piper Aztec) (5.5 hours)

a) Objective: Vertical description of the turbulence in the atmosphere

b) Research flight strategy

Schedule (UTC) IOP-11 (05/07/11)

Tethered Balloon/SUMO/RS

<table>
<thead>
<tr>
<th>Time</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00</td>
<td>14:00</td>
</tr>
<tr>
<td>15:00</td>
<td>17:00</td>
</tr>
<tr>
<td>18:00</td>
<td>19:30</td>
</tr>
</tbody>
</table>

C NI(0)

Inversion

W1(a) 0.8zi (3300 ft) E1(b)

W1(d) 0.4zi (2800 ft) E1(c)

Sunset 19:40 UTC

W1(a) 0.8zi (4300 ft) E1(b)

W1(d) 0.4zi (2800 ft) E1(c)

c) Vertical structure of the atmosphere
d) Boundary layer height (UHF)