



## Minutes of the BBC aircraft planning meeting

*KNMI, De Bilt, The Netherlands*

*12 January, 2001*

### **List of participants:**

KNMI: André van Lammeren, Arnout Feijt, Erik van Meijgaard, Hannelore Bloemink, Anne Mathieu, Pier Siebesma  
Univ. Bonn: Susanne Crewell, Victor Venema, Ulrich Löhnert  
GKSS: Dagmar Nagel  
Meteo France: Marie-Pierre Lefebvre, Jean-Louis Brenguier  
ITF Leipzig: Manfred Wendisch, Rolf Maser (Enviscope), Bernd Schumacher (Rheinbraun)  
FU Berlin: Marc Schröder  
ESA/ESTEC: Patrick Wursteisen

### **1. Opening and Welcome**

André van Lammeren opens the meeting and welcomes the participants

### **2. Adoption of the agenda**

The agenda is approved.

### **3. Overview CLIWA-NET project and BBC campaign**

André van Lammeren presents an overview of the CLIWA-NET project in general and the BBC campaign. An electronic version of his presentation and other CLIWA-NET documents can be found at the CLIWA-NET web site ([www.knmi.nl/samenw/cliwanet/](http://www.knmi.nl/samenw/cliwanet/)).

### **4. Overview 4D-Wolken project**

Susanne Crewell presents an overview of the 4D-Wolken project. An electronic version of this presentation can be found at the CLIWA-NET web site ([www.knmi.nl/samenw/cliwanet/](http://www.knmi.nl/samenw/cliwanet/)).

### **5. Merlin (Meteo France)**

Marie-Pierre Lefebvre gives an overview presentation on the MERLIN IV aircraft and its instrumentation.

Aircraft: ceiling: 24000 ft (19000 ft max load)  
range: 4-5 hrs  
true air speed: 170 – 240 kts

Instruments ( $\mu$ -physical from GKSS):

- FSSP extended range, 3 – 96  $\mu\text{m}$
- 2DC probe, 50 – 800  $\mu\text{m}$
- 2DP probe, 200 – 6400  $\mu\text{m}$
- Nevzorow probe
- Fast FSSP
- PVM probe
- King probe
- Lyman  $\alpha$  (humidity)
- CCN counter

## **6. Partenavia (ITF, Leipzig)**

Manfred Wendisch gives an overview of the scientific objectives of the ITF contribution to 4D-Wolken and the PARTENAVIA aircraft and its instrumentation.

Motivation: Enhanced (anomalous) absorption, effect of cloud inhomogeneity (LWC vs. altitude).

Aircraft: ceiling: 4 km  
range: 4 – 5 hrs  
max. speed: 80 m/s, min.: 50 m/s

Instruments:

- aerosol  $\mu$ -physics
- FSSP size distribution
- 2DC (GKSS) size distribution
- PVM LWC, effective radius
- Radiation:
  - Albedometer, upward and downward looking , 400 – 1000 nm, approx 2 nm resolution spectral irradiance

Also: ground-based instruments:

- sun photometer
- spectral irradiance (as in aircraft)
- 94 GHz doppler radar (test)

Desired range: 0 – 4 km (flight permission!)

Wish list:

- Overcast boundary layer clouds (pref. no cirrus).
  - smooth descent top to base (about 5 degrees)
  - horizontal legs (2-3 km) above, within & below cloud
- Scattered boundary layer clouds
  - horizontal legs (2-3 km) above, within (top, middle, base) & below the clouds. Main interest for radiation: top within cloud.
- Cloudless case

## **7. Cessna (FU Berlin)**

Marc Schröder presents the contribution from the FU Berlin.

Aircraft: ceiling: 3 km (instrument limitations)  
range: 4 hrs, 20 mins

speed: 80 kts (max: 105/110 kts)

- Instruments:
- casi (imaging spectrograph 0.4 – 1.0  $\mu\text{m}$ ) cloud fraction
  - FUBISS spectrograph, 0.3 – 1.7  $\mu\text{m}$ . optical depth, effective radius, droplet concentration, geometrical thickness
  - FTIR, multi spectral 5 – 17  $\mu\text{m}$ . cloud top temperature & height, optical depth, spectral emissivity, effective radius, LWP. **Needs liquid nitrogen!**

Desired range: 0 – 3050 m.

Wish list:

- Focus on Sc, pref. no cirrus above.
- Rectangular patterns (about 20 minutes/pattern, 10 km). 1 as high as possible (3 km) to coincide with ENVISAT overpass, 1 above, 1 within, 1 below cloud.
- Perpendicular and parallel to wind direction
- Over ground-based instruments.

## 8. Other short introductions

- Pier Siebesma (KNMI) presents a brief overview of the observations required for LES model validation. For this the variability of the fluxes over the area and vertical profiles are important.
- Jean-Louis Brenguier (Meteo France) presents the fast FSSP instrument and some results of the ACE experiment. He states that the distance from cloud base is the parameter that determines the microphysics. He suggests to make continuous vertical scans through the clouds. They have very good experience with this in earlier campaigns.

## 9. Discussion

An extensive discussion on planning, flight patterns and logistics takes place. The outcome of the discussions is given below.

### **PLANNING**

Available flight hours:

- Merlin: 10 hr (possibly more?)
- Partenavia: 35 – 40 hr
- Cessna: 40 hr

Availability of aircraft:

- Merlin: not 27 – 31 August, need time to prepare, so available 7 – 30 Sept.
- Partenavia: 4 weeks, 6 weeks stand-by, so from 20 Aug. – 30 Sept.
- Cessna: 6 weeks, 15 Aug. – 30 Sept.

But: Merlin and Partenavia both use GKSS probes, and GKSS has 4 weeks max.

Conclusion:

- Partenavia 1 – 30 Sept.
- Merlin 7 – 30 Sept.
- Cessna 1 – 30 Sept. (2 weeks earlier not very useful)

## **FLIGHT PATTERNS**

- 2Q's: 1. planes with respect to ground stations  
2. planes with respect to other planes

1. Back & forth to Cabauw + other stations LWC values
2. Combination of in situ with radiation measurements

Suggested flight patterns:

1. Target:  $\mu$ -physics and radiation
  - Back & forth to Cabauw, along wind, tracks about 50 km
  - Cessna: high altitude (needs some flights in and below clouds)
  - Merlin: saw tooth pattern
  - Partenavia: horizontal tracks at cloud base, middle & top
2. Target: dynamics (i.e. situation with small large-scale forcing)
  - Square south-east of Cabauw, including Cabauw and De Bilt, tracks about 50 km
  - Merlin, horizontal track at various altitudes
3. Target: all stations (mesoscale)
  - Pentagon over all BBC-stations (south & east of Cabauw)
  - Same aircraft patterns as in 1.
4. Target: Cabauw remote sensing site
  - Cabauw
  - Spiral around & through the cloud(s), tracks (typically 5 km) above remote sensing site in Cabauw

Sketches of the flight patterns are attached to these minutes.

## **Logistics**

- Rotterdam:
  - Will need room/office for data processing/meetings/briefings
  - Hangar
  - other?KNMI will make first contact, then the various aircraft groups will make their individual arrangements.
- Communication between ground & aircraft might be difficult (VHF didn't work at CARL).

## **10 Wrap-up, action items**

Contact Rotterdam airport:	André van Lammeren
Discuss flight patterns with Air Traffic Control authorities:	André van Lammeren
Send electronic copies of the presentations to KNMI:	All Speakers
Distribute minutes of the meeting:	André van Lammeren
Liquid Nitrogen for FTIR	André van Lammeren

## **11 Round the table**

No points were raised.

## **12 Closing of the meeting**

The meeting was closed at 16:00 hr.

# **BBC aircraft planning meeting**

***KNMI, De Bilt, The Netherlands***

***12 January, 2001***

## **Agenda**

- 1) Opening and Welcome, Andre van Lammeren
- 2) Adoption of the agenda
- 3) Overview CLIWA-NET project and BBC campaign, Andre van Lammeren (15 min)
- 4) Overview 4D-Wolken project, Susanne Crewell (MIUB) (15 min)
- 5) The Merlin IV aircraft, Meteo France, Marie-Pierre Lefebvre (15 min)
- 6) Partenavia P68B, ITF Leipzig, Manfred Wendisch (15 min)
- 7) Cessna, FUB, Marc Schröder (15 min)
- 8) Other short introductions:
  - Fast FSSP, Meteo France, Jean-Louis Brenguier
  - Evaluation of LES models, KNMI, Pier Siebesma
  - .....
- 9) Discussion on
  - Objectives for the aircraft measurements
  - Instrumentation of the aircraft
  - Flight plans
  - Co-ordination of the aircraft
  - Co-ordination with Air Traffic Control
  - Logistics
  - Operation of ground-based systems
  - ...
- 10) Wrap-up, action items
- 11) Round the table
- 12) Closing of the meeting (approx. 16:30)