DOMECair Campaign
Antarctica 2012-13

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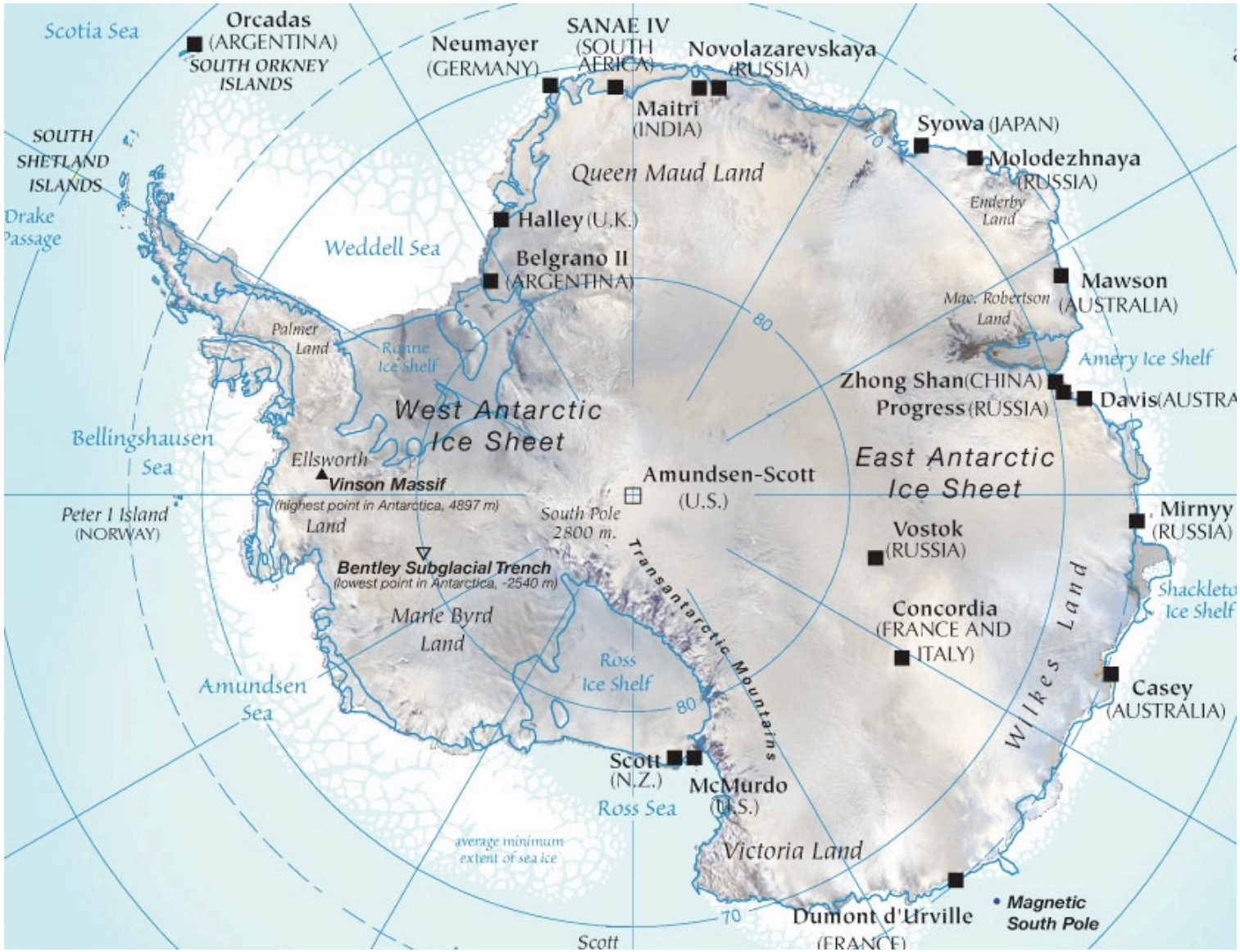
Background / Objectives

- SMOS is a radiometer
- Calibration must be checked via external targets, cold and hot
- Free space is the cold point - only by-weekly, however.
- Dome-C is candidate for hot point - seen by SMOS many times a day!
- Temporal stability verified by tower based radiometer
- Spatial homogeneity??
- Measurements at higher frequencies by SMMR, SSM-I, AMSR-E look promising
- But what about details and accuracy at L-band??
- Need area coverage with airborne, stable radiometer

Antarctica

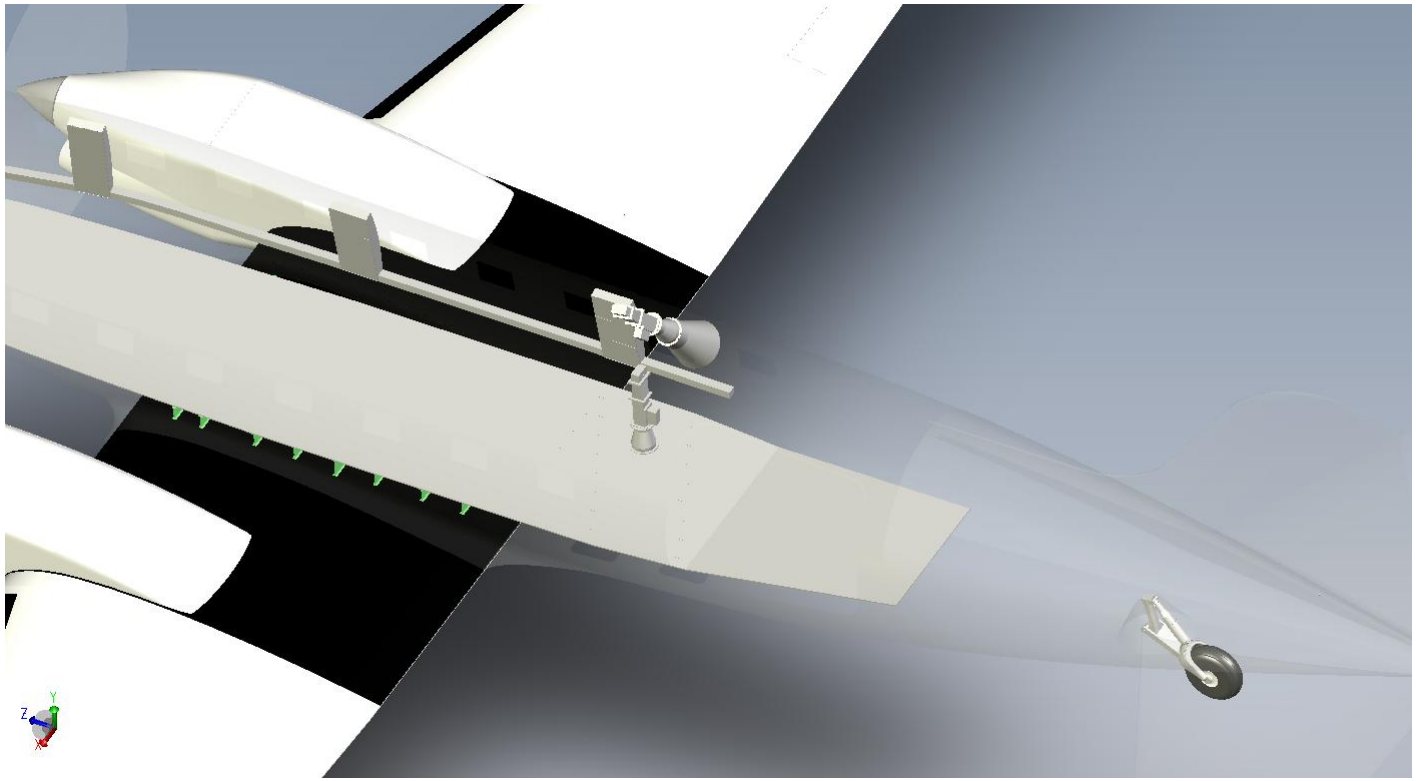

Scotia Sea
Orcadas
(ARGENTINA)
SOUTH ORKNEY ISLANDS
Neumayer
(GERMANY)
SANAE IV
(SOUTH AFRICA)
Novolazarevskaya
(RUSSIA)
Maitri
(INDIA)
Syowa (JAPAN)
Molodezhnaya
(RUSSIA)
Enderby Land
Queen Maud Land
SOUTH SHETLAND ISLANDS
Drake Passage
Halley (U.K.)
Weddell Sea
Belgrano II
(ARGENTINA)
Mawson
(AUSTRALIA)
Mac. Robertson Land
Amery Ice Shelf
Palmer Land
Ronne Ice Shelf
Zhong Shan(CHINA)
Progress (RUSSIA)
Davis(AUSTRA
West Antarctic Ice Sheet
Bellingshausen Sea
Ellsworth
Vinson Massif
(highest point in Antarctica, 4897 m)
Amundsen-Scott
(U.S.)
East Antarctic Ice Sheet
Peter I Island
(NORWAY)
Land
South Pole
2800 m.
Vostok
(RUSSIA)
Mirnyy
(RUSSIA)
Bentley Subglacial Trench
(lowest point in Antarctica, -2540 m)
Transantarctic Mountains
Shackleto
Ice Shelf
Marie Byrd Land
Concordia
(FRANCE AND ITALY)
Wilkes Land
Ross Ice Shelf
Amundsen Sea
Casey
(AUSTRALIA)
Scott
(N.Z.)
McMurdo
(U.S.)
Ross Sea
average minimum extent of sea ice
Victoria Land
Dumont d'Urville
(FRANCE)
Magnetic South Pole
Scott
70
80
80
70

EMIRAD-2 Specifications

- Fully polarimetric (i.e. 4 Stokes)
- RFI flagging by kurtosis and polarimetry
- 2 antennas - one nadir pointing, one pointing at 40° incidence
- Antennas are Potter horns (no sidelobes) with 38° and 31° HPBW
- Footprints around 450 m from 2000 ft flight altitude

AWI Basler BT-67

Antenna Horns in Basler



Side Looking Horn

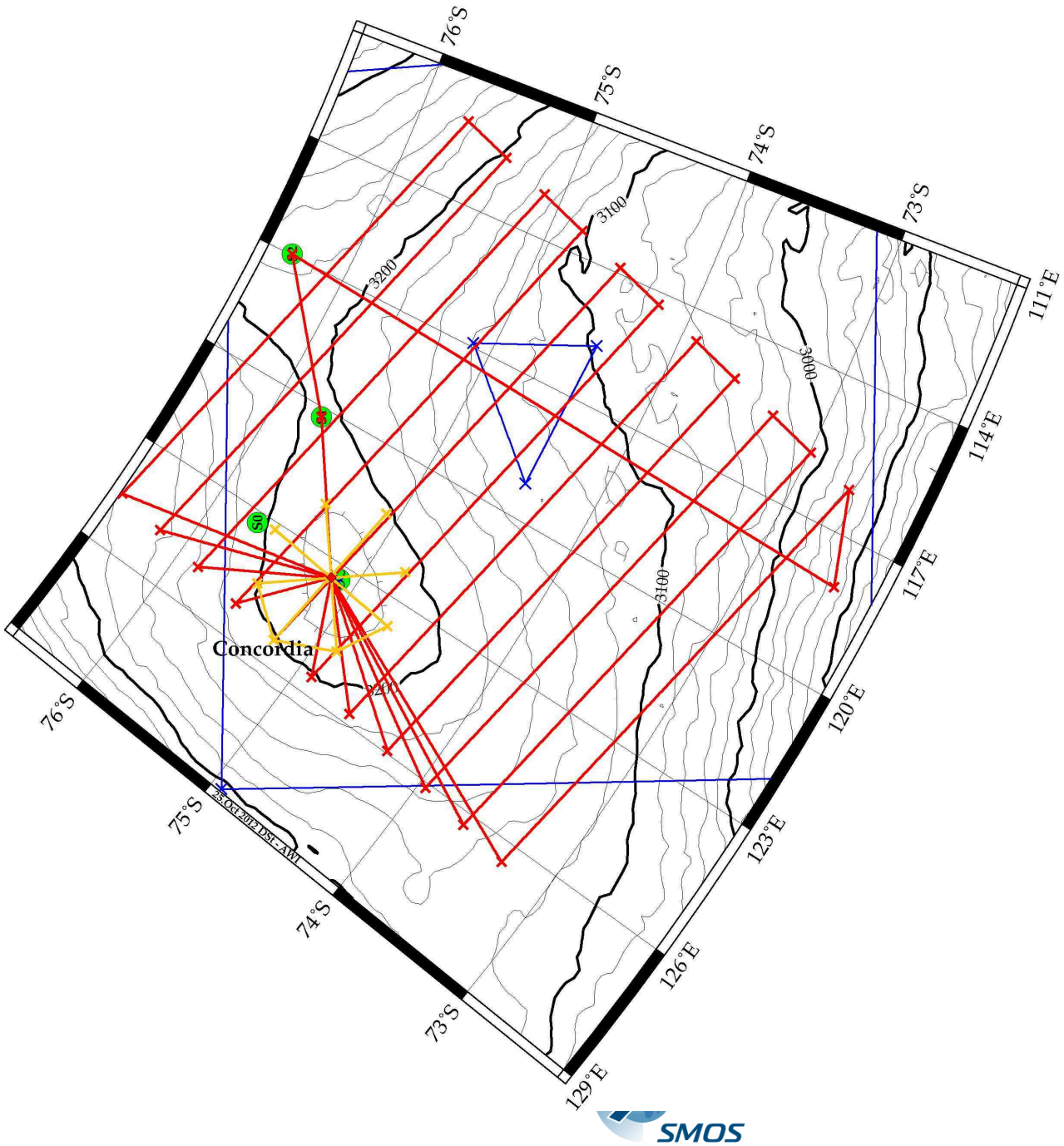
Radiometer System in Basler

Raster + Star Pattern

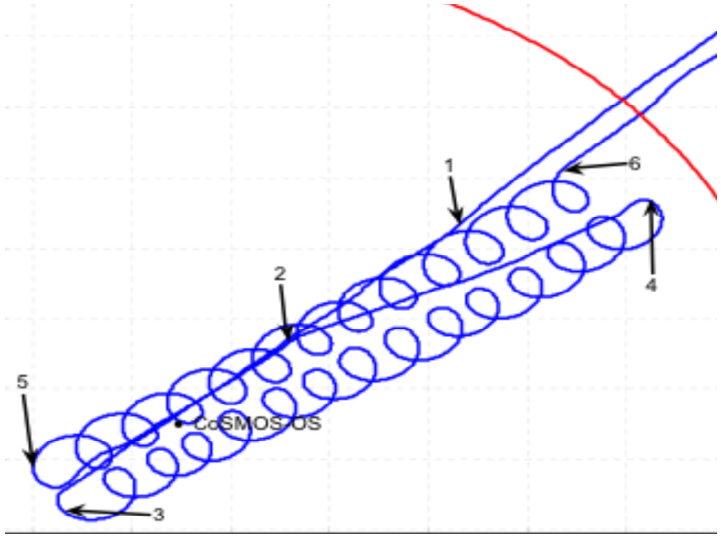
- 350 x 350 km area covered
- 11 lines each 350 km
- separation 35 km
- 24 hours of flight
- Altitude ≈2000 ft above terrain, constant flight level

- Sun must be avoided: never 100° ± 45° compared to track
- No flight 7:20 to 13:20 (raster pattern)

- More intense coverage near Concordia: star pattern
- Also used for azimuth analysis



Azimuth signature? - Circle Flights



- Constant roll and pitch - drift with wind!
- 10 + 10 circles, roll + and - 10 deg
- Incidence angles: 10, 30, 50 deg.
- Circle diameter: 6 km
- Two sets of circles (morning / evening) to sort out Sun signature from surface signature
- Sun signature also to be used for raster pattern corrections
- In total: 6 h for circles

Schedule

- Installation completed
- Test flight performed
- Installation of EMIRAD-2 at Novo: Jan. 10 - 12
- Dome-C airborne campaign: Jan. 12 - 21
- Equipment de-installed and packed
- Departure DTU scientist from Novo Jan. 27