



CIRPAS

- **The Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS) was established at the Naval Postgraduate School in Monterey, California by the Office of Naval Research in 1996 to provide Manned and Unmanned Air Vehicle flight services to the scientific and engineering communities.**
- **CIRPAS Twin Otter became an University National Oceanographic Laboratory System (UNOLS) National Facility in 2002, and the CIRPAS SPA-10 became an NSF National Facility in 2010.**



Changes at NPS

- Abolishment of Centers and Institutes
- Directorship only for tenured faculty
- 51% rule
- Enhanced review structure for proposals
- Activity must fit mission of the school
- Priority is Education of naval officers



Divestitures

1. Camp Roberts UAV Test Grounds
2. UAVs
 - Sentries
 - Predators
 - Gnats
3. Storm Radar
4. SPA-10

CIRPAS FACILITIES:

- **Camp Roberts Facility**
 - Friendly airspace for UAV testing and training (R2503).
 - Military ground maneuvers (equipment, personnel)
 - 3500 x 60 ft runway
 - 2000 sq ft hangar
 - Office Space



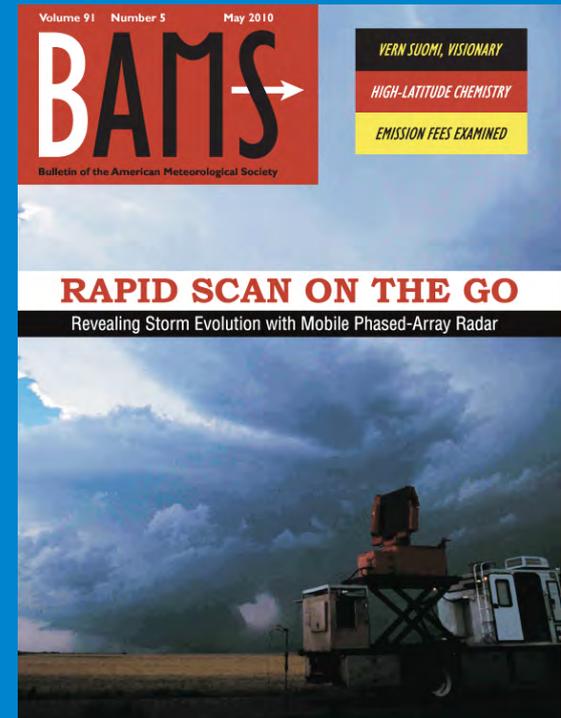


NAVAL
POSTGRADUATE
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Storm radar



**MWR-05X Mobile Storm
Radar**





NAVAL
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Storm Penetrating A-10



A-10 has 11 hard points on wings and belly where 8000 lbs of instruments may be suspended.
It has a gun bay where 2200 lbs of stuff may be mounted

Engineering test flights are planned late 2013 (including tests of baseline instruments and communication).

Progressive science flights are planned in 2014



What is retained

- Twin Otter Research Aircraft (Now a Lab in MR)
- One half of the CIRPAS hangar
- Calibration Laboratory
- Instrumentation
 1. Meteorological/Thermodynamical properties
 2. Aerosol Physical Properties
 3. Cloud Physical Properties



Research Aircraft: Twin Otter



- Research Capacity: 1500 lbs
- Research Power: 5600 W at 28 VDC, 4000W 110VAC 60 hz:
- Speed: 100-140 Kts
- Practical Ceiling: 18000 ft.



FACILITIES:

- **Marina Facility**

- 3500 ft runway - manned operations only
- 30,000 sq ft maintenance hangar
- Instrumentation and Calibration Laboratory
- Maintenance and Payload integration shops
- Offices





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Pelican Predator Surrogate





Facility Instruments



Nose:

Temperature

Dew Point

Pressure

Static

Dynamic

Sideslip

Attack angle

GPS/INS

IR Temperature

Liquid Water Content

Aerosol Inlet



Facility Instruments

Cabin: Nephelometer, Sootphotometer, CPCs, UFCPC, Data System
Racks for 'Research' and 'Guest' Instruments.
Satcom system





Facility Instruments

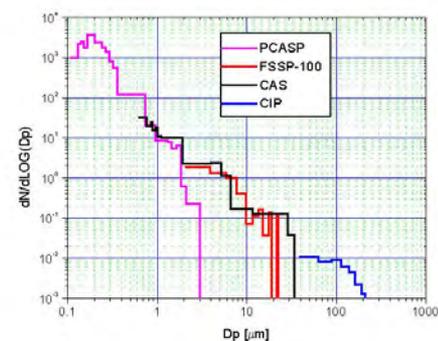
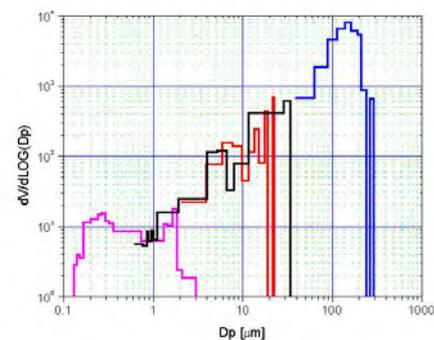
Wings: CAPS, FSSP, PCASP, CIP, PIP, APS

Hard points and pods for 'research' or 'guest' instruments



Aerosol and Cloud Size Spectrometers

Light Drizzle BL





Mentored Instruments

1. Coherent Wind LIDAR System

Mentor: Dr David Emmitt, Simpson Weather Associates

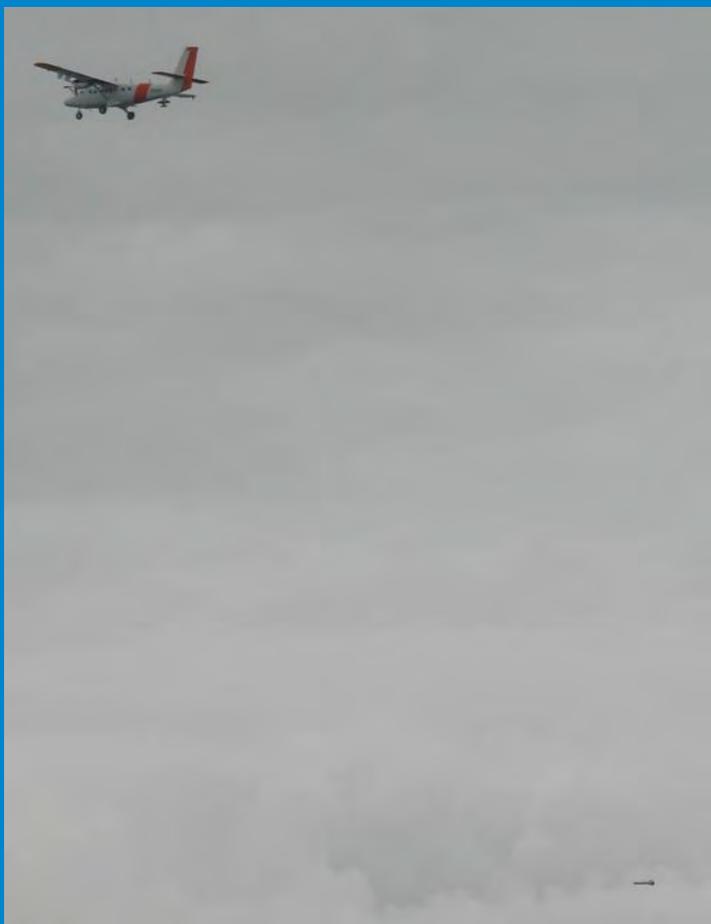


TODWL two axis scanner





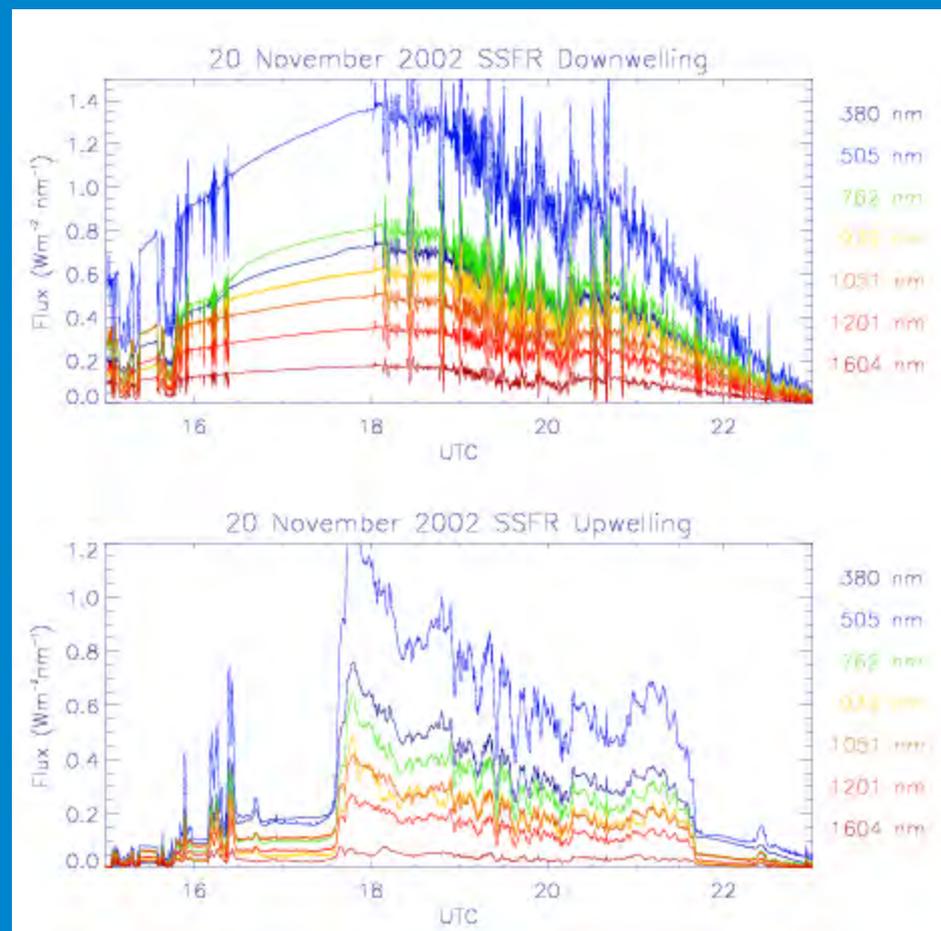
2. (CTV) Controlled Towed Vehicle Mentor: Djamel Kehlief, UC Irvine





3. Stabilized Radiometer Platform

Mentor: Anthony Bucholz, NRL



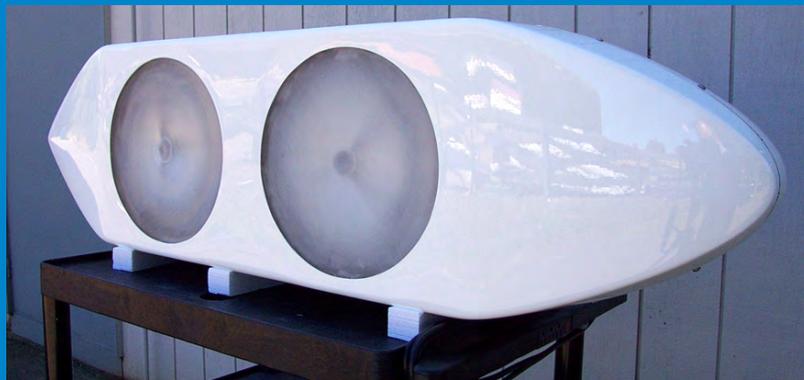


4. ALE 47 Despenser Pod Chaff/Sonde Dispenser





CIRPAS Abandoned Research Instruments



1. Cloud radar, 95 GHz



2. Phased Doppler Interferometer
For drop size measurements

RECENT AND FUTURE TWIN OTTER MISSIONS

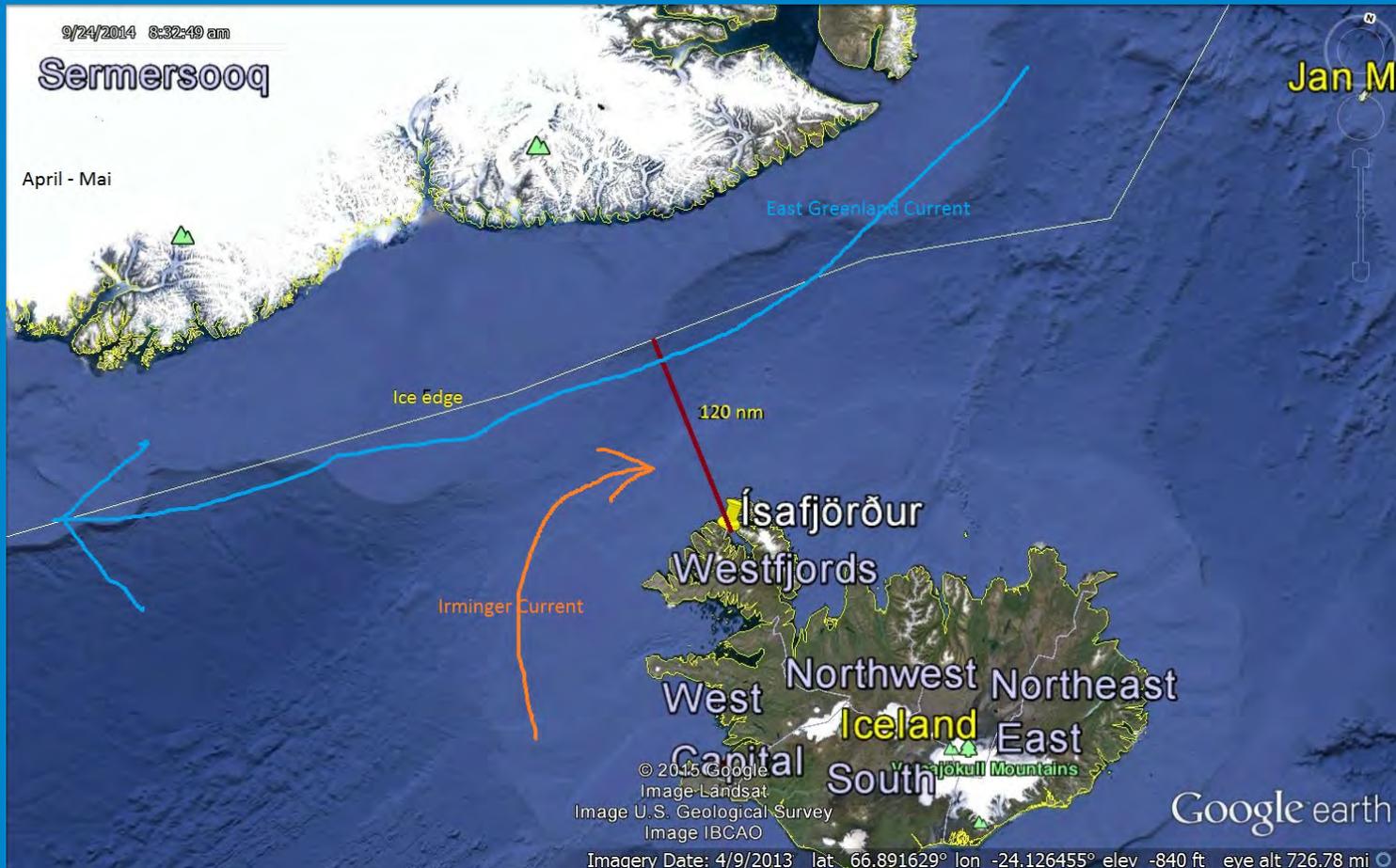
2017:

- 1.Santa Ana: February – March, ONR, Qing Wang
- 2.Ice-Edge: April-May, ONR, Antony Bucholz & Haf Jonsson.
- 3.C-Harrier, NASA, Liane Guild
- 4.CASPER-WEST, ONR, Qing Wang

2018:

- 1.El –Chapo, June-July, ONR, John Seinfeld & Armin Sorooshian
- 2.C-17: September, Army, Keith Allen
- 3.Organized Structures, September, ONR, Dave Emmitt
- 4.C-Harrier, October, NASA, Liane Guild

ICE EDGE

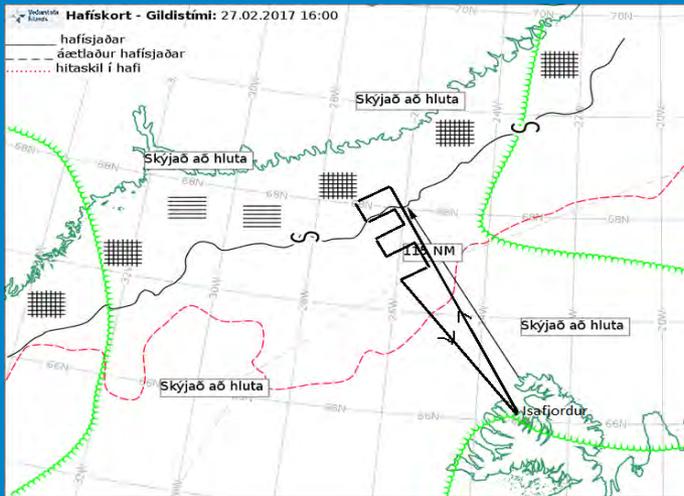


ICE Edge



Objectives:

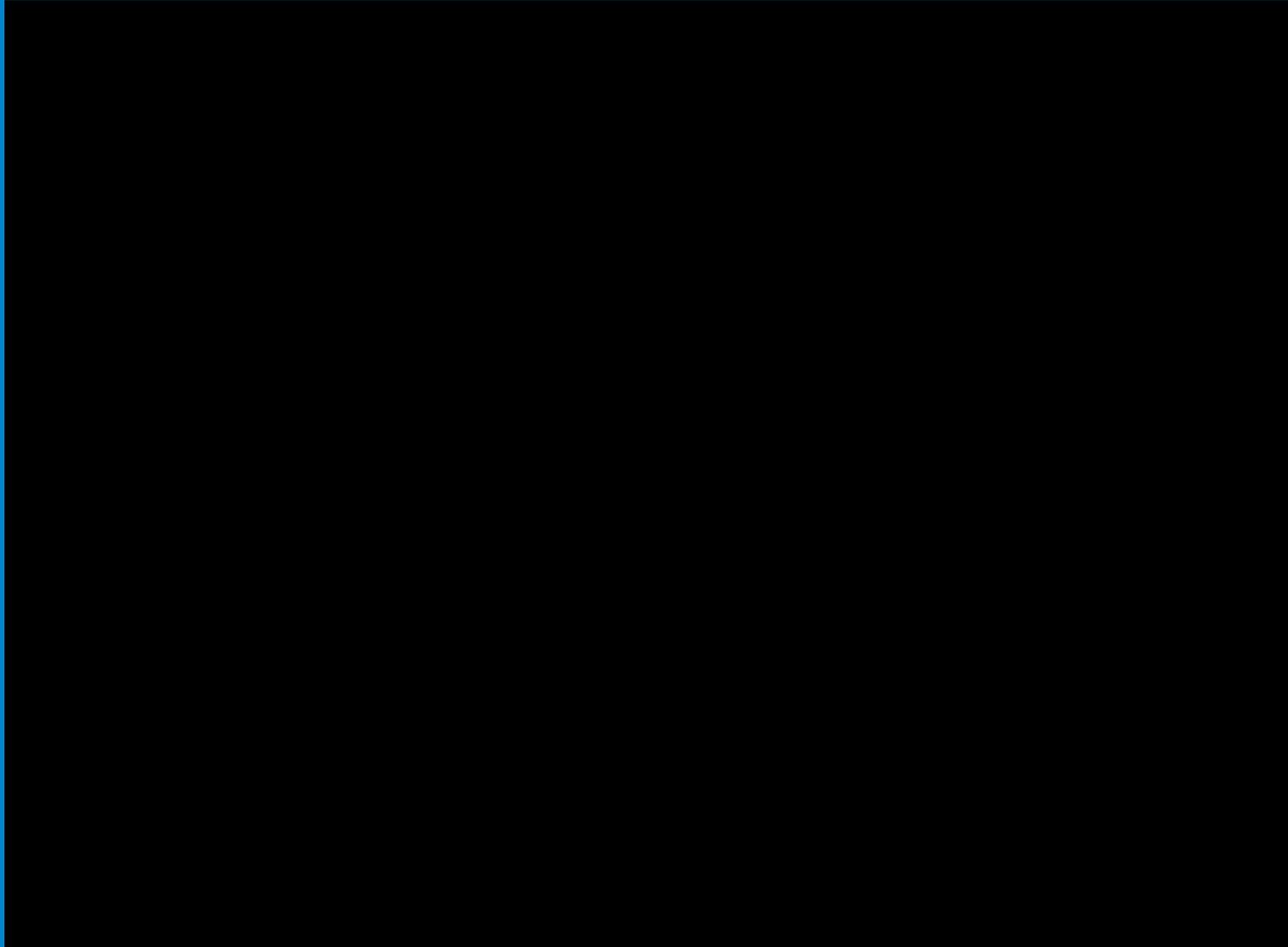
- Measure momentum, heat water vapor, and radiation fluxes at 100 ft., 300 ft. and 1000 ft. altitudes near ice edge
- Measure optical extinction properties, aerosol, scattering and absorption coefficients.
- Measure sea surface temperature
- Identify from visual and infrared images convergence zones (ice compression and ridging potential) and divergence zones (void formation).



Team: Pilot, Co-pilot, Crew chief, 3 Navy (NPS, NRL) scientists, Local scientists.

15 research flights , 70 flight hours.

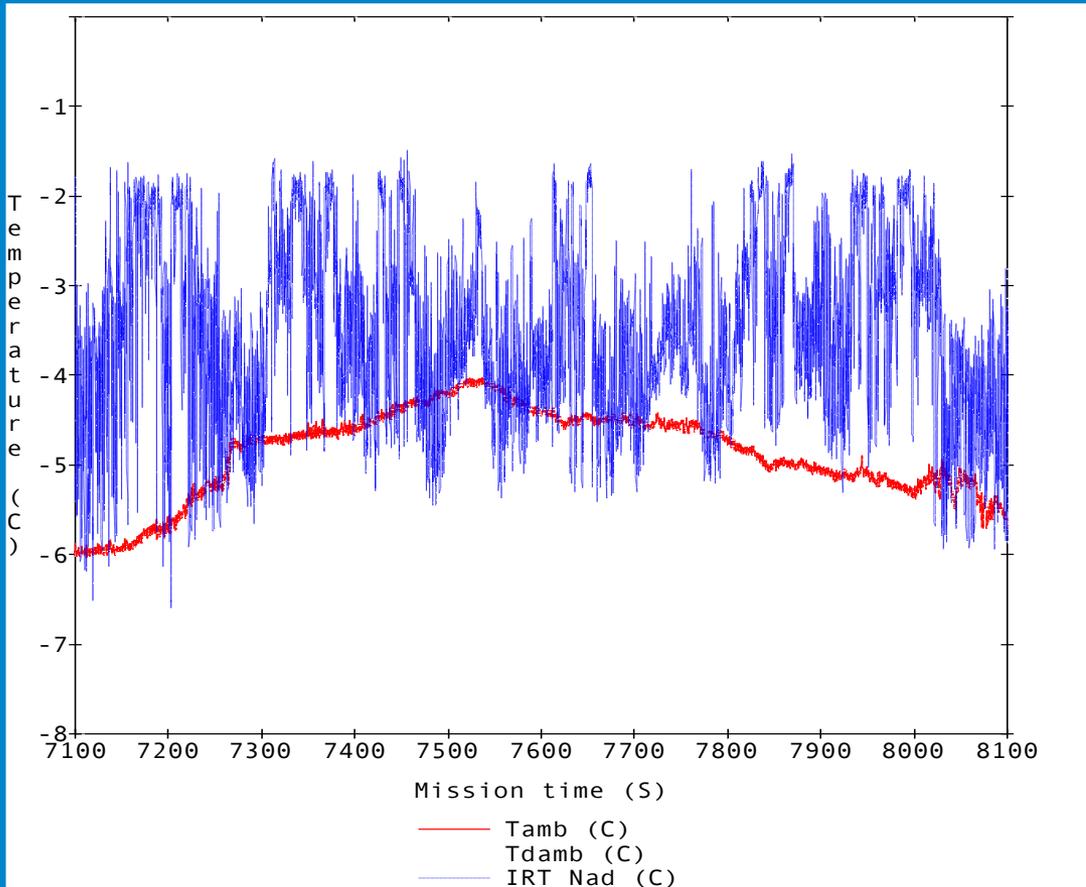
Ice edge



Ice edge



Ice Edge



Altitude: 100 ft
Over broken ice.



FIN