



Measuring Ice properties with:

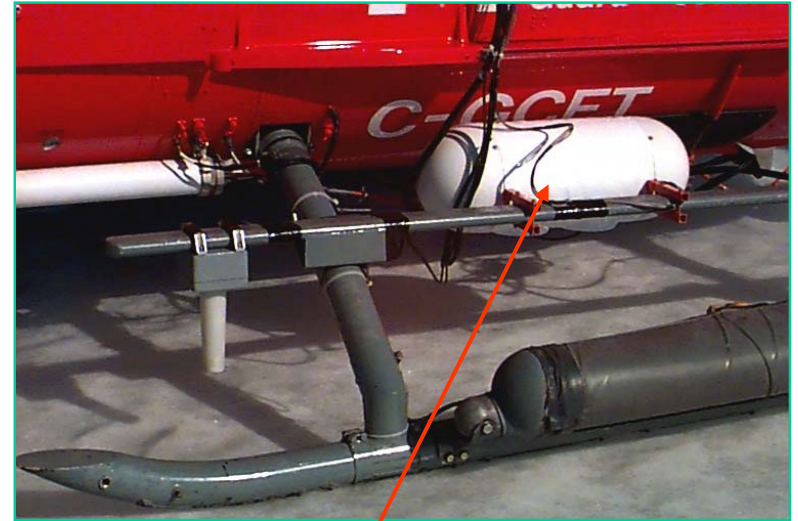
- fixed-mounted helicopter sensors**
- satellite-tracked ice beacons**

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Helicopter-borne instrumentation

*Helicopter-borne Electromagnetic
(HEM) and Laser System:*
Ice thickness and ice roughness



Video/Laser System:

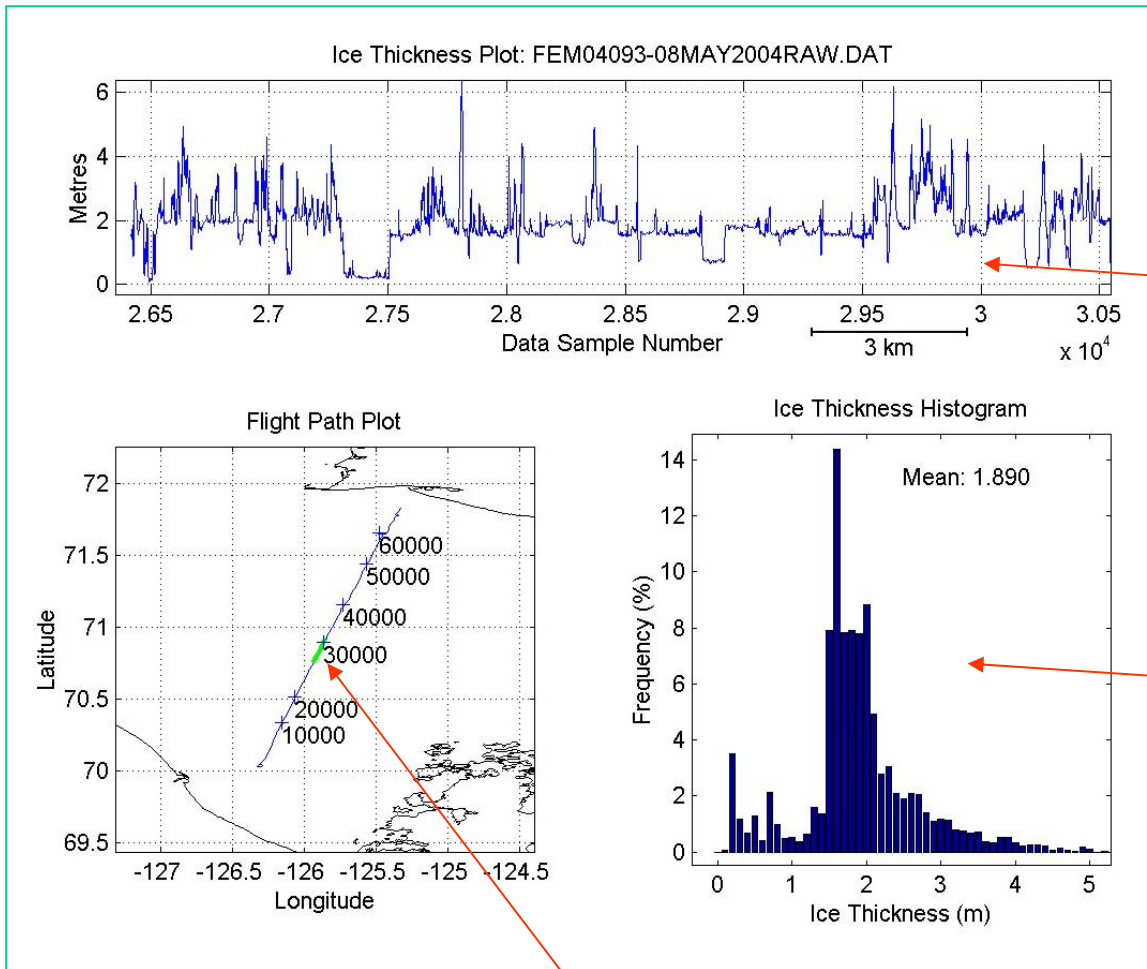
Ice concentration

Ice type

Ice roughness

___Ridge/lead distributions

Ice-plus-snow thickness from mobile ice section



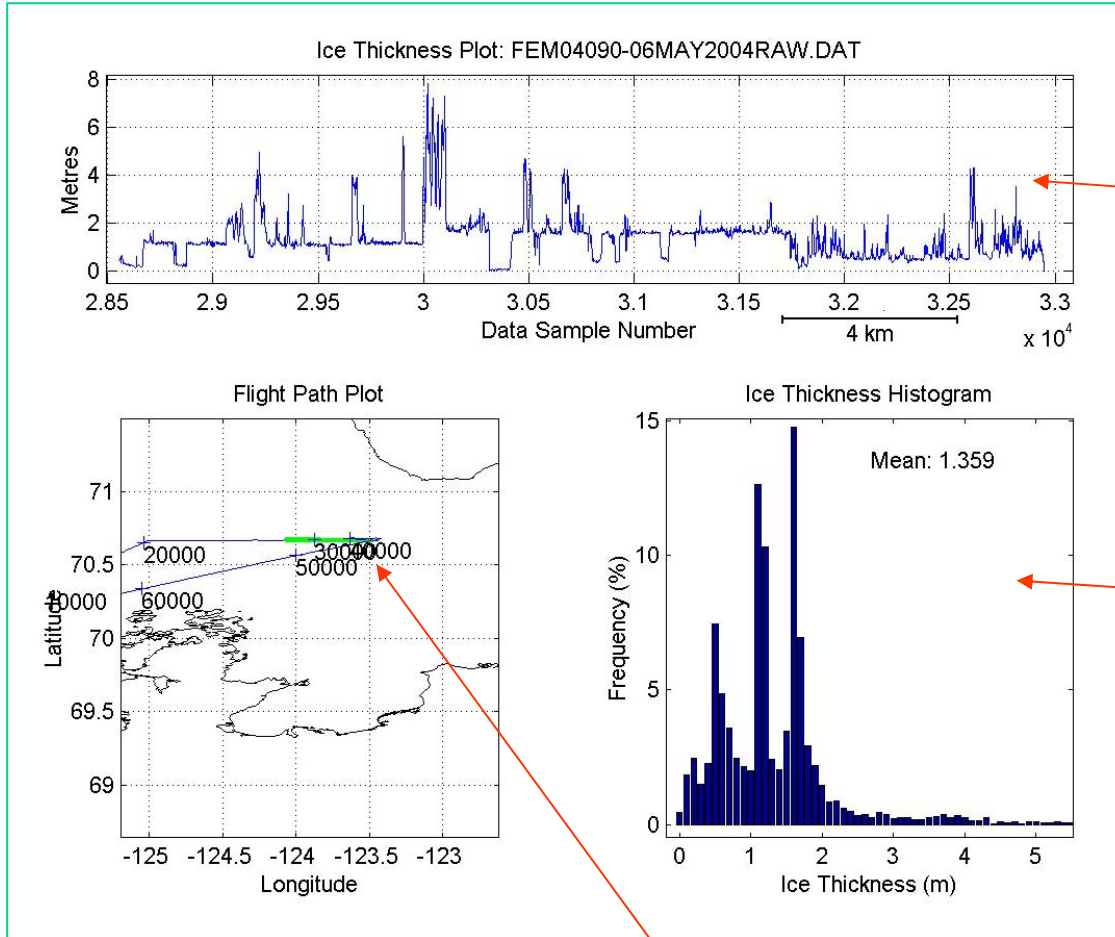
Location of line section (green)

CASES

Ice thickness data of 18km line section from mobile pack ice (May 8, 2004)

Thickness histogram of line section data shows several thinner refrozen leads (not seen in land-fast ice)

Ice-plus-snow thickness from mobile ice section

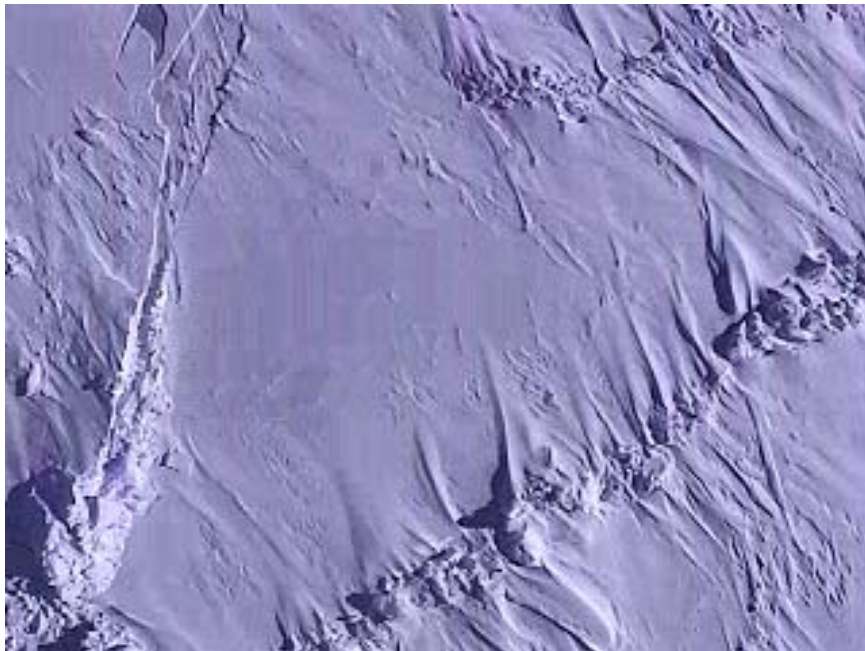


Location of line section (green)

CASES

Ice thickness data of 23km line section from mobile pack ice (May 6, 2004) east of Cape Parry

Thickness histogram of line section data shows three distinct ice types (all thinner than the land-fast)

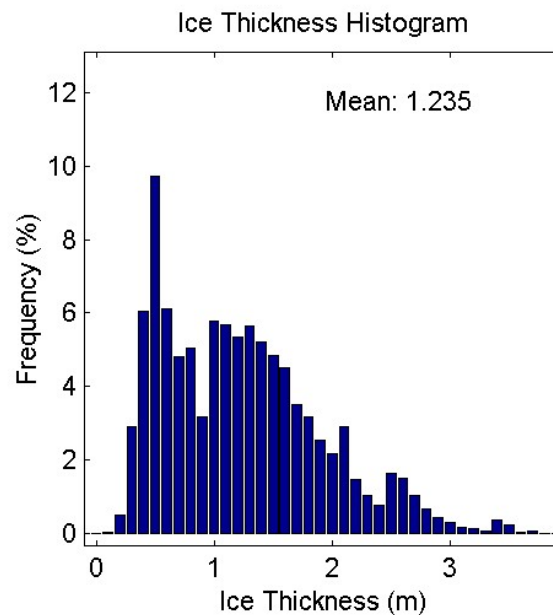
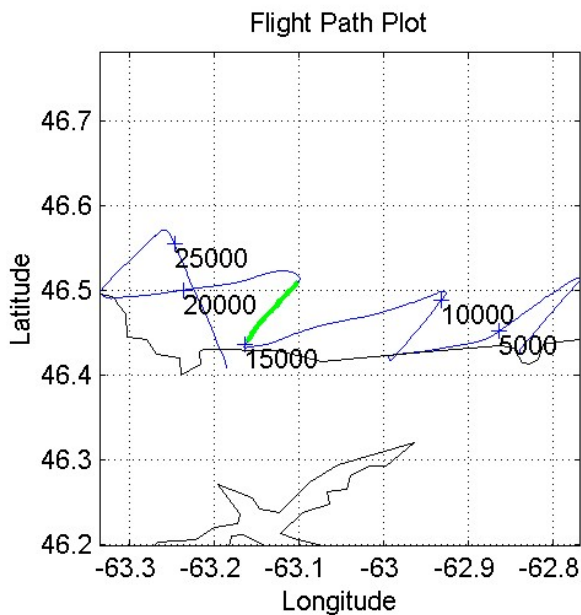
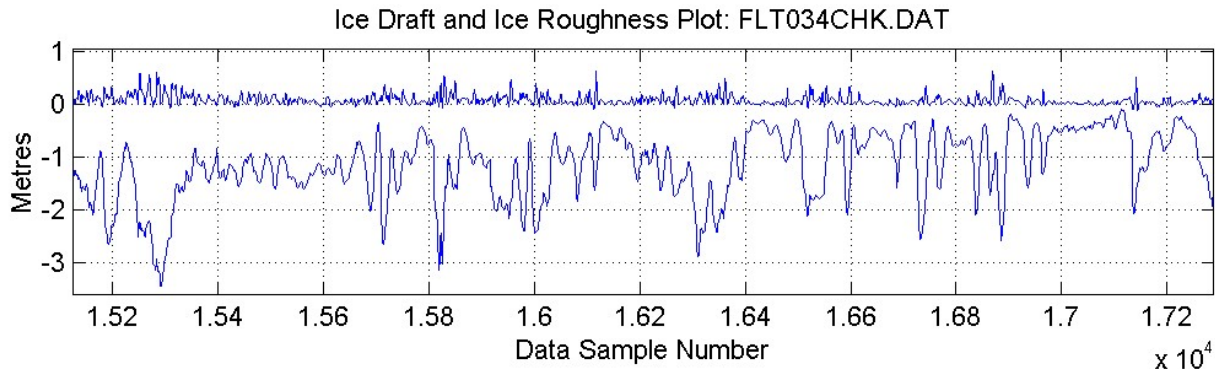


CASES

Video frames
(~100m wide) of
rough old ice in
mobile pack ice

(May 8, 18:00)

Ridges up to 19m
observed by EM-
laser sensor on
May 8 flight.

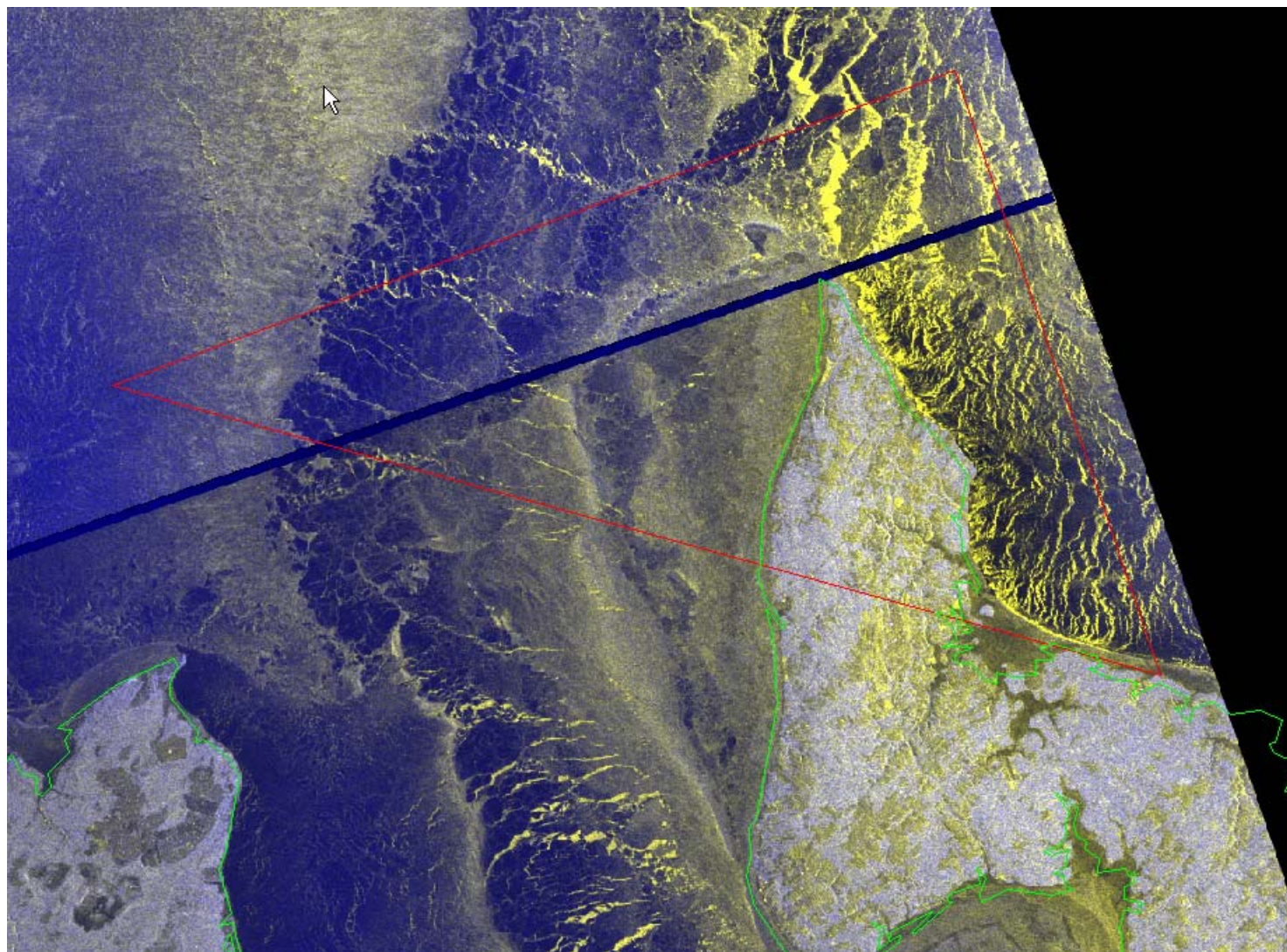


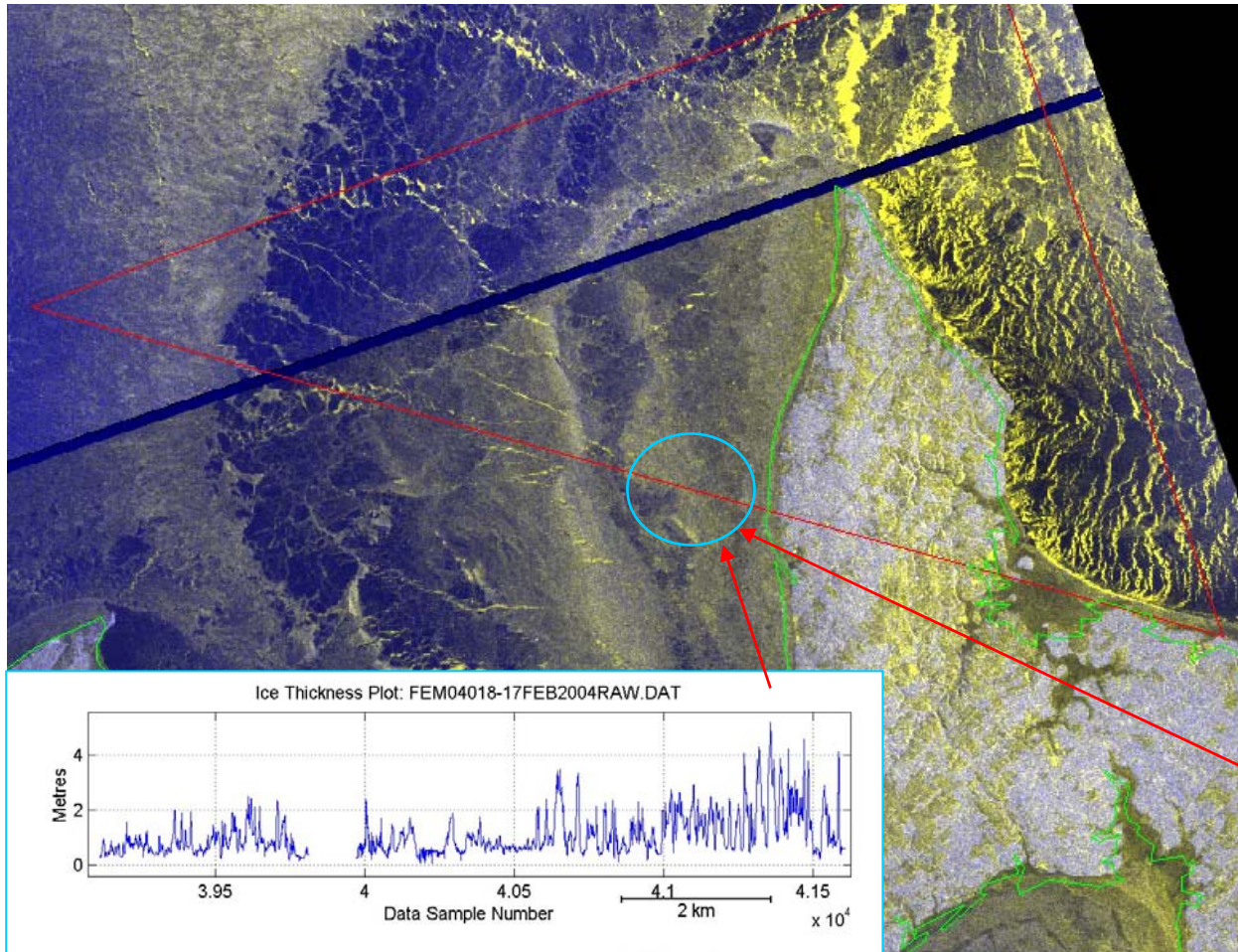
Line section data collected on March 8, 2001 with towed sensor "Ice Probe"



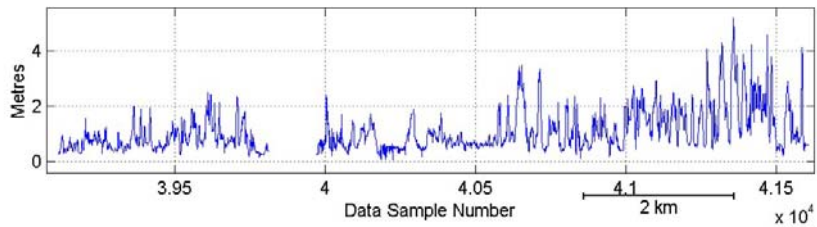
**Fisheries and Oceans
Canada
Bedford Institute of Oceanography**

**Pêches et Océans
Canada**

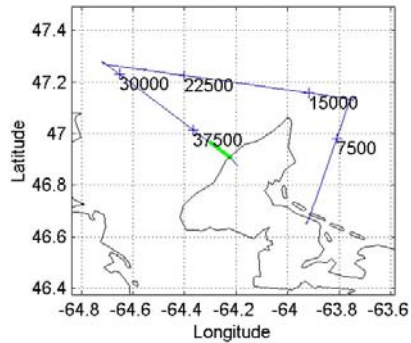




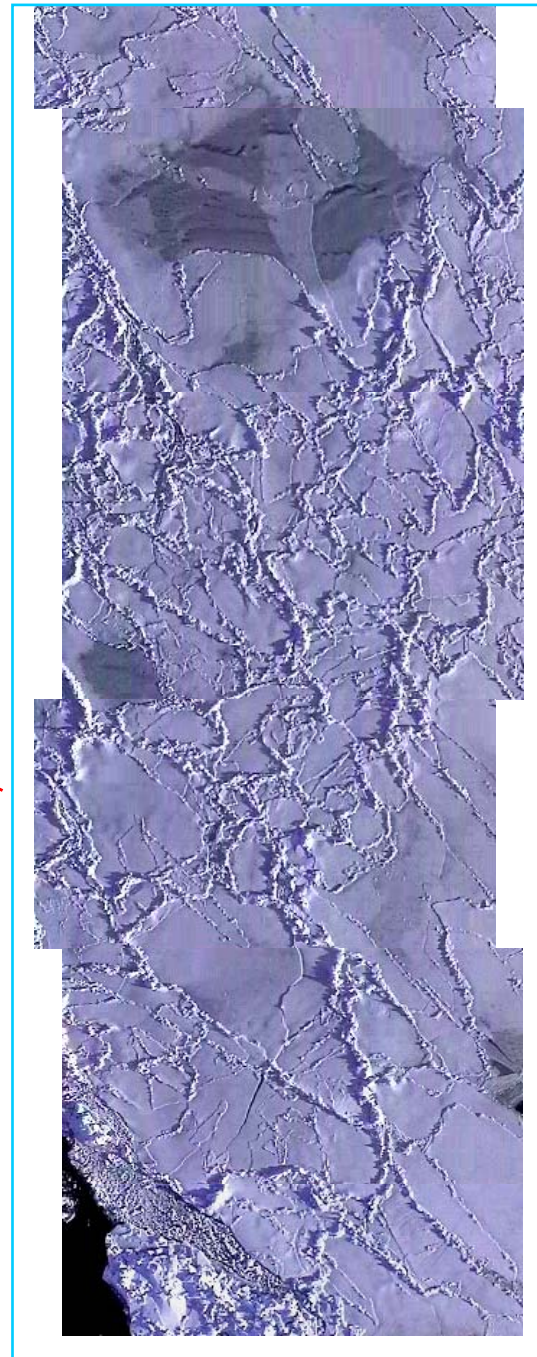
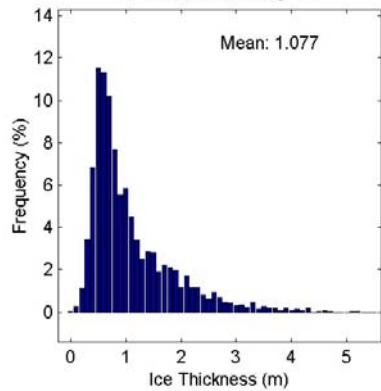
Ice Thickness Plot: FEM04018-17FEB2004RAW.DAT

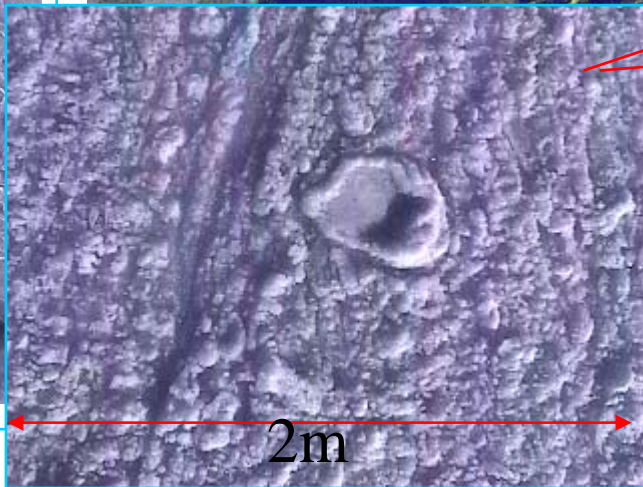
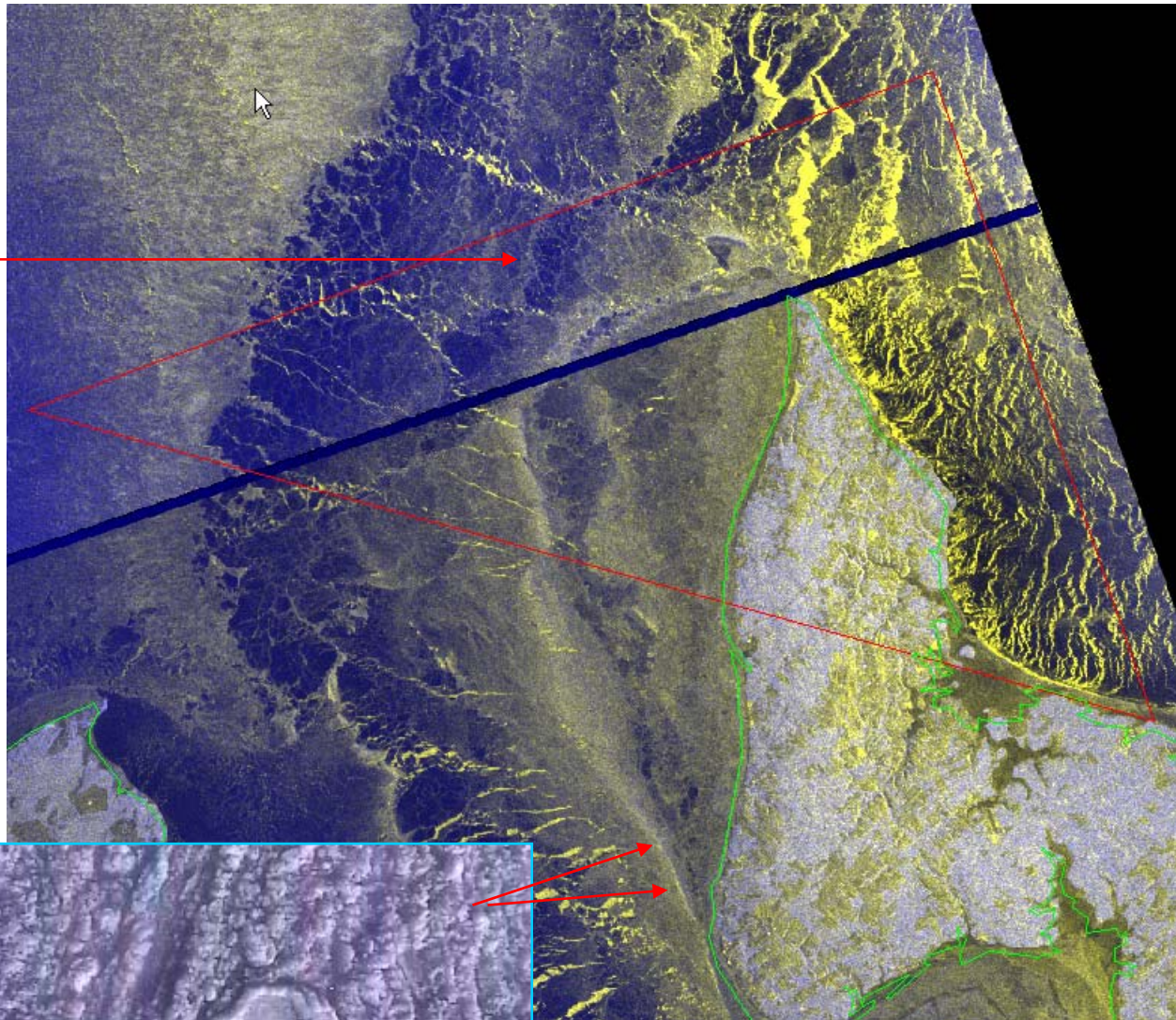
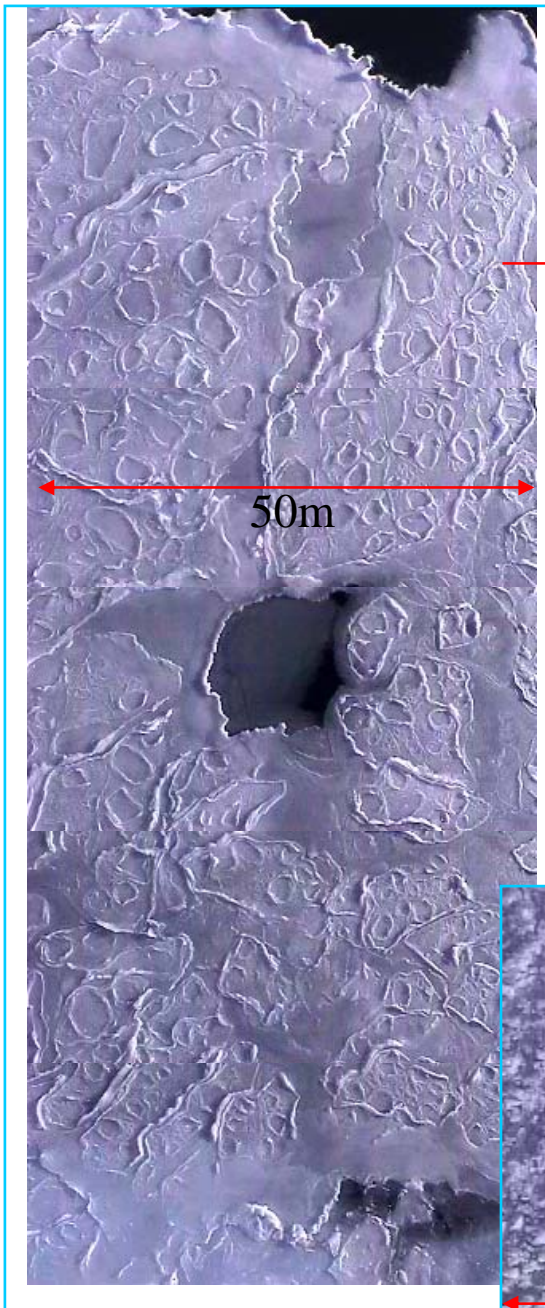


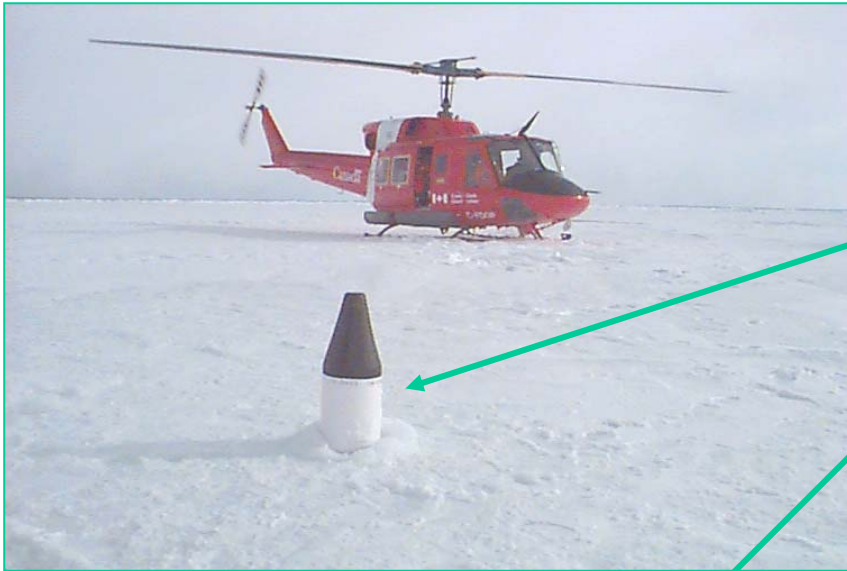
Flight Path Plot



Ice Thickness Histogram







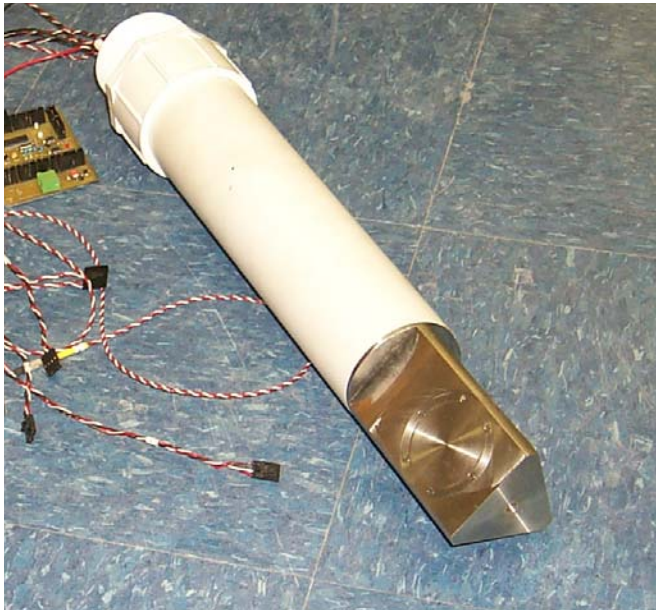
Satellite-tracked ice beacons

- *GPS location*
- *Ice growth*
- *Ice pressure*
 - *Ice temperature profile*
 - *Wind profiles*





Pressure beacon





Tekscan sensor

Flexiforce Pressure Sensors



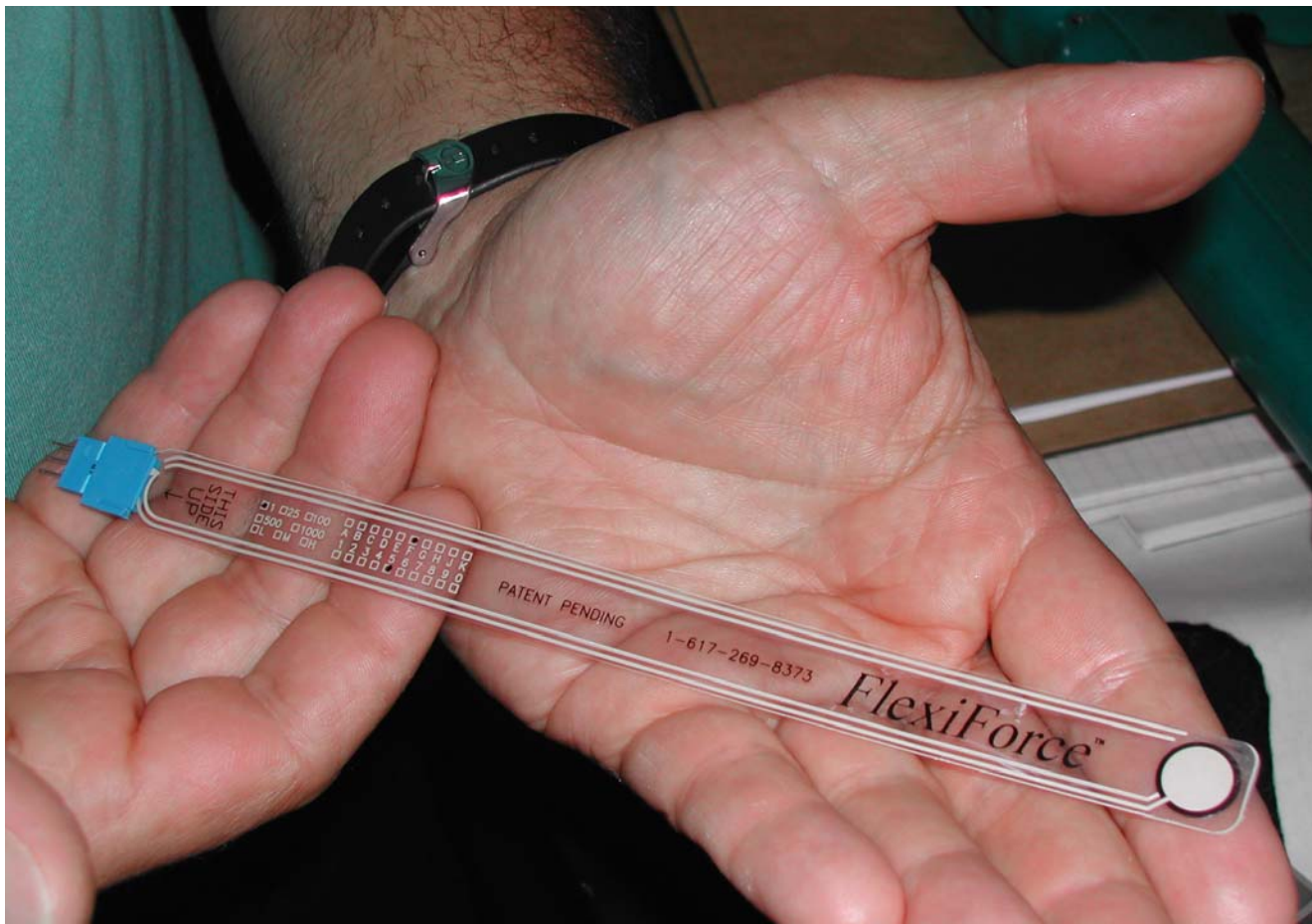
These sensors are ideal for measuring forces without disturbing the dynamics of a test. They can be used to measure both static and dynamic forces. They are thin enough to enable non-intrusive measurement. The resistance of the sensor decreases as force is applied.

[Click here for more information.](#)

<u>Item No.</u>	<u>Description</u>	<u>Price</u>
PS-01	Flexiforce Pressure Sensor: 0 - 1 lb. force	\$24.95
PS-02	Flexiforce Pressure Sensor: 0 - 25 lb. force	\$24.95
PS-03	Flexiforce Pressure Sensor: 0 - 100 lb. force	\$24.95
PS-04	Flexiforce Pressure Sensor: 0 - 500 lb. force	\$24.95
PS-05	Flexiforce Pressure Sensor: 0 - 1000 lb. force	\$24.95

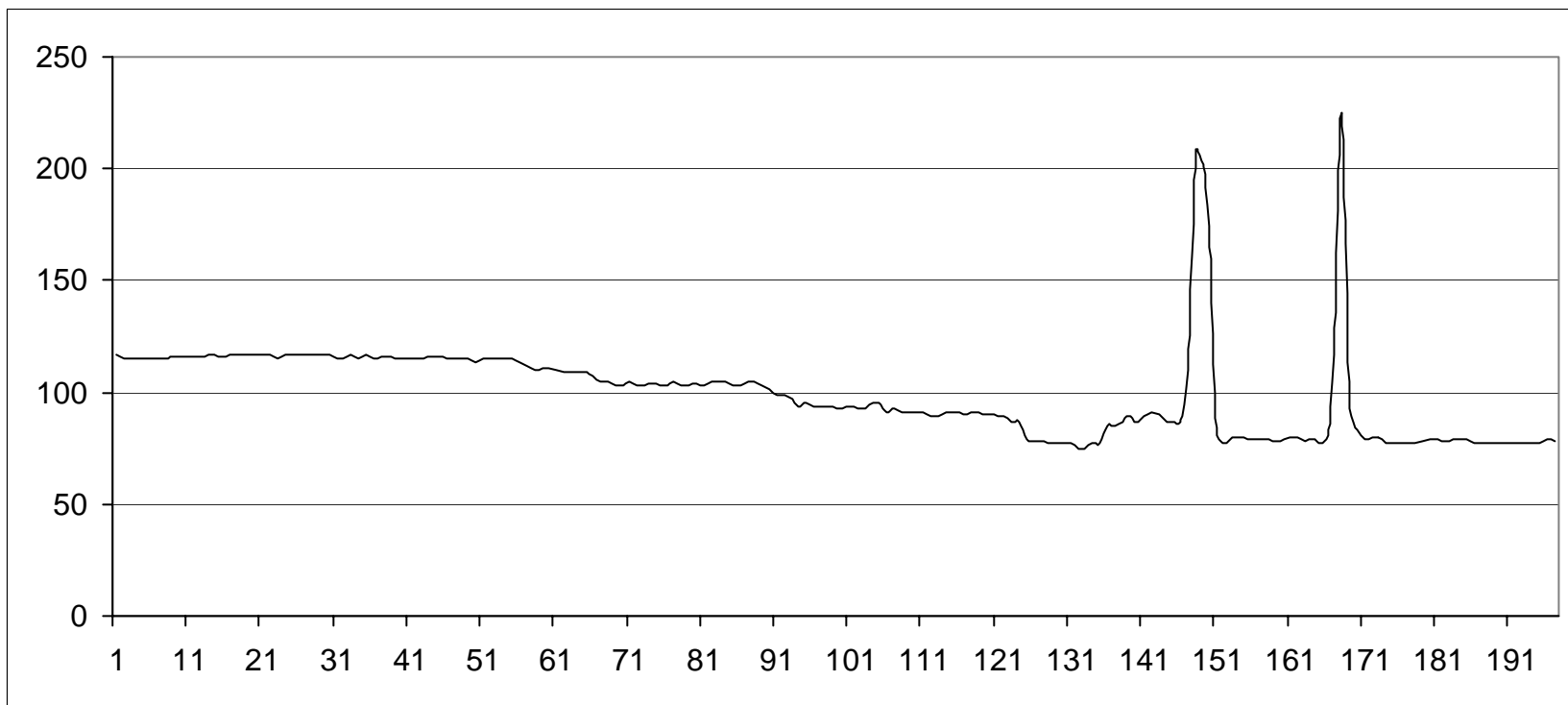


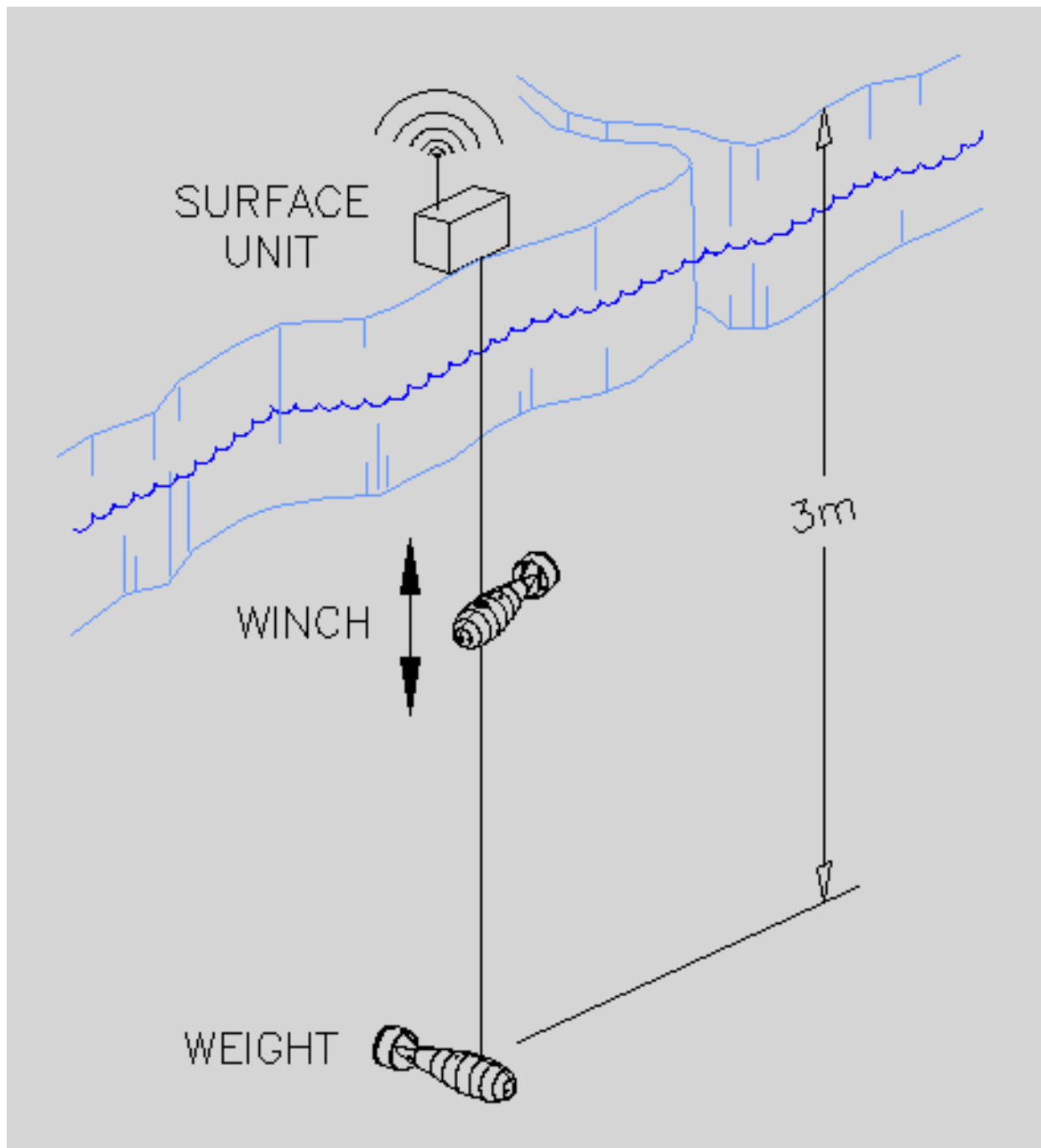
Pressure sensor used for preliminary tests

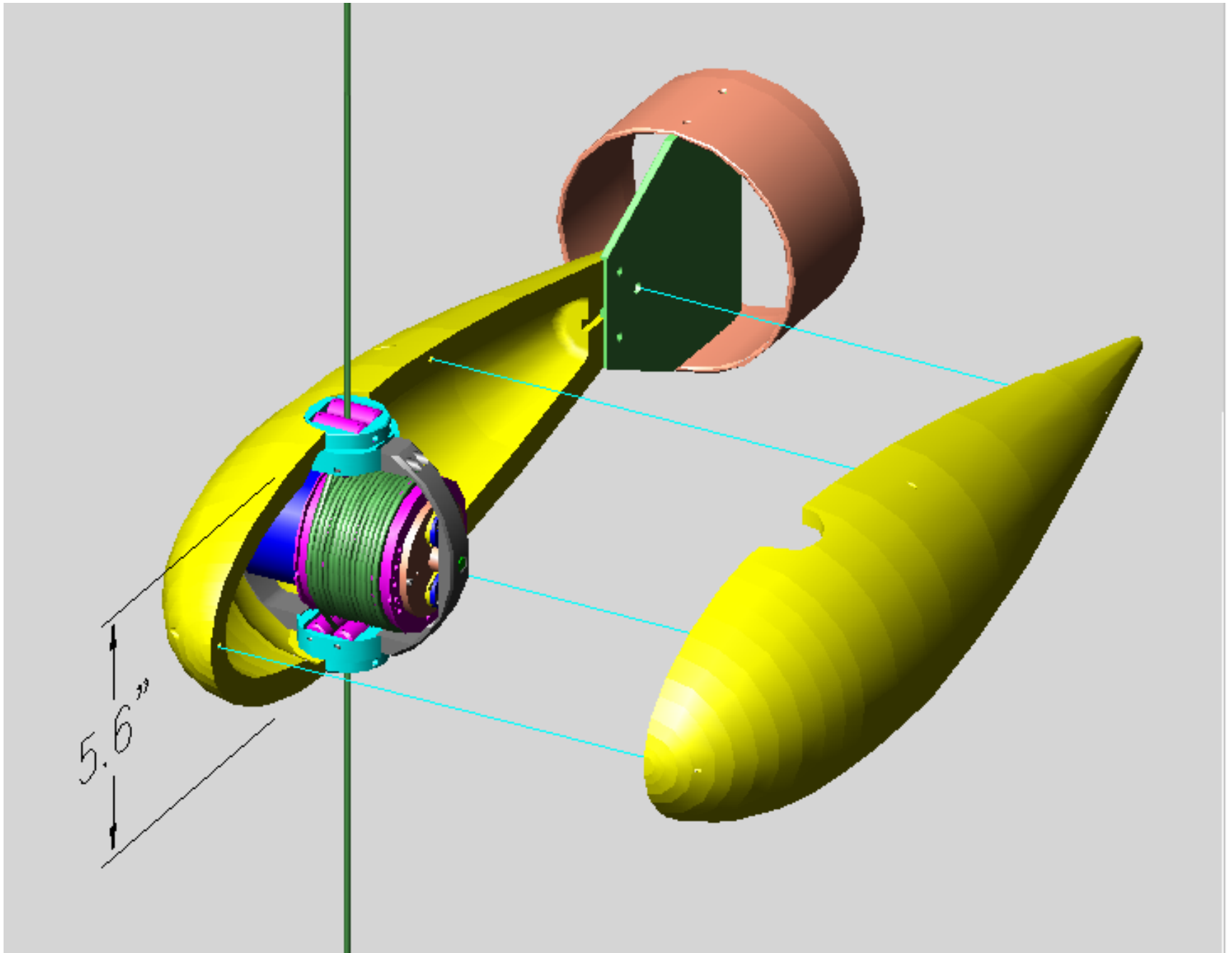




Test #2 - Sensor frozen in a plastic bag and pressure put on by C-clamp







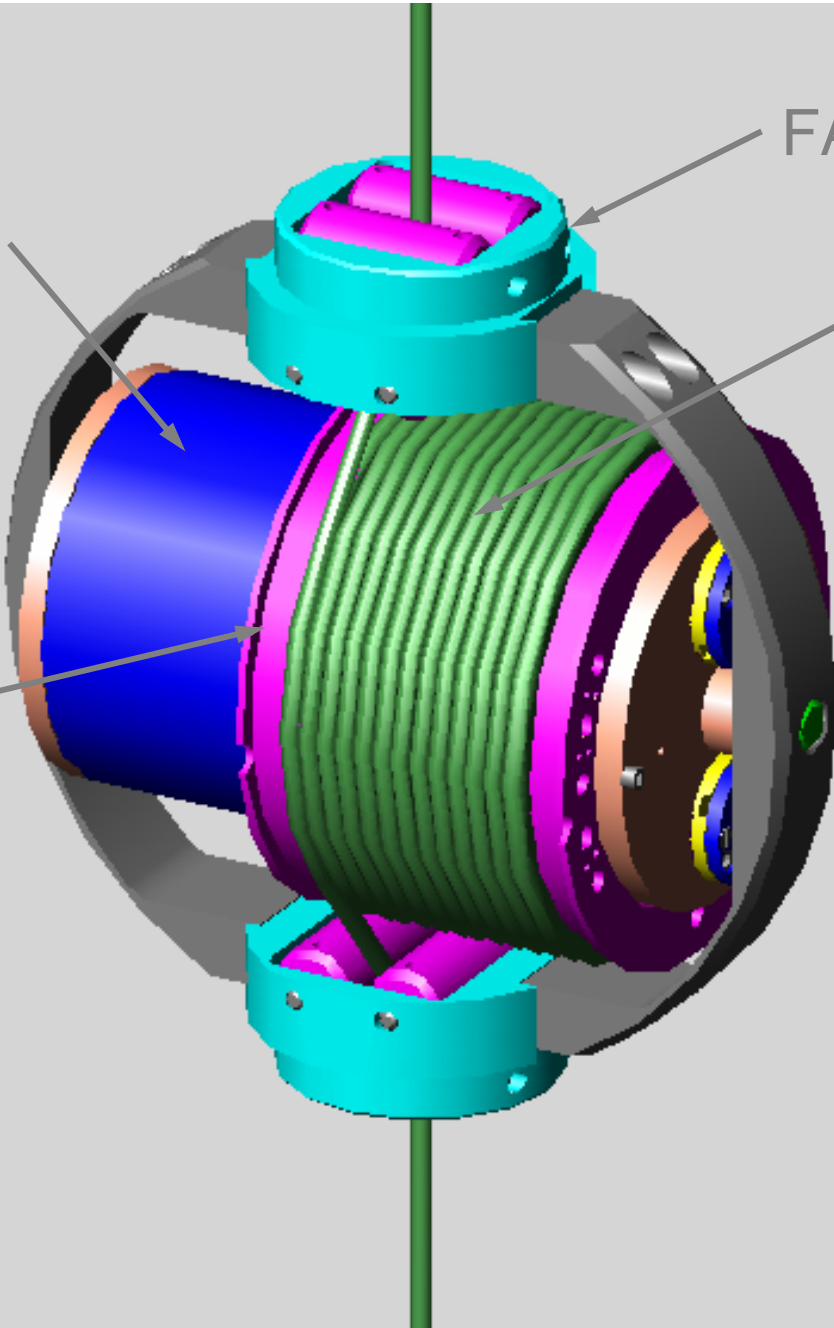
5.6"

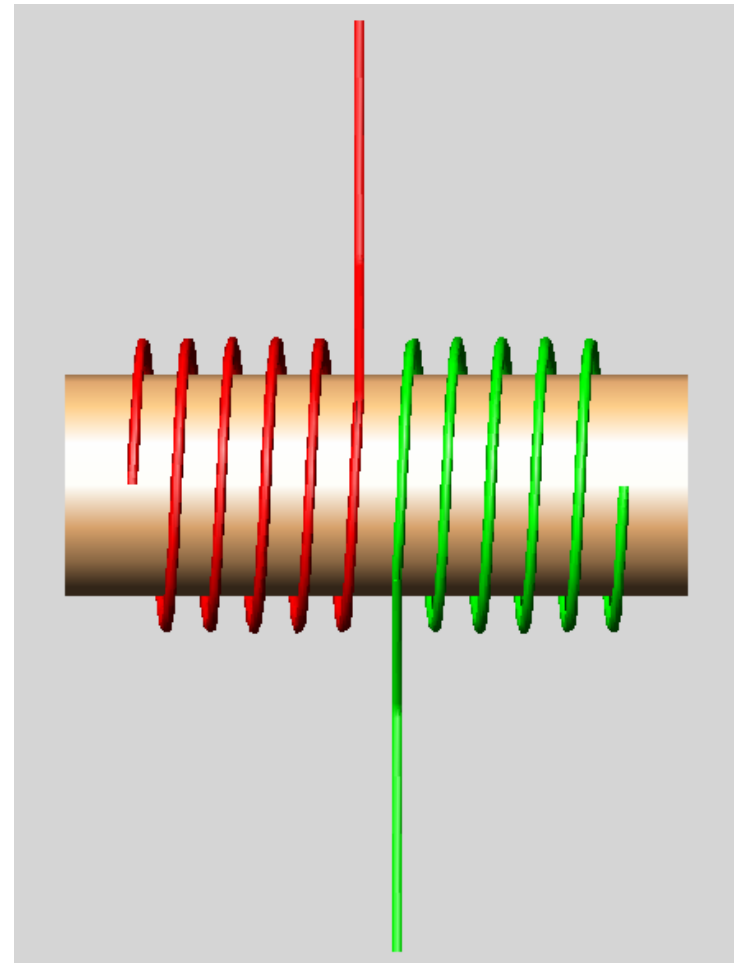
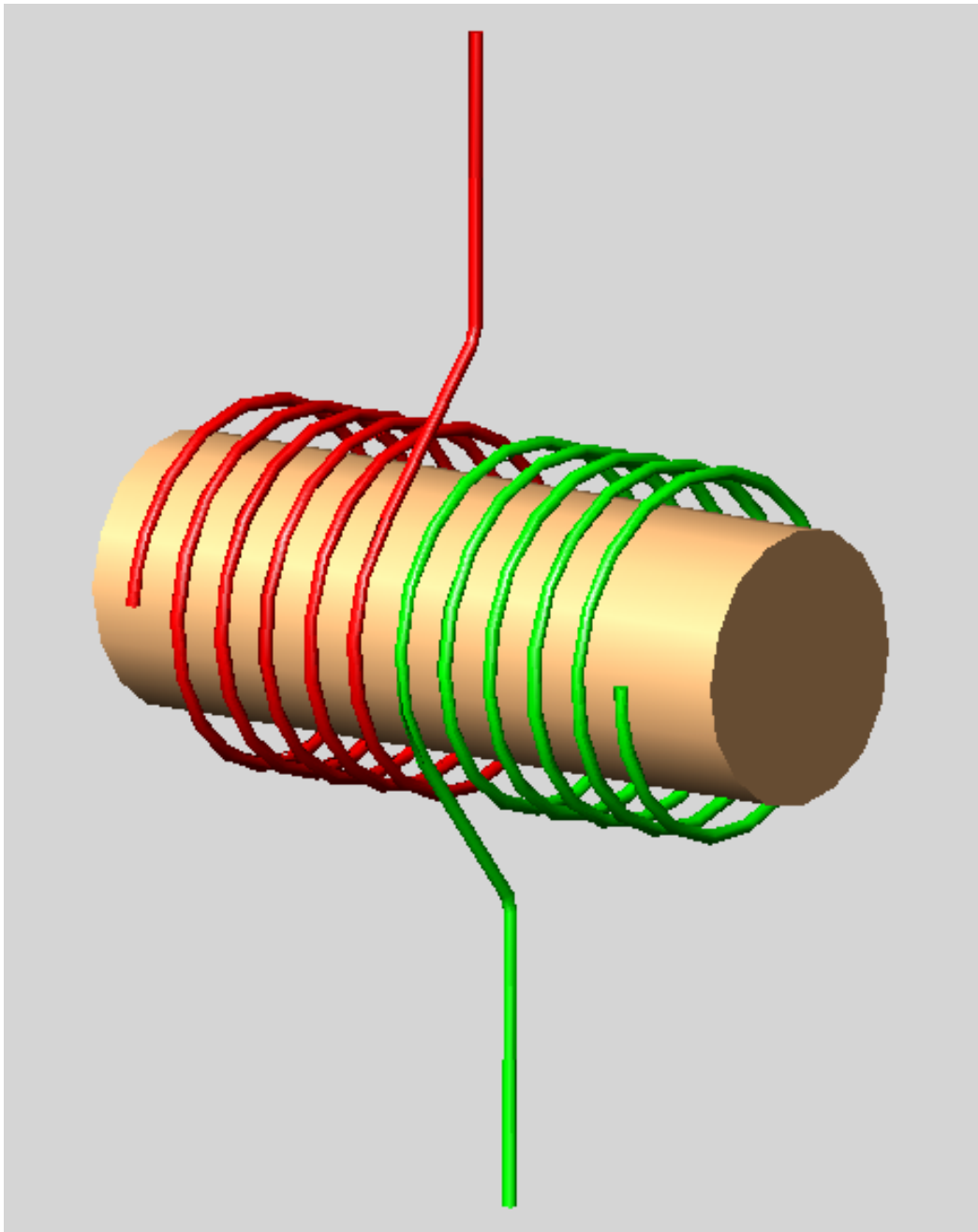
PRESSURE
CASE

DRUM

FAIRLEAD

CABLE







2nd Ice growth Beacon

- **Different response to an electromagnetic signal down a cable in through the ice and into the water.**
- **require a sensitive receiver with high speed clock.**
- **response depends on ice properties (salinity)**

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