

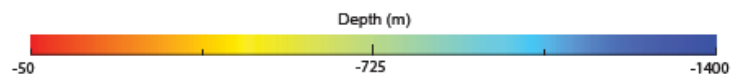
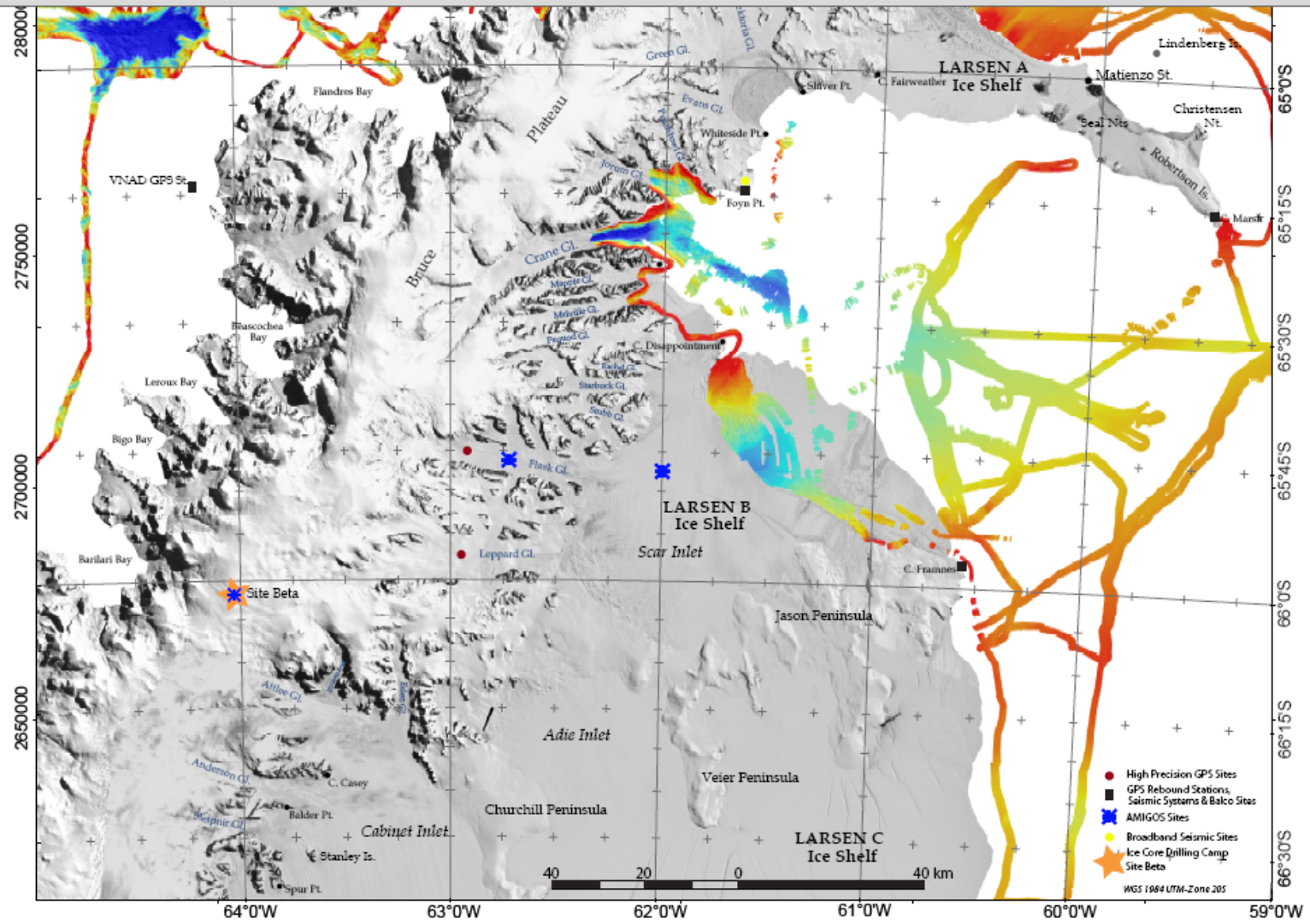
National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976

Automated Met-Ice-Geo Observation Systems (AMIGOS) Deployed to Larsen B Region Feb 2010 using Iridium SBD, Dial-in and Dial-out Communications

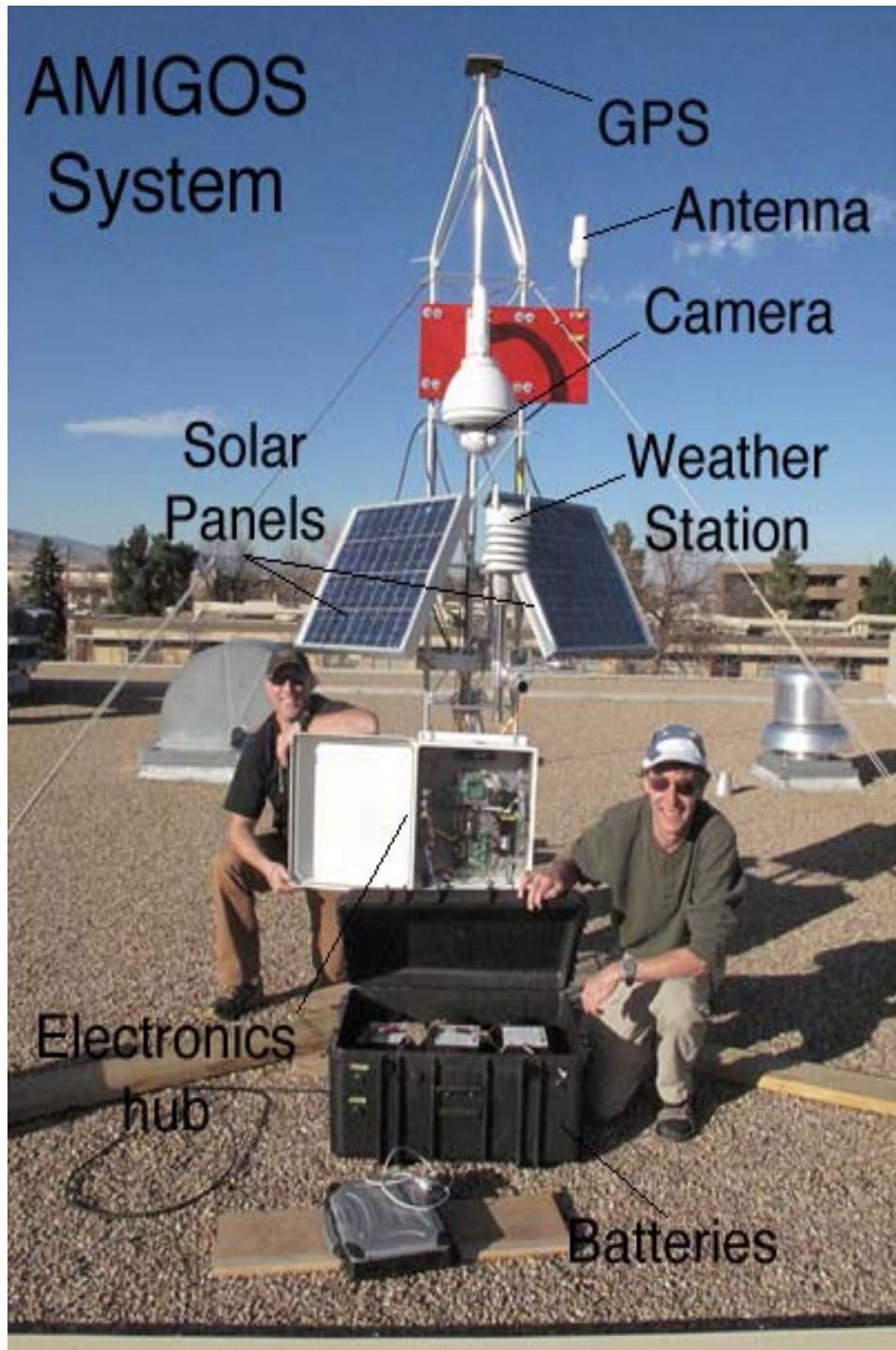
Terry Haran & Ted Scambos: <http://nsidc.org>

Ronald Ross: <http://thistle.org>





- High Precision GPS Sites
 - GPS Rebound Stations, Seismic Systems & Balco Sites
 - ★ AMIGOS Sites
 - ★ Broadband Seismic Sites
 - ★ Ice Core Drilling Camp Site Beta
- WGS 1984 UTM-Zone 20S



Control:
Triton ETN-LP Linux computer
Campbell CR-1000 data logger
INS Spider 5TX-EEC ethernet hub

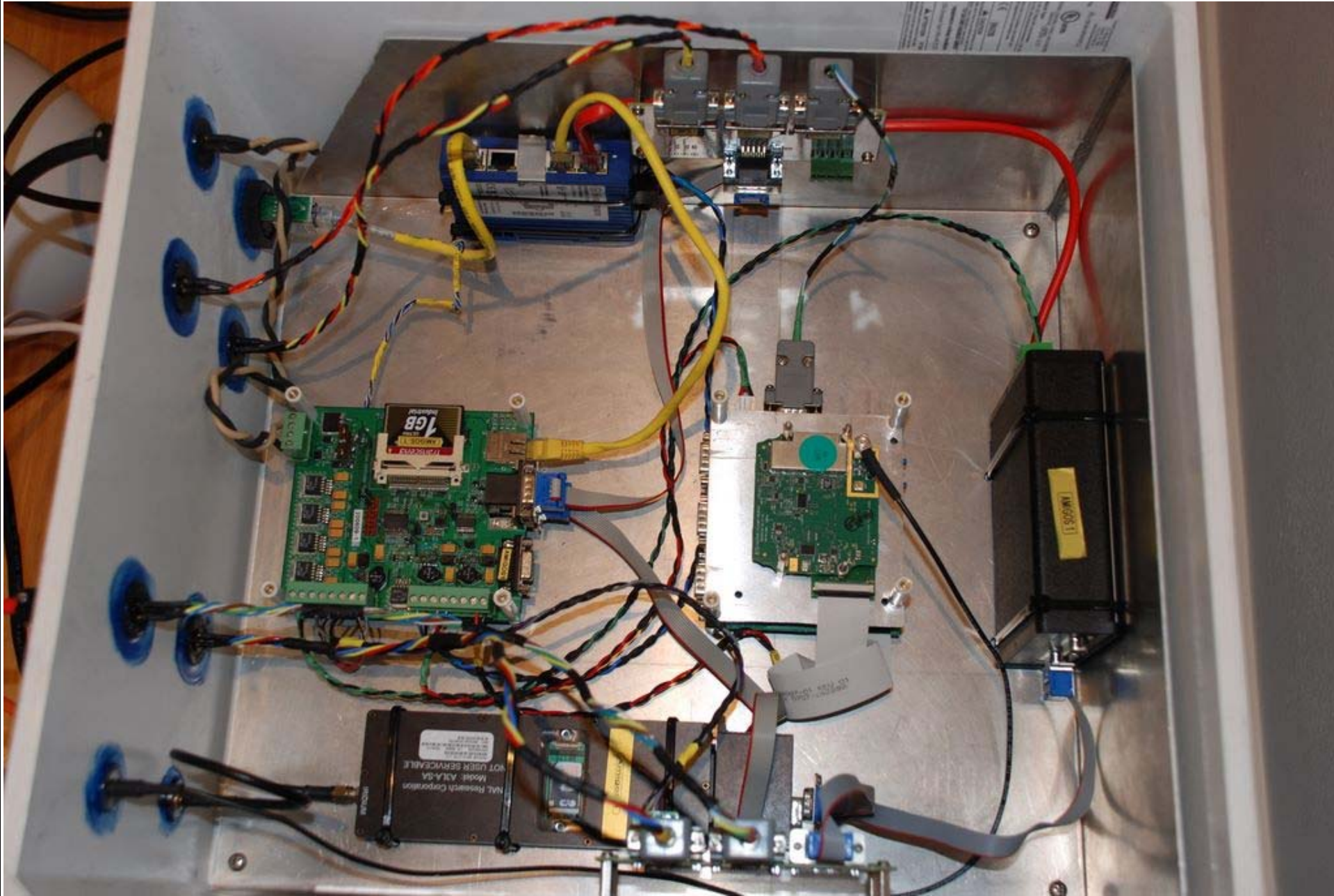
Communications:
NAL A3LA-SA Iridium modem
DCB IP6600 router

Scar and Flask Sensors:
Vaisala WXT510 weather sensor
Apogee SP-212 pyranometers (2)
Sony PTZ color camera*
Topcon GRS-1 precision GPS*
Platinum thermistors (4)*

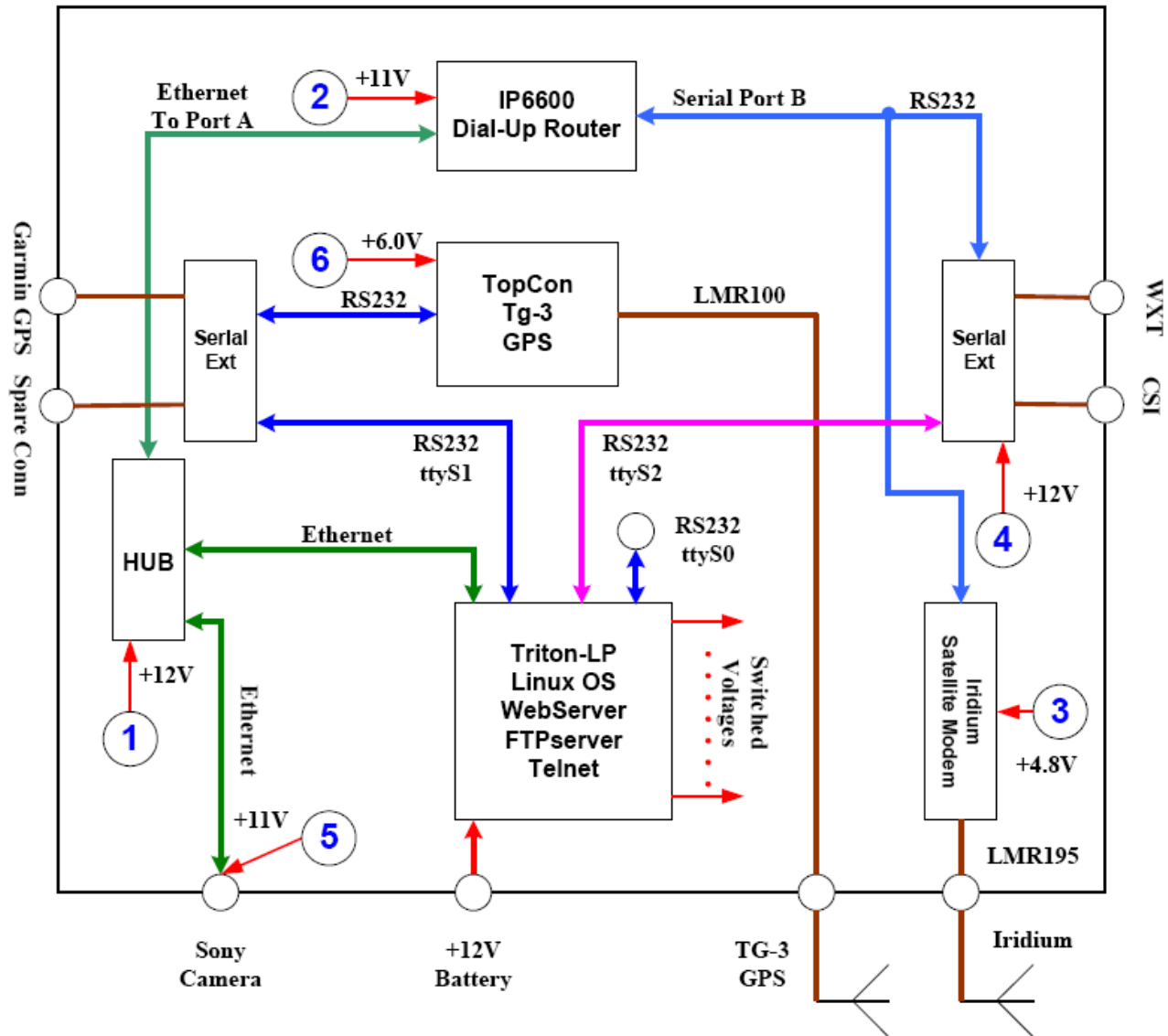
Site Beta Sensors:
Vaisala WXT510 weather sensor
Apogee SP-212 pyranometers (2)
Campbell SR50A Sonic ranging*
Garmin 17-HVS WAAS GPS*
Platinum thermistors (17)*

Scar and Flask Power:
Flexcharge 20NC12L12F charger
BP-340J 40 watt solar panels (3)
E31SLDGST Deka 12V batteries (4)*

Site Beta Power:
Flexcharge 20NC12L12F charger
BP-340J 40 watt solar panels (3)
E31SLDGST Deka 12V batteries (3)*



Shelter box wiring diagram



Iridium ASCII Single Burst Data (SBD)

Each ASCII SBD message is limited to 120 bytes and is sent to 2 email addresses.

Scar (amigos2) and Flask (amigos3):
Topcon GPS (GRS & ALT) hourly
Vaisala weather (WXT) hourly
Campbell firn temperature (CSI) hourly

```
amigos2 GRS 032510 024001 $GNRMC,024153.00,A,6547.72229320,S,06159.9817502,W,0.0181,190.462,250310,A*7F
amigos2 ALT 032510 024001 $GNGNS,024154.00,6547.72229257,S,06159.9817456,W,AA,170.64,44.5623,9.5175,*6D
amigos2 WXT 032510 024501 244.1.9 -18.7.81.0 975.7.13.1.248 2.1.1.1 -20.8.13.2 0.085 -15.7 0.000 0.000
amigos2 CSI 032510 025002 B 11.425 -9.959 934.7844 970.7236 974.0176 968.4227 E

amigos3 GRS 032510 024001 $GNRMC,024153.00,A,6546.4840283,S,06242.7626370,W,0.0147,330.149,250310,A*76
amigos3 ALT 032510 024001 $GNGNS,024154.00,6546.4840182,S,06242.7626376,W,AA,180.61,436.4875,9.1260,*5B
amigos3 WXT 032510 024502 318.1.3 -5.6.55.1 926.9.13.3.351 2.2.1.2 -8.4.13.3 0.098 -3.7 0.000 0.000
amigos3 CSI 032510 025002 B 11.494 -7.993 962.7997 978.1437 985.9234 985.3119 E
```

Site Beta (amigos5):
Garmin GPS (GPS) daily
Vaisala weather (WXT) hourly
Campbell firn temperature and snow surface range (CSI0, CSI1, CSI2) hourly

```
amigos5 GPS 032410 235501 $GPRMC,235651,A,6601.9436,S,06402.4542,W,000.0,000.0,240310,017.2,E*71
amigos5 WXT 032510 004501 0.0.0 -16.0 91.3 759.9 13.1 0.0 0.0 1.1 -16.4 13.2 0.008 -14.5 0.000 0.000
amigos5 CSI0 032510 005002 B 11.477 -12.623 954.0620 950.5318 939.7087 939.5476 939.7842 947.0802 945.8764
amigos5 CSI1 032510 005002 942.8342 943.6211 944.5876 944.2655 944.5025 944.7442 944.6503 944.0864 943.1196
amigos5 CSI2 032510 005002 941.5331 5.570 211.000 E
```

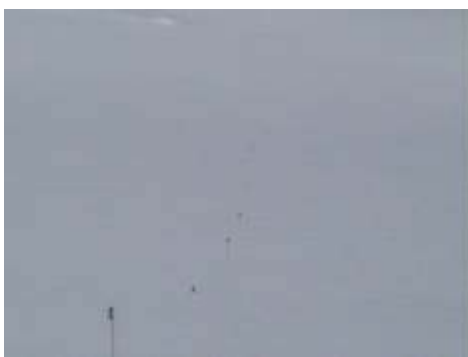
Iridium Dial-out

AMIGOS Iridium phones Earthlink dial-up account using Hawaii number to establish an internet connection.

FTP of individual binary files to NSIDC sidads server:

- 6 Sony image JPEG thumbnails (320x240) 2kb-7kb each 2 times daily
- 1 Topcon precision GPS gzipped TPS file 26kb-35kb each 4 times daily

Example: Flask amigos3 03/24/2010 14:09 UTC images



Iridium Dial-in

NSIDC Iridium connected to Windows XP laptop phones an AMIGOS Iridium to establish a network connection.

Windows Command Prompt then used to establish:

a telnet session to the Linux bash shell on the AMIGOS to change the crontab schedule, execute programs, or manipulate data;

or an ftp session to the AMIGOS to perform file transfers.

Firefox browser can also be used to change the dial-out/dial-in schedule.

Skeduler A2

Wed Mar 24 17:14:13 UTC 2010

Submit

Time	Dial-out Days/Times			Dial-in Days/Times		
Preset 1	9	: 11	: 05 Day:Hr:Min On	8	: 13	: 05 Day:Hr:Min On
		11	: 20 Day:Hr:Min Off		13	: 20 Day:Hr:Min Off
Preset 2	8	: 14	: 05 Day:Hr:Min On	8	: 15	: 05 Day:Hr:Min On
		14	: 20 Day:Hr:Min Off		15	: 15 Day:Hr:Min Off
Preset 3	9	: 16	: 05 Day:Hr:Min On	8	: 17	: 05 Day:Hr:Min On
		16	: 20 Day:Hr:Min Off		17	: 15 Day:Hr:Min Off
Preset 4	8	: 19	: 05 Day:Hr:Min On	8	: 20	: 05 Day:Hr:Min On
		19	: 20 Day:Hr:Min Off		20	: 15 Day:Hr:Min Off

Volts = Amps = Temp C =

Solar_snow W = 0.387 Solar_sky W = 0.454 Up 30 + 23:11

RR check for 0 to 23 hours and 0 to 59 minutes
0=Sunday 8=Every 9=Never

AMIGOS Links:

<http://iceshelf.wordpress.com/>
<http://picasaweb.google.com/pettit.on.ice/LarissaProject#/>
<http://thistle.org/>

Special thanks to Erin Pettit, Martin Truffer, and Rob Bauer

THANK YOU!!