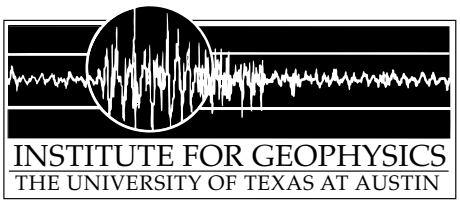
SOAR

Support Office for Aerogeophysical Research
University of Texas Institute for Geophysics

Notes to Accompany
VTZ1
Data Distribution
2000/2001 Field Season

Version 1.0
June 1, 2001



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GAN Notes

Laser - General Information

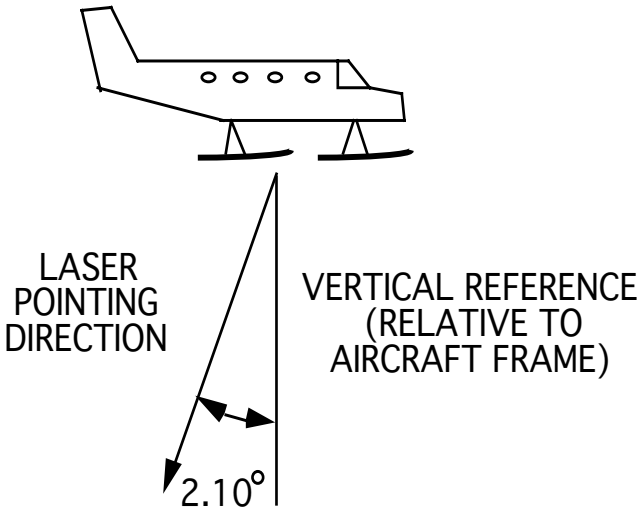
1. **System Information**
   Console - Azimuth PRAM IV Laser Profiler (s/n 126, sys. 1)
   Transceiver - Azimuth Model LRY-500 Laser Transceiver (s/n 128, sys. 1)
   Power Supply - Amoco Model ALCRDZ-Q Laser Power Supply (s/n PPA0767, sys. 1)

2. **Settings**
   Pulse Rate = 1000Hz
   Group Size = 64
   Stop Pulse = First

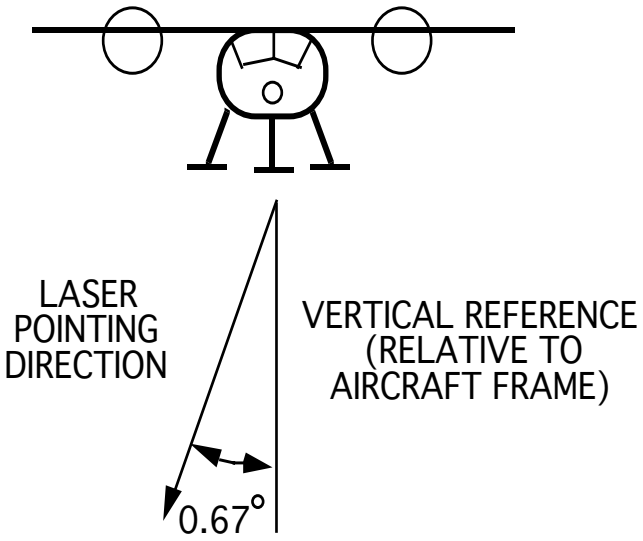
3. **Calibration Data**
   For VTZ1, the skiways were used for a reflector for laser calibration. GPS data for the skiways were obtained using a sled-mounted GPS platform, designated SKD10 both at NGD and VOS. The skiway at Willy Field was surveyed by snowmobile and multiple passes of the aircraft during TF06. The Vostok skiway was surveyed by snowmobile during F15 and F46 and by aircraft during F40.

Laser Pointing Angles

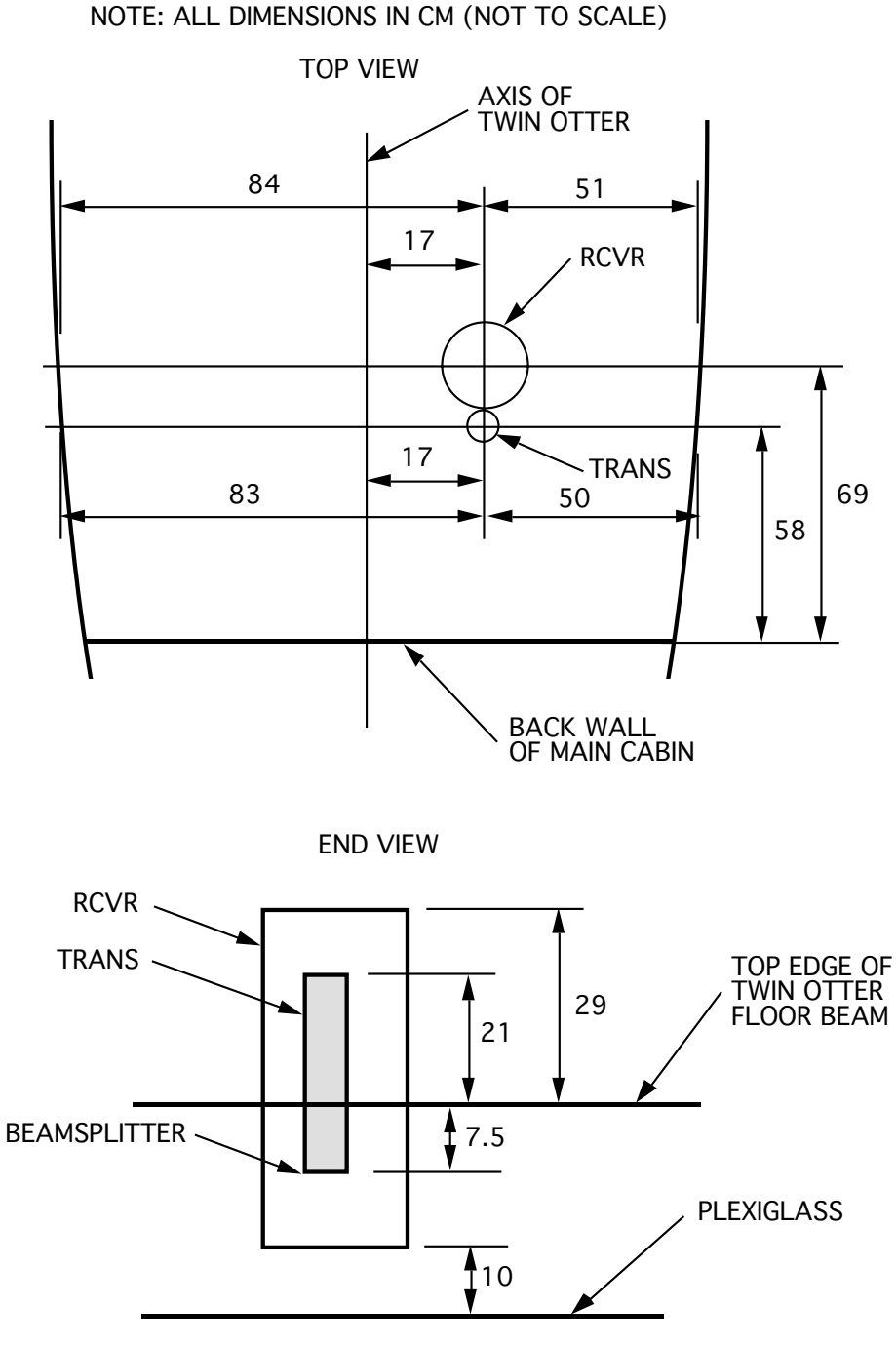
1. Fore - Aft Angle



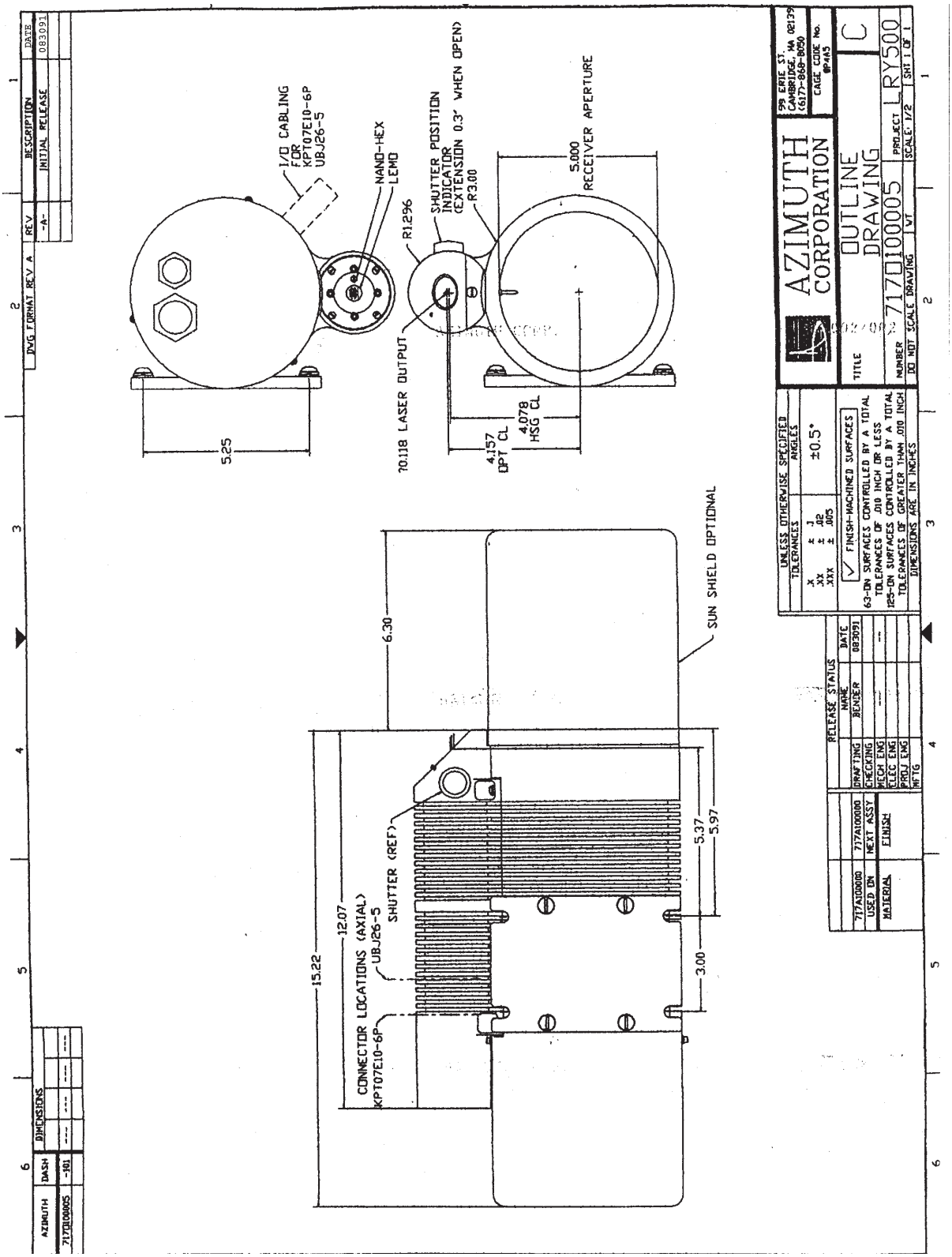
2. Roll Angle



Laser Mounting Position within SJB



Laser Transceiver Factory Drawing



INS Mounting Angles

The INS (Inertial Navigation System) mounting angles are referenced to the Twin Otter frame. Two ground tests were performed comparing stationary INS pitch and roll angles with measurements made manually (with a digital level) on the Twin Otter frame near the LASER mounting apparatus.

A. Pitch Angle

(pitch angle > 0 implies nose up, pitch angle < 0 implies nose down)

	Meas. 1	Meas. 2
INS Pitch Angle =	- 1.16 deg.	- 0.78 deg.
Measured Pitch Angle =	- 0.71 deg.	- 0.36 deg.
Difference =	- 0.45 deg.	- 0.42 deg

Conclusion: The INS outputs pitch values about 0.44 degrees more nose down than the Twin Otter frame.

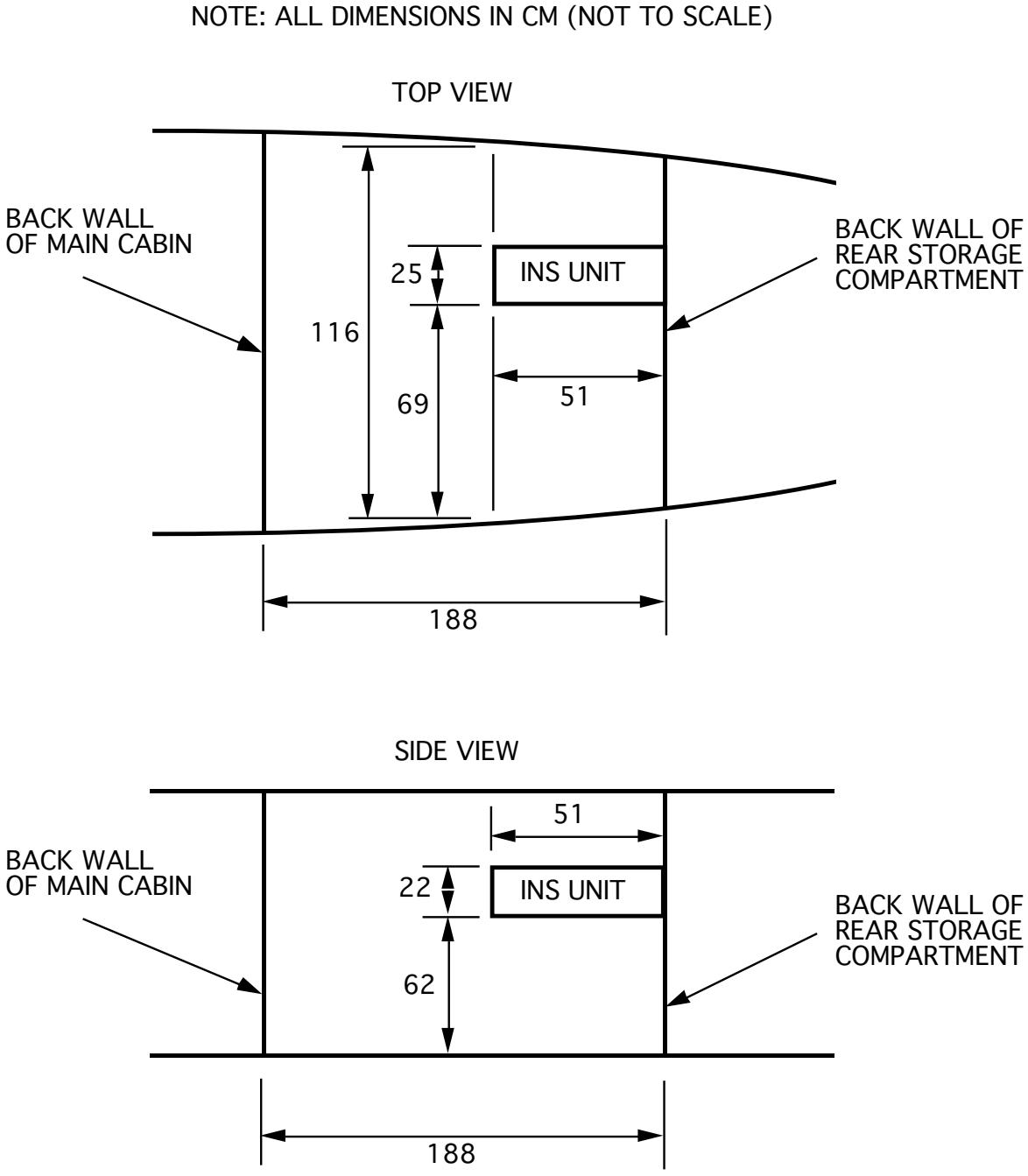
B. Roll Angle

(roll angle > 0 implies right down, roll angle < 0 implies left down)

	Meas. 1	Meas. 2
INS Roll Angle =	+ 0.31 deg.	+ 0.69 deg.
Measured Roll Angle =	+ 0.26 deg.	+ 0.74 deg.
Difference =	+ 0.05 deg.	- 0.05 deg

Conclusion: The INS outputs roll values about 0.0 degrees more right down than the Twin Otter frame.

INS Mounting Position within SJB



Radar - General Information

1. Antenna Cable Length

The length of both antenna cables was measured to be 25.144 feet.
Wave propagation speed in the cables is 0.88c, where c is the speed of light in a vacuum.

2. System Power Measurements

Pulse Generator set to: 250ns pulse width
80ms pulse rate

4 Nov, 2000, PMX 3, PPA 3, HPPA 3A & 3B: peak power 8321W ; 3847W e. @ ports A & B
26 Dec, 2000, PMX 3, PPA 3, HPPA 3A & 3B: peak power 8321W
1 Jan, 2001: PMX 4, PPA 3, HPPA 4A & 4B: peak power 7049W
6 Jan, 2001: PMX 4, PPA 4, HPPA 4A & 4B: peak power 6840W

3. Radar Receiver Response Curve

The radar receiver response curve is shown on the following page. This is the response for the entire TUD receiver, not just the log detector.

4. Radar Antenna Locations

The two dipole radar antennas are mounted 1.27 meters below each wing of the Twin Otter. The centerline of each antenna is located 6.40 meters from the centerline of the fuselage. Each antenna is 2.01 meters wide.

5. Pulse and Receiver Settings

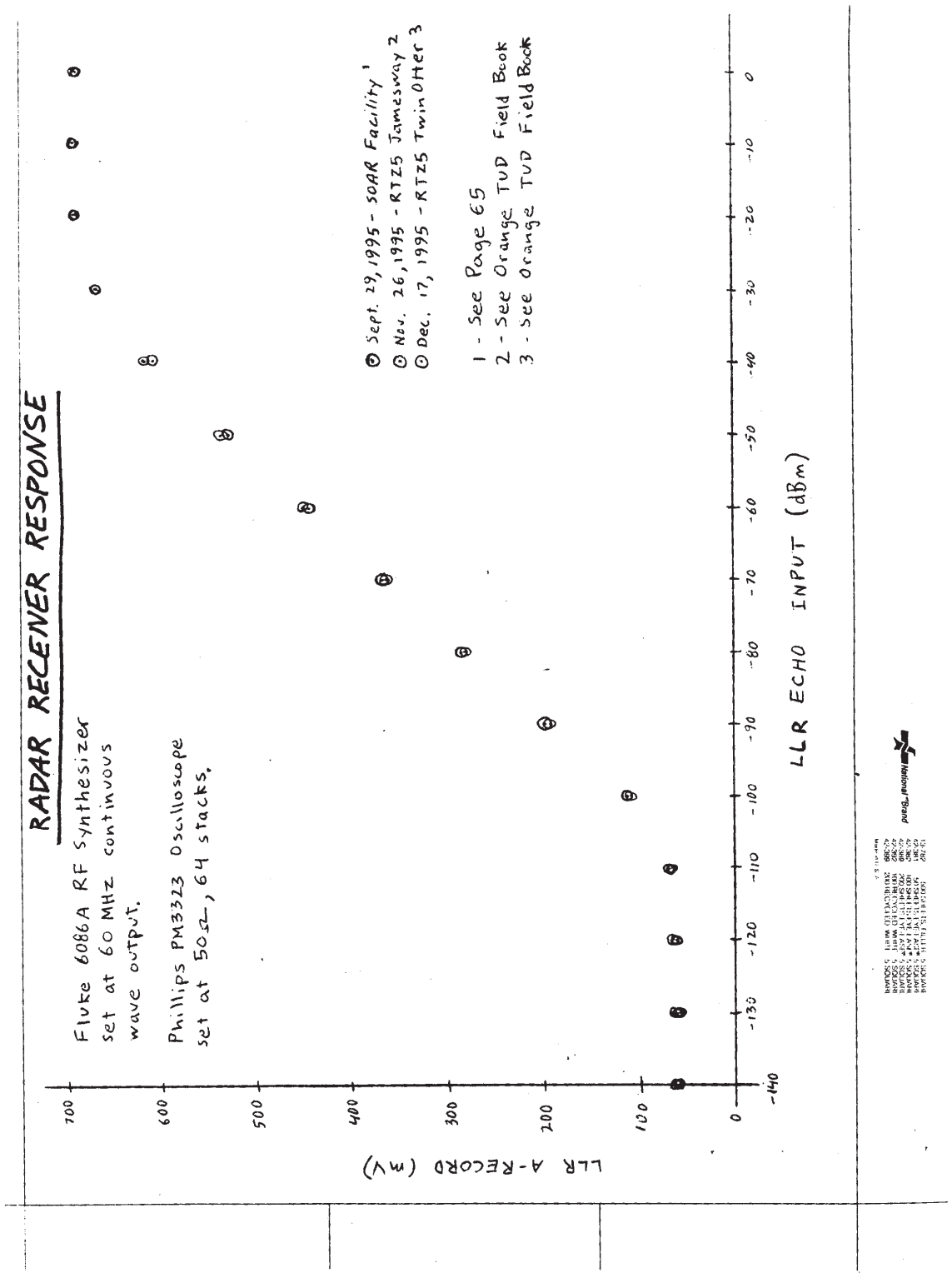
For all flights involving projects LVS and DCS, the radar settings were the same as SOAR has always used. These settings were:

Pulse Width = 250 nanoseconds
Pulse Rate = 80 microseconds, i.e., PRF = 12.5 kHz
Receiver Bandwidth = 4 MHz (to correspond to the pulse width)

6. Equipment Changes

Radar system 3 was installed at the beginning of VTZ1. Equipment changes occurred before flights as noted below. After an equipment change, the configuration was consistent until the next recorded change.

28 Dec 2000, F23: PMX 4 swapped in
29 Dec 2000, F26: PPA 4 swapped in
30 Dec 2000, F29: PPA 3 swapped back in
31 Dec 2000, F30: HPPA 4A & 4B swapped in
1 Jan 2001, F32: PMX 3 and PPA 4 swapped in
2 Jan 2001, F34: PMX 4 swapped in


RADAR RECEIVER RESPONSE
Fluke 6086A RF Synthesizer
set at 60 MHz continuous
wave output.
Phillips PM3323 Oscilloscope
set at 50Ω, 64 stacks.
Sept. 29, 1995 - SOAR Facility 1
Nov. 26, 1995 - RTZ5 Jamesway 2
Dec. 17, 1995 - RTZ5 Twin Otter 3
1 - See Page 65
2 - See Orange TVD Field Book
3 - See Orange TVD Field Book
LLR A-RECORD (mV)
LLR ECHO INPUT (dBm)
700
600
500
400
300
200
100
0
-140
-130
-120
-110
-100
-90
-80
-70
-60
-50
-40
-30
-20
-10
0

Radar Digitizer - DSA (Digital Signal Averager)

SOAR's RADAR digitization for the entire VTZ1 field season has the following specifications:

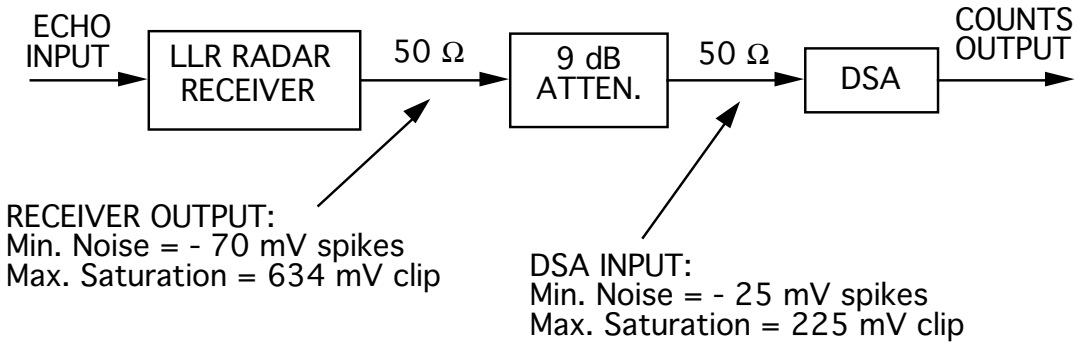
Sampling Rate = 16 ns per sample
Sampling Depth = 4096 samples per individual signal
Stacking = 2048 individual signals per stacked signal

In SOAR's terminology, the DSA configuration is for a 250 mv range with a 90% offset. These settings configure the DSA response as follows:

input voltage to DSA (mv)	output counts from DSA (single signal, i.e., before stacking)
- 25	0
.	.
.	.
.	.
225	255

There is a 9 dB padding attenuator between the LLR RADAR Receiver output and the DSA input. This configuration is chosen in consideration of the below sketch.

RADAR Receiver and DSA Block Diagram



Gravity Information

1. Sensor Specifications

SOAR used the same Bell Aerospace BGM-3 gravity meter sensor in the VTZ1 season that SOAR used in the RTZ8 and RTZ9 seasons. (This was a different sensor than SOAR used in previous seasons, RTZ7 and earlier.) The specifications are as follows:

BGM-3 Serial Number: 226
CPS S/N: 321
Scale Factor: 4.989344
Bias: 856127.9

where, Vertical Acceleration (in mgal) = (Counts) * (Scale Factor) + (Bias).

2. Base Reference Counts

The Gravity Data Buffer output, in counts, at SOAR's VTZ1 bases of operation are as follows:

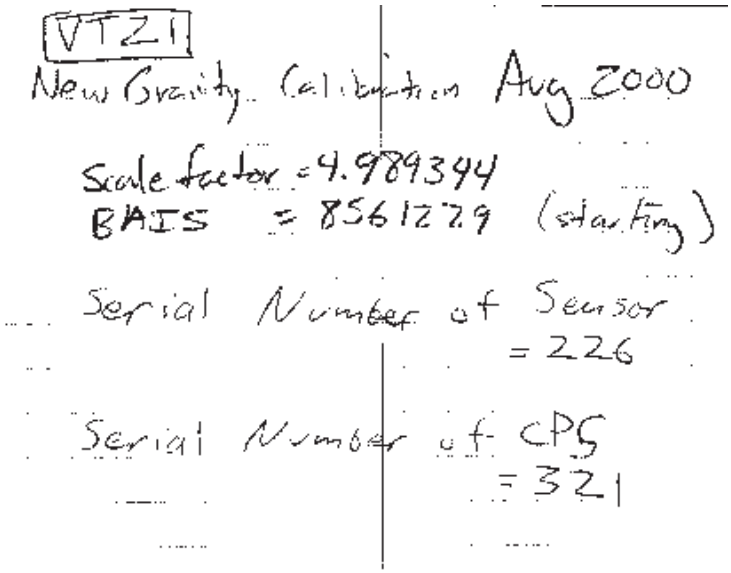
William's Field (NGD):	25,415 (sometimes 25,414)
Vostok Camp (VOS):	25,207 (sometimes 25,206)

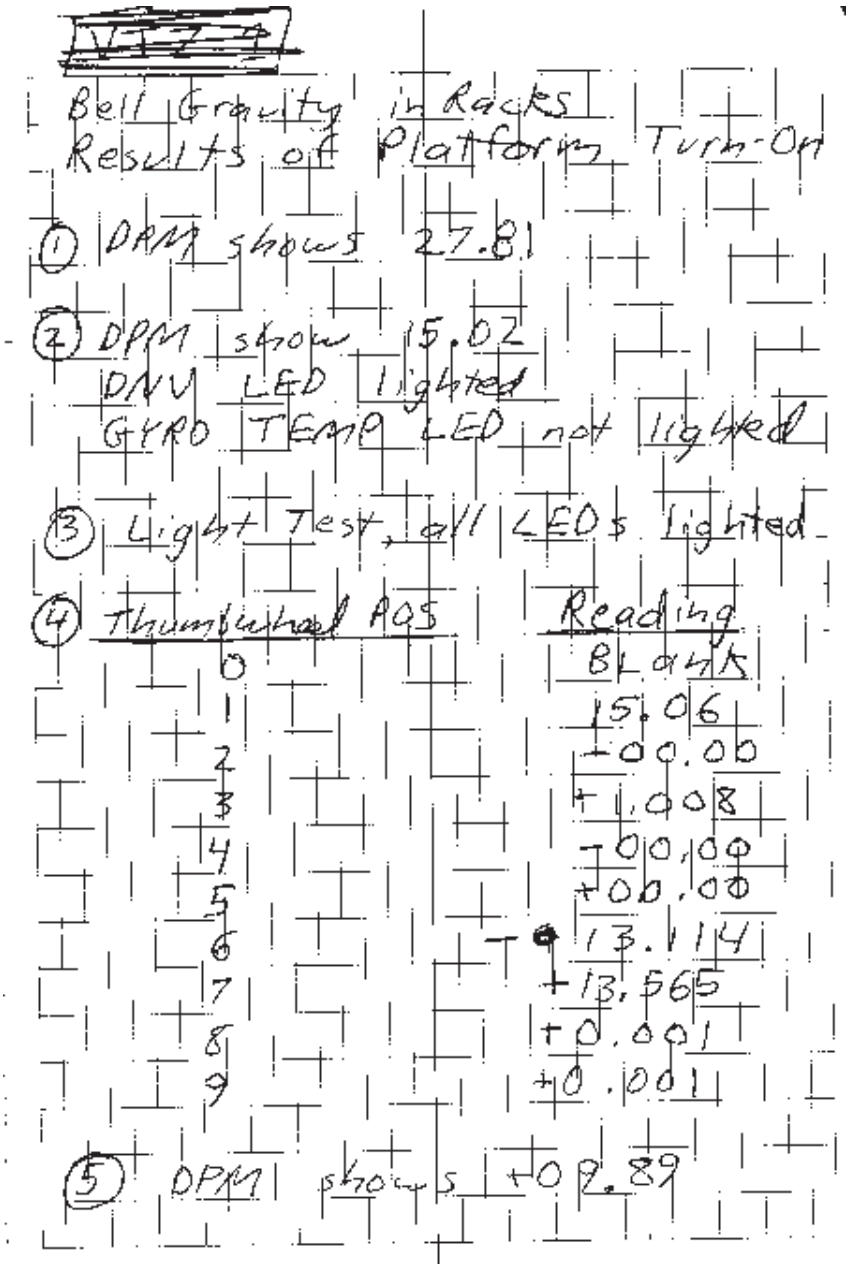
3. Platform Information

NAVOCEANO had the complete gravity-meter system checked out prior to loaning it to us for the VTZ1 field season. The problems encountered during the RTZ9 field season were fixed.

During RTZ9, the system was accidentally plugged into 220 vac ground power at Dome C Station. The system was made to work after this accident by replacing the primary control power supply (s/n 321) with the spare control power supply (s/n 320). After repairs by NAVOCEANO, SOAR was able to use CPS 321 for VTZ1. The bias and scale factor for VTZ1 have changed since RTZ9.

Gravity Notes




VTZ1
Bell Gravity in Racks
Results of Platform Turn-On
(1) DPM shows 27.81
(2) DPM show 15.02
DMU LED lighted
GYRO TEMP LED not lighted
(13) Light Test, all LEDs lighted
(4) Thumbwheel AOS Reading
0 BLANK
1 15.06
2 +00.00
3 +4.008
4 +00.00
5 +00.00
6 +13.114
7 +13.565
8 +0.001
9 +0.001
(5) DPM shows +02.89

SDK

(6) DNV LED goes off

(7)

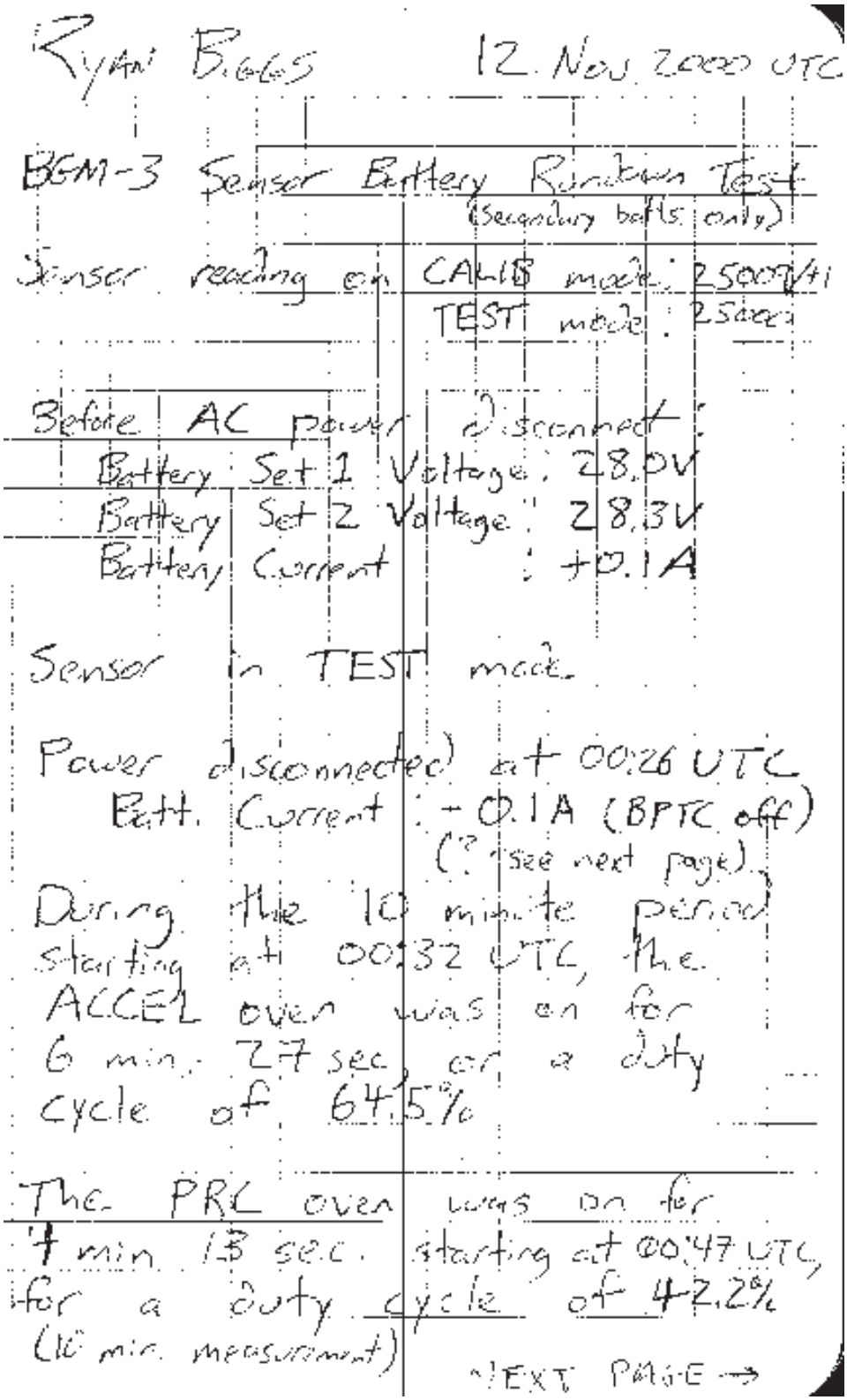
Pos	Reading
6	−0.479
7	−0.245
8	−0.002
9	−0.066

(8) DPM Blank

GDB Reading 25415/−1

GRV logging
start 01:025415

start File	start GMT	end GMT
J313	2:30	1:52
J314	1:52	3:41
J315	3:41	6:41
J316	6:41	22:40
J319	0:37	?



Ryan Beegs 12 Nov 2002 UTC

BGM-3 Sensor Battery Runtown Test
(Secondary batts only)

Sensor reading on CALIB mode: 2500 T/I
TEST mode: 2500

Before AC power disconnect:
Battery Set 1 Voltage: 28.0V
Battery Set 2 Voltage: 28.3V
Battery Current: +0.1A

Sensor in TEST mode.

Power disconnected at 00:26 UTC
Batt. Current: -0.1A (BPTC off)
(? see next page)

During the 10 minute period starting at 00:32 UTC, the ACCEL oven was on for 6 min. 27 sec. or a duty cycle of 64.5%

The PRL oven was on for 4 min 13 sec. starting at 00:47 UTC, for a duty cycle of 42.2%
(10 min measurment)

NEXT PAGE →

13 Nov. 2000 00:10 UTC

Power was removed from the sensor & batteries again for an initial voltage drop test.

With AC voltage applied:

Batt. Set 1 Voltage : 28.1V
" " 2 : 28.3V
Batt. Current : +0.15A

Immediately after removing voltage:

Batt. Set 1 Voltage : 27.3V
" " 2 " : 27.3V
Batt. Current : -0.35A
(BPTC off)

The BPTC was on for 2 min 36 sec starting at 01:05 UTC, for a duty cycle of 26.0% (10 min measurement)

At 01:33

Batt. Set 1 : 26.4V
Batt. Set 2 : 26.5V

At 03:55 noticed Batt. Current reads ~0.38A with all ovens off and a little more than 1A with BPTC on. Was meter sticking before?

04:00

Batt. Set 1 : 26.2V
" " 2 : 26.3V

09:25

In last half hour, batts. have fallen below 20V:

Batt. Set 1 : 17.4V
Batt. Set 2 : 17.5V
All ovens "stuck" on

December 4, 2000

Results of ZERO Damp Tests.
(See orange GAN field book on GRAVITY for the test procedure.)

(2) 8 mins, 51 secs ROLL HI-MODE

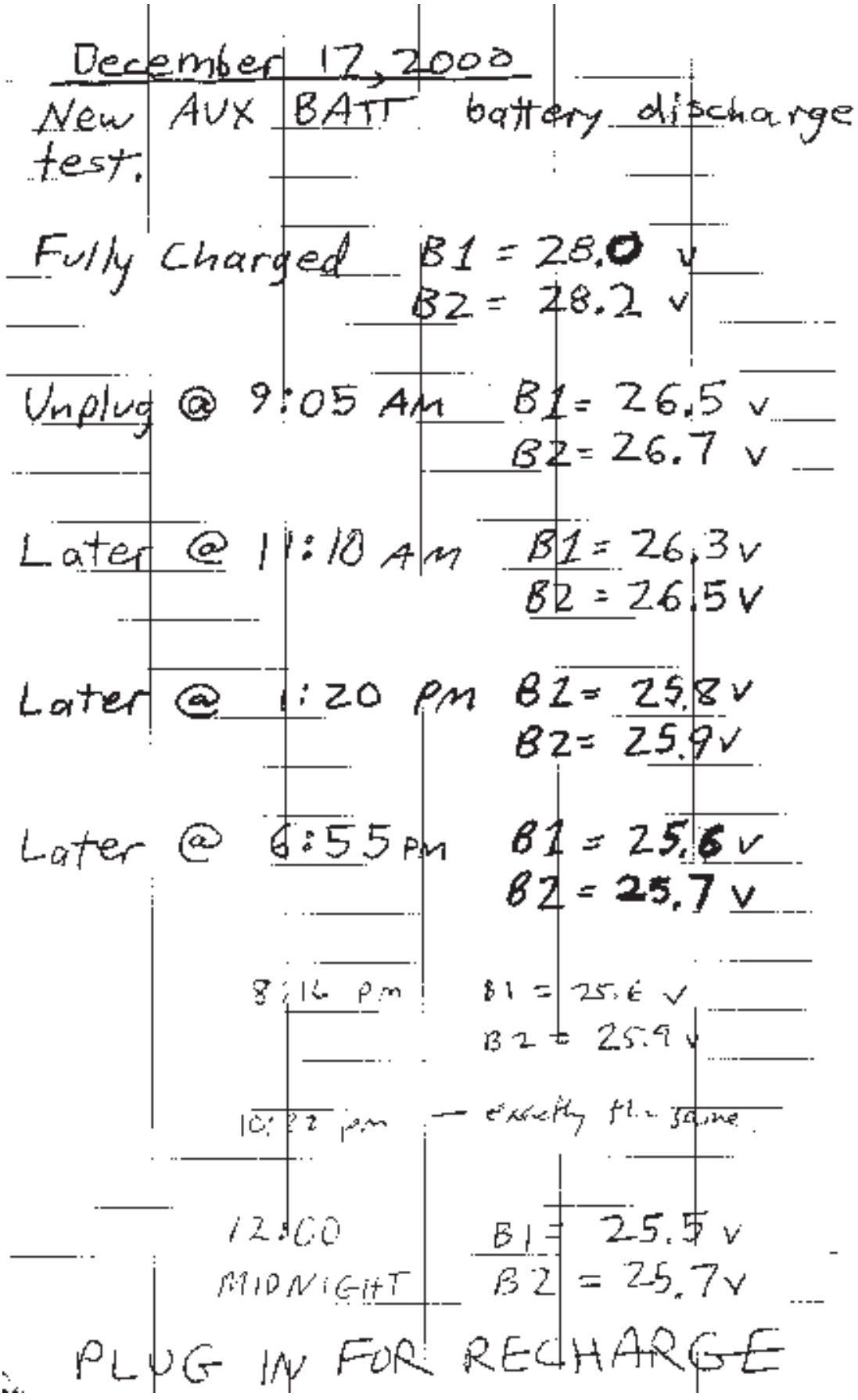
(3) 8 mins, 50 secs PITCH HI-MODE

(4) 11 mins, 4 secs ROLL LOW-MODE

(5) 11 mins, 7 secs, PITCH LOW-MODE

December 16, 2000

Installed new NAVOCEANO batteries into AUX BATT and Sensor ½ Depth Battery Box.


December 17, 2002
New AUX BATT battery discharge test.
Fully Charged B1 = 28.0 v
B2 = 28.2 v
Unplug @ 9:05 AM B1 = 26.5 v
B2 = 26.7 v
Later @ 11:10 AM B1 = 26.3 v
B2 = 26.5 v
Later @ 1:20 PM B1 = 25.8 v
B2 = 25.9 v
Later @ 6:55 PM B1 = 25.6 v
B2 = 25.7 v
8:16 PM B1 = 25.6 v
B2 = 25.9 v
10:22 PM — exactly the same
12:00 MIDNIGHT B1 = 25.5 v
B2 = 25.7 v
PLUG IN FOR RECHARGE

Twin Otter (SJB) GPS Antenna Mounting Locations

A. SJB1 (Left side of SJB)

Antenna type: Trimble model 22433 - 10, L1/L2 aircraft GPS antenna
Devices using SJB1: a. Ashtech Z-12 GPS Receiver: (SJB10), p/n 700845 - 10
b. Trimble TrimFlight DGPS Receiver
c. TrueTime XL-DC GPS Time Code Generator
d. Ashtech Z-Surveyor GPS Receiver (SJB30)

1. Height from floor to antenna = 160 cm
2. Distance from left wall to antenna = 47 cm
3. Distance from right wall to antenna = 95 cm
4. Distance from inside back wall to antenna = 208 cm

B. SJB2 (Right side of SJB)

Antenna type: Trimble model 22433 - 10, L1/L2 aircraft GPS antenna
Devices using SJB2: a. TurboRogue SNR-8000 GPS Receiver (SJB20), p/n 7490500 - 050

1. Height from floor to antenna = 160 cm
2. Distance from left wall to antenna = 80 cm
3. Distance from right wall to antenna = 62 cm
4. Distance from inside back wall to antenna = 211 cm

Note

J360: Receiver at SJB10 (LPO2266) exchanged for receiver at VOS10 (LPO1737)
J362: Receiver at SJB20 exchanged for spare receiver T-135
other serial numbers in aircraft not indicated

Ground GPS Platforms

Listed here are the GPS receiver and antenna platforms used during VTZ1.

Project Acronym Summary:

- LVS = Lake Vostok Suvey
- DCS = Deep Crustal Seismic Survey

Main and Base Station Acronym Summary:

- NGD = William's Field
- CTR = Seismic Center
- VOS = Vostok Camp
- SKD = Snowmobile towing sled-mounted antenna and receiver

Flight / Project /Station Summary:

- F01 – F07 were for DCS
- F08 - F45 were for LVS
- F46 - F48 were for DCS
- some later flights included transects for both projects
- a DCS transect was flown during TF10

The following page contains a table of GPS receivers and antennas. Days on which changes to the configuration were made appear on the table. The new or edited fields are highlighted on the date of change and are assumed to remain unchanged until the next alteration is noted (unless otherwise specified in the date field).

Ground Receiver Configurations & Changes

	Receiver	Receiver Type	Serial Number	Antenna
J 313	NGD10	Z-12	LPO2266	CR13143
	NGD20	Turborogue	T-135	6824
	NGD30	Z-Surveyor	UZ12002112	137
J316	NGD10	Z-12	**?**	CR13143
	NGD20	Turborogue	T-135	6824
	NGD30	Z-Surveyor	UZ12002112	137
J317	NGD10	Z-12	?	**137**
	NGD20	Turborogue SNR-8000	**T-409**	6824
	NGD30	Z-Surveyor	UZ12002112	**CR13143**
J329	NGD10	Z-12	**2285**	137
	NGD20	Turborogue SNR-8000	T-409	6824
	NGD30	Z-Surveyor	UZ12002112	CR13143
J334	NGD10	Z-12	2285	137
	NGD20	Turborogue	**T-135**	**316**
	NGD30	Z-Surveyor	UZ12002112	CR13143
J339	NGD10	Z-12	2285	**316**
	NGD20	Turborogue	T-135	**6824**
	NGD30	Z-Surveyor	UZ12002112	CR13143
	SKD10	**Z-12**	**2285**	**137**
J342(TF06 only)	NGD10	**Turborogue**	**T-135**	**6824**
	NGD20	**Z-12**	**2285**	**316**
	NGD30	Z-Surveyor	UZ12002112	CR13143
J344	NGD10	Z-12	2285	316
	NGD20	**Turborogue SNR-8000**	**T-409**	**T-137**
	NGD30	Z-Surveyor	UZ12002112	CR13143
J346	NGD10	Z-12	2285	**6824**
	NGD20	Turborogue SNR-8000	T-409	**316**
	NGD30	Z-Surveyor	UZ12002112	CR13143
J347 & J348 only	NGD10	Z-12	2285	6824
	NGD20	Turborogue SNR-8000	T-409	316
	NGD30	Z-Surveyor	UZ12002112	CR13143
	CTR10	**Z-12**	**1737**	**13046**
	CTR20	**Turborogue**	**T-135**	**T-137**
J354	**VOS10**	Z-12	**LPO1737**	**13046**
	VOS20	Turborogue SNR-8000	T-409	316
	VOS30	Z-Surveyor	UZ12002112	CR13143
J360	VOS10	Z-12	**LPO2266**	13046
	VOS20	Turborogue SNR-8000	T-409	316
	VOS30	Z-Surveyor	UZ12002112	CR13143
J364	VOS10	**Z-Surveyor**	**UZ12002112**	13046
	VOS20	Turborogue SNR-8000	T-409	316
	VOS30	**Z-12**	**LPO2266**	CR13143

Magnetometers - General Information

1. Airborne Cesium Magnetometer

A Geometrics model 823A airborne cesium vapor magnetometer was used with the Twin Otter this season. This magnetometer was run at 10 Hz and had a resolution of 0.001 nanotesla.

2. Ground-Based Cesium Magnetometers

A Geometrics model 823B ground-based cesium vapor magnetometer was used to record base station magnetics data at both of the main base stations. These magnetometers were also run at 10 Hz and had resolutions of 0.001 nanotesla.

3. Ground-Based Proton Precession Magnetometers

As a supplement and backup to the 823B cesium vapor magnetometers, Geometrics model 856 proton precession magnetometers were also run at both main base stations during the VTZ1 season. These magnetometers sampled magnetics data once every 10 seconds, and had resolutions of 0.1 nanotesla.

Mag Base Platform Summary

NGD

NGD50	823 Mag #1, S/N 823049, sensor #6393, UT#669275
NGD60	856 Mag #4, sensor #3, S/N 50348,

CTR

CTR50	856 Mag #5, S/N 50350, sensor #5
CTR60	856 Mag #4, sensor #3, S/N 50348 (what about NGD60?)

VOS

VOS50	823 Mag #1, S/N 823049, sensor #669275
VOS60	856 Mag #3, sensor #2, S/N unknown

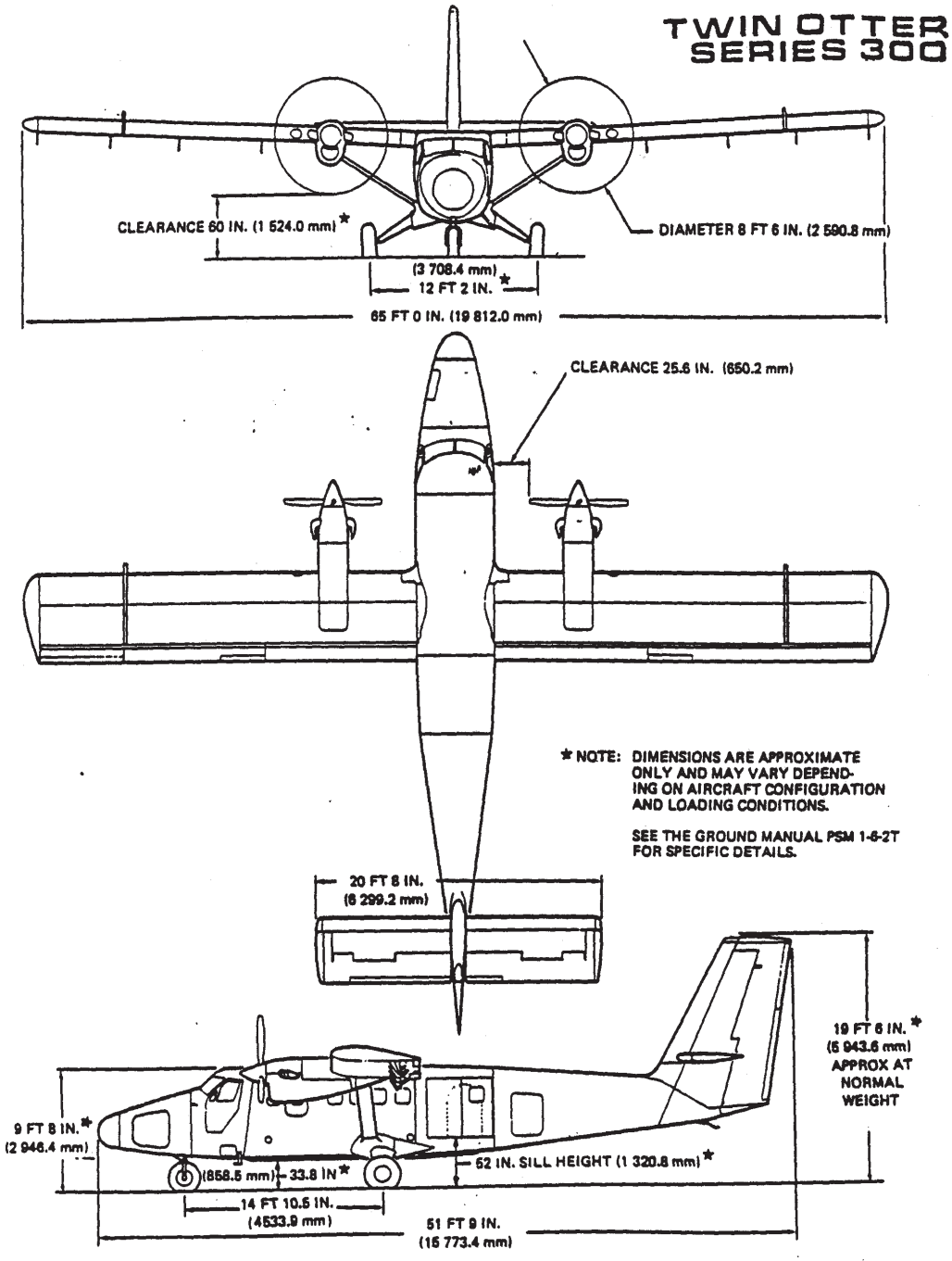
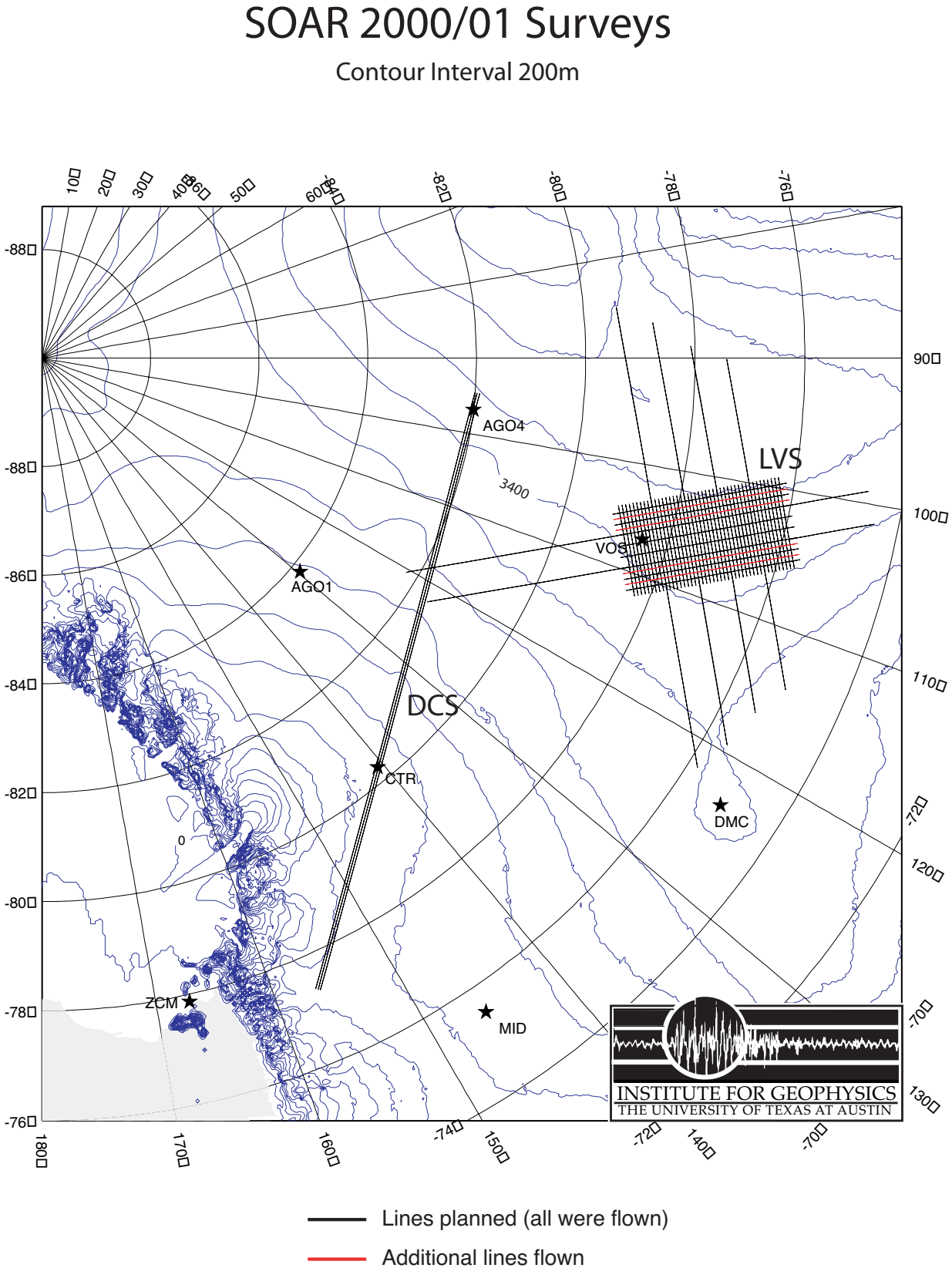


Figure 1-1. Three-View, Standard Wheelplane

1-1-3

EDS Notes

VTZ1 Survey Targets



Flight Summary Sheet

Flight	Take Off Date	J-day	Time	Base	Description	Transects flown, comments	Pilot	CoPilot	CCR	RAD	PFN	Land Date	Time	Duration
TF07	12/07/00	342	7:51	NGD	Willy Skiway	VTZ1/SJB0/TT11a,b,c,d,e,f,g,h	Bob	Louie	Ryan		Jody	12/07/00	9:26	01:35
F01	12/11/00	346	1:50	NGD	To Seismic Ctr	DCS/X/X01a	Louie	Bob	Ryan	Marty	Vicki	12/11/00	5:33	03:43
F02	12/11/00	346	6:44	CTR	From Seismic Ctr	DCS/X/X03a	Louie	Bob	Ryan	Marty	Vicki	12/11/00	10:22	03:38
F03	12/12/00	347	5:20	CTR	From Seismic Ctr	DCS/DCSx/X01b,c;X03c,d	Sandi	Tony	Ryan		Jody	12/12/00	9:34	04:14
F04	12/12/00	347	10:46	CTR	From Seismic Ctr	DCS/DCSx/X02a	Sandi	Tony	Ryan		Jody	12/12/00	13:34	02:48
F05	12/13/00	348	0:53	NGD		DCS/DCSx/X01d	Bob	Louie	Jack		Marty	12/13/00	4:35	03:42
F06	12/13/00	348	5:47	CTR	From Seismic Ctr	DCS/DCSx/X02b,c,d,e	Bob	Louie	Jack		Marty	12/13/00	9:56	04:09
F07	12/13/00	348	11:05	CTR		DCS/DCSx/X02f	Bob	Louie	Jack		Marty	12/13/00	14:05	03:00
F08	12/19/00	354	23:25	VOS		LVS/CCx/X24a,X19a	Bob	Louie	Ryan		Vicki	12/20/00	2:47	03:22
F09	12/20/00	355	4:51	VOS		LVS/CCy/Y05a,Y07a	Bob	Louie	Ryan		Vicki	12/20/00	8:32	03:41
F10	12/23/00	358	2:21	VOS		LVS/CCx/X13a,X10a,X07a,X04a	Bob	Louie	Tom		Jack	12/23/00	6:40	04:19
F11	12/23/00	358	20:22	VOS		LVS/CCx/X27a,X22a	Sandi	Tony	Ryan		Marty	12/23/00	23:25	03:03
F12	12/24/00	359	4:28	VOS		LVS/CCx/X16a,X01a;CCy/Y03a	Bob	Louie	Jack		John	12/24/00	8:34	04:06
F13	12/24/00	359	13:46	VOS		LVS/CCx/X30a,X33a;CCy/Y09a	Sandi	Tony	Ryan		Ellie	12/24/00	17:42	03:56
F14	12/25/00	360	20:12	VOS		LVS/CCy/Y15a,Y11a	Bob	Louie	Ryan		Ellie	12/25/00	23:58	03:46
F15	12/26/00	361	1:58	VOS		LVS/CCy/Y13a,Y03b;CCx/X42a	Bob	Louie	Marty	Jack	Jack	12/26/00	5:51	03:53
F16	12/26/00	361	14:01	VOS		LVS/CCy/Y01a;CCx/X39a;VTZ1/SJB0/TT17a	Sandi	Tony	Ryan		Ellie	12/26/00	17:52	03:51
F17	12/26/00	361	19:38	VOS		LVS/CCx/X36a,X41a;VTZ1/SJB0/TT18a,TT19a	Sandi	Tony	Ryan		John	12/26/00	23:32	03:54
F18	12/27/00	362	2:12	VOS		LVS/CCx/X09a,X12b,X15a	Bob	Louie	Tom	Eric	Marty	12/27/00	5:40	03:28
F19	12/27/00	362	14:09	VOS		LVS/CCx/X23a,X20a	Sandi	Tony	Ryan		Jody	12/27/00	17:01	02:52
F20	12/27/00	362	20:33	VOS		LVS/CCy/Y09b,Y14a	Bob	Louie	Tom		Ellie	12/28/00	0:36	04:03
F21	12/28/00	363	2:07	VOS		LVS/CCx/X17a,X14a,X11a,X08a	Bob	Louie	Marty	Eric	John	12/28/00	5:43	03:36
F22	12/28/00	363	14:06	VOS		LVS/WCx/X10a,X19a	Sandi	Tony	Ryan		Jody	12/28/00	18:04	03:58
F23	12/28/00	363	20:00	VOS		LVS/NCy/Y05a,Y11a	Sandi	Tony	Ryan		Ellie	12/29/00	0:00	04:00
F24	12/29/00	364	2:11	VOS		LVS/CCy/Y13b;CCx/X18a,X21a	Bob	Louie	Marty	Eric	John	12/29/00	5:59	03:48
F25	12/29/00	364	14:12	VOS		mission abort	Tony	Sandi	Ryan		Ellie	12/29/00	14:40	00:28
F26	12/29/00	364	16:10	VOS		LVS/SCy/Y05a,Y11a	Tony	Sandi	Ryan		Ellie	12/29/00	20:12	04:02
F27	12/29/00	365	21:52	VOS		LVS/ECx/X28a,X37a;VTZ1/SJB0/TT20a	Bob	Louie	Tom		Jody	12/30/00	01:59	04:07
F28	12/30/00	365	3:18	VOS		LVS/WCx/X10b,X19b	Bob	Louie	Marty	Eric	Marty	12/30/00	07:16	03:58
F29	12/30/00	365	19:54	VOS		LVS/WCx/X28a,X37a	Sandi	Tony	Ryan		Jody	12/30/00	23:54	04:00
F30	12/31/00	366	2:16	VOS		LVS/ECx/X10a,X19a	Bob	Louie	Tom		Marty	12/31/00	06:15	03:59
F31	01/01/01	001	14:02	VOS		mission abort	Sandi	Tony	Ryan		Jody	01/01/01	14:45	00:43
F32	01/01/01	001	16:08	VOS		LVS/CCy/Y02b,CCx/X37a,X34a	Sandi	Tony	Ryan		Jody	01/01/01	20:15	04:07
F33	01/01/01	001	21:39	VOS		LVS/CCx/X02a,X05a,X08a	Sandi	Tony	Ryan		Ellie	01/02/01	01:00	03:21
F34	01/02/01	002	2:38	VOS		LVS/CCx/X31a,X28a,X25a	Bob	Louie	Marty	Eric		01/02/01	06:42	04:04
F35	01/02/01	002	13:59	VOS		LVS/SCy/Y05b,Y11b	Sandi	Tony	Ryan		Jody	01/02/01	18:02	04:03
F36	01/02/01	002	20:03	VOS		LVS/CCX/X03a,X06a,X09b,X12b	Bob	Louie	Tom		John	01/03/01	00:11	04:08
F37	01/03/01	003	2:06	VOS		LVS/CCx/X32a,X29b,X26a	Louie	Bob	Marty	Eric		01/03/01	06:23	04:17
F38	01/03/01	003	13:56	VOS		LVS/NCy/Y05b,Y11b	Sandi	Tony	Ryan		Ellie	01/03/01	17:52	03:56
F39	01/03/01	003	19:59	VOS		LVS/WCx/X28b,X37b	Sandi	Tony	Ryan		Jody	01/03/01	23:59	04:00
F40	01/04/01	004	1:38	VOS	Laser cal	LVS/ECx/X10b,X19b;VTZ1/SJB0/TT21a,TT21b	Louie	Bob	Tom		Marty	01/04/01	06:00	04:22
F41	01/04/01	004	14:02	VOS		LVS/CCy/Y02b,CCx/X43a,X40a	Sandi	Tony	Ryan		Ellie	01/04/01	18:15	04:13
F42	01/04/01	004	19:58	VOS		LVS/CCx/X38a,X35a	Bob	Louie	Ryan		Jody	01/04/01	23:31	03:33
F43	01/05/01	005	1:00	VOS		LVS/ECx/X28b,X37b	Louie	Bob	Marty	Eric		01/05/01	05:04	04:04
F44	01/05/01	005	20:01	VOS		LVS/CCx/X44a,X45a;VTZ1/SJB0/TT24a	Sandi	Tony	Ryan		Jody	01/05/01	23:59	03:58
F45	01/06/01	006	18:00	VOS		LVS/Ccy/Y12a,Y04a	Sandi	Tony	Ryan		Ellie	01/06/01	21:46	03:46
F46	01/06/01	006	23:23	VOS		DCS/DCSx/X02g;VTZ1/SJB0/TT26a,TT27a	Sandi	Tony	Tom			01/07/01	05:26	06:03
F47	01/07/01	007	16:07	VOS		DCS/DCSx/X03e;VTZ1/SJB0/TT28a	Sandi	Tony	Ryan			01/07/01	22:13	06:06
F48	01/08/01	008	23:30	VOS		DCS/DCSx/X01e;VTZ1/SJB0/TT29a	Sandi	Tony	Tom			01/09/01	05:23	05:53

Julian Day Calendar
(leap year)

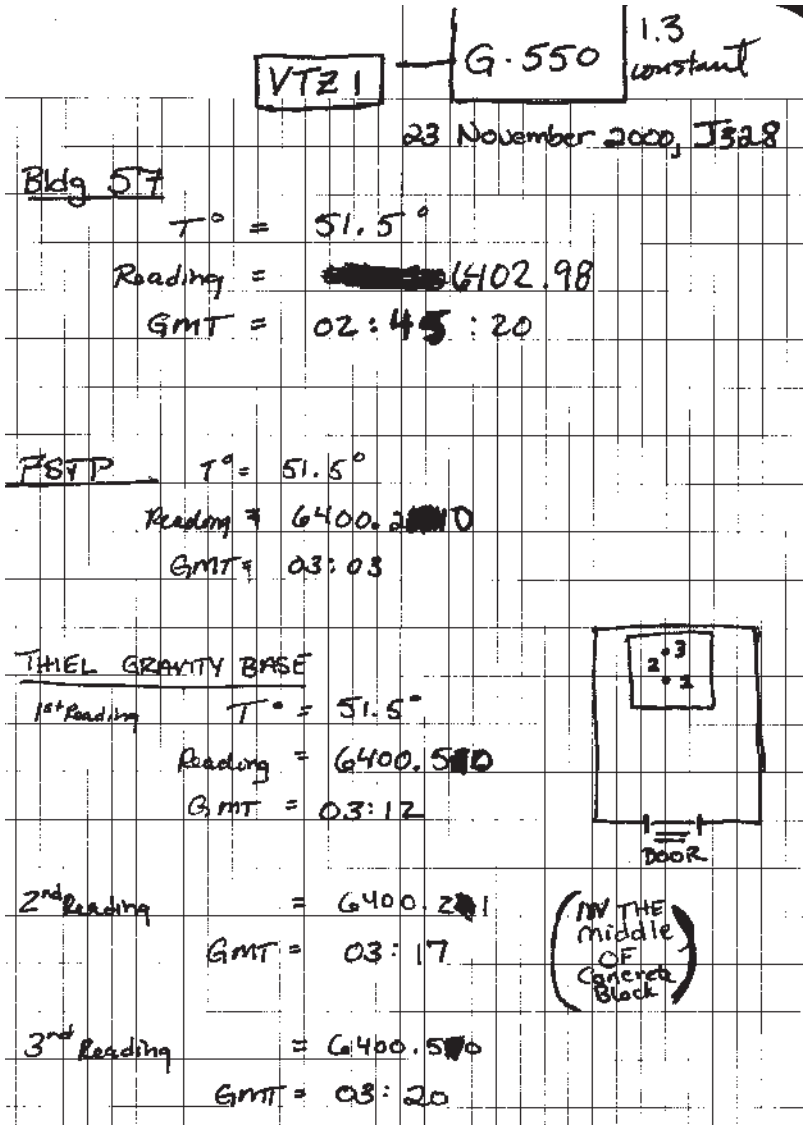
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	001	032	061	092	122	153	183	214	245	275	306	336
2	002	033	062	093	123	154	184	215	246	276	307	337
3	003	034	063	094	124	155	185	216	247	277	308	338
4	004	035	064	095	125	156	186	217	248	278	309	339
5	005	036	065	096	126	157	187	218	249	279	310	340
6	006	037	066	097	127	158	188	219	250	280	311	341
7	007	038	067	098	128	159	189	220	251	281	312	342
8	008	039	068	099	129	160	190	221	252	282	313	343
9	009	040	069	100	130	161	191	222	253	283	314	344
10	010	041	070	101	131	162	192	223	254	284	315	345
11	011	042	071	102	132	163	193	224	255	285	316	346
12	012	043	072	103	133	164	194	225	256	286	317	347
13	013	044	073	104	134	165	195	226	257	287	318	348
14	014	045	074	105	135	166	196	227	258	288	319	349
15	015	046	075	106	136	167	197	228	259	289	320	350
16	016	047	076	107	137	168	198	229	260	290	321	351
17	017	048	077	108	138	169	199	230	261	291	322	352
18	018	049	078	109	139	170	200	231	262	292	323	353
19	019	050	079	110	140	171	201	232	263	293	324	354
20	020	051	080	111	141	172	202	233	264	294	325	355
21	021	052	081	112	142	173	203	234	265	295	326	356
22	022	053	082	113	143	174	204	235	266	296	327	357
23	023	054	083	114	144	175	205	236	267	297	328	358
24	024	055	084	115	145	176	206	237	268	298	329	359
25	025	056	085	116	146	177	207	238	269	299	330	360
26	026	057	086	117	147	178	208	239	270	300	331	361
27	027	058	087	118	148	179	209	240	271	301	332	362
28	028	059	088	119	149	180	210	241	272	302	333	363
29	029	060	089	120	150	181	211	242	273	303	334	364
30	030		090	121	151	182	212	243	274	304	335	365
31	031		091		152		213	244		305		366

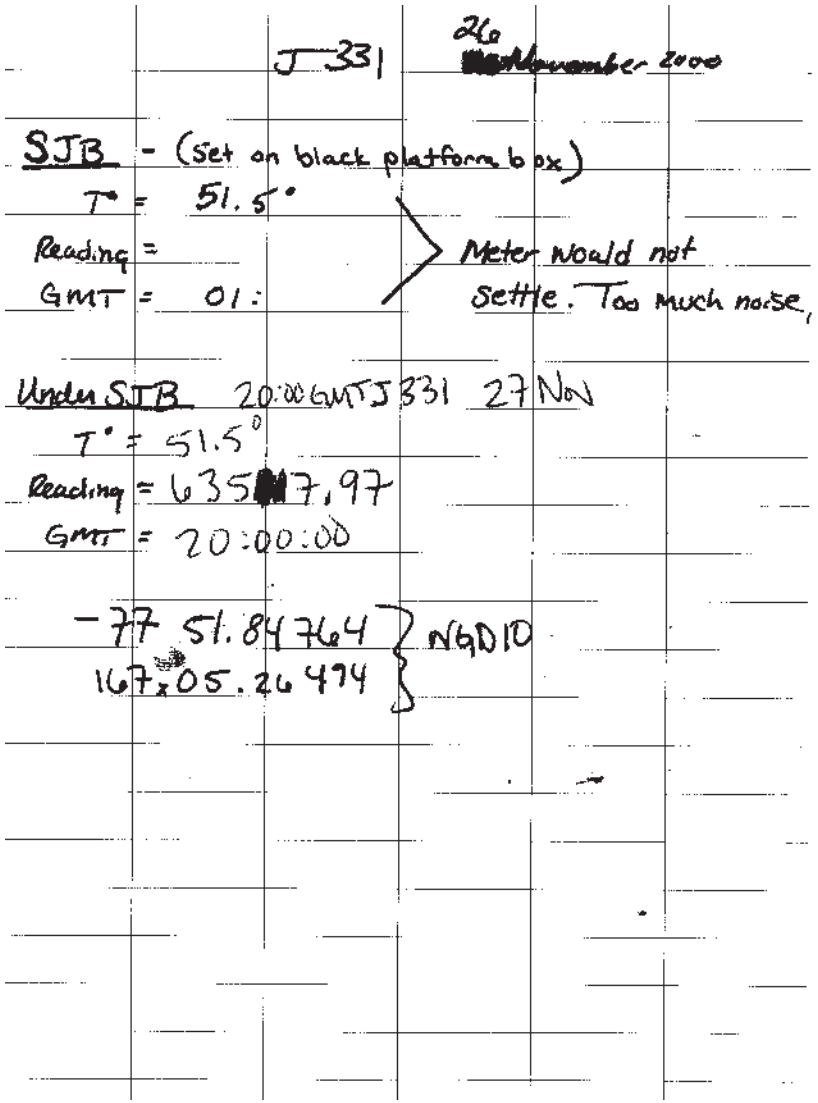
Gravity Ties

Preliminary Data

Compiled by Vicki Rystrom		last updated:	12/12/00				
completed by MEI & TGR: 5/30/01							
Meter:	USGS G-550						
	USGS Baseplate						
	constant 1.3						
	Temperature 51.5						
Locations:	Bldg 57	Next to MEC					
(WGS-84 Elipsoid)		USGS Brass Disk "SATGRAV" 1991-92					
		Lat: -77 50.8593					
		Lon: 166 40.463					
		Elev: 35m					
	Fstop	Behind FSTOP Bldg on concrete pad					
		USGS Brass Disk "SEISMIC" 1966-67					
		Lat: -77 50.9192					
		Lon: 166 40.7988					
		Elev: 49m					
	Theil	Theil Gravity Base					
		Cement pad, center					
	NGD	Willie Field, under SJB in grey crate in front of Jamesway					
		Lat: -77 51.8476					
		Lon: 167 05.2649					
		Elev: -34m					
	CTR	Seismic Center					
		Lat: -80 15.9306					
		Lon: 140 37.926					
		Elev: 2282m					
	VOS	Back vestibule of Borek Jamesway					
		Lat: -78 28.9709					
		Lon: 106 48.0683					
		Elev: 3477m					
DateTime:	In GMT						
Location	YYJJJHHMM	Reading					Uncalibrated conversion to mGals
Bldg 57	003280245	6402.98					982979.4594
Fstop	003280303	6400.21					982976.6063
Theil	003280312	6400.50	(Three readings taken, only center one included here)				982976.905
NGD	003312000	6357.97					982933.0991
CTR	003460613	5742.00					982298.65
Bldg 57	003462103	6402.72					982979.1916
Fstop	003462136	6399.98					982976.3694
Theil	003462142	6400.25	(Center of cement block)				982976.6475
VOS	003602341	5361.06					981906.2818

Gravity Ties Field Notebook



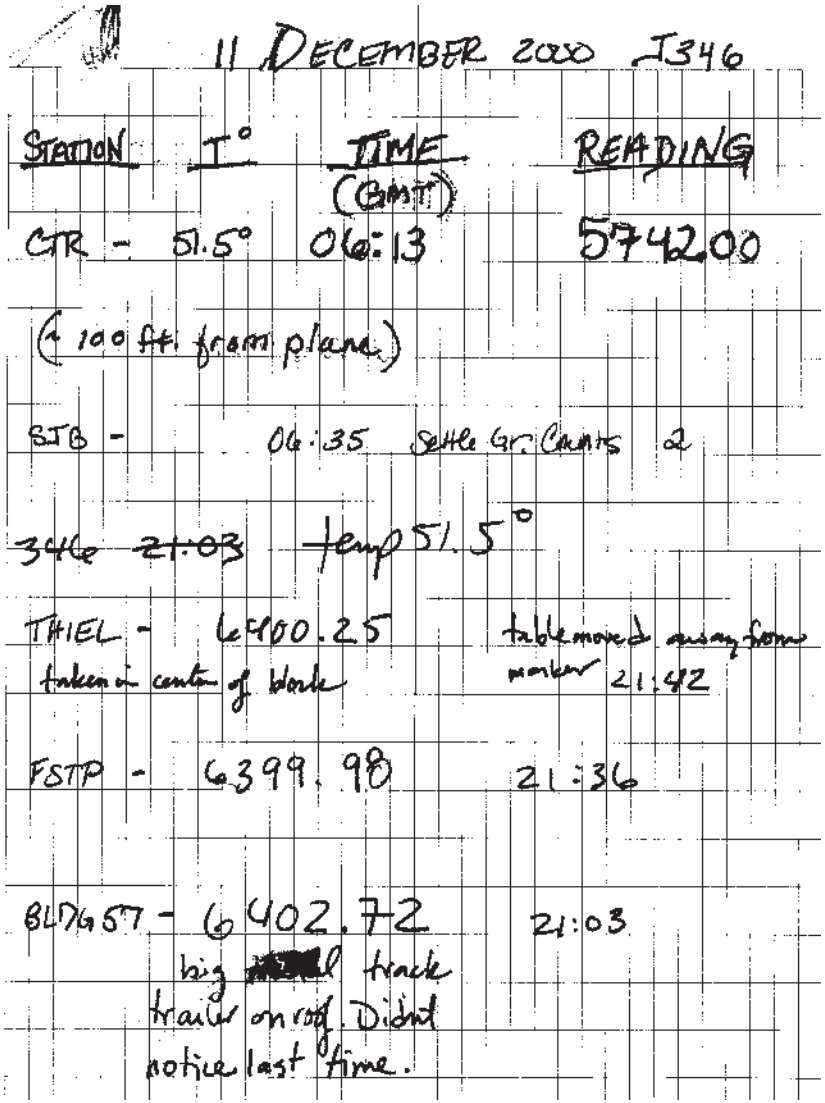


J 331 26 [redacted] November 2000

SJB - (Set on black platform box)
T° = 51.5°
Reading =
GMT = 01:
} Meter would not settle. Too much noise,

Under SJB 20:00 GMT J331 27 NOV
T° = 51.5°
Reading = 635[redacted]7,97
GMT = 20:00:00

-77 51.84764
167x05.26474
} NGDIC



11 DECEMBER 2000 J346

STATION	T°	TIME (GMT)	READING
CTR -	51.5°	06:13	574200

(+ 100 ft. from plane)

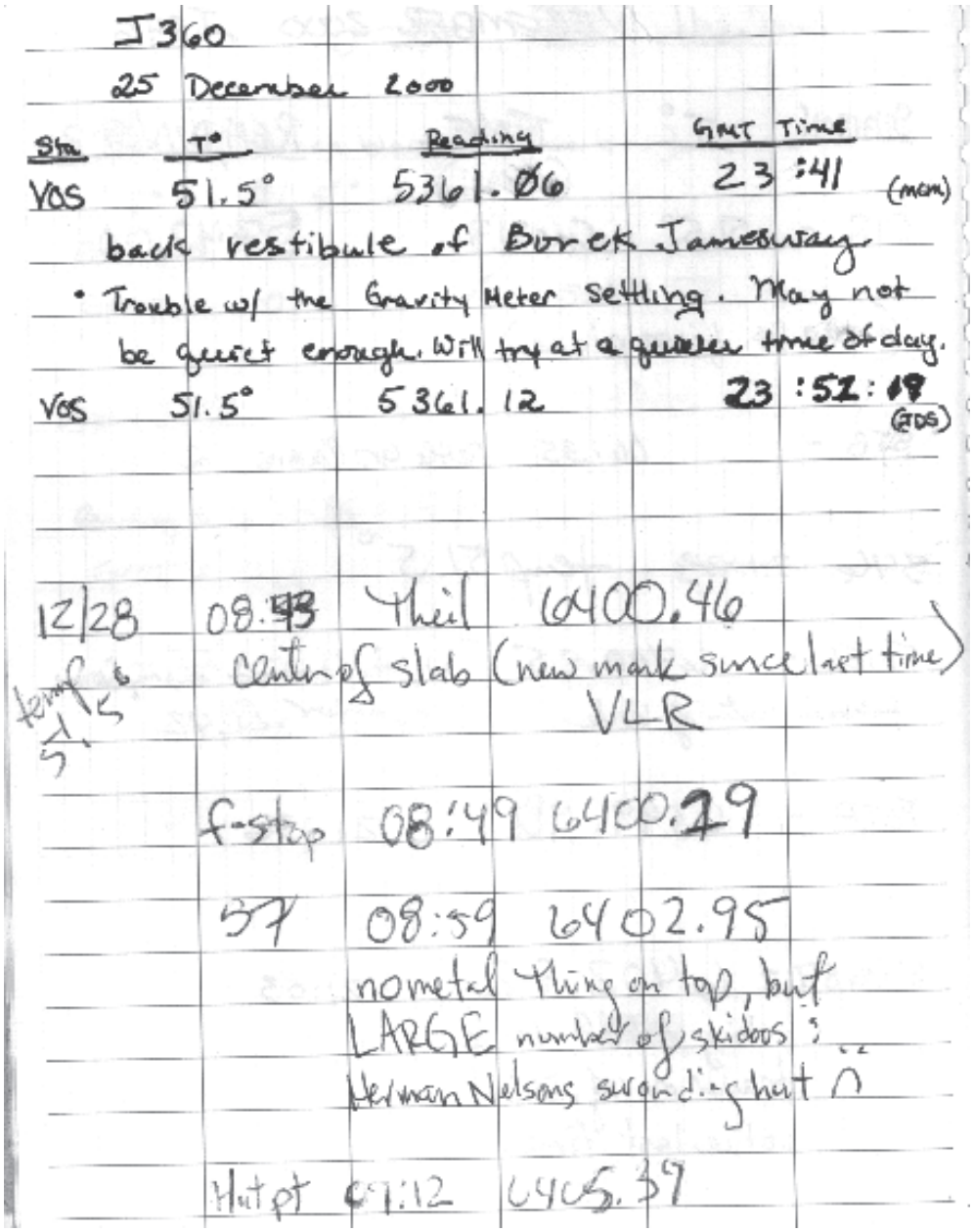
SJB - 06:35 Settle Gr. Counts 2

346 ~~21:03~~ Temp 51.5°

THIEL - 6400.25 table moved away from marker 21:42
taken in centr of Work

FSTP - 6399.98 21:36

BLDG 57 - 6402.72 21:03
big [redacted] truck
trailer on road. Didn't
notice last time.



J360
25 December 2000

Sta	T°	Reading	GMT Time	
VOS	51.5°	5361.06	23:41	(mcm)

back vestibule of Borek Jamesway
• Trouble w/ the Gravity Meter settling. May not be quiet enough. Will try at a quieter time of day.

VOS	51.5°	5361.12	23:51:19	(GDS)

12/28 08:~~43~~ Thiel 6400.46
temp 15.6 center of slab (new mark since last time)
VLR

f-stop 08:49 6400.29

37 08:59 6402.95
no metal thing on top, but LARGE number of skidoos ; .. Herman Nelsons surrounding hut ∩

Hut pt 09:12 6405.39

LVS

Project Information

Project Name on Proposal: Understanding the Boundary Conditions of the Lake Vostok Environment: A Site Survey for Future Work

Principal Investigators: Robin Bell and Michael Studinger,
Lamont-Doherty Earth Observatory, Columbia University

Survey Objectives: A 330 x 165 km grid at 7.5 x 22.5 km resolution over subglacial Lake Vostok with 12 regional lines extended in all directions as far as possible from the main grid. All geophysical data streams equally important, although laser altimetry was not considered to be crucial (operations would not be held up for lack of laser data).

Summary of Operations:
The main Vostok grid was flown at a nominal line spacing of 7.5 x 22.5 km (primary grid), with a target of increasing resolution to 7.5 x 11.25 km if possible. The primary grid was accomplished, and four additional lines were flown, so that a portion of the grid was accomplished at the higher resolution (see accompanying figure).

All regional lines were flown and repeated to improve the quality of potential fields data (on separate flights).

This survey was accomplished in 36 flights from the US base at Lake Vostok (East Camp). See Flight Summary Sheets for specifics.

Flight Information:
A. Flight Targets: see attached

B. Coordinate System: see attached

C. Elevations: see attached

D. Radar Resolutions: Radar settings were 250 ns pulsewidth, 4 MHz bandwidth, 80 microsecond pulse interval, 2048 returns stacked

E. Radar Blanking: No radar blanking necessary

F. Radar Altimeter: Used at pilot's discretion

G. Extended Run-ins and Run-outs: 15.0 km run-ins and run-outs with explicit waypoints for all transects

H. Communication of Flight Plans: designated point of contact between pilots and SOAR (JWH & TGR)

I. Flight Sequencing: scheduled as weather permitted

J. Flight Times: Flight windows were established consistent with the lowest magnetic noise periods at the main base from which the flights originated.

	GMT
VOS	0100-0700
	1300-1900
	1900-0100

K. Flight Planning Documents: prepared by JWH or TGR and distributed to flight crews prior to each flight. Copies of all flight plans are saved as part of SOAR flight logs.

L. Reflight Criteria: Any transects for which a major geophysical data stream is missing is priority for reflight. Dedicated reflights only after all initially planned lines are flown. M. Studinger was consulted regarding reflight priorities.

M. Weather Contingencies: Within a transect, jumps of 1000 feet can be made within a flight line, given bad weather. Abort if clouds.

N. Leap Second: N/A

O. Gravity ties: Measurements were taken with a Lacoste and Romberg meter at McMurdo, Seismic Center, and Vostok. Absolute tie available at McMurdo.

P. Base Station Issues: VOS is the base of operations

Q. QC Review: Data was broken out immediately following a flight. Each flight line was given an initial review and rated for overall data quality.

R. GPS mask angle: 10 degrees unless holes are introduced, then decrease to 5 degrees

S. PST Names: File names incorporate the SOAR project acronym for the project name with geography indicated withing the sets:

LVS / (NESWC)C(xy) / (XY)(0-9)(0-9)(a-z)

T. Waypoint List: See attached.

LVS Main Grid Waypoints

LVS/CCx/X01	SOT	-15000	0	-79.056085	104.359135	-79	3.37	104	21.55
LVS/CCx/X01	SOL	0	0	-79	105	-79	0	105	0
LVS/CCx/X01	EOL	157500	0	-78.335108	111.333138	-78	20.11	111	19.99
LVS/CCx/X01	EOT	172500	0	-78.265023	111.898142	-78	15.9	111	53.89
LVS/CCx/X03	SOT	-15000	15000	-78.933638	104.070468	-78	56.02	104	4.23
LVS/CCx/X03	SOL	0	15000	-78.878154	104.705852	-78	52.69	104	42.35
LVS/CCx/X03	EOL	157500	15000	-78.219963	110.992633	-78	13.2	110	59.56
LVS/CCx/X03	EOT	172500	15000	-78.150544	111.554234	-78	9.03	111	33.25
LVS/CCx/X05	SOT	-15000	30000	-78.810914	103.788002	-78	48.65	103	47.28
LVS/CCx/X05	SOL	0	30000	-78.756019	104.417962	-78	45.36	104	25.08
LVS/CCx/X05	EOL	157500	30000	-78.104418	110.658609	-78	6.27	110	39.52
LVS/CCx/X05	EOT	172500	30000	-78.035653	111.216795	-78	2.14	111	13.01
LVS/CCx/X07	SOT	-15000	45000	-78.687923	103.511553	-78	41.28	103	30.69
LVS/CCx/X07	SOL	0	45000	-78.633606	104.136146	-78	38.02	104	8.17
LVS/CCx/X07	EOL	157500	45000	-77.988483	110.330901	-77	59.31	110	19.85
LVS/CCx/X07	EOT	172500	45000	-77.920362	110.885666	-77	55.22	110	53.14
LVS/CCx/X09	SOT	-15000	60000	-78.564673	103.240942	-78	33.88	103	14.46
LVS/CCx/X09	SOL	0	60000	-78.510924	103.860227	-78	30.66	103	51.61
LVS/CCx/X09	EOL	157500	60000	-77.87217	110.009353	-77	52.33	110	0.56
LVS/CCx/X09	EOT	172500	60000	-77.804684	110.560694	-77	48.28	110	33.64
LVS/CCx/X11	SOT	-15000	75000	-78.441172	102.975997	-78	26.47	102	58.56
LVS/CCx/X11	SOL	0	75000	-78.38798	103.590033	-78	23.28	103	35.4
LVS/CCx/X11	EOL	157500	75000	-77.755489	109.693811	-77	45.33	109	41.63
LVS/CCx/X11	EOT	172500	75000	-77.688629	110.241726	-77	41.32	110	14.5
LVS/CCx/X13	SOT	-15000	90000	-78.317429	102.716553	-78	19.05	102	42.99
LVS/CCx/X13	SOL	0	90000	-78.264784	103.325398	-78	15.89	103	19.52
LVS/CCx/X13	EOL	157500	90000	-77.638452	109.384126	-77	38.31	109	23.05
LVS/CCx/X13	EOT	172500	90000	-77.572208	109.928617	-77	34.33	109	55.72
LVS/CCx/X15	SOT	-15000	105000	-78.193451	102.46245	-78	11.61	102	27.75
LVS/CCx/X15	SOL	0	105000	-78.141343	103.066165	-78	8.48	103	3.97
LVS/CCx/X15	EOL	157500	105000	-77.521068	109.080154	-77	31.26	109	4.81
LVS/CCx/X15	EOT	172500	105000	-77.455431	109.621223	-77	27.33	109	37.27
LVS/CCx/X17	SOT	-15000	120000	-78.069246	102.213533	-78	4.15	102	12.81
LVS/CCx/X17	SOL	0	120000	-78.017666	102.812177	-78	1.06	102	48.73
LVS/CCx/X17	EOL	157500	120000	-77.403348	108.781752	-77	24.2	108	46.91
LVS/CCx/X17	EOT	172500	120000	-77.338308	109.319406	-77	20.3	109	19.16
LVS/CCx/X19	SOT	-15000	135000	-77.944822	101.969655	-77	56.69	101	58.18
LVS/CCx/X19	SOL	0	135000	-77.893759	102.563288	-77	53.63	102	33.8
LVS/CCx/X19	EOL	157500	135000	-77.285301	108.488786	-77	17.12	108	29.33
LVS/CCx/X19	EOT	172500	135000	-77.22085	109.023031	-77	13.25	109	1.38
LVS/CCx/X21	SOT	-15000	150000	-77.820184	101.730672	-77	49.21	101	43.84
LVS/CCx/X21	SOL	0	150000	-77.76963	102.319353	-77	46.18	102	19.16
LVS/CCx/X21	EOL	157500	150000	-77.166935	108.201121	-77	10.02	108	12.07
LVS/CCx/X21	EOT	172500	150000	-77.103065	108.731967	-77	6.18	108	43.92
LVS/CCx/X23	SOT	-15000	165000	-77.695341	101.496446	-77	41.72	101	29.79
LVS/CCx/X23	SOL	0	165000	-77.645287	102.080235	-77	38.72	102	4.81
LVS/CCx/X23	EOL	157500	165000	-77.048261	107.918628	-77	2.9	107	55.12
LVS/CCx/X23	EOT	172500	165000	-76.984962	108.446086	-76	59.1	108	26.77
LVS/CCx/X25	SOT	-15000	180000	-77.570298	101.266843	-77	34.22	101	16.01
LVS/CCx/X25	SOL	0	180000	-77.520735	101.8458	-77	31.24	101	50.75
LVS/CCx/X25	EOL	157500	180000	-76.929287	107.641182	-76	55.76	107	38.47
LVS/CCx/X25	EOT	172500	180000	-76.866551	108.165264	-76	51.99	108	9.92
LVS/CCx/X27	SOT	-15000	195000	-77.445062	101.041735	-77	26.7	101	2.5
LVS/CCx/X27	SOL	0	195000	-77.395981	101.615918	-77	23.76	101	36.96
LVS/CCx/X27	EOL	157500	195000	-76.810021	107.368661	-76	48.6	107	22.12
LVS/CCx/X27	EOT	172500	195000	-76.74784	107.889381	-76	44.87	107	53.36
LVS/CCx/X29	SOT	-15000	210000	-77.319639	100.820997	-77	19.18	100	49.26
LVS/CCx/X29	SOL	0	210000	-77.271032	101.390466	-77	16.26	101	23.43
LVS/CCx/X29	EOL	157500	210000	-76.690472	107.100947	-76	41.43	107	6.06
LVS/CCx/X29	EOT	172500	210000	-76.628837	107.618319	-76	37.73	107	37.1
LVS/CCx/X31	SOT	-15000	225000	-77.194035	100.604509	-77	11.64	100	36.27
LVS/CCx/X31	SOL	0	225000	-77.145893	101.169322	-77	8.75	101	10.16
LVS/CCx/X31	EOL	157500	225000	-76.570647	106.837923	-76	34.24	106	50.28
LVS/CCx/X31	EOT	172500	225000	-76.509551	107.351964	-76	30.57	107	21.12
LVS/CCx/X33	SOT	-15000	240000	-77.068256	100.392156	-77	4.1	100	23.53
LVS/CCx/X33	SOL	0	240000	-77.020572	100.952371	-77	1.23	100	57.14

LVS/CCx/X33	EOL	157500	240000	-76.450555	106.579478	-76	27.03	106	34.77
LVS/CCx/X33	EOT	172500	240000	-76.389989	107.090205	-76	23.4	107	5.41
LVS/CCx/X35	SOT	-15000	255000	-76.942306	100.183825	-76	56.54	100	11.03
LVS/CCx/X35	SOL	0	255000	-76.895072	100.7395	-76	53.7	100	44.37
LVS/CCx/X35	EOL	157500	255000	-76.330201	106.325504	-76	19.81	106	19.53
LVS/CCx/X35	EOT	172500	255000	-76.270159	106.832934	-76	16.21	106	49.98
LVS/CCx/X37	SOT	-15000	270000	-76.816192	99.979408	-76	48.97	99	58.76
LVS/CCx/X37	SOL	0	270000	-76.7694	100.530601	-76	46.16	100	31.84
LVS/CCx/X37	EOL	157500	270000	-76.209595	106.075894	-76	12.58	106	4.55
LVS/CCx/X37	EOT	172500	270000	-76.150068	106.580047	-76	9	106	34.8
LVS/CCx/X39	SOT	-15000	285000	-76.689918	99.778802	-76	41.4	99	46.73
LVS/CCx/X39	SOL	0	285000	-76.643562	100.325569	-76	38.61	100	19.53
LVS/CCx/X39	EOL	157500	285000	-76.088743	105.830546	-76	5.32	105	49.83
LVS/CCx/X39	EOT	172500	285000	-76.029723	106.331442	-76	1.78	106	19.89
LVS/CCx/X41	SOT	-15000	300000	-76.563491	99.581904	-76	33.81	99	34.91
LVS/CCx/X41	SOL	0	300000	-76.517561	100.124302	-76	31.05	100	7.46
LVS/CCx/X41	EOL	157500	300000	-75.967652	105.589359	-75	58.06	105	35.36
LVS/CCx/X41	EOT	172500	300000	-75.909132	106.087019	-75	54.55	106	5.22
LVS/CCx/X43	SOT	-15000	315000	-76.436913	99.388617	-76	26.21	99	23.32
LVS/CCx/X43	SOL	0	315000	-76.391404	99.926701	-76	23.48	99	55.6
LVS/CCx/X43	EOL	157500	315000	-75.846327	105.352238	-75	50.78	105	21.13
LVS/CCx/X43	EOT	172500	315000	-75.788302	105.846682	-75	47.3	105	50.8
LVS/CCx/X45	SOT	-15000	330000	-76.310191	99.198848	-76	18.61	99	11.93
LVS/CCx/X45	SOL	0	330000	-76.265095	99.732673	-76	15.91	99	43.96
LVS/CCx/X45	EOL	157500	330000	-75.724777	105.119087	-75	43.49	105	7.15
LVS/CCx/X45	EOT	172500	330000	-75.667237	105.610337	-75	40.03	105	36.62
LVS/CCx/X02	SOT	172500	7500	-78.207836	111.725369	-78	12.47	111	43.52
LVS/CCx/X02	SOL	157500	7500	-78.277587	111.162065	-78	16.66	111	9.72
LVS/CCx/X02	EOL	0	7500	-78.939113	104.852132	-78	56.35	104	51.13
LVS/CCx/X02	EOT	-15000	7500	-78.994897	104.214015	-78	59.69	104	12.84
LVS/CCx/X04	SOT	172500	22500	-78.093149	111.384715	-78	5.59	111	23.08
LVS/CCx/X04	SOL	157500	22500	-78.16224	110.824821	-78	9.73	110	49.49
LVS/CCx/X04	EOL	0	22500	-78.817122	104.561136	-78	49.03	104	33.67
LVS/CCx/X04	EOT	-15000	22500	-78.87231	103.928471	-78	52.34	103	55.71
LVS/CCx/X06	SOT	172500	37500	-77.978057	111.050451	-77	58.68	111	3.03
LVS/CCx/X06	SOL	157500	37500	-78.046498	110.493975	-78	2.79	110	29.64
LVS/CCx/X06	EOL	0	37500	-78.694847	104.276306	-78	41.69	104	16.58
LVS/CCx/X06	EOT	-15000	37500	-78.749452	103.649037	-78	44.97	103	38.94
LVS/CCx/X08	SOT	172500	52500	-77.862571	110.72242	-77	51.75	110	43.35
LVS/CCx/X08	SOL	157500	52500	-77.930373	110.169367	-77	55.82	110	10.16
LVS/CCx/X08	EOL	0	52500	-78.572298	103.99746	-78	34.34	103	59.85
LVS/CCx/X08	EOT	-15000	52500	-78.62633	103.375528	-78	37.58	103	22.53
LVS/CCx/X10	SOT	172500	67500	-77.746703	110.400468	-77	44.8	110	24.03
LVS/CCx/X10	SOL	157500	67500	-77.813875	109.850841	-77	48.83	109	51.05
LVS/CCx/X10	EOL	0	67500	-78.449484	103.724425	-78	26.97	103	43.47
LVS/CCx/X10	EOT	-15000	67500	-78.502953	103.107771	-78	30.18	103	6.47
LVS/CCx/X12	SOT	172500	82500	-77.630464	110.084448	-77	37.83	110	5.07
LVS/CCx/X12	SOL	157500	82500	-77.697015	109.538246	-77	41.82	109	32.29
LVS/CCx/X12	EOL	0	82500	-78.326413	103.457031	-78	19.58	103	27.42
LVS/CCx/X12	EOT	-15000	82500	-78.37933	102.845597	-78	22.76	102	50.74
LVS/CCx/X14	SOT	172500	97500	-77.513863	109.774214	-77	30.83	109	46.45
LVS/CCx/X14	SOL	157500	97500	-77.579803	109.231435	-77	34.79	109	13.89
LVS/CCx/X14	EOL	0	97500	-78.203094	103.195116	-78	12.19	103	11.71
LVS/CCx/X14	EOT	-15000	97500	-78.255469	102.588843	-78	15.33	102	35.33
LVS/CCx/X16	SOT	172500	112500	-77.396912	109.469626	-77	23.81	109	28.18
LVS/CCx/X16	SOL	157500	112500	-77.46225	108.930265	-77	27.73	108	55.82
LVS/CCx/X16	EOL	0	112500	-78.079534	102.938524	-78	4.77	102	56.31
LVS/CCx/X16	EOT	-15000	112500	-78.131377	102.337353	-78	7.88	102	20.24
LVS/CCx/X18	SOT	172500	127500	-77.27962	109.170547	-77	16.78	109	10.23
LVS/CCx/X18	SOL	157500	127500	-77.344365	108.634598	-77	20.66	108	38.08
LVS/CCx/X18	EOL	0	127500	-77.955741	102.687104	-77	57.34	102	41.23
LVS/CCx/X18	EOT	-15000	127500	-78.007061	102.090974	-78	0.42	102	5.46
LVS/CCx/X20	SOT	172500	142500	-77.161997	108.876843	-77	9.72	108	52.61
LVS/CCx/X20	SOL	157500	142500	-77.226157	108.344299	-77	13.57	108	20.66
LVS/CCx/X20	EOL	0	142500	-77.831722	102.44071	-77	49.9	102	26.44
LVS/CCx/X20	EOT	-15000	142500	-77.882529	101.849561	-77	52.95	101	50.97
LVS/CCx/X22	SOT	172500	157500	-77.044052	108.588387	-77	2.64	108	35.3
LVS/CCx/X22	SOL	157500	157500	-77.107636	108.059236	-77	6.46	108	3.55
LVS/CCx/X22	EOL	0	157500	-77.707485	102.199201	-77	42.45	102	11.95

LVS/CCx/X22	EOT	-15000	157500	-77.757788	101.612973	-77	45.47	101	36.78
LVS/CCx/X24	SOT	172500	172500	-76.925794	108.30505	-76	55.55	108	18.3
LVS/CCx/X24	SOL	157500	172500	-76.988811	107.779282	-76	59.33	107	46.76
LVS/CCx/X24	EOL	0	172500	-77.583036	101.96244	-77	34.98	101	57.75
LVS/CCx/X24	EOT	-15000	172500	-77.632844	101.381075	-77	37.97	101	22.86
LVS/CCx/X26	SOT	172500	187500	-76.807232	108.026713	-76	48.43	108	1.6
LVS/CCx/X26	SOL	157500	187500	-76.86969	107.504314	-76	52.18	107	30.26
LVS/CCx/X26	EOL	0	187500	-77.458383	101.730297	-77	27.5	101	43.82
LVS/CCx/X26	EOT	-15000	187500	-77.507704	101.153735	-77	30.46	101	9.22
LVS/CCx/X28	SOT	172500	202500	-76.688374	107.753254	-76	41.3	107	45.2
LVS/CCx/X28	SOL	157500	202500	-76.750282	107.234211	-76	45.02	107	14.05
LVS/CCx/X28	EOL	0	202500	-77.33353	101.502646	-77	20.01	101	30.16
LVS/CCx/X28	EOT	-15000	202500	-77.382374	100.930827	-77	22.94	100	55.85
LVS/CCx/X30	SOT	172500	217500	-76.569229	107.48456	-76	34.15	107	29.07
LVS/CCx/X30	SOL	157500	217500	-76.630594	106.968856	-76	37.84	106	58.13
LVS/CCx/X30	EOL	0	217500	-77.208486	101.279363	-77	12.51	101	16.76
LVS/CCx/X30	EOT	-15000	217500	-77.256859	100.712229	-77	15.41	100	42.73
LVS/CCx/X32	SOT	172500	232500	-76.449804	107.220516	-76	26.99	107	13.23
LVS/CCx/X32	SOL	157500	232500	-76.510634	106.708135	-76	30.64	106	42.49
LVS/CCx/X32	EOL	0	232500	-77.083255	101.06033	-77	5	101	3.62
LVS/CCx/X32	EOT	-15000	232500	-77.131167	100.497822	-77	7.87	100	29.87
LVS/CCx/X34	SOT	172500	247500	-76.330107	106.961015	-76	19.81	106	57.66
LVS/CCx/X34	SOL	157500	247500	-76.39041	106.451939	-76	23.42	106	27.12
LVS/CCx/X34	EOL	0	247500	-76.957844	100.845433	-76	57.47	100	50.73
LVS/CCx/X34	EOT	-15000	247500	-77.005302	100.287494	-77	0.32	100	17.25
LVS/CCx/X36	SOT	172500	262500	-76.210145	106.705949	-76	12.61	106	42.36
LVS/CCx/X36	SOL	157500	262500	-76.26993	106.20016	-76	16.2	106	12.01
LVS/CCx/X36	EOL	0	262500	-76.832257	100.634561	-76	49.94	100	38.07
LVS/CCx/X36	EOT	-15000	262500	-76.879269	100.081134	-76	52.76	100	4.87
LVS/CCx/X38	SOT	172500	277500	-76.089927	106.455216	-76	5.4	106	27.31
LVS/CCx/X38	SOL	157500	277500	-76.1492	105.952694	-76	8.95	105	57.16
LVS/CCx/X38	EOL	0	277500	-76.706501	100.427608	-76	42.39	100	25.66
LVS/CCx/X38	EOT	-15000	277500	-76.753075	99.878635	-76	45.18	99	52.72
LVS/CCx/X40	SOT	172500	292500	-75.969458	106.208713	-75	58.17	106	12.52
LVS/CCx/X40	SOL	157500	292500	-76.028227	105.709439	-76	1.69	105	42.57
LVS/CCx/X40	EOL	0	292500	-76.580581	100.224471	-76	34.83	100	13.47
LVS/CCx/X40	EOT	-15000	292500	-76.626723	99.679895	-76	37.6	99	40.79
LVS/CCx/X42	SOT	172500	307500	-75.848747	105.966345	-75	50.92	105	57.98
LVS/CCx/X42	SOL	157500	307500	-75.907018	105.470297	-75	54.42	105	28.22
LVS/CCx/X42	EOL	0	307500	-76.454502	100.025049	-76	27.27	100	1.5
LVS/CCx/X42	EOT	-15000	307500	-76.50022	99.484815	-76	30.01	99	29.09
LVS/CCx/X44	SOT	172500	322500	-75.727798	105.728016	-75	43.67	105	43.68
LVS/CCx/X44	SOL	157500	322500	-75.78558	105.235172	-75	47.13	105	14.11
LVS/CCx/X44	EOL	0	322500	-76.328269	99.829247	-76	19.7	99	49.75
LVS/CCx/X44	EOT	-15000	322500	-76.37357	99.293299	-76	22.41	99	17.6
LVS/CCy/Y01	SOT	0	-15000	-79.121549	105.300598	-79	7.29	105	18.04
LVS/CCy/Y01	SOL	0	0	-79	105	-79	0	105	0
LVS/CCy/Y01	BP1	0	150000	-77.76963	102.319353	-77	46.18	102	19.16
LVS/CCy/Y01	BP2	0	180000	-77.520735	101.8458	-77	31.24	101	50.75
LVS/CCy/Y01	EOL	0	330000	-76.265095	99.732673	-76	15.91	99	43.96
LVS/CCy/Y01	EOT	0	345000	-76.13864	99.542125	-76	8.32	99	32.53
LVS/CCy/Y03	SOT	22500	-15000	-79.034015	106.257722	-79	2.04	106	15.46
LVS/CCy/Y03	SOL	22500	0	-78.9134	105.949191	-78	54.8	105	56.95
LVS/CCy/Y03	BP1	22500	150000	-77.69148	103.193328	-77	41.49	103	11.6
LVS/CCy/Y03	BP2	22500	180000	-77.444101	102.70568	-77	26.65	102	42.34
LVS/CCy/Y03	EOL	22500	330000	-76.195312	100.526871	-76	11.72	100	31.61
LVS/CCy/Y03	EOT	22500	345000	-76.069481	100.330183	-76	4.17	100	19.81
LVS/CCy/Y05	SOT	45000	-15000	-78.943559	107.199741	-78	56.61	107	11.98
LVS/CCy/Y05	SOL	45000	0	-78.823893	106.883716	-78	49.43	106	53.02
LVS/CCy/Y05	BP1	45000	150000	-77.610592	104.056288	-77	36.64	104	3.38
LVS/CCy/Y05	BP2	45000	180000	-77.364764	103.555136	-77	21.89	103	33.31
LVS/CCy/Y05	EOL	45000	330000	-76.122995	101.313068	-76	7.38	101	18.78
LVS/CCy/Y05	EOT	45000	345000	-75.997805	101.110442	-75	59.87	101	6.63
LVS/CCy/Y07	SOT	67500	-15000	-78.850247	108.126536	-78	51.01	108	7.59
LVS/CCy/Y07	SOL	67500	0	-78.731546	107.803452	-78	43.89	107	48.21
LVS/CCy/Y07	BP1	67500	150000	-77.52702	104.908075	-77	31.62	104	54.48
LVS/CCy/Y07	BP2	67500	180000	-77.282773	104.394007	-77	16.97	104	23.64
LVS/CCy/Y07	EOL	67500	330000	-76.048183	102.091109	-76	2.89	102	5.47
LVS/CCy/Y07	EOT	67500	345000	-75.923649	101.882748	-75	55.42	101	52.96

LVS/CCy/Y09	SOT	90000	-15000	-78.754151	109.038024	-78	45.25	109	2.28
LVS/CCy/Y09	SOL	90000	0	-78.636427	108.708308	-78	38.19	108	42.5
LVS/CCy/Y09	BP1	90000	150000	-77.440815	105.748554	-77	26.45	105	44.91
LVS/CCy/Y09	BP2	90000	180000	-77.19818	105.222155	-77	11.89	105	13.33
LVS/CCy/Y09	EOL	90000	330000	-75.970914	102.860852	-75	58.25	102	51.65
LVS/CCy/Y09	EOT	90000	345000	-75.847052	102.646959	-75	50.82	102	38.82
LVS/CCy/Y11	SOT	112500	-15000	-78.655338	109.934155	-78	39.32	109	56.05
LVS/CCy/Y11	SOL	112500	0	-78.538603	109.598223	-78	32.32	109	35.89
LVS/CCy/Y11	BP1	112500	150000	-77.35203	106.577612	-77	21.12	106	34.66
LVS/CCy/Y11	BP2	112500	180000	-77.111034	106.039463	-77	6.66	106	2.37
LVS/CCy/Y11	EOL	112500	330000	-75.89123	103.62217	-75	53.47	103	37.33
LVS/CCy/Y11	EOT	112500	345000	-75.768053	103.402947	-75	46.08	103	24.18
LVS/CCy/Y13	SOT	135000	-15000	-78.553878	110.814907	-78	33.23	110	48.89
LVS/CCy/Y13	SOL	135000	0	-78.438141	110.473167	-78	26.29	110	28.39
LVS/CCy/Y13	BP1	135000	150000	-77.26072	107.395158	-77	15.64	107	23.71
LVS/CCy/Y13	BP2	135000	180000	-77.021386	106.845832	-77	1.28	106	50.75
LVS/CCy/Y13	EOL	135000	330000	-75.809171	104.374948	-75	48.55	104	22.5
LVS/CCy/Y13	EOT	135000	345000	-75.686691	104.150599	-75	41.2	104	9.04
LVS/CCy/Y15	SOT	157500	-15000	-78.449839	111.680288	-78	26.99	111	40.82
LVS/CCy/Y15	SOL	157500	0	-78.335108	111.333138	-78	20.11	111	19.99
LVS/CCy/Y15	BP1	157500	150000	-77.166935	108.201121	-77	10.02	108	12.07
LVS/CCy/Y15	BP2	157500	180000	-76.929287	107.641182	-76	55.76	107	38.47
LVS/CCy/Y15	EOL	157500	330000	-75.724777	105.119087	-75	43.49	105	7.15
LVS/CCy/Y15	EOT	157500	345000	-75.603007	104.889814	-75	36.18	104	53.39
LVS/CCy/Y02	SOT	11250	345000	-76.104377	99.937118	-76	6.26	99	56.23
LVS/CCy/Y02	SOL	11250	330000	-76.230523	100.130761	-76	13.83	100	7.85
LVS/CCy/Y02	BP1	11250	180000	-77.482759	102.277032	-77	28.97	102	16.62
LVS/CCy/Y02	BP2	11250	150000	-77.730901	102.757707	-77	43.85	102	45.46
LVS/CCy/Y02	EOL	11250	0	-78.957068	105.47642	-78	57.42	105	28.59
LVS/CCy/Y02	EOT	11250	-15000	-79.078152	105.78104	-79	4.69	105	46.86
LVS/CCy/Y04	SOT	33750	345000	-76.033955	100.721297	-76	2.04	100	43.28
LVS/CCy/Y04	SOL	33750	330000	-76.159468	100.920979	-76	9.57	100	55.26
LVS/CCy/Y04	BP1	33750	180000	-77.404767	103.131721	-77	24.29	103	7.9
LVS/CCy/Y04	BP2	33750	150000	-77.651375	103.626195	-77	39.08	103	37.57
LVS/CCy/Y04	EOL	33750	0	-78.869006	106.418295	-78	52.14	106	25.1
LVS/CCy/Y04	EOT	33750	-15000	-78.989148	106.730628	-78	59.35	106	43.84
LVS/CCy/Y12	SOT	123750	345000	-75.727665	103.777822	-75	43.66	103	46.67
LVS/CCy/Y12	SOL	123750	330000	-75.850495	103.999632	-75	51.03	103	59.98
LVS/CCy/Y12	BP1	123750	180000	-77.06652	106.44402	-77	3.99	106	26.64
LVS/CCy/Y12	BP2	123750	150000	-77.306688	106.987829	-77	18.4	106	59.27
LVS/CCy/Y12	EOL	123750	0	-78.488697	110.037567	-78	29.32	110	2.25
LVS/CCy/Y12	EOT	123750	-15000	-78.604935	110.376454	-78	36.3	110	22.59
LVS/CCy/Y14	SOT	146250	345000	-75.645137	104.521267	-75	38.71	104	31.28
LVS/CCy/Y14	SOL	146250	330000	-75.767263	104.748103	-75	46.04	104	44.89
LVS/CCy/Y14	BP1	146250	180000	-76.97564	107.244888	-76	58.54	107	14.69
LVS/CCy/Y14	BP2	146250	150000	-77.214133	107.799591	-77	12.85	107	47.98
LVS/CCy/Y14	EOL	146250	0	-78.386942	110.905023	-78	23.22	110	54.3
LVS/CCy/Y14	EOT	146250	-15000	-78.502177	111.249517	-78	30.13	111	14.97

LVS Regional Line Waypoints

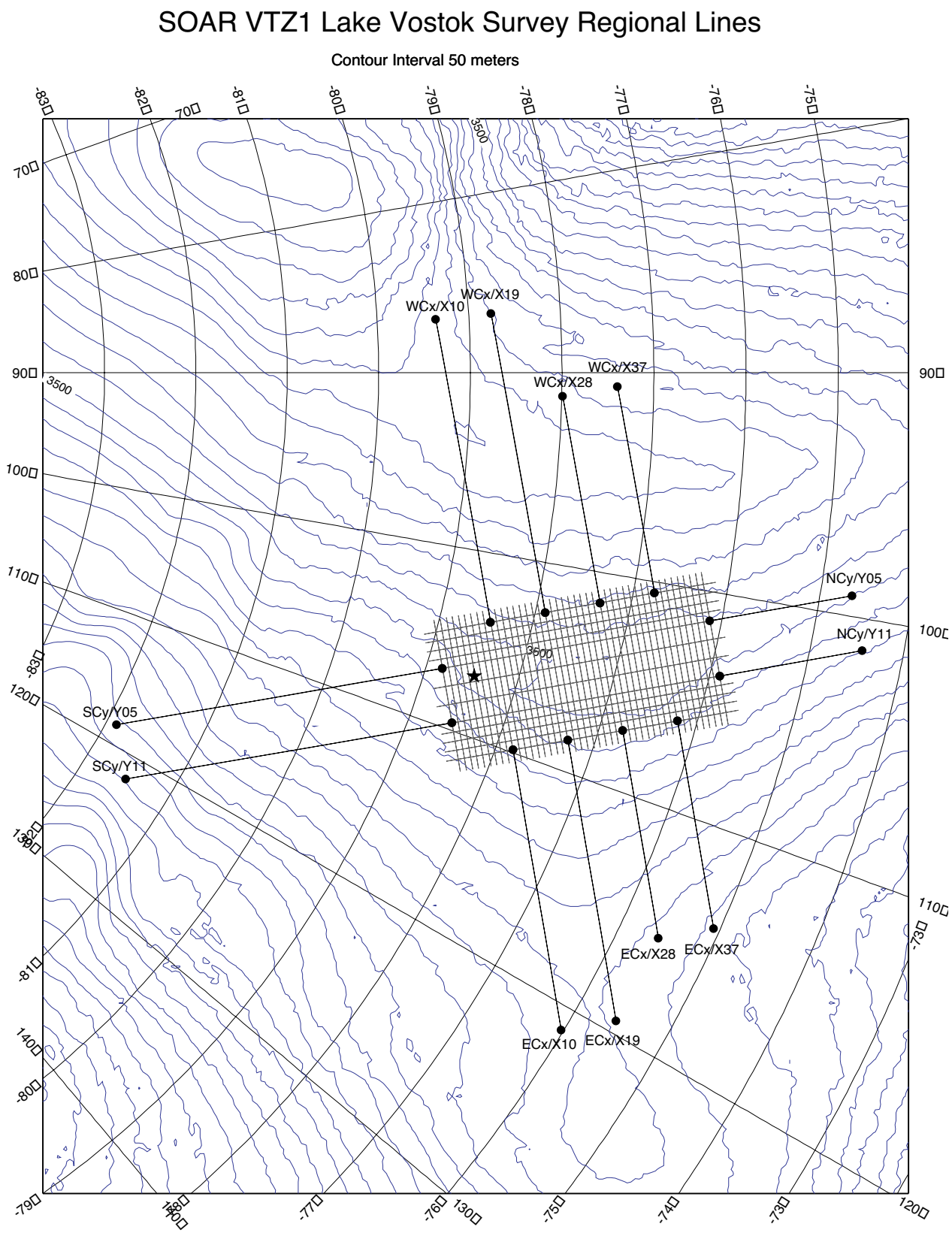
LVS/NCy/Y05	BEG	SOT	45000	330000	-76.122995	101.313068	-76	7.38	101	18.78
LVS/NCy/Y05	END	EOT	45000	505000	-74.653236	99.152708	-74	39.19	99	9.16
LVS/NCy/Y11	BEG	SOT	112500	330000	-75.89123	103.62217	-75	53.47	103	37.33
LVS/NCy/Y11	END	EOT	112500	505000	-74.443163	101.278659	-74	26.59	101	16.72
LVS/SCy/Y05	BEG	SOT	45000	0	-78.823893	106.883716	-78	49.43	106	53.02
LVS/SCy/Y05	END	BP13	45000	-405000	-81.891943	118.518484	-81	53.52	118	31.11
LVS/SCy/Y11	BEG	SOT	112500	0	-78.538603	109.598223	-78	32.32	109	35.89
LVS/SCy/Y11	END	EOL	112500	-405000	-81.506848	121.726204	-81	30.41	121	43.57
LVS/WCx/X10	BEG	SOT	0	67500	-78.449484	103.724425	-78	26.97	103	43.47
LVS/WCx/X10	END	BP12	-375000	67500	-79.35839	86.864462	-79	21.5	86	51.87
LVS/WCx/X19	BEG	SOT	0	135000	-77.893759	102.563288	-77	53.63	102	33.8
LVS/WCx/X19	END	EOT	-370000	135000	-78.753338	86.696903	-78	45.2	86	41.81
LVS/WCx/X28	BEG	SOT	0	202500	-77.33353	101.502646	-77	20.01	101	30.16
LVS/WCx/X28	END	BP8	-255000	202500	-77.988464	91.248701	-77	59.31	91	14.92
LVS/WCx/X37	BEG	SOT	0	270000	-76.7694	100.530601	-76	46.16	100	31.84
LVS/WCx/X37	END	EOL	-255000	270000	-77.395586	90.691648	-77	23.74	90	41.5
LVS/ECx/X10	BEG	SOT	157500	67500	-77.813875	109.850841	-77	48.83	109	51.05
LVS/ECx/X10	END	BP11	502500	67500	-76.025428	121.02757	-76	1.53	121	1.65
LVS/ECx/X19	BEG	SOT	157500	135000	-77.285301	108.488786	-77	17.12	108	29.33
LVS/ECx/X19	END	EOT	502500	135000	-75.561169	119.449481	-75	33.67	119	26.97
LVS/ECx/X28	BEG	SOT	157500	202500	-76.750282	107.234211	-76	45.02	107	14.05
LVS/ECx/X28	END	BP8	412500	202500	-75.565412	115.408499	-75	33.92	115	24.51
LVS/ECx/X37	BEG	SOT	157500	270000	-76.209595	106.075894	-76	12.58	106	4.55
LVS/ECx/X37	END	EOT	412500	270000	-75.067055	114.058702	-75	4.02	114	3.52

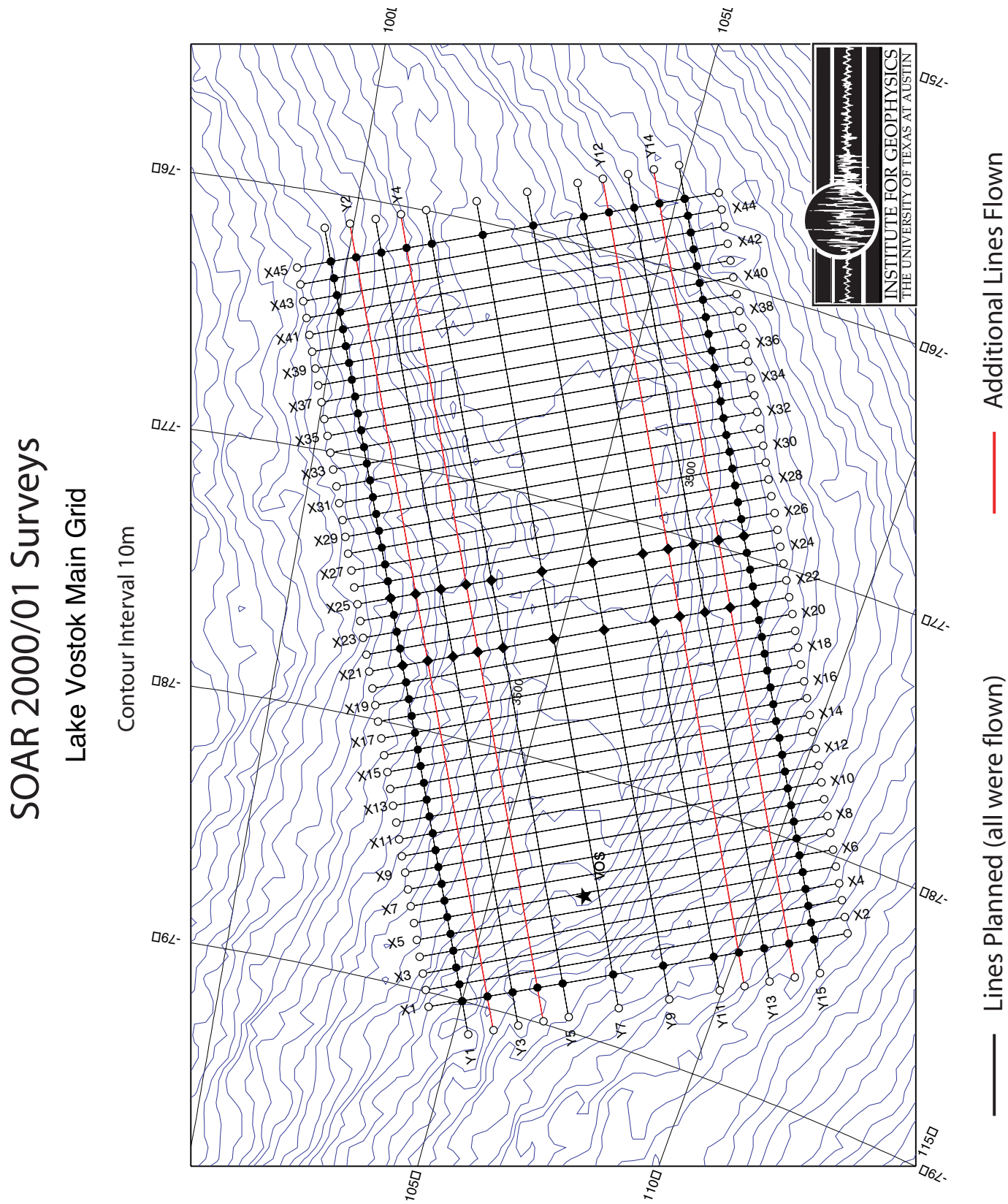
Projection Parameters used for LVS

lvs.peony

```
#  parameters for the LVS survey
#  JWH 24-11-00
#

4       # Lambert Conformal Conic

6378137 # Semi-major Axis (A)
6356752.3141    # Semi-minor Bxis (B)
-76     # First Standard Parallel (SPU)
-78     # Second Standard Parallel (SPL)
105     # Center Meridian (BLON)
-79     # Projection Origin (BLAT)
0       # False Easting (SHFTX)
0       # False Northing (SHFTY)

0       # Unused
0       # Unused
0       # Unused
0       # Unused
0       # Unused
0       # Unused
```

Survey Maps


SOAR VTZ1 Lake Vostok Survey Regional Lines
Contour Interval 50 meters
WCx/X10
WCx/X19
WCx/X28
WCx/X37
NCy/Y05
NCy/Y11
SCy/Y05
SCy/Y11
ECx/X10
ECx/X19
ECx/X28
ECx/X37
3500


SOAR 2000/01 Surveys
Lake Vostok Main Grid
Contour Interval 10m
INSTITUTE FOR GEOPHYSICS
THE UNIVERSITY OF TEXAS AT AUSTIN
Lines Planned (all were flown)
Additional Lines Flown
VOS
3500
3900
100
105
110
115
-75
-76
-77
-78
-79

DCS

Project Information

Project Name on Proposal: Collaborative Research: A Broadband Seismic Investigation of Deep Continental Structure Across the East-West Antarctic Boundary

Principal Investigators: Sridhar Anandakrishnan of U. of Alabama, Douglas Wiens of Washington University, and Andrew Nyblade of Pennsylvania State University

Project Objectives: A series of three parallel lines spaced 5km apart (approximately 1200 km in length), extending from AGO4 toward Taylor Dome. Endpoints (one each end) were provided by the PI's. Radar sounding of subsurface topography was primary data stream.

Summary of Operations:

The lines were flown in 10 flights, with some repeats for improvement of potential fields data. With the exception of the pressure altimeter data stream (used for gravity QC) on early flights, all data appears to be of excellent quality.

Flight Information:
A. Flight Targets: see attached

B. Coordinate System: see attached

C. Elevations: see attached

D. Radar Resolutions: Radar settings were 250 ns pulsewidth, 4 MHz bandwidth, 80 microsecond pulse interval, 2048 returns stacked

E. Radar Blanking: No radar blanking necessary

F. Radar Altimeter: Used at pilot's discretion

G. Extended Run-ins and Run-outs: Transect segments overlap as much as feasible with minimum overlap of 5 km.

H. Communication of Flight Plans: designated point of contact between pilots and SOAR (JWH & TGR)

I. Flight Sequencing: scheduled as weather permitted

J. Flight Times: Flight windows were established consistent with low magnetic noise periods at the main base from which the flights originated.

	GMT
NGD	0400-1000
	1000-1600
	2200-0400
VOS	0100-0700
	1300-1900
	1900-0100

K. Flight Planning Documents: prepared by JWH or TGR and distributed to flight crews prior to each flight. Copies of all flight plans are saved as part of SOAR flight logs.

L. Reflight Criteria: Any transects for which a major geophysical data stream is missing is priority for reflight. Dedicated reflights only after all initially planned lines are flown.

M. Weather Contingencies: Within a transect, jumps of 1000 feet can be made within a flight line, given bad weather. Abort if clouds.

N. Leap Second: N/A

O. Gravity ties: Measurements were taken with a Lacoste and Rumberg meter at McMurdo, Seismic Center, and Vostok. Absolute tie available at McMurdo.

P. Base Station Issues: NGD was base of operations for F01-F07 and TF10, with CTR as a refueling stop and temporary base station for some lines. VOS was base of operations for F46-F48, with AGO4 used as a refueling stop. See Flight Summary Sheet for specifics.

Q. QC Review: Data was broken out immediately following each flight, except flights that landed at CTR where no QC facilities were available. Each flight line is given an initial review and rated for overall data quality. Determination of whether reflights were required were made at that time.

R. GPS mask angle: 10 degrees unless holes are introduced, then decrease to 5 degrees

S. PST Names: File names incorporate the SOAR project acronym for the project name with geography indicated withing the sets:
DCS / DCSx / X0(1-3)(a-z)

T. Waypoint List: See attached.

DCS Waypoints

DCS line x1

Waypoint	LON	LAT
1	156.55918	-77.368411
2	155.771984	-77.578083
3	154.95837	-77.785399
4	154.117303	-77.990237
5	153.247721	-78.192465
6	152.348541	-78.391947
7	151.418659	-78.588536
8	150.456958	-78.782082
9	149.462313	-78.972423
10	148.433599	-79.159389
11	147.369695	-79.342804
12	146.269501	-79.522482
13	145.131941	-79.698229
14	143.955983	-79.869839
15	142.74065	-80.037103
16	141.485038	-80.199798
17	140.188333	-80.357696
18	138.849833	-80.51056
19	137.468971	-80.658145
20	136.045337	-80.800203
21	134.578701	-80.936475
22	133.069043	-81.066702
23	131.51658	-81.190621
24	129.921785	-81.307966
25	128.285421	-81.418473
26	126.608555	-81.521882
27	124.892586	-81.617935
28	123.139252	-81.706385
29	121.350648	-81.786992
30	119.529223	-81.859531
31	117.677782	-81.923794
32	115.799468	-81.97959
33	113.897747	-82.02675
34	111.976374	-82.065131
35	110.039359	-82.094613
36	108.090915	-82.115108
37	106.135415	-82.126556
38	104.177323	-82.128929
39	102.221143	-82.12223
40	100.271351	-82.106495
41	98.332336	-82.081789
42	96.408339	-82.048209
43	94.503406	-82.005878

DCS line x2

1	156.398866	-77.340141
2	155.610793	-77.549345
3	154.796397	-77.756184
4	153.954654	-77.960533
5	153.084516	-78.162264
6	152.184913	-78.361237
7	151.254758	-78.557309
8	150.29295	-78.750328
9	149.298383	-78.940132
10	148.269951	-79.126554
11	147.206554	-79.309417
12	146.107114	-79.488536
13	144.970577	-79.663716
14	143.795938	-79.834756
15	142.582242	-80.001445
16	141.328612	-80.163563
17	140.03426	-80.320882
18	138.698512	-80.473169
19	137.320825	-80.62018
20	135.900813	-80.761667
21	134.438271	-80.897377
22	132.933201	-81.027051
23	131.385837	-81.15043
24	129.796669	-81.26725
25	128.166467	-81.377251
26	126.496306	-81.480176
27	124.787583	-81.57577
28	123.042028	-81.663788
29	121.261722	-81.743996
30	119.449089	-81.816172
31	117.606903	-81.880109
32	115.738269	-81.935621
33	113.846602	-81.98254
34	111.935604	-82.020726
35	110.009221	-82.050062
36	108.0716	-82.070461
37	106.12704	-82.081863
38	104.179933	-82.084242
39	102.234705	-82.0776
40	100.295758	-82.061973
41	98.367409	-82.037424
42	96.453831	-82.00405
43	94.559004	-81.961972

DCS line x3

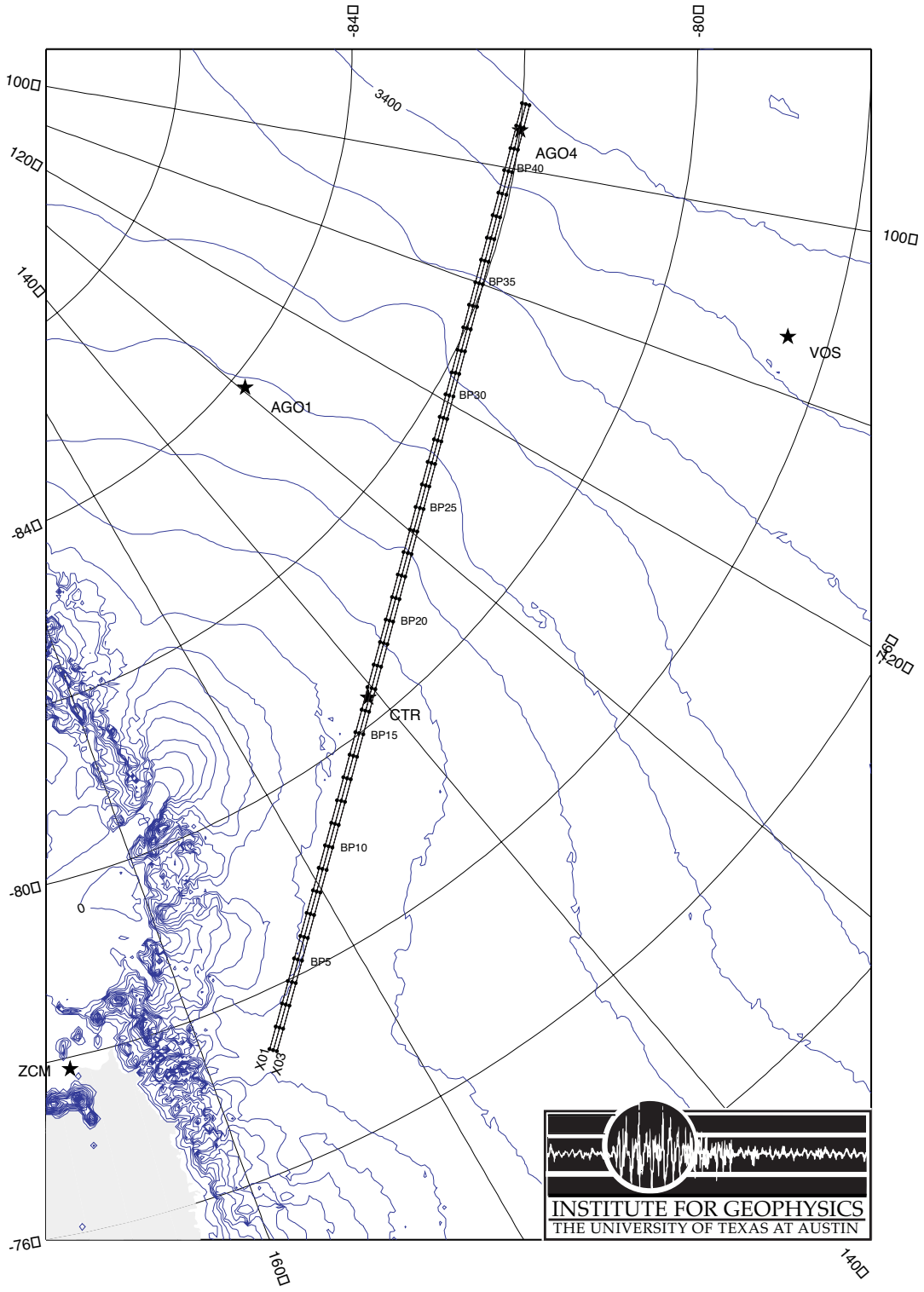
1	156.239254	-77.311776
2	155.450334	-77.520513
3	154.635184	-77.726875
4	153.792795	-77.930737
5	152.92213	-78.13197
6	152.022134	-78.330436
7	151.091736	-78.525992
8	150.129852	-78.718485
9	149.135394	-78.907754
10	148.107274	-79.093634
11	147.044415	-79.275946
12	145.945757	-79.454507
13	144.810273	-79.629125
14	143.636977	-79.799597
15	142.424943	-79.965713
16	141.173318	-80.127257
17	139.881339	-80.284002
18	138.548357	-80.435714
19	137.173854	-80.582154
20	135.757471	-80.723076
21	134.299023	-80.858227
22	132.798535	-80.987352
23	131.256256	-81.110195
24	129.672692	-81.226494
25	128.048623	-81.335994
26	126.385129	-81.438438
27	124.683603	-81.533577
28	122.945771	-81.621169
29	121.173694	-81.700982
30	119.369777	-81.772798
31	117.536761	-81.836413
32	115.67771	-81.891643
33	113.795995	-81.938325
34	111.895261	-81.976318
35	109.979395	-82.00551
36	108.052477	-82.025813
37	106.118736	-82.037171
38	104.18249	-82.039555
39	102.248092	-82.03297
40	100.319871	-82.017449
41	98.402071	-81.993056
42	96.498801	-81.959885
43	94.613977	-81.918057

Projection Parameters used for DCS

dcs.peony

```
# file generated by DLM 12/9/00
10 # Stereographic
6356752.3141    # Sphere (Semi-minor Axis, B)
0 # not used
0 # not used
0 # not used
157.900 # center longitude
-76.9151 # center latitude
0 # false easting
0 # false northing
0 # not used
0 # not used
0 # not used
0 # not used
0 # not used
0 # not used
0 # not used
142.5343535 # rotation
```

Survey Map


SOAR 2000/01 Surveys
DCS Lines
Contour Interval 200m
-84
-80
100
120
140
3400
AGO4
BP40
BP35
VOS
AGO1
BP30
BP25
BP20
CTR
BP15
BP10
0
BP5
ZCM
-76
160
140
INSTITUTE FOR GEOPHYSICS
THE UNIVERSITY OF TEXAS AT AUSTIN

Quality Control

Notes on Quality Ratings

(updated May 2001)

1. POS

The POS data for each of the Tuborogue and Ashtech data sets are rated 1 if they: started before takeoff, ended sometime after landing, are without obvious dropouts in the differential pseudorange solution, and do not contain adjacent simultaneous cycle slips of three or more satellites. If any one of these criteria are violated the POS data are given a rating of 2. If more than one of these criteria (or more than one simultaneous slip of three or more satellites) occur, the data are rated a 3. (SEP, ASH, & TRB)

2. Base MAG

It has been found that if the base mag shows a range of greater than 100 gammas during a given transect there are often level shifts between that transect and adjacent ones, and that transects flown during quieter magnetic periods (indicated by base mag ranges of less than 100 gammas during the transect) are never shifted relative to their neighbors. Therefore transects whose base mag range is greater than 100 gammas are ranked a 3. Transects whose corresponding base mag range is less than 100 gammas but were recorded during noisy mag periods should be ranked a 2. A quality rating of 1 should be assigned to all transect data ranging less than 100 gammas during quiet mag periods.

3. RAD

Radar data receives joint surface/bed ratings. If the radar data shows continuous surface/bed despite 20% or less drop-outs, it should be rated a 1/1. If the drop-outs obscure the surface/bed for between 20% and 80% of the transect it should be rated a 2/2. If the surface/bed is obscured for more than 80% of the transect, it should be rated a 3/3. Mixed ratings are probable.

4. GRV

Tum-induced anomalies at the beginning of the transect are easy to see, however, vertical accelerations of the plane caused by sudden altitude changes are not removed from the gravity data. Transects rate a 1 only if there are no major turbulence or altitude changes that disrupt the gravity data. If there are one or two events that cause isolated disruptions, the transect rates a 2. If the gravity data for an entire transect is corrupted by turbulence or altitude shifts, the transect rates a 3.

5. MAG

If the aeromagnetic data have few or no drop-outs, it should be ranked a 1. If dropouts are present for greater than about 20% of the transect, but the signal is observable, then it should be ranked a 2. If the signal level of the data is not observable because of drop outs over more than 80% of the transect, it should be rated a 3.

6. LAS

If the laser data shows the surface over more than 80% of the transect, despite drop-outs, it should be rated a 1. If the drop-outs obscure the surface for between about 20% and 80% of the transect then it should be rated a 2. If the surface is obscured for more than 80% of the transect, it should be rated a 3.

7. AVN

If the AVN data have few or no drop-outs, it should be rated a 1. If drop-outs are present for greater than about 20% of the transect, but the signal is observable then it should be rated a 2. If the signal level of the data is not observable for over 80% of the transect because of drop-outs, it should be rated a 3.

8. PRS

If the PRS data have few or no drop-outs, it should be rated a 1. If drop-outs are present for greater than about 20% of the transect, but the signal is observable, then it should be rated a 2. If the signal level of the data is not observable for over 80% of the transect because of drop-outs, it should be rated a 3.

9. NAV

If the cross-track stays under +/- 25 m, it should be rated a 1. If cross-track is more than +/- 25 m for greater than about 20% of the transect then it should be rated a 2. If the cross-track is greater than +/- 25 m for greater than 80% of the transect, it should be rated a 3.

10. Weather

If the weather was sunny and clear throughout the transect, it is rated a 1. If there were intermittent clouds, the weather is rated a 2. If it was cloudy throughout the transect, the weather is rated a 3. (If the weather caused no degradations it receives a 1. Otherwise, it receives the worst weather caused rating)

QC Summary Tables

DCS QC Summaries by Transect Name

DCS QC Summary (VTZ1) — 1 good, 2 fair, 3 poor

DCSx/X	Flt	frm BP	to BP	POS Loc	POS^	b-mag	Srf	Bed	G	M	L	A	P	Nav	WX	Comments
X01a	F01	1	19	NGD	2	1	1	1	2 *	#	3	1	3 *	1	3	climb due to clouds
X01b	F03	16	22	CTR	1	1	1	1	2 *	1	1	1	3 *	2	1	
X01c	F03	22	31	CTR	1	1~	1	1	2 *	1	1	1	3 *	2	1	
X01d	F05	1	19	NGD	2	1~	1	1	2 *	1	1	1	3 *	1	1	
X01e	F48	30	43	VOS	1	?	1	1	1	1	1	1	1	1	1	
0																
X02a	F04	1	<16	NGD	2	1	1	1	1 *	1	1	1	3 *	2	1	
X02b	F06	16	21	CTR	3?	1	1	1	2 *	1	1	1	3 *	2	2	
X02c	F06	20	29	CTR	3?	1	1	1	1 *	1	2	1	3 *	2	2	
X02d	F06	29	22	CTR	3?	1	1	1	2 *	1	2	1	3 *	2	2	
X02e	F06	22	16	CTR	3?	1	1	1	2 *	1	1	1	3 *	2	2	
X02f	F07	16.5	1	NGD	2	1	1	1	1 *	1	1	1	3 *	1	2	
X02g	F46	28	43	VOS	1	?	1	1	1	1	2	1	1	2	1	
X03a	F02	1	19	NGD	2	1	1	2	1 *	1	3	1	3 *	1	3	
X03b	x	not flown														
X03c	F03	31	22	CTR	1	1~	1	1	1 *	1	1	1	3 *	2	1	
X03d	F03	22	16	CTR	1	1~	1	1	1 *	1	1	1	3 *	2	1	
X03e	F47	29	43	VOS	1	1	1	1	1	1	2	1	1	2	1	

* Pressure transducer connected wrong. QC rating for gravity based on on raw grav only.
\# QC plot not available but proper amount of data was recorded.
~ QC plot not good but from what is plotted data assigned the given rating.
^ Rating based on the best pair combination (base and rover) of GPS receivers.
? QC plot does not support any rating.

LVS QC Summaries by Transect Name

LVS QC Summary (VTZ1): CCx													
	Flt												Comments
		POS*	b-mag	Srf	Bed	G	M	L	A	P	Nav	WX	
LVS/CCx													
X01a	12	1	1	1	1	1	1	1	1	1	2	1	
X02a	33	2	1	1	1	1	1	1	1	1	2	1	
X03a	36	1	1	1	1	1	1	1	1	1	2	1	
X04a	10	1	1	1	1	1	1	3	1	1	1	1	
X05a	33	2	1	1	1	1	1	1	1	1	1	1	
X06a	36	1	1	1	1	1	1	1	1	1	1	1	
X07a	10	1	1	1	1	1	1	3	1	1	2	1	
X08a	21	1	1	1	1	1	1	1	1	1	3	1	Incomplete, needs complete refly
X08b	33	2	1	1	1	1	1	1	1	1	2	1	
X09a	18	1	1	1	1	1	3	1	1	1	1	1	
X09c	36	1	1	1	1	1	1	1	1	1	2	1	
X10a	10	1	1	1	1	1	1	3	1	1	2	1	
X11a	21	1	1	1	1	1	1	1	1	1	1	1	
X12a	x	0	0	x	x	x	x	x	x	x	x	x	There is no 12a; this line flown as 12 b the first time.
X12b	18	1	1	1	1	1	3	1	1	1	1	1	
X12c	36	1	1	1	1	1	1	1	1	1	1	1	
X13a	10	1	1	1	1	1	1	3	1	1	2	1	
X14a	21	1	1	1	1	1	1	1	1	1	3	1	
X15a	18	1	1	1	1	1	1	1	1	1	2	1	
X16a	12	1	1	1	1	1	1	1	1	1	2	1	
X17a	21	1	1	1	1	1	1	1	1	1	1	1	
X18a	24	1	1	1	1	1	1	1	1	1	1	1	
X19a	8	2	1	1	1	1	1	1	1	1	2	1	
X20a	19	2	1	1	1	2	1	1	1	1	2	1	
X21a	24	1	1	1	1	1	1	1	1	1	1	1	
X22a	11	1	1	1	1	1	1	1	1	1	3	1	
X23a	19	2	1	1	1	2	1	1	1	1	1	1	
X24a	8	2	1	1	1	1	1	1	1	1	2	1	
X25a	34	1	1	1	1	2	1	1	1	1	1	1	
X26a	37	1	1	1	1	1	1	1	1	1	3	1	
X27a	11	1	1	1	1	1	1	1	1	1	1	1	
X28a	34	1	1	1	1	1	1	1	1	1	2	1	
X29a	37	1	1	1	1	1	1	1	1	1	3	1	
X29b	37	1	1	1	1	1	1	1	1	1	1	1	
X30a	13	1	1	1	1	1	1	1	1	1	1	1	
X31a	34	1	1	1	1	1	1	1	1	1	1	1	
X32a	37	1	1	1	1	1	1	1	1	1	1	1	
X33a	13	1	1	1	2	1	1	1	1	1	3	1	
X34a	32	1	1	1	2	1	1	1	1	1	1	1	
X35a	42	1	2	1	2	1	1	1	1	1	1	1	
X36a	17	1	1	1	2	1	1	1	1	1	3	1	
X37a	32	1	1	1	1	1	1	1	1	1	1	1	
X38a	42	1	2	1	1	1	1	1	1	1	2	1	
X39a	16	1	1	1	1	1	1	1	1	1	3	1	
X40a	41	1	1	1	1	1	1	1	1	1	1	1	
X41a	17	1	1	1	2	1	1	1	1	1	3	1	
X42a	15	1	1	1	2	1	1	1	1	1	1	1	
X43a	41	1	1	1	2	1	1	1	1	1	2	1	
X44a	44	1	1	1	2	2	1	2	1	1	2	1	
X45a	44	1	1	1	2	1	1	2	1	1	1	1	

LVS QC Summary (VTZ1): CCy													1 good, 2 fair, 3 poor
	Flt												
		POS*	b-mag	Srf	Bed	G	M	L	A	P	Nav	WX	Comments
LVS/CCy													
Y01a	16	1	1	1	1	1	1	1	1	1	2	1	
Y02a	41	1	1	1	1	1	1	1	1	1	2	1	
Y02b	32	1	1	1	1	1	1	1	1	1	2	1	
Y03a	12	1	1	1	1	1	1	1	1	1	1	1	
Y03b	15	1	1	1	1	1	?	1	1	1	1	1	
Y04a	45	1	1	1	1	1	1	1	1	1	1	1	
Y05a	9	1	1	1	1	1	1	1	1	1	2	1	
Y06a													not flown
Y07a	9	1	1	1	1	1	1	1	1	1	1	1	
Y08a													not flown
Y09a	13	1	1	1	1	1	1	1	1	1	1	1	
Y09b	20	1	1	1	1	2	1	1	1	1	2	1	
Y10a													not flown
Y11a	14	1	?	1	1	1	1	1	1	1	1	1	
Y12a	45	1	1	1	1	1	1	1	1	1	3	1	
Y13a	15	1	1	1	1	1	1	1	1	1	1	1	
Y13b	24	1	1	1	1	1	1	1	1	1	1	1	
Y14a	20	1	1	1	1	2	2	2	1	1	2	2	
Y15a	14	1	?	1	1	1	1	1	1	1	1	1	

* Rating based on the best pair combination (base and rover) of GPS receivers.

? QC plot does not support any rating.

LVS QC Summary (VTZ1): Regionals													
	Flt												Comments
		POS*	b-mag	Srf	Bed	G	M	L	A	P	Nav	WX	
LVS/NCy													
Y05a	23	1	1	1	1	2	1	2	1	1	2	2	climb in middle for WX
Y05b	38	1	1	1	1	1	1	1	1	1	2	1	
Y11a	23	1	1	1	1	1	1	2	1	1	1	2	
Y11b	38	1	1	1	1	1	1	2	1	1	2	2	
LVS/SCy	**0**												
Y05a	26	1	1	1	1	1	1	1	1	1	1	1	
Y05b	35	1	1	1	1	1	1	2	1	1	2	2	
Y11a	26	1	1	1	1	1	1	1	1	1	1	1	
Y11b	35	1	1	1	1	2	1	1	1	1	2	2	
LVS/ECx													
X10a	30	1	1	1	1	1	1	1	1	1	1	1	
X10b	40	1	1	1	1	1	1	1	1	1	?	1	
X19a	30	1	1	1	1	1	1	1	1	1	1	1	
X19b	40	1	1	1	1	1	1	1	1	1	?	1	
X28a	27	1	1	1	1	1	1	1	1	1	1	1	
X28b	43	1	1	1	1	1	1	1	1	1	2	1	
X37a	27	1	1	1	1	1	1	1	1	1	2	1	
X37b	43	1	1	1	1	2	1	1	1	1	2	1	
LVS/WCx													
X10a	22	1	1	2	1	1	1	1	1	1	1	1	radar problem toward end
X10b	28	1	1	1	1	1	?	1	1	1	1	1	
X19a	22	1	1	1	1	1	1	1	1	1	1	1	
X19b	28	1	1	1	1	1	1	1	1	1	1	1	
X28a	29	1	1	1	1	1	1	1	1	1	1	1	
X28b	39	1	1	1	1	1	1	1	1	1	1	1	
X37a	29	1	1	1	1	1	?	1	1	1	1	1	
X37b	39	1	1	1	1	2	1	1	1	1	2	2	

* Rating based on the best pair combination (base and rover) of GPS receivers.

? QC plot does not support any rating.

NOD Notes

NGD Reference Coordinates for K&RS

kars.NGD10_FROM_NGD

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -1311187.069 300496.879 -6213735.381
reference
 -1311187.069 300496.879 -6213735.381
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.NGD20_FROM_NGD

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-1311187.069 300496.879 -6213735.381
reference
-1311176.236 300495.251 -6213737.430
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.NGD30_FROM_NGD

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-1311187.069 300496.879 -6213735.381
reference
-1311167.237 300491.932 -6213739.326
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.SKD10_FROM_NGD

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -1311187.069 300496.879 -6213735.381
reference
 -1311187.069 300496.879 -6213735.381
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

CTR Reference Coordinates for K&RS

kars.CTR10_FROM_CTR

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-836755.6 686799.9 -6266846.3
reference
-836755.6 686799.9 -6266846.3
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.CTR20_FROM_CTR

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-836755.6 686799.9 -6266846.3
reference
-836755.6 686799.9 -6266846.3
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.NGD10_FROM_CTR

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-836755.6 686799.9 -6266846.3
reference
 -1311187.069 300496.879 -6213735.381
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.NGD20_FROM_CTR

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
-836755.6 686799.9 -6266846.3
reference
-1311176.236 300495.251 -6213737.430
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

VOS Reference Coordinates for K&RS

kars.VOS10_FROM_CTR

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -661560.14 919723.4 -6261479.4
reference
 -369472.1 1223692.9 -6231335.7
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.VOS10_FROM_VOS

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -369472.1 1223692.9 -6231335.7
reference
 -369472.1 1223692.9 -6231335.7
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.VOS20_FROM_VOS

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -369472.1 1223692.9 -6231335.7
reference
 -369472.1 1223692.9 -6231335.7
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

kars.VOS30_FROM_VOS

```
2
  1  0  0  1  1  0  0  0
  0  1  1  0  2.0  2.0  2.0
  0  1  1  0  3   1
  0  0  0  0  0  0  0  0  0  0  0
  0  0  1  1
base.n
rover
 -369472.1 1223692.9 -6231335.7
reference
 -369472.1 1223692.9 -6231335.7
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
<START-STOP-TIMES>
 0
rove.o
  0.000   0.000   0.000
-17.000 980.000  20.000
  0.000   0.000   0.000
base.o
  0.000   0.000   0.000
-17.000 980.000  20.000
base.n
```

Spheroid parameters used for K&RS pseudorange solutions

param.amb

```
6378135.000
0.00335278
15.0
8000.0
2000.0
2.0
0.9
0.1
0.0
0.2
3.5
0.75
5
```

RINEX Data Availability Matrix

	NGD10	NGD20	NGD30	CTR10	CTR20	VOS10	VOS20	VOS30	SJB10	SJB20	SJB30
F01	data	data	data	no data	no data	no data	no data	no data	data	data	data
F02	data	data	data	no data	no data	no data	no data	no data	data	data	data
F03	data	data	data	data	data	no data	no data	no data	data	data	data
F04	data	data	data	no data	no data	no data	no data	no data	data	data	data
F05	data	data	data	no data	no data	no data	no data	no data	data	data	data
F06	data	data	data	data	no data	no data	no data	no data	data	data	data
F07	data	data	data	no data	no data	no data	no data	no data	data	data	data
F08	no data	no data	no data	no data	no data	data	data	data	data	data	data
F09	no data	no data	no data	no data	no data	data	data	data	data	data	data
F10	no data	no data	no data	no data	no data	data	data	data	data	data	data
F11	no data	no data	no data	no data	no data	data	data	data	data	data	data
F12	no data	no data	no data	no data	no data	data	data	data	data	data	data
F13	no data	no data	no data	no data	no data	data	data	data	data	data	data
F14	no data	no data	no data	no data	no data	data	data	data	data	data	data
F15	no data	no data	no data	no data	no data	data	data	data	data	data	data
F16	no data	no data	no data	no data	no data	data	data	data	data	data	data
F17	no data	no data	no data	no data	no data	data	data	data	data	data	data
F18	no data	no data	no data	no data	no data	data	data	data	data	data	data
F19	no data	no data	no data	no data	no data	data	data	data	data	data	data
F20	no data	no data	no data	no data	no data	data	data	data	data	data	data
F21	no data	no data	no data	no data	no data	data	data	data	data	data	data
F22	no data	no data	no data	no data	no data	data	data	data	data	data	data
F23	no data	no data	no data	no data	no data	data	data	no data	data	data	data
F24	no data	no data	no data	no data	no data	data	data	data	data	data	data
F25	no data	no data	no data	no data	no data	data	data	data	data	data	data
F26	no data	no data	no data	no data	no data	data	data	data	data	data	data
F27	no data	no data	no data	no data	no data	data	data	data	data	data	data
F28	no data	no data	no data	no data	no data	data	data	data	data	data	data
F29	no data	no data	no data	no data	no data	data	data	data	data	data	data
F30	no data	no data	no data	no data	no data	data	data	data	data	data	data
F31	no data	no data	no data	no data	no data	data	data	data	data	data	data
F32	no data	no data	no data	no data	no data	data	data	data	data	data	data
F33	no data	no data	no data	no data	no data	data	data	data	no data	data	data
F34	no data	no data	no data	no data	no data	data	data	data	data	data	data
F35	no data	no data	no data	no data	no data	data	data	data	data	data	data
F36	no data	no data	no data	no data	no data	data	data	data	data	data	data
F37	no data	no data	no data	no data	no data	data	data	data	data	data	data
F38	no data	no data	no data	no data	no data	data	data	data	data	data	data
F39	no data	no data	no data	no data	no data	data	data	data	data	data	data
F40	no data	no data	no data	no data	no data	data	data	data	data	data	data
F41	no data	no data	no data	no data	no data	data	data	data	data	data	data
F42	no data	no data	no data	no data	no data	data	data	data	data	data	data
F43	no data	no data	no data	no data	no data	data	data	data	data	data	data
F44	no data	no data	no data	no data	no data	data	data	data	data	data	data
F45	no data	no data	no data	no data	no data	data	data	data	data	data	data
F46	no data	no data	no data	no data	no data	data	data	data	data	data	data
F47	no data	no data	no data	no data	no data	data	data	data	data	data	data
F48	no data	no data	no data	no data	no data	data	data	data	data	data	data

NOD Shift Log Notebook

VTZ 1

Primary NOD:	Eleanor Jewel	EBJ
	Eric Irrgang	MEI
	John Gorbec	JSG
Rotated in FOP:	Martha McConnell	MCM
	Jody Sturdy	JDS
	Vicki Rystrom	VLR
Roamers:	Jack Holt	JWH
	Mark Mayber	MJM
	Dave Morse	DLM

Notes on equipment changes and trouble in GPS notebook and MAG notebook.

JDAY 347 TF10 F03 F04

PS6 MAG #4 DID NOT LOG

ELLIE UNPACKING PORTABASE AND PUTTING BATTERIES ON CHARGERS

ERIC CLEARING DISK SPACE ON RAV3 & RUNNING GLNK

856 Mag #5 magpac'ed (on RAV3 ~/F03/d347a55.dat)
TRB downloaded

16:00 GMT ATRS DATA BROKEN OUT & ARCHIVED (DOS STILL RUNNING)
F04 MAIN GLNK STILL REMAINS BEFORE PARANOIA AND GMAGS

17:50 GMT PARANOIA STARTED
LAST DAT FOR ATRS BEING ARCHIVED

ISSUES TO COMPLICATE MATTERS...

ALL GPS UNITS ORIGINALLY STARTED J346
NGO 20 STOPPED @ 4:55 DURING F03
RESTARTED @ ~~4:58~~ 5:59 DURING F03 J347
SO F03 & F04 HAVE GPS STARTED ON DIFFERENT JDAYS
AND F03 IS THE ONLY FLIGHT w/ a & b DATA (NGO 20)

I BELIEVE ALL ORIG FILES ARE OKAY, BUT BQ POS IS
GIVING WEIRD PERMISSIONS ERRORS.
- NEED TO CONFIRM REASONABLE-LOOKING OBS FILES
ALSO, RAV3 SEEMS UNUSUALLY SLUGGISH. A REBOOT
MIGHT DO IT SOME GOOD AFTER PARANOIA FINISHES
SHOULD WE RUN KARS FROM BOTH BASES?

4

18:10 GMT ELLIE HAS GONE TO BED
JSG NOT YET ARRIVED
MOST OBS FILES EMPTY, BUT NOT ALL!

18:15 JSG HAS ARRIVED; MEI WILL UPDATE BEFORE GOING TO BED

J348R JSG

Got Kevs Soln's for CTR in F03

by Quigyus user breakout:
copy .dat file from /FLGA/F03/
vm1856.v2
to /856/F03

run 856 - PCTR50 F-HH vevs

login as guclin/ and type:

run mag -D856 - BCTR F-HH vev

Raw Jokevs_ctr to get CTR solutions
Ran Do kevs for F03
and F04

Not off # TF10 yet

5

Reran TF10 SJB20 breakout.

with bo_pos_tb_plot TF10 SJB20

Have wrong orig file time don't match log files

Need to look into NGDHO NGD CTR TF12a yet.

Have not done Any Archiving yet

J. Gerhoc

6

5 348 13:20

QC TIME-SHIFTING PROBLEM

GPS RECEIVERS STARTED BEFORE JDAY ROLLOVER ARE DELAYED 24 HOURS ON POS_QC RELATIVE TO MAG DATA

PROBLEM TRACED TO RUN_POS_QC, AS KARS OUTPUT HAS PROPER DATES & TIMES

RUN-POS_QC OBVIOUSLY COMPLETELY IGNORES DATE AND FIGURES TIME BASED ON START TIME, IN THIS CASE 23:XX

MAKING RUN_POS_QC LOOK AT THE DATE MAY BE A NEARLY UNAVOIDABLE PAIN IN THE ASS, SO IS IT WORTH IT?

OPTION: DISCARD A FEW MINUTES OF BROKEN OUT DATA TO MAKE PRETTIER OUTPUT

WRONG PROJECT NAMES

"VTZ1" IS HARD-CODED INTO NUMEROUS SCRIPTS: MKA_GPS & MOST SCRIPTS FROM BREAKOUT ONWARDS

THE EFFECT IS THAT MUCH OF THE BROKEN OUT DATA IS MISFILED, WITH NO OPTION OF "DCS" OR "VOS" AS A PROJECT NAME

EDITING THE SCRIPTS TO ACCEPT PROJECT ARGUMENTS & DEBUGGING MAY TAKE SEVERAL DAYS

KARS ERROR

FOR FLIGHTS OUT OF A REMOTE BASE (CTR) KARS GIVES AN INPUT FILE ERROR, COMPLAINING ABOUT THE NONEXISTENCE OF SOMETHING LIKE "(BLAH)_FROM_CTR.INP"

THIS SEEMS TO RESULT IN KARS TAKING THE FIRST HOUR OR SO TO GET AN RDOP

7

BELOW 10 & LOCK ON TO THE ROVER'S POSITION
NEED TO RERUN KARS W/ NGO BASE...

14:00 MET TALKED TO DAVE RE: QC PLOTS
& DECIDED ON A COURSE OF ACTION
SINCE DATA IS GOOD & QC IS MESSED UP
PRETTY QC IS LOW PRIORITY
IN UPCOMING "SPARE TIME," RUN_POS_QC
CAN BE MODIFIED TO IGNORE THE
FIRST FEW MINUTES OF DATA FROM
A FLIGHT THAT TAKES OFF ~ 00:30 GMT
AND AVOID SEEING PREVIOUS DAY'S DATA
USE "TAIL +< 2 $\frac{\text{SAMPLES}}{\text{SEC}}$ X 60 $\frac{\text{SEC}}{\text{MIN}}$ X 15 MINUTES)"
SOME DATA FILES, LIKE HEIGHT.TZ, RUN A CONTINUOUS
TIME FROM THE START OF THE FLIGHT. THUS,
IF THE DATA STARTS @ 23:00, A FIVE HOUR FLIGHT
WILL END AT 28:00, CONFUSING THE QC SCRIPTS
REGARDLESS OF DATE. IF THE SCRIPTS USE
ONE OF THESE FILES TO GET THE TIMES, AN
"AWK" PIPELINE COULD BE USED TO SUBTRACT
24 HOURS FROM ALL TIMESTAMPS OF DATA SETS
CONTAINING TIMESTAMPS EXCEEDING 24:00
THE PRETTY QC MIGHT NOT BE AVAILABLE BEFORE
VOSTOK
14:19 MEDIA FROM FLIGHTS 5+ ARRIVED

NOTE: KARS DOES NOT DO WELL WITH A HIGH
PROCESSOR LOAD. DO NOT RUN SIMULTANEOUSLY
WITH OTHER PROCESSOR-INTENSIVE PROGRAMS

8

14:45 TALKED TO JACK
THERE HAS BEEN MORE THAN ENOUGH GROUND TIME TO DISCARD PRE-GPS-DAY-ROLLOVER DATA FROM RINEX FILES
WILL DO & RE-RUN KARS & POS_QC

17:20 WAITING FOR DDUMPS TO FINISH TO RUN PARANOIA
GLNK FINISHED
STILL NO POS_QC: NEED TO EDIT/BREAKOUT DATA
BD_POS STILL RUNNING...
BROKEN OUT DATA FOR F03, F04, IF10 NEEDS TO BE DOUBLE-CHECKED! MAY NEED TO BE BROKEN OUT AGAIN

RAN BD_POS FOR F05
WILL COPY ASHTECH RINEX FILES TO OTHER FLIGHTS
RUN BD_POS_TRB FOR F06, F07

d1 IS 97% FULL! THERE'S NOTHING LEFT TO DELETE SAFELY

18:00 DDUMPS STILL RUNNING
ATRS DLT ARCHIVES DONE. DDS FOR F07 STILL RUNNING. THEN DO F05 & F06
ALL DATA BROKEN OUT. NEED TO STRIP OUT PRE-ROLLOVER DATA. VI MIGHT NOT BE ABLE TO HANDLE THE FILE SIZE... MAY NEED TO WRITE A SCRIPT TO CAT THE FILE INTO TO WRITE OUT ALL LINES AFTER THE ROLLOVER
ASHTECH RINEX ONLY FOR F05. COPY FILES TO F06 & F07

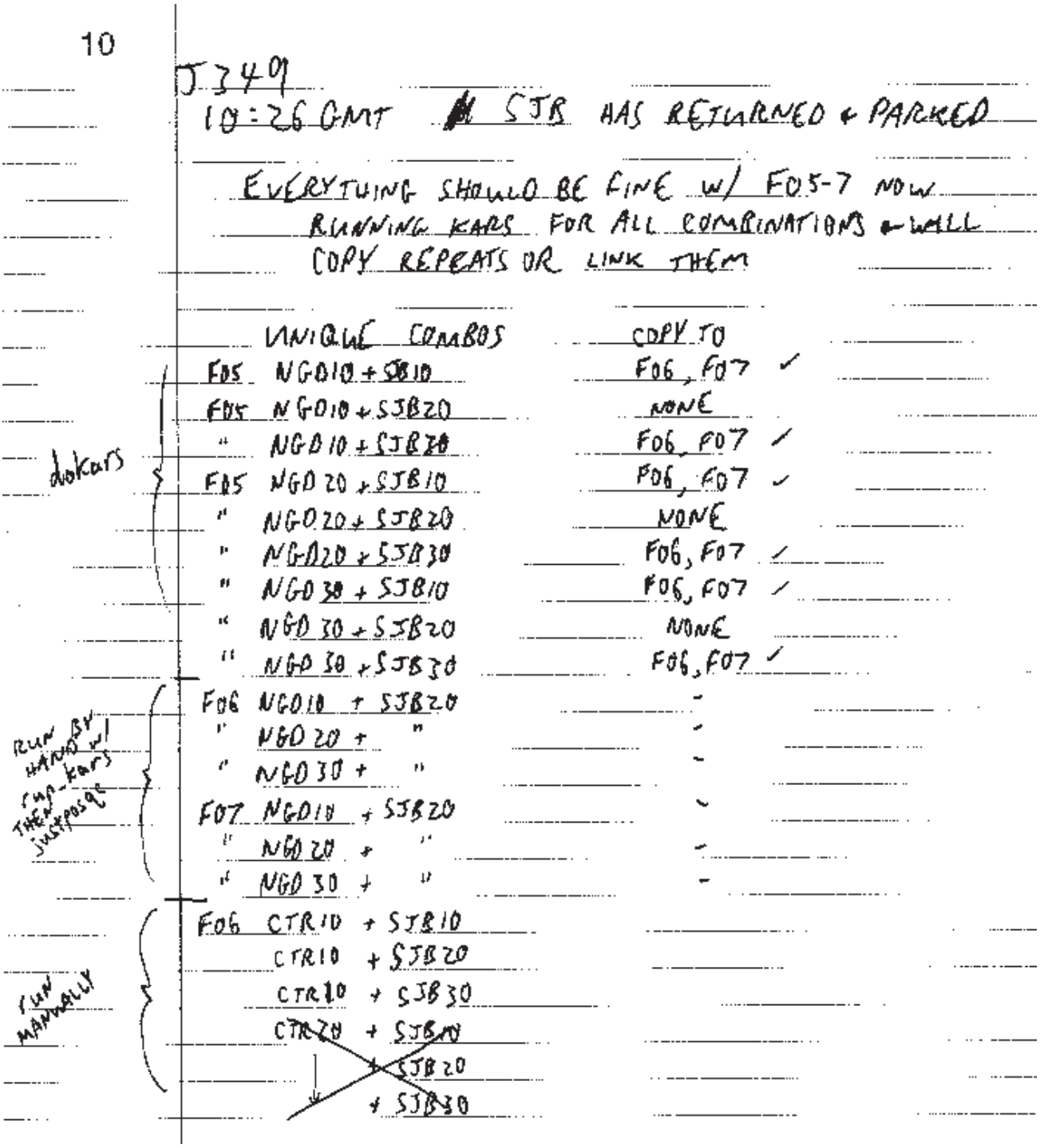
9

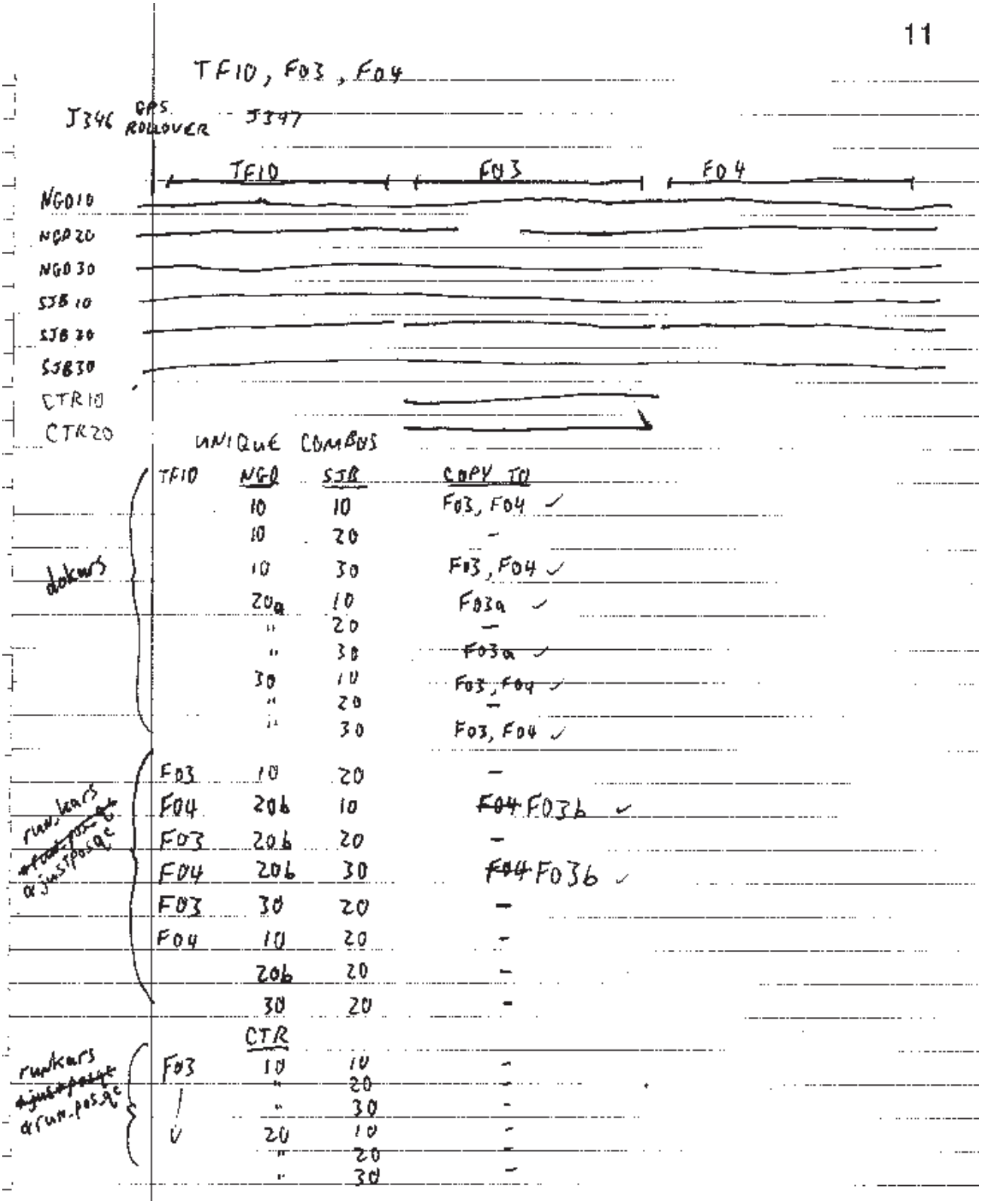
MGI WROTE SCRIPT ~breakout/day_stripper TO USE IN A PIPELINE TO STRIP PRE-ROLLOVER DATA, THOUGH IT'S AS SLOW AS KARS. GOOD THAT WE ONLY HAVE TO RUN IT FOR 6 FILES

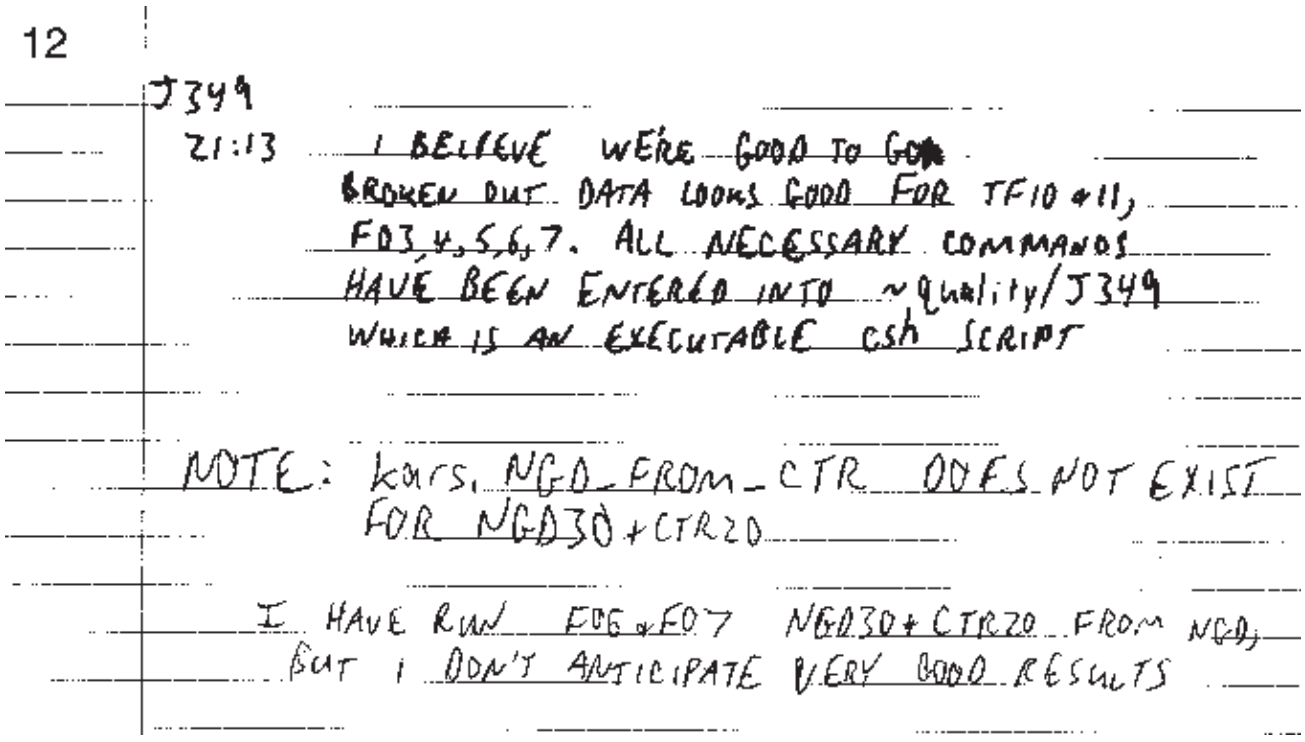
TRYING NEOD FOR EOG FIRST. WHEN FINISHED TRY RUN_KARS FOR NEOD+SJB2D EOG & RUN_POS_BC. IF SUCCESSFUL, COPY OBS FILE (AND KARS SOLUTIONS) TO OTHER FLIGHTS AND RUN THE REST OF THE ASHTECHS & THE FIRST OF THE TURBO ROGUES

HERE'S A THOUGHT: MAYBE THE LOOP AT THE END OF THE SCRIPT COULD BE REPLACED W/ "cat" —

DONE. WORKS


10
1349
10:26 GMT SJB HAS RETURNED & PARKED
EVERYTHING SHOULD BE FINE W/ F05-7 NOW
RUNNING KARS FOR ALL COMBINATIONS & WILL
COPY REPEATS OR LINK THEM
UNIQUE COMBOS
COPY TO
F05 NGD10 + SJB10
F06, F07 ✓
F05 NGD10 + SJB20
NONE
" NGD10 + SJB30
F06, F07 ✓
dokars
F05 NGD20 + SJB10
F06, F07 ✓
" NGD20 + SJB20
NONE
" NGD20 + SJB30
F06, F07 ✓
" NGD30 + SJB10
F06, F07 ✓
" NGD30 + SJB20
NONE
" NGD30 + SJB30
F06, F07 ✓
F06 NGD10 + SJB20
-
" NGD20 + "
-
" NGD30 + "
-
RUN BY HAND W/ rnp_kars THEN JUST POST
F07 NGD10 + SJB20
-
" NGD20 + "
-
" NGD30 + "
-
F06 CTR10 + SJB10
CTR10 + SJB20
CTR10 + SJB30
CTR20 + SJB10
SJB20
+ SJB30
RUN MANUALLY


11
TF10, F03, F04
J346
GPS ROLLOVER
J347
TF10
F03
F04
NGD10
NGD20
NGD30
SJB10
SJB20
SJB30
CTR10
CTR20
UNIQUE COMBOS
TF10 NGD SJB COPY TO
10 10 F03, F04 ✓
10 20 –
10 30 F03, F04 ✓
20a 10 F03a ✓
" 20 –
" 30 F03a ✓
30 10 F03, F04 ✓
" 20 –
" 30 F03, F04 ✓
F03 10 20 –
F04 20b 10 F04 F03b ✓
F03 20b 20 –
F04 20b 30 F04 F03b ✓
F03 30 20 –
F04 10 20 –
20b 20 –
30 20 –
CTR
F03 10 10 –
" 20 –
" 30 –
20 10 –
" 20 –
" 30 –



12

J349

21:13 I BELIEVE WE'RE GOOD TO GO
BROKEN OUT DATA LOOKS GOOD FOR TF10 & 11,
F03, 4, 5, 6, 7. ALL NECESSARY COMMANDS
HAVE BEEN ENTERED INTO ~quality/J349
WHICH IS AN EXECUTABLE csh SCRIPT

NOTE: kars. NGD_FROM_CTR DOES NOT EXIST
FOR NGD30+CTR20

I HAVE RUN F06 & F07 NGD30+CTR20 FROM NGD,
BUT I DON'T ANTICIPATE VERY GOOD RESULTS

13

J355 TF13, F08, & F09 STILL BEING WORKED ON

PROBLEMS ENCOUNTERED:

TF13: VOS10 STARTED LATE
→ UNKNOWN STARTING POSITION OF ROVER
MISSING MAG

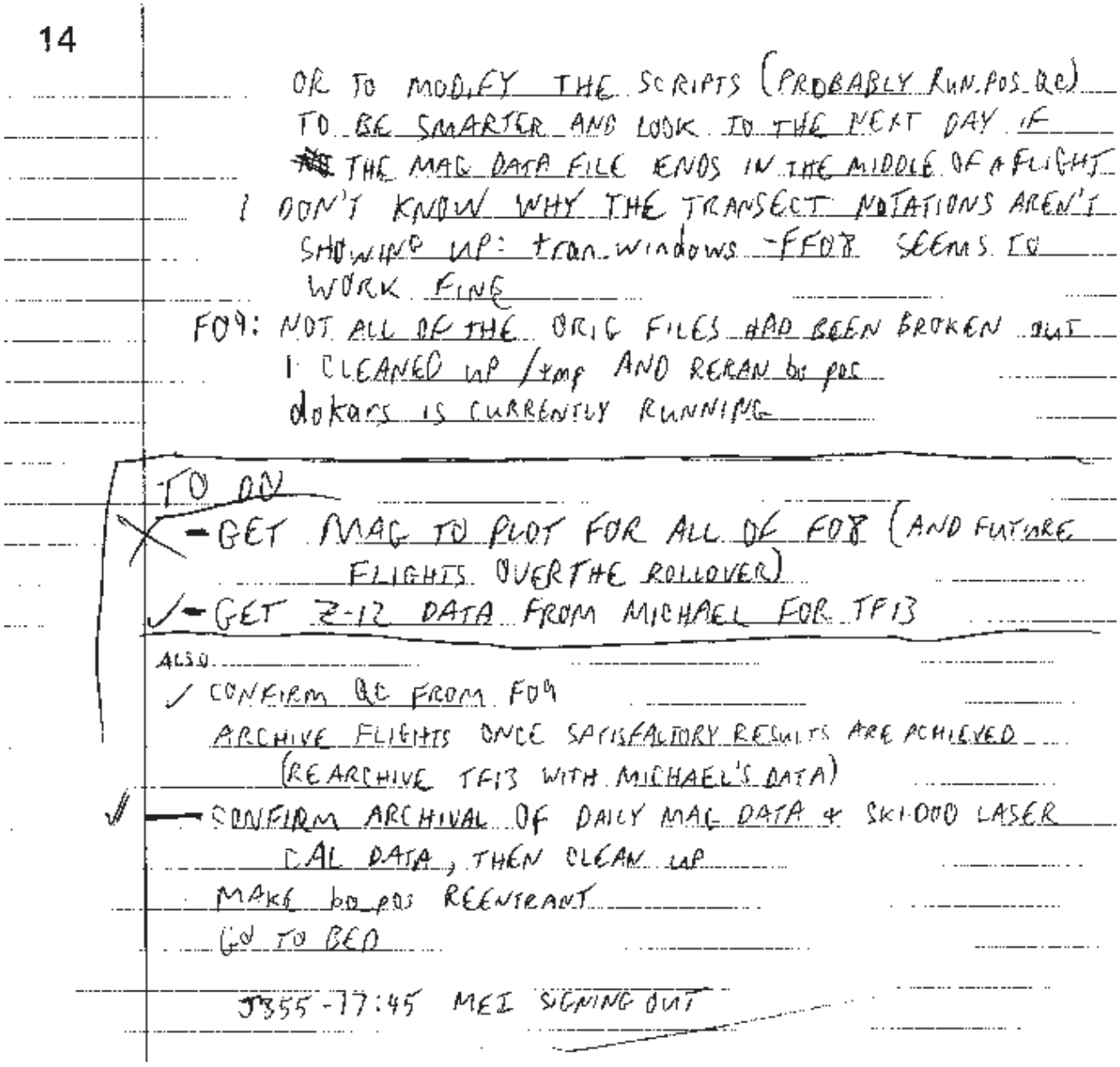
F08 MISSING MAG
NO TRANSECTS MARKED ON QC PLOT

F09 MISSING POS

RESULTS AS OF 1700 J355

TF13: ~~RAN KARS~~ MADE VOSXO_FROM_CTR FILES
RAN KARS; DATA WAS CRUMMY BECAUSE STARTING POSITION WAS MID-FLIGHT
USED OFFSET DATA FROM RSRLXYZ & PROJECTED BACK TO START TIME OF VOS10 TO FIND INITIAL POSITION FOR ~~VOS10_CTR~~ kars.VOS10_FROM_CTR
IF WE CAN GET MORE COMPLETE DATA FROM MICHAEL'S Z-12, WE CAN COPY kars.VOS20_FROM_CTR TO kars.VOS10_FROM_CTR AND RERUN KARS FOR BETTER, MORE COMPLETE SOLUTIONS. VOS10 WAS STARTED AFTER THE BEGINNING OF THE FIRST TRANSECT
THE MISSING MAG DATA OCCURRED BECAUSE TF13 HAD BEEN "GMAG'ED FOR J354 INSTEAD OF J353

F08: ONCE AGAIN, GMAG (run_linked_base) HAD BEEN RUN FOR ~~THE~~ DAY AFTER THE FLIGHT STARTED
HOWEVER, CORRECTING THIS RESULTS IN MAG DATA FOR ONLY THE PART OF THE FLIGHT BEFORE THE GPS DAY ROLLOVER
AFTER EXPERIMENTATION, I SUSPECT THE SOLUTION WOULD BE EITHER TO CONCATENATE J355 DATA TO J354, THOUGH I DON'T KNOW IF THAT WOULD WORK →



14

OR TO MODIFY THE SCRIPTS (PROBABLY RUN_POS_QC) TO BE SMARTER AND LOOK TO THE NEXT DAY IF THE MAG DATA FILE ENDS IN THE MIDDLE OF A FLIGHT

I DON'T KNOW WHY THE TRANSECT NOTATIONS AREN'T SHOWING UP: tran.windows -FF08 SEEMS TO WORK FINE

FO9: NOT ALL OF THE ORIG FILES HAD BEEN BROKEN OUT I CLEANED UP /tmp AND RERAN bo_pos dokars IS CURRENTLY RUNNING

TO DO

- GET MAG TO PLOT FOR ALL OF FO8 (AND FUTURE FLIGHTS OVER THE ROLLOVER)
- GET Z-12 DATA FROM MICHAEL FOR TF13

ALSO

- CONFIRM QC FROM FO9
- ARCHIVE FLIGHTS ONCE SATISFACTORY RESULTS ARE ACHIEVED (REARCHIVE TF13 WITH MICHAEL'S DATA)
- CONFIRM ARCHIVAL OF DAILY MAG DATA & SKI.000 LASER CAL DATA, THEN CLEAN UP
- MAKE bo_pos REENTRANT
- GO TO BED

1355 - 17:45 MEI SIGNING OUT

15

OBSERVATION

IN ~vts/kacs/xy2plot x_low + x_high ARE FOUND FROM THE GPS DATA. WE CAN CHECK TO SEE IF THEY ARE OUT OF THE RANGE OF THE MAGgammas.xy FILE AND APPEND MORE MAGgammas FILES TO /tmp/tmpx.$$ APPROPRIATELY. THIS WON'T BE EASY BECAUSE THE SCRIPTS GO BY FLIGHT RATHER THAN JULIAN DAY (THOUGH THE FLIGHTS ARE SYMBOLICALLY LINKED TO THEIR RESPECTIVE J DAY

J357 MAG DID NOT START LOGGING TO NEW DATA FILE ON GMT DAY ROLLOVER. WE RESET SYSTEM CLOCK TO GMT (IT WAS 5 MINUTES OFF) AND WE'LL HOPE IT ROLLS OVER TOMORROW. THEN WE CAN CP ~~VTG~~ VOS060050.J356a TO VOS060050.J357a.

J360 J36 Discovered Ashtech + otha orig data for F10x F11 were not Archived for J358a J359 Julian day archives.

The orig index file for J358 was empty & and J359 Jday archive did not contain F11 as implied by daily ops log sheet.

Renamed turd J358 index file to J359-shve and re run

Find_daily J358 F10 F11 J355 J356 J357 J358

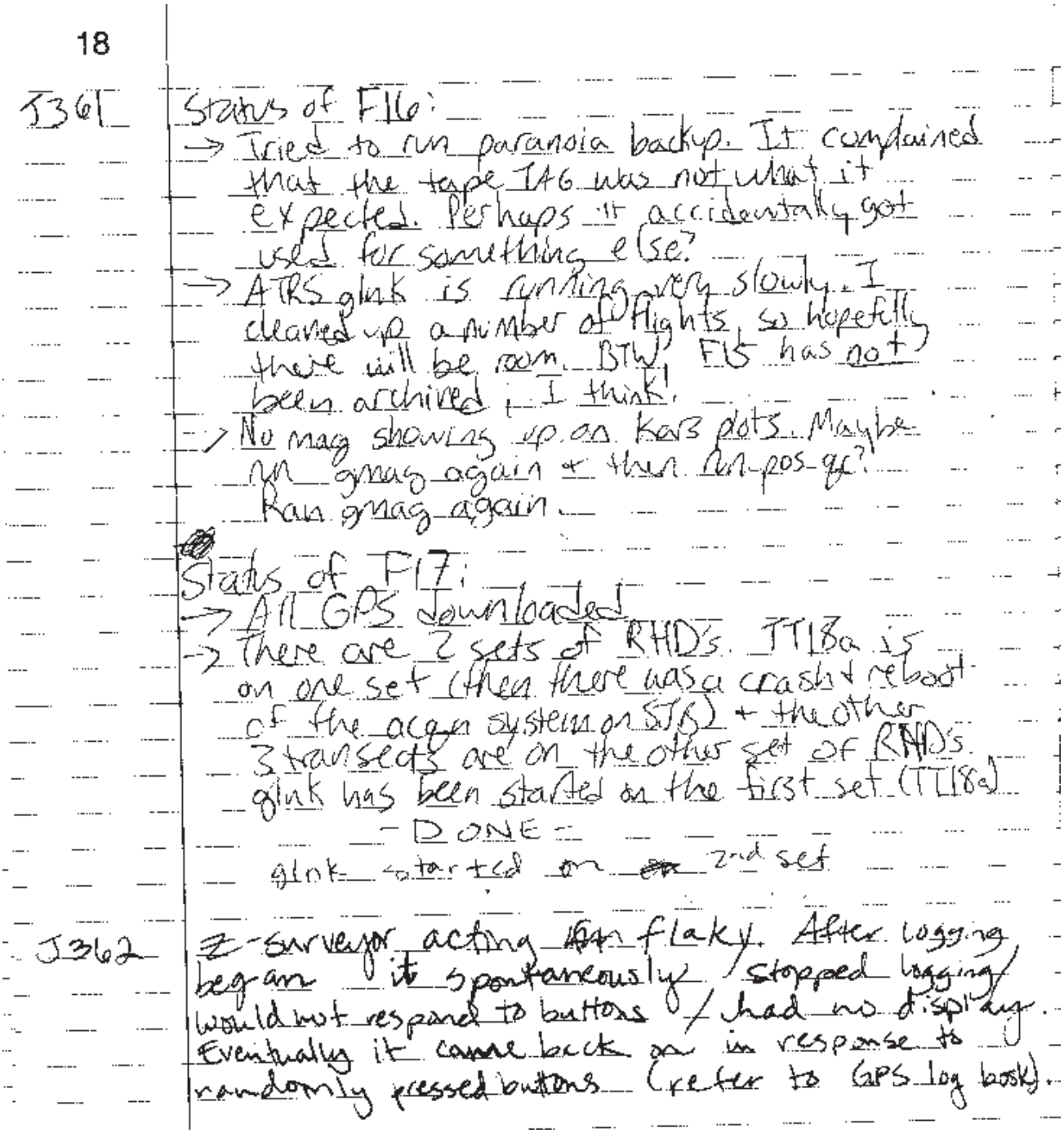
ran: daily_dat J358
daily_orig J358

17

J361 LUNCHBOX DID NOT ROLLOVER w/ JULIAN DAY. ANY OTHER FLIGHTS ON J361 WILL HAVE TO COPY VOS406060.J360a TO VOS406050.J361a BEFORE RUNNING GAMAG AFTER THE (PRESUMED) ROLLOVER OF J362, THIS WILL HAVE TO BE DONE ONE MORE TIME ~~BEFORE~~ TO GET ALL OF THE J361 DATA FOR THE BASE MAC BINDER & THE ARCHIVE.

08:30 GINK HAS STILL NOT BEEN RUN FOR ATRS FIS BECAUSE I AM USING THE RHO BAY TO TEST A DRIVE THAT MALFUNCTIONED. WHEN THE DRIVE IS DONE BEING TESTED, IT WILL NEED TO HAVE IT'S FILE SYSTEM INFORMATION RESTORED. THE EASIEST WAY TO DO THIS (& THE WAY SOK DID IT INITIALLY) IS TO DD ANOTHER RHO TO IT. THE SPARE ATRS ACAN COMPUTER SHOULD BE HANDY FOR THIS

dokars IS RUNNING FOR FIY WITH FIS CUED UP TO RUN WHEN IT'S DONE. AS SOON AS FIY IS DONE (ASSUMING NO PROBLEMS) THE J360 ARCHIVES CAN BE MADE WITH THE ADDITIONAL FLIGHTS & JDAYS AS NOTED ON THE LOG SHEET



18

J361 Status of F16:
→ Tried to run paranoia backup. It complained that the tape TA6 was not what it expected. Perhaps it accidentally got used for something else?
→ ATRS glink is running very slowly. I cleaned up a number of flights, so hopefully there will be room. BTW, F15 has not been archived - I think!
→ No mag showing up on kars plots. Maybe run gmag again & then fm-pos-qc?
Ran gmag again

Stats of F17:
→ All GPS downloaded
→ There are 2 sets of RHD's. TT18a is on one set (then there was a crash & reboot of the acqu system on STS) + the other 3 transects are on the other set of RHD's. glink has been started on the first set (TT18a)
- DONE -
glink started on 2nd set

J362 Surveyor acting flaky. After logging began it spontaneously stopped logging, would not respond to buttons / had no display. Eventually it came back on in response to randomly pressed buttons (refer to GPS log book).

19

J363 11:07 DUE TO A TAR USAGE ERROR WHEN I TAGGED THE ATRS VOL. 3 DLT FLIGHTS AND INSUFFICIENT ERROR CHECKING IN ARCHIVE_DLT, F13 - F18 WERE NOT ARCHIVED TO DLT.

I HAVE CORRECTED ARCHIVE_DLT TO NOT LEAVE TAR COPY IN /TMP AND RE-TAGGED DLT VOL. 3

I WILL EXAMINE THE DATES ON THE ARCHIVE LOGS TO DETERMINE WHICH DAT ARCHIVES TO DUMP ONTO THE DLT.

~~I WILL RUN: tar xvf /dev/dat ; tar cvf /dev/dlt~~ FOR F12, F13, F14, F15, F16, F17, F18, MT12, + MT06 + MT07 + MT08 + MT09 + MT10 + MT11

~~SETUP DLT w/ mt -f /dev/dlt asf 3~~

~~AND DOUBLE-CHECKING FILE #'S AS I GO~~

OOPS! IT DOESN'T LOOK LIKE THE DRIVES WILL BE FREE THIS SHIFT

REMEMBER, PLEASE NOTE WHETHER THERE WERE ERRORS FOR ANY COMMAND YOU RUN BEFORE SIGNING OFF ON IT

TAR DOESN'T WORK THAT WAY + dd IS GIVING WEIRD READ ERRORS FOR THE DAT, SO I MADE A SCRIPT IN ~~/ATRS/~~ CALLED dat2dlt

~~INFORTUNATELY~~ NO SPACE MAY BE A LIMITING FACTOR

MUCH FASTER BETTER

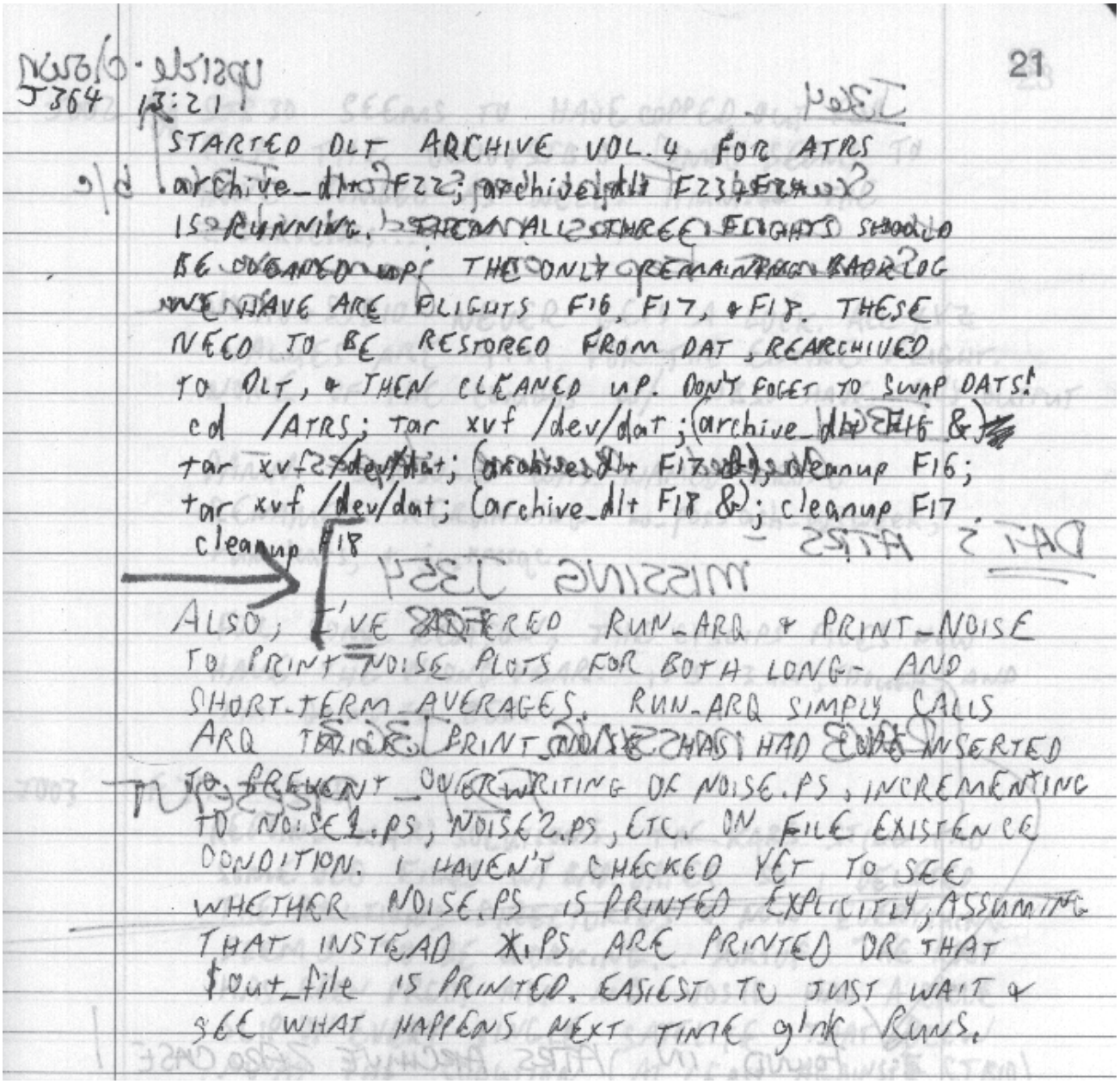
FAILING THIS, THE DATS COULD BE RESTORED TO RAID + ARCHIVED AGAIN: mt -f /dev/dat rew
cd /ATRS ; tar xvf /dev/dat ; mt -f /dev/dat off
archive_dlt (ARCHIVE NAME) ; cleanup (ARCHIVE NAME)

20

J363 Kurs is bombing out on SJB20 combo's.
21:20 Traced Problem to XYZ coordinates in
UTC OBS file for SJB20 F22a.
JSG
tcqc gave "-Inf" as SJB20 X
coordinate, which causes Kurs to Bomb.
will change tcqc config file for SJB20
to have 0, 0, 0, as X,Y,Z coordinate for
SJB20.

J364 VOS 30 flush card for F23 was accidentally
01:30 deleted prior to down load.
= NO BASE & SURV DATA
F23

J364 JOS changed VOS 10 & VOS 30 cfg
files to reflect switching of Z-12
& Z-surv positions changed:
.rn
.rt (us90 ↔ 1L90)
.rv



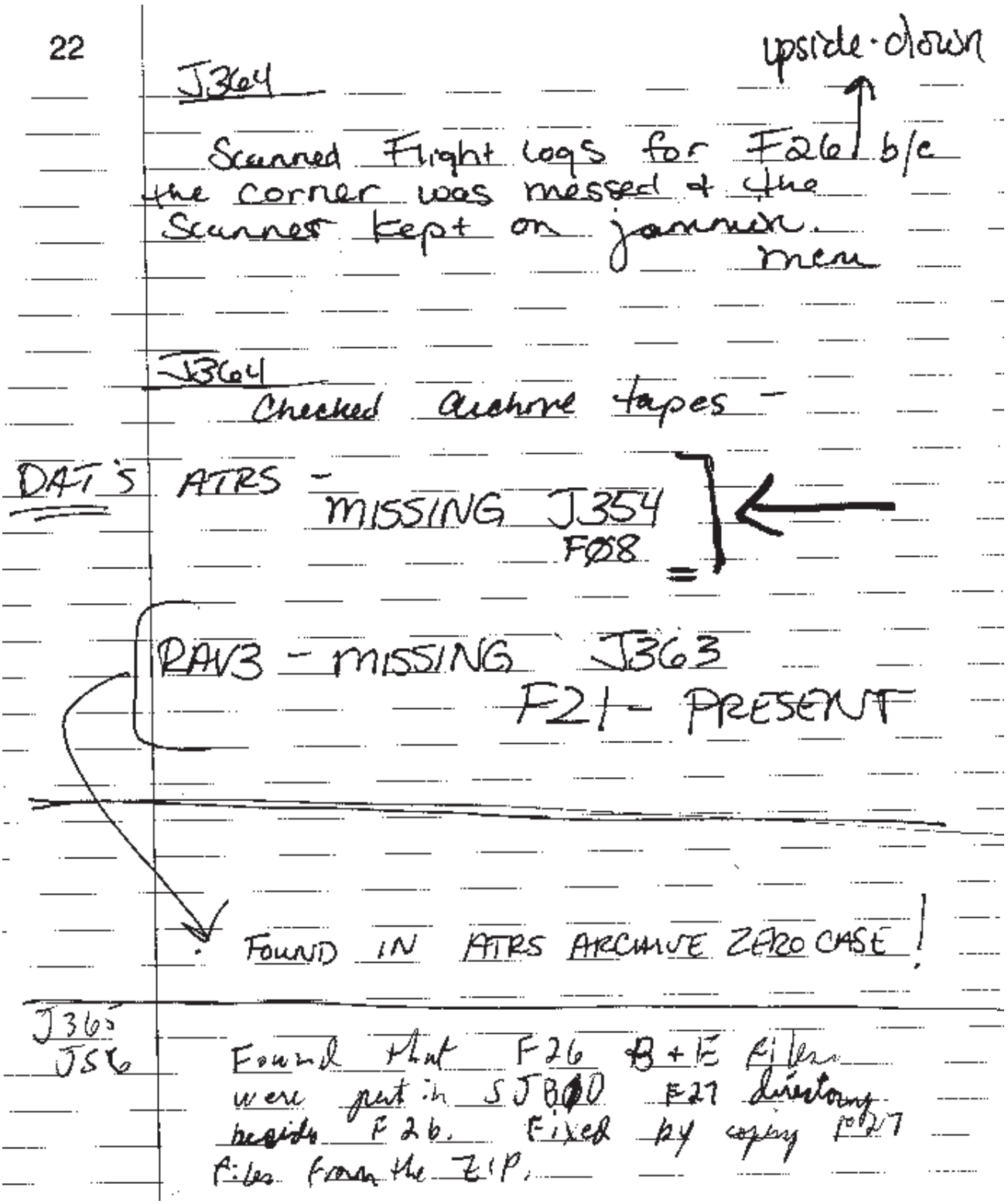
21

13:21

STARTED DLT ARCHIVE VOL. 4 FOR ATRS archive_dlt F22; archive_dlt F23 IS RUNNING. WHEN ALL THREE FLIGHTS SHOULD BE CLEANED UP. THE ONLY REMAINING BADGOG WE HAVE ARE FLIGHTS F16, F17, & F18. THESE NEED TO BE RESTORED FROM DAT, REARCHIVED TO DLT, & THEN CLEANED UP. DON'T FORGET TO SWAP DATS!

cd /ATRS; tar xvf /dev/dat; (archive_dlt F16 &)
tar xvf /dev/dat; (archive_dlt F17 &); cleanup F16;
tar xvf /dev/dat; (archive_dlt F18 &); cleanup F17
cleanup F18

ALSO, I'VE MODIFIED RUN_ARQ & PRINT_NOISE TO PRINT NOISE PLOTS FOR BOTH LONG- AND SHORT-TERM AVERAGES. RUN_ARQ SIMPLY CALLS ARQ TWICE. PRINT_NOISE HAS HAD CODE INSERTED TO PREVENT OVERWRITING OF NOISE.PS, INCREMENTING TO NOISE1.PS, NOISE2.PS, ETC. ON FILE EXISTENCE CONDITION. I HAVEN'T CHECKED YET TO SEE WHETHER NOISE.PS IS PRINTED EXPLICITLY, ASSUMING THAT INSTEAD *.PS ARE PRINTED OR THAT $out_file IS PRINTED. EASIEST TO JUST WAIT & SEE WHAT HAPPENS NEXT TIME g/nk RUNS.


22
upside-down
J364
Scanned Flight logs for F26 b/c the corner was messed & the Scanner kept on jamming. new
J364
Checked Archive tapes -
DAT'S ATRS - MISSING J354 F08
RAV3 - MISSING J363
F21 - PRESENT
FOUND IN ATRS ARCHIVE ZERO CASE!
J360 J516
Found that F26 B+E files were put in SJB00 F27 directory besides F26. Fixed by copying F027 files from the ZIP.

JOOZ STB 30 SEEMS TO HAVE COPPED OUT FOR F34. THE VOS10+STB10 COMBO SEEMS TO HAVE BOMBED AS WELL. HMM.. THE Z-SURVEYORS...

VOS10+STB10 NEVER GETS A LOCK. ALL XYZ VALUES ARE -9999 FOR THE ENTIRE FLIGHT. NONE OF THE COMBOS W/ STB10 HAVE ANY OUTPUT

DAMN. STB30a.b WAS NAMED WRONG RENAMED. RERUNNING bo_pos. ash_gpsweek, run_kars, + justposqc

FOR SOME REASON, THE CYSLIPS FILES NOW HAVE THE WRONG YEAR. IT'S 3am, THOUGH, AND I'M GOING TO BED.

JOO3 F37 13:45

REDOING KARS SOLUTIONS. THE KARS STILL HAD SOME OLD FILES W/ BAD DATES SO I DELETED THE SOLUTIONS DIRECTORIES & NOW EVERYTHING SEEMS TO BE WORKING... SORTOF. THE ROOP HAS BEEN PRETTY HIGH AND VOS10 HAD A CYCLE SLIP ON EVERY SINGLE SATELITE THAT BLEW AWAY THE SOLUTION (AT LEAST AGAINST STB10) FOR A COUPLE OF HOURS. THE CYCLE-MEGASLIP OCCURRED AT 01:25 FROM 0.5 TO 1.0 SECONDS AFTER THE MINUTE. I'M NOT STICKING AROUND TO SEE THE NEW POS PLOTS, BUT THEY NEED TO BE SCRUTINIZED. I SUSPECT THERE MAY BE MORE ERRORS. STILL HAVEN'T FIXED THE YEAR PROBLEM W/ THE CYSLIPS FILE,

FINISHED PULLING QC PS FOR MICHAEL.

25

JDD4 RE: F39

MISSING STBID & VOS20 ORIG. RUNMENT KARS FOR OTHERS & THEN WILL DO THE REST WHEN AVAILABLE.

FIND_LAMONT NEEDS TO BE FIXED TO GET ALL PS FILES OLD ONES NEED TO BE RELOADED.

CYSLIPS IS BEING FIXED, BUT KARS NEEDS TO BE RERUN FOR F37. F38 SHOULD BE READY TO TRY JUSTPOSE AGAIN.

06:35: GOT STBID FOR F39...

F40: bo.pos INDICATED AN ERROR w/ VOS20 ORIG DATA: FAILURE TO READ RECORD 132490

12:41 /dev/dsk/c0t0d0s0, MOUNTED AT '/', IS FULL. I CAN'T WRITE OUT FILES. I'M GOING TO REBOOT BECAUSE I CAN'T EVEN 'ls /'

✓ dokars HAD GOTTEN TO VOS30+STB80 FOR F39

✓ I THINK I'VE FIXED FIND_LAMONT

✓ NEED TO RUN PARANOIA FOR F39

26

READING LAMONT ARCHIVE:

I'VE WRITTEN A SCRIPT IN code/.../archive CALLED retrieve_lamont WHICH TAKES A JDAY ARGUMENT. I HAVEN'T TESTED IT YET, BUT IT SHOULD RESTORE BREAKOUT, QUALITY, & FLIGHT_LOG DIRECTORIES UNDER THE HOME DIRECTORY OF USER archive. THEN IT USES A VERSION OF THE NEW FIND_LAMONT SCRIPT TO MAKE A NEW INDEX FILE FOR THE JDAY. AFTER REARCHIVING THE LAMONT DATA, IT REMOVES THE TEMPORARY DATA DIRECTORIES FROM archive AND TERMINATES.

BY GOING ONE JDAY AT A TIME, WE CAN AVOID FILLING UP THE HARD DRIVE (LIKE HAPPENED EARLIER) OR TYING UP THE TAPE DRIVE.

CURRENT STATE OF POS_DC

I FORGOT TO WORK ON RUN_CROSS, BUT IT SHOULD BE JUST ABOUT READY TO GO. TOM WANTS A CROSS-TRACK FOR F40 WHERE THE TRMM FLIGHT CRAPPED OUT.

WE'VE RECREATED THE CYSLIPS FILES FOR THE FLIGHTS THAT CORRUPTED DURING TESTING OF JOHN'S FIX. F37, F38, & F39 HAVE CORRECTED CYSLIPS FILES SO WE CAN RUN JUSTPOSDC FOR THEM. UNTIL JOHN FINISHES HIS SCRIPT, IT'S TRIVIAL TO JUST FIX THE FILES IN vi, WHICH IS WHAT WE'VE DONE, BEFORE PRINTING THE PLOTS.

GLNK FOR ATRS

HAS YET TO PRODUCE NOISE PLOTS FOR F40, THOUGH IT HAS BEEN RESTARTED SEVERAL TIMES FOR REASONS SUCH AS A FULL HARD DISK, SUSPICION OF STALLING OR FILE CORRUPTION. THE RADAR FILES ARE QUITE LARGE

27

FOR THIS FLIGHT, THOUGH, SO I WANT TO GET IT RUN AT LEAST ANOTHER HOUR BEFORE WORRYING, & AT WHICH POINT THE FIRST STEP WOULD BE TO BREAK OUT THE FILES & VIEW THEM IN XEVAS, AS PER MATT'S DIRECTIONS (TOM & I EACH HAVE PRINTED INSTRUCTIONS)

TODO AS OF 16:00
- GET POS PLOTS W/ CYCLE SLIPS FOR F37-F40
- ARCHIVE J003
- GET CURRENT AND OLD LAMONT DATA ARCHIVED
- GET ATRS QC FOR F40
- GET CROSS-TRACK FOR F40
- SOLVE CYSLIPS PROBLEM

17:43 GMT GOING-TO-BED STATUS REPORT

RUN_CROSS BASICALLY RUNS, THOUGH IT'S OATZKY SEEMS TO REMOVE STRAN_TIMES TOO EARLY.

USE RUN_CROSS -1 VOS### + STA### -2 VOS### + STA### F###

LIKE W/ RUNPOS_BC. WE SHOULD ONLY NEED THIS FOR F40

retrieve_lamont SEEMS TO BE WORKING, TOO. I'M DOING J001 AS A TEST. THAT LEAVES J002 & J354 - J365 TO BE REDONE

STILL HAND-EDITING CYSLIPS FILES, CURRENTLY CAUGHT UP.

GLNK STILL HASN'T FINISHED FOR F40. THIS IS BAD.

28

J005 Made Vol 7 ATRS ARCHIVE TAPE.
J56 I put the Volume number in the JAO File.
printed QC FROM F40 & F41
Seems that the Web_arq QC hangs if the output files are already there.
Printed existing output by hand.

J005 ALL CAUGHT UP. ARCHIVES UP TO DATE, THOUGH
10:45 retrieve_lamont STILL NEEDS TO BE RUN FOR J354-J366.

CYSLIPS PROBLEM FIXED. USED SEO PIPE IN RAW_POS.RC

NOTE: ACCIDENTILY USED RAV3 DUMP TAPE FOR DODUMPS ON RAV2. NO BIGGY...

MTZZ INCLUDES INFORMATION FOR CHECKING THE CALIBRATION/MOUNTING OF THE LASER AND MUST BE ARCHIVED FOR VTZ1 BUT NOT FOR LAMONT.

J005 LAMONT ARCHIVE

IS UP TO DATE, MISSING ONLY J354 - J362 EXCLUDING J356 & J35

USE "retrieve_lamont JHH#" AS "ARCHIVE" USER.

EACH TIME IT IS RUN, YOU WILL USE THREE TAPES, EACH TAKING ABOUT 20 MINUTES, SO WE CAN RUN IT ANY TIME WITHOUT FEAR OF TYING UP THE DLT DRIVE TOO EXTENSIVELY. ADDITIONALLY, WE COULD SET IT UP TO USE AN EXTRA DLT DRIVE INSTEAD.

THE THREE TAPES INVOLVED ARE THE LAMONT ARCHIVE AND COPY 1 OF THE FIRST VOLUME OF BOTH TARG + ORIG ARCHIVES.

MOST OF THE TIME TAKEN IS DUE TO TAPE SEEKING, SO IT WOULD BE MORE EFFICIENT TO DO SEVERAL ARCHIVES SIMULTANEOUSLY, BUT THERE WOULD BE PROBLEMS RUNNING OUT OF DISK SPACE, AS WELL AS TYING UP THE DRIVES. THE WAY IT IS AIN'T SO BAD, AND WE'VE BOT SEVERAL DAYS, THOUGH I THINK WE CAN DO IT IN ONE.

354
~~355~~
~~356~~
~~359~~
362

EACH ARCHIVE REQUIRES ABOUT ~~15~~ 15% OF THE SPACE ON /d1 TO RUN

HERE'S AN IDEA! RUN TWO OR THREE ITERATIONS OF retrieve_lamont IN DIFFERENT WINDOWS AND LET THEM USE EACH TAPE IN TURN, SO THAT THE TAPES ONLY REWIND BETWEEN JOBS.

↑ 2 PROBLEMS: TAPES GO OFFLINE WHEN DONE FOR A JOB
TEMPORARY FILES ARE INDISCRIMINATELY DELETED UPON TERMINATION

CONCLUSION: ANY INCREASE IN EFFICIENCY WOULD DETRACT FROM USER-FRIENDLINESS. AS IT IS, ANYONE CAN DO THIS AND THERE'S ONLY 7 TO GO.

30

JOH IN THE CONTINUING SAGA OF THE LAMONT ARCHIVE...

IN THE ADVENT THAT WE NEED TO GIVE LAMONT DATA FOR THE TEST TRANSECTS, I HAVE WRITEN A SCRIPT IN ~~MATLAB~~ code/.../archive/breakout CALLED ~~find_TT~~ find_TT. IT LOOKS AT THE TARG OLT LOGS TO GENERATE AN INDEX FILE WHICH IT CONVENIENTLY NAMES ACCORDING TO THE TAPE ARCHIVE NUMBER. THIS MEANS IT DEPENDS ON THE ARCHIVE HAVING ALREADY BEEN RUN (daily_dlt) IN ORDER TO GENERATE AN INDEX FILE.

TO PERFORM THE NEW ARCHIVE, FIRST RESTORING THE DATA (IF NECESSARY) DO SOMETHING LIKE THE FOLLOWING: FOR INDEX 23

```
POP IN THE TARG TAPE
mt -f /dev/dlt asf 23
tar xvf -I /soar/note/xpeed/VTZ1/archive/breakout/LAMONT\
    Index/23
SWAP TAPES
~~rm~~ mt -f /dev/dlt eom
TAR cvf /dev/dlt -I
foreach file (`awk '{ORS=" "; print $0}'`)
    rm $file
end
```

I DIDN'T SCRIPT THIS BECAUSE YOU MIGHT WANT TO DO SEVERAL AT ONCE OR WHATEVER. ANYWAY, IT'S EASY ENOUGH THAT A SCRIPT IS UNNECESSARY AND WOULD TAKE LONGER TO WRITE & DEBUG THAN JUST DOING IT.

31

IN OTHER NEWS, THERE SEEM TO HAVE BEEN PROBLEMS WITH MANY OF THE RETRIEVE_LAMONT JOBS THAT WERE RUN. J354-J363 DID NOT INDEX ALL OF THE FILES. THIS IS WIERD BECAUSE IT HAS WORKED BOTH BEFORE AND SINCE. OH; YEAH: J001 & J003 ARE GOOD BUT J002 IS CRAP. THE MISSING FILES DO APPEAR IN THE OLT ARCHIVES FOR TARG, BUT I NOW WONDER IF THEY'RE REALLY THERE. THE THING TO DO NOW IS RUN IT AND CHECK EVERYTHING EVERY STEP OF THE WAY. I WONDER IF IT ~~WAS~~ DO HAD SOME SORT OF PERMISSIONS PROBLEMS...

HMM... THE NORMAL find_daily SEEMS TO HAVE STOPPED WORKING, TOO! --- FIVE MINUTES LATER IT'S WORKING FINE AGAIN AND ALL I DID WAS REMOVE THE INDEX FILES AND RERUN IT! THIS IS WEIRD...

ANOTHER NOTE: ~~RETRIEVE_LAMONT~~ find_lamont & find_arc_lamont DOESN'T FILTER OUT TEST TRANSECTS IN THE breakout/ELSA DIRECTORY. THIS COULD BE FIXED QUITE EASILY ~~BUT I WON'T BOTHER JUST YET~~ FIXED

WELL, I CONFIRMED THAT find_lamont WORKS SO I REMADE find_arc_lamont FROM find_lamont AND IT WORKED FOR J002, SO I GUESS WE COULD TRY RERUNNING retrieve_lamont FOR J354-J363. MAKE SURE LOOK AT THE INDEX FILE BEFORE OKAY-ING THE LAMONT TAPE. COMPARING THE INDEX FILE SIZE SHOULD BE SUFFICIENT

LS -L /SOAR/nrce/xped/VTZ1/archive/breakout/Lamont/Index

AND CHECK THAT THE FILE SIZE IS THE SAME ORDER OF MAGNITUDE AS KNOWN GOOD ARCHIVES.

ALSO, PROBABLY TAKE A LOOK AT THE OUTPUT & MAKE SURE IT ISN'T ALARMINGLY BRIEF.

32
J006 (JDS) Lamont Archiving status:

retrieve_lamont started for: J354 362

→ tried to run retrieve_lamont for J354 & then J362. Both times I got error message -
tar: can't change directories to targ/xpcd/VTZV quality/pcar/VTZ1/105160/J3626: No such file or directory

→ lamont archives J354 to J363 still need to be done!

J007 / 08 January 2001 2:20 am local

F46 - There were 2 sets of Hard drives for this flight.
They were run F46...a and F46...b in the glnk script. I know the script calls for the version but is that right? B/c it was all F46. Well it doesn't seem to do anything except print out...a and ...b JDS + MCM were confused + need clarification.

GMAG - Appears that J007 has appended to J006. So, we did not get mag plot on POS prints. I ran J006 again but have not copied any file in lunchbox.

Ski-Doo - Looks like data HOSED.
I put the Skd10a.b and Skd10a.e in the acgn/.../ASK/... F46

I then ran bo-pos again for the flight. I couldn't remember how to run bo-pos for just one platform. Does that help?

→ Run Kars for just VOS30 + SKD10
Started at 2:30 am local.
Went too quickly

Ran [redacted] run-pos-gc
ERROR
I left the Quality Control windows open for you to see

34

PROBLEMS W/ FY6 FIXED:

SKDID STARTED ON DIFFERENT JDAY THAN REST OF FY6. BROKE OUT MANUALLY & RERAN KARS. MAG DATA'S A MESS, THOUGH, AND I'M NOT GONNA MAKE IT PRETTY SO LONG AS WE GOT IT. AT LEAST THERE'S SOME MAG ON MOST OF THE RC NOW.

J008 retrieve.lamont IN PROGRESS FOR J359-J363.
NEED TO RESTORE targ/.../breakout/ELSA FOR J005 AND RE-ARCHIVE J005 & J006 FOR LAMONT.
CURRENTLY RESTORING INDEX 23, 26, 29 TO REARCHIVE TEST TRANSECTS. VOLUME 2 STILL NEEDS TO BE DONE

2:08 SHIT!
THROUGH A TERRIBLE OVERSIGHT, I NEGLECTED TO mt -f /dev/dlt eom BEFORE WRITING TO TAPE AND I WIPED IT! NOW WE NEED TO retrieve.lamont FOR J354, J355, J358-J005, & daily.lamont FOR J006.
I GUESS THE ONE UPSIDE IS THAT THE TAPE WILL BE CLEANER FOR LAMONT...
NOTE: DO IN REVERSE ORDER SO AS TO AVOID CONFUSION WITH WHICH VOLUME TO RESTORE DATA FROM
~~J006, J005, J004, J003, J002, J001~~, J366, J365, J364 J363, J362, J361, J360, J359, J358, J355, J354

15:16 DAMN!!!
J006 IS THE ONLY ONE THAT HAS EVERYTHING!
THE REST HAVE ONLY THE POST SCRIPT. I WILL ONCE AGAIN REMAKE find_arc_lamont FROM find.lamont
THIS IS STARTING TO REALLY PISS ME OFF. WORST CASE SCENARIO, WE CAN FINISH THIS AT WILLY FIELD.

35

16:30 VTZ1 ARCHIVES COMPLETE. TWO SYSTEM DUMPS HAVE BEEN MADE OF RAVZ. I'M NOW TESTING retrieve_lament WITH JDOS.

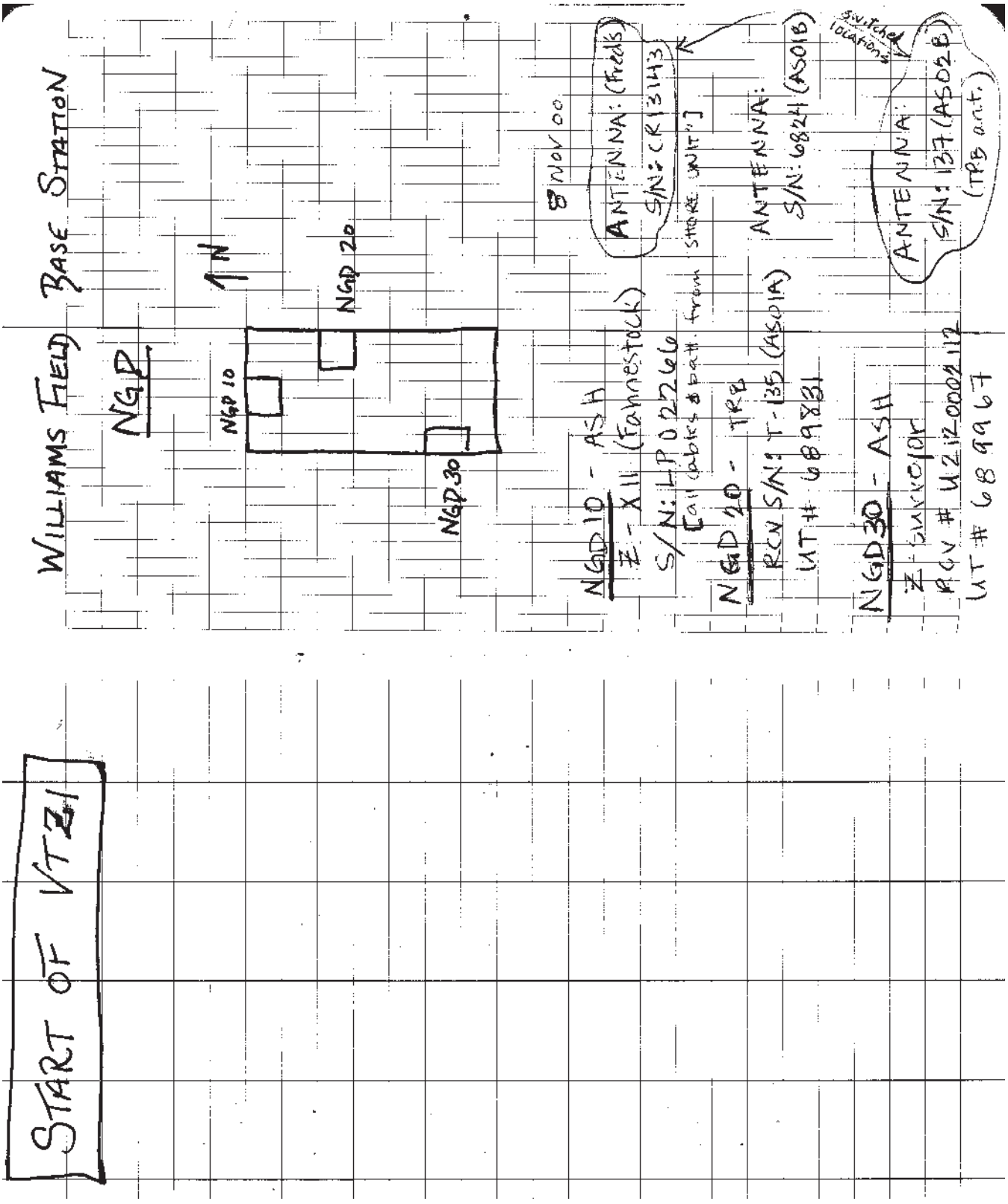
17:15 PROBLEMS SEEM TO BE FIXED. RETRIEVE_LAMENT HAD ..../ELSA/ELSA (RECURSIVE) WHEN FINDING ARGUMENTS FOR find_src_lament, WHICH ALSO HAD THE SAME ERROR CAUSING IT TO NOT INDEX breakout/ELSA.

NOW JOBS AND DOWN NEED TO BE DONE. DON'T FORGET TO USE VOLUME 2 UNTIL TOLD OTHERWISE BY retriave_lament. ORIG & TARG WILL SWITCH VOLUMES AT DIFFERENT TIMES.

I'M LEAVING A SYSTEM DUMP RUNNING AND GOING TO BED. I COULDN'T FIND ANY LABELS FOR THE DUMP AT...

Willy Field & Seismic Center Notes and Logs

Base GPS Field Notes



9 Nov 00 - Shore Unit

Ashtech logged for about 5 hours. TEQC not found so used Ashtonn. Waiting for [redacted] J3G to arrive about TEQC. (SDK didn't find) Ashtonn - similar procedure as RT29

11 Nov 00

Testing logging on TRB. Flashcard AS01B Logging well.

- Switched Shore Unit onto STA10
- Now NGD10 is M. Fahnestock
  - * Black case labelled - (Bad ?)
- Still using cables from Shore Unit setup on NGD 10

Note: M. Fahn does not have differential option

* Waiting for TEQC to breakout

11-12-00

NGD 10 - 2-X16, On and all parameters entered into Ashtech.

All's well - 10-11 SVs found.

NGD 20 - TRB - AS01A not working. There is power but cannot get out of DISPLAY SETUP screen.

May not even be searching for Satellites.

Visual Antenna connections, looks good

Switched out TRB (AS01A) w/ TRB SNR-8000

NGD 20

TRB SNR-8000
S/N T-409
UT # 619367
MOD. 7490540-050

Turned on + started to track right away

1400 Start Z-XII logging
1406 Start TRB logging
Start Z-Surveyor but after 30 minutes Rx is still not seeing any satellites but knows its position.

1615 Stop Z-XII Record Number: 10142
Total Block Errors: 5953

Stopped TBR 16:20
2979 Kb

Both Z-Surveyor would not lock any Satellites. Antenna connections good. Hooked up to a TRB Antennna (AS02B).
SWITCHED Antenna Connections w/ the Ashtech Z-XII which is hooked up to ASH Antenna.
Z-Surveyor then only worked! So, Z-Surveyor only likes Ashtech Antennas + not TRB.
The Z-XII Rx still found 10 SVs when connected to AS02B.

to maintain proper nomenclature, Fred's antenna was switched with TRB antenna on top of Jamesway. (now Z-Surveyor has ASH antenna).

Ashtech
FRED'S antenna = NGD30
S/N# CR1B1483

TRB antenna = NGD 10
S/N# 137 (AS02B)

file: T01A (GPS collection for Bjorn)

22:15 Stop logging TBR, Z-12, Z-Surv.

11/15/00
New Firmware 2L00 was installed by JSG on both STB10 + NGD10, Ashtechs. Since then, logged Z-XII and had nearly as many Block Errors as Record Numbers.

11/18/00
NGD20 - Fixed AS01A. There is a switch in the back that must be on 'Local' not on 'Port A'. AS01A seems to be working fine now. Did not try logging, but it was finding satellites + operating normally.

11/24

Z-12 was turned off (the one labeled 'Bad?') It wouldn't turn back on, but then it did. We don't know why. logfile seems to have been erased during this process somehow. (?)

NGD 10 : ASH Z-X11 S/N : 2285

TRB Antenna S/N: 137 AS02B

11/28/00

NGD20 (TRBge) - 11/27/00 had trouble finding satellites. Initially was logging, then stopped logging. Turned it off, couldn't find any satellites for hours. This morning it was fine. Possible cause - severe known mag storms. Mag activity has settled down this AM. Other GPS receivers (10,30) not seemingly affected. VLR

11/29/00

TRB T-409 (AS02A) would not see SSV's

Switched out w/ TRB T-135 (AS01A), and would not see SSV

AS02 In Satellite Scoreboard OSS - 0, only lock on 1 SSV then none

" MODE CHANGE COMPLETE (5)"

↳ what does this mean

AS01 OSS : 2 → OSS : 0 (flip back & forth)

So, Changed out Choke Ring Antenna.

Replaced Antenna S/N : 6824 (AS01B)

w/ Yellow case Antenna S/N:

RX now tracking & logging !

NGD 10

ASH RX S/N : LPO 2285 [M. FAHN Z-X11]

Ant - TRB AS02B S/N: 137

NGD 20

TRB T-135 (AS01A)

Ant S/N : 316 (YELLOWCASE)

UT # 689783

NGD 30

ASH RX Z-Surveyor # uZ12000211Z

UT # 689967

ASH ANTENNA S/N: CR13193 (FRED'S ASH ANT.)

* Something Wrong w/ Choke Ring Antenna S/N: 6824 AS01B *

12-04-2000 (J33?)

Testing AS01B. - Replaced AS02B on NGD10

Test AS02A - Replace AS01 at NGD20

↳ putting AS02 antenna on sled for laser calibration w/ Fannestock Z-12 (S/N: 2285)

Switched AS02 antenna w/ yellow case antenna to try AS01 w/ [redacted] TBR. TBR can't seem to lock onto > 1 SV with other TBR ant. (yellow case) it gave "C/A" S/N values for only 3 satellites & never (after 15 min) found correct lat/long. Then, when plugged into ASH ant. ("Fred's") it finds correct lat/long w/ 8 SV's, w/in 3 minutes.

NGD 10 - yellow case
NGD 20 - AS01
NGD 30 - FRED'S

Test Results - TRB doesn't like AS01. ASH seems okay w/ AS01. TRB okay w/ yellow case. 2-XII

J342 -

Had Z-surveyor logging. Ben put battery in. System crashed. Restart no good. Had to disconnect power & antenna remove batt's flash. Reconnected & put everything in. Turned on all ok..

J342 GMT 7:00

Mass chaos. For JT-06, which was just completed, the antennas for NGD10 and NGD20 were plugged into the opposite recievers (ie NGD 10 ant → NGD 20 Rx)

J344 Iwakoga

S/N T-409 } can use 20mb series card (flash) but not >20mb
UT 619367

S/N T-135 } cannot use 20mb
UT 609831 } or >20mb flash

J344 21:50

NGD 20 ~~now takes ASO2A antenna~~ changed antennae reciever to:

TRB Rx AS02A SNR-8000
S/N: T-409
UT: 619367
TRB Antenna AS02B
S/N: T-137

J346 00:57

TRB NGD 20 would not track SV's. switched out cable. Still not enough SV's to track. Switched out antenna & tracking begins immediately

NGD20 antenna changed to:

TRB antenna (yellow case)
S/N: 316

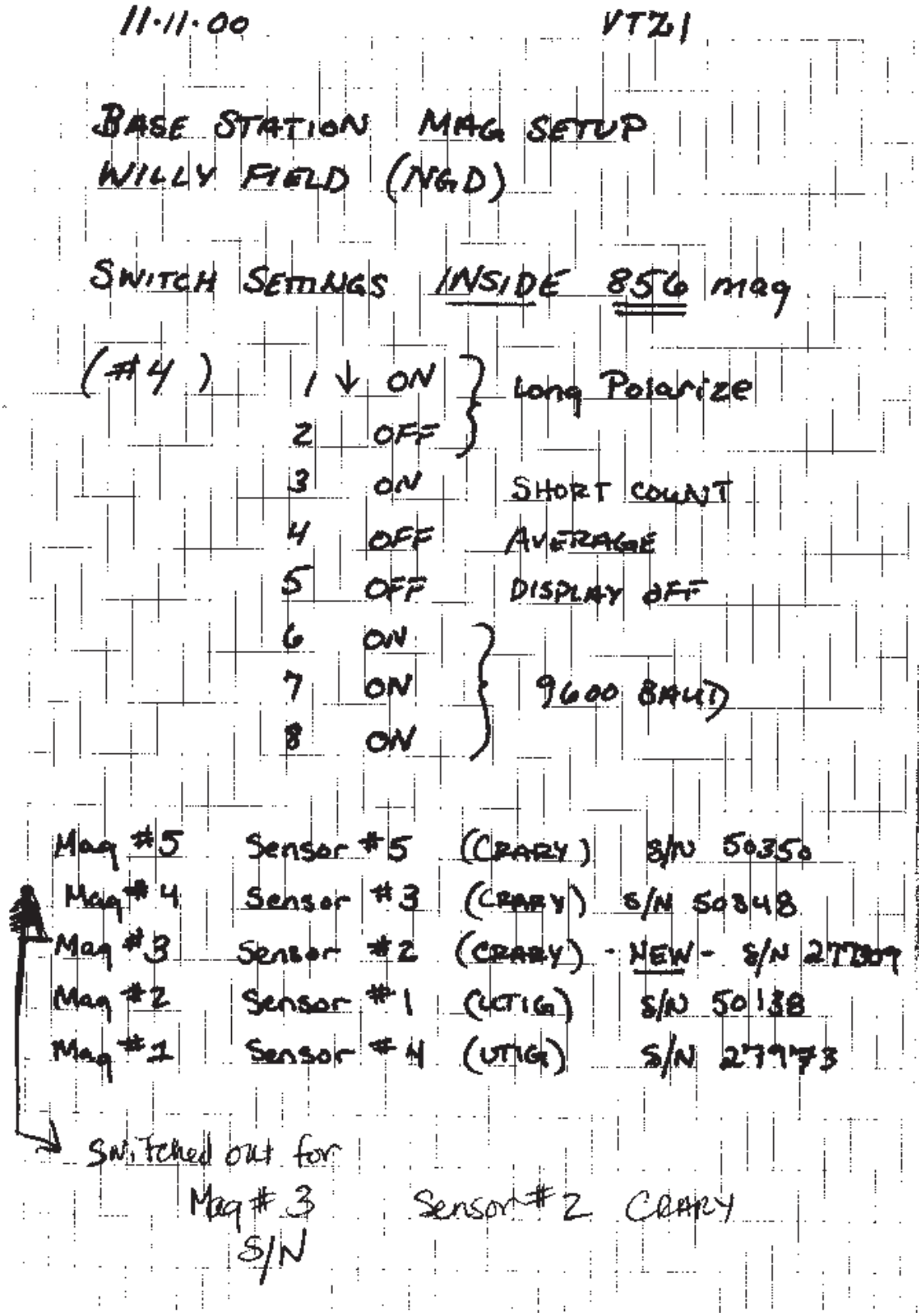
NGD 10

ASH Rx (Fannestock)
S/N: ~~[illegible]~~ 2285
TRB ant AS01B
S/N: 6824

~~J344~~ J346
~~[illegible]~~ - Dec. 12

- NGD30 is displaying a lot of cycle slops.
- Switched out antenna cable ~~[illegible]~~

Base Mag Field Notes



Which have been tested & Okay

Mag #4 - good

Mag #1 - good takes D batteries

Mag #5 - good

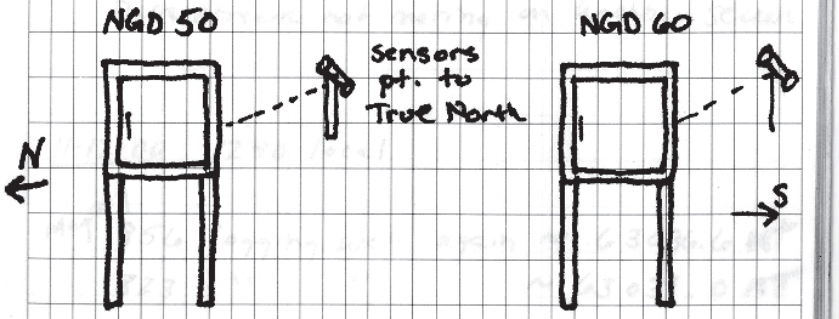
Mag #3 - Okay

Mag #2 - NOT GOOD & lithium battery is way low.

11·11·00

Set up lunchbox, reset PST + platforms, looks good.
Remote + base radios working well w/in
j-way. Networks 1 (823) + 2 (856).

Set up NGD 50 + NGD 60



823 Mag
Mag# 1 S/N 823049
Sensor# G393
NT# 669275
(Network radio 1)

856 mag
Mag# 4
Sensor #3
S/N 50348
(Network radio 2)

1700 Local - Start logging to lunchbox + looks good.
856 ~ 62000 nt (Batt: 11.9v)
823 ~ 62000 nt

When setting up 823 ... noticed that one of the wires running from the Solar panel to the black (−) part of the banana plug is disconnected.
Battery still okay though & will monitor

2000 Local
856 radio not RX!
Data stream not moving on knobbox screen.

11·12·00, 1240 local
Mag #4
856 logging well again ~ 63036.6 MT
823 " " ~ 63031.0 MT

MEI, JDS, EBJ →
Switched 856 battery & repositioned antenna.
Took antenna battery out in order to swap

823 battery reading low ~ 8.5 V due to severed wire. Spliced wire & hooked back up - batt ~ 9.3 V. All's well. Solar Panel charging well. Also charging

battery inside J-Way intended to switch out in future.

Inside J-way, we moved radios a little further apart

2000 hrs, local

823 Mag is sparking a lot and then froze. not Rx. Steadies out, but at ~ 17,000 nT, then spikes again, freezes at 32,000 nT, sparking again.

2230 hrs, local
#5 823 batt: 7.5 v, switched out w/ #4 batt
reading: 13.2 v

825 mag
Reading norm ~ 63197 nT
856 mag ~ 63201 nT

Also switched out 856 internal batt.
External 12.5 v

11-13-00

1735, local
→ Hooked up lunchbox + radios to UPS earlier. When turned back on 856 radio NOT Rx.
→ Switched out the 12v, 8ah batt w/ 12v, 17 ah batt. Both were reading ~ 13.0 v.
→ Cleared 856 mag
→ Restarted Radio - both remote + base
All's well.

823 mag batt # ~ 13.2 v

856 mag: 63157 nT
823 mag: 63152 nT

11-14-00

J319, 0120 GMT, 1420-local

NG050 - 823 ~ 63094 nT
NGD60 856 ~ 63099 nT

* Start logging lunchbox for a long time

11/15/00 1800 - Someone shutdown lunchbox accidentally, Have to restart. Also restart 856 radio cause CD-Rx lights off.

11/15/2000

1818 - Start Lunch 3 logging mag,
- J320 -

11/17/00

0900 - Spikes noticed w/ 823 mag, Radio not Rx either, 0.00 nT.

There has been no sun for ~ 3 days so Switched out battery b/c the V = 6.98... not so good. Replaced w/ another 12V, 55 ah. Radios not talking through. Remote radio CD light not on. Tx like wild fire though. Base radio has CD light on but no Rx. Standing by to see Radio batts start charging.

Also ~~deleted~~ stopped & started recording again on Lunch 3.

856 batts okay, ~ 12.63 V

- Radio Station Network #1 pair replaced by Network #3 pair.
- Network #1 won't talk to each other. Must reprogram.

20 Nov 2000 -

- Network #1 Radio Units reprogrammed
- Updated procedure is RAW now.

Ⓐ Lunchbox GPS = NGD40

11/20/2000 - [redacted] 823 mag ~ 63096 nT
856 mag ~ 63101 nT

J324 appended to J323 file b/c lunchbox did not create new file for J-day. SDK fixed. Not sure why happened.

1700 hrs. Mag #4 856 switched out for Mag #1
856 to be tested.
Mag #1 no internal battery
856 batt ~ 13 volts
823 batt ~ 13-14 volts

11/21/2000

Mag #1 not working. SDK recycled radios.
CD lights okay, not Rx.

823 Mag ~ 63230 nT

10:25 local / 21:21 GMT -
Mag #1 restarted ~ 63192 nT
- functioning properly -

11/26/2000 - 15:00 Local
Switched Mag 1 Console w/ mag 5

11/26/2000

856 mag#5 internal switches:

1 — on ↓
2 — off
3 — on
4 — off
5 — off
6 — on
7 — on
8 — on

internal batt. = 8.2 V (batt. Ø2) batt. changed to: NO int. batt. (they all need charging)

856 batt. # Ø6 V = 4.8

11/26/2000 · Lunch box 3 every once in a while will not create a new file for Jxxx. The current J-day will append to previous J-day file. Don't know until run gmag.

J331 appended to J330

[823 batts ~ 12.4 V
856 batts ~ 12.4 V]

11/27/00 Switched 823 Radios
01:11 GMT from Network 3 to Network 1

[823 ~ 12.5 V
856 ~ 13.1 V]

Erased Internal Memory on 856

11/28 - UPS went down, having Generator problems here at Wiley. Restarted Lunch 3 J333.

[2100 local] - 823 down, Switched out Battery #5 w/ Battery #4 (?) ↘ 4V
- No sun today & voltage was down to
- 856 batt ~ 12.5 V

[less than 24 hrs 12.4V → 4V not a good batt?]

11/29/00 - 22:28 GMT
856 ~ 63014.8 nT
823 ~ 63010.12 nT

0230 GMT - J334 / 11.29.00
• 823 went out
- Recycled Radio Power at Remote - All's well

11/30/00 - J334 22:20 GMT
• Switch out Mag # ~~5~~ w/ Mag #2
- uses 9 D-cells
- internal lithium batt. dead

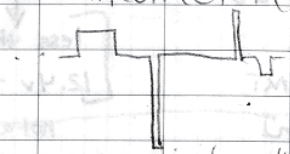
11/30/00 23:23 GMT
823 batt: 14.14 V
856 batt: 13 V
switched out Mag #5, data still to be downloaded from internal memory

11/30/00 cont.

Mag #2 would not allow reprogramming of time. Internal Lithium battery low.

Mag #3 switched in to NG1GO.

- Crary Mag, apparently not used by SOAR before. Seemed to be giving sporadic + incorrect readings.



we tried setting the internal switches with on either ↑ or ↓, and we tried running through the whole programming process again, to no avail.

Mag #2 was reattempted. We were able to set the time, tuning, + so on. But it refused to begin logging.

Mag #4 was switched in + seems to be working fine.

Mag #3 was returned to Crary & another mag (~~#2~~ the NEW "mag #3") was checked out.

J336 22:25 GMT

Switching new Mag #3 w/ Mag #4. mag #3 internal batt. = 12.2V
lithium = 3.68V

- Display reads "Data Err" at all initial button pressings. ~~Lithium batt. too low?~~ If button is press again (while display reads "data Err", progaming may proceed as normal.
- Mag #3 not working. Left Mag #4 out at hutlet. After pressing

AUTO - AUTO-SHIFT-010

one reading is transmitted, 7 sec. later screen reads "data Err" & no more readings taken.

856 Batt = 14.0V
823 Batt = 13.7V

J338 03:30 GMT

Mag #3 "Data Err" fixed by pressing [ERASE] [ERASE]. mag had to be re-programed afterwards.

Mag #3 installed in hutlet.
Mag #4 brought back inside.
#3 appears to work fine now.

Mag#2 - will not show display or beep when attached to external battery now.
Lithium batt. = 0.17 V
(WAY too low, but why will it not work w/ external batt.??)

J339, 1445 GMT
Sensor # 1 switched in. Sensor #3 brought back. (behaved superbly)
All's well.
Space 823 Mag # switched. Mag # brought back
All other Dynasty cable being tested w/ 856 Mag.

J339 ~~0713 GMT~~ 09:00 GMT
~~for remote MAG #5, batt #6~~
Switched Sensors on 856
brought in #1, placed #5

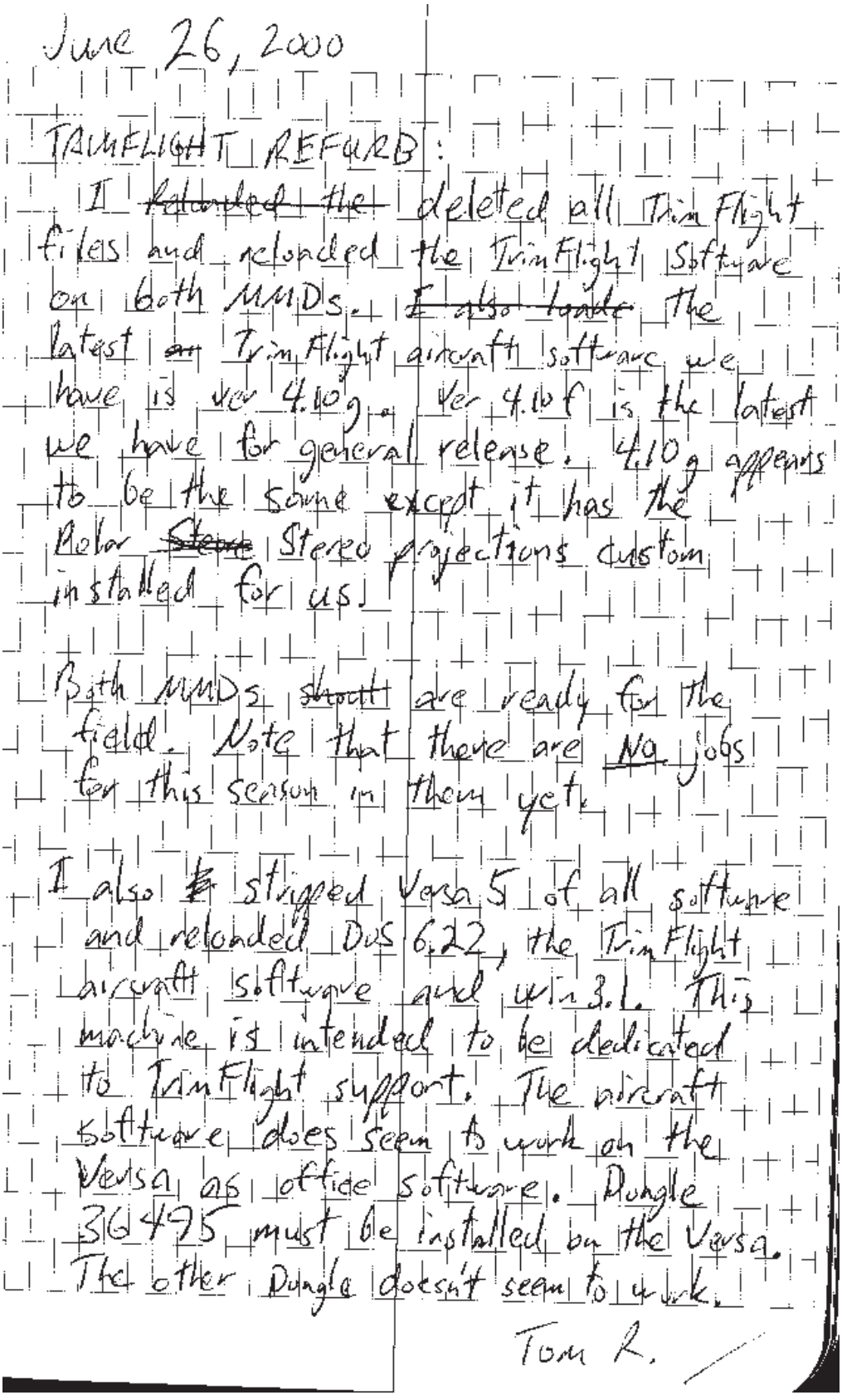
drop mags
pick up

J340 Tested lunchbox 2. Problem with viewing disk space and magnetic trend. Problem was in code... ok now.
-08:35 GMT switched Sensor on 856 from #5 to #2 ← behaved superbly

J341 - AUTO + TUNE + SHIFT set to 00.4 nF in MAG #4 to match capacitance of newly constructed, Blue sensor/batt cable to be used as portable base unit.

J342 - RTQC STOPPED & RESTARTED @ 2300 TO IMPLEMENT NEW CODE IN HOPES OF FIXING DATE ROLLOVER PROBLEM

DGPS



June 26, 2000

TRIMFLIGHT REFORD:

I ~~Reloaded the~~ deleted all Trim Flight files and reloaded the TrimFlight Software on both MMDs. ~~I also loade~~ The latest ~~an~~ Trim Flight aircraft software we have is ver 4.10g. Ver 4.10f is the latest we have for general release. 4.10g appears to be the same except it has the Polar ~~Stere~~ Stereo projections custom installed for us.

Both MMDs ~~should~~ are ready for the field. Note that there are No jobs for this season in them yet.

I also ~~s~~ stripped Versa 5 of all software and reloaded DOS 6.22, the Trim Flight aircraft software and win 3.1. This machine is intended to be dedicated to TrimFlight support. The aircraft software does seem to work on the Versa as office software. Dongle 36475 must be installed on the Versa. The other Dongle doesn't seem to work.

Tom R.

June 28, 2000
Both TrimFlight units (MMD, LIGHTBAR and Fuces Fusdane unit) powered up and test good. Good acq of GPS satellites.

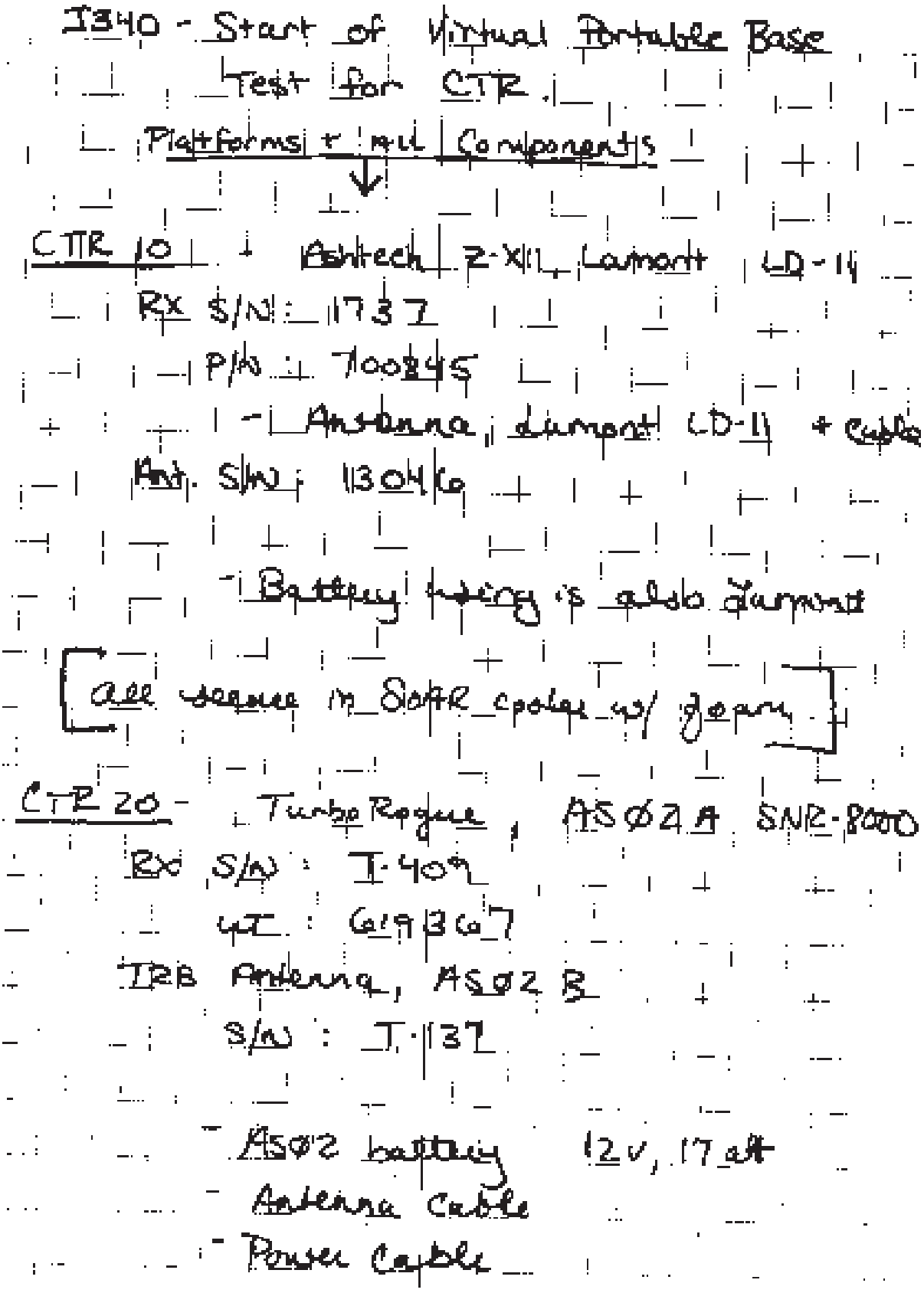
VTZ1
Nov. 16, 2000 RKB

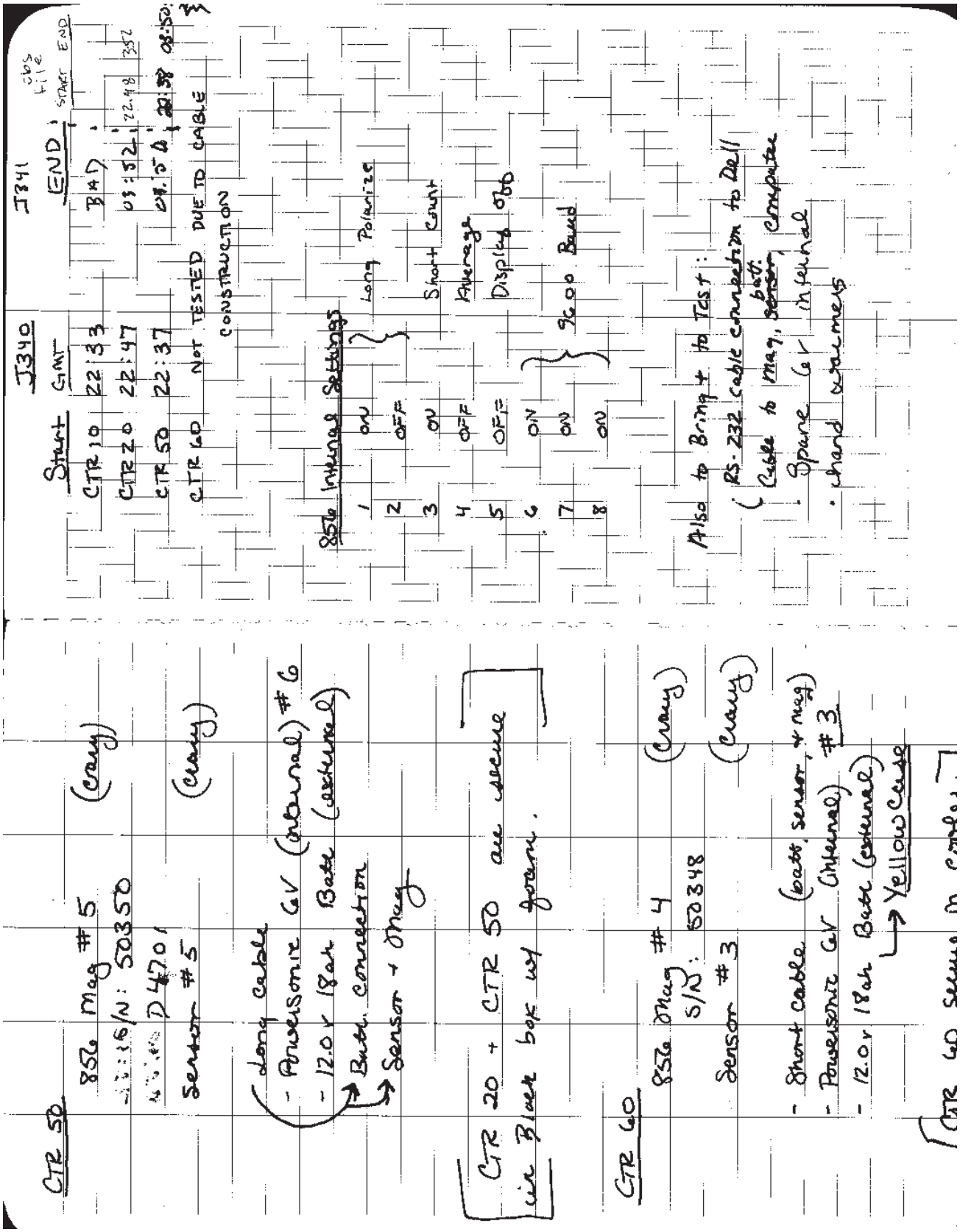
Serial Output format

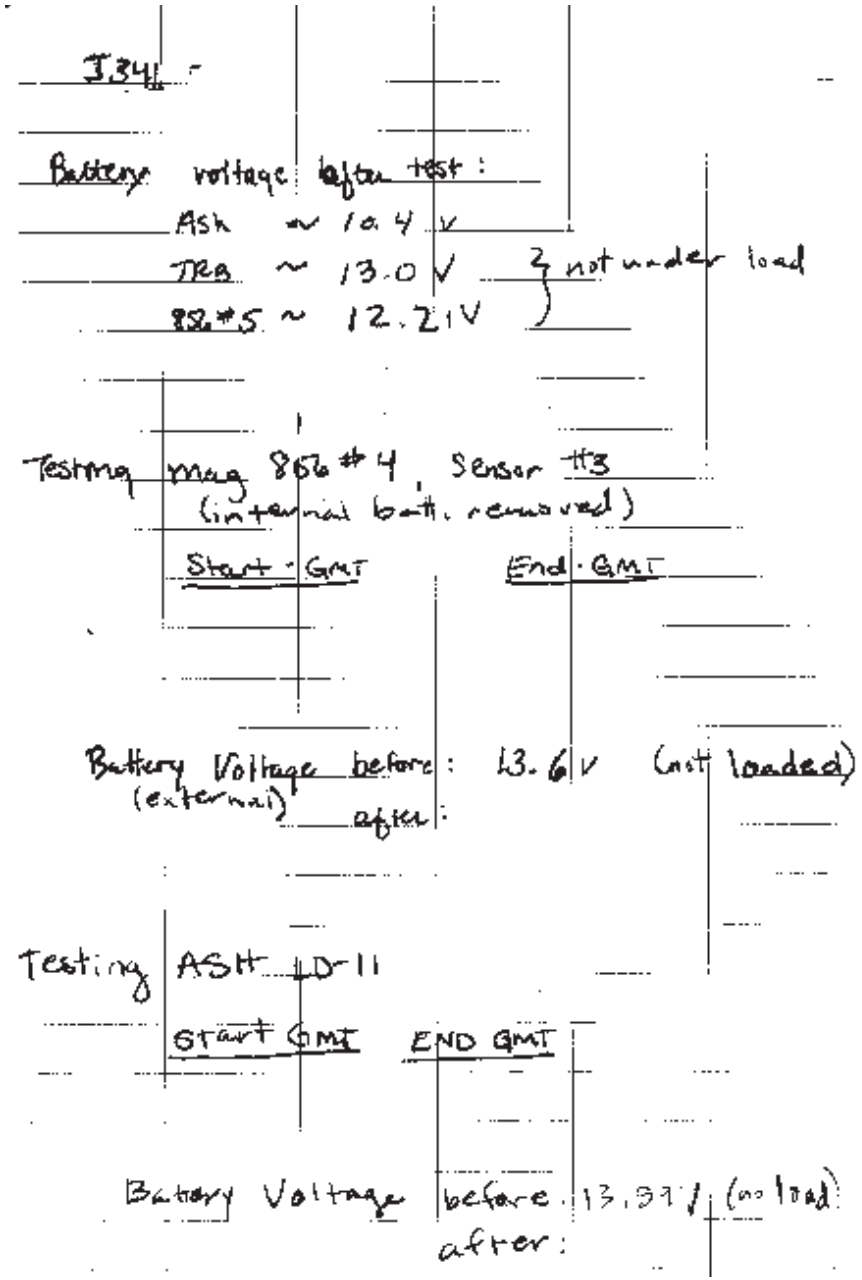
Port	Info	Head	Format	Width	Dp	Tail	Sign
p1	Lat	"	PkdSpc	14	9	"	Y
p1	Long	"	PkdSpc	15	9	"	Y
p1	Track	"	PkdSpc	6	1	"	Y
p1	Gnd Spd	"	PkdSpc	6	1	"	Y
p1	Offline	"	PkdSpc	9	1	"	Y
p1	PDOP	"	PkdSpc	7	1	"	Y
p1	GPS height	"	PkdSpc	8	1	"	Y
p1	Easting	"	PkdSpc	13	1	"	Y
p1	Northing	"	PkdSpc	13	1	"	Y
p1	Time	"	PkdSpc	10	1	<13><10>	Y

totally wrong!
-RKB

Remote Base at Seismic Center: CTR




J340
Start GMT
CTR 10 22:33
CTR 20 22:47
CTR 50 22:37
CTR 60 Not tested due to cable construction
J341
END
CTR 50
858 Mag #5 (navy)
S/N: 50350
D4201
Sensor #5 (navy)
- along cable
- Awesome GV (internal) #6
- 12.0 v 18ah Batt (external)
→ Batt. connection
→ Sensor + Mag
CTR 20 + CTR 50 are inside the Black box w/ green.
CTR 60
858 Mag #4 (navy)
S/N: 50348
Sensor #3 (navy)
- Short cable (east sensor, + mag)
- Powersonic GV (internal) #3
- 12.0 v 18ah Batt (external)
→ Yellow Cable
858 Internal Settings
1 ON Long Polarize
2 OFF
3 ON Short Count
4 OFF Average
5 OFF Display OBS
6 ON 9600 Baud
7 ON
8 ON
Also to Bring to Test:
RS-232 cable connection to Dell
Cable to mag, sensor, batt.
Spare GV internal
Hand tools/measure



J341 -

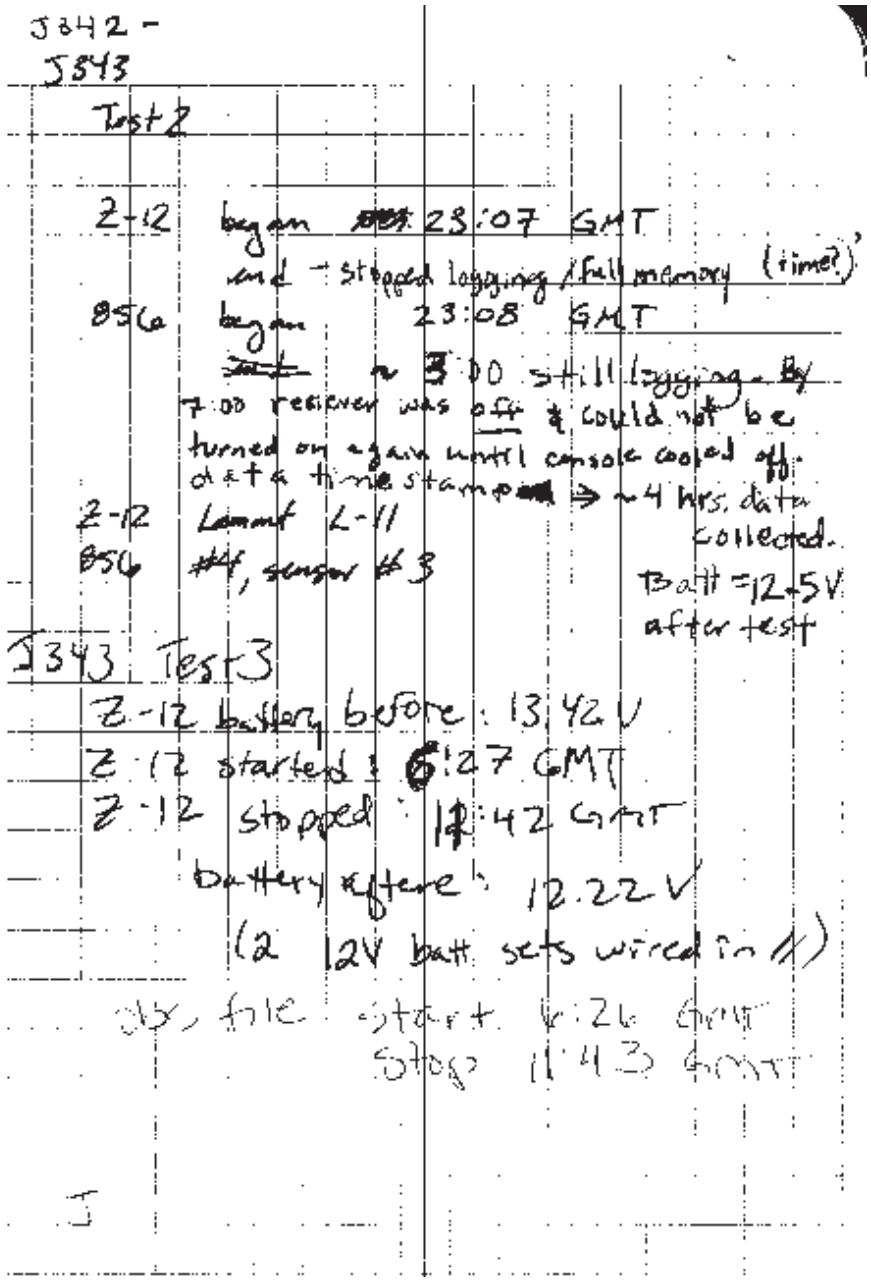
Battery voltage after test:
Ash ~ 10.4 V
TRB ~ 13.0 V } not under load
856 #5 ~ 12.21 V

Testing mag 856 #4, Sensor #3
(internal batt. removed)
Start · GMT End · GMT

Battery Voltage before: 13.6 V (not loaded)
(external) after:

Testing ASH LD-11
Start GMT END GMT

Battery Voltage before 13.97 V (no load)
after:



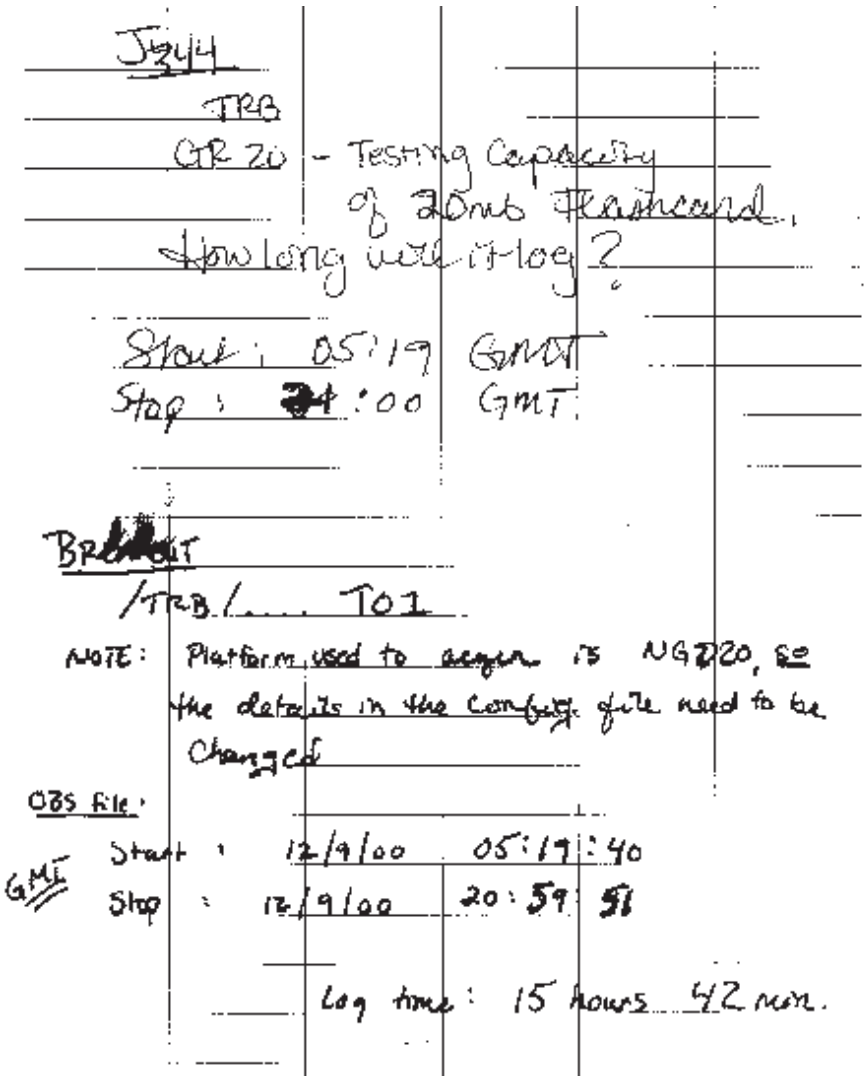
J342 -
J343

Test 2

Z-12 began ~~856~~ 23:07 GMT
end - stopped logging / full memory (time?)
856 began 23:08 GMT
~~Test~~ ~ 3:00 still logging. By 7:00 receiver was off & could not be turned on again until console cooled off. data time stamp ⇒ ~4 hrs. data collected.
Z-12 Lemmf L-11
856 #4, sensor #3
Batt = 12.5 V after test

J343 Test 3
Z-12 battery before: 13.42 V
Z-12 started: 6:27 GMT
Z-12 stopped: 12:42 GMT
battery after: 12.22 V
(2 12V batt sets wired in //)
dat, file start 6:26 GMT
stop 11:43 GMT

J



J244
TRB
CTR 20 - Testing Capacity
of 20mb Flashcard.
How long will it log?

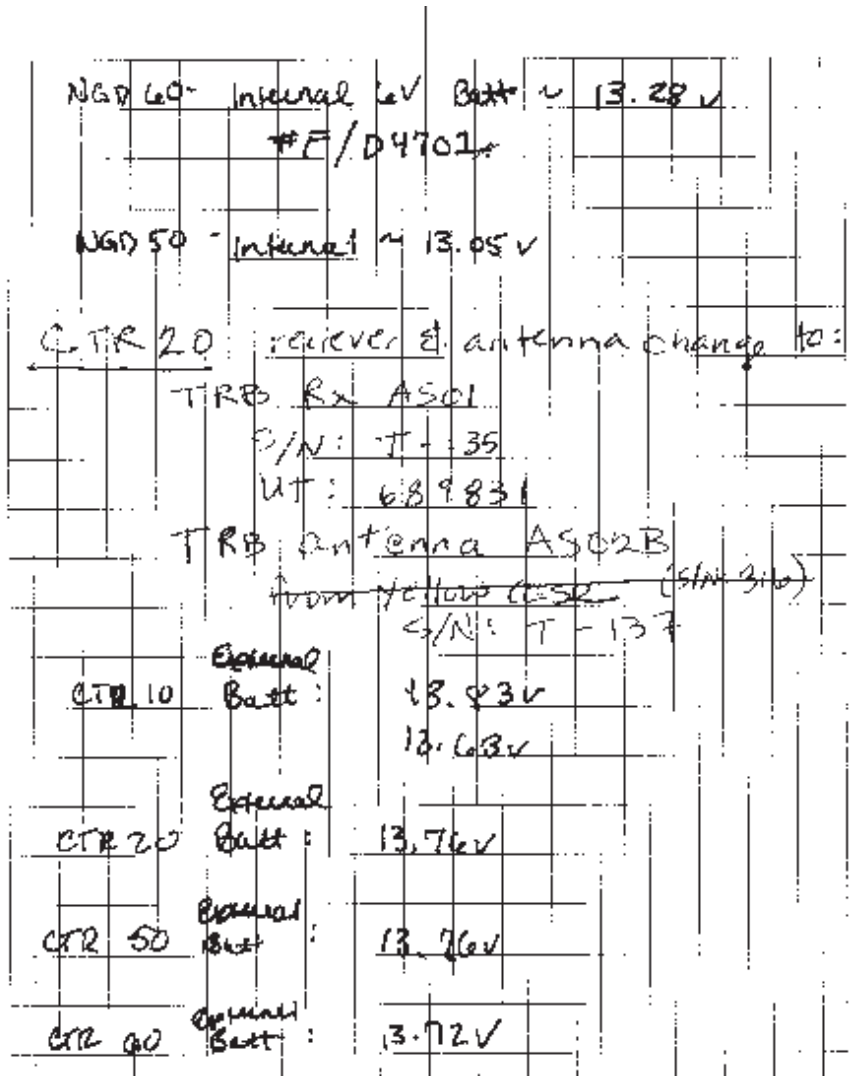
Start: 05:19 GMT
Stop: 24:00 GMT

BR[illegible]T
/TRB/... TO1

NOTE: Platform used to acquire is NGD20, so the details in the Config file need to be Changed

OBS File:
Start: 12/9/00 05:19:40
GMT
Stop: 12/9/00 20:59:51

Log time: 15 hours 42 min.



NGD 60 - Internal 12V Batt ~ 13.28 V
#F/D4701

NGD 50 - Internal ~ 13.05 V

CTR 20 : reciever & antenna change to:
TRB Rx ASC1
S/N: T-135
UT: 689831
TRB antenna AS02B
from Yellow CTR (S/N 316)
S/N: T-137

CTR 10 External Batt: 13.93V
13.68V

CTR 20 External Batt: 13.76V

CTR 50 External Batt: 13.76V

CTR 60 External Batt: 13.72V

J347 F03

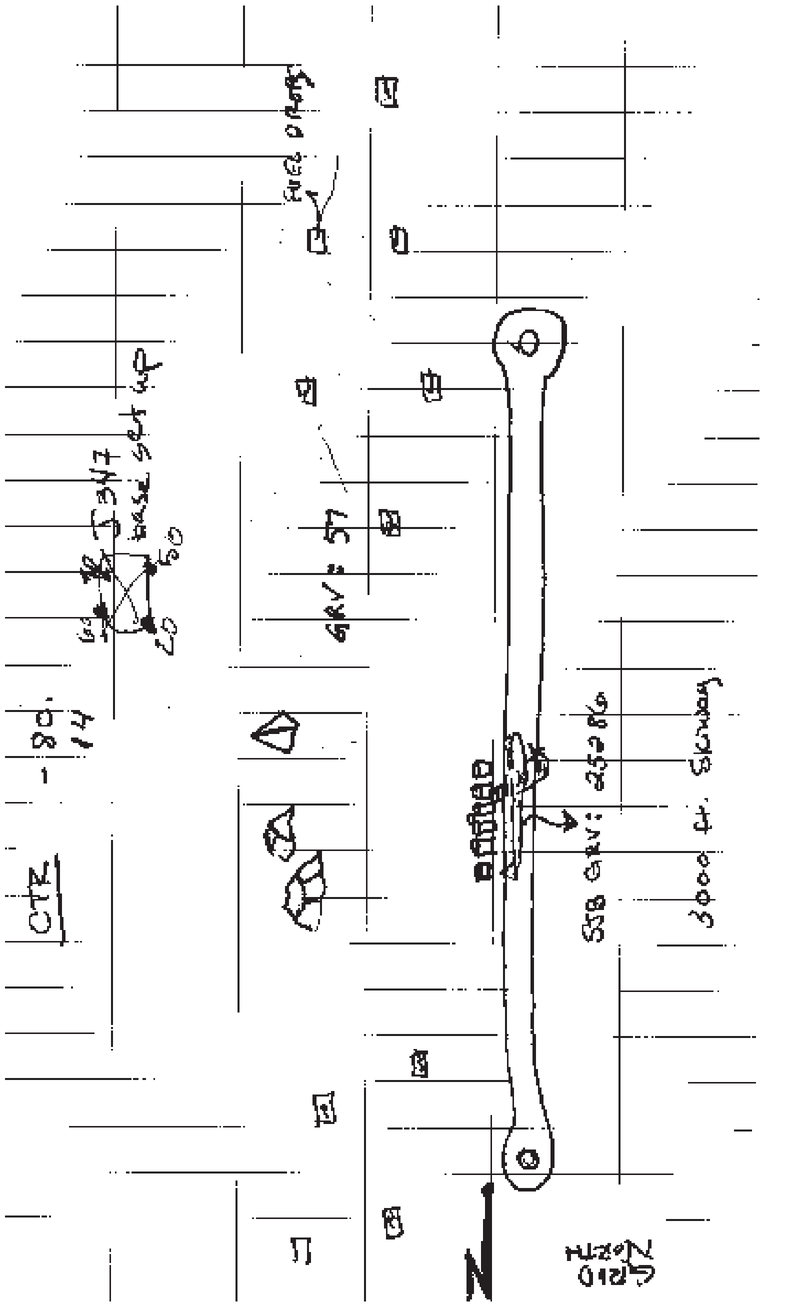
Porta-base setup:

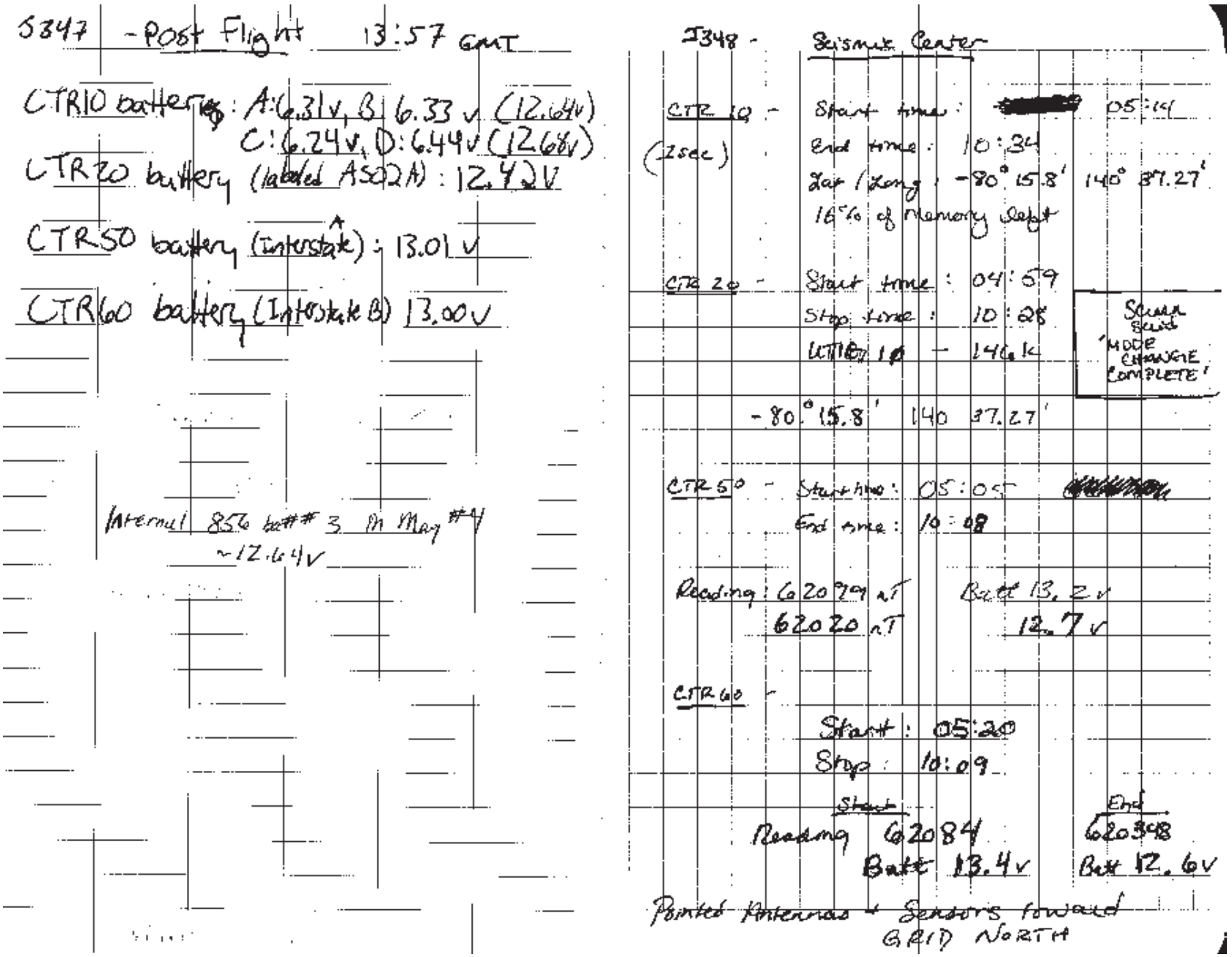
CTR 10 (Z-12) 1 sec. int.
Start time: 04:46
Stop time: 09:57
LAT/LONG: 80:15.8218 S
140:37.2684 E

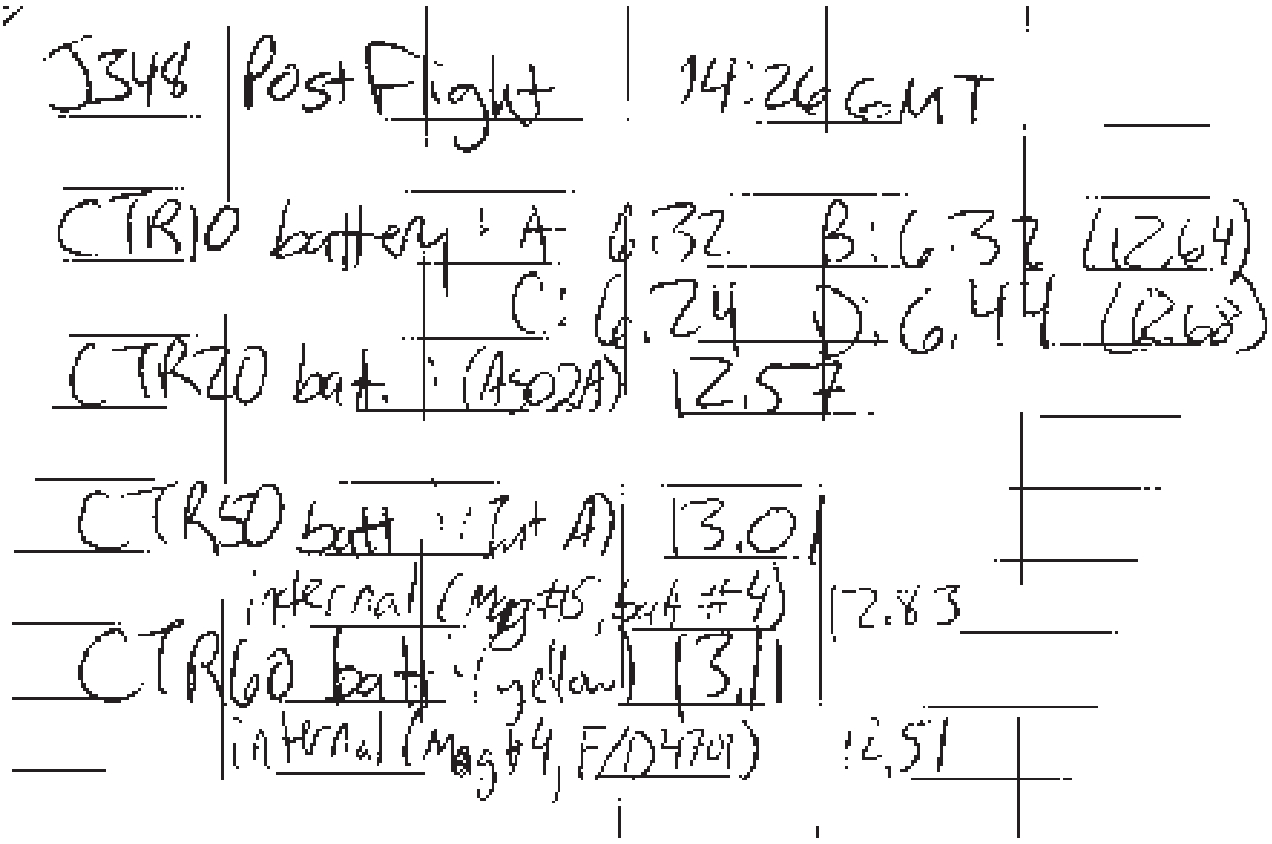
CTR 20 (TRB) 1 sec. int.
start time: 04:30
stop time: 09:46
flash card: 6909K (UTIG 10)
LAT/LONG: 80.2635 x -836755.6
140.621 E y 6867999
z -626684.6

CTR 50 (Mag 5) 10 sec. int.
Start time: ~04:50
Stop time: 09:47

CTR 60 (mag 4) 10 sec. int.
start time: NEVER
stop time: STARTED!
- unit refused to power on, even after all batt connections checked (actually it turned on once, briefly, then off, then never on again)




5347 - Post Flight 13:57 GMT
CTR10 battery: A: 6.31v, B: 6.33v (12.64v)
C: 6.24v, D: 6.44v (12.68v)
CTR20 battery (labeled AS02A): 12.42V
CTR50 battery (Interstak): 13.01v
CTR60 battery (Interstak B) 13.00v
Internal 856 batt # 3 in May #4
~12.64v
I348 - Seismic Center
CTR 10 - Start time: [redacted] 05:14
(1sec) End time: 10:34
Lat/Long: -80° 15.8' 140° 37.27'
16% of memory left
CTR 20 - Start time: 04:59
Stop time: 10:28
Square Skies "MODE CHANGE COMPLETE"
-80° 15.8' 140 37.27'
CTR 50 - Start time: 05:05
End time: 10:08
Reading: 62079 nT Batt 13.2v
62020 nT 12.7v
CTR 60 -
Start: 05:20
Stop: 10:09
Start End
Reading 62084 62038
Batt 13.4v Batt 12.6v
Pointed Antennas + Sensors toward GRID NORTH


1348 Post Flight 14:26 GMT
CTR10 battery: A: 6.32 B: 6.32 (12.64)
C: 6.24 D: 6.44 (12.68)
CTR20 batt.: (A502A) 12.57
CTR50 batt: (int A) 3.01
internal (Mag #5, batt #4) 12.83
CTR60 batt: (yellow) 3.11
internal (Mag #4, F/D 4704) 12.51

Post Flight Operations Logs

NOD Page 1 11/29/00
NOD VTZ1:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): (NGD) VOS

	Flight or Window	TF03	TF02	TF04	TF05	TF06	TF07				
Acquisition and Breakout	RHD Acqn & Brkt (glnk)	7(2)3 VEB	EBJ	✓	maj JSC	MEI	VLR				
	BaseMagAcqn&Brkt (gmag) 2-12	VEB	EBJ	MEI	MEI	~~MEI~~ MEI	ST VLR ~~VLR~~				
	Base ~~ASBI~~ Acqn (fill out log sheet) 2-12	EBJ	✓	✓	✓	VLR	VLR				
	SJB ~~ASBI~~ Acqn (fill out log sheet) 2-12	JDS	✓	✓	JDS	MEI	VLR				
	Base Z-Surv Acqn (fill out log sheet)	EBJ	✓	✓	EBJ	MEI	VLR				
	SJB Z-Surv Acqn (fill out log sheet)	EBJ	✓	✓	EBJ	MEI	VLR				
	Base TRB Acqn (fill out log sheet)	JDS	✓	✓	JDS	MEI	VLR				
	SJB TRB Acqn (fill out log sheet)	JDS	✓	✓	JDS	MEI	VLR				
	GPS Breakout (bo_pos)	EBJ	✓	MEI JDS	EBJ	start VLR ~~VLR~~ MEI VLR	STARTED DONE mei				
Quality Control	~~dokars~~ (includes run-pos.qf)	~~[redacted]~~	✓	MEI ~~[redacted]~~	MEI	start DONE mei	start DONE mei				
	run_cross										
Other	Scan Flight Logs	JDS	VLR	EBJ	mei	mei	mei				
	Paranoia Back-Up	EBJ	JDS	EBJ	mei	VLR	VLR				

Date Scanned into Heirarchy :

Equipment Notes :
+ PROCEDURE

TF04 Paranoia does not currently include gmag (236)

TF04 bo-pos did it work 1st time because gmag did not work (due to appended julian day file)

TF07 : TRB AS01 S/N T-135
w/ AS02 S/N T-409

AS01 Antenna S/N-135 NGD-10
Yellowcase Ant. S/N NGD-20

NOD Page 1 12/7/00
NOD VTZ1:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): (NGD) VOS

task begun
task finished

	Flight or Window	TF08	TF09	F01	F02	F03	TF10	F04	F05	F06	F07
Acquisition and Breakout	**RHD Acqn & Brkt** (glnk)	mei	mei	mei	MEI	mei	mei	mei	mei	mei	MEI
		mei	mei	EBJ	mei	mei	mei	mei	mei	MEI	mei
	BaseMagAcqn&Brkt (gmag)	mei	Mei	mei	mei	mei	mei	mei	mei	mei	mei
		mei	mei	mei	mei	mei	mei	mei	mei	mei	mei
	Base Z-12 Acqn (fill out log sheet)	✓	VAL	JDS	mei	EBJ →		→	EBJ →		→
	SJB Z-12 Acqn (fill out log sheet)	JDS	MEI	mei	mei	EBJ →		→	MEI EBJ	mei	mei
	Base Z-Surv Acqn (fill out log sheet)	EBJ	JDS	JDS	JDS	EBJ →		→	EBJ	→	
	SJB Z-Surv Acqn (fill out log sheet)	MEI	JDS	JDS	JDS	EBJ →		→	EBJ	~~EBJ~~	~~EBJ~~
	Base TRB Acqn (fill out log sheet)	mei	MEI	mei	mei	EBJ →		→	EBJ →		
	SJB TRB Acqn (fill out log sheet)	MEI	MEI	mei	mei	EBJ →		→	EBJ →		
	GPS Breakout (bo_pos)	JDS	mei	EBJ	EBJ	EBJ	EBJ	mei	mei	mei	mei
		mei	mei	EBJ	mei	EBJ	EBJ	~~mei~~	mei	mei	mei
Quality Control	**dokars** (includes run_pos_qc)	mei	mei	mei	mei	mei	mei	mei	mei	mei	mei
		mei	mei	mei	mei	mei	mei	mei	mei	mei	mei
	run_cross										
Other	**Scan Flight Logs**	MCM	VAL	EBJ	EBJ	EBJ	EBJ	EBJ	EBJ	EBJ	EBJ
	Paranoia Back-Up	JDS	mei	JDS	EBJ	mei	mei	mei	mei	mei	mei

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Notes:

NOD
NOD VTZ1:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

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SOAR VTZ1 - Post Flight Operations

Base (circle one): (NGD) VOS

task begun
task finished

J353 J354 J355

	Flight or Window	TF11	TF12	TF13	F08	F09					
Acquisition and Breakout	**RHD Acqn & Brkt** (glnk)	mli	mcm	mli	JSG	mli					
		mli	mcm	mli	JSG						
	BaseMagAcqn&Brkt (gmag)	mli	mcm	mli	J354						
		mli	mcm	mli	J355 JSG						
	Base Z-12 Acqn (fill out log sheet)	mli	mcm	✓	JSG						
	SJB Z-12 Acqn (fill out log sheet)	mli	mcm	✓	JSG JSG						
	Base Z-Surv Acqn (fill out log sheet)	mli	mcm	✓	JDS						
	SJB Z-Surv Acqn (fill out log sheet)	mli	mcm	✓	EBJ						
	Base TRB Acqn (fill out log sheet)	mli	mcm	✓	JSG						
	SJB TRB Acqn (fill out log sheet)	mli	mcm	✓	JSG						
	GPS Breakout (bo_pos)	mli	mcm	✓	JSG						
		mli	mcm	✓	✓						
Quality Control	**dokars** (includes run_pos_qc)	mli	mcm	✓	✓						
		/	/	mli	✓						
	run_cross										
Other	**Scan Flight Logs**	JDS	JDS	EBJ	JDS						
	Paranoia Back-Up	mli	~~JDS~~ mcm	JSG	JSG						

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Notes:

Daily Operations and Archive Logs

NOD Page 1 11/28/00
NOD VTZ1:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

	Archive for Julian Day	MT11 - J325	TF02 - J333	TF03 - J335	TF04 J336	TF05 J337	J338	J339	J340	J341	J342 TF06 TF07
Daily Operations	find_daily	JDS	JDS	MEI	MEI	MEI	←	←			MEI
	orig DLT, Copy 1	JDS	JDS	MEI	MEI	MEI	←				
	orig DLT, Copy 2	JDS	JDS	MEI	MEI	MEI	←				
	targ DLT, Copy 1	MEI	JDS	MEI	MEI	MEI	←				
	targ DLT, Copy 2	MEI	JDS	MEI	MEI	MEI	←				
	Julian Day DAT	JDS	JDS	MEI	MEI	MEI	←				↓
	856 Mag memory clear										
	System Back-up (indicate tape) (dadumps)		MEI	MEI	MEI	MEI	MEI	MEI	MEI	MEI	MEI

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NOD Page 1 12/7/00
NOD VTZ1:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun	Include times
task finished	and initials

	Archive for Julian Day	J343	J344	J345	J346	J347	J348	J349	J350 J351
	Flights Archived	TF08	TF09		F01 F02	TF10 F03 F04	F05	F06	F07	TF11	TF12
Daily Operations	find_daily										
	Julian Day DAT										
	orig DLT, Copy 1									JH	
	orig DLT, Copy 2									JH	JH
	targ DLT, Copy 1									JH	
	targ DLT, Copy 2									JH	
	823 and 856 Mag battery check										
	System Back-up [dodumps] (indicate tape)										

Date Scanned into Heirarchy 12/19/00 JSG

Ashtech Z-12Acquisition Logs

SOAR VTZ1 -NGD Ashtech Z-XII Acquisition Log NGD10

Julian Day Window	Flight	Platform	Start Record (GMT hh:mm)	End Record (GMT hh:mm)	Acqrd b File Size, KB	Acqrd e File Size, KB	Record #	Block Errors	
J 324 W	F MT08	NGD 10	04:03	7:26	19,511,101	18,834	24459	12	
		SJB10	07:22 →		23,583,144	23,607	19546	4	
J 327 W	F TF01	NGD10	21:22	22:47					CANX'D
		SJB10							
J 329 W	F MT12	NGD10	05:03	07:03:37	13624569	13,029	14351	8	
		SJB10							
J 332 W	F MT13	NGD10	01:08	05:00					
		SJB10							
J 332 W	F TF01	NGD10	05:12	06:56					
		SJB10	05:23:29	06:--					
J 333 W	F MT16	NGD10	02:18	~~05:35~~					
		SJB10							
J 333 W	F TF02	NGD10	21:28:28	1:40	27846440	27606	30213	16	Fahnstock 2266
		SJB10							
J 335 W	F TF03	NGD10	01:48	6:43	35809836	34314	35390	16	
		SJB10							
J 336 W	F TF04	NGD10	06:12	10:32	25805675	28509	31357	16	
		SJB10							
J W337	F TF05	NGD10	2:47	6:44	38783154	39732	42863	28	
		SJB10			41702416				
J W342	F TF06	NGD10	0:33	06:24	~~26805~~	39216	41927	30	
		SJB10							
Date Scanned into Heirarchy :									

SOAR VTZ1 - NGD Ashtech Z-XII Acquisition Log
Platform- NGD10

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Acqrd **b** File Size, kB	Acqrd **e** File Size, kB	Record #	Block Errors
J 342 W 2	F TF07	6:55	10:22	20,424	20	24807	10
J 343 W	F TF08	05:58	11:26	33,584	34	39214	9
J 344 W	F TF09	06:10:03	12:38	40,745	41	46526	18
J 346 W	F 01 a & F02 b	00:08	11:11	18,004,313 ~~26674~~ 24,010,530	18,318K 24,768K	26674	11
J 346 W 1	F 03	23:53	(J347) 14:47	104,334	94	107276	53
J 347-8 W	F 05	23:56	14:44	106,831	94	106568	57
J 349 W	F TF11	06:47:58	10:58	26,787	27	30108	6
J 351 W	F ~~TF12~~	06:20:12	10:25:41	26,488	25	—	—
J W353	F TF13	05:09	08:13			22063	10
J W	F						
J W	F						
J W	F						
J W	F						
J W	F						
J W	F						

VOS10 →

Date Scanned into Heirarchy : 12/20/00 JSG

TurborogueAcquisition Logs

SOAR VTZ1 - NGD 20 TurboRogue Acquisition Log

Julian Day Window	Flight	Platform	Flashcard Name	Start Record (GMT hh:mm)	End Record (GMT hh:mm)	Data Volume	
J 324 W	F MT08	NGD20	UTIG5	04:16	07:25	4253K	
		SJB20			7.32	3722	
J 327 W	F TFØ1	NGD20	UTIG8	22:21	22:48	1542	→ CANX'D
		SJB20					
J 329 W	F MT12	NGD20	UTIG8	05:09	07:04	2433	
		SJB20					
J 332 W	F MT13 ~~EEE~~	NGD20	UTIG10	01:10:40			Solar flare monitoring
		SJB20					
J 332 W	F TFØ1 Flight cancelled	NGD20	~~ASØ1B~~ ~~05:06~~	05:06			→ STOPPED LOGGING B/W 06:30-0650
		SJB20					
J 333 W	F ~~MT14~~ MT16	NGD20	UTIG9	01:35	05:30	5307K	
		SJB20					
J 333 W	F TF02	NGD20	UTIG5	22:08:05	1:45:18	4839	
		SJB20					
J 335 W	F TF03	NGD20	~~ASØ2~~	02:02	0645	6348	
		SJB20					
J W 336	F TF04	NGD20	UTIG2	06:21	10:31	5440	
		SJB20					
J W 337	F TF05	NGD20	UTIG5	02:49	8:44	7824	
		SJB20					
J W 342	F TF06	NGD20	UTIG2	00:35	06:26	7883	
		SJB20					
Date Scanned into Heirarchy :							

SOAR VTZ1 - NGD TurboRogue Acquisition Log
Platform- NGD 20

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Flashcard Name	Data Volume
J 342 W 2	F TF07	07:09	10:18	UTIG5	3931
J W 343	F TF08	06:06	11:24	UTIG10	7154
J W 344	F TF09	06:14	12:38	UTIG9	8566K
J W 346	F FØ1 & FØ2	00:58	11:07		13329K
J W 346	F FØ3	23:55	4:55 (from obs) ?	ASO1B	7424K disk got full
J W 347	F FØ3	~~12:05~~ 05:30 ish	14:49	20MB UTIG12	11508
J W ~~347~~	F ~~FØ5~~	23:59	14:43	UTIG12	19777
J W 349	F TF11	06:47	10:59	UTIG10	5631K
J W 351	F TF12	06:28:42	10:25:45	UTIG8	5303K
J W 353	F TF13	10 ~~Ø~~ VOS 20			
J W	F				
J W	F				
J W	F				
J W	F				
J W	F				

Date Scanned into Heirarchy : 12/20/00 JSG

Ashtech Z-SurveyoAcquisition Logs

SOAR VTZ1 -NGD Ashtech Z-Surveyor Acquisition Log

Julian Day Window	Flight	Platform	Start Record (GMT hh:mm)	End Record (GMT hh:mm)	File Name on Z-Suveyor	% Mem. left	Flash Card	
J 327 W	F TF01	NGD 30	21:03	22:47	00: NGD3A	99%	C(?)	—CANNOT?
		SJB30						
J 329 W	F MT12	NGD30	05:03	07:01:41	00: NGD3A	?	C	
		SJB30						
J 332 W	F MT13/ TF01	NGD30	00:41		00: NGD3A	99%	C	} solar flare
		SJB30	05:20		SJB3A	99	B	
J 333 W	F MT16	NGD30	01:43:07	05:28	00: NGD3A	99%	D	
		SJB30						
J 333 W	F TF02	NGD30	21:05	1:45	00: NGD3A	99%	B	
		SJB30						
J 335 W	F TF03	NGD30	01:56	06:43	00: NGD3A.335	99%	D	
		SJB30						
J W 336	F TF04	NGD30	06:18	10:31	00: NGD3A	99%	B	
		SJB30						
J W 337	F TF05	NGD30	2:39	6:42	00: NGDA	84%	B	
		SJB30						
J W 340	F TF06	NGD30	0:22	06:27	00: NGD3A	99%	B	
		SJB30	00:56					
J W 342	F TF07	NGD30	6:34	10:32	00: NGD3A	89%	D	
		SJB30						
J W 343	F TF08	NGD30	6:00	11:29	00: NGD3A	99%	C	
		SJB30						
Date Scanned into Heirarchy :								

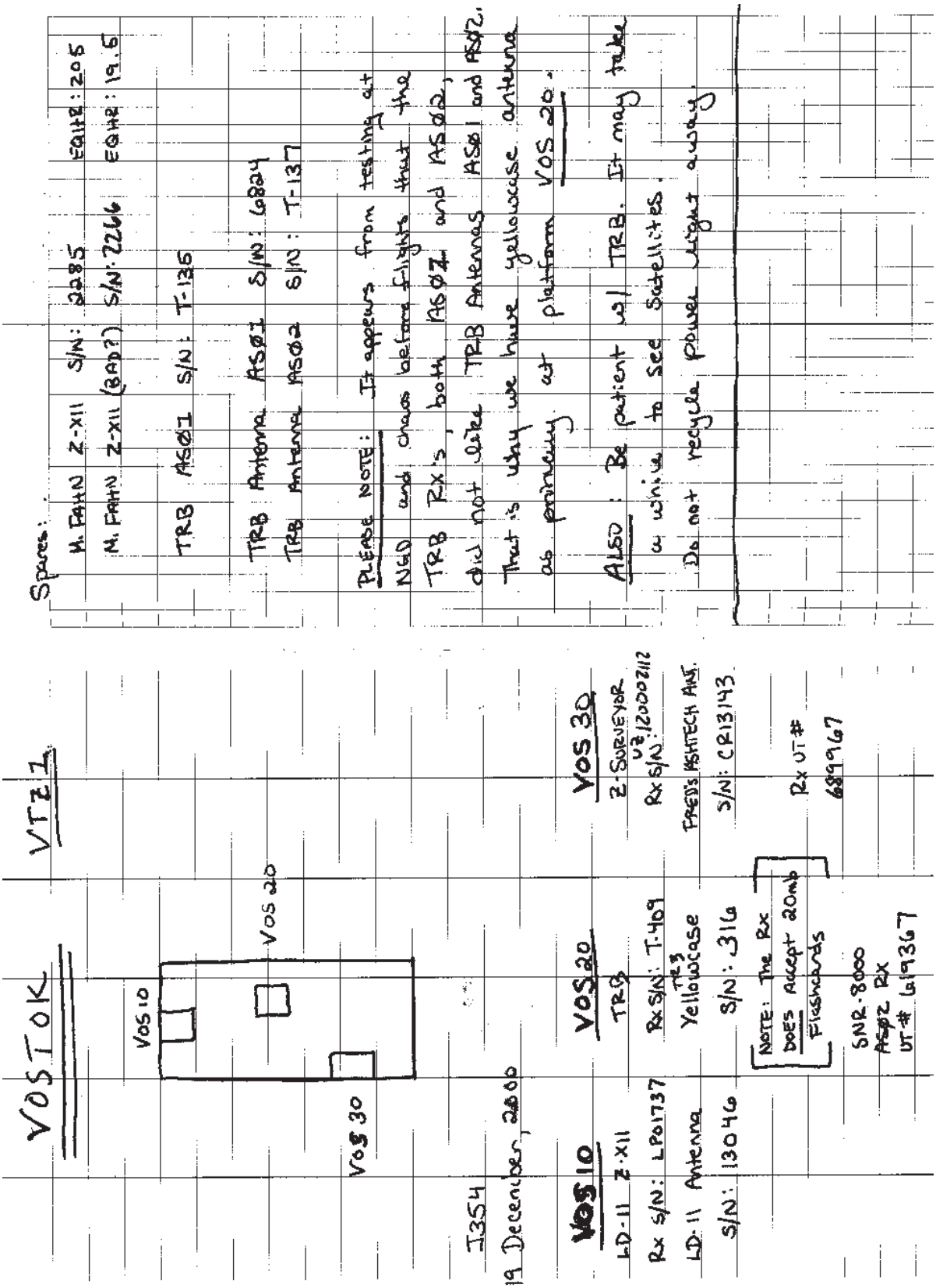
SOAR VTZ1 - NGD Z-Surveyor Acquisition Log
Platform- NGD 30

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	File Name on Z-Surveyor	% Mem. left at END	Flash Card
J 344 W	F TF09	06:13	12:40	00:NGD3A	66%	D
J 345 W	F 01 & F02	23:57	11:06	00:NGD3A00, 345	36%	D
J 346 W	F F03	23:48	14:51 (J347)	00:NGD3A	35%	B
J 348 W	F 05	13:00	14:46	00:NGD3A	35%	B
J 34[illegible] W	F TF11	06:45	10:59	00.NGD3A	99%	D
J 351 W	F TF12	06:28	10:24	00.NGD3A	99%	D
J 353 W	F TF13	no VOS	30			
J W	F					
J W	F					
J W	F					
J W	F					
J W	F					
J W	F					
J W	F					
J W	F					

Date Scanned into Hierarchy : 12/20/00 JSG

Vostok Camp Notes and Logs

Base GPS Field Notes



J357 DECEMBER 22, 2000

The Z-Surveyor at the base has exhibited multiple cycle-slips during ground tests, testflights + survey flights. Today, we moved the Z-Surv Rx further away from the TRB Rx. Bingo. The TRB makes a lot of noise and affects the Z-Surv Rx b/c of its plastic casing. Z-Surv. now ~ 5' away from TRB receiver.

J358

Z-Surv. would not delete files & start logging to new file when "Delete all" was entered (card D). Same thing happened the other day w/ card C. Card C was tested later & worked fine. Today Z-Surv. was turned on before inserting card D. After turning unit off, then on again w/ card already inside, "Delete all" & logging functioned just fine.

J360 Dec 25, 2000

M. FAHNESTOCK'S Z-12 with questionable internal memory S/N LP02266 is swapped into aircraft.
I checked its ability to acquire satellites and log to a PC via datalogr program before swap. TGP

[Change of plan. The good LPO Z-12 S/N LP01737 is in the plane. The S/N LP02266 is in the case] *

VOS ID R+ = M. Fahn. S/N: LP02266

J360 [redacted]
20:15 (GMT) + Z-Surv. (VOS30) turned on normally, then while scrolling thru menus the display turned off & logging light would not flash green light next to on/off button still on though. Battery was at 25%, but unit has been plugged into outlet the whole time. Batt. should not have been draining while plugged in. Maybe

orange power cable is bad. The cable head tends to slide apart from itself more than it should. Finally, after ~~replacing~~ re-inserting same battery & cable (no spares available) & pressing up/down buttons a bunch the unit turns back on normally. Currently logging. Will try & determine true problem after flight. (unit ~~it~~ would not be found by PC terminal until after it mysteriously started display/logging).

J362 20:07 (GMT)

Z-surv. started logging for flight, then 1/2 hour later (or so) logging stopped & no screen display available- no response to buttons. green power light still on though. Power cable end was fixed the other day (screw had been missing) & battery is at 100%. Tom thinks it's flaky. John was randomly pressing buttons after removing & replacing battery, then pressed up arrow for 2 seconds when reciever suddenly awoke. Now logging as normal.

SJB2D Rx = AS01 TRB S/N: T-135

(switched because AS02 was not responding to keypad)

J364 01:30 (GMT)

base z-surveyor has had many cycle slips lately. switched z-surv. & Z-12 antenna cables to test. (flight F24)

VOS10 Rx = Z-Surveyor S/N: VZ12000212

VOS30 Rx = M. Fahn. Z-12 S/N: LP022266

Base Mag Field Notes

Checked on J357

VOSTOK - VTZ1

dogging on primary lunchbox since J354

- VOS 50 -
(823)
MAG# 1
S/N 823049
Sensor # 6393
UT# 6669275
(Network Radio # 1)
Battery #5
Batt ~ Good

- VOS 60 -
(856)
MAG #3
Sensor #2
S/N [redacted]7
(CRARY)
(Network Radio #2)
~ 59791 nT
Batt ~ 13.2

Huts set up approximately Eastward of SOAR Jamesway.

Post Flight Operations Logs

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): NGD (VOS)

task begun
task finished

	Flight or Window	F09	F10	F11	F12	F13	F14	F15	F16	F17	F18
	Julian Day	J355	J358	J358	J359	J359	J360	J361	J361	J361	362
Acquisition and Breakout	RHD Acqn & Brkt (glnk)	mei, mcm	mcm ✓	JDS JDS	mei mei	JDS mcm	JDS ✓	mei mei	JDS JDS	JDS	mei mei
	ATRS Acqn & Brkt (glnk on rav2)	mei mei	✓ ✓	JDS JDS	mei mei	JDS ~~JDS~~	JDS JDS	mei mei	JDS	JSG JSG	JSG ✓
	BaseMagAcqn&Brkt (gmag)	✓ ✓	mcm ✓	JDS ✓	mei mei	JDS JDS	JDS ✓	mei mei	JDS JDS	JDS	JSG
	Base ASH Acqn (fill out log sheet)	JDS	JDS	JDS	mei	JDS	mei	mei	JDS	EBJ	mei
	SJB ASH Acqn (fill out log sheet)	mei	mei	JDS	mei	JDS	JDS	mei	JDS	EBJ	mei
	Base Z-Surv Acqn (fill out log sheet)	EBJ	mei	mei	mei	JDS	JDS	mei	JDS	JDS	mei
	SJB Z-Surv Acqn (fill out log sheet)	EBJ	mcm	mei	mei	JDS	JDS	mei	JDS	JDS	mei
	Base TRB Acqn (fill out log sheet)	EBJ	mei	mei	mei	JDS	JDS	mei	JDS	EBJ	mei
	SJB TRB Acqn (fill out log sheet)	JDS	JDS	JDS	mei	JDS	JDS	mei	JDS	JDS	mei
	GPS Breakout (bo_pos)	EBJ ✓	mei mei	~~mei~~ mei	mei mei	mcm ✓	mei mei	mei mei	EBJ EBJ	JSG JSG	mei mei
Quality Control	dokars (includes run_pos_qc)	✓ ✓	mei mei	mei mei	mei mei	mcm mcm	mei mei	mei mei	EBJ ✓	mei mei	mei EBJ
	run_cross										
Other	Scan Flight Logs	JDS	mei	mei	mei	JDS	✓	mei	JDS	mei	mei
	Paranoia Back-Up	EBJ	mei	mei	mei	mcm	mei	mei	✓	mei	mei

Date Scanned into Hierarchy : J362

Notes: F13 - glnk was run w/ VTZ1 as project INSTEAD of LVS. Remember, LVS is the project. VTZ1 /.../SJBa.else existed though in orng/xped... path. Had to run by hand - run-breakout. F13 + run-linked_sjb F13 ..→ Funky plots. Went + removed SJBa.else + try to run glnk again - Did not work. When you run by hand, rpitch is out dated? - its not doradpit PXX - The disk may have a problem b/c when DLM switched disks we were able to acquire all 3 transects rather than just part of 1 from ~~the~~ Disk 3

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): NGD (VOS)

task begun
task finished

	Flight or Window	F19	F20	F21	F22	F23	F24	F26	F27	F28	F29
	Julian Day	362	362	363	363	363	364	364	364/365	365	365
Acquisition and Breakout	RHD Acqn & Brkt (glnk)	EBJ	mcm	mcm	EBJ	mcm	mei	JDS	EBJ	J366	mcm
		EBJ	mcm	mei	JDS	JDS	mei	mcm		J366	mcm
	ATRS Acqn & Brkt (glnk on rav2)	EBJ	mcm	mei	EBJ	mcm	mei	JDS	EBJ	mei	EBJ
		EBJ	JDS	mei	EBJ	JDS	mei	mcm	EBJ	mei	EBJ
	BaseMagAcqn&Brkt (gmag)	EBJ	mcm	mei	EBJ	JDS	mei	JDS		mei	mcm / 366 mcm mcm
		mcm	mcm	mei	EBJ	JDS	mei	mcm		mei	mcm
	Base ASH Acqn (fill out log sheet)	EBJ	mcm	mei	EBJ	mcm	mcm	JDS	EBJ	mei	EBJ
	SJB ASH Acqn (fill out log sheet)	EBJ	JDS	mei	JSG	JDS	mei	mcm	EBJ	mei	mcm
	Base Z-Surv Acqn (fill out log sheet)	JDS	EBJ	mei	JSG	No DATA USAF ERROR	mei	mcm	JDS	mei	EBJ
	SJB Z-Surv Acqn (fill out log sheet)	EBJ	EBJ	mei	JSG	JDS	mei	mcm	JDS	mei	EBJ
	Base TRB Acqn (fill out log sheet)	EBJ	JDS	mei	EBJ	JDS	mei	mcm	EBJ	mei	mcm
	SJB TRB Acqn (fill out log sheet)	EBJ	JDS	mei	EBJ	JDS	mei	mcm	EBJ	mei	mcm
	GPS Breakout (bo_pos)	EBJ	EBJ	mei	JDS	JDS	mei	mcm	✓	mei	EBJ
		EBJ	✓	mei	JDS	JDS	mei	mcm	✓	mei	EBJ
Quality Control	dokars (includes run_pos_qc)	EBJ	mei	mei	JSG	JDS	mei	mcm	✓	mei	EBJ
		JDS	mei	mei	JDS	✓	mei	✓	✓	mei	mei
	run_cross										
Other	Scan Flight Logs	EBJ	JDS	✓	JDS	EBJ	✓	mcm	EBJ	mei	mcm
	Paranoia Back-Up	JDS	EBJ	mei	JDS	JDS JDS	mei	mcm	mei	mei	mcm

Date Scanned into Hierarchy :

Notes: Initial Gmag 2nd time after verifying it worked!
F22 - Need SJB ASH - Can't seem to read zipdisk. - reset zip drive solved prob.
F27 - glnk ran, but printer jammed - need to redo some printouts (Power cycle of Andrews bay)

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): NGD (VOS)

task begun
task finished

cyc. slip fixed dates

	Flight or Window	F30	F32	F33	F34	F35	F36	F37	F38	F39	F40
	Julian Day	J366	5001	J001/002	J002	J002	J002	J003	J003	J003	J004
Acquisition and Breakout	RHD Acqn & Brkt (glnk)	✓	EBJ	JSG	✓	EBJ	JDS	mli	JDS	JSG	mcm
		mli	EBJ	✓	mj	EBJ	✓	mli	EBJ	JDS	mcm
	ATRS Acqn & Brkt (glnk on rav2)	✓	EBJ	JSG	✓	EBJ	JDS	mli	JDS	JSG	mcm
		mli	mcm	✓	mj	EBJ	JDS	mli	JDS	JDS	
	BaseMagAcqn&Brkt (gmag)	✓	EBJ	mli	✓	EBJ	JDS	mli	EBJ	JDS	mcm
		mli	EBJ		mli	EBJ	✓	mli	EBJ	JDS	mcm
	Base ASH Acqn (fill out log sheet)	mli	EBJ	JSG	mli	EBJ	EBJ	mli	JDS	mli	mli
	SJB ASH Acqn (fill out log sheet)	mli	[redacted]	lost file	mli	JDS	JDS	mli	EBJ	JDS	MCM
	Base Z-Surv Acqn (fill out log sheet)	mli	mcm	JSG	mli	EBJ	JDS	mli	EBJ	EBJ	mcm
	SJB Z-Surv Acqn (fill out log sheet)	mli	mcm	JSG	mli	EBJ	JDS	mli	EBJ	EBJ	mcm
	Base TRB Acqn (fill out log sheet)	mli	EBJ	JSG	mli	JDS	JDS	mli	JDS	JDS	mcm
	SJB TRB Acqn (fill out log sheet)	mli	JDS	JSG	mli	JDS	JDS	mli	EBJ	JDS	mcm
	GPS Breakout (bo_pos)	mli	JSG	JSG	mli	EBJ	JDS	mli	EBJ	mli	mli
		mli			mli	EBJ	✓	mli	EBJ	mli	mli
Quality Control	dokars (includes run_pos_qc)	mli	JSG	JSG	mli	EBJ	JSG	mli	EBJ	mli	mli
		mli		mli	✓	JDS	✓	✓	✓	JDS	mli
	run_cross										mli
											mli
Other	Scan Flight Logs	mli	✓	mli	mli	JDS	mli	mli	EBJ	JDS	mli
	Paranoia Back-Up	mli	JSG	JSG	mli	EBJ	JDS	mli	EBJ	mli	mli

Date Scanned into Hierarchy :

Notes:

~~Gmag for F36 not printing at! What went doing wrong?~~ never mind.

ATRS - F40: Error - LP print could not read request. No print-out

ATRS F40 QC Always in run_arc, no link to dirty work, Archived + went on.

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:SOAR VTZ1-Post Flight Ops

SOAR VTZ1 - Post Flight Operations

Base (circle one): NGD (VOS)

task begun
task finished

	Flight or Window	F41	F42	F43	MT22	F44	F45	F46	F47	F48
	Julian Day	J004	004	J005	J005	J005	J006	J006 / J007	J007	J007
Acquisition and Breakout	RHD Acqn & Brkt (glnk)	JDS ✓	JDS ✓	JSG ✓ JSG	✓ ✓	JDS JDS	JDS JDS	JDS ✓	mei mei	JDS ✓
	ATRS Acqn & Brkt (glnk on rav2)	JDS ✓	JSG JSG	JSG ✓	✓ ✓	JDS JDS	mcm JDS	EBJ EBJ	mei mei	JDS ✓
	BaseMagAcqn&Brkt (gmag)	JDS ✓	EBJ EBJ	MEI MEI	✓ ✓	JDS ✓	JDS JDS	EBJ EBJ	mei mei	JDS ✓
	Base ASH Acqn (fill out log sheet)	JDS	EBJ	✓	✓	EBJ	mcm	JDS	JDS	JDS
	SJB ASH Acqn (fill out log sheet)	EBJ	EBJ	mei	✓	JDS	JDS	EBJ	mei	JDS
	Base Z-Surv Acqn (fill out log sheet)	EBJ	JDS	✓	✓	EBJ	mcm	EBJ	mei	EBJ
	SJB Z-Surv Acqn (fill out log sheet)	EBJ	JDS	✓	✓	EBJ	mcm	EBJ	mei	✓
	Base TRB Acqn (fill out log sheet)	JDS	EBJ	mei	✓	JDS	JDS	JDS	mei	EBJ
	SJB TRB Acqn (fill out log sheet)	JDS	EBJ	mei	✓	JDS	JDS	JDS	mei	JDS
	GPS Breakout (bo_pos)	EBJ EBJ	EBJ EBJ	mei mei	✓ ✓	EBJ EBJ	JDS JDS	JDS mcm	mei mei	mei mei
Quality Control	dokars (includes run_pos_qc)	EBJ EBJ	EBJ ✓	mei mei	✓ ✓	EBJ ✓	JDS JDS	JDS mcm	mei mei	mei mei
	run_cross									
Other	Scan Flight Logs	EBJ	JDS	✓	✓	EBJ	EBJ	EBJ	mei	mei
	Paranoia Back-Up	EBJ	EBJ	mei	✓	EBJ	JDS	JDS	mei	mei

Date Scanned into Hierarchy : 1-8-01

Notes:
F44 - Z-surveyor base (VOS#0) - flash card had 2 files (a+b) - not sure why. both were downloaded to rav3
- both broken out. ~30s gap btw them - don't know how this will affect data
- z-surv file appears to have stopped & re-started just after take off - both files (a & b) have gone through bo_pos and run_kars & will be archived.

F46 - 2 sets of RHD's
I downloaded the 2nd set with glnk .... b'
For ATRS - radar plots for test transects are not printing. My guess is it's something to do with the project name. ~~POS QC put in DGS binder, unless you know better.~~

Daily Operations and Archive Logs

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun / task finished	Include times and initials

No F11 Data! Fix!

ORIG INDEX EMPTY. Nothing archived Fix!

	Archive for Julian Day	353	354	355	356	357	358	358 ~~359~~	359	359	360
	Flights Archived	TF13	F08	F09			F10	F11	F12	F13	F14
Daily Operations	find_daily	mli	mli	mli	←	←	mli	←	mli	←	mli
	Julian Day DAT	mli	mli	mli	←	←	✓	←	mli	←	mli
		mli	mli	mli	←	←	✓	←	mli	←	mli
	orig DLT, Copy 1	mli	mli	mli	←	←	EMPTY	←	mli	←	mli
		mli	mli	mli	←	←	✓	←	mli	←	mli
	orig DLT, Copy 2	mli	mli	mli	←	←	EMPTY	←	mli	←	mli
		mli	mli	mli	←	←	✓	←	mli	←	mli
	targ DLT, Copy 1	mli	mli	mli	←	←	✓	←	mli	←	mli
		mli	mli	mli	←	←	✓	←	mli	←	mli
	targ DLT, Copy 2	mli	mli	mli	←	←	✓	←	mli	←	mli
		✓	mli	mli	←	←	✓	←	✓	←	mli
	ATRS archive	TF13 DDS	DLT DDS	DLT DDS	MT03 DDS		DLT DDS	mli	mli	mli	mli
		DLT DDS	DLT DDS	DLT DDS	MT04 DLT		DLT DDS	mli	mli	mli	mli
	Lamont archive		mli	mli			mli	←	mli	←	mli
			mli	mli			mli	←	mli	←	mli
	Daily gmag (plots into binder)	✓	✓	✓	✓	✓	mli	→		mli	mli
	823 and 856 Mag battery check						✓				
	System Back-up [dodumps] (indicate tape)						1				3
							a				C

Date Scanned into Hierarchy

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun	Include times
task finished	and initials

	Archive for Julian Day	361	358	361	361	J362	J362	J362	J363	J363	J363
	Flights Archived	F15	F10 F11 J355-8	F16	F17	F18	F19	F20	F21	F22	F23
Daily Operations	find_daily	✓	JSG	✓	mli	✓	✓	mli	—	—	mli
	Julian Day DAT	✓	JSG	✓	mli	✓	✓	mli	—	—	mli
		✓	JSG	✓	mli	✓	✓	mli	—	—	mli
	orig DLT, Copy 1	✓	JSG	✓	mli	✓	✓	mli	—	—	mli
		✓	JSG	✓	mli	✓	✓	mli	—	—	mli
	orig DLT, Copy 2	✓	JSG	✓	mli	✓	✓	mli	—	—	mli
		✓	JSG	✓	mli	✓	✓	mli	—	—	mli
	targ DLT, Copy 1	✓		✓	mli	✓	✓	mli	—	—	mli
		✓		✓	GBJ	✓	✓	mli	—	—	mli
	targ DLT, Copy 2	✓		✓	EBJ	✓	✓	mli	—	—	mli
		✓		✓	EBJ				—	—	mli
	ATRS archive	mli		JSG	JSG	JSG DLT	mli	mli	mli	mli	mli
		mli		JSG	JSG	DAT	mli	mli	mli	mli	mli
	Lamont archive	✓	✱	✓	mli	✓	✓	mli	—	—	mli
					EBJ	✓	✓	mli	—	—	mli
	Daily gmag (plots into binder)			JSG				✓	JPS		
	823 and 856 Mag battery check										
	System Back-up [dodumps] (indicate tape)				EBJ #1	ATRS b			#3		

Date Scanned into Hierarchy

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun / *task finished* Include times and initials

	Archive for Julian Day	364	364	364	364	365	365	366	001	001/002	002
	Flights Archived	F24	F25	F26	F27	F28	F29	F30	F32	F33	F34
Daily Operations	find_daily	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
	Julian Day DAT	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
		✓	X	✓	mli	✓	mli	mli	✓	mli	mli
	orig DLT, Copy 1	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
		✓	X	✓	mli	✓	mli	mli	✓	mli	mli
	orig DLT, Copy 2	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
		✓	X	✓	mli	✓	mli	mli	mli	mli	mli
	targ DLT, Copy 1	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
		✓	X	✓	mli	✓	mli	mli	✓	mli	mli
	targ DLT, Copy 2	✓	X	✓	mli	✓	mli	mli	✓	mli	mli
		✓	X	✓	mli	✓	mli	mli	✓	mli	mli
	ATRS archive	mli	X	mli	mli	mli	EBJ	mli	JSG	JSG	mli
		mli	X	mli	mli	mli	✓	mli	JSG	JSG	mli
	Lamont archive	✓	X	✓	mli	✓	mli	mli	✓	mli	JDS
		✓	X	✓	mli	✓	mli	mli	✓	✓	✓
	Daily gmag (plots into binder)						mli	mli	JSG		
	823 and 856 Mag battery check	JSG									
	System Back-up ATRS [dodumps] (indicate tape) RAV3	#1			b #2			c #3			

Date Scanned into Hierarchy

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun / *task finished* Include times and initials

	Archive for Julian Day	J002	J002	J003	J003	J003	J004	004	004	005	005
	Flights Archived	F35	F36	F37	F38	F39	F40	F41	F42	F43	MT22
Daily Operations	find_daily	✓	mli	JO	JDS	EBJ	✓	✓	mli	✓	✓
	Julian Day DAT	✓	mli		JSG	JSG	✓	✓	mli	✓	✓
		✓	mli						mli	✓	✓
	orig DLT, Copy 1	✓	mli				✓	✓	mli	✓	✓
		✓	mli			JSG	✓	✓	mli	✓	✓
	orig DLT, Copy 2	✓	mli			JSG	✓	✓	mli	✓	✓
		✓	mli			JSG	✓	✓	mli	✓	✓
	targ DLT, Copy 1	✓	mli			JSG	✓	✓	mli	✓	✓
		✓	mli			JSG	✓	✓	mli	✓	✓
	targ DLT, Copy 2	✓	mli			JSG	✓	✓	mli	✓	✓
		✓	mli			JSG	✓	✓	mli	✓	✓
	ATRS archive	EBJ	JSG	mli	JSG	mli	JSG	JSG	JSG	✓	X
		mli	✓	mli	JSG	mli	JSG	JSG	✓	✓	X
	Lamont archive	JDS	JDS	✓	✓	mli	✓	✓	mli	✓	X
		✓	✓	✓	✓	mli	✓	✓	mli	✓	X
	Daily gmag (plots into binder)	mli				mli			JDS		
	823 and 856 Mag battery check										
	System Back-up [dodumps] (indicate tape)								ATRS #1		

Date Scanned into Hierarchy JDL

NOD Page 1 12/20/00
Zip 100:VTZ1 Log Sheets:Daily Operations

SOAR VTZ1 - Daily Operations

task begun	Include times
task finished	and initials

	Archive for Julian Day	005	006	006	007	007	008				
	Flights Archived	~~F44~~	F45	F46	F47	F48	—				
Daily Operations	**find_daily**	mli	✓	mli	✓	✓	mli				
	Julian Day DAT	mli	✓	mli	✓	✓	mli				
		mli	✓	mli	✓	✓	mli				
	orig DLT, Copy 1	mli	✓	mli	✓	✓	mli				
		mli	✓	mli	✓	✓	mli				
	orig DLT, Copy 2	mli	✓	mli	✓	✓	mli				
		mli	✓	mli	✓	✓	mli				
	targ DLT, Copy 1	mli	✓	mli	✓	✓	mli				
		mli	✓	mli	✓	✓	mli				
	targ DLT, Copy 2	mli	✓	mli	✓	✓	mli				
		mli	✓	mli	✓	✓	mli				
	ATRS archive	mli	mli	mli	✓	mli	~~mli~~				
		mli	mli	mli	✓	mli	~~mli~~				
	Lamont archive	mli	✓	~~mli~~	~~✓~~	~~mli~~	~~mli~~				
		mli	✓	~~mli~~	~~✓~~	~~mli~~	~~mli~~				
	Daily gmag (plots into binder)			mli		mli	mli				
	823 and 856 Mag battery check										
	System Back-up [dodumps] (indicate tape)						ATRSX2				
							RAW3				

Date Scanned into Hierarchy 1-8-01

Ashtech Z-12Acquisition Logs

SOAR VTZ1 - VOS Ashtech Z-XII Acquisition Log
Platform- VOS10

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Acqrd **b** File Size, kB	Acqrd **e** File Size, kB	Record #	Block Errors
J 354 W	F 08	21:49:58	03:38	41,855	39.7	41,832	26
J W 355	F 09	03:47:41	09:17	35,124	33.2	?	21
~~J 355 W~~	~~F 10~~	~~20:06:19~~					CANX'D
J 356 W	F MT20	06:40:26					
J W 357	F MT21	04:07:21	06:13	13,631	1c/	15067	7
J 358 W	F 10	01:03:17	07:17	43,761,179	41,925	44852	22
J W 358	F 11	19:14:16	00:12:28	32,851 kB	~~35 519 33KB~~	35773	16
~~J 359 W 1~~	~~F 12~~	~~1105 20:54~~					
J 359 W 1	F 12	3:30	9:14	~~35 918 41183~~	35	41183	26
J 359 W 2	F 13	12:50	18:27	38,612	37	40435	17
J 360 W 3	F 14	19:13	00:34	35843	33	38441	22
J 361 W 1	F 15	01:18	6:24	35066	34	36977	19
J 361 W 2	F 16	13:08	18:32a			34430	31
J 361 W 3	F 17	18:56	00:13	36059	33	38050	14
J 362 W 1	F 18	01:17	6:28	35235	34		

ITOM

Date Scanned into Hierarchy : J362

SOAR VTZ1 - VOS Ashtech Z-XII Acquisition Log
Platform- VOS10

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Acqrd b File Size, kB	Acqrd e File Size, kB	Record #	Block Errors	
J W 362	F 19	13:09	17:39	31,643	31	32383	21	
J W 362	F 20	19:39:14	01:04	38,417	35	38955	17	
J W 363	F 21	01:20	6:24	34 329 ~~36477~~	34	36477	24	
J W 363	F 22	13:20	18:43	36598	35	38728	28	
J W 363	F 23	19:15	00:39	37,255	35	~~38826~~	14	
J W 364	F 24	01:24	6:33	36,333	33	?	?	< VOS 30
J W 364	F 25	15:21	CANXD due to dead RADAR					VOS 30
J W 364	F 26	14:55	20:51	37,923	36	42613	23	VOS 30
J W 364	F 27	21:03	02:29	40,613 ~~39099~~	36	39099	18	
J W 365	F 28	02:39	07:57:08	34.677	32	38038	24	VOS 30
J W 365	F 29	19:08 ~~13:12~~	00:30:30	36.978	36	38563	21	VOS 30
J W 366	F 30	00:38	6:49	42,132	39	44504	15	
J W ~~001~~	F ~~31~~	~~13:10~~						
J W 001	F 32	15:10	20:50	36784	33	40833	14	
J W 001	F 33	20:57	01:36:04	34769	30		19	

Date Scanned into Heirarchy :

SOAR VTZ1 - VOS Ashtech Z-XII Acquisition Log
Platform- ~~VOS10~~ VOS30

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Acqrd **b** File Size, kB	Acqrd **e** File Size, kB	Record #	Block Errors
J W 002	F 34	1:51	07:25	37,217	35	40301	25
J W 002	F 35	13:09	14:39	37048	36	39506	20
J W 002	F 36	19:20	00:46	38645	35	39035	25
J 002 W	F 37	01:23:14	01:3 6:58	36303	35	39651	20
J 003 W	F 38	13:11	18:28	34639	35	38072	17
J 003 W	F 39	18:56	00:30	39033	36	40046	22
J W 004	F 40	00:40	6:36	39793	38	42683	25
J 004 W	F 41	13:15	18:54			40655	18
J 004 W	F 42	19:05	00:05	34716	32	35899	13
J W 005	F 43	00:16	05:45	38,871	35	39493	12
J W 005	F 44	19:18	00:35	~~37477~~ 37931	32	37977	23
J 006 W	F 45	17:12	22:21:52	34,209	33	37172	23
J 006 W	F 46	22:33	06:02	42,264	48	53738	25
J W 007	F 47	15:12	22:47			54548	22
J W 007	F 48	22:55	~~06:00~~ 6:01	49547	45	~~49547~~	no w 30

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TurborogueAcquisition Logs

SOAR VTZ1 - VOS TurboRogue Acquisition Log
Platform- VOS 20

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Flashcard Name	Data Volume
J 354 W	F 08	21:47	03:37	UTIG5	7860
J W 355	F 08	03:40	09:20	UTIG3	7602
~~J 356~~ W	~~F 10~~	~~20:35:26~~		~~UTIG8~~	CANX'D
J 358 W	F 10	01:04:50	07:12	UTIG8	8361K
J W 358	F 11	19:14:42	00:11	UTIG2	6611K
J 359 W 1	F 12	~~0:54~~ 3:34	9:12	AS026	7555
J 359 W 2	F 13	12:53	18:26	UTIG11	7450
J ~~360~~ 320 W 3	F 14	19:10	00:33	UTIG12	7205
J 361 W 1	F 15	01:16	6:32	UTIG11	7096
J 361 W 2	F 16	13:14	18:38	UTIG12	7297
J 361 W 3	F 17	18:45	00:16	UTIG11	7423
J 362 W 1	F 18	01:13	6:28	UTIG10	7056
J W 362	F 19	13:06	17:41	AS02 ~~UTIG~~	6187
J W 362	F 20	19:39	01:04:32	UTIG5	7267
J W 363	F 21	01:15	6:24	UTIG7	6418

Date Scanned into Heirarchy :

SOAR VTZ1 - VOS TurboRogue Acquisition Log
Platform- VOS 20

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Flashcard Name	Data Volume
J W 363	F 22	13:23	18:44	ASO2	7212
J 363 W	F 23	19:10	00:39	UTIG12	7389
J 364 W	F 24	01:24	6:33	UTIG10	6951
J 364 W	F 25	~~13:36~~		~~UTIG11~~	CANXD
J 364 W	F 26	14:58	20:49	UTIG11	7876
J 364 W	F 27	21:02	02:30	UTIG3	7401
J W 365	F 28	02:33	07:58:19	UTIG9	7275
J ~~365~~ W	F 29	19:08 ~~13:07~~	00:31:18	UTIG12	7219
J W 366	F 30	00:40:42	~~522~~ 6:50	UTIG 11	7291
J ~~W 001~~	F ~~31~~	~~13:09~~		UTIG9	
J W 001	F 32	15:11	20:57:13	UTIG9	7592
J W 001	F ~~33~~	21:04:48 ~~20:56:05~~	01:37:23	UTIG4	6305K
J ~~3102~~ W	F 34	01:46	07:24	ASO2B	7592
J 002 W 2	F 35	13:09	18:40	UTIG11	7436
J W 002	F 36	19:22	00:46~~07~~	UTIG5	7270~~5~~

Date Scanned into Heirarchy :

SOAR VTZ1 - VOS TurboRogue Acquisition Log
Platform- VOS 20

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	Flashcard Name	Data Volume
J 002 W	F 37	21:30:12	6:59	UTIG2	7365
J 003 W	F 38	13:11	18:30	UTIG12	7170
J 003 W	F 39	18:55	00:31	UTIG 11	7566
J W 004	F 40	00:41	~~8:10~~ 6:40	AS01B	8053
J W 004	F 41	13:18	18:59	UTIG12	7691
J W 004	F 42	19:05	00:07	UTIG 11	6774
J W 005	F 43	00:12	05:44	UTIG12	7461
J W 005	F 44	19:14	00:39	UTIG5	7245
J 006 W	F 45	17:14	22:24	UTIG4	6930
J 006 W	F 46	22:30	06:02	UTIG 11	10139
J W 007	F 47	15:09	22:46	UTIG11	10296
J W 007	F 46	22:51	06:00	UTIG12	9617
J W	F				
J W	F				
J W	F				

Date Scanned into Heirarchy : 1-8-01

Ashtech Z-SurveyoAcquisition Logs

SOAR VTZ1 - VOS Z-Surveyor Acquisition Log
Platform- VOS 30

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	File Name on Z-Surveyor	% Mem. left	Flash Card	
J 354 W	F 08	~~21:55~~ 22:00	03:34	00:VOS3A00. 354	67%	D	
J W 355	F 09	03:36	09:21	00 VOS3A		F	
~~J 355 W~~	~~F 10~~	~~20:04~~		~~00:VOS3A~~		~~F~~	CANX'D
J 357 W	F MTZ1	04:01		00. VOS3A00.357	99%	C	283min left
J 358 W	F ~~10~~	01:04	7:17	00.VOS3A00. 358		D	
J 358 W	F 11	19:13:35	00:09:50			B	
J 359 W	F 12	~~00:48:00~~ 3:28	9:11	...,1865DE		F	
J 359 W	F 13	12:49	18:28			D	
J 360 W	F 14	20:00	00:30	10.VOS3A00. 360	74%	C	
J W 361	F 15	01:14	6:28			F	
J 361 W 2	F 16	13:17	18:34	00:VOS3A00. 361		D	
J 361 W 3	F 17	18:35	00:15	" "		B	
J 362 W 1	F 18	01:09	6:32		67%	E	
J W 362	F 19	13:10	17:42	00:VOS3A	74%	E	
J W 362	F 20	20:15 ~~17:40~~	01:07	00.VO3A	71%	C	

See Shift book

Date Scanned into Hierarchy :

SOAR VTZ1 - VOS Z-Surveyor Acquisition Log
Platform- VOS 30

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	File Name on Z-Surveyor	% Mem. left	Flash Card	
J W 363	F 21	01:18	6:17	00.VOS3A. 363	71	E (?)	
J W 363	F 22	13:24	18:41	VOS3A	70%	C	
J W 363	F 23	28:19	00:41	VOS3A. 363		F	
VOS10 J W 364	F 24	01:23	6:33	VOS1A. 364	78%	B	<VOS10
VOS10 J W 364	F 25	~~12:36~~		VOS1A. 364	CANXD	F	<VOS10
VOS10 J W 364	F 26	15:00	20:49	VOS1A. 364		F	VOS10
VOS10 J W 364	F 27	20:53	02:31	"	66%	E	
J W 365	F 28	02:32	08:00	VOS1A.365	71%	C	
VOS10 J W 365	F 29	19:10	00:28	VOS1A.365	-	F	VOS10
J W 366	F 30	00:28	6:51	VOS1A.366	64%	E	
J W ~~001~~	F ~~31~~	17:11		VOS1A.001		E	
J W 001	F 32	15:12		VOS1A.001	70%	E	
J W 001	F 33	20:59:20		VOS7A08.361		D	
J W 002	F 34	1:41	07:25	VOS10A		E	
J W 002	F 35	13:11	18:42	VOS10A.002	77%	A	

Date Scanned into Hierarchy :

SOAR VTZ1 - VOS Z-Surveyor Acquisition Log
Platform- VOS ~~30~~ 10

Julian Day Window	Flight	Start Record (GMT hh:mmm)	End Record (GMT hh:mmm)	File Name on Z-Surveyor	% Mem. left	Flash Card
J 002 W	F 36	19:23	00:46	VOS1A.002	68%	E
J 002 W	F 37	01:24:40	7:00	VOS1A01.003		C
J 003 W	F 38	13:14	18:31	VOS1A01.003		D
J 003 W	F 39	18:49	00:32	VOS1A01.003		A
J 004 W	F 40	00:41	6:38	VOS1A01.003		C
J 004 W	F 41	13:18	18:55	VOS1A01.004		D
J 004 W	F 42	18:57	00:12	VOS1A01.004		C
J 005 W	F 43	00:15	05:44	VOS1A01.005	68%	D
J 005 W	F 44	19:18	00:41	VOS1A01.005	76%	A
J 006 W	F 45	17:4	22:22	VOS1A01.006	72%	C
J 006 W	F 46	22:25	6:00	VOS1A01.006		A
J 007 W	F 47	15:10	22:49		69%	B
J 007 W	F ~~48~~	22:52	6:01	VOS1A01.007	58%	E
J W	F					
J W	F					

Date Scanned into Hierarchy : 1-8-01

RINEX documentation

from *http://lox.ucsd.edu/GPSProcessing/Pythagoras/rinex.html*

```
*********************************************************
RINEX: The Receiver Independent Exchange Format Version 2
*********************************************************

                          Werner Gurtner
                       Astronomical Institute
                         University of Berne


                          (Revision, April 1993)
                       (Clarification December 1993)
                      (Doppler Definition: January 1994)
                      (PR Clarification: October 1994)
                      (Wlfact Clarification: February 1995)
                 (Event Time Frame Clarification: May 1996)
              (Minor errors in the examples A7/A8: May 1996)
         (Naming convention for compressed met files; January 1997)
               (Continuation line clarifications: April 1997)
                     (GLONASS Extensions: April 1997)
         (Met sensor description and position records: April 1997)
                (Wavelength factor clarifications: April 1997)
           (Error in example A12: CORR TO SYSTEM TIME, April 1997)
  (Redefinition of sv clock params in GLONASS Nav Mess Files: March 1998)
      (Naming conventions for compressed RINEX obs files: March 1998)
          (GPS week: No roll-over, continuous number: March 1998)
        (Error in compressed DOS file naming convention: July 1998)
       (Table A13 contained blank satellite identifiers: Sept 1998)
         (Discrepancy between Tables A5 and A9 removed: Sept 1998)



0. INTRODUCTION

0.1 First Revision

This paper is a revised version of the one published by W. Gurtner and G.
Mader in the CSTG GPS Bulletin of September/October 1990. The main reason
for a revision is the new treatment of antispoofing data by the RINEX
format (see chapter 7). Chapter 4 gives a recommendation for data
compression procedures, especially useful when large amounts of data are
exchanged through computer networks. In Table A3 in the original paper the
definiton of the "PGM / RUN BY / DATE" navigation header record was
missing, although the example showed it. The redefinition of AODE/AODC to
IODE/IODC also asks for an update of the format description. For consistency
reasons we also defined a Version 2 format for the Meteorological Data files
(inclusion of a END OF HEADER record and an optional MARKER NUMBER record).

*  The slight modification (or rather the definition of a bit in the Loss  *
*  of Lock Indicator unused so far) to flag AS data is so small a change   *
*  that we decided to NOT increase the version number!                     *
```

0.2 Later Revisions:

* URA Clarification (10-Dec-93):

  The user range accuracy in the Navigation Message File did not contain
  a definition of the units: There existed two ways of interpretation:
  Either the 4 bit value from the original message or the converted value
  in meters according to GPS ICD-200. In order to simplify the interpretation
  for the user of the RINEX files I propose the bits to be converted into meters
  prior to RINEX file creation.

* GLONASS Extensions:

  In March 1997 a proposal for extensions to the current RINEX definitions based
  on experiences collected with GLONASS only and mixed GPS/GLONASS data files
  was circulated among several instrument manufacturers and software developers.
  The results of the call for comments have been worked into this document.
  A separate document (glonass.txt) summarizes just the necessary extensions.

* A blank satellite identifier is allowed in pure GPS files only

* Met sensor description and position records were added to facilitate the
  precise use of met values.

* Description and examples for wavelength factors and their temporary changes
  (bit 1 of LLI) clarified.

* The RINEX documentation distributed in spring 1997 contained definitions for
  the GLONASS satellite clock offset and drift with the intention to have them
  defined identically to the GPS values. Unfortunately the GLONASS Interface
  Document consulted had a sign error in one of the formulae.

  The values should be stored into the RINEX file as -TauN, +GammaN, -TauC.
  The original definition asked for -TauN, -GammaN, +TauC. See paragraph 8.2.

  To avoid problems with files created with the original definitions a real
  valued version number (2.01) has been introduced for GLONASS nav mess files.

* IGS decided to use the Hatanaka compression scheme for RINEX observation
  files. Below the corresponding RINEX file name conventions are included
  as recommendations. The DOS naming (extension .yyE) was wrongly set to
  .yyY in the March 1998 version of the document.

* GPS week: The GPS week number in all RINEX files is a continuous number
  not affected by the 1024 roll-over, it runs from 1023 over 1024 to 1025 etc.

* A descrepancy between the definition of the header line fields of met sensor
  description and position in Table A5 and the example in Table A9 was removed.
  The latter was correct.

1. THE PHILOSOPHY OF RINEX

The first proposal for the "Receiver Independent Exchange Format" RINEX has
been developed by the Astronomical Institute of the University of Berne for

the easy exchange of the GPS data to be collected during the large European GPS campaign EUREF 89, which involved more than 60 GPS receivers of 4 different manufacturers. The governing aspect during the development was the following fact:

Most geodetic processing software for GPS data use a well-defined set of observables:

- the carrier-phase measurement at one or both carriers (actually being a measurement on the beat frequency between the received carrier of the satellite signal and a receiver-generated reference frequency).

- the pseudorange (code) measurement, equivalent to the difference of the time of reception (expressed in the time frame of the receiver) and the time of transmission (expressed in the time frame of the satellite) of a distinct satellite signal.

- the observation time being the reading of the receiver clock at the instant of validity of the carrier-phase and/or the code measurements.

Usually the software assumes that the observation time is valid for both the phase AND the code measurements, AND for all satellites observed.

Consequently all these programs do not need most of the information that is usually stored by the receivers: They need phase, code, and time in the above mentioned definitions, and some station-related information like station name, antenna height, etc.

2. GENERAL FORMAT DESCRIPTION

Currently the format consists of four ASCII file types:

1. Observation Data File
2. Navigation Message File
3. Meteorological Data File
4. GLONASS Navigation Message File

Each file type consists of a header section and a data section. The header section contains global information for the entire file and is placed at the beginning of the file. The header section contains header labels in columns 61-80 for each line contained in the header section. These labels are mandatory and must appear exactly as given in these descriptions and examples.

The format has been optimized for mimimum space requirements independent from the number of different observation types of a specific receiver by indicating in the header the types of observations to be stored. In computer systems allowing variable record lengths the observation records may then be kept as short as possible. The maximum record length is 80 bytes per record.

Each Observation file and each Meteorological Data file basically contain the data from one site and one session. RINEX Version 2 also allows to include observation data from more than one site subsequently occupied by

a roving receiver in rapid static or kinematic applications.

If data from more than one receiver has to be exchanged it would not be economical to include the identical satellite messages collected by the different receivers several times. Therefore the Navigation Message File from one receiver may be exchanged or a composite Navigation Message File created containing non-redundant information from several receivers in order to make the most complete file.

The format of the data records of the RINEX Version 1 Navigation Message file is identical to the former NGS exchange format.

The actual format descriptions as well as examples are given in the Tables at the end of the paper.

3. DEFINITION OF THE OBSERVABLES

GPS observables include three fundamental quantities that need to be defined: Time, Phase, and Range.

TIME:

The time of the measurement is the receiver time of the received signals. It is identical for the phase and range measurements and is identical for all satellites observed at that epoch. It is expressed in GPS time (not Universal Time).

PSEUDO-RANGE:

The pseudo-range (PR) is the distance from the receiver antenna to the satellite antenna including receiver and satellite clock offsets (and other biases, such as atmospheric delays):

```
PR  =  distance +
       c * (receiver clock offset - satellite clock offset +
            other biases)
```

so that the pseudo-range reflects the actual behavior of the receiver and satellite clocks. The pseudo-range is stored in units of meters.

See also clarifications for pseudoranges in mixed GPS/GLONASS files in chapter 8.1.

PHASE:

The phase is the carrier-phase measured in whole cycles at both L1 and L2. The half-cycles measured by sqaring-type receivers must be converted to whole cycles and flagged by the wavelength factor in the header section.

The phase changes in the same sense as the range (negative doppler). The phase observations between epochs must be connected by including the integer number of cycles. The phase observations will not contain any systematic drifts from intentional offsets of the reference oscillators.

The observables are not corrected for external effects like atmospheric refraction, satellite clock offsets, etc.

If the receiver or the converter software adjusts the measurements using the real-time-derived receiver clock offsets dT(r), the consistency of the 3 quantities phase / pseudo-range / epoch must be maintained, i.e. the receiver clock correction should be applied to all 3 observables:

```
  Time(corr)  = Time(r)  -  dT(r)
  PR(corr)    =  PR(r)   -  dT(r)*c
  phase(corr) = phase(r) -  dT(r)*freq
```

DOPPLER:

The sign of the doppler shift as additional observable is defined as usual: Positive for approaching satellites.

4. THE EXCHANGE OF RINEX FILES:

We recommend using the following naming convention for RINEX files:

```
        ssssdddf.yyt      ssss:   4-character station name designator
                           ddd:   day of the year of first record
                             f:   file sequence number within day
                                  0: file contains all the existing
                                     data of the current day
                            yy:   year
                             t:   file type:
                                  O: Observation file
                                  N: Navigation file
                                  M: Meteorological data file
                                  G: GLONASS Navigation file
```

To exchange RINEX files on magnetic tapes we recommend using the following tape format:

- Non-label; ASCII; fixed record length: 80 characters; block size: 8000

- First file on tape contains list of files using above-mentioned naming conventions

When data transmission times or storage volumes are critical we recommend compressing the files prior to storage or transmission using the UNIX "compress" und "uncompress" programs. Compatible routines are available on VAX/VMS and PC/DOS systems, as well.

Proposed naming conventions for the compressed files:

System	Obs files	GPS Nav Files	GLONASS Nav Files	Met Files
UNIX	ssssdddf.yyO.Z	ssssdddf.yyN.Z	ssssdddf.yyG.Z	ssssdddf.yyM.Z
VMS	ssssdddf.yyO_Z	ssssdddf.yyN_Z	ssssdddf.yyG_Z	ssssdddf.yyM_Z

```
     DOS      ssssdddf.yyY    ssssdddf.yyX    ssssdddf.yyV       ssssdddf.yyW
```

Proposed naming conventions for observation files compressed using the Hatanaka file compression scheme:

```
     System   Obs files

     UNIX     ssssdddf.yyD.Z
     VMS      ssssdddf.yyD_Z
     DOS      ssssdddf.yyE
```

References for the Hatanaka compression scheme: See e.g.

```
     ftp://igscb.jpl.nasa.gov/igscb/software/rnxcmp/docs/
     IGSMails 1525,1686,1726,1763,1785
```

5. RINEX VERSION 2 FEATURES

The following section contains features that have been introduced for RINEX Version 2.

5.1 Satellite Numbers:

Version 2 has been prepared to contain GLONASS or other satellite systems' observations. Therefore we have to be able to distinguish the satellites of the different systems: We precede the 2-digit satellite number with a system identifier.

```
        snn                  s:    satellite system identifier
                                   G or blank : GPS
                                   R          : GLONASS
                                   T          : Transit
                            nn:    PRN (GPS), almanac number (GLONASS)
                                   or two-digit Transit satellite number

        Note: G is mandatory in mixed GPS/GLONASS files

                                   (blank default modified in April 1997)
```

5.2 Order of the Header Records:

As the record descriptors in columns 61-80 are mandatory, the programs reading a RINEX Version 2 header are able to decode the header records with formats according to the record descriptor, provided the records have been first read into an internal buffer.

We therefore propose to allow free ordering of the header records, with the following exceptions:

- The "RINEX VERSION / TYPE" record must be the first record in a file

- The default "WAVELENGTH FACT L1/2" record (if present) should precede all records defining wavelength factors for individual satellites

- The "# OF SATELLITES" record (if present) should be immediately followed by the corresponding number of "PRN / # OF OBS" records. (These records may be handy for documentary purposes. However, since they may only be created after having read the whole raw data file we define them to be optional.

5.3 Missing Items, Duration of the Validity of Values

Items that are not known at the file creation time can be set to zero or blank or the respective record may be completely omitted. Consequently items of missing header records will be set to zero or blank by the program reading RINEX files. Each value remains valid until changed by an additional header record.

5.4. Event Flag Records

The "number of satellites" also corresponds to the number of records of the same epoch followed. Therefore it may be used to skip the appropriate number of records if certain event flags are not to be evaluated in detail.

5.5 Receiver Clock Offset

A large number of users asked to optionally include a receiver-derived clock offset into the RINEX format. In order to prevent confusion and redundancy, the receiver clock offset (if present) should report the value that has been used to correct the observables according to the formulae under item 1. It would then be possible to reconstruct the original observations if necessary. As the output format for the receiver-derived clock offset is limited to nanoseconds the offset should be rounded to the nearest nanosecond before it is used to correct the observables in order to guarantee correct reconstruction.

6. ADDITIONAL HINTS AND TIPS

Programs developed to read RINEX Version 1 files have to verify the version number. Version 2 files may look different (version number, END OF HEADER record, receiver and antenna serial number alphanumeric) even if they do not use any of the new features

We propose that routines to read RINEX Version 2 files automatically delete leading blanks in any CHARACTER input field. Routines creating RINEX Version 2 files should also left-justify all variables in the CHARACTER fields.

DOS, and other, files may have variable record lengths, so we recommend to first read each observation record into a 80-character blank string and decode the data afterwards. In variable length records, empty data fields at the end of a record may be missing, especially in the case of the optional receiver clock offset.

7. RINEX UNDER ANTISPOOFING (AS)

Some receivers generate code delay differences between the first and second

frequency using cross-correlation techniques when AS is on and may recover the phase observations on L2 in full cycles. Using the C/A code delay on L1 and the observed difference it is possible to generate a code delay observation for the second frequency.

Other receivers recover P code observations by breaking down the Y code into P and W code.

Most of these observations may suffer from an increased noise level. In order to enable the postprocessing programs to take special actions, such AS-infected observations are flagged using bit number 2 of the Loss of Lock Indicators (i.e. their current values are increased by 4).

8. GLONASS Extensions

8.1 RINEX Observation file

8.1.1 Time System Identifier

RINEX Version 2 needs one major supplement, the explicit definition of the time system:

GLONASS is basically running on UTC (or, more precisely, GLONASS system time linked to UTC(SU)), i.e. the time tags are given in UTC and not GPS time. In order to remove possible misunderstandings and ambiguities, the header records "TIME OF FIRST OBS" and (if present) "TIME OF LAST OBS" in GLONASS and GPS observation files _can_, in mixed GLONASS/GPS observation files _must_ contain a time system identifier defining the system that all time tags in the file are referring to: "GPS" to identify GPS time, "GLO" to identify the GLONASS UTC time system. Pure GPS files default to GPS and pure GLONASS files default to GLO.

Format definitions see Table A1.

Hence, the two possible time tags differ by the current number of leap seconds.

In order to have the current number of leap seconds available we recommend to include a LEAP SECOND line into the RINEX header.

If there are known non-integer biases between the "GPS receiver clock" and "GLONASS receiver clock" in the same receiver, they should be applied. In this case the respective code and phase observations have to be corrected, too (c * bias if expressed in meters).

Unknown such biases will have to be solved for during the post processing

The small differences (modulo 1 second) between GLONASS system time, UTC(SU), UTC(USNO) and GPS system time have to be dealt with during the post-processing and not before the RINEX conversion. It may also be necessary to solve for remaining differences during the post-processing.

8.1.2 Pseudorange Definition

The pseudorange (code) measurement is defined to be equivalent to the

difference of the time of reception (expressed in the time frame of the receiver) and the time of transmission (expressed in the time frame of the satellite) of a distinct satellite signal.

If a mixed-mode GPS/GLONASS receiver refers all pseudorange observations to one receiver clock only,

- the raw GLONASS pseudoranges will show the current number of leap seconds between GPS time and GLONASS time if the receiver clock is running in the GPS time frame

- the raw GPS pseudoranges will show the negative number of leap seconds between GPS time and GLONASS time if the receiver clock is running in the GLONASS time frame

In order to avoid misunderstandings and to keep the code observations within the format fields, the pseudoranges must be corrected in this case as follows:

```
  PR(GPS) := PR(GPS) + c * leap_seconds   if generated with a receiver clock
                                          running in the GLONASS time frame

  PR(GLO) := PR(GLO) - c * leap_seconds   if generated with a receiver clock
                                          running in the GPS time frame
```

to remove the contributions of the leap seconds from the pseudoranges.

"leap_seconds" is the actual number of leap seconds between GPS and GLONASS (UTC) time, as broadcast in the GPS almanac and distributed in Circular T of BIPM.

8.1.3 More than 12 satellites per epoch

The format of the epoch / satellite line in the observation record part of the RINEX Observation files has only been defined for up to 12 satellites per epoch. We explicitly define now the format of the continuation lines, see table A2.

8.2 RINEX Navigation Files for GLONASS

As the GLONASS navigation message differs in contents from the GPS message too much, a special GLONASS navigation message file format has been defined.

The header section and the first data record (epoch, satellite clock information) is similar to the GPS navigation file. The following records contain the satellite position, velocity and acceleration, the clock and frequency biases as well as auxiliary information as health, satellite frequency (channel), age of the information.

The corrections of the satellite time to UTC are as follows:

```
  GPS    : Utc = Tsv - af0  -  af1  *(Tsv-Toc) - ... -  A0  - ... - leap_sec
  GLONASS: Utc = Tsv + TauN - GammaN*(Tsv-Tb)        + TauC
```

*** In order to use the same sign conventions for the GLONASS corrections

as in the GPS navigation files, the broadcast GLONASS values are stored as:

-TauN, +GammaN, -TauC.

The time tags in the GLONASS navigation files are given in UTC (i.e. _not_ Moscow time or GPS time).

Filenaming convention: See above.

9. REFERENCES

Evans, A. (1989): "Summary of the Workshop on GPS Exchange Formats." Proceedings of the Fifth International Geodetic Symposium on Satellite Systems, pp. 917ff, Las Cruces.

Gurtner, W., G. Mader, D. Arthur (1989): "A Common Exchange Format for GPS Data." CSTG GPS Bulletin Vol.2 No.3, May/June 1989, National Geodetic Survey, Rockville.

Gurtner, W., G. Mader (1990): "The RINEX Format: Current Status, Future Developments." Proceedings of the Second International Symposium of Precise Positioning with the Global Positioning system, pp. 977ff, Ottawa.

Gurtner, W., G. Mader (1990): "Receiver Independent Exchange Format Version 2." CSTG GPS Bulletin Vol.3 No.3, Sept/Oct 1990, National Geodetic Survey, Rockville.

10. RINEX VERSION 2 FORMAT DEFINITIONS AND EXAMPLES

TABLE A1

OBSERVATION DATA FILE - HEADER SECTION DESCRIPTION

	HEADER LABEL (Columns 61-80)	DESCRIPTION	FORMAT
	RINEX VERSION / TYPE	- Format version (2) - File type ('O' for Observation Data) - Satellite System: blank or 'G': GPS 'R': GLONASS 'T': NNSS Transit 'M': Mixed	I6,14X, A1,19X, A1,19X
	PGM / RUN BY / DATE	- Name of program creating current file - Name of agency creating current file - Date of file creation	A20, A20, A20
*	COMMENT	Comment line(s)	A60
	MARKER NAME	Name of antenna marker	A60
*	MARKER NUMBER	Number of antenna marker	A20
	OBSERVER / AGENCY	Name of observer / agency	A20,A40

REC # / TYPE / VERS	Receiver number, type, and version (Version: e.g. Internal Software Version)	3A20
ANT # / TYPE	Antenna number and type	2A20
APPROX POSITION XYZ	Approximate marker position (WGS84)	3F14.4
ANTENNA: DELTA H/E/N	- Antenna height: Height of bottom surface of antenna above marker - Eccentricities of antenna center relative to marker to the east and north (all units in meters)	3F14.4
WAVELENGTH FACT L1/2	- Wavelength factors for L1 and L2 1: Full cycle ambiguities 2: Half cycle ambiguities (squaring) 0 (in L2): Single frequency instrument	2I6,
	- Number of satellites to follow in list for which these factors are valid. 0 or blank: Default wavelength factors for all satellites not contained in such a list.	I6,
	- List of PRNs (satellite numbers with system identifier) Repeat record if necessary	7(3X,A1,I2)
# / TYPES OF OBSERV	- Number of different observation types stored in the file	I6,
	- Observation types	9(4X,A2)
	If more than 9 observation types: Use continuation line(s)	6X,9(4X,A2)
	The following observation types are defined in RINEX Version 2: L1, L2: Phase measurements on L1 and L2 C1 : Pseudorange using C/A-Code on L1 P1, P2: Pseudorange using P-Code on L1,L2 D1, D2: Doppler frequency on L1 and L2 T1, T2: Transit Integrated Doppler on 150 (T1) and 400 MHz (T2) Observations collected under Antispoofing are converted to "L2" or "P2" and flagged with bit 2 of loss of lock indicator (see Table A2). Units : Phase : full cycles Pseudorange : meters Doppler : Hz Transit : cycles	

	The sequence of the types in this record has to correspond to the sequence of the observations in the observation records		
*|INTERVAL	Observation interval in seconds	I6	*
TIME OF FIRST OBS	- Time of first observation record (4-digit-year, month,day,hour,min,sec) - Time system: GPS (=GPS time system) GLO (=UTC time system) Compulsory in mixed GPS/GLONASS files Defaults: GPS for pure GPS files GLO for pure GLONASS files	5I6,F12.6, 6X,A3	
*|TIME OF LAST OBS	- Time of last observation record (4-digit-year, month,day,hour,min,sec) - Time system: GPS (=GPS time system) GLO (=UTC time system) Compulsory in mixed GPS/GLONASS files Defaults: GPS for pure GPS files GLO for pure GLONASS files	5I6,F12.6, 6X,A3	*
*|LEAP SECONDS	Number of leap seconds since 6-Jan-1980 Recommended for mixed GPS/GLONASS files	I6	*
*|# OF SATELLITES	Number of satellites, for which observations are stored in the file	I6	*
*|PRN / # OF OBS	PRN (sat.number), number of observations for each observation type indicated in the "# / TYPES OF OBSERV" - record. If more than 9 observation types: Use continuation line(s) This record is (these records are) repeated for each satellite present in the data file	3X,A1,I2,9I6 6X,9I6	*
END OF HEADER	Last record in the header section.	60X	

Records marked with * are optional

TABLE A2

OBSERVATION DATA FILE - DATA RECORD DESCRIPTION

OBS. RECORD	DESCRIPTION	FORMAT
EPOCH/SAT or EVENT FLAG	- Epoch : year (2 digits), month,day,hour,min,sec - Epoch flag 0: OK 1: power failure between	5I3,F11.7, I3,

	previous and current epoch	
	>1: Event flag	
	- Number of satellites in current epoch	I3,
	- List of PRNs (sat.numbers with system identifier, see 5.1) in current epoch	12(A1,I2),
	- receiver clock offset (seconds, optional)	F12.9
	If more than 12 satellites: Use continuation line(s)	32X, 12(A1,I2)
	If EVENT FLAG record (epoch flag > 1):	
	- Event flag:	
	2: start moving antenna	
	3: new site occupation (end of kinem. data) (at least MARKER NAME record follows)	
	4: header information follows	
	5: external event (epoch is significant, same time frame as observation time tags)	
	6: cycle slip records follow to optionally report detected and repaired cycle slips (same format as OBSERVATIONS records; slip instead of observation; LLI and signal strength blank)	
	- "Number of satellites" contains number of records to follow (0 for event flags 2,5)	
OBSERVATIONS	- Observation / - LLI / - Signal strength | rep. within record for each obs.type (same seq as given in header)	m(F14.3, I1, I1)
	If more than 5 observation types (=80 char): continue observations in next record.	
	This record is (these records are) repeated for each satellite given in EPOCH/SAT - record.	
	Observations: Phase : Units in whole cycles of carrier Code : Units in meters Missing observations are written as 0.0 or blanks. Loss of lock indicator (LLI). Range: 0-7 0 or blank: OK or not known Bit 0 set : Lost lock between previous and current observation: cycle slip possible Bit 1 set : Opposite wavelength factor to the one defined for the satellite by a previous WAVELENGTH FACT L1/2 line. Valid for the current epoch only. Bit 2 set : Observation under Antispoofing (may suffer from increased noise) Bits 0 and 1 for phase only.	

	Signal strength projected into interval 1-9: 1: minimum possible signal strength 5: threshold for good S/N ratio 9: maximum possible signal strength 0 or blank: not known, don't care		

TABLE A3
NAVIGATION MESSAGE FILE - HEADER SECTION DESCRIPTION

	HEADER LABEL (Columns 61-80)	DESCRIPTION	FORMAT	
	RINEX VERSION / TYPE	- Format version (2) - File type ('N' for Navigation data)	I6,14X, A1,19X	
	PGM / RUN BY / DATE	- Name of program creating current file - Name of agency creating current file - Date of file creation	A20, A20, A20	
*	COMMENT	Comment line(s)	A60	*
*	ION ALPHA	Ionosphere parameters A0-A3 of almanac (page 18 of subframe 4)	2X,4D12.4	*
*	ION BETA	Ionosphere parameters B0-B3 of almanac	2X,4D12.4	*
*	DELTA-UTC: A0,A1,T,W	Almanac parameters to compute time in UTC (page 18 of subframe 4) A0,A1: terms of polynomial T : reference time for UTC data W : UTC reference week number. Continuous number, not mod(1024)!	3X,2D19.12, 2I9	*
*	LEAP SECONDS	Delta time due to leap seconds	I6	*
	END OF HEADER	Last record in the header section.	60X	

Records marked with * are optional

TABLE A4
NAVIGATION MESSAGE FILE - DATA RECORD DESCRIPTION

OBS. RECORD	DESCRIPTION	FORMAT
PRN / EPOCH / SV CLK	- Satellite PRN number - Epoch: Toc - Time of Clock year (2 digits) month day	I2, 5I3,

	hour	
	minute	
	second	F5.1,
	- SV clock bias (seconds)	3D19.12
	- SV clock drift (sec/sec)	
	- SV clock drift rate (sec/sec2)	
BROADCAST ORBIT - 1	- IODE Issue of Data, Ephemeris	3X,4D19.12
	- Crs (meters)	
	- Delta n (radians/sec)	
	- M0 (radians)	
BROADCAST ORBIT - 2	- Cuc (radians)	3X,4D19.12
	- e Eccentricity	
	- Cus (radians)	
	- sqrt(A) (sqrt(m))	
BROADCAST ORBIT - 3	- Toe Time of Ephemeris	3X,4D19.12
	(sec of GPS week)	
	- Cic (radians)	
	- OMEGA (radians)	
	- CIS (radians)	
BROADCAST ORBIT - 4	- i0 (radians)	3X,4D19.12
	- Crc (meters)	
	- omega (radians)	
	- OMEGA DOT (radians/sec)	
BROADCAST ORBIT - 5	- IDOT (radians/sec)	3X,4D19.12
	- Codes on L2 channel	
	- GPS Week # (to go with TOE)	
	Continuous number, not mod(1024)!	
	- L2 P data flag	
BROADCAST ORBIT - 6	- SV accuracy (meters)	3X,4D19.12
	- SV health (MSB only)	
	- TGD (seconds)	
	- IODC Issue of Data, Clock	
BROADCAST ORBIT - 7	- Transmission time of message	3X,4D19.12
	(sec of GPS week, derived e.g.	
	from Z-count in Hand Over Word (HOW)	
	- spare	
	- spare	
	- spare	

TABLE A5
METEOROLOCICAL DATA FILE - HEADER SECTION DESCRIPTION

HEADER LABEL (Columns 61-80)	DESCRIPTION	FORMAT

	RINEX VERSION / TYPE	- Format version (2) - File type ('M' for Meteorological Data)	I6,14X, A1,39X
	PGM / RUN BY / DATE	- Name of program creating current file - Name of agency creating current file - Date of file creation	A20, A20, A20
*	COMMENT	Comment line(s)	A60 *
	MARKER NAME	Station Name (preferably identical to MARKER NAME in the associated Observation File)	A60
*	MARKER NUMBER	Station Number (preferably identical to MARKER NUMBER in the associated Observation File)	A20 *
	# / TYPES OF OBSERV	- Number of different observation types stored in the file - Observation types The following meteorological observation types are defined in RINEX Version 2: PR : Pressure (mbar) TD : Dry temperature (deg Celsius) HR : Relative Humidity (percent) ZW : Wet zenith path delay (millimeters) (for WVR data) The sequence of the types in this record must correspond to the sequence of the measurements in the data records If more than 9 observation types are being used, use continuation lines with format (6X,9(4X,A2))	I6, 9(4X,A2)
	SENSOR MOD/TYPE/ACC	Description of the met sensor - Model (manufacturer) - Type - Accuracy (same units as obs values) - Observation type Record is repeated for each observation type found in # / TYPES OF OBSERV record	 A20, A20,6X, F7.1,4X, A2,1X
	SENSOR POS XYZ/H	Approximate position of the met sensor - Geocentric coordinates X,Y,Z (ITRF - Ellipsoidal height H or WGS-84) - Observation type Set X,Y,Z to zero if not known. Make sure H refers to ITRF or WGS-84! Record required for barometer, recommended for other sensors.	 3F14.4, 1F14.4, 1X,A2,1X

END OF HEADER	Last record in the header section.	60X

TABLE A6
METEOROLOGICAL DATA FILE - DATA RECORD DESCRIPTION

OBS. RECORD	DESCRIPTION	FORMAT
EPOCH / MET	- Epoch in GPS time (not local time!) year (2 digits), month,day,hour,min,sec	6I3,
	- Met data in the same sequence as given in the header	mF7.1
	More than 8 met data types: Use continuation lines	4X,10F7.1,3X

TABLE A7
OBSERVATION DATA FILE - EXAMPLE

```
----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2              OBSERVATION DATA    M (MIXED)           RINEX VERSION / TYPE
BLANK OR G = GPS,  R = GLONASS,  T = TRANSIT,  M = MIXED    COMMENT
XXRINEXO V9.9       AIUB                22-APR-93 12:43     PGM / RUN BY / DATE
EXAMPLE OF A MIXED RINEX FILE                               COMMENT
A 9080                                                      MARKER NAME
9080.1.34                                                   MARKER NUMBER
BILL SMITH          ABC INSTITUTE                           OBSERVER / AGENCY
X1234A123           XX                  ZZZ                 REC # / TYPE / VERS
234                 YY                                      ANT # / TYPE
  4375274.       587466.      4589095.                      APPROX POSITION XYZ
         .9030         .0000         .0000                  ANTENNA: DELTA H/E/N
     1     1                                                WAVELENGTH FACT L1/2
     1     2     6   G14   G15   G16   G17   G18   G19      WAVELENGTH FACT L1/2
     4    P1    L1    L2    P2                              # / TYPES OF OBSERV
    18                                                      INTERVAL
  1990     3    24    13    10   36.000000                  TIME OF FIRST OBS
                                                            END OF HEADER
 90  3 24 13 10 36.0000000  0  3G12G 9G 6                          -.123456789
  23629347.915            .300 8         -.353    23629364.158
  20891534.648           -.120 9         -.358    20891541.292
  20607600.189           -.430 9          .394    20607605.848
 90  3 24 13 10 50.0000000  4  4
     1     2     2   G 9   G12                               WAVELENGTH FACT L1/2
  *** WAVELENGTH FACTOR CHANGED FOR 2 SATELLITES ***        COMMENT
      NOW 8 SATELLITES HAVE WL FACT 1 AND 2!                COMMENT
                                                            COMMENT
```

```
 90  3 24 13 10 54.0000000  0  5G12G 9G 6R21R22                      -.123456789
  23619095.450      -53875.632 8    -41981.375    23619112.008
  20886075.667      -28688.027 9    -22354.535    20886082.101
  20611072.689       18247.789 9     14219.770    20611078.410
  21345678.576       12345.567 5
  22123456.789       23456.789 5
 90  3 24 13 11  0.0000000  2
                            4  1
           *** FROM NOW ON KINEMATIC DATA! ***              COMMENT
 90  3 24 13 11 48.0000000  0  4G16G12G 9G 6                         -.123456789
  21110991.756       16119.980 7     12560.510    21110998.441
  23588424.398     -215050.557 6   -167571.734    23588439.570
  20869878.790     -113803.187 8    -88677.926    20869884.938
  20621643.727       73797.462 7     57505.177    20621649.276
                            3  4
A 9080                                                MARKER NAME
9080.1.34                                             MARKER NUMBER
         .9030         .0000         .0000            ANTENNA: DELTA H/E/N
          --> THIS IS THE START OF A NEW SITE <--     COMMENT
 90  3 24 13 12  6.0000000  0  4G16G12G 6G 9                         -.123456987
  21112589.384       24515.877 6     19102.763 3  21112596.187
  23578228.338     -268624.234 7   -209317.284 4  23578244.398
  20625218.088       92581.207 7     72141.846 4  20625223.795
  20864539.693     -141858.836 8   -110539.435 5  20864545.943
 90  3 24 13 13  1.2345678  5  0
                            4  1
       (AN EVENT FLAG WITH SIGNIFICANT EPOCH)         COMMENT
 90  3 24 13 14 12.0000000  0  4G16G12G 9G 6                         -.123456012
  21124965.133       89551.30216     69779.62654  21124972.2754
  23507272.372     -212616.150 7   -165674.789 5  23507288.421
  20828010.354     -333820.093 6   -260119.395 5  20828017.129
  20650944.902      227775.130 7    177487.651 4  20650950.363
                            4  1
          *** ANTISPOOFING ON G 16 AND LOST LOCK         COMMENT
 90  3 24 13 14 12.0000000  6  2G16G 9
                123456789.0      -9876543.5
                        0.0            -0.5
                            4  2
          ---> CYCLE SLIPS THAT HAVE BEEN APPLIED TO    COMMENT
               THE OBSERVATIONS                         COMMENT
 90  3 24 13 14 48.0000000  0  4G16G12G 9G 6                         -.123456234
  21128884.159      110143.144 7     85825.18545  21128890.7764
  23487131.045     -318463.297 7   -248152.72824  23487146.149
  20817844.743     -387242.571 6   -301747.22925  20817851.322
  20658519.895      267583.67817    208507.26234  20658525.869
                            4  4
        ***   SATELLITE G 9   THIS EPOCH ON WLFACT 1 (L2)  COMMENT
        *** G 6 LOST LOCK AND THIS EPOCH ON WLFACT 2 (L2)  COMMENT
              (OPPOSITE TO PREVIOUS SETTINGS)             COMMENT

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|
```

TABLE A8

```
|                       NAVIGATION MESSAGE FILE - EXAMPLE                      |
+------------------------------------------------------------------------------+

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2              N: GPS NAV DATA                         RINEX VERSION / TYPE
XXRINEXN V2.0       AIUB                12-SEP-90 15:22     PGM / RUN BY / DATE
EXAMPLE OF VERSION 2 FORMAT                                 COMMENT
     .1676D-07   .2235D-07  -.1192D-06  -.1192D-06          ION ALPHA
     .1208D+06   .1310D+06  -.1310D+06  -.1966D+06          ION BETA
     .133179128170D-06  .107469588780D-12   552960       39 DELTA-UTC: A0,A1,T,W
     6                                                      LEAP SECONDS
                                                            END OF HEADER
 6 90  8  2 17 51 44.0 -.839701388031D-03 -.165982783074D-10  .000000000000D+00
     .910000000000D+02  .934062500000D+02  .116040547840D-08  .162092304801D+00
     .484101474285D-05  .626740418375D-02  .652112066746D-05  .515365489006D+04
     .409904000000D+06 -.242143869400D-07  .329237003460D+00 -.596046447754D-07
     .111541663136D+01  .326593750000D+03  .206958726335D+01 -.638312302555D-08
     .307155651409D-09  .000000000000D+00  .551000000000D+03  .000000000000D+00
     .000000000000D+00  .000000000000D+00  .000000000000D+00  .910000000000D+02
     .406800000000D+06
13 90  8  2 19  0  0.0  .490025617182D-03  .204636307899D-11  .000000000000D+00
     .133000000000D+03 -.963125000000D+02  .146970407622D-08  .292961152146D+01
    -.498816370964D-05  .200239347760D-02  .928156077862D-05  .515328476143D+04
     .414000000000D+06 -.279396772385D-07  .243031939942D+01 -.558793544769D-07
     .110192796930D+01  .271187500000D+03 -.232757915425D+01 -.619632953057D-08
    -.785747015231D-11  .000000000000D+00  .551000000000D+03  .000000000000D+00
     .000000000000D+00  .000000000000D+00  .000000000000D+00  .389000000000D+03
     .410400000000D+06

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|


+------------------------------------------------------------------------------+
|                                  TABLE A9                                    |
|                    METEOROLOGICAL DATA FILE - EXAMPLE                        |
+------------------------------------------------------------------------------+

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2              METEOROLOGICAL DATA                     RINEX VERSION / TYPE
XXRINEXM V9.9       AIUB                3-APR-96 00:10      PGM / RUN BY / DATE
EXAMPLE OF A MET DATA FILE                                  COMMENT
A 9080                                                      MARKER NAME
     3    PR    TD    HR                                   # / TYPES OF OBSERV
PAROSCIENTIFIC      740-16B                      0.2    PR SENSOR MOD/TYPE/ACC
HAENNI                                           0.1    TD SENSOR MOD/TYPE/ACC
ROTRONIC            I-240W                       5.0    HR SENSOR MOD/TYPE/ACC
        0.0           0.0           0.0        1234.5678 PR SENSOR POS XYZ/H
                                                            END OF HEADER
 96  4  1  0  0 15  987.1   10.6   89.5
 96  4  1  0  0 30  987.2   10.9   90.0
 96  4  1  0  0 45  987.1   11.6   89.0

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|
```

TABLE A10
GLONASS NAVIGATION MESSAGE FILE - HEADER SECTION DESCRIPTION

	HEADER LABEL (Columns 61-80)	DESCRIPTION	FORMAT	
	RINEX VERSION / TYPE	- Format version (2.01) - File type ('G' = GLONASS nav mess data)	F9.2,11X, A1,39X	#
	PGM / RUN BY / DATE	- Name of program creating current file - Name of agency creating current file - Date of file creation (dd-mmm-yy hh:mm)	A20, A20, A20	
*	COMMENT	Comment line(s)	A60	*
*	CORR TO SYSTEM TIME	- Time of reference for system time corr (year, month, day) - Correction to system time scale (sec) to correct GLONASS system time to UTC(SU) (-TauC)	3I6, 3X,D19.12	*
*	LEAP SECONDS	Number of leap seconds since 6-Jan-1980	I6	*
	END OF HEADER	Last record in the header section.	60X	

Records marked with * are optional

TABLE A11
GLONASS NAVIGATION MESSAGE FILE - DATA RECORD DESCRIPTION

OBS. RECORD	DESCRIPTION	FORMAT
PRN / EPOCH / SV CLK	- Satellite almanac number - Epoch of ephemerides (UTC) - year (2 digits) - month - day - hour - minute - second - SV clock bias (sec) (-TauN) - SV relative frequency bias (+GammaN) - message frame time (sec of day UTC)	I2, 5I3, F5.1, D19.12, D19.12, D19.12
BROADCAST ORBIT - 1	- Satellite position X (km) - velocity X dot (km/sec) - X acceleration (km/sec2) - health (0=OK) (Bn)	3X,4D19.12

BROADCAST ORBIT - 2	- Satellite position Y	(km)	3X,4D19.12
	- velocity Y dot	(km/sec)	
	- Y acceleration	(km/sec2)	
	- frequency number	(1-24)	
BROADCAST ORBIT - 3	- Satellite position Z	(km)	3X,4D19.12
	- velocity Z dot	(km/sec)	
	- Z acceleration	(km/sec2)	
	- Age of oper. information	(days) (E)	

TABLE A12
GLONASS NAVIGATION MESSAGE FILE - EXAMPLE

```
----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2.01           GLONASS NAV DATA                         RINEX VERSION / TYPE
ASRINEXG V1.1.0 VM  AIUB                19-FEB-98 10:42     PGM / RUN BY / DATE
STATION ZIMMERWALD                                          COMMENT
  1998     2    16    0.379979610443D-06                    CORR TO SYSTEM TIME
                                                            END OF HEADER
 3 98  2 15  0 15  0.0 0.163525342941D-03 0.363797880709D-11 0.108000000000D+05
    0.106275903320D+05-0.348924636841D+00 0.931322574615D-09 0.000000000000D+00
   -0.944422070313D+04 0.288163375854D+01 0.931322574615D-09 0.210000000000D+02
    0.212257280273D+05 0.144599342346D+01-0.186264514923D-08 0.300000000000D+01
 4 98  2 15  0 15  0.0 0.179599039257D-03 0.636646291241D-11 0.122400000000D+05
    0.562136621094D+04-0.289074897766D+00-0.931322574615D-09 0.000000000000D+00
   -0.236819248047D+05 0.102263259888D+01 0.931322574615D-09 0.120000000000D+02
    0.762532910156D+04 0.339257907867D+01 0.000000000000D+00 0.300000000000D+01
11 98  2 15  0 15  0.0-0.559808686376D-04-0.272848410532D-11 0.108600000000D+05
   -0.350348437500D+04-0.255325126648D+01 0.931322574615D-09 0.000000000000D+00
    0.106803754883D+05-0.182923507690D+01 0.000000000000D+00 0.400000000000D+01
    0.228762856445D+05 0.447064399719D+00-0.186264514923D-08 0.300000000000D+01
12 98  2 15  0 15  0.0 0.199414789677D-04-0.181898940355D-11 0.108900000000D+05
    0.131731816406D+05-0.143945598602D+01 0.372529029846D-08 0.000000000000D+00
    0.171148715820D+05-0.118937969208D+01 0.931322574615D-09 0.220000000000D+02
    0.135737919922D+05 0.288976097107D+01-0.931322574615D-09 0.300000000000D+01

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|
```

TABLE A13
GLONASS OBSERVATION FILE - EXAMPLE

```
----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2              OBSERVATION DATA    R (GLONASS)         RINEX VERSION / TYPE
XXRINEXO V1.1       AIUB                27-AUG-93 07:23     PGM / RUN BY / DATE
TST1                                                        MARKER NAME
VIEWEG              BRAUNSCHWEIG                            OBSERVER / AGENCY
```

```
100                 XX-RECEIVER         1.0                 REC # / TYPE / VERS
101                 XX-ANTENNA                              ANT # / TYPE
  3844808.114    715426.767   5021804.854                  APPROX POSITION XYZ
        1.2340         .0000         .0000                  ANTENNA: DELTA H/E/N
     1     1                                                WAVELENGTH FACT L1/2
     2    C1    L1                                          # / TYPES OF OBSERV
    10                                                      INTERVAL
  1993     8    23    14    24   40.049000      GLO         TIME OF FIRST OBS
                                                            END OF HEADER
 93  8 23 14 24 40.0490000  0  3  2R01R21
  23986839.824       20520.565 5
  23707804.625       19937.231 5
  23834065.096       -9334.581 5
 93  8 23 14 24 50.0490000  0  3  2R01R21
  23992341.033       49856.525 5
  23713141.002       48479.290 5
  23831189.435      -24821.796 5
 93  8 23 14 25   .0490000  0  3  2R01R21
  23997824.854       79217.202 5
  23718494.110       77092.992 5
  23828329.946      -40219.918 5
 93  8 23 14 25 10.0490000  0  5  2R05R17R01R21
  24003328.910      108602.422 5
  24933965.449      -19202.780 5
  22203326.578       -2987.327 5
  23723851.686      105777.849 5
  23825485.526      -55529.205 5
 93  8 23 14 25 20.0490010  0  5  2R05R17R01R21
  24008828.023      138012.178 5
  24927995.616      -51188.500 5
  22202547.907       -7213.298 5
  23729236.758      134533.636 5
  23822662.277      -70749.590 5
 93  8 23 14 25 30.0490000  0  5  2R05R17R01R21
  24014330.779      167446.477 5
  24922041.288      -83151.666 5
  22201767.457      -11388.909 5
  23734633.024      163360.131 5
  23819848.894      -85881.102 5

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|
```

TABLE A14

MIXED GPS/GLONASS OBSERVATION FILE - EXAMPLE

```
----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|

     2              OBSERVATION DATA    M (MIXED)           RINEX VERSION / TYPE
YYRINEXO V2.8.1 VM  AIUB                19-FEB-97 13:59     PGM / RUN BY / DATE
TST2                                                        MARKER NAME
001-02-A                                                    MARKER NUMBER
JIM                 Y-COMPANY                               OBSERVER / AGENCY
```

```
1                   YY-RECEIVER         2.0.1               REC # / TYPE / VERS
1                   GEODETIC L1                             ANT # / TYPE
  3851178.1849   -80151.4072  5066671.1013                  APPROX POSITION XYZ
        1.2340        0.0000        0.0000                  ANTENNA: DELTA H/E/N
     1     0                                                WAVELENGTH FACT L1/2
     2    C1    L1                                          # / TYPES OF OBSERV
    10                                                      INTERVAL
    11                                                      LEAP SECONDS
  1997     2     6    11    53    0.000000      GPS         TIME OF FIRST OBS
                                                            END OF HEADER
 97  2  6 11 53  0.0000000  0 14G23G07G02G05G26G09G21R20R19R12R02R11
                               R10R03
  22576523.586   -11256947.60212
  22360162.704   -16225110.75413
  24484865.974    14662682.882 2
  21950524.331   -13784707.24912
  22507304.252     9846064.848 2
  20148742.213   -20988953.712 4
  22800149.591   -16650822.70012
  19811403.273   -25116169.741 3
  23046997.513    -3264701.688 2
  22778170.622  -821857836.745 1
  22221283.991  -988088156.884 2
  19300913.475   -83282658.19013
  20309075.579  -672668843.84713
  23397403.484  -285457101.34211
 97  2  6 11 53 10.0000000  0 14G23G07G02G05G26G09G21R20R19R12R02R11
                               R10R03
  22578985.016   -11244012.910 2
  22359738.890   -16227337.841 2
  24490324.818    14691368.710 2
  21944376.706   -13817012.849 2
  22512598.731     9873887.580 2
  20147322.111   -20996416.338 4
  22798942.949   -16657163.594 2
  19812513.509   -25110234.795 3
  23053885.702    -3227854.397 2
  22770607.029  -821898566.774 1
  22222967.297  -988079145.989 2
  19297913.736   -83298710.38413
  20313087.618  -672647337.04113
  23392352.454  -285484291.40311

----|---1|0---|---2|0---|---3|0---|---4|0---|---5|0---|---6|0---|---7|0---|---8|
```

Book of Raw

THE BOOK OF RAW (THE BREAKOUT BIBLE) Wed Nov 4 11:23:37 CST 1998

STREAM CODE - the unique code for the data stream generated by a device;
the first three letters are a general acronym for the system, i.e.:
AVN - inertial navigation system,
GPS - global positioning system,
GRV - gravity system,
LAS - laser altimetry system,
MAG - magnetics system,
PRS - pressure altimetry system,
RAD - ice radar system, or
RNS - radio navigation system;
the fourth letter indicates the manufacturer of the device's interface:
a - Ashtech Corp,
d - Del Norte Technology Inc,
h - Holometrix Corp,
j - Jet Propulsion Lab,
k - Kinemetrics Corp,
l - Lamont-Doherty Earth Observatory,
n - Naval Research Lab,
p - Paroscientific Inc,
s - U.S. Geological Survey (Denver),
t - Trimble Navigation Corp,
w - Western Avionics Corp,
x - Texas Instruments, or
z - Zero Length Spring Corp;
the fifth letter indicates the data stream's chief attribute, i.e.:
a - acceleration,
c - clock,
h - height,
m - magnetic field,
p - position,
t - table,
z - pressure (for PRS), or
z - range (for LAS);
and the sixth digit identifies different streams originating from the same
device by consecutively numbering them.

STREAM ID# - the unique internal number assigned to each stream during breakout.

OF BYTES - the total number of bytes in the IDS (if present) plus the XDS;
recall that every device packet has the following form:
HDR - header section, fixed # of bytes currently = 48,
CT - clock/time section, fixed # of bytes currently = 20,
IDS - internal data section, and
XDS - external data section;
and that breakout depends on a fixed packet length (HDR + CTD + IDS + XDS)
for a given stream. Certain non-device data streams may have other sections,
like the IPS and PIS, but they are not relevent here.

ATTR - the name of the attribute field; some are selectively assigned by FARCE,
while the rest are assigned here - as indicated by angle brackets <attr>.

FARCE FORM - the physical format in which a field arrives from the device:
ascii - ascii character array,
BCD - packed binary coded decimal,
float - IEEE binary floating decimal,
s-int - signed binary integer, or
u-int - unsigned binary integer.

DECODED FORMAT - the logical format in which we interpret the field:
A - ascii token,
I - signed integer number, or
R - real number.

Stream Code: (all) Stream ID#: (all) # of Bytes: n/a

Device: all; FARCE prepends every packet of every device stream with a HDR

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		HDR	(ignored)		8	
	prj	project name	8	ascii	n/a (token)	A
	set	set name	8	ascii	n/a (token)	A
	trn	transect name	8	ascii	n/a (token)	A
	snm	stream name	8	ascii	n/a (token)	A
	seq	sequence number	4	s-int	n/a (number)	I
	len	packet length	4	s-int	n/a (number)	I

Stream Code: (all) Stream ID#: (all) # of Bytes: n/a

Device: all; FARCE prepends every packet of every device stream with a CTD (field seasons CTZ1-3) or a CT (field seasons RTZ4+)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
CT	<clk_y>	clock - year	2	BCD	years	I
	<clk_n>	clock - month	1	BCD	months	I
	<clk_d>	clock - day	1	BCD	days	I
	<clk_h>	clock - hours	1	BCD	hours	I
	<clk_m>	clock - minutes	1	BCD	minutes	I
	<clk_s>	clock - seconds	1	BCD	seconds	I
	<clk_f>	clock - hunds	1	BCD	0.01 seconds	I
	tim	time relative to SOT	4	s-int	10 usecs	I
	RTZ4+ : <cep>	clock extended precision	4	BCD		
CTZ1-3 :	dis	time relative to SKP	4	s-int	mm	I
	RTZ4+ : <tep>	time extended precision	4	BCD		
CTZ1-3 :	loc	distance relative to SKP	4	s-int	km (CTZ1-2) mm (CTZ3)	I

NOTE: SOT means "start of transect," and SKP means "some known point."

Stream Code: AVNwp1 Stream ID#: 16 # of Bytes: 88

Device: Western Avionics S-800 Data Acquisition Interface (DAI)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	sta	AVN status word	2	u-int	bit-defined	I
		NOTE: HEX() values represent hexadecimal values derived from 21-bit binary signed two's-complement numbers; to convert these values: 1. convert to decimal, and 2. scale (multiply) by the indicated resolution, res_*, if any: res_D = 180 / (2^21) res_K = 3276.7 / (2^21)				
XDS	clk	clock time (hh:mm:ss)	8	ascii	n/a (token)	A
		(ignored)			1	
	<lat_s>	latitude 'sign'	1	ascii	n/a (token)	A
	<lat_v>	latitude value	6	ascii	HEX(degrees) *(1/res_D)	A
		(ignored)			1	
	<lon_s>	longitude 'sign'	1	ascii	n/a (token)	A
	<lon_v>	longitude value	6	ascii	HEX(degrees) *(1/res_D)	A
		(ignored)			1	
	<gsp_s>	ground speed 'sign'	1	ascii	n/a (token)	A
	<gsp_v>	ground speed value	6	ascii	HEX(knots) *(1/res_K)	A
		(ignored)			1	
	<trk_s>	track angle 'sign'	1	ascii	n/a (token)	A
	<trk_v>	track angle value	6	ascii	HEX(degrees) *(1/res_D)	A
		(ignored)			1	
	<hdg_s>	heading 'sign'	1	ascii	n/a (token)	A
	<hdg_v>	heading value	6	ascii	HEX(degrees) *(1/res_D)	A
		(ignored)			1	
	<wsp_s>	wind speed 'sign'	1	ascii	n/a (token)	A
	<wsp_v>	wind speed value	6	ascii	HEX(knots) *(1/res_K)	A
		(ignored)			1	
	<wdr_s>	wind direction 'sign'	1	ascii	n/a (token)	A

<wdr_v>	wind direction value	6	ascii	HEX(degrees) *(1/res_D)	A
	(ignored)			1	
ral	radar altitude	4	ascii	HEX(feet)	A
	(ignored)			1	
pal	pressure altitude	4	ascii	HEX(feet) + 4000 ft	A
	(ignored)			1	
ias	indicated air speed	4	ascii	HEX(knots)	A
	(ignored)			1	
oat	outside air temp	4	ascii	HEX(degs C) + 60 degs C	A
	(ignored)			2	

Stream Code: AVNwp2 Stream ID#: 24 # of Bytes: 94

Device: Western Avionics S-1200 Data Acquisition Interface (DAI)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	sta	AVN status word	2	u-int	bit-defined	I

NOTE: The value of each decoded field must be scaled (multiplied) by the indicated resolution, res_*, to determine the true value:

res_A = 1.71661377E-04
res_B = 5.493164063E-03
res_C = 3.90625E-03
res_D = 0.125
res_E = 7.8125E-03
res_F = 1.0
res_G = 1.220703125E-04
res_H = 9.765625E-04
res_I = 2.0
res_J = 0.25

XDS	ilt	inertial latitude	4	s-int	(1/res_A)	deg	I
	iln	inertial longitude	4	s-int	(1/res_A)	deg	I
	dtrk	desired track	2	s-int	(1/res_B)	deg	I
	xtrk	crosstrack	2	s-int	(1/res_C)	NM	I
	lat	updated latitude	4	s-int	(1/res_A)	deg	I
	lon	updated longitude	4	s-int	(1/res_A)	deg	I
	gsp	ground speed	2	s-int	(1/res_D)	knots	I
	trk	track angle	2	s-int	(1/res_B)	deg	I
	hdg	true heading	2	s-int	(1/res_B)	deg	I
	wsp	wind speed	2	s-int	(1/res_E)	knots	I
	wdr	wind direction	2	s-int	(1/res_B)	deg	I
	mtrk	magnetic track angle	2	s-int	(1/res_B)	deg	I
	mhdg	magnetic heading	2	s-int	(1/res_B)	deg	I
	drift	drift angle	2	s-int	(1/res_B)	deg	I
	fpang	flight path angle	2	s-int	(1/res_B)	deg	I
	fpacl	flight path accel	2	s-int	(1/res_G)	g	I
	pitch	pitch angle	2	s-int	(1/res_B)	deg	I
	roll	roll angle	2	s-int	(1/res_B)	deg	I

bpr	body pitch rate	2	s-int	(1/res_C)	deg/s	I
brr	body roll rate	2	s-int	(1/res_C)	deg/s	I
byr	body yaw rate	2	s-int	(1/res_C)	deg/s	I
blna	body lon accel	2	s-int	(1/res_G)	g	I
blta	body lat accel	2	s-int	(1/res_G)	g	I
bnma	body normal accel	2	s-int	(1/res_G)	g	I
phdg	platform heading	2	s-int	(1/res_B)	deg	I
tar	track angle rate	2	s-int	(1/res_H)	deg/s	I
par	pitch att rate	2	s-int	(1/res_C)	deg/s	I
rar	roll att rate	2	s-int	(1/res_C)	deg/s	I
dtd	distance to dest	4	s-int	(1/res_D)	NM	I
ttd	time to dest	2	s-int	(1/res_F)	mins	I
pvs	potential vert speed	2	s-int	(1/res_F)	ft/min	I
ialt	inertial altitude	4	s-int	(1/res_D)	ft	I
atha	along-track horiz accel	2	s-int	(1/res_G)	g	I
xtha	cross-track horiz accel	2	s-int	(1/res_G)	g	I
vacl	vertical acceleration	2	s-int	(1/res_G)	g	I
ivs	intertial vert speed	2	s-int	(1/res_F)	ft/min	I
nsv	N-S velocity	2	s-int	(1/res_D)	knots	I
ewv	E-W velocity	2	s-int	(1/res_D)	knots	I
ral	radar altitude	2	s-int	(1/res_I)	ft	I
oat	outside air temp	2	s-int	(1/res_J)	deg C	I

Stream Code: GPSap1 Stream ID#: 30 # of Bytes: 203

Device: Ashtech M12 GPS Navigation System (ASH)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	sta	GPS status word	2	u-int	bit-defined	I
	id	GPS block ID #	2	u-int	n/a (number)	I
		XDS (ignored)			7	
	<utc_h>	utc of posit, hours	2	ascii	hours	I
	<utc_m>	utc of posit, minutes	2	ascii	minutes	I
	<utc_s>	utc of posit, seconds	4	ascii	seconds	R
		(ignored)			1	
	<lat_d>	latitude degrees	2	ascii	degrees	I
	<lat_m>	latitude minutes	7	ascii	minutes	R
		(ignored)			1	
	lth	latitude hemisphere	1	ascii	'N' or 'S'	A
		(ignored)			1	
	<lon_d>	longitude degrees	3	ascii	degrees	I
	<lon_m>	longitude minutes	7	ascii	minutes	R
		(ignored)			1	
	lnh	longitude hemisphere	1	ascii	'E' or 'W'	A
		(ignored)			3	
	nsv	# of SV's in use	1	ascii	n/a (number)	I
		(ignored)			1	
	<hdp>	horiz dilut of precis	4	ascii	n/a (scalar)	R
		(ignored)			1	
	<aht>	antenna height	6	ascii	meters	I
		(ignored)			3	
	<ght>	geoidal height	4	ascii	meters	I
		(ignored)			11	
	<cog>	course over ground	6	ascii	degrees	R
		(ignored)			5	

<sog_n>	speed over ground	6	ascii	knots	R
	(ignored)			3	
<sog_k>	speed over ground	6	ascii	km/hr	R
	(ignored)			15	
gxt	crosstrack error	7	ascii	NM	R
	(ignored)			1	
gxd	crosstrack direction	1	ascii	'L' or 'R'	A
	(ignored)			15	
<tpf>	time of position fix	4	s-int*	seconds	I
<osn>	op-entered site name	4	ascii	n/a (token)	A
<efx>	earth-fixed 'x'	8	float*	meters	R
<efy>	earth-fixed 'y'	8	float*	meters	R
<efz>	earth-fixed 'z'	8	float*	meters	R
<nco>	nav clock offset	4	float*	millisecs	R
<vx>	velocity in 'x'	4	float*	meters/second	R
<vy>	velocity in 'y'	4	float*	meters/second	R
<vz>	velocity in 'z'	4	float*	meters/second	R
<ncd>	nav clock drift	4	float*	seconds	R
pdp	posit dilut of precis	2	u-int*	n/a (scalar) x100	I
	(ignored)			4	

NOTE: Output from the M12 is not intel-ordered; thus these fields* are not byte-swapped during decode.

```
Stream Code:  GPSap2                                          # of Bytes:  N/A

                     Device:  Ashtech M12 GPS Navigation System (ASH)
```

```
                     +-----------------------------------------+
    |                                                          |
    |    NOTE:  This stream follows standard rinex format.     |
    |        A rinex description can be found in "rinex2.txt" at |
    |        http://igscb.jpl.nasa.gov                         |
    |                                                          |
                     +-----------------------------------------+
```

Stream Code: GPSap3 # of Bytes: 69

Device: Ashtech GG24 GPS and Glonass Navigation System (GG24)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		XDS (ignored)			11	
	rtime	Milliseconds of GPS weeek	4	long	milliseconds	I
		(ignored)			4	
	ecefx	Antenna position X	8	double	meters	R
	ecefy	Antenna position Y	8	double	meters	R
	ecefz	Antenna position Z	8	double	meters	R
	rcoff	receiver clock offset	4	float	meters	R
	vx	Antenna velocity in X	4	float	m/s	R
	vy	Antenna velocity in Y	4	float	m/s	R
	vz	Antenna velocity in Z	4	float	m/s	R
	rcdrft	Receiver clock drift	4	float	m/s	R
	pDOP	pDOP times 100	2	short		R
		(ignored)			4	

Stream Code: GPSjp1 Stream ID#: 33 # of Bytes: 84

Device: JPL/AOA TurboRogue SNR-8000 Survey & Navigation Receiver (TRB)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	sta	GPS status word	2	u-int	bit-defined	I
	id	GPS block ID #	2	u-int	n/a (number)	I
XDS	flg	packet flag (always -1)	2	s-int	n/a (number)	I
	gdp	geom dilut of precis	2	s-int	n/a (scalar) GDOP*10	I
	tim	time*	4	s-int	seconds	I
	lat	latitude, positive N	8	float	degrees	R
	lon	longitude, positive E	8	float	degrees	R
	alt	altitude	4	float	meters	R
	hsp	horizontal speed	4	float	meters/second	R
	vsp	vertical speed	4	float	meters/second	R
	lps	leap seconds	1	u-int	seconds	I
	nsv	# of sv's being tracked	1	u-int	n/a (number)	I
	**<prn_1>	prn for sv #1	1	u-int	n/a (number)	I
	<prn_2>	prn for sv #2	1	u-int	n/a (number)	I
	<prn_3>	prn for sv #3	1	u-int	n/a (number)	I
	<prn_4>	prn for sv #4	1	u-int	n/a (number)	I
	<prn_5>	prn for sv #5	1	u-int	n/a (number)	I
	<prn_6>	prn for sv #6	1	u-int	n/a (number)	I
	<prn_7>	prn for sv #7	1	u-int	n/a (number)	I
	<prn_8>	prn for sv #8	1	u-int	n/a (number)	I
	<elv_1>	elevation of sv #1	2	s-int	degrees*10	I
	<elv_2>	elevation of sv #2	2	s-int	degrees*10	I
	<elv_3>	elevation of sv #3	2	s-int	degrees*10	I
	<elv_4>	elevation of sv #4	2	s-int	degrees*10	I
	<elv_5>	elevation of sv #5	2	s-int	degrees*10	I
	<elv_6>	elevation of sv #6	2	s-int	degrees*10	I
	<elv_7>	elevation of sv #7	2	s-int	degrees*10	I
	<elv_8>	elevation of sv #8	2	s-int	degrees*10	I
	<azi_1>	azimuth of sv #1	2	s-int	degrees*10	I
	<azi_2>	azimuth of sv #2	2	s-int	degrees*10	I
	<azi_3>	azimuth of sv #3	2	s-int	degrees*10	I
	<azi_4>	azimuth of sv #4	2	s-int	degrees*10	I
	<azi_5>	azimuth of sv #5	2	s-int	degrees*10	I
	<azi_6>	azimuth of sv #6	2	s-int	degrees*10	I
	<azi_7>	azimuth of sv #7	2	s-int	degrees*10	I
	<azi_8>	azimuth of sv #8	2	s-int	degrees*10	I

```
NOTES:
    |        * This "time" is the number of elapsed seconds since  06 Jan 80.
    **The "pseudo-random number" (prn) is the satellite's unique ID.
    |    For the prn's, elv's, and azi's:  if no satellite is being tracked
    |    on a given channel (1-8), the data for that channel are set to 0's.
    |
                        +-------------------------------------+
```

Stream Code: GPSjp2 Stream ID#: 33 # of Bytes: N/A

Device: JPL/AOA TurboRogue SNR-8000 Survey & Navigation Receiver (TRB)

NOTE: This stream follows standard rinex format.
A rinex description can be found in "rinex2.txt" at
http://igscb.jpl.nasa.gov

Stream Code: GPSkc1 Stream ID#: 35 # of Bytes: 16

Device: Kinemetrics TrueTime 705-101 GPS Time Code Generator (TCG)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		XDS (ignored)			1	
	clk	clock (jjj:hh:mm:ss)	12	ascii	n/a (token)	A
	tqc	time quality character	1	ascii	(SP . * # ?)	A
		(ignored)			2	

Stream Code: GPSmc1 Stream ID#: ? # of Bytes: 164

Device: Motorola GTOncore GPS

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
XDS		(ignored)	5		'@@Eq,'	
	date	date (mm,dd,yy)	8	ascii	n/a (token)	A
		(ignored)	1		','	
	time	UTC time (hh,mm,ss)	8	ascii	n/a (token)	A
		(ignored)	1		','	
	lat_d	latitude Degrees (dd)	2	ascii	degrees	I
		(ignored)	1		','	
	lat_m	latitude Minutes (mm.mmmm)	7	ascii	degrees	R
		(ignored)	1		','	
	lat_h	latitude Direction (h)	1	ascii	'N' or 'S'	A
		(ignored)	1		','	
	lon_d	longitude Degrees (ddd)	3	ascii	degrees	I
		(ignored)	1		','	
	lon_m	longitude Mins (mm.mmmm)	7	ascii	degrees	R
		(ignored)	1		','	
	lon_h	longitude Direction (h)	1	ascii	'W' or 'E'	A
		(ignored)	1		','	
	hgt	height (shhhhh.h)	8	ascii	meters	R
		(ignored)	1		','	
	spd	speed (sss.s)	5	ascii	knots	R
		(ignored)	1		','	
	hdg	heading (hhh.h)	5	ascii	degrees	R
		(ignored)	1		','	
	sta_m	fixed Mode (m)	1	ascii	'0' or '1'	A
		(ignored)	1		','	
	sta_t	fixed Type (t)	1	ascii	'0' through '3'	A
		(ignored)	1		','	
	DOP	dop (dd.d)	4	ascii	n/a	R

```
                (ignored)                1              ',
sats    num of stats (nn)        2    ascii    n/a            I
                (ignored)                1              ',
sta     station ID (rrrr)        4    ascii    token          A
                (ignored)                1              ',
age     age of differential (aa) 2    ascii    secs           I
                (ignored)                1              ',
             (ignored)               3    ascii    even parity
               (ignored)             2             '\r\n'
```

Stream Code: GPStp1 Stream ID#: 29 # of Bytes: 167

Device: Trimble TNL-2000 GPS Navigation System (TRM)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	sta	GPS status word	2	u-int	bit-defined	I
	id	GPS block ID #	2	u-int	n/a (number)	I
	XDS	(ignored)			2	
	<glt_h>	latitude hemisphere	1	ascii	'N' or 'S'	A
		(ignored)			1	
	<glt_d>	latitude degrees	2	ascii	degrees	I
		(ignored)			1	
	<glt_m>	latitude minutes	4	ascii	0.01 mins	I
		(ignored)			2	
	<gln_h>	longitude hemisphere	1	ascii	'E' or 'W'	A
		(ignored)			1	
	<gln_d>	longitude degrees	3	ascii	degrees	I
		(ignored)			1	
	<gln_m>	longitude minutes	4	ascii	0.01 mins	I
		(ignored)			2	
	<trk>	true track	3	ascii	degrees	I
		(ignored)			2	
	ghs	horizontal speed	3	ascii	knots	I
		(ignored)			2	
	<dtw>	distance to waypoint	6	ascii	0.01 NM	I
		(ignored)			2	
	<ttw_h>	time to wpoint - hours	2	ascii	hours	I
	<ttw_m>	time to wpoint - mins	2	ascii	minutes	I
		(ignored)			2	
	<ctd>	crosstrack direction	1	ascii	'L' or 'R'	A
	xte	crosstrack error	4	ascii	0.01 NM	I
		(ignored)			2	

<tad>	track angle direction	1	ascii	'L' or 'R'	A
<tae>	track angle error	4	ascii	0.1 degrees	I
	(ignored)			2	
<dtk>	desired track	4	ascii	0.1 degrees	I
	(ignored)			2	
<aln>	active leg number	2	ascii	n/a (token)	A
	(ignored)			2	
<dwd>	dest waypoint desig*	5	ascii	n/a (token)	A
	(ignored)			2	
<bdw>	bearing to dest wpoint	4	ascii	0.1 degrees	I
	(ignored)			2	
<prd>	parallel direction	1	ascii	'L' or 'R'	A
<pro>	parallel offset	4	ascii	0.1 NM	I
	(ignored)			2	
epe	estimated posit error	3	ascii	0.1 NM	I
	(ignored)			2	
<mgd>	magnetic direction	1	ascii	'E' or 'W'	A
<mgv>	magnetic variation	4	ascii	0.1 degrees	I
	(ignored)			2	
tss	time since solution	3	ascii	0.1 seconds	I
	(ignored)			25	
date	date (mm/dd/yy)	8	ascii	n/a (token)	A
	(ignored)			2	
time	time (hh:mm:ss)	8	ascii	n/a (token)	A
	(ignored)			10	

NOTE: This code* is entered by the operator and must be 5 characters!

Stream Code: GPStp2 Stream ID#: 37 # of Bytes: 112

Device: Trimble Trimflite differential GPS Navigation System

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		XDS	(space)		1	
		latitude hemisphere	1	ascii	"+" or "-"	A
		latitude	12	ascii	decimal degrees (dd.fffffffff)	A
			(space)		1	
		longitde hemisphere	1	ascii	"+" or "-"	A
		longitude	13	ascii	decimal degrees (ddd.fffffffff)	A
			(space)		1	
		track (course over ground)	6	ascii	decimal degrees (dddd.f)	A
			(space)		1	
		ground speed	6	ascii	knots (dddd.f)	A
			(space)		1	
		offline distance	9	ascii	meters (ddddddd.f)	A
			(space)		1	
		PDOP	7	ascii	(ddddd.f)	A
			(space)		1	
		GPS height	8	ascii	meters (ddddd.ff)	A
			(space)		1	
		Easting	13	ascii	meters (ddddddddd.ffff)	A
			(space)		1	
		Northing	13	ascii	meters (ddddddddd.ffff)	A
			(space)		1	
		DOS Time	10	ascii	(hh:mm:ss.s)	A
			(carrage return)		1	
			(line feed)		1	

Stream Code: GPSxp1 Stream ID#: 18 # of Bytes: 388*

Device: TI-4100 Navstar GPS Navigation System (TI4100)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	sta	GPS status word	2	u-int	bit-defined	I
	id	GPS block ID #	2	u-int	n/a (number)	I

NOTE: *This is a gruesome, horrifying packet full of embedded DLE's which must be unstuffed before decode can proceed; the length of this packet (IDS+XDS) after the DLE's are unstuffed is actually 416 bytes.

XDS		(ignored)			20	
	lon	longitude	8	float	radians	R
	lat	latitude	8	float	radians	R
	alt	altitude	8	float	meters	R
	esd	east speed	8	float	meters/second	R
	nsd	north speed	8	float	meters/second	R
	usp	up speed	8	float	meters/second	R
		(ignored)			168	
	hsp	horizontal speed	4	float	meters/second	R
	cte	crosstrack error	4	float	meters	R
		(ignored)			12	
	pdp	posit dilution of precis	8	float	n/a (scalar)	R
	epe	estimated posit error	4	float	meters	R
		(ignored)			112	
	<prn_1>	ID# for tracked SV #1	2	u-int	n/a (ID#)	I
	<prn_2>	ID# for tracked SV #2	2	u-int	n/a (ID#)	I
	<prn_3>	ID# for tracked SV #3	2	u-int	n/a (ID#)	I
	<prn_4>	ID# for tracked SV #4	2	u-int	n/a (ID#)	I
	scc	convergence code	2	u-int	n/a (code)	I
		(ignored)			20	

Stream Code: GRVla1 Stream ID#: 14 # of Bytes: 14

Device: LDGO Gravity Sensor Data Buffer (GDB_L)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
XDS	ci	count interval	2	ascii	seconds	I
		(ignored)			1	
	ct	gravity count	6	ascii	n/a (count)	I
		(ignored)			1	
	sta	status (01, 02, 03, 04)	2	ascii	n/a (token)	A
		(ignored)			2	

Stream Code: GRVnt1 Stream ID#: 13 # of Bytes: 20

Device: NRL Gravity Platform Data Buffer (GDB_N)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: The value of a decoded 'count' must be divided by the voltage resolution (1638.4) to determine the digitized voltage.				
XDS	cut	control unit time	4	float	seconds	R
	rt	roll tilt	2	s-int	n/a (count)	I
	pt	pitch tilt	2	s-int	n/a (count)	I
	pi	pitch integrator	2	s-int	n/a (count)	I
	ri	roll integrator	2	s-int	n/a (count)	I
	pa	pitch accelerometer	2	s-int	n/a (count)	I
	ra	roll accelerometer	2	s-int	n/a (count)	I
	sync	sync flag ("cnys")	4	ascii	n/a (token)	A

Stream Code: GRVza1 Stream ID#: 32 # of Bytes: 133

Device: ZLS Airborne Gravimeter/Platform System (GRV_Z)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: To convert the 'analog gravity' to relative gravity in mgals: 1. multiply by 0.9966 (analog resolution), and 2. add a fixed offset (per field calibration).				
XDS	lin	line ID	10	ascii	n/a (token)	A
		(ignored)			3	
	yr	year	4	ascii	years	I
		(ignored)			1	
	day	julian day	3	ascii	days	I
		(ignored)			1	
	clk	clock (hh:mm:ss)	8	ascii	n/a (token)	A
		(ignored)			1	
	cnt	analog gravity	7	ascii	n/a (count)	R
		(ignored)			1	
	spg	spring tension	7	ascii	n/a (count)	R
		(ignored)			1	
	xcp	cross coupling	7	ascii	n/a (count)	R
		(ignored)			1	
abm	raw beam		6	ascii	millivolts	R
		(ignored)			1	
	vcc	long accelerometer X beam position	6	ascii	millivolts	R
		(ignored)			1	
	al	long accelerometer X beam velocity	6	ascii	millivolts	R
		(ignored)			1	
	ax	cross accelerometer X beam velocity	6	ascii	millivolts	R
		(ignored)			1	
	ve	square of beam velocity	6	ascii	millivolts	R

	(ignored)			1	
ax2	cross accelerometer^2 * X beam velocity	6	ascii	millivolts	R
	(ignored)			1	
xacc2	cross accelerometer^2	6	ascii	millivolts^2	R
	(ignored)			1	
lacc2	long accelerometer^2	6	ascii	millivolts^2	R
	(ignored)			1	
xacc	cross accelerometer	6	ascii	millivolts	R
	(ignored)			1	
lacc	long accelerometer	6	ascii	millivolts	R
	(ignored)			1	
pp	platform period	6	ascii	n/a (token)	A
	(ignored)			2	

Stream Code: LAShz1 Stream ID#: 31 # of Bytes: 5

Device: Holometrix PRAM-IV Laser Rangefinder (PRAM)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
XDS	sta	altimeter status byte	1	u-int*	bit-defined	I
	npr	# of pulses received	1	u-int*	n/a (count)	I
	rng	range	3	u-int*	centimeters	I

NOTE: Output from the PRAM-IV is not intel-ordered; thus these fields* are not byte-swapped during decode.

Stream Code: MAGgm1 Stream ID#: 42 # of Bytes: 19

Device: EG&G Geometrics 856 Sensor/Magnetometer

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
XDS	day	julian day	3	ascii	days	A
		(ignored)			1	
	clk	clock (hhmmss)	6	ascii	n/a	A
	nmf	quality indicator	1	ascii	n/a (token)	A
	gammas	mag reading	6	ascii	nTeslas*10	A
		(ignored)			2	

Stream Code: MAGgm2 Stream ID#: 41 # of Bytes: 18

Device: EG&G Geometrics 823 Sensor/Magnetometer

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		XDS	(ignored)		1	
	gammas	mag reading	10	ascii	nTeslas	A
			(ignored)		1	
	lvl	signal level	4	ascii	volts (0-5)	A
			(ignored)		2	

Stream Code: MAGsm1 Stream ID#: 12 # of Bytes: 14

Device: USGS (Denver) Magnetics Interface (MGI)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	sta	magnetic status word	2	u-int	bit-defined	I
	eop	end of polarize time	4	u-int	10 usecs	I
	sop	start of polarize time	4	u-int	10 usecs	I
XDS	gammas	mag reading	4	BCD	nTeslas	R

Stream Code: PRSpz1 Stream ID#: 15 # of Bytes: 16

Device: Paroscientific S-1000 Digiquartz Transmitter (PRS)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	XDS	(ignored)			5	
	mbar	pressure sample	7	ascii	mbars	R
		(ignored)			2	

Stream Code: PRSpz2 Stream ID#: 34 # of Bytes: 17

Device: Paroscientific S-1000 Digiquartz Transmitter (PRS)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	len	length of the XDS	2	u-int	bytes	I
	XDS	(ignored)			5	
	mbar	pressure sample	8	ascii	mbars	R
		(ignored)			2	

Stream Code: RADge1 Stream ID#: ? # of Bytes: (see below)

Device: EG&G 9826 Digital Signal Averager

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: In terms of breakout, this stream is unique; we determine the length of the XDS directly from the CT section. Thus it is not possible (or necessary) to specify a total # of bytes here. Samples are 4ns.				
IDS	depth	The averaging depth	4	u-int	bytes	I
XDS		(consists entirely of 24-bit stacked digital waveforms)				

Stream Code: RADgh1 Stream ID#: ? # of Bytes: (see below)

Device: EG&G 9826 Digital Signal Averager

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: In terms of breakout, this stream is unique; we determine the length of the XDS directly from the log file. Thus it is not possible (or necessary) to specify a total # of bytes here. Samples are 16ns.				
IDS	pad	zero padding	30	u-int	bytes	I
XDS		(consists entirely of 24-bit stacked digital waveforms)				

Stream Code: RADsh1 Stream ID#: 11 # of Bytes: (see below)

Device: USGS (Denver) Digital Stacking Unit (DSU)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: In terms of breakout, this stream is unique; we determine the length of the XDS directly from the log file. Thus it is not possible (or necessary) to specify a total # of bytes here. Samples are 20ns.				
IDS	len	length of the XDS	4	u-int	bytes	I
	nbp	bytes per data point	2	u-int	bytes	I
	nsr	samples recorded	4	u-int	n/a (count)	I
	sta	radar status word	2	u-int	bit-defined	I
	bem	beam direction	2	u-int	bit-defined	I
	sos	start-of-stack time	4	u-int	10 usecs	I
	eos	end-of-stack time	4	u-int	10 usecs	I
	nwt	times thru wait loop	4	u-int	n/a (count)	I
	wtm	wait time	4	float	millisecs	R
XDS		(consists entirely of 24-bit stacked digital waveforms)				

Stream Code: RADsh2 Stream ID#: 11 # of Bytes: (see below)

Device: USGS (Denver) Digital Stacking Unit (DSU)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
		NOTE: In terms of breakout, this stream is unique; we determine the length of the XDS directly from the log file. Thus it is not possible (or necessary) to specify a total # of bytes here. Samples are 40ns.				
IDS	len	length of the XDS	4	u-int	bytes	I
	nbp	bytes per data point	2	u-int	bytes	I
	nsr	samples recorded	4	u-int	n/a (count)	I
	sta	radar status word	2	u-int	bit-defined	I
	bem	beam direction	2	u-int	bit-defined	I
	sos	start-of-stack time	4	u-int	10 usecs	I
	eos	end-of-stack time	4	u-int	10 usecs	I
	nwt	times thru wait loop	4	u-int	n/a (count)	I
	wtm	wait time	4	float	millisecs	R
XDS		(consists entirely of 24-bit stacked digital waveforms)				

Stream Code: RNSdp1 Stream ID#: 17 # of Bytes: 125

Device: Del Norte 325 Flying Flagman Guidance System (325)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	sta	radio nav status word	2	u-int	bit-defined	I
XDS	evt	event number	3	ascii	n/a (number)	I
	flg	RNS flag	1	ascii	n/a (token)	A
	cc1	channel #1 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg1	channel #1 - range	7	ascii	meters	R
		(ignored)			2	
	cc2	channel #2 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg2	channel #2 - range	7	ascii	meters	R
		(ignored)			2	
	cc3	channel #3 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg3	channel #3 - range	7	ascii	meters	R
		(ignored)			2	
	cc4	channel #4 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg4	channel #4 - range	7	ascii	meters	R
		(ignored)			2	
	code	RNS code “header”	1	ascii	n/a (token)	A
	chn1	1st channel used	1	ascii	n/a (number)	I
	chn2	2nd channel used	1	ascii	n/a (number)	I
		(ignored)			1	
	X	grid X coordinate	10	ascii	meters	R
	Y	grid Y coordinate	10	ascii	meters	R
	Xf	field X coordinate	10	ascii	meters	R
	Yf	field Y coordinate	10	ascii	meters	R
		(ignored)			1	

```
gsp      ground speed              3     ascii     meters/second    I
                          (ignored)                 1
xtd      crosstrack distance       5     ascii     meters           I
                          (ignored)                 1
dtg      distance to go            5     ascii     meters           I
                          (ignored)                 1
clk      RNS clock                 8     ascii     n/a (token)      A
                          (ignored)                 2
```

Stream Code: RNSdp2 Stream ID#: 27 # of Bytes: 144

Device: Del Norte 325 Flying Flagman Guidance System (325)

Packet Sect:	Attr:	Description:	# of Bytes:	FARCE Form:	Decoded Units:	Decoded Format:
IDS	sta	radio nav status word	2	u-int	bit-defined	I
XDS	evt	event number	3	ascii	n/a (number)	I
	flg	RNS flag	1	ascii	n/a (token)	A
	cc1	channel #1 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg1	channel #1 - range	7	ascii	meters	R
		(ignored)			2	
	cc2	channel #2 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg2	channel #2 - range	7	ascii	meters	R
		(ignored)			2	
	cc3	channel #3 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg3	channel #3 - range	7	ascii	meters	R
		(ignored)			2	
	cc4	channel #4 - code	2	ascii	n/a (code)	I
		(ignored)			1	
	rg4	channel #4 - range	7	ascii	meters	R
		(ignored)			2	
	code	RNS code “header”	1	ascii	n/a (token)	A
	chn1	1st channel used	1	ascii	n/a (number)	I
	chn2	2nd channel used	1	ascii	n/a (number)	I
		(ignored)			1	
	X	grid X coordinate	10	ascii	meters	R
	Y	grid Y coordinate	10	ascii	meters	R
	Xf	field X coordinate	10	ascii	meters	R
	Yf	field Y coordinate	10	ascii	meters	R

```
                                (ignored)                1
gsp      ground speed            3     ascii     meters/second            I
                                (ignored)                1
         xtd      crosstrack distance      5     ascii     meters          I
                                (ignored)                1
         dtg      distance to go           5     ascii     meters          I
                                (ignored)                1
         fno      field number/offset      4     ascii     n/a (number)    I
                                (ignored)                1
         lin      line number/direction    4     ascii     n/a (number)    I
                                (ignored)                1
         dat      date                     8     ascii     n/a (token)     A
                                (ignored)                1
         clk      RNS clock (hh:mm:ss)     8     ascii     n/a (token)     A
                                (ignored)                2
```
