87010nav

NAVIGATION LOG

FARNELLA 87-3

NORTH ATLANTIC

MARCH 28- APRIL 25, 1987

FRNL 87-3 87010 104482

87010nav

U.S.G.S.
INTEGRATED NAVIGATION SYSTEM
AND
NORTHSTAR LORAN-C NAVIGATION LOG

SHIP FARNELLA 87-03

CRUISE NO. 87010

DATE 28th MARCH - 25th APRIL

CHIEF SCIENTIST O'LEARY / HUGHES CLARKE

TAPE #	START	END	COMMENTS AND OBSERVATIONS		PAGE _____
			ABC		IBM
			N/STAR	M/Pulse	M/Pulse

TAPE # | START | END

COMMENTS AND OBSERVATIONS

PAGE

NAVIGATION INFORMATION (LORAN C)

GLORIA CRUISE F87-3

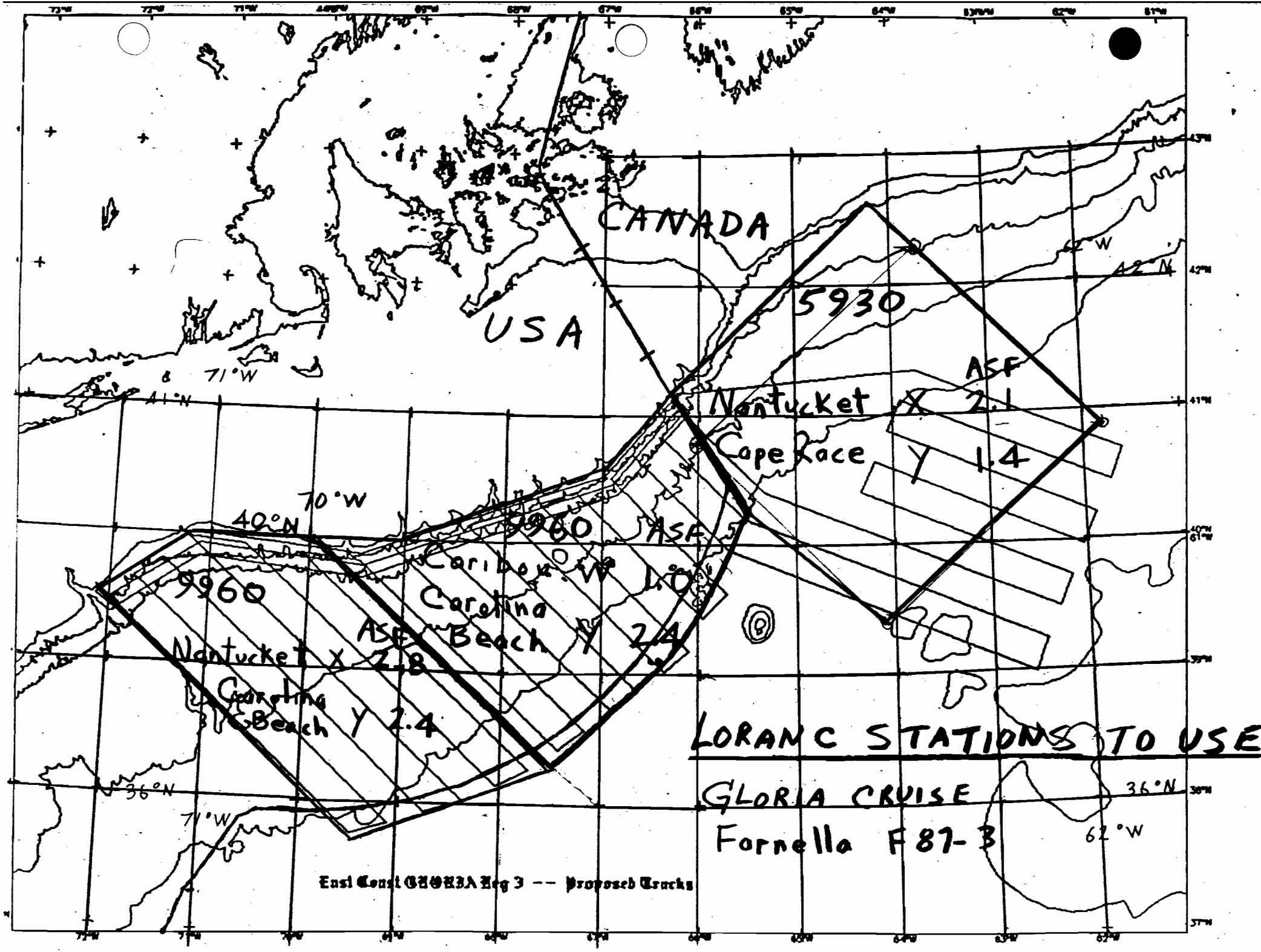
ASF's used for entire cruise in the Mininav (Megapulse / IBM) LORAN C
Accutix 500

Chain	station		ASF (μs)
9960	Seneca	Master	
	Caribou	W	+1.0
	Nantucket	X	+2.8
	Carolina Beach	Y	+2.4
5930	Caribou	Master	
	Nantucket	X	+2.1
	Cape Race	Y	+1.4

The ASF corrections applied as above were chosen as a mean for the project areas from the available sources — DMA Correction Tables (blue book) and CHS, BIO listings.

See the sketch (LORAN C STATIONS TO USE) to identify which Chain and stations were used for particular project areas.

G. Castello


CANADA
USA
5930
ASF
Nantucket X 2.1
Cape Race Y 1.4
9960
ASF
Caribou W 1.0
Carolina Beach Y 2.4
9960
Nantucket X 2.8
Carolina Beach Y 2.4
71°W
41°N
70°W
40°N
36°N
71°W
42°N
62°W
36°N
62°W
LORAN C STATIONS TO USE
GLORIA CRUISE
Fornella F87-3
East Coast GLORIA Leg 3 -- Proposed Tracks

MININAV

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 1
28/3			USGS Megapulse system	
			turned on ~1500 Z 28/3/86	
			Upper Accufix 500.	
			Left IBM PC.	
			9960 Chain X Nantucket	
			Y Carolina Beach.	
			— Time corrected to Gauge Clock	
			at 1533 Z	
			ASF inputs X — 2.80	
			Y — 2.40	
			5 sec sampling rate	
			25 " filter.	
			5 minute printout.	
			— Started on E drive.	
29/3				
			time reset @ 04:14:00	
			system crashed @ ≈ 0100 Z	
			DISC #1 — NO EOF.	
			rebooted @ 0410 Z	
			2 new discs put in E and F	
			5 sec sampling rate	
			25 sec Filter	
			5 min printout	
			0419 Data Disc E enabled for logging	

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			J.D 088
			0428 WP #1, 2, 3 entered
			0450 Ship have to temporarily
			0500 ships generator problems.
			- all units turned off.
			0655 - OK to use power again
			rebooting both systems.
			0718 - restarted NAVF.
			data to disk E. same disk as before,
			old DATA1 renamed to DATA0
			sampling rate now 30 seconds.
			0719 - time reset
			0805. sampling rate back to 5,25.
			sampling rate is also screen update rate
			& steering update rate.
			- Would help if sampling rate could be longer!
			0819 - sampling rate to 10,40
			- cycle lock enabled.
1600	—		GLORIA recovered - drifting
1037		—	F6 - Disc off.
1709			Disc on
			J.D. 088
1821z			Gloria, magnetometer in water - resume survey
			Nav printer on, writing to disk
			Co 55°, SP 5 kts
1908			reset time
			JD 089
0129			manually changed Disc (CHDS) disc#2 has 6161 records
0346			time reset.

TAPE #	START	END	COMMENTS AND OBSERVATIONS
			J.D 089
0517			A/C → 072°
0552			DISK ON DRIVE F: DATA2 PRINTER ON
0700			Record # 1999 39° 56.769 69° 11.2474
1552			Record # 5190 Stop program (F1) write EOF
			→ change L/C stations from 9960 X, Y
			to 9960 W, Y (new baseline of X)
			Re initialize NAVF
			9960 W (Caribou) and Y (Carolina Beach)
			ASF W 1.0
			Y 2.4
			Sample rate 10 s Filter 50 s
			print every 5 m
1607			logging on a new disc (F) (Disc # 4)
			Remove disc # 3 (≈ 5200 records)
1615			Record # 52 φ 40 21.158 λ 67 30.421
1826			A/C → 047°
DAY 090			
0109			End Line # 1 A/C stbd.
0114			A/C steady on 129 °T
0200			A/C stbd. End short line (# 1A)
0207			steady on 225 °T Begin Line # 2
0445			on course 225 °T Record # 4550 φ 40 46.5086
0948			AC → 253 λ 66 23.5846
1313			7600 records on Disc # 4 (F) Auto switched to E
1400			weak signal from 9960 Y (Carolina Beach)

TAPE #	START	END	COMMENTS AND OBSERVATIONS
1513			stop logging 9960 W, Y
			Carolina Beach (9960 Y) is off air
			EOF on. Disk #5, (DATA 3)
1652			Turn Printer off 9960.
			— Northstar — switched to WX.
1737			— swapping chains around to get printout
			DISC CA2 was in Lower Accufix
			exited. (DATA Ø)
			— reinitialised in Upper Accufix.
1754			— printing out from. L. IBM / U. Accufix
			5930XY 2.1 / 1.4.
			10sec 50secs. (on disk C#2)
1931			— problems with lower Accufix, not stable on the same
			chain (5930) at upper.
			Carolina beach appears to be back.
			~~[illegible]~~
~~1967~~			— Loggin 9960 XY on R. IBM, L. Accufix.
2002			— all stable.
JD90			on disk #5 (already has DATA 3)
			5s / 80s / sampling rate
			— LOGGING 5930XY — amazing we still have it.
			and 9960 XY
			5930 XY — going to printer.
~~[illegible]~~			
			— Northstar switched to 9960XY
			(~1930)
2327			Printer paper jam, cleared

TAPE #	START	END	COMMENTS AND OBSERVATIONS
JD 091			
0216			Time set on North star L/C
			North star using 9960 W, Y
0243			A/C to 271 °T
0247			steady on course 271 °T
≈ 0330			North star using 9960 X, Y
0518			reset 9960 XY time.
0928			stopped logging 5930XY. 5631 records on Disc # C2.
			changing Upper Accufix to 9960 XY.
0948			LIBM. now logging 9960XY ⟹ printer.
			RIBMC (Lower Accufix) stopped logging 9960XY,
			changing Lower Accufix to 5930 XY
			RIBM now monitoring 5930 XY, but not logging
1320			A/C to 236 ; ≈ 1830 A/C to 055 °T
≈ 2320			A/C 090
JD 092			
0100			on course 090 °T
0330			Bad position on 5930 X, Y probably poor
			signal from Cape Race S/N −4 dB
			or because crossing Baseline Ext 5930 X (Nantucket)
~ 0700			automatically switched discs
			data 2 writing on Disk #7 still 9960XY
			reinitialize NAVF – trying to get Caribou now
			not on receiver, so log 9960 XY again.
			(Disk #7 Data 0)

TAPE #	START	END	COMMENTS AND OBSERVATIONS
0744			— initialize Navf. — now logging 9960 WY.
			Disk #8 DATA 1.
			Caribou is ~ 1 dB !
1017			——— now ~ 2 dB
1311			Reset time (it was 1 min slow)
1600			on course ≈ 072 °T
≈ 2240			A/C 033
JD 093			
			logging 9960 W, Y
0140			A/C 056
0447			End line 3F (US coverage)
			Write EOF on Disc #8 & remove (7586 records)
0447			Reinitialize Mini nav : using 5930 X Nantucket
			Y Cape Race
* *			Begin Canadian Coverage
			Begin Line C1
			on course 139 °T (4c recvr)
			Bridge is using North star 1 for line navigation
0459			Begin logging 5930 X, Y on Disc ~~#5~~ C3
			Sample rate 10 s filter 50 s printer 5 min
			signal str : X 7 db
			Y 1 db
1300			End line C1
			A/C 084 °T Begin line C1A

(0212) (138)

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 7
1456			A/C to 320 °T End line C1A	
1513			steady on 320 °T Begin line C2	
JD 094				
0055			End line C2 A/C 048	
0103			Begin line C2A on course ≈ 048 °T	
			logging 5930 X, Y	
0206:06			and logging on disc # C3 (7600 records) EOF with auto switch to #C4	
0206:13			Begin logging on disc #C4 5930 X, Y	
			ASF X = 2.1 ; Y = 1.4	
			Sample rate 10 s Filter 50 s Printer 5 min	
0212			A/C to 138 °T End line C2A	
0221			steady on 138 °T Begin line C3	
1235			End line C3 ; A/C to 079° T	
1242			Begin line C3A ; steady on 079°T	
1250			SNR X 8dB Y 4dB (C. Rose)	
1441			End line C3A A/C 319°	
1455			Begin line C4 steady on 319°	
1630			SNR X 9dB Y 5dB	
2313			Disc #C4 Full (7600 records) ; Begin logging on #C5	
JD 095				
0119			End line C4 A/C to 51 °T	
0128			Begin line C4A on course 51 °T	
0245			End line C4A A/C to 139 °T	
0255			Begin line C5 on course 139 °T	
1543			End line C5 A/C 081 °T	

TAPE # JD095 START END	COMMENTS AND OBSERVATIONS
1548	Begin Line C5A on course 081° T
1935	— "Unformated disk in drive E: DATA3."
	? — stopped logging.
	supposedly 7754 records written.
	— presumably did not put EOF
	on disk #C5.
	— file DATA3 apparently has no bytes.
1940	— NAV 5930 restarted.
	disc # C6.
2000	— Bridgewater reports 1-2nm difference between
	Northstar and MNS.
	Nantucket ~~Cape Race~~. 8dB
	Cape Race 6dB
	logging on disc #C7 (C6 has only 1 record ?)
JD096	
1345	low signal strength on 5930 X, (6dB) and Y (0dB)
	Northstar lost lock; Megapulse did not
1350	signal strength on X and Y is good; Northstar
	is back on line.
JD097	on line C7
0333	low signal str. on 5930Y (C. Race)
	status 7 is on Megapulse; Northstar is good SNR 560
0409	End line C7; A/C 041° T
0421	Begin line C7A; on course 41° T
0550	End line C7A: A/C 315° T

TAPE #	START	END	COMMENTS AND OBSERVATIONS
0558			Begin line C8 ; on course 315 °T
1346			L/C SNR Northstar X 940 Y 850
			Megapulse X 8dB Y 6dB
1357			Time adjusted on RHS IBM
2300			EOL C8 ; A/C to 071 °T
2311			SOL C8A ; on course 071 °T
JD098			
0109			End line C8A A/C 135°
0115			Begin line C9 on course 135°
0130			5930 Y (C. Rice) shows status 7 (Warning; signal loss for >10 sec.) It's been like this for past 24 hrs. ; SNR 2dB (OK) (580 (good) on N/Stn) ; station looks good on the other occasions.
1216			switch to DRIVE E #C10
1223			ENTER NEW DISK in DRIVE F #C11
1600			SNR 5930 X 8dB Y 6dB
1642			End line C9 ; A/C to 045 °T
1652			Begin line C9A ; on course 045 °T
1820			End line C9A ; A/C to 316 °T
1830			Begin line C10 ; on course 316 °T
* 2000			Begin logging Megapulse (Right IBM) on ABC system
JD099			
0925			switch to DRIVE ~~E~~ F INSERT DISK C12 in DRIVE ~~F~~ E
1005			END LINE C10 A/C to 070
1017			BEGIN LINE C10A on CSE 070°
1158			END LINE C10A A/C CSE to 134
1206			BEGIN LINE C11 CSE = 134°

TAPE #	START	END	COMMENTS AND OBSERVATIONS
1500			Megapulse Reciever (lower) is reading 10 μs higher on 5930 Y (C. Race) than the upper Megapulse and the Northstar. This is the reciever being logged on ABC. Both stations (X, Y) on both Megapulse recievers show status 7 (loss of signal >10 sec)
See Note Below			SNR X 8dB (960 N/Star) Y 6dB (920) M 8dB (900)
			~~5930 Y logged on MiniNAV (IBM) from 0515 –~~
1536			3rd cycle search enabled on lower Megapulse and 5930 Y (C. Race) immediately reduced by 10 μs; now agrees with upper Megapulse and N/Star.
			TD's on all 3 recievers now agree (both X & Y)
2112			END LINE C11A
2121			SOL C12
~~2146~~			~~[illegible]~~
			MISTAKE ↑ ALREADY DONE @ 0925
			Note
			5930 Y (C. Race) ~~[illegible]~~ jumped 10 μs at about 0515 JD099 (see track plot) and was corrected at 1536 (see above)
			This affected data logged on ABC only. (lower Megapulse)
			The TD's from upper megapulse were logged on the MiniNAV IBM; these are good during this
(disc #C10 & C11)			→ period (0515 – 1536); 5930 Y had not jumped on this reciever (the upper one).

TAPE #	START / END	COMMENTS AND OBSERVATIONS
JD		100
0100		TD's on all 3 recievers agree
		Mini nav IBM logging 5930 X, Y from upper megapulse
		Disc. # C11
		ABC logging 5930 X, Y from lower megapulse
		(via an IBM serial port)
0428		EOL C12 ; A/C 250°T
0434		SOL C13A ; mcourse 250°T
1400		5930 X (Nantucket 12576) on lower megapulse is
		reading 100 μs higher than upper megapulse
		5930 X on upper M/pulse is 20 μs lower than M/Stan
1417		5930 X Y
1420		Upper M/pulse 12572.38 30232.31
		Lower M/pulse 12671.18 30232.54 (late reading)
		N/Stan 12591.9 30232.3
		This started about 1240 JD100 (see track plot
1425		3rd cycle search enabled; 5930 X returns to 3rd cycle
		5930 X Y
* 1430		Upper 12583.27 30242.06
		Lower 12583.14 30242.20 (late reading)
		N/Stan 12583.3 30242.1
		Signals now are correct.
		It appears that while in status 4, (AE – enable
		cycle status; disable cycle jumps) cycle jumps will
		occur although they are not supposed to.

TAPE #	START	END	COMMENTS AND OBSERVATIONS
1430			Status 7 (loss of signal > 10 sec) has been or for extended periods; so after this brief loss of signal it does not settle back on 3rd cycle because cycle jump are disabled (by AE) (status 4)
			From now on receiver to be kept in status 3 (+E enable cycle selection and jumps) except in areas of low signal strength.
1451			End line C13A; A/C 229°T
1453			SOL C13B; or course 229°T
2226			WARNING ON ACCUFIX (#7 on sheet)
			ID 101
0007			ENTER EEZ
0034			PROGRAM OFF.
0035			DISK C12 6499 RECORDS
0040			End Canadian Coverage
0108			Begin USA Coverage; A/C 141°T
			Reinitialize right IBM
0115			Right IBM (and ∴ ABC) start logging 9960 W, Y 9960 W (Caribou, 13000 μs) Y (Carolina Beach 43000 μs)

TAPE #	START	END	COMMENTS AND OBSERVATIONS
0115			ASF's input 9960 W +1.0 μs
			9960 Y +2.4 μs
			sample rate 10 sec
			Filter 50 sec
			O/P to ABC (punta port) 1 min
0121			SOL 4 ; on course 141 °T
			Northstar L/C also on 9960 W, Y
0130			SNR 9960 W 2 dB 600 (M/s)
			Y −1 dB 330 (M/s)
0440			DISC INITIALIZED FS-87 NA DISC #9 9960
			10s/sample 50s/filter W/+1.0 ASF Y/+2.4 ASF
0840			EOL 4, SOL 5
1227			EOL 5, SOL 5A
JD101 2221			EOL 6A
2233			SOL 7 DISC #9
JD102			
0145			Disc #9 full ; switch to Disc #10 (F: Data 2)
0449			EOL 7 : A/C to 000 °T
0455			SOL 7A : on course 000 °T
			m/pulse N/station
			SNR 9960 W 1 dB 350
			Y −2 dB 290
			M 0 dB 450
0558			SOL 8 DISC #10
			redoing portion of a line along the slope; previous
			data was poor — very noisy (during bad weather)

TAPE #	START	END	COMMENTS AND OBSERVATIONS
JD 102			
2253			END DISC # 10
2253			BEGIN DISC #11. DRIVE "E"
2303			INSERT DISC #12 DRIVE "F"
JD 103			
0100			North Star Receiver using 9960 X, Y instead of W, Y; this is good
			Megapulse/IBM still logging 9960 W, Y
			M/pulse N/star
0140			SNR 9960 M 3 dB 590
			W 0 dB 460
			X 7 dB 890
			Y 2 dB 550
0426			EOL 8C ; A/C 180°T
0431			SOL 8D on course 180°T
1400			North Star using 9960 W, Y now
			M/pulse " 9960 W, Y
			N/star appears to work well in selecting the 2 "best" stations for fixing. It automatically selected the best 2 now the time we would have done it manually.
2242			DISC #11 END, INSERT DISC #13 IN DRIVE E
			JD 104
0053			EOL 9B ; A/C to 140°T
0100			SOL 10 on course 140

TAPE #	START	END	COMMENTS AND OBSERVATIONS
0100			lightning storms just south of present position
0400			SNR 9960 M −1dB 305
			W 0 dB 350
			Y −2dB 290
1348			Reset time on both IBM's (out by 1-2 sec)
1705			Disc # 12 is full — 7600 records — removed
1710			Begin logging on Disc # 13 9960 W, Y
0717			EOL 10 ; A/C 204°
0719			SOL 10A O/C 204°
0906			EOL 10A A/C 320°
0917			SOL 11 O/C 320° Weather is poor;
1854			EOL 11 A/C 254° 35-40 Kn. NE wind;
1855			SOL 11A O/C 254° heavy seas
2041			EOL 11A A/C 140°
2049			SOL 12 O/C 140°
JD 105			
0529			EOL 12 A/C 253°
0530			SOL 12A O/C 253°
0725			EOL 12A A/C 320°
0726			SOL 13 O/C 320°
1700			swell is down some but wind is ≈ 25 Kn. from North
* 1700			lower Magapulse is on status 4 for testing; upper is on status 3
			All SNR are good
KB			END DISC 13 7600 RECS
2125			SOL 14 CSE = 139°
2206			FILE DISC # 13 7600 RECS, Add DISC 15 DRIVE E

TAPE #	START	END	COMMENTS AND OBSERVATIONS
JD			106
0100			Status 7 on 9960 y (Carolina Beach
0502			EOL 14 A/C 227°
0510			SOL 14A o/c 227°
0623			SOL 15 o/c 319°
1120			Disc #14 is full — 7600 records
1125			Logging on Disc #15 (E)
			status 7 on 9960 w, y on both megapulse rec.
			JD 107
0826			DISC #15 7600 RECORDS STORED
1013			DISC #17 inserted in DRIVE E
2177			START LINE 18 CSE = 136°
JD			108
0825			END DISK #17 RECN 1034 EOF
			ALL EQUIPMENT SHUT DOWN DUE.
			TO CHANGE OVER OF SHIP'S POWER.
0850			LORAN-C STATIONS ACQUIRED
			PROGRAM RESTARTED ON 9960 CHAIN W.Y
			LORAN-C LOGGING |||| loop around to resume L 18
1430			EOL 18 ; SOL 18A ; 1603 EOL 18A ; SOL 19 o/c 317°
2025			— Power Crash — All IBM's & Accufix off.
			Disc #18 — [no EOF]
			— waiting — no power in lab.
			(XBT system turned off).
2046			H/C + Computer backon - logging on Disk #19
			DRIVE E
2104			2nd IBM - outputting 9960 W/Y
			to ABC at 30 sec rate
2130			looping around to resume L 19 o/c = 140

TAPE #	START	END	COMMENTS AND OBSERVATIONS
2219			Resume L 19 o/c 317°
JD			109
0344			EOL 19
0350			SOL 19A
0551			EOL 19A
0551			Switch to 9960 X (Nantucket) and Y (Carolina Beach)
"			Both Megapulse receivers and North Star are on 9960 X, Y
"			Finish logging 9960 W, Y on Disc #19 (DATA1) 3267 records; write EOF
"			Begin logging 9960 X, Y on Disc # 19 (DATA1A)
"			ABC now logging 9960 X, Y from IBM/Megapulse
			both are 10 sec sample; 50 sec filter
0551			both M/pulse receivers are on 20 sec filter (ie MOZO E)
			North star receiver is 'Forced' to use 9960 X, Y for 4L convert
0558			SOL Lin 20; o/c 137°; logging on Disc # 19 DATA1A
0606			Reset time on right IBM (to ABC) at 30 sec
1630			status 7 on 9960 Y (Carolina) both receivers
1759			End logging on Disc # 19; possibly no EOF for DATA1A
			i.e. 9960 X, Y since 0551/109
1800			Begin logging on Disc # 20 (DATA2)
2306			EOL L 20 A/C 270°; SOL 20A
			wrong waypoint; loop around to SOL 21
JD			110
0155			SOL L21 o/c 317°
* 0500			lower Megapulse (being logged on ABC) is
			tracking 10 μs high on 9960 X (Nantucket)
			showing status 6. This receiver was put in
			status 4 (disable cycle jump) since 1700/105

See printout @ 0400/110 signal loss on master & Y

TAPE #	START	END	COMMENTS AND OBSERVATIONS
0500			After temporary signal loss, the tracking gate may not lock onto the 3rd cycle, but some other (in this case the 4th cycle) and because cycle jump is disabled it can't return to the 3rd cycle where it should be. Again (see 1430/100) this indicates that putting receiver in status 4 for extended periods is not wise.
0517			lower receiver put in status 3 (enable cycle selection) and immediately returned to 3rd cycle (reduced by 10μs). It now agrees with upper mega pulse and North star.
			All SNR's are good
1505			Disc # 20 is full (7600 rec); begin logging on # 21
1519			EOL L21
1523			SOL L21A O/C 270°
1647			EOL 21A A/C 138°
1700			SOL 22 O/C 138°
JD			111
0000			All SNR's are good
0904			EOL 22
0914			SOL 22A
1128			EOL 22A
1133			SOL 23 CSE = 316°
1212			END DISC # 21 7600 RECORDS START DISC #22
1214			ENTER DISC #23 IN DRIVE 'E'
JD			112
0100			status 1 on master (08 on IBM)
0919			END DISC #22 7600 RECORDS START DISC #23

TAPE # 112	START	END	COMMENTS AND OBSERVATIONS
1006			ENTER DISC #24 IN DRIVE 'F'
0500			EOL 23 A/C 229°
0509			SOL 23A o/c 229°
0617			EOL 23A A/C 136°
0625			SOL 24 o/c 136°
2129			EOL 24 A/C 254
2143			SOL 24A o/c 254
2354			EOL 24A A/C 315°
SD			113
0004			SOL 25 o/c 315
0625			END DISC #23 RECN 7600 DR E
0626			START DISC #24 DR F
1757			EOL 25 A/C 090° ; Finish Regular Coverage
1839			SOL 26 o/c 090° ; Begin Fill-ins ; check line.
2130			status 7 on 9960 Y ; no cycle jumps occurred
2300			cleared status 7
SD			114
0040			EOL 26 A/C 180
0048			SOL 27 o/c 180
0330			Finish Disc # 24 (7600 recs) ; Begin disc # 25 (EOL 27)
0532			EOL 27 A/C 084°
0538			SOL 28 o/c 084°
2235			— QUIT LOGGING
			Disk #25 170 records
			END LEG 3

TAPE #	START	END	COMMENTS AND OBSERVATIONS	PAGE 20
			? something funny about disks 25 & 26	

TAPE # | START | END

COMMENTS AND OBSERVATIONS

NORTH STAR 7000 TD'S

TD	GMT TIME	9960			
		Caribou W	Nam. X	Beach Y	
092/87	1610	13692.5	25042.2	43200.3	
	1620	13681.4		43202.2	
	1630	13670.4		43204.1	
	1650	13648.7		43207.3	
	1700	13637.6		43209.2	
093	0210	13130.1		43381.3	
	0220	13120.0		43385.3	
	0230	13109.9		43389.9	
	0240	13099.7		43394.1	
	0255	13084.5		43400.3	
	0300	13079.4		43402.4	
	0325	13053.9		43412.5	
	0330	13048.7		43414.7	
	0440	12978.6		43442.6	
		5930	X (Nam)	Y (C. Rock)	
093	0530		11999.9	30495.9	TD [illegible] with Megapulse
			9.86	6.09	
094	0400		12164.8	30348.2	
			4.78	8.39	North Star is
	0445		12159.2 (9.16)	30309.2 (9.47)	0.2 high on Y
	0450		12158.4 (8.38)	30304.9 (5.05)	SNR = 400
096	1435		12515.7 (5.60)	29918.1 (8.25)	
		9960	W (Caribou)	Y (Carbonbeach)	
106	1710		13825.2 (.14)	43051.6 (.51)	