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Institute of
Oceanographic Sciences
Deacon Laboratory

INTERNAL DOCUMENT NO. 326

Operational Procedures for Cumulus Surface Flux Measurement Programme.

Birch, K.G.& Smith, P.K.

1993

Natural Environment Research Council

INSTITUTE OF OCEANOGRAPHIC SCIENCES
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This report is a practical guide which should enable all tasks associated with a visit to carried out with only reference to this document. The contents detail the visit, including logistical constraints, computer software commands, and sample documentation forms.

KEYWORDS

Cumulus, MultiMet, GPS, Fluxgate

Solent Sonic Anemometer

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OPERATIONAL PROCEDURES FOR CUMULUS SURFACE FLUX MEASUREMENT PROGRAMME.

1. ABSTRACT

The report documents the procedures that are utilised over the period of a Cumulus Visit. Clarification of the tasks and timescales enables all the stages of the performed in a controlled manner with each person involved understanding the context of their part in the task list.

This report is a practical guide which should enable all tasks associated with a visit to be carried out with only reference to this document. The contents detail the visit, including logistical constraints, computer software commands, and sample documentation forms.

2. OVERVIEW

The report documents the procedures and individual tasks that are associated over the period 'before', 'during', and 'after' a Cumulus Visit. The visits, which occur at regular time intervals of usually five weeks, total eleven in each calendar year.

To produce quality data, which is independent of the individual operators input, standardisation of operational procedures is essential. Clarification of the tasks and timescales enables all the stages of be performed in a controlled manner with each person involved understanding the context of their part in the task list. Whilst the tasks are documented as for an individual visit, this must be set in the context of each visit being part of a continuous process of visits.

Failure to comply with the proceedures in 'content or timescales' has severe penalties to all involved, and is a position from which it is difficult to recover without significant manpower.

This standardisation of details documented will help to ensure that the relevant information is recorded. The structured documentation acts as a guide to completion of the tasks ensuring continuity through each of the four individual systems tasks.

3. INTRODUCTION

3.1. History of Ship

Cumulus was originally operated and owned by the Netherlands, as part of the Internationally supported North East Atlantic Organisation (NEAOS) agreement, until funding problems caused their withdrawal. The ship was then sold to the MOD(Met Office) for One Pound and has been operated since then as the sole Met Office Weathership. The Cumulus continued under the UK contribution as part of the NEYOS operations until the agreement was terminated. Since then Cumulus has been funded directly by Met Office, although its management is controlled by J.Marr under contract to the Met Office. The life expectancy of Cumulus has varied throughout the time that we have been associated with its operational use.

Conditions of the purchase agreement with the MOD was that the ship would be sold back to the Netherlands at the termination of Met Office operational requirements

3.2. Area of Operation

Cumulus operates in a free drifting mode within a 20 mile diameter circle at Weather Station Lima, Lat. 57.5 N and long 20 W.

The ship drifts portside to windward in moderate or low wind conditions, turning head to wind in strong wind conditions, making as little way as possible.

The port call dates for this year are in Appendix B.

3.3. Meteorological Office Personnel

Capt. Gordon Mackie - Head of Port Met Officer Operations.

Capt. Mackie is the Section Administrator for the Port Meteorological Officers. He is responsible for the placement of the ship management contracts through MOD Bath.

Capt. Stuart Norwell

In December 1993 he became responsible for Cumulus operations, taking over from the Liverpool Port Meteorological Officer Albert Brittain, who retired at the end of December 1993.

3.4. Shipboard Meteorological Observation

The routine operational '1 hourly' meteorological measurements are made by the ships Meteorological staff. These data are manually recorded, and also transmitted via a satellite link to the Meteorological Office at Bracknell.

At the completion of each cruise a photo copy of the meteorological logs sheet is provide to the IOS. This provides an early opportunity to use this data for inter comparison with other systems measurements. Subsequently the data is obtained from the Meteorological Office on computer storage media. The meteorological logs sheet detail parameters in some fields to greater accuracy that the computer media .i.e '1' minute resolution compared to).1 degree.

4. IOSDL CUMULUS WORK

4.1. History of Operations

MultiMet was first deployed on Voyage 19 sailing on 15th October 1987 and has been in continuous operation since that date. Throughout this period we have manned only three cruises, Voyages 19, 22 & 30.

When the IOSDL usage was first initiated the life expectancy of Cumulus was only until spring 1989, however this was extended a further year until 1990. A further extension was negotiated with a new Management contract agreed with J.Marr lasting until early 1992. which was again renewed in 1993. The 1992 agreement marked the change over to total manning of the ship by Marr's personnel.

At the commencement of work on Cumulus a major consideration was that the ship must not be altered or damaged in anyway, as at the end of Met Office usage it was to be sold back to the Dutch.

5. SYSTEMS INSTALLATIONS

There are four measurements systems for which IOSDL is operationally responsible. these are : -

5.1. MultiMet Slow Sampling

This collects means meteorological variables for '1 Minute' and stores data to Sea Data Tape. A system has been continuously deployed on the ship since Voyage 19, with the logger hardware changed once during this period.

5.2. Sonic Wind Stress Measurements

This is normally operational for the period Autumn through to Spring, as the window of interest is for high winds. The system is based on a high frequency response Solent Sonic anemometer . Sampled by a PC Processor for tens minutes, the data is then processed with results stored to hard and floppy disc.

The data sampling commences at the start of each quarter hour and produces two different format output messages for each storage media. A subset of the spectral data is stored on the floppy disc drive, with the full analysis stored on the hard disc.

5.3. Shipborne Wave Recorder

Installed as part of Taunton Wave work but is now funded as part of Wind Stress program. A contract with J.Driver is organised on an annual basis for servicing etc.

At the beginning of 1990 an NEC 286 PC Processor was installed, which routinely collects data, processes, and stores the wave spectra to hard disc. A hard copy output is also available of Significant Wave Height(Hs). This was primarily put in for the benefit of the Met Observers who require this measurement as part of their Hourly Observations.

Three spectral datasets are collected each hour, starting on the hour, twenty past and twenty minutes to each hour.

The recording of SBWR data is only required when the Fast Sampling is operational i.e. autumn to spring.

5.4. GPS & Fluxgate Compass Recording System

System components are : -

a) GPS single channel receiver.

b) Fluxgate Compass, self calibrating.

c) PC clone.

The serial output of each sensor is controlled via a dual input RS232 card into the PC. The software samples the datasets and stores formatted data to the Hard and Floppy discs at '1 minute' and '2 minute' intervals respectively.

6. COMMUNICATIONS

Data communications for the Met Office observations are sent from the ship on an hourly basis. From the middle of 1990 the Hourly observations were routinely sent by Satellite, but there is still the previously used HF system, if required. The HF system can cause unpredictable results in all ships systems due to the quality of the ships mains wiring and power levels of the signals transmitted.

7. PORT VISITS

The visits to the ship at all port calls only are essential when the Fast Sampling and SBWR systems are recording data. This is a media storage limitation, although there may also be sensor replacement/servicing that is necessary. The Slow Sampling is continually operational, with the Met Office staff overseeing the equipment in our absence. The Senior Met Officer will collect the Voyage MultiMet tape and documentation ,when IOS staff do not visit at a Port call.

8. VISIT TASKS

A series of Forms (Appendix C - F) describe in more detail the tasks to be carried out before, during and after a Visit to the ship. Notes concerning detailed operations of the computer system(s) are also included (Appendix H).

Data replay depends on hardware systems which are only available at Wormley, i.e. Sea Data, SBWR quick look. Hence the replay/processing will be carried out by the Rennell Engineers at Wormley. The processing is important as a diagnostic tool to evaluate the sensor performance and therefore must be completed immediately after each visit. Skills required for the data processing are that staff must be literate in SUN/Mainframe/PSTAR and with NCS ID's

9. LOGISTICAL CONSIDERATIONS

For the duration of our work the Cumulus, apart from refits, has always operated out of Greenock. However with the new Meteorological Office deployment policy it may operate in areas other than Weather Station Lima, if moved south it is likely that Pembroke will be the 'Port of Call'.

An IOS car has been booked for Monday - Thursday of the week during which Cumulus docks. This applies for all known docking periods as in Appendix B. This should cover the periods necessary for visits by road or air to Glasgow or by road to Pembroke.

9.1. Points of Contacts

Name	Title	Address	Contact Numbers
Capt. Gordon Mackie	Marine Superintendent and Branch Director Observations(Marine)	Meteorological Office, Scott Building, Eastern Road, Bracknell, Berkshire.	tel. 0344 855654, fax. 0344 855921.
Cumulus cell phone			tel. 0836 261513
IOSDL			tel. 0428 684141 fax. 0428 683066
J. Marr			tel. 0482 27873
John Driver		Sedge Systems The Old Squire, North Curry, Taunton TA3 6LX	tel. 0823 490198, fax .0823 490126
JRC Chilworth			tel. 0703 766184 fax. 0703 755777
Met Team cell phone			tel. 0860 689029
Stuart Norwell	Ocean Weathership Officer	Meteorological Office, Scott Building, Eastern Road, Bracknell, Berkshire.	tel. 0344 855913
not yet appointed	Glasgow Port Meteorological Officer	Navy Buildings, Ebdon Street Greenock Strathclyde PA16 7SL	tel. 0475 892838 or 0475 24700
not yet appointed	Liverpool Port Meteorological Officer	Room 218, Royal Liver Building, Liverpool, L3 1HU	tel. 051 236 6565 fax. 051 227 4762

10. VISIT TASKS & TIMESCALES

The forms that are included in this report will help individuals to maintain task continuity. The overall tasks must however be seen as part of 'not just as a single visit', but as part of the overall dataset collect for all systems throughout the year. The Cumulus dataset is collected when all systems are sampling, and cannot be considered as achieving the targets when one or more system is not operational.

The aim of the forms is to provide reminders to staff and also to convey to other staff a record of the work that has been completed. During a usual visit cycle at least two staff will be involved, but it is not exceptional for more than two to have some involvement.

For these reasons the completion and circulation of the forms is necessary to ensure all members of the Team are aware of progress and constraints. By ensuring that all in the Team are informed, diagnosis of possible problems or the implementation of solutions will be realised within the shortest cycle time.

Technological tasks in support of the Cumulus programme can be considered in three groups : -

1) Visit tasks, including pre-visit and post visit

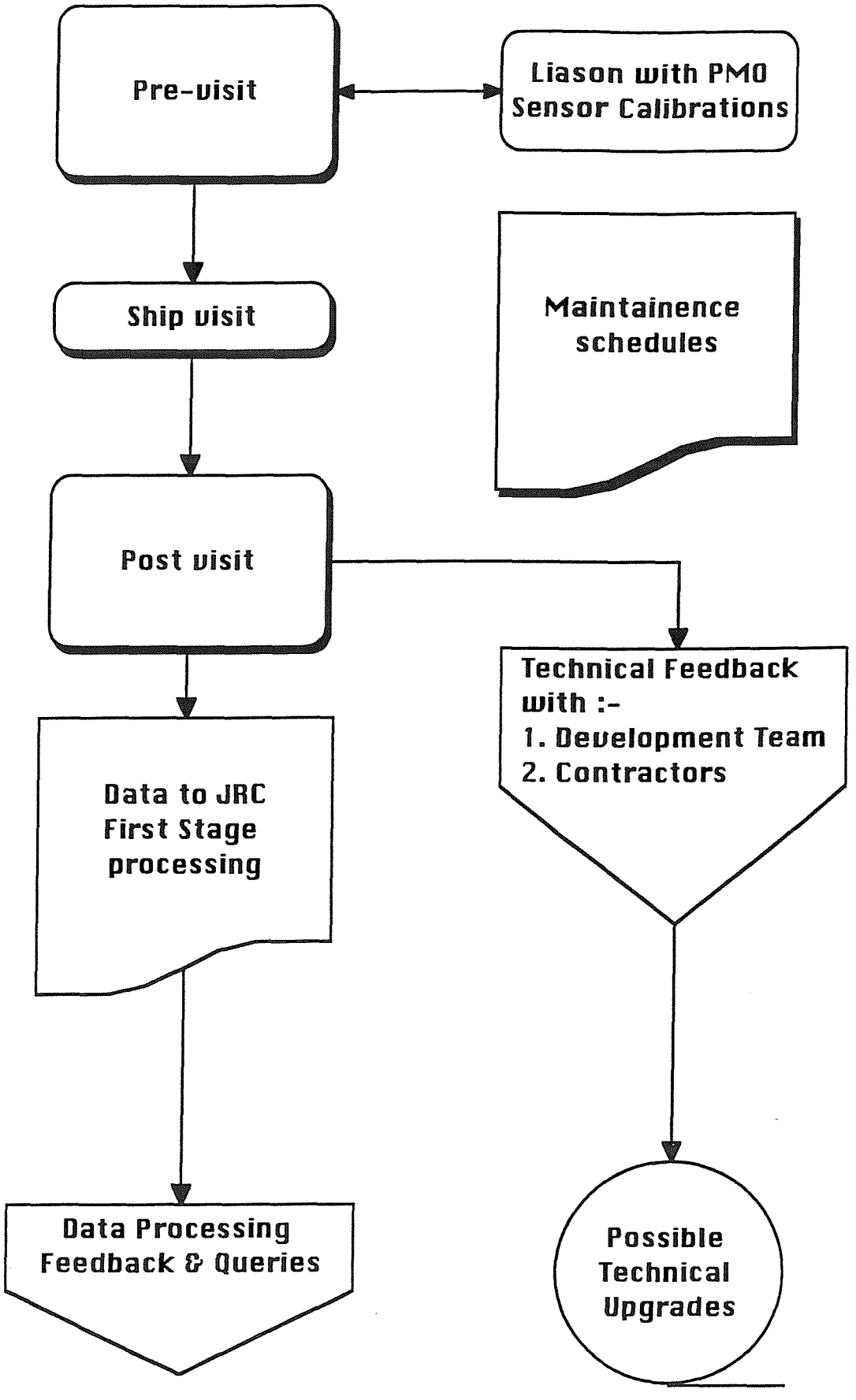
2) Maintenance tasks, i.e. re-wiring etc.

3) Development tasks, i.e. systems upgrades

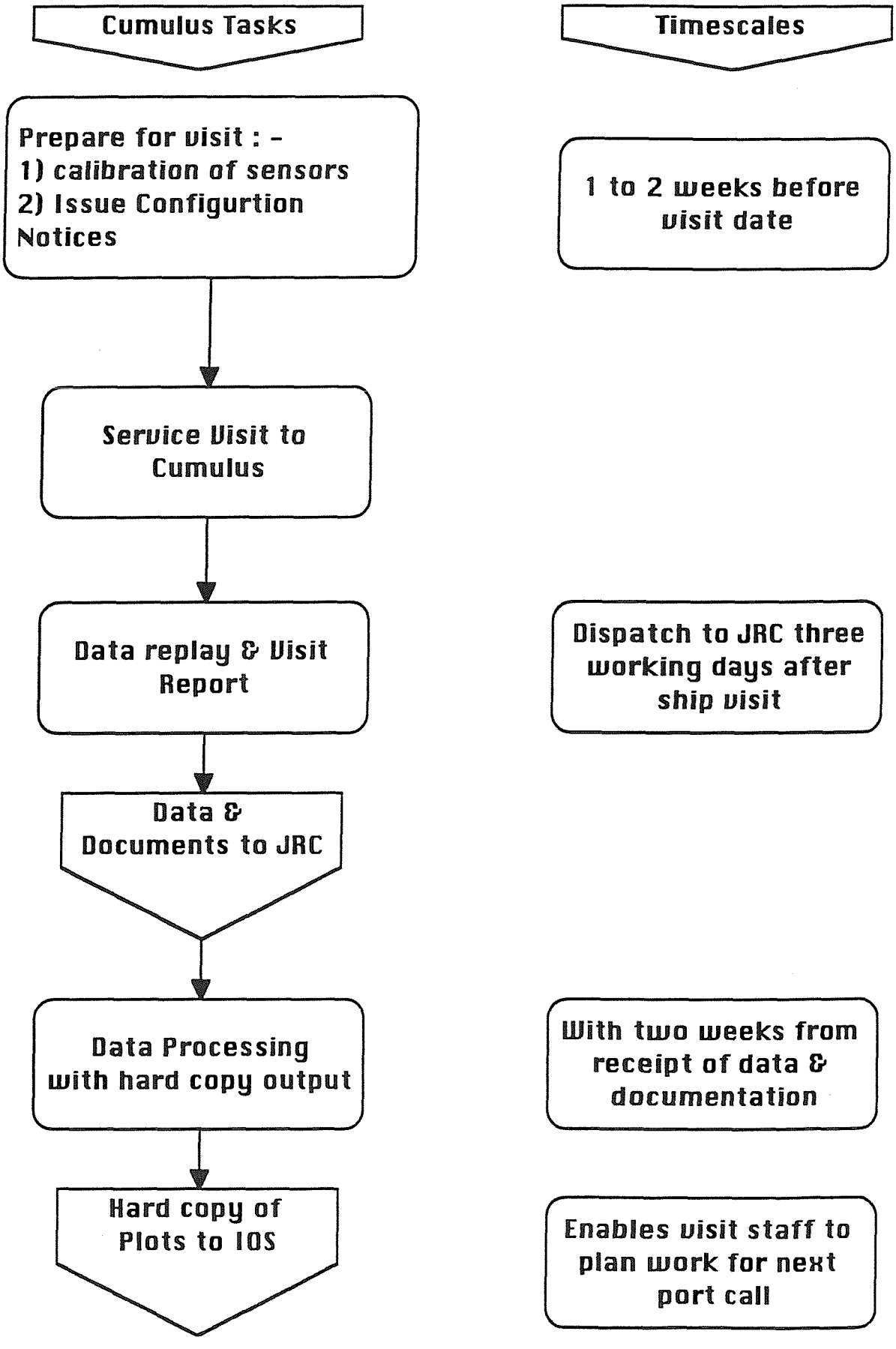
The flowcharts show the context of tasks to one another and show the timescales. The importance of the timescales cannot be over stated. Each member of staff is crucial in the cyclic process of collecting the dataset, with an individual failures only highlighted when deficiencies are recognised often some months later in the data quality.

The situation where team members undertaking tasks change cannot be treated simplistically. There must be a clear understanding 'at all times' of current status of tasks and systems constraints, this implies that all documentation needs to be kept clearly informative and neither vague or out of date.

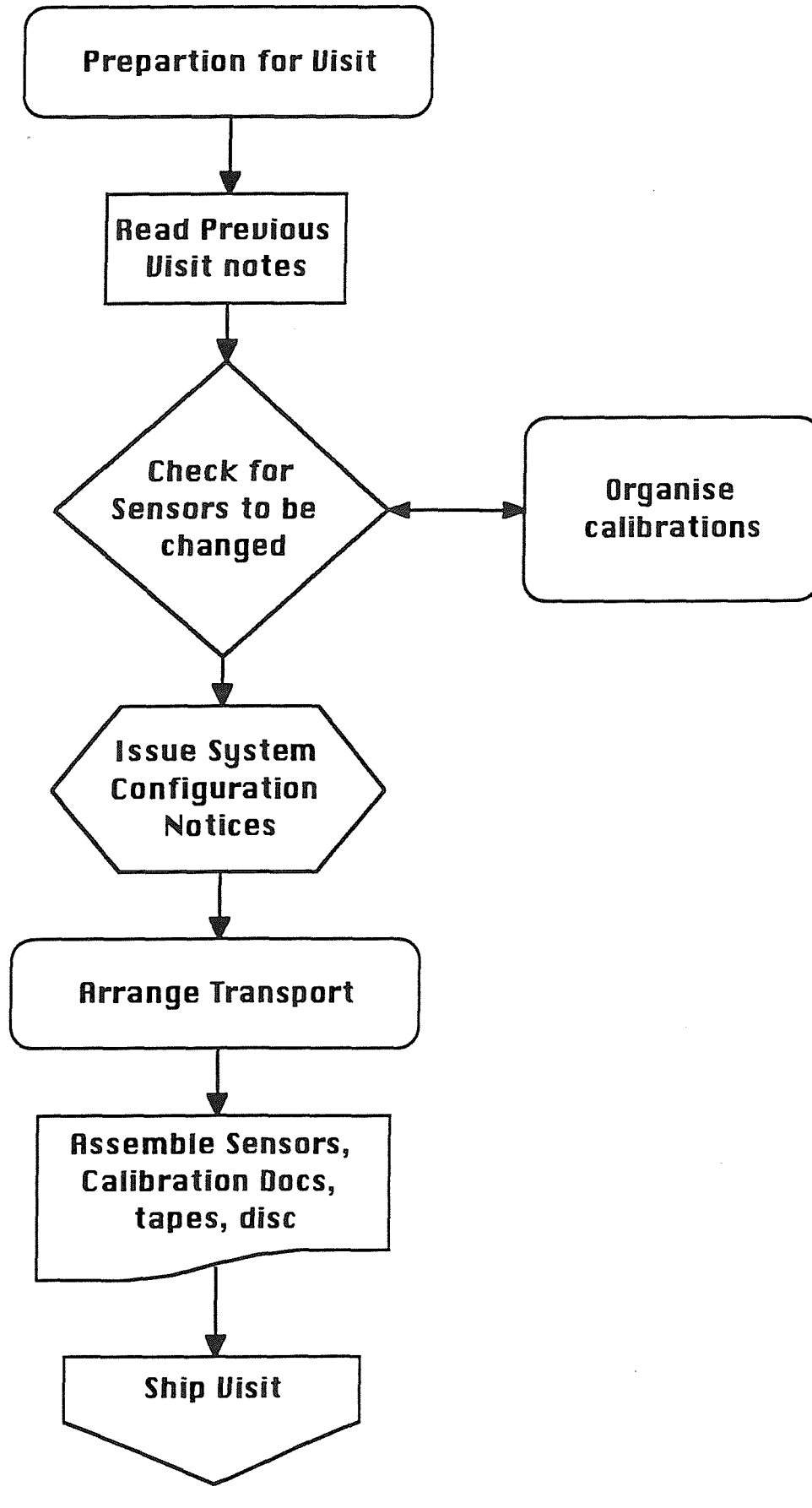
10.1. Flow diagram of Tasks Overview



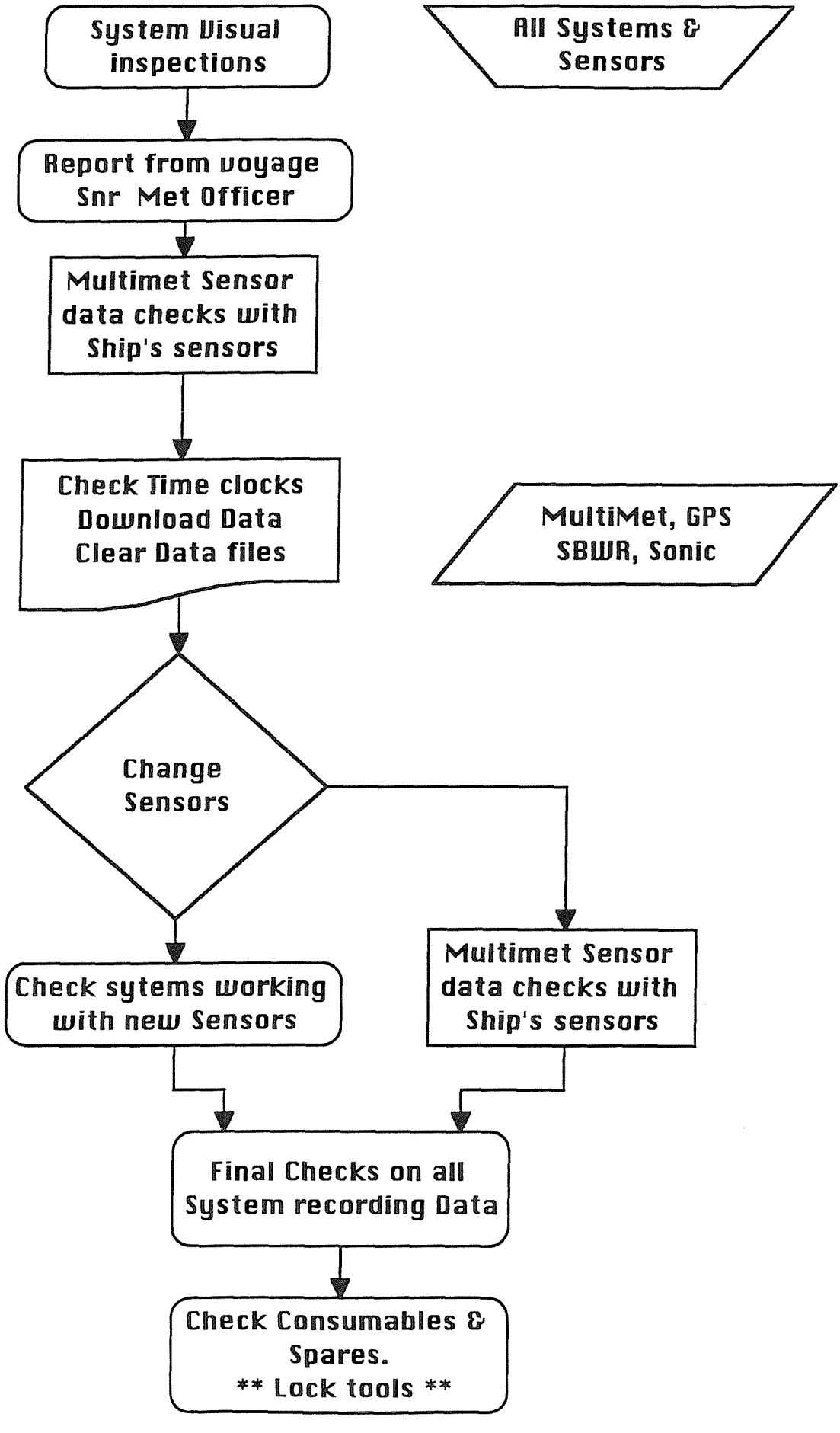
10.2. Flow diagram of Tasks and timescales



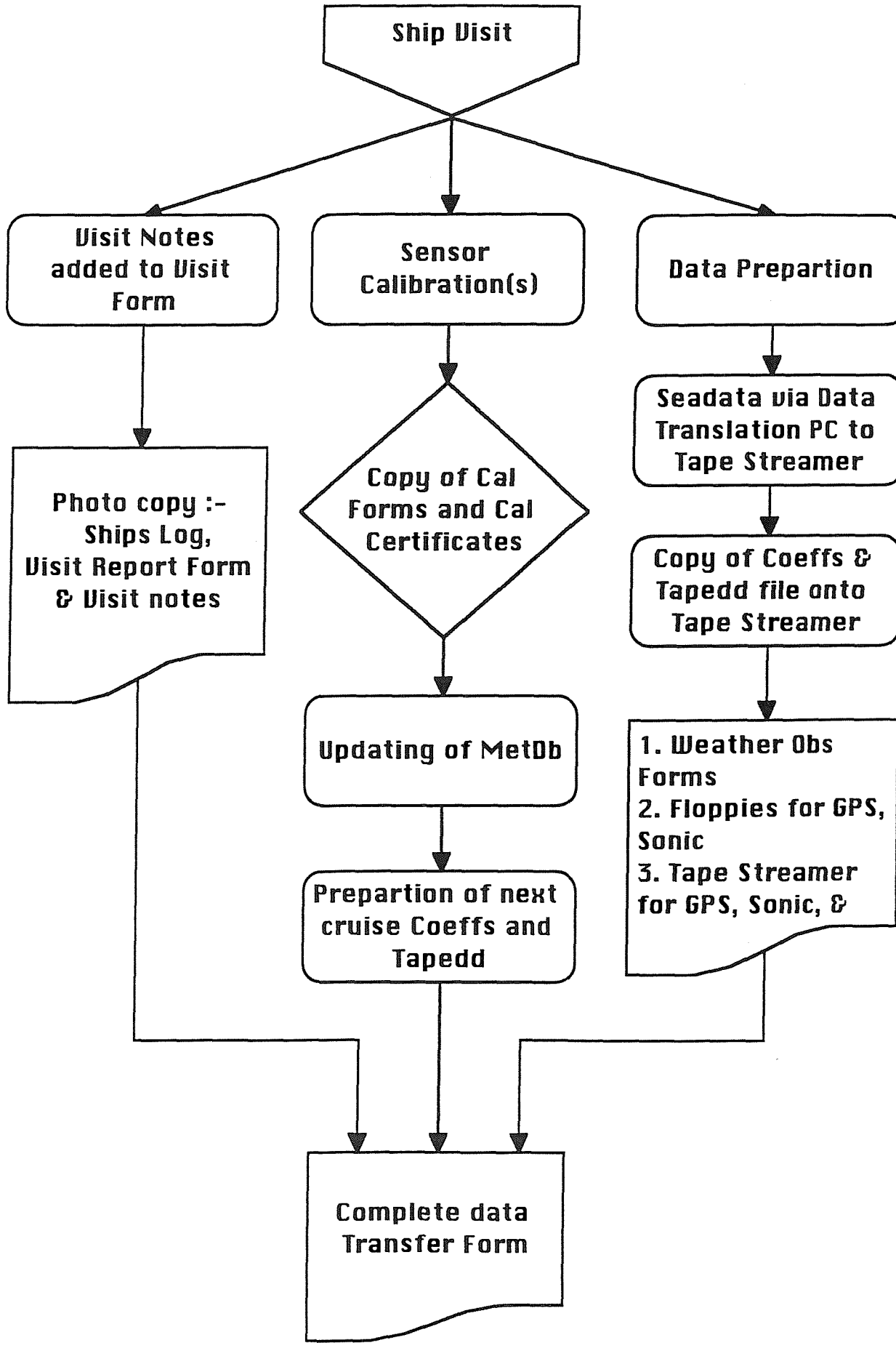
10.3. Flow diagram of Preparation for Visit



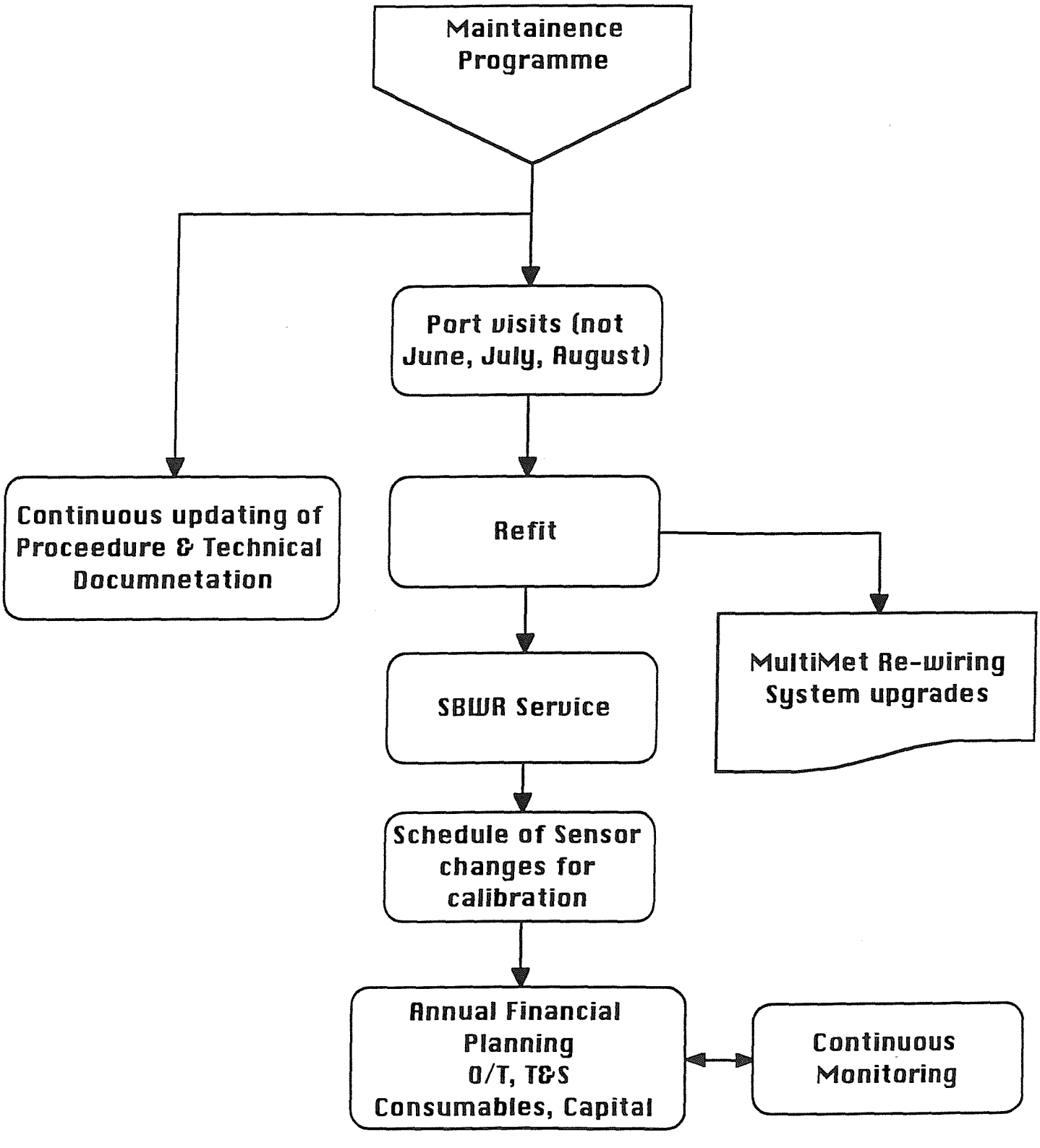
10.4. Flow diagram of Ship Visit



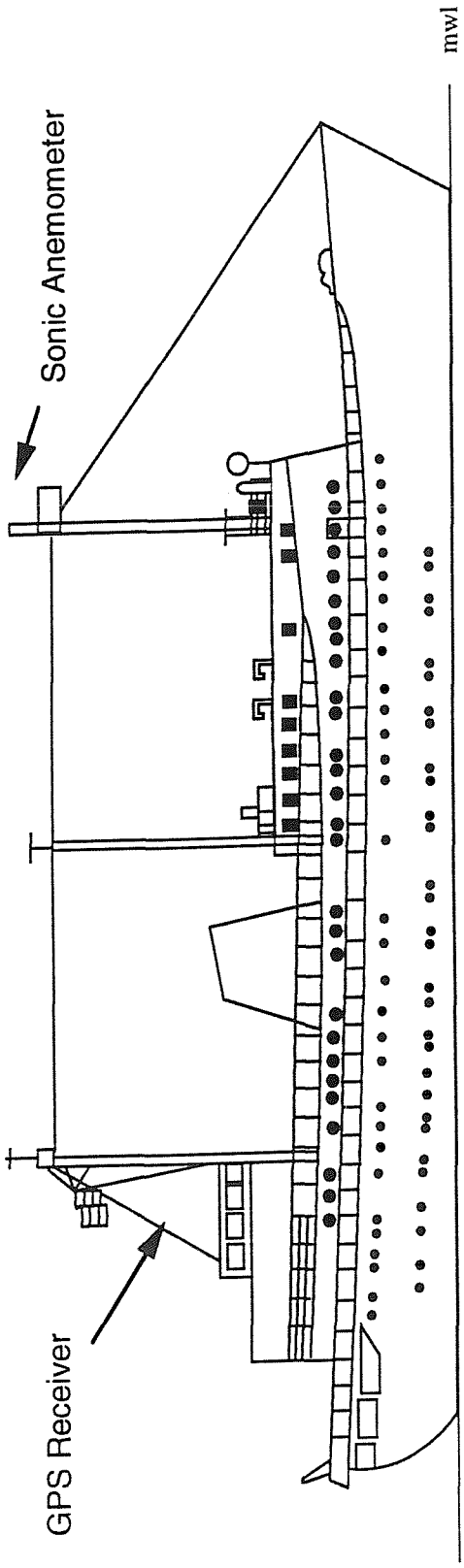
10.5. Flow diagram of Post Visit

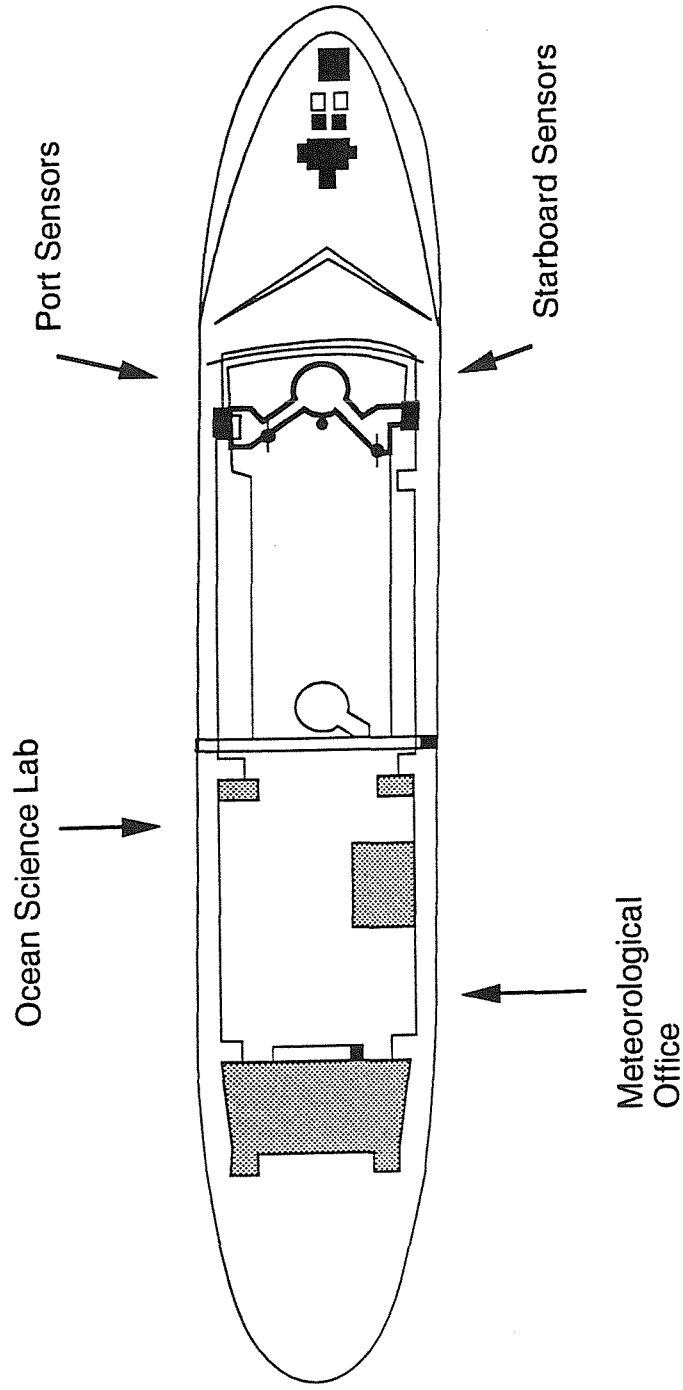


10.6. Flow diagram of Maintainence Schedule



A.1 APPENDIX A - SENSOR POSITION ON CUMULUS


mwl
Sonic Anemometer
GPS Receiver


Port Sensors
Starboard Sensors
Ocean Science Lab
Meteorological Office

B.1 APPENDIX B - SAILING SCHEDULE

CUMULUS SAILING SCHEDULE TO END OF 1994

Voy No.	Dep Home Port	Arr Station	Leave Station	Arr Home Port
82	Thur 02.12.93	05.12.93	01.01.94	Tue 04.01.94
83	Thur 06.01.94	09.01.94	05.02.94	Mon 07 ~~Tue 08~~.02.94
84	Thur 10.02.94	13.02.94	12.03.94	Tue 15.03.94
85	Thur 17.03.94	20.03.94	16.04.94	Tue 19.04.94
86	Thur 21.04.94	24.04.94	21.05.94	Tue 24.06.94
87	Thur 26.05.94	29.05.94	25.06.94	Tue 28.06.94
		DRYDOCK		
88	Thur 07.07.94	10.07.94	06.08.94	Tue 09.08.94
89	Thur 11.08.94	14.08.94	10.09.94	Tue 13.09.94
90	Thur 15.09.94	18.09.94	15.10.94	Tue 18.10.94
91	Thur 20.10.94	23.10.94	19.11.94	Tue 22.11.94
92	Thur 24.11.94	27.11.94	24.12.94	Tue 27.12.94

The Marine Superintendent
Meteorological Office
Met O(OM), Scott Building
Eastern Road, Bracknell
Berkshire RG12 2PW
TEL: 0344 856554
FAX: 0344 855921
TELEX: 849801

C.1 APPENDIX C - LOGISTICS OF CUMULUS VISITS

C.1.1 Transport

C.1.1.1 Visits to Greenock via Glasgow

By IOS car to Heathrow Airport, parking in the Long Term Car Park. Then by Shuttle to Glasgow, on arrival collect baggage and the hire car keys from the hire company kiosk at the terminal entrance, also collect car telephone. Driving Licence will be needed and credit card may prove useful.

The hire cars are parked near terminal entrance. Drive to Greenock Container Berth and park near Cumulus.

C.1.1.2 Visits to Pembroke or Refit Port

These are usually made in an IOS/Hire car.

Note An IOS car should be available(if previously booked), but check with Transport Section. Air Tickets and Hire Car for Glasgow should be booked through Group Secretary.

D.1 APPENDIX D - VISIT PREPARATION FORM

Cumulus Visit Cruise

Date of Visit _____

Port of call _____

Cumulus Check List

1. Check Transport

Air Ticket	
Car Hire	
Cell phone	

2. Check Z88 Computer

Z88	
Serial Cable	
PSU	

3. Sensors

Deployed		Replacement	
Serial Number	Calibration Cert.	Serial Number	Calibration Cert.

4. Consumables -

Sea Data Tape	
Data Cartridge DC2120	
Printer Ribbon (Epson FX80)	
Bootable 3.5" (DS HD) with GPS Software	
Photo Copier Paper (A3)	
Battery 'AA' 4 off Duracell MN1500	
Wicks Fan Motors	

5. Software : -

NEC SETUP disk	
GPS Program Software	
Sonic Software	
BPBackup Software	

E.1 APPENDIX E - VISIT REPORT FORM

Cumulus Visit Report

Cruise number _____

Date of visit. _____

Visit by (name). _____

Port of call _____

1.1 Collect from Ship

IOS Ships Log		
MultiMet Tape		
Met Office Log Sheets (copy)		
SBWR Test Chart Roll		
SBWR Test sheet		

MultiMet sensor Checks

Time Date

Channel	Sensor	MultiMet	Met Office
Ch. 1	Sonic U		
Ch. 2	Sonic V		
Ch. 3	Sonic W		
Ch. 4	Sonic ref.		
Ch. 6	Air Pressure		
Ch. 7	Port Wet		
Ch. 8	Port Dry		
Ch. 9	Stbd Wet		
Ch. 10	Stbd Dry		
Ch. 11	Port Wind Spd		
Ch. 12	Stbd Wind Spd		
Ch. 13	Port Wind Dir		
	SST Port		
	SST Stbd		

2.1 Tasks

Sonic Fast Sampling System

Check Time, Software Clock	
Reboot - Check Time Hardware Clock	
Copy Data from Hard Disk to Tape	
Delete Data from Hard Disk	
Correct time	

SBWR

Check Time, Software Clock	
Reboot - Check Time Hardware Clock	
Copy Data from Hard Disk to Tape	
Delete Data from Hard Disk	
Correct time	

GPS & Compass

Check Time, Software Clock	
Check Mode	
Compass	
Stop Logging Alt F2 Caps Lock 'On'	
Reboot - Check Time Hardware Clock	
Remove Bootable Floppy with data	
Insert Bootable Floppy with GPS Software	
Correct time	

MultiMet

Power LEDs working	
Tape Transport moved	
Time Check	
Time Corrected	

3.1 Change Sensors

Deployed		Replacement	
Sensor Type	Serial Number	Sensor Type	Serial Number
Pt Psy			
Pt W S			
Pt W D			
Stbd Psy			
Stbd W S			
Sonic			

Check on MultiMet Sensors after Change

Time Date

Channel	Sensor	MultiMet	Met Office
Ch. 1	Sonic U		
Ch. 2	Sonic V		
Ch. 3	Sonic W		
Ch. 4	Sonic ref		
Ch. 6	Air Pressure		
Ch. 7	Port Wet		
Ch. 8	Port Dry		
Ch. 9	Stbd Wet		
Ch. 10	Stbd Dry		
Ch. 11	Port Wind Spd		
Ch. 12	Stbd Wind Spd		
Ch. 13	Port Wind Dir		
	SST Port		
	SST Stbd		

Met Office Comments

Visual Inspection

6.2 Brief Description of Met Conditions

7. Next Visit

8. Follow up Action Required On :-

Tool Kit Check

Light Duty Cutters		Flat Needle File	
Heavy Duty Cutters		Round Needle File	
Bent Nose Pliers		Square Needle File	
Crimp Tool		Half Round Needle File	
Retractable Knife		Three Square Needle File	
Small Screwdriver		Equalling Needle File	
Medium Screwdriver		Hand Drill	
Large Screwdriver		1.5 mm. Drill	
No. 0 Posidrive		2 mm. Drill	
No. 1 Posidrive		3 mm. Drill	
No. 2 Posidrive		4 mm. Drill	
Allen Key Penknife		5 mm. Drill	
10 mm. Spanner		5.5 mm Drill	
11 mm. Spanner		6 mm. Drill	
13 mm. Spanner		3 m. Tape Rule	
14 mm. Spanner		3" Vice	
16 mm. Spanner		Soldering Iron	
17 mm. Spanner		Desoldering Tool	
19 mm. Spanner		Soldering Iron Stand	
Small Adjustable Spanner		10 m. Mains Extension Lead	
Large Adjustable Spanner		Padlock	
4 oz. Hammer			
Right Angle Hacksaw			

F.2 APPENDIX F - POST VISIT FORM

Post Cumulus Visit

Name _____

Date of Visit _____

Port of call _____

Date

1.1 Returning Sensors

Entered in Sensor Management System	
Sensors Re-Calibrated	

(See notes on Returned Sensors)

2.1 Voyage Calibration Form completed

3.1 Copy from Z88 to PC Disc :-

Z88 BASIC Monitor Software

4.1 Photo copy : -

IOS Ships Log	
Visit Report 2 copies	
Voyage Calibration Form	

5.1 Tape Replay

Replay Sea Data Tape to PC	
Tape Streamer copy	

8.1 Insert into Ships Log File : -

IOS Ship Log Sheets	

8.2 Insert into Calibration File : -

Voyage Calibration Form	

8.3 Insert into Visits File : -

Cumulus Visit Form	
Visits Report Form	
Visit Report	
Post Cumulus Visit Form	

Extra Items

Items highlighted from the previous Visit report

G.3 APPENDIX G - LISTING OF CUMULUS ITEMS TO BE SENT TO JRC

Visit Report	
IOS Ships Log	
Met Journal	
SBWR Test Roll	
SBWR Report Sheet	
SBWR Log Sheet	
Calibration Sheet	
Tapedd Sheet	
Coeffs Sheet	
Sonic Weekly Backup Tape	
Sonic / SBWR / Multimet Backup Tape	
GPS Data	

Date _____ Name _____

H.1 APPENDIX H - OPERATIONAL NOTES

H.1.1 Multi Met Logger

H.1.1.1 Data Check

Check the logger initially by observing that all DC. power LEDs are illuminated and that the data LED above the tape transport flashes once per minute and the tape transport moves.

Connect Z88 mains adapter before turning the Z88 on, this must be done before and not after turning on the Z88 as the power source is determined at the time of 'power on'.

Data are sent from the logger via the RS232 port on the CPU card. To display an data connect the data lead to Z88 to the front panel connector.

Press:

Shift + Shift	Both shift keys together will 'power up' the Z88

H.1.1.2 Starting from Index Menu

Starting from the Index Menu on the Z88 select the BASIC application using the ARROW KEYS.

Type:

LOAD ":RAM.1/ZCnn.BAS"	to load BASIC program, where 'nn' is cruise number
RUN<cr>	to start BASIC program

The data should be transmitted within 1 minute. The Z88 will display the data for the first 8 channels. Make a note of the readings on the Visit Report form.

Press:

Space Bar	the remaining 8 channels are displayed and should be noted.

The space bar toggles between channels 1-8 and 9-16.

A few seconds before the data is received the display will freeze. Compare the data against the readings in the Met Office and enter these on the form. There will be some small differences but large errors indicates a sensor failure.

If the data fails to be displayed, check the Z88 baud rate (see Appendix 2). If the baud rate is correct, reset the Slow Logger with the reset button on the CPU board, and then RE-RUN the Basic program.

H.1.1.3 Time Check

To stop BASIC program

Press :-

ESC	Prompt character displayed

To enter TERMINAL mode

Press :-

1) Index Key	Display shows Index Menu
2) Arrow key<cr>	Select Terminal Mode

3) Reset logger on seconds = 59 by pressing the reset button on the CPU card near the RS232 connector.

4) Wait for one min for the 82 CHAR data string to be displayed, the first 17 characters will be in the format "S00YYMMDDhhmmss00" and include the time word. The Time Word is generated exactly 1 second after the reset button is pressed, therefore if the time is correct the seconds will read 00. If in error by more than 15 seconds then the Logger clock must be reset to the correct time.

H.1.1.4 Reset Time

1) Press reset button on the CPU card while holding in button on the front panel. This will cause the logger to go into the clock routine.

This requires the operator to enter the date and time into the Z88 in the following format.

2) ss,mm,hh,dd,MM<cr>

Note new date/time must be entered in less than 10 seconds!, as the watch dog circuit will reset the logger, if the occurs repeat the procedure until the Time is correct.

3) Repeat this Time Check as above to ensure that the time is now correct

H.1.1.5 Z88 Baud Rate Changes

To stop BASIC program and exit application press :-

1) **Esc** Prompt Displayed

2) **Index Key** Index Menu on display

To enter Panel menu :-

1) Select Panel Menu from Index

2) Use arrow keys to position cursor on the Baud and over-type in new value **2400** for both Tx and Rx.

3) **<cr>** Return to application

H.1.2 The Shipborne Wave Recorder

The Shipborne Wave Recorder equipment is located in the Met Office. The NEC computer is situated in a 19" rack, and is mounted behind the front panel. The NEC is set - up to boot the SBWR software on power up.

H.1.2.1 Check software clock

Whilst software is running check and record GMT time and software clock time. Check that date is correct.

H.1.2.2 To halt the program

Type

Ctrl-Pause	Exit, prompt not clearly visible
SYSTEM<cr>	Exit GWBASIC

H.1.2.3 To Copy Data Files

To Backup of data connect the Tape streamer to the printer port and switch on power supply

Type

BPSBWR <cr>	the data backup is controlled by a batch file.

At completion of backup, remove tape cartridge from drive and label as:

CUMULUS CR nn	where 'nn' is Cruise just completed
jjjhhmm	First file on disk
jjjhhmm	Last file on disk

H.1.2.4 Check hardware clock

Type : -

TIME <cr>	record Time GMT and hardware clock
DATE<cr>	record processor date

H.1.2.5 To delete data files

Press:

1) **DS<cr>**	Directory scanner
2) **D**	Change Drive
3) **D:<cr>**	Select drive D
4) **F1 or F2**<cr>	Move cursor to SBWR directory
5) **T**	Use "T" and ARROW KEYS to Tag files maximum 300 files
6) **Alt D**	To delete all tagged files
7) **Y<cr>**	Yes to confirm

8) Then tag next batch of files and repeat until all files are deleted.

H.1.3 GPS & Compass

GPS & Compass System operation

1. Check for correct operation (i.e. collecting or processing data)

2. Check software clock the date and time are updated from the GPS data message, but an errors should be recorded

3. Exit software by **Alt +F1**

4. Remove the floppy disc drive A

H.1.3.1 Backup of data

Connect the Tape streamer to the printer port and switch on power supply

Type **BPGPS <cr>**	the data backup is controlled by a batch file.

6. Delete data

1) DS <cr>	to enter Directory Scanner
2) F2	to select DATA directory
3) TTT etc.	to tag all files in DATA directory
4) ALT D	to delete tagged files
y<cr.	to confirm

H.1.3.2 Check hardware clock

TIME <cr>	record Time GMT and hardware clock
DATE<cr>	record processor date

H.1.3.3 Reset Time

TIME <cr>	only change if time is more than 15 seconds in error
DATE <cr>	correct as necessary
Re-boot PC	ensures software clock updated
	system starts with correct configuration

Check for correct operation collecting and processing data. This will take a few minutes depending on satellite visibility, and then the screen will continue to update at '1 minute' intervals.

H.1.4 GPS & Compass System Disk

This is a bootable floppy disk, which must contain the following files :-

COMMAND.COM

AUTOEXEC.BAT

CONFIG.SYS

GPS13.BAS

GWBASIC.EXE

Note when formatting system disks use command, FORMAT /S

H.1.5 GPS & Compass Commands

H.1.5.1 Commence Logging - <Alt><F1>.

This key is employed to initiate the logging of data to disk at 1 minute intervals. On pressing the key, a call is made to the routine that opens a file for logging data. At the start of the program the key is enabled, but on entry into the routine, the key is immediately disabled. The key is re-enabled once the open file has been closed. The routine initially inquires whether a new disk has been inserted, and this is achieved by the use of the flag NEWDISK. If this is the case, then a call is made to the routine that checks the amount of space available on the disk. This routine evaluates the number of bytes free on the disk, and calculates how much time would elapse before the disk would be full. This is displayed to the user, who has the option of continuing, or inserting a new disk and repeating the process. On completion, control is passed to the original data logging routine.

A dummy file is opened, so as to write six hours of records to it. This is in order to establish whether there is enough room on the disk for the actual data file. If a disk full error is encountered by the error trapping routine, then the user is requested to insert a new disk, otherwise the dummy file is deleted. The routine then builds up the correct filename, and subsequently opens that file for sequential output. A flag (LOGGING) is set to indicate that logging has commenced, and a timer interrupt is initialised to activate every 60 seconds - the purpose of this being to write the records to disk. Control is then passed back to the point at which the program was interrupted.

H.1.5.2 Stop Logging - <Alt><F2>)

At the start of the program, this key is disabled, and therefore performs no action. The key is only enabled when a data file has been opened for logging. On pressing the key combination the routine closes the data file.

H.1.5.3 Escape to Command Menu - <Alt><Esc>.

Program control is passed to the routine which displays additional commands. A new screen is shown to the user and a new set of function keys (F1,F2,F5,F6) is enabled for use in this command screen.
The screen remains displayed, until an <Alt><Enter> is detected.

H.1.5.4 Return to Main Screen - <Alt><Enter>.

This causes the program to return to the original display screen. The function keys that were enabled in the command screen are disabled.

H.1.5.5 View GPS or Compass Raw Data<F1> & <F2>.

These function keys are only enabled when in the command screen. They cause control to be passed to the routine which displays the contents of COM1, or the routine which displays the contents of COM2, whichever the case may be. A continuous loop is set up that reads the content of the COM port; this is done by successive calls to the routine which reads a GPS data record.

H.1.5.6 Re-Start GPS Receiver - <F5>.

This causes a call to the routine to restart the GPS. The program simply sends a restart message to the GPS system, waits a second or two.
Again, the key is only enabled while in the command screen.

H.1.5.7 Re-Initialise GPS Parameters - <F6>.

Pressing <F6> causes the routine to initialises the GPS parameters, and as in the above case, the key is only enabled while in the command screen. The routine prompts the user for information concerning the antenna location, and the coding ensures that default values are given. When all values have been input, the routine prompts the user for their correctness, and subsequently makes a call to the routine which assigns values to the GPS. This routine builds up a properly formatted message from the user input, and transmits it to the GPS. Control is passed back to the original routine.

For further details refer to IOSDL Internal document No 308 - GPS and ship head recording system: installation and operators guide by K.G.Birch, R.W.Pascal, & A.L.Williams

H.1.6 Sonic Fast Sampling

1. Check for correct operation (i.e. collecting or processing data)

2. Check software clock when software is at the message 'waiting for next record start'. record GMT time and software clock time. Check that date is correct.

3. Whilst 'waiting for next record start' exit software by **shift +}**

4. Check hardware clock by

TIME <cr>	record Time GMT and hardware clock
DATE<cr>	record processor date

H.1.6.1 Backup of data

Connect the Tape streamer to the printer port and switch on power supply

Type **BPSONIC <cr>**	the data backup is controlled by a batch file.

H.1.6.2 Deleting data

1) DS <cr>	to enter Directory Scanner
2) F2	to select DATA directory
3) TTT etc.	to tag all files in DATA directory
4) ALT D	to delete tagged files
y<cr.	to confirm

H.1.6.3 Reset Time

TIME <cr>	only change if time is more than 15 seconds in error
DATE <cr>	correct as necessary
Re-boot PC	ensures software clock updated
	system start with correct configuration

Check for correct operation collecting and processing data, through to scatter plot. This will take approximately 14 minutes, commencing from the next quarter hour increment.

H.1.7 Disc format and formatting

Care must be taken with the type i.e. DS DD or DS HD 3.5" floppy discs that are used . The Shipborne Wave Recorder NEC PC only supports DS DD discs, whereas the GPS and Sonic DSP PC's support DS HD.

DO NOT use the wrong discs or data maybe lost

Formatting NEC Disks

To exit software press :-

1) **Ctrl+Pause** Halts program

Type :-

SYSTEM<cr> Exit from GWBASIC

To format disks - not bootable

Type:

1) **DS<cr>** Directory scanner

Press:

2) **F1 or F2<cr>** To select DOS

3) **Arrows Keys** Select FORMAT.COM

4) **X**<cr> Execute

5) **A:**<cr> Drive A

6) Place disk to be formatted in drive A and type:-

7) **<cr>** To start format

8) Remove disk and insert next disc, repeat steps 6 and 7 until 11 disks are formatted, then type:-

9) **N<cr>** No more disks

10) **<cr>** Return to DOS

I.1 APPENDIX I - DATA COLLECTED FROM CUMULUS SENIOR METEOROLOGICAL OFFICER

All items are collected by the Senior Meteorological officer at the completion each cruise, and are as detailed on the list below.

ITEMS TO COLLECT TOGETHER FOR I.O.S.D.L. FROM O.W.S. CUMULUS.

1 **METEOROLOGICAL JOURNAL**

2 **I.O.S. SHIPS LOG**

3 **SBWR TEST ROLL**

4 **SBWR REPORT SHEET**

5 **MULTIMET TAPE**

6 **SYSTEMS REBOOT INFORMATION**

7 **COMPASS DEVIATIONS (IF APPLICABLE)**

J.1 APPENDIX J - SHIPBORNE WAVE RECORDER TEST PROCEDURE

J.1.1 Mid Cruise Test

Chose a time when the wave height is 3 meters or more.

Record Date, Time and Cruise number at start of record.

Start chart recorder at 1mm per second.

Operate the switches as indicated in the table below.

Record Time (GMT) at each switch change.

PORT ACC	PORT PRESS	STBD ACC	STBD PRESS	TIME
ON	ON	ON	ON	2 MIN
OFF	OFF	OFF	OFF	2 MIN
ON	OFF	OFF	OFF	6 MIN
OFF	ON	OFF	OFF	6 MIN
OFF	OFF	ON	OFF	6 MIN
OFF	OFF	OFF	ON	6 MIN
ON	ON	ON	ON	2 MIN

K.1 APPENDIX K - SEADATA TAPE TRANSLATION

K.1.1 Sea data tape

The Sea Data Reader and a PC is located in Room 218.

1. Switch on : -

   Computer

   Multibuffer

   Sea Data Reader

2. Place the Cassette in the reader with side A facing out

3. Press **FAST RWD**

4. When the BOT light is on check the following settings

MASTER GAIN	50
THRESHOLD 5	20
DENSITY	800
CHARACTERS PER	
CASSETTE RECORD	080
MODE	COUNTER
CONTROL	LOCAL
OUTPUT	1/2" TAPE
CASSETTE RECORDS	
PER 1/2" TAPE IRG	32

5. Press the **READ** button

6. Adjust the four individual track gains to give 100 % on the LED s display

7. Press **STOP** then **FAST RWD**

8. Clear the Multibuffer

Press all three buttons at once until all LED s are off.

9. When the LED s have settled

Switch EOF switch on the interface box to **OFF**

10. Type

SEA <cr>

11. When the following prompts appear type in as shown

record size = **80 <cr>**

manual control = **Y <cr>**

12. Type in name of the file

TAPEnn.D Where **nn** is the cruise number

13. When requested press **READ** on the reader and any key on the computer to start the translation

14 Check that the **GOOD DATA** light is lit and adjust the track gains to maintain 100% readings on the LED s display

15. At the end of the tape

Switch EOF switch on the interface box to **ON**

16. Press **FAST RWD**

17. The file should be in directory C:\DATATRAN. Type

CD DATATRAN <cr>

DIR<cr> To ensure that the file is there

DOS2UNIX TAPEnn.D TAPE.nn To translate the DOS file to a UNIX file

L.I APPENDIX L - MULTIMET DATA PREPARATION FOR TRANSFER MEDIA TO JRC UNIX SYSTEMS

L.1.1 Backup Tape of files to Tape Streamer

1. Log onto the Network using your password
2. Transfer the TAPEDD and COEFFS files to the network. Type

COPY filename.ext G:\DATATRAN\filename.ext

3. Connect the Backpack tape drive to the computer in Room 218. (The one used for Sea Data Tape Translation.) and switch on Computer and Tape drive
4. Place the Sonic / SBWR tape in the tape drive.
5. Type

CD BACKPACK <cr>

BPBACKUP <cr>

6. Using the Menu select G:\DATATRAN
7. Select the TAPEDD and COEFFS files
8. Select C:\DATATRAN
9. Select TAPE.nn
10. Use the Menu to backup selected files. Use the default settings.
11. Press **Esc** to return to the DOS prompt
12. Type

DEL TAPEnn.D to remove DOS file

DEL TAPE.nn to remove UNIX file

M.1 APPENDIX M - TAPEDD AND COEFF FILE GENERATION

M.1.1 Coeffs File

1) Log on to the network using your password

2) Type

G: <cr>

CD DATATRAN\COEFFS <cr>

Edit COEFFS00.CAL<cr>

If the number of sensors have been changed then change line 10 and lines 20 and line 30. Enter the serial number of the sensor, electronics number where applicable location and coefficients.

3) Save file as COEFFSnn.CAL where nn is the cruise number

4) Type

DOS2UNIX COEFFSnn.CAL G:\DATATRAN\UNIX\COEFFS.nn<cr>

M.1.2 Tapedd File

1) Log on to the network using your password

2) Type

G: <cr>

CD DATATRAN\TAPEDD <cr>

3) Edit TAPEDD.00

The cruise number will need to be changed in the title and line 40. If the number of sensors have been changed then change line 150 and lines 160 and if a new EPROM is inserted in MultiMet change line 180 to the current year.

4)Check that the channel numbers are correct

5)Save file as TAPEDD.nn where nn is the cruise number

6) Type

DOS2UNIX TAPEDD.nn G:\DATATRAN\UNIX\TAPEDD.nn <cr>

M.1.3 Calibration sheet

1). The calibration sheets are on the PC in Room 217. At the DOS prompt type

MET <cr>

Arrow keys <cr> to select Metdb

Alt

<cr>

C:\PKS\PIPE <cr>

Arrow keys <cr> To select CAL00.PIP

N <cr>

2). Enter coeffs and if any sensors have been changed enter serial number electronics number and location.

3). Press

Alt

Arrow keys <cr> To select Options

Change title to include cruise number **<cr>**

4). Press

Alt

Arrow keys <cr> To select Save

Change file name to include cruise number <cr>

5). To Print Calibration Sheet press

Alt P

<cr> <cr>

6). To Quit press

Alt

Arrow keys <cr> To select Exit

Arrow keys <cr> To select Quit

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