



INSTITUTE FOR GEOPHYSICS
THE UNIVERSITY OF TEXAS AT AUSTIN

8701 North MoPac Expressway • Austin, Texas 78759-8397 • (512) 471-6156 • Fax: (512) 471-8844
Internet: utig@utig.ig.utexas.edu • Omnet: UTIG.AUSTIN

March 7, 1995

To: Paul Stoffa, Director, Institute for Geophysics

From: James A. Austin, Jr. and E. William Behrens

EUB / JAB

Subject:

A PROPOSAL FOR STUDENT TRAINING:
A CRUISE TO EAST BREAKS, NORTHERN GULF OF MEXICO, TO TEST A
PORTABLE MULTICHANNEL ACQUISITION SYSTEM

Field Area: East Breaks, northern Gulf of Mexico - indentation of the shelf break on the face of a low-stand delta. This is the apparent source for two downslope sediment transport lobes involving different depositional processes [debris flows and turbidity currents]. The cause of the differences is unknown, and will be the objective of a master's thesis if seismic data can be collected. The study area centers at ~27°40' N, 95°40' W.

'Existing' Support: Committed UTIG student monies will provide 5 ship days aboard the TAMU vessel *Gyre* (shiptime request submitted). Pending proposals have been submitted by Behrens to ACS/PRF and Mobil Oil Co. The PRF panel meeting will be in May 1995; negotiations with Mobil may go on for as long as the next several months. Support from either would provide at least 2 days of additional ship time (maximum 5, if both came through), one graduate student tuition, funds for ¹⁴C dating and other core analyses, computer charges (basic annual hook-up plus an additional \$1,000 - 4,000), and travel for Behrens and a student to and from Galveston. (*Note: Cores will probably only be collected if Mobil/PRF money is forthcoming. Coring could also be done during seismic down-time, unless we find that it is too expensive as an add-on.)

Projected Student Activities:

- Maintaining and operating acquisition equipment, assist seismic data acquisition.

- Navigation equipment operation and recordkeeping, course plotting and maintenance.
- Piston coring operations and core acquisition logs; core lab analyses*.
- 3.5kHz reflection profiling equipment - operation and recordkeeping.
- Preliminary onboard multichannel data processing.

Student Deliverables: A post-cruise report (fall semester) on at least one of the above activities (in the past, final reports have commonly consisted of a processed [through stacking] multichannel line). One or more interested students could be registered for the fall semester for either a graduate or undergraduate training cruise course (MNS348, [cross listed as GEO348k] or MNS388), which routinely requires such a follow-up research project report. Student evaluation of the course offering is automatic, as that is a College of Natural Sciences requirement. Undergraduates (and perhaps graduates, too) pay a \$40 incidental fee, which is directly available for departmental use (It's small but handy). If the data are forthcoming, the ultimate product of this project would be a supervised (Marine Sciences) master's thesis.

NSF-UNOLS Ship Time Request Form

Include in all NSF proposals and send copies to UNOLS office and ship operator(s)

Paul L.

P.I. Name: Dr. James A. Austin, Jr. Institution Address: University of Texas Institute for Geophysics 8701 N. Mopac Blvd. Austin, TX 78759 Phone Number: (512) 471-0450 Fax Number: 471-8844 E-mail: jamie@utig.ig.utexas.edu		Will this project require use of a research vessel or special platform? <input type="checkbox"/> No (Go to Signature) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Ancillary Only <input type="checkbox"/> Principal Use of Ship Large Program? (Ex. WOCE)											
Name of Person Requesting Ship Time (Multi-P.I. Proposals): Institution: same as above Phone Number: Fax Number: E-mail: jamie@utig.ig.utexas.edu		Proposal Title: "Testing the L-DEO DURIP Portable MCS System: An Exercise in Student Training"											
Purpose of Ship Time: Student training / MCS equipment testing / MCS data acquisition													
<input checked="" type="checkbox"/> New Proposal? Inst. Proposal # _____ NSF Proposal # _____ <input type="checkbox"/> Renewal Proposal Grant # _____		Submitted to: Agency _____ Division _____ Program UTIG Account/Mobil? _____											
Amount Requested: ~ \$60K Start Date: 1 August 1995 End Date: 31 August, 1995		Other Scientists Involved in Multi-P.I. Program: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Name</th> <th style="text-align: left;">Institution</th> </tr> </thead> <tbody> <tr> <td>Dr. John Diebold</td> <td>L-DEO</td> </tr> <tr> <td>Dr. Bill Behrens</td> <td>UTIG</td> </tr> <tr> <td>Dr. Craig Furthorpe</td> <td>UTIG</td> </tr> <tr> <td>Dr. Richard Buffler</td> <td>UTIG</td> </tr> </tbody> </table>		Name	Institution	Dr. John Diebold	L-DEO	Dr. Bill Behrens	UTIG	Dr. Craig Furthorpe	UTIG	Dr. Richard Buffler	UTIG
Name	Institution												
Dr. John Diebold	L-DEO												
Dr. Bill Behrens	UTIG												
Dr. Craig Furthorpe	UTIG												
Dr. Richard Buffler	UTIG												
Year 1995	Ship(s) Requested Name or Size (Ex. Large, Medium) Gyre	# of Science Days Required 4	Optimum Dates Month/Day/Year late August	Alternate Dates Month/Day/Year none									
Estimated Ship Days Needed: 8		Transit: 2	Science: 4	Port: 2									
Proposed Ports: Galveston		Start Port: Galveston	Intermediate:	End Port: Galveston									
Area of Operations (Use codes from standard Naval Chart [on back] and brief description) Codes: NA9 (northern Gulf of Mexico)		Number in Scientific Party: 14 (6 students)											
Geographic Description (Latitude and Longitude): Beginning: Gulf of Mexico/Texas continental Ending: slope		Technician Required: (CTD, SCS, MCS, SeaBeam, etc) MCS (to be provided)											
Is any part of the project within 200 miles of a Foreign Coast? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (List countries' clearance required)		Special Equipment Required: MCS system - to be provided. (inc. compressor)											
Diving? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Number of Individual Dives: _____ Number Participating Divers: _____		Special Requirements: GPS navigation (List type, quantity, and disposal plans) Radioactive? Explosives? Other? hull-mounted 3.5kHz, if available											
Signature of P.I. or Chief Scientist: Dr. James A. Austin, Jr.		Date: February 20, 1995											

Send a copy of this form to the ship operator

Addresses of ship operators and information on available vessels may be obtained from the UNOLS office or from NSF

Ship Operations
National Science Foundation
1800 G. St. NW
Washington, DC 20550
Tel: (202)357-7837
FAX: (202) 357-7621

UNOLS Office
University of Rhode Island
P.O. Box 392
Saunderstown, RI 02874
Tel: (401) 792-6825
FAX: (401) 792-6486

Sent to:

- ☐ NSF
☐ UNOLS Office
☐ Ship Operator

Special Instructions

Year:

Proposals requiring ship time must be received by the May 1 Target Date to be considered for scheduling in the following calendar year. Ship schedules for the calendar year are finalized by October of the *previous* year.

Clearances:

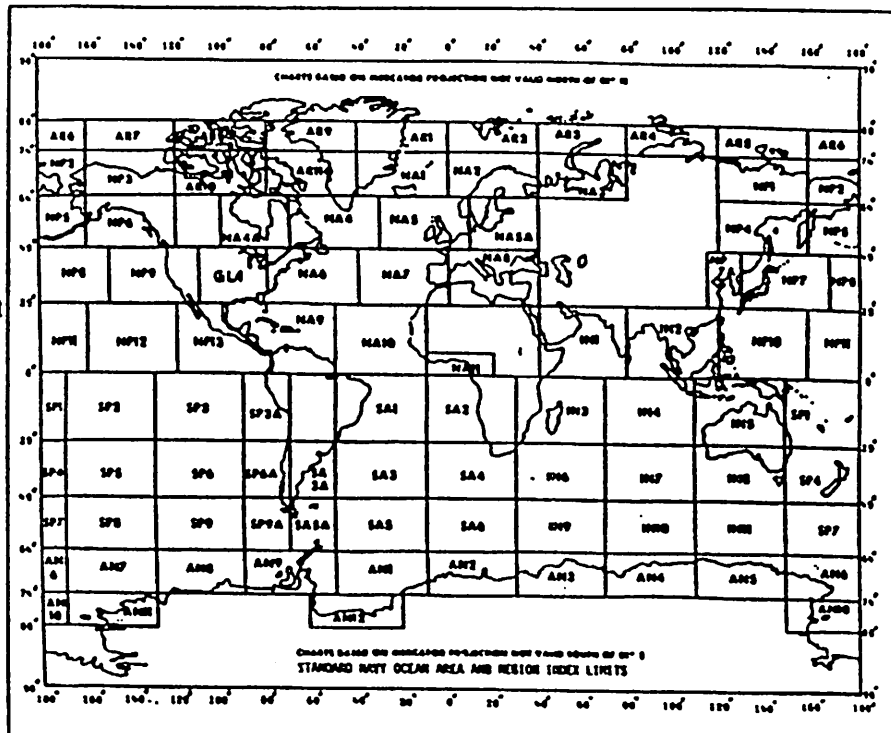
Clearances are required for ALL scientific work within any foreign nation's 200 mile Exclusive Economic Zone. Foreign clearance is often difficult to obtain, and in most cases, requests should be submitted to the Department of State at least seven months prior to expected cruise date. Requests for clearance may be submitted prior to final funding decisions. Contact ship operator or:

Research Vessel Clearance Officer
U.S. Department of State
OES/OA, Room 5801
Washington, D.C. 20520
Tel: (202) 647-0240

Track:

Attach cruise track.

Standard Navy Ocean Area and Region Index Limits



INFORMATION FOR OPERATORS

Installed Equipment to be used:

Winches:

Dredge/Trawl ____
Hydro ____
CTD ____
Capstans ____

Computer/peripherals ____
PC computers ____
SAIL System ____
Digital XBT ____
ADCP ____
Gravimeter ____

Wire:

Mechanical

9/16" ____ 1/2" ____ 1/4" ____

Conductor

0.680" ____ 0.322" ____ .225" ____
Single ____ Multi ____

12 kHz echosounder ____
3.5 kHz echosounder ____
Magnetometer ____
Multibeam sounder ____
Air compressor(s) ____
Uncontaminated seawater intake ____

Navigation:

GPS ____
Transit satellite ____
Loran ____
Other ____

Immarsat ____
ATS ____
FAX ____
Cellular ____

Available equipment to be used:

Pingers ____
Gravity Corers ____
Piston Corers ____
Box Corers ____
Rock Dredges ____

Chest Freezers ____
Refrigerators ____

CTD ____
Rosette Sys. ____

Vans:

Refrigerated ____
Magazine ____
Isotope Isolation ____
Lab ____
Storage ____
Berthing ____

Airgun/watergun system: ____
Explosive Handling Gear ____

Auto Analyzer ____
Salinometer ____

Nutrients ____
Oxygen titration ____

Nets:

Dip net ____
Plankton ____
Neuston ____
Bongo ____
Mid-water trawl ____
MOCNESS ____ (Size) ____

Work boats ____

Niskin bottles ____
Thermometers ____

Other Special Equipment; Comments:



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February 7, 1995

Memorandum

To: Dr. Paul Stoffa, Acting Director, UTIG

From: Dr. James A. Austin, Jr., Senior Research Scientist

A handwritten signature in blue ink, appearing to read "J. A. Austin, Jr.", with a stylized flourish at the end.

Subject: Use of 1995 UTIG student monies for a test of a DOD-supported, "portable" MCS system currently being developed at Lamont-Doherty Earth Observatory

As we briefly discussed in your office, the system in question (8/10 cu. in sleeve gun array, 48 trace/12.5 m. groups receiver, OYO acquisition electronics, 100 SCFM compressor, L-DEO-designed gun controller and peripherals) was proposed to the DOD DURIP program for support in the fall of 1994 (copy of the proposal is available for your perusal on request). That support (~\$325K) was approved in December, and has been augmented since by some matching dollars from L-DEO (~\$50K), NSF equipment funds (part of a block facilities grant to L-DEO), and an ONR supplement from Joe Kravitz. Greg Mountain and I (and co-investigators from UTIG and L-DEO) plan to use the system offshore northern California in support of ONR's STRATAFORM program in 1996. The system will then be made available by L-DEO on a first-come, first-served basis to the U.S. scientific community in support of funded research activities.

Purchase, final design and fabrication of the system will take place during the spring and summer of this year. I would like to propose that the funds in question be used to bring the system down to the Gulf of Mexico for a ~5-day test aboard the Texas A&M University vessel *Gyre* (currently based in Galveston), probably in late August 1995. We have ascertained that the platform is available during the summer months, at \$6,300/day.

I have discussed a preliminary "science" program for the test cruise with Dick Buffler, who is going to coordinate with Bill Behrens on a couple of selected areas: one on the outer shelf to image slumps and lowstand deltas, a second in deeper water to look at sediment wave fields. Details of that plan will be forthcoming, should the Budget Council look favorably on this request.

We plan to find a mix of graduate and undergraduate students for the exercise, based upon advertizing within UTIG and at the DGS. The students will:

- participate on the cruise and all related activities (loading, unloading, gear handling, watchstanding)
- get some first-hand experience at designing an MCS survey and acquiring "state-of-the-art" MCS information
- be involved in onboard QC and basic processing (displaying, stacking, filtering) the test data
- if the data quality is satisfactory, co-author with the scientists a small paper (probably in the GCAGS Journal) on results of imaging in the test areas

Proposed Budget

5 days <i>Gyre</i> , at \$6,300/day	\$31,500	
Shipping, system components to/from L-DEO	5,000 (to be finalized)	
Travel (Austin, Buffler, Behrens, Sastrup, 6 students) to/from Galveston	1,000	
Miscellaneous expenses,	<u>1,000</u>	
TOTAL:		\$38,500



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MEMORANDUM

February 13, 1995

To: Dr. Paul Stoffa
Acting Director, UTIG

From: James A. Austin, Jr.
Senior Research Scientist

JAA

Subject: Preliminary Science Plan, proposed *Gyre* student cruise, August 1995

As I mentioned in an earlier memo on this subject, Bill Behrens has prepared the attached, in expectation that student monies will be made available by the Budget Council in support of testing of the DURIP portable MCS system this coming summer. Dr. Behrens is in the process of seeking additional monies from both Mobil, PRF and NSF in support of research on the proposed areas. Should some/all of these monies be forthcoming (decisions no later than June), there is the possibility that the cruise could be extended from the currently proposed 5 days to as many as 10. That, of course, will depend upon platform availability.

I will let you know as I find out more details. Thank you for your attention.

PROPOSED HIGH RESOLUTION TRACK LINES ON THE TEXAS CONTINENTAL SLOPE TO COMPLEMENT EXISTING DATA AND STUDIES

AREA 1 EAST BREAKS SLIDE

Two lobes of downslope sediment transport have been mapped from GLORIA sonographs and identified as debris flows (Rothwell et al., 1991). Our ground truth shows that one of the lobes does not contain debris flows but rather turbidites. A masters thesis (James N. Piper) is underway to answer question why the difference? Some of the proposed grid lines (Fig. 2) were shot with 3.5 kHz during the summer of 1994. The rest are proposed in a PRF proposal due to be evaluated in May.

AREA 2 UPPER SLOPE WAVE FIELD

Almost adjacent to the East Breaks complex is an upper slope sediment wave field (Fig. 2, red color). Study of this field would augment study of the large field on the Mexican continental rise, a proposal for which was just submitted to NSF jointly by UTIG & TAMU (PIs E.W. Behrens & David A. Brooks respectively).

AREA 3 RIO GRANDE SLOPE

Our mapping (UTIG Tech. Report 123) shows a sediment transport system from a shelf edge delta to the Perdido Canyon (Fig. 3). Nothing is known about the sediment passing through the canyon (no submarine fan is apparent). Sediment passing through the canyon may contribute significantly to the continental rise wave field mentioned above. A survey of the rise area between Perdido Canyon and the wave field is included in the NSF proposal. Preliminary data would be extremely helpful.

See Figure 1 for regional relationships, Figs 2 & 3 for details.

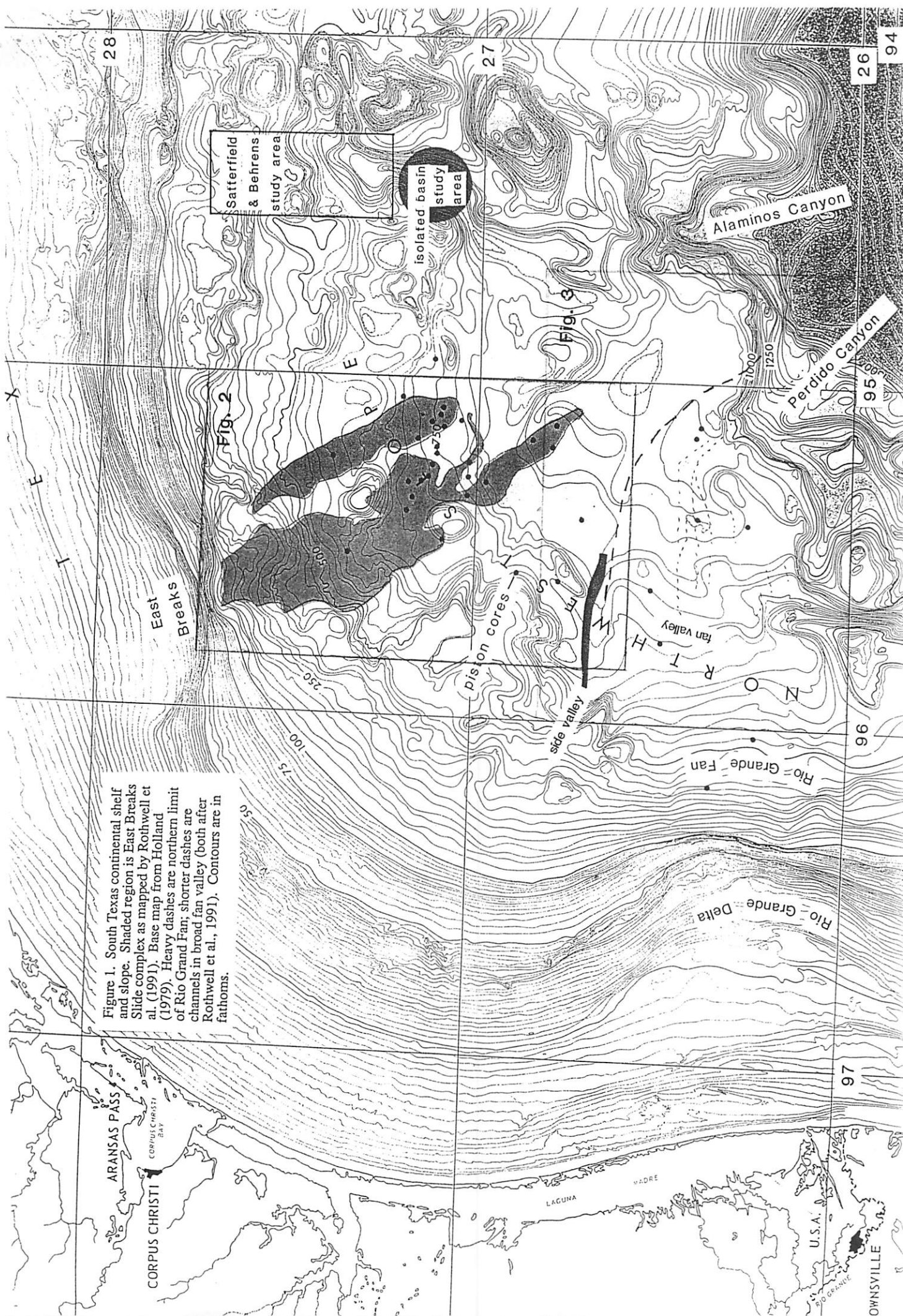


Figure 1. South Texas continental shelf and slope. Shaded region is East Breaks Slide complex as mapped by Rothwell et al. (1991). Base map from Holland (1979). Heavy dashes are northern limit of Rio Grande Fan; shorter dashes are channels in broad fan valley (both after Rothwell et al., 1991). Contours are in fathoms.

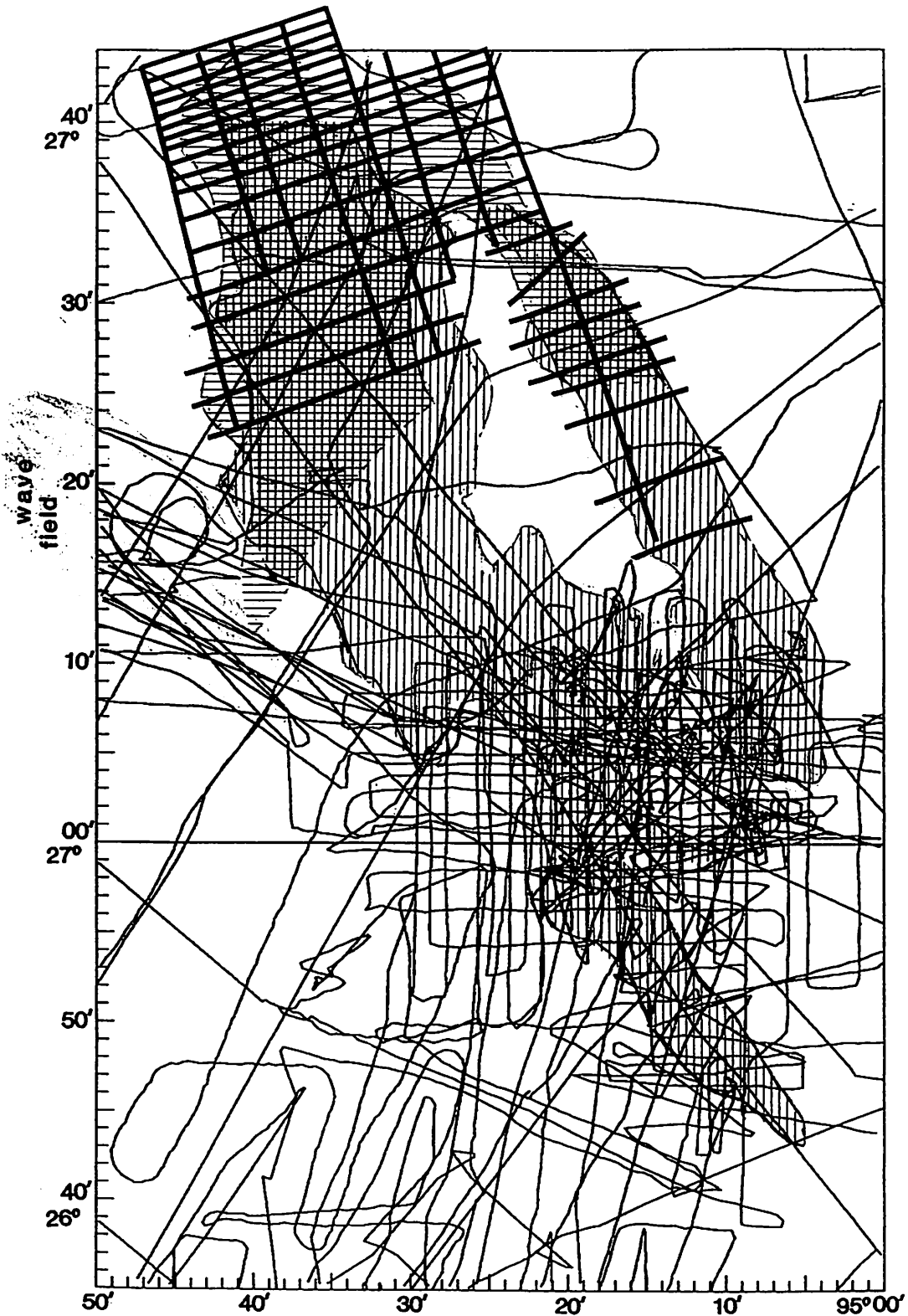
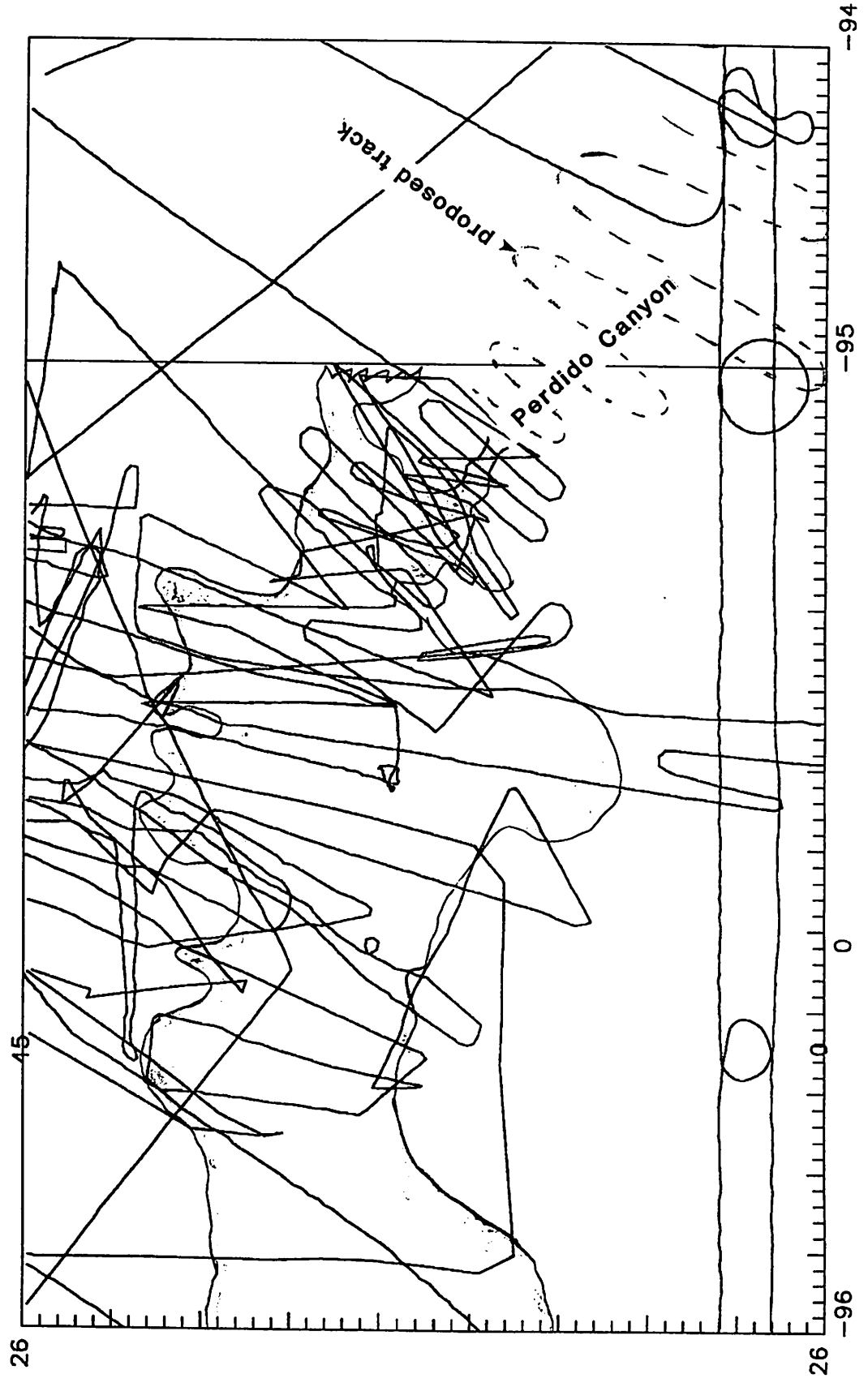


Figure 2 University of Texas track lines in East Breaks area. Vertically striped pattern is debris flow lobes mapped by Rothwell et al. (1991) from GLORIA side scan sonographs (also shown in Fig. 1). Our seismic and core data show that eastern lobe is really turbidite deposits. Horizontally striped pattern is upper slide complex mapped by Hardin (1986) from seismic reflection data. Rectilinear grid of heavy lines is proposed survey.

Figure 3. Track lines and outline of downslope sediment transport pathway (orange) between shelf edge delta and Perdido Canyon. Proposed track line is designed to determine fate of sediment passing from the pathway through the canyon (and possibly on to continental rise wave field).



TEXAS A&M UNIVERSITY
Department of Oceanography
College Station, Texas

PRE-CRUISE PLAN

Vessel Name Gyre Cruise No. _____
Beginning date and port 11/12 Sept. 1995/Galveston, TX
Terminating date and port 17 Sept. 1995/Galveston, TX
Intermediate ports and dates _____

NOTE: ATTACH PAGE-SIZE CHARTLET SHOWING GENERAL CRUISE TRACK.

Summary of Scientific Plan: 1) To test new high-res., portable L-DEO MCS system.
2) To collect piston cores in support of sedimentological studies of the Gulf of Mexico.

SCIENTIFIC AND TECHNICAL PERSONNEL

<u>Name</u>	<u>Title</u>	<u>Affiliation</u>
1. J. A. Austin	Senior Res. Sci., Chief Scientist	UT-Inst. for Geophysics
2. E. W. Behrens	Associate Professor	Univ. of Texas, Austin
3. C.S. Fulthorpe	Research Associate	UT-Inst. for Geophysics
4. J. Pulliam	Post-Doc Fellow	UT-Inst. for Geophysics
5. M.Z. Beltran	Student	University of Texas
6. E. L. Calaway	Student	University of Texas
7. J. Floyd	Student	University of Texas
8. J. Gamble	Student	University of Texas
9. G. S. Grubbs	Student	University of Texas
10. J. N. Piper	Student	University of Texas
11. J. Smith	Student	University of Texas
12. L. Stewart	Student	University of Texas
13. A. Teagan	Student	University of Texas
14. L. Zahm	Student	University of Texas
15. J. Diebold	Scientist	L-DEO
16. N. Driscoll	Scientist	L-DEO
17. P. Buhl	Scientist	L-DEO
18. C. Gutierrez	Technician	L-DEO
19. B. Francis	Technician	L-DEO
20.		
21.		
22.		
23.		

Submitted by: James A. Austin, Jr. 29 August 1995
Chief Scientist Date

Accepted by:

Supervisor for Technical Personnel Port Captain

Approved by:

Manager, Marine Operations Head, Department of Oceanography

COLLEGE OF GEOSCIENCES

COLLEGE STATION, TEXAS 77843-3144

Reply to
Department of
OCEANOGRAPHY

MEMORANDUM FOR CHIEF SCIENTIST James A. Austin, Jr.
CONCERNING CRUISE # .

Attached are checklists for equipment which may be made available to GYRE users, if request is made in sufficient time to reserve it and make necessary preparations. Also enclosed is a preliminary request form for required marine and electronic technician support both at sea and prior to/following up the cruise.

THIS PLANNING AND REQUEST DOCUMENT SHOULD BE COMPLETED AND RETURNED TO THE TECHNICIANS SUPPORT GROUP WELL IN ADVANCE OF THE CRUISE, and followed up as appropriate by direct contact with the marine and electronics technicians group to assure proper service. See the GYRE cruise handbook for details on procedures, equipment availability, etc. NOTE that there is a modest use charge to the scientific project funds for most of the equipment listed.

ELECTRONICS TECHNICIANS PHONE NUMBER IS: (409) 845-7214

MARINE TECHNICIANS PHONE NUMBER IS: (409) 845-8385
=====

SCIENTIFIC PARTY'S CONTACT PERSON FOR MARINE TECHNICIANS EQUIPMENT:
NAME:

NAME: _____ PHONE: _____

SCIENTIFIC PARTY'S CONTACT PERSON FOR ELECTRONICS TECHNICIANS EQUIPMENT:
NAME:

NAME: _____ PHONE: _____

DATE AND PORT OF MOBILIZATION: Galveston/9-7 to 9-11, 1995

DATE AND PORT OF DEMOBILIZATION: Galveston/ 9-17, 1995

NOTES, COMMENTS, SPECIAL NEEDS, ETC.:

MT required for mob/demob

ET required for mob/demob and cruise

Equipment Check-Off List
to be Supplied (if available) by:

Marine Tech Group

Van requirements:

None

 Nansen Bottles (Number)

 Reversing Thermometers

 Protected Unprotected

 5 L. Niskin Bottles (Number)

 with Thermometer Racks

 Salinometers

 Plessey (Inductive)

 U. of W. (Conductive)

 Guildline (Conductive)

 Oxygen Titration System

 Auto Analyzer

 PO_4 SiO_3 NO_3 NO_2

 Gravity Corer

XX Piston Corer

 Box Corer

 Rock Dredge

 Shipek Sampler

 Van Veen Sampler

 Drogue Bouys

 Special Winches (List below)

 Other special requirements:

 MCS system, including winch

 and compressor, to be put

 aboard.

Electronic Tech Group

 Precision Bathymetry (12 kHz)

XX Subbottom Profiling (3.5 kHz)

 Towed Transducers

XX Hull-mounted Transducers

 Correlator

 10 Kw Power Amplifier

 Surface Salinograph (conductivity)

 Surface Thermograph

 XBT Recorder/Launcher

 9040 S/T/D (6000 meters)

 9006 S/T/D (1500 meters)

 Rosette Multisampler

 Anemometer

 12 kHz Pinger (hydroproducts)

 NH_4

 12 kHz Pinger (Benthos)

 Magnetometer

 HP 2100 Computer System

 Elgar Voltage Regulator (1 KVA)

NAVIGATION

XX Satellite Navigation Receiver /GPS

 Omega Navigation Receiver (GPS)

XX Loran A/C Receivers

XX Radar (navigation)

XX Satellite Communications INMARSAT

 Special frequencies for ship's

 radiotelephone

 On board anyway

TEXAS A&M UNIVERSITY -- R/V GYRE
ELECTRONIC EQUIPMENT CHECKLIST

BATHYMETRY

_____ 12 KHz
xxx 3.5 KHz

Specify type of usage (continuous, navigational, only on station, etc.)

PINGER

_____ Planned usage of 12 KHz unit? No

SEA SURFACE TEMPERATURE

_____ Planned usage (continuous, intermittent): _____

SEA SURFACE CONDUCTIVITY

_____ Planned usage (continuous, intermittent): _____

XBT

_____ Launcher
_____ Recorder
_____ Paper (specify type)
_____ Record on computer?

How many XBTs planned? _____

CTD, NEIL BROWN MK III (6,000 m)

_____ A/D channels (1/2). Specify sample rate and recording mode;
how many casts anticipated: _____

CTD, GRUNDY 9042 (3,000 m)

_____ Specify use; number of casts anticipated: _____

MAGNETOMETER

_____ Specify planned utilization: _____

30 KJ SPARKER

_____ Specify planned utilization: _____

SAIL LOOP

____ Describe your equipment, and ship's parameters to be logged:
nav. for 3.5 KHz/MCS profiling & piston coring

COMPUTER SYSTEM (HP A600)

____ Printer
____ Plotter
____ Magnetic tape storage (9-track).
____ Data logger; Specify equipment to be logged:
____ Describe general pattern of computer usage: _____

MINICOMPUTER HP-85

____ Describe planned usage: _____

NAVIGATION EQUIPMENT

XX Satellite navigation/Omega
XX LORAN C (standard position-fixing)
XX LORAN C (position keeping)
XX Outline navigational needs for your program: continuous
nav. for MCS/3.5 KHz & piston coring

COMMUNICATIONS

____ SSB: Specify any unusual needs (frequencies, call signs, etc.)

XX INMARSAT (Telephone/Telex/Telemail) for personal communications

____ Intercoms: Specify any unusual requirements: _____

____ VHF Walkie-talkie; Specify usage: _____

SPECIAL POWER REQUIREMENTS

XX Line voltage regulation; specify tolerance, loads, and equipment
requiring regulated power: for winch operation on deck;
conditioned 110 V AC for electronics in the lab.

XX Line frequency regulation: Specify tolerance, loads, and equip-
ment requiring regulated power: 60 cycle in the lab.

OTHER SPECIAL ELECTRONIC/ELECTRICAL NEEDS

____ Specify any particular requirements: _____

TEXAS A&M UNIVERSITY -- R/V GYRE
TECHNICIAN SERVICES DESIRED

MARINE TECHNICIANS:

Number of technicians desired prior to cruise: 1 MT

Dates: 9-7 to 9-11, inclusive

Services Needed: help in setting up equipment

Number of Technicians desired during cruise: _____

Services Needed: _____

Number of Technicians desired to follow-up cruise: 1 MT

Dates: 9-17/9/18

Services Needed: demobilization of equipment

=====

ELECTRONICS TECHNICIANS:

Number of technicians desired prior to cruise: 1 ET

Dates: 9-7 to 9-11 inclusive

Services Needed: help in setting up equipment

Number of technicians desired during cruise: 1 ET

Services needed: maintenance of flat-bed recorders; help with
general electronics operations

Number of technicians desired to follow-up cruise: 1 ET

Dates: 9-17 to 9-18

Services needed: demobilization of equipment

TEXAS A&M UNIVERSITY -- R/V GYRE

MARINE EQUIPMENT CHECKLIST

HYDROGRAPHY

- _____ Large General Oceanics Rosette Multisampler with up to 12
30-liter bottles. Number of bottles needed, including
spares _____.
- _____ Small General Oceanics Rosette Multisampler with up to six
5-liter bottles or 12 1.7-liter bottles.
_____ Number of 5-liter bottles, including spares
_____ Number of 1.7-liter bottles, including spares
- _____ Niskin bottles for use on wire only (no rosette)
_____ Number and type of bottles needed
- _____ Reversing thermometers
_____ Low range protected; how many and depth range
_____ Full range protected; how many and depth range
_____ Unprotected; how many and depth range
- _____ Surface bucket thermometers

CHEMISTRY

SALINOMETERS:

- _____ Plessey Model 6230N inductive salinometer
_____ Guildline Model 8400 conductive salinometer

AUTOANALYZERS: (Continuous analysis of ortho-phosphate, silicate,
nitrate, nitrite, ammonia, and urea.)

- _____ 5-channel Technicon
_____ 6-channel Alpkem

State parameters to be analyzed and number of samples anticipated:

DISSOLVED OXYGEN: (includes calibrated sample bottles.)

Number of samples anticipated: _____

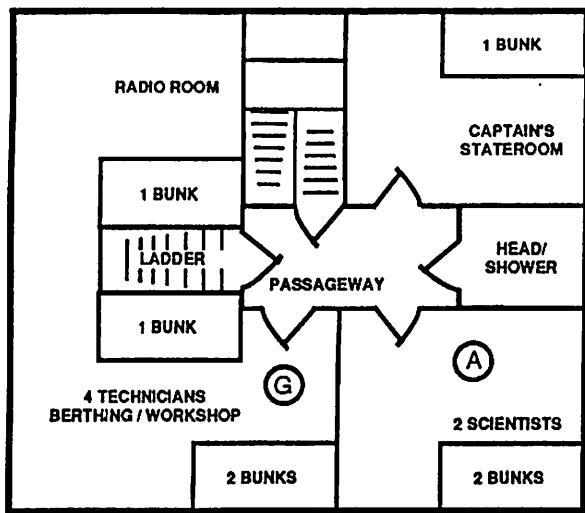
BOTTOM SAMPLERS

Note: Plastic core liners, sample bags, etc., not provided except when
Pre-arranged at scientist's expense.

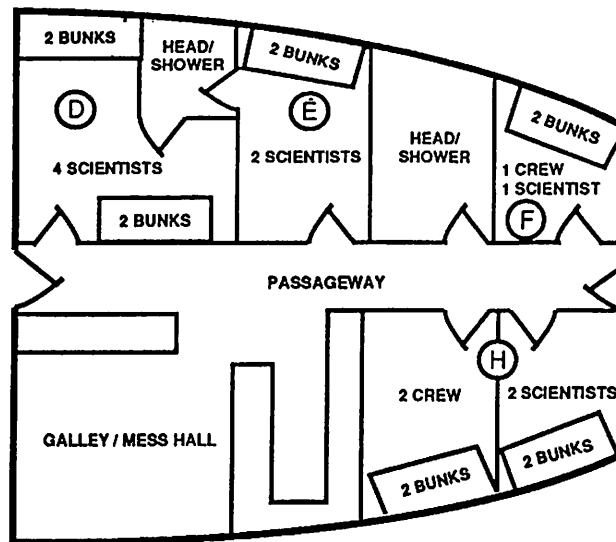
- _____ Piston corer (for use on 1/2" wire only)
_____ Gravity corer (8' barrel)
_____ Van Veen sampler
_____ Shipek sampler
_____ Large box corer (18" x 18" x 30" sample)
_____ Rock dredge

BIOLOGICAL NETS

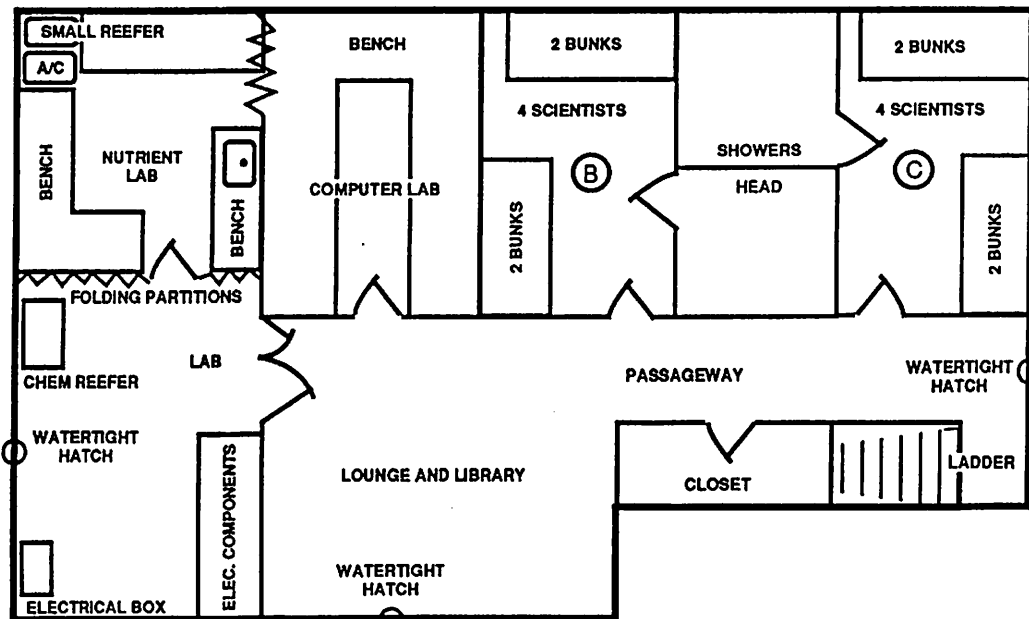
- _____ Otter trawl
_____ 1-meter 200 mesh plankton net
_____ 1/2-meter phytoplankton net



UPPER DECK



MAIN DECK



UPPER DECK (AFT)

SCIENTIST / TECHNICIAN BERTHING

ROOM A	ROOM E
Austin	Stewart
Diebold	Teagan
ROOM B	ROOM F
Grubbs	Buhl
Gamble	Driscoll
	ROOM G
	ET/TAMU
ROOM C	ROOM H
Behrens	Francis(?)
Piper	
Calaway	
	Pulliam
ROOM D	Fulthorpe
Smith	
Beltran	
Zahm	
Floyd	

BERTHING PLAN
FIGURE 2

