

PROPOSAL

Hawaii-Tahiti-Hawaii

1980

Another copy in  
"Crew Training"  
1977-83 Group

**INTRODUCTION LETTER**

**by**

**Michael A. Tongg**

PLAN FOR HOKULE'A VOYAGE TO  
TAHITI AND RETURN, 1980

PLAN FOR HOKULE'A VOYAGE TO  
TAHITI AND RETURN, 1980

I. GOAL

Provide people the opportunity to relieve, feel, and better understand what were the survival experiences of the first voyagers to Hawaii. Provide the Peoples of the Pacific with another real symbol of self pride and their common cultural and economic interests.

II. OBJECTIVES TO ACHIEVE PURPOSE

1. To conduct cultural voyaging exchanges to strengthen and enhance cultural and economic ties between the United States and Polynesia and Hawaii's role as a cultural and economic liaison between the peoples of the Pacific and the United States;
2. To further test and document the Hawaii-Tahiti-Hawaii route without instrumentation and compare the non-instrumental voyage with instrument control on board;
3. To test as many traditional voyaging techniques as time and finances allows. For example, the durability of lauhala sails, the continuation of the food preservation project, testing of ancient fishing methods, etc.;
4. To develop a training and education program for prospective crew members and the general public;
5. To attempt to identify and recreate traditional Polynesian values, to better understand the relationship between man and his Natural Environment as a means of survival.

III. ACTIVITIES TO ACHIEVE THE OBJECTIVES

1. Develop a detailed operational plan for the following areas:
  - a. Vessel preparation and integrity to assure a safe long distance sail to and from Tahiti
  - b. Non-instrumental navigation
  - c. Safety and communications program requirements
  - d. Physical and psychological health program for crew
  - e. Overall crew training program to include all appropriate activity elements as well as curriculum for classroom and field exercises.



III. ACTIVITIES TO ACHIEVE THE OBJECTIVES (continued)

- f. Research and documentation of projects for voyage.
- g. Provisions
- 2. Depending upon the program activity requirements--develop appropriate support plans in the following areas:
  - a. Budget and finance
  - b. Public information
  - c. Cultural educational/exchange resources
  - d. Tahiti liaison
  - e. Dissemination program for project results and data

IV. SUGGESTED TIME FRAMES FOR PLANNING PROCESS

- 1. By week of January 1, 1979:
  - a. Complete general descriptive statement regarding short/long term goals of PVS and Hokule'a (refer to written statements by PVS Board).
  - b. Specification of areas with their responsible individuals to be included in the needs assessment for program requirements. Distribution of assessment duties for completion within six weeks.
  - c. Meet with PVS officers to get input from Board of PVS regarding plan elements/goals/timing.
  - d. Assign group to determine structural needs of vessel. Contact Coast Guard to resolve outstanding issues and get full cooperation.
- 2. By week of February 19, 1979:
  - a. Appointment of voyage committee to begin planning process. Solicitation of scientific projects for voyage should begin.
  - b. Submission of assessment studies for each area in regard to voyage as well as training goals. Appropriate time schedules should be included.
  - c. Establish training committee to prepare comprehensive training curriculum and schedule.

IV. SUGGESTED TIME FRAMES FOR PLANNING PROCESS (continued)

2. By week of February 19, 1979: (continued)
  - d. Presentation to and approval by PVS Board of General Descriptive Plan and Statement.
3. By week of April 3, 1979:
  - a. Completion of comprehensive training curriculum and forwarding of such to PVS for approval.
  - b. Assignment of instructors and scheduling of training course by training committee and planning group. Begin preparation of course materials.
  - c. Continue solicitation of scientific project proposals for voyage.
  - d. Continue to review needs assessment and schedules.
4. By week of April 23, 1979:
  - a. Begin selection process for training course.
  - b. Continue preparation of training course materials.
  - c. Continue solicitation of scientific project proposals for voyage.
  - d. Continue to review needs assessment and schedules.
  - e. Voyage Committee to present proposed schedule for review by planning group and forward to PVS Board for suggestions.
  - f. Appoint group to begin long-range planning process (beyond voyage).
5. By week of May 21, 1979:
  - a. Selection of training group (s) completed.
  - b. Completion of training course materials and final scheduling of classes.
  - c. Final needs assessment and training check list reviewed by planning group.
  - d. Begin screening of scientific project proposals for voyage.

IV. SUGGESTED TIME FRAMES FOR PLANNING PROCESS (continued)

5. By week of May 21, 1979: (continued)
  - e. Completion and approval of voyage plan by voyage committee. Plan to be approved by planning group for forwarding to PVS Board for approval.
6. By Mid-June, 1979:
  - a. Training program begins.
  - b. Final selection of scientific projects for voyage completed.
  - c. Long-range planning group to present goals with general time frame for review by planning group.
  - d. Voyage Committee to prepare implementation plan and schedule to planning group.
7. October, 1979
  - a. Selection of crews and reserves for voyage
  - b. Completion of tentative voyage plan

1979

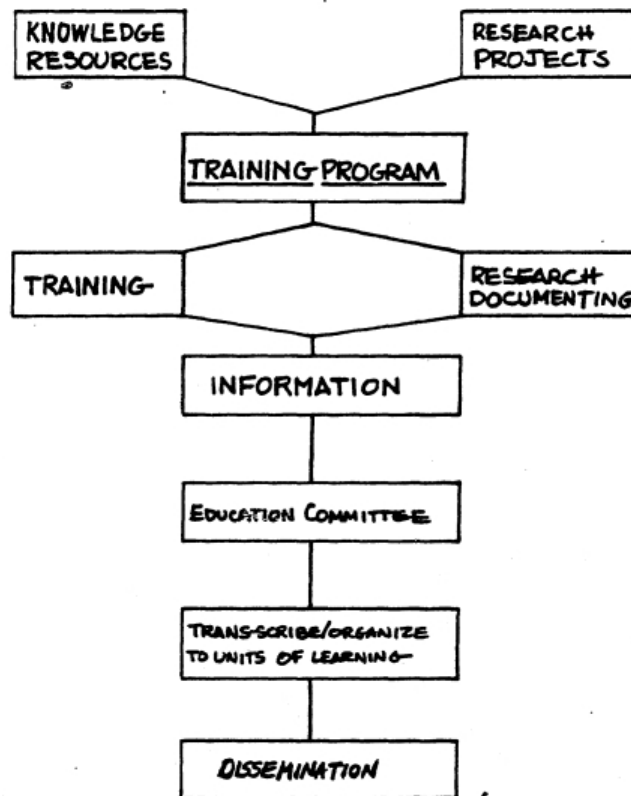
FEBRUARY	FEBRUARY/MARCH • OVERALL GENERAL PLANNING COMPLETED • CREW SELECTION • DESIGN COMPLETED • SELECT CREW APPLICANTS (SHORT LIST (32)).
MARCH	
APRIL	APRIL - SEPTEMBER IMPLEMENT PROGRAMS • VESSEL • HEALTH • SAFETY • RESEARCH • CLASS STUDIES
MAY	MAY - SEPTEMBER FIELD STUDIES OCEAN TRAINING
JUNE	
JULY	
AUGUST	
SEPTEMBER	SEPTEMBER - • SELECTION OF FINAL CREW AND ALTERNATES
OCTOBER	OCTOBER - JANUARY • CREW TRAINING
NOVEMBER	
DECEMBER	

1980

JANUARY	JANUARY - • DRY DOCK • REPAIR & MAINTENANCE WORK
FEBRUARY	FEBRUARY • FINAL CREW TRAINING • FINAL COMB TESTING
MARCH	MARCH/APRIL/MAY • PROVISIONING • DEPARTURE TO TAHITI TRANSIT TO TAHITI
APRIL	
MAY	MAY: TAHITI • CREW EXCHANGES • DEPARTURE OF CREW • HAWAII DEPARTURE

# CULTURAL RESEARCH PROJECTS

## FLOW OF INFORMATION



BUDGET

Tahiti 1980

## STEERING COMMITTEE

## BUDGET

Tahiti 1980

TRAINING

## Vessel

a. Drydocking	\$ 6,000.00	
Materials		
Sails		
b. Safety Equipment	5,000.00	
c. Escort Vessel	2,000.00	
d. Communication	10,200.00	
e. Foul weather gear	600.00	
f. Food	6,000.00	\$ 29,800.00

Health	500.00	500.00
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Safety	1,000.00	1,000.00
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## Research

a. Training	300.00	
b. Equipment	2,700.00	
c. Contingency fund	10,000.00	13,000.00

Class Studies	300.00	300.00
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## Field Studies

a. Operational costs	500.00	
b. Micronesian venture	15,500.00	
c. Contingency fund	3,000.00	19,000.00

Total	\$ 63,600.00
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PLANNING

Crew Selection	200.00	200.00
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Education	3,000.00	3,000.00
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## Tahiti Liaison

a. Contingency fund	5,000.00	
b. Airfare	7,500.00	
c. Lodging	500.00	
d. Mooring	400.00	13,400.00

Total	\$ 16,600.00
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GRAND TOTAL	<u>\$ 80,200.00</u>
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3/30 ma

# CREW TRAINING PROGRAM

CHAIRMAN  
STEERING COMMITTEE

TRAINING					
VESSEL	HEALTH	SAFETY	RESEARCH	CLASS STUDIES	FIELD STUDIES OFFICER'S CORE
<u>I. VESSEL ORIENTATION.</u> <u>II. COMPOSE OF PARTS AND THEIR FUNCTIONS.</u> <u>III. MAINTENANCE IN TERMS OF SEAWORTHINESS</u>	<u>I. PHYSICAL:</u> <ul style="list-style-type: none"> <li>• DRY</li> <li>• INJURY</li> <li>• SICKNESS</li> <li>• PREVENTIVE MEDICINE.</li> <li>• PHYSICAL EXAMINATION</li> </ul> <u>II. PSYCHOLOGICAL:</u> <ul style="list-style-type: none"> <li>• STRESS</li> <li>• WHAT TO EXPECT</li> <li>• HOW TO COPE.</li> <li>• PSYCHOLOGICAL SCREENING</li> </ul> <u>III. PHYSICAL CONDITIONING PROGRAM</u>	<u>I. CLASSROOM STUDIES:</u> <ul style="list-style-type: none"> <li>• BASIC FIRST AID</li> <li>• SURVIVAL TRAINING</li> <li>• HAZARDS OF VOYAGING</li> <li>• EMERGENCY PROCEDURES</li> <li>• COMMUNICATIONS</li> <li>• EMERGENCY EQUIPMENT</li> </ul> <u>II. AT SEA:</u> <ul style="list-style-type: none"> <li>• SURVIVAL TECHNIQUES</li> <li>• HAZARDS OF VOYAGING</li> <li>• EMERGENCY PROCEDURES AND DRILLS</li> <li>• OPERATION OF SAFETY EQUIPMENT:</li> <li>— HOW TO USE</li> <li>— WHEN TO USE</li> <li>— WHERE TO STORE</li> <li>• COMMUNICATIONS TRAINING</li> </ul>	<u>I. PROJECTS</u> <ul style="list-style-type: none"> <li>• NAVIGATION</li> <li>• CRAFT PERFORMANCE.</li> <li>• RISK EXPERIMENTS</li> <li>• FISHING</li> <li>• DEPARTURE ROUTE</li> <li>• ANCHOR MATERIALS</li> </ul> <u>II. DOCUMENTATION</u> <ul style="list-style-type: none"> <li>• WHAT TO DOCUMENT</li> <li>• WHERE TO DOCUMENT</li> <li>• HOW TO OPERATE EQUIPMENT</li> </ul>	<u>I. SUBJECTS</u> <ul style="list-style-type: none"> <li>• CULTURAL HERITAGE</li> <li>• NEGATIVE THEORY</li> <li>• BASIC SAILING THEORY</li> <li>• HULLSEA ORIENTATION</li> <li>• SIMULATED VOYAGING</li> <li>• CLIMATELOGY</li> <li>• NAVIGATION</li> <li>• CRAFT PERFORMANCE</li> <li>• BASIC SEAMANSHIP</li> </ul>	<u>I. SHORT SAILS (DAY)</u> <ul style="list-style-type: none"> <li>• BASIC SEAMANSHIP</li> <li>• MECHANICS OF:</li> <li>— SAILING</li> <li>— HULLSEA</li> <li>— STEERING</li> <li>— SAIL SETTING</li> </ul> <u>II. EXTENDED SAILING (INTER-ISLAND)</u> <ul style="list-style-type: none"> <li>• SIMULATED VOYAGING</li> <li>• LIFE AT SEA</li> <li>• WATCH DUTIES</li> <li>• LEARN THE CRAFT</li> </ul> <u>III. SAFETY</u> <ul style="list-style-type: none"> <li>• PRACTICE EMERGENCY PROCEDURES &amp; DRILL</li> <li>• OPERATION AND PROPER STORAGE OF SAFETY EQUIPMENT</li> </ul>
• DRYDOCKING \$6,000.00 • MATERIALS/SALES • SAFETY EQUIP. 5,000.00 • PAUL WEATHER EQUIP. 600.00 • COMMUNICATION 10,240.00 • FOOD PREPARATION 6,000.00 • ESCORT VESSEL 2,000.00 <b>TOTAL: 29,800.00</b>	• HEALTH \$500.00	• SAFETY \$1,000.00	• TRAINING \$300.00 • EQUIPMENT 2,700.00 • CONTINGENCY FUND 10,000.00 <b>TOTAL: \$13,000.00</b>	• CLASS STUDIES \$300.00	• OPERATIONAL COST \$500 • MICROBIOLOGY • VENTURE 15,500 • CONTINGENCY FUND 3,000 <b>TOTAL: \$19,000.</b>
<b>\$80,200.00</b> TOTAL BUDGET			TRAINING DEPT. TOTAL BUDGET <b>\$63,600.00</b> TOTAL		



# PROGRAM

TEE

PLANNING				
ES	FIELD STUDIES OFFICER'S CORE	CREW SELECTION STEERING COMMITTEE	EDUCATION	TAHITI LIAISON/ EXPENSES
I. SHORT SALES (DAY)	<ul style="list-style-type: none"> <li>BASIC SEAMANSHIP</li> <li>MECHANICS OF:                             <ul style="list-style-type: none"> <li>SAILING</li> <li>HOKULEA</li> <li>STEERING</li> <li>SAIL SETTING</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>CREW SELECTION DESIGN                             <ul style="list-style-type: none"> <li>OFFICER'S CORE</li> <li>CREWMAN CORE</li> <li>CRITERIA</li> </ul> </li> <li>FINAL CREW SELECTION                             <ul style="list-style-type: none"> <li>CRITERIA</li> <li>SELECTION PROCESS</li> </ul> </li> <li>COMMUNICATION                             <ul style="list-style-type: none"> <li>RESPONSIBLE FOR COMMUNICATION BETWEEN STEERING COMMITTEE AND CREW</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>DOCUMENTATION CALL INFORMATION REGARDING VOYAGING                             <ul style="list-style-type: none"> <li>CLASS LECTURES</li> <li>SAFETY PROGRAM</li> <li>HEALTH</li> <li>VESSEL PERFORMANCE</li> <li>OCEAN STUDIES</li> <li>RESEARCH PROJECTS</li> <li>VOYAGE RESULTS</li> </ul> </li> <li>TRANSCRIPTION/ORGANIZATION                             <ul style="list-style-type: none"> <li>CONVERT DATA INTO EDUCATIONAL UNITS</li> </ul> </li> <li>DISSEMINATION                             <ul style="list-style-type: none"> <li>INFORMATION MADE AVAILABLE TO PUBLIC:                                     <ul style="list-style-type: none"> <li>FILMS</li> <li>SLIDES</li> <li>TAPE</li> <li>ARTICLES</li> <li>LECTURES</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>ACCOMMODATIONS                             <ul style="list-style-type: none"> <li>TAHITI AIR FARE</li> <li>LODGING IN TAHITI</li> <li>MOORING HOKULEA</li> <li>REPAIR WORK ON HOKULEA</li> <li>TRANSPORTATION</li> </ul> </li> <li>CONTINGENCY PLAN                             <ul style="list-style-type: none"> <li>IF HOKULEA NEEDS TO STAY IN TAHITI FOR 1 YEAR</li> </ul> </li> <li>CREW FAMILY COMPENSATION</li> </ul>
DO \$	<ul style="list-style-type: none"> <li>OPERATIONAL COST \$500.00</li> <li>MECHANISM</li> <li>VEHICLE 15,500.00</li> <li>CONTINGENCY FUND 3000.00</li> <li>TOTAL \$19,000.00</li> </ul>	<ul style="list-style-type: none"> <li>COMMUNICATIONS:                             <ul style="list-style-type: none"> <li>LETTERS</li> <li>PHONE CALLS \$200.00</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>EDUCATIONAL COMMITTEE \$3,000.00</li> </ul>	<ul style="list-style-type: none"> <li>CONTINGENCY FUND \$5,000.00</li> <li>AIRFARE 7,500.00</li> <li>LODGING 500.00</li> <li>MOORING 400.00</li> <li>TOTAL \$13,400.00</li> </ul>
<div> <div> TOTAL BUDGET  00.00 TOTAL </div> <div> PLANNING-DEPT. TOTAL BUDGET  \$18,600.00 TOTAL </div> </div>				

a) Vessel

IDEAS FOR A SAFE VOYAGE ON HOKULE'A TO TAHITI AND BACK

Wally Froiseth

I. VESSEL PREPARATION

a. Extensive drydocking including:

- 1) Complete check of wormshoe and fixing or replacement as needed.
- 2) Repair any worn spots on hull fiberglass, especially bottom of bow.
- 3) Recaulk manus and fiberglass both manus to hull over caulking.
- 4) Detail inspection of all iaku ties and replacement as required.
- 5) Inspection of iakus and hulls for cracks, fractures, etc.
- 6) Sand and paint hulls.
- 7) Inspection of all lines and running gear with replacement as needed.
- 8) Inspection of all masts, spars, booms.
- 9) Assure compartment decks water tight.
- 10) Inspect and test all safety equipment.
- 11) Check hatch cover gaskets material, tie downs and fittings, replace as required.
- 12) Test pumps and inspect for wear and deterioration.
- 13) Inspect all sails.
- 14) Outboard engine overhaul.
- 15) Anchors and anchor line inspection.

II. SCHEDULING OF PREPARATIONS

- a. Drydocking should be scheduled at least three months in advance of departure date.
- b. Present schedule, to be approved by the Board of Directors, includes the use of Hokule'a if requested grant for teaching comes through, up until October, 1980 (prior approval for grant submission was given by the Board of Directors).
- c. The above would mean drydocking would be scheduled for January, 1981, however, if grant not approved, drydocking could be scheduled for January 1, 1980.

III. PRESENT HOKULE'A SEAWORTHINESS - JANUARY, 1979

- a. At present, Hokule'a's seaworthiness is actually better at this time than it ever was since many lessons of experience have been incorporated and improvements made.
- b. Most important, of which is, prevention of the flooding of hulls and any possible water intake removal has been substantially improved.
- c. A meeting was held on January 19, 1979 with Coast Guard personnel to review tests and needs for clearance to sail. Inclining test was conducted under supervision of Coast Guard on January 31, 1979. Results not available yet. A test proved that the flooded end and manu compartments can be emptied by use of new pumps in 13 minutes.

IV. EQUIPMENT FOR HOKULE'A

- a. I would suggest all safety equipment as suggested by the Coast Guard be provided and carried on board. Any additions be carefully reviewed by your committee and should be a committee decision, not any individual decision. This should also include any and all spare equipment of any type.
- b. Training on purpose and use of all equipment should be required of all crew members before departure.
- c. Provide one new set of sails.

V. BUDGET REQUIREMENTS

Drydocking costs	\$2,000
Materials	1,000
Sails	1,500
Miscellaneous	500
<b>TOTAL</b>	<b>\$5,000</b>

VI. TRAINING

- a. Regular scheduled classes and time specified for training in all phases of sailing, safety, etc. and be required of all crew members before sailing.
- b. Included should be at least one class in catamaran sailing which could be arranged with some people like Woody Brown, Rudy Choy, and Joey Cabell for experiences. Double hull sailing is different than keel boat sailing. Inter-island sails should be utilized for training personnel. Have training talks to crew by experienced persons in areas of damage control, first aid, man overboard drills, etc.

VII. ADDITIONAL IDEAS AND RECOMMENDATIONS

- a. Limit of personnel to preferably only ten (one for each compartment) or possibly 12 at most.
- b. Limit all equipment aboard and require clearance of committee for any and all items. Includes spare gear, safety equipment, personal gear, food, etc. Training or talks on improvization -- replacement in Tahiti, etc.
- c. Establish routine of watch personnel including time checks of compartments, lines--all running gear--noting of barometer reading in log each hour, etc.
- d. Require reading by each watch prior to takeover of watch of log.
- e. Establish load line for Hokule'a and do not exceed.
- f. Assure a satisfactory spray shield and cover over hatches. Ask experienced sail makers and other sailors for ideas.
- g. Serious potential crew members be given chance and required to be part of crew on inter-island sails as far as possible.
- h. Limit weight load to 500 lbs/person average including all gear and food, etc. Total limit 12,000 lbs.
- i. Leave early in morning in the best weather available.
- j. Do not store materials in end compartments.
- k. Storage should be 75% to windward and 25% leeward hulls.
- l. Include instructions to all crew--do not put hatch covers on when down below in compartments--airtight now with double seal gaskets--very little oxygen--VERY IMPORTANT. May have to put in small vent hole with cork and suggest painting on underside of hatch covers appropriate warning to this effect. (May be done right away.)
- m. Mount EPRIBS properly and have class on operation to all crew members.

b) Communication

# HONOLE'UA COMMUNICATIONS BUDGET - TAHITI TRIP

1/24/79

## I. VHF

1. 78 Channels VHF synthesized 25 watt (for international frequencies)	@ 900.00 -	900.00
2. VHF antenna 6db and mount 2 ea (one spare)	@ 100.00 -	200.00
3. Remote weatherproof speaker	@ 25.00 -	25.00
4. Head set for above	@ 30.00 -	30.00
		<u>1,155.00</u>

## II. Power

1. 2 ea 150 amp hr marine batteries 12VDC	@ 150.00 -	300.00
2. Marinetics distribution panel with VM and AM. 6 ea circuit breakers 1 ea Battery #1 1 ea Battery #2 1 ea VHF 1 ea SSB 2 ea Spare	@ 170.00 -	170.00
3. 2 ea battery boxes	@ 10.00 -	20.00
4. 30 feet 2 conductor #6 power cable battery feed	@ 1.00 -	30.00
5. Solar power trickle charger	@ 300.00 -	300.00
6. Water driven trickle charger	@ 300.00 -	300.00
7. Misc. wire, fittings, etc.	@ 50.00 -	50.00
		<u>1,170.00</u>

## III. Tools

1. Simple plastic water proof tool box
2. Can contact cleaners
3. Can penetrating oil
4. Small hammer
5. Diagonal wire cutters
6. Plastic wire ties
7. Plastic tape
8. Silicon seal
9. Scotch cote
10. Silicon grease
11. Screw drivers - straight and phillips (assorted)
12. Knife
13. Flashlight
14. Crescent wrench

100.00

IV. Emergency Gear

1. 6 Channel handheld VHF radio, 1 & 4 watt switchable Regency or Motorola	@ 850.00 -	850.00
2. 2 ea Class B EPIRBs (purchased)	@ 440.00 -	440.00
3. 8 ea Personal strobes attached to the life preserver (purchased)	@ 52.50 -	420.00
4. 2 ea Man overboard strobe attached to buoy	@ 59.50 -	119.00
5. 1 ea High Seas HF portable - Northern radio N888	@ 1000.00 -	1,000.00
6. 2 ea S.O.S. beam lights	@ 20.00 -	40.00
		<u>2,869.00</u>

V. Long Range HF SSB

1. 1 ea 125-150 watt SSB radio, 2-23 MHz with antenna coupler	@ 3000.00 -	3,000.00
2. 2 ea SSB antennas Shakespeare or Morad (1 spare)	@ 350.00 -	700.00
3. 1 ea 100 sq ft counterpoise screen, fibreglassed for rigidity to be attached to bottom of deck (material only)	@ 100.00 -	100.00
4. 2 ea dynaplates for ground	@ 25.00 -	50.00
5. Misc. wire, straps, lugs	-	50.00
		<u>3,900.00</u>

Labor for all - 1,000.00

GRAND TOTAL \$10,194.00

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*weight & volume calculation*



HOKULE'A COMMUNICATIONS CONSIDERATIONS

1/24/79

1. Handhelds VHF precautionary measure.
2. Basic radio equipment could be secured thru direct donations from manufacturers.
3. Ham Radio could be used for long range communications but a special operator must be trained and licensed.
4. 78 Channels VHF radio could be a 12 or 24 channel version with set channels and would be suitable if channels were picked intelligently whereas the 78 ch radio has all U.S. and international channels.
5. Chargers could be eliminated if batteries were sized properly for a set sail plan. If eliminated, this leaves problems if batteries need to be recharged in remote areas if the vessel remained in the South Pacific for 1 year.
6. An alternate recharging program would be to take the auxiliary engine along and use its built in alternator for recharging. Keeping in mind the batteries are not to be used for starting, we may consider taking the engine because of possible scheduled or unscheduled trips to other islands. Gas then becomes a problem.
7. The P.V.S. still owns a 12 channel 25 watt Pace VHF and could be used. It certainly will be used for the inter-island trips now planned.
8. Long range daily contact can be made with the U.S. Coast Guard or KEMS Inc. on Hi Freq SSB.
9. EPIRBs Class B (2 ea) as of this date have been purchased and are on the Hokule'a. Therefore, 2 new batteries should be purchased before the Tahiti trip (\$110.00).
10. A small trickle charge system would allow the batteries to be used for

navigation lights without the need to change batteries or carry excessive number of replacements.

11. Class A EPIRBs (auto deploy type) was considered but we believe the pitching, rolling and yawing of the vessel in rough water will cause nuisance deployment.

12. Since the vessel will be used for inter-island travel prior to Tahiti, the power system and tools should be installed and fully tested.

13. The High Seas SSB radio need not be installed until just prior to the Tahiti trip but it would be good to have it inter-island primarily for crew training and system tests for refinements.

14. Most of the strobes as of this date have been purchased so the batteries need to be replaced. (8 ea @ \$8.00 = \$64.00)

15. If the radio communications gear is all purchased and used inter-island for 1 year refurbishing must be accomplished prior to trip. (\$600.00)

16. The hand sets and earphones are provided for communications security.

17. License for the VHF, SSB and EPIRB should still be current but should be re-checked. However, operators' permits must be secured.

18. Training (all)

a) 8 hours straight, 4 ea 2 hr session after hours or 2 ea 4 hr sessions.

b) Topics

- 1) FCC regulations
- 2) Radio principles
- 3) Electricity (Basic)
- 4) Antenna principles

Communications Operations - Page 3

- 5) Radio wave propagation
- 6) Operator permits
- 7) Final exam and certification
- 8) Specifics of Hokule'a communication system
- 9) S.O.P.
- 10) Actual operation exercise
- 11) Emergency procedures
- 12) EPIRBs and emergency communication

19. Training (specific) for primary and secondary operators selected out of the Phase I students

- a) Communication schedules
- b) Operation plan
- c) Emergency procedures
- d) Additional 4 -8 hours of training as needed
- e) A primary operator should be designated on every voyage offshore.
- f) Final exam (oral OK but written preferred for recordkeeping)

20. Location of gear

- a) VHF antenna - near navigator's platform
- b) SSB antenna between masts aft of Hale
- c) Batteries - in Hale or top of one of the hatches as previous
- d) Solar panel and water generator - close to batteries
- e) Radios in a water or splash proof location in Hale or top deck somewhere to avoid problems of a flooded compartment.

21. A good 3 months will be needed to complete procurement, installation and training.

22. I believe the availability of dollars and availability of donations of gear to be the primary constraint and of first priority.

ILLEGIBLE

c) Micronesian Venture

Thoughts on a Micronesian Venture

February 27, 1979

The Polynesian Voyaging Society is contemplating a voyage to Tahiti in 1980 or 1981. The purpose is to learn more about long distance noninstrumental navigation and the sailing characteristics of the vessel. Such research will enhance our knowledge of the thoughts and ways of the Polynesians of old.

Crew training for a 1980 voyage must start soon. Presently the vessel is in drydock being made ready for an intensive training program.

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The Micronesian noninstrumental navigators constitute a living resource on the ancient methods of sailing long distances over the open ocean. Reading the stars, winds, and swells and putting it together is an art form that results in survival at sea. Careful documentation of the ways of such navigators needs to be done now before technology encroaches on that domain.

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crew and accompanying the Hokule'a as captain or navigator (or both) on a trip to Tahiti.

#### Tentative Schedule

Assuming a 1980 sailing date early in the year, we propose bringing a noninstrumental navigator to Hawaii in November 1979 for a period of about seven months.

The navigator would be responsible for training the crew for four months and then sailing to Tahiti in March-April, returning in May-June 1980.

#### Agreement

For maximum learning on our part and for the greatest unhampered use of his talent, we agree that the noninstrumental navigator would be in complete command.

Clarity of communication is essential, and we suggest that a translator of his choice accompany him.

We agree to his authority and will work without a contract. He will have the option to leave any time he wants. Canoe and crews must be ready for sailing when the time is right. He is the teacher and commitments shall be clear and schedules will be complied with. A willingness to learn on our part and determination to follow through on commitments will set the stage for a most effective working relationship with the noninstrumental navigator.

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### Steps

The first step is for Nainoa Thompson to go to Micronesia and, with proper protocol, contact a noninstrumental navigator with this proposal. Such contact is often difficult and may take weeks. March 1979 would be ideal for the first contact, and Nainoa return to Hawaii.

Assuming a noninstrumental navigator is contacted and agreement reached, Nainoa would return to Micronesia in October for a month or two of study and apprenticeship and learning the methods of the teacher.

December 1979 would be the time for the Micronesian navigator to come to Hawaii for crew training and sailing, with an eventual trip to Tahiti and return.

### Cost

Trip to Micronesia, gifts, exploratory talks	\$3,000
Round-trip transportation for navigator and interpreter	2,000
Stipend for navigator, \$1,000/month	7,000
Stipend for translator, \$500/month	3,500
Food, housing, transportation in Hawaii to be furnished by Nainoa Thompson	n/c

\* Maui Piracy would be ideal person for the job, it would be most proper to approach him 1st to see if he would be willing in such a venture. If not other resources could be approached.



d) Food

FOOD PREPARATION

35 Day Diet Plan - 17 Crew Members

Estimated Budget                      \$6,000.00 to \$8,000.00

Estimated Food Storage Space      (to be advised)

Estimated Nutritional Value Per (to be advised)  
Meal

Estimated Storage Weight              (to be advised)

CREW SELECTION

CREW SELECTION: General Statement

It is of utmost importance that a pool of approximately thirty-one trainees be selected to undergo the classroom and field studies necessary to carry out the intended 1980 voyage of the Hokule'a to Tahiti and back to Hawaii. It is estimated that thirty-one committed trainees will allow the development of two man crews and the appropriate reserves.

The careful selection of the trainees is crucial to the success of the two voyages. To this end, a committee of capable individuals, knowledgeable in the technical, physical, and psychological needs of the proposed voyage shall be instituted to review the planned training and voyage, develop specific criteria and procedures for crew selection and screen and select the initial group of trainees.

In October, 1979, the selection committee shall be asked to review the performance and individual situation of the trainees, the comments of classroom and field instructors, and the requirements of the detailed voyage plan and to select the two crews and their reserves for the Hawaii-Tahiti-Hawaii voyage of the Hokule'a.

Attached please find suggestions and general comments relating to the selection process. Final criteria and procedures, however, will be developed in final form from the selection committee.

### Crew Selection: General Suggestions

A pool of 31 prospective crew members will be established and trained from which final selection for the Hawaii-Tahiti voyage will be selected.

Each candidate will be assessed according to the following criteria.

1. Health  
Pass a physical examination
2. Experience  
Some understanding of and familiarity of the ocean is desirable although not absolutely necessary, for the specifics will be learned in the training program.
3. Compatibility  
Ability to work well with others. No serious personality problems.
4. Ability and willingness to learn  
Eagerness to seek out knowledge, curiosity, receptivity to demands of research, commitment to the ideals of the Polynesian Voyaging Society.

The trainees selected according to the criteria above will be subjected to an intensive hundred-hour training program. Final selection for the proposed 1980 Hawaii-Tahiti voyage will be made with the following criteria guiding the process:

1. Health  
Pass a physical examination and complete a physical conditioning program.

2. Knowledge and practical experience in the operation of Hokule'a.
3. Knowledge of Hokule'a--parts and functions.
4. Knowledge of safety  
First aid, preventive medicine, emergency procedures, hazards of voyaging, survival training on land and sea, emergency equipment and its use.
5. Background knowledge  
Heritage of ancient seamanship and voyaging, migration theory, basic sailing and theory, noninstrumental navigation, climatology, fishing.
6. Compatibility  
Through experiences in sailing together the individual finds the reality of stresses and strains in living closely with others. A demonstrated ability to work well with others under pressures.
7. Ability to learn  
Openness to new ideas and ways. Each crew member will be involved in a research project and possibly receive special training. He will be expected to adequately carry out the assignment and documentation as a contribution to furthering our knowledge of ancient voyaging.

### Officer Selection

Those appointed to officer rank will have met all the requirements for crew member. In addition, they will have the capability of performing specific tasks.

1. The officers will include the captain, first mate/watch captain, instrumental navigator, noninstrumental navigator, and medical doctor.
2. Build two or three groups of qualified individuals who have a demonstrated competence for the job. They would also perform as teachers in the training program.

### Training

Crew training needs to begin as soon as possible so that the selection process may proceed.

The ideal instructor/resource person would be Mau Piailug. An attempt to contact him has not yet been successful. Adequate funding would have to be secured in such an eventuality.

### Crew Selection Procedures

1. Each committee head is responsible for submitting a crew evaluation form on each person to the crew selection committee.
2. The crew selection committee will base their decisions on the following:
  - a. The evaluation form
  - b. Physical examination and conditioning
  - c. Psychological evaluation tests
  - d. Group discussion of each candidate

Each individual will be ranked by the committee, including alternates, in each specific criteria.

No questions will be used in crew selection that would require a written answer.

As soon as possible the crew selection committee will determine the fairest way for choosing the crew members.

The final crew must comprise a group that can work together well. An important criterion, then, is that of compatibility--a team, and not merely individuals. .



TRAINING PROGRAM

#### TRAINING GOALS: General Statement

It is the goal of the training program to mold a group of selected individuals into a competent, efficient, and motivated crew and replacements capable of carrying out the research, voyaging, and cultural goals planned for the 1980 sail.

It is of prime importance that each participant is prepared physically, psychologically, and technically to carry out his specific duties and responsibilities on the voyage. As in the days of ancient Polynesian voyaging, each individual will have a critical role and responsibility to fulfill. The success of the voyage and the safety of the crew will depend upon his/her carrying out these responsibilities in cooperation with his/her fellow crew members. The training program will prepare each individual to accept the challenge of their responsibilities and assure as much as possible the molding of an efficient team capable of meeting the technical and psychological needs of a non-instrumental navigation of the Pacific.

Much of the outlined content which follows deals with training programs aimed at the technical and physical competence levels of the individuals in the various areas, such as navigation, safety, sailing, etc. They should be self-explanatory. Two aspects which are not elaborated upon in the following documents, yet, are crucial to the success of the training program should be mentioned here.

First, it is a goal of the training program to provide all the participants with a thorough cultural and historical

TRAINING GOALS (continued)

understanding of the foundations of non-instrumental voyaging. Impart, this implies the creation of a certain "mind set" among crew members which will allow them a better contemporary understanding of the traditional concepts, and perspectives, and technology used by the ancient Polynesian voyagers.

A second important goal of the training program which goes beyond the physical and technical preparation of the crew is the crucial element of teamwork and mutual dependence among crew members. It is most necessary that each crew member understands and is willing to depend upon the strengths of his/her fellow crew members. Though insufficient, the term "teamwork" describes part of this goal for the training program, but it is a teamwork that goes beyond the mechanical working together of individuals and points to the psychological unit which is necessary for a successful voyage. The classroom and field studies are thus not only frameworks for technical learning, but at the same time they are organized to provide the trainees the shared experiences of dealing with and solving different problems and situations as a unit.

### Training Activities:

The training program for the 1980 voyage of the Hokule'a is divided into two general overlapping categories: (a) classroom programs and (b) field training.

(a) Classroom programs: After the selection of the trainee group there will be instituted a program of approximately eighty-five to one hundred classroom hours which each trainee will complete successfully before he/she can be considered for final crew selection. It is planned that classroom work will be completed as soon as schedules permit, but it will probably not be finished before the field training commences. When necessary, all topics covered in the classroom will find practical application in the field studies.

The general areas of classroom studies and the approximate hours contemplated are the following (see attached detailed plans for additional information):

1. Vessel: (15 hours) Basic nomenclature, structure, function of vessel parts and general sailing theory and practice. Understanding of vessel's capabilities and limitation.
2. Safety: (10 hours) General emergency procedures and precautions. Introduction to basic survival techniques and considerations. Conditions and situations to be aware of.
3. Navigation: (15 hours) General principles of non-instrumental navigation including work at Planetarium. Two or three trainees will be selected to concentrate on navigation as their specialty..
4. Cultural heritage: (15 hours) Basic history of Polynesian voyaging and their cultural foundations.
5. Research/Documentation: (10 hours) Basic research techniques and the use of camera, tape, and written documentation methods.
6. Communication: (8 hours) Principles of communication equipment and procedures. Designated individuals

Training Activities: (continued)

6. Communication: (continued) will receive additional intensive training.
7. Health/Physical and psychological conditioning: (20 hours)  
General health considerations, including food regime;  
basic first aid techniques (elected individuals to  
receive additional intensive training); psychological  
dimensions of voyage; basic physical conditioning.

(b) Field excercises: Commencing as soon as feasible and continuing with increasing regularity until the final sail will be a series of field training excercising on the Hokule'a. These training excercises will include all on board activities of the trainees beginning with in port orientations, progressing to day and weekend sails prior to the 1980 voyage.

The field excercises will be oriented toward the practical application of classroom principles and the development of the efficient teamwork of the trainees. Each individual will have the opportunity of developing in the field the specific responsibilities he/she would be called upon to carry out during the actual voyage.

It is envisioned that by October, 1979, a specific crew and alternates will be selected and training activities from that point until the actual sailing will almost be exclusively conducted aboard the vessel.

In summary, it is the intention of the training program to prepare each crew member technically, physically, and psychologically to efficiently and cooperatively carry out his responsibilities on the 1980 voyage of the Hokule'a. To insure this goal it is the

Training Activities: (continued)

intention of the training committee to insure that each member of the final crew has successfully completed a training curriculum of a minimum of approximately one hundred classroom hours and 300 - 400 hours of field exercises.

See attached documents for additional information.

### TRAINING PROGRAM

Basic assumptions: That the Polynesian Voyaging Society exists to learn more about ancient voyaging and seafaring. The process is a lengthy one, and each venture is an attempt to find out as much as we can to that a more complete picture will emerge.

A long range program will support those assumptions. A process is suggested in the diagram below:



a) Crew Training Program



CREW TRAINING  
Hawaii-Tahiti Voyage of Hokule'a

The aim of extensive training of the Hokule'a crew is to provide the background, theory, and the practical experience needed in a successful trip to Tahiti. Such voyaging, along with careful documentation of the experience, will further the research efforts into the ways of ancient Polynesians.

Training in several areas of expertise will take place over a period of year to acquaint crew members with the theory of ancient and modern sailing, non-instrumental navigation, safety at sea, practical sailing experiences, as well as longer periods of simulated voyaging.

### Sailing Ways--Old and New

The background knowledge and theory will be covered in classroom sessions and in selected readings.

1. Heritage

Theories of the settlement of Polynesia.  
Ancient sailing crafts. Simulated condition of ancient voyaging. Experimental archeology. History of Hokule'a.

2. Basic sailing and theory

Making way over the ocean with knowledge of wind, sea, and craft. Sailing theory in a variety of conditions. Design of crafts--mono and multiple hulls--and sailing characteristics.

3. The vessel Hokule'a

Parts, design, theory, compromises, functions. Discoveries on its sailing qualities and characteristics. Maintaining a seaworthy craft.

4. Simulated voyaging

Regions of travel, local as well as distant. Expecting the non-expected in long-distance voyaging and dealing effectively with various contingencies. Slides, lectures, films.

5. Basic climatology

Wind directions and varying conditions with the seasons. Theory of swells, generation, directions, reading the sea for advancing pressure systems. Cloud cover and rainfall. Rainfall. Optimum seasons and conditions. Computer simulation studies on drift.

6. Documentation

Since long-distance voyaging is a part of a research effort, crew members will be trained to record their observations--what to document and how to do it.

7. Special projects

Adaptability in furthering answers to research questions. Flexibility in responding to new conditions.

8. Navigation

See paper, "Noninstrumental Navigation Training."

### Safety Program

1. Basic First Aid course
2. Survival training  
Land and sea.
3. Hazards of sea voyaging  
Characteristics of a double-hulled vessel--  
the Hokule'a in particular--and hazards to  
be aware of, situations to anticipate.
4. Emergency procedures on Hokule'a  
Classroom lectures and demonstrations while  
under sail.
5. Communication  
How to operate emergency equipment. How  
to maintain equipment. Improvization and  
repair.
6. Health  
Physical--diet, injury, sickness, preventive  
medicine.  
Mental--stress of voyaging, what to expect,  
coping with the unexpected, adaptability.  
Conditioning--achieving a desired goal.

**b) Proposed Noninstrumental Navigation  
Training Program**

## PROPOSED NONINSTRUMENTAL NAVIGATION

### TRAINING PROGRAM

The crew members of Hokule'a need to know the principles and specifics of holding a particular course set by the navigator. Such competency depends upon a knowledge of the stars as well as the ways of the sea.

#### Noninstrumental Celestial Navigation

Crew members will become familiar with the terms and concepts relating to the stars.

1. Sidereal compass and the rising and setting places of principal stars.
2. The sun, and its eastward movement among the stars of about one degree a day. The sun's apparent path on the celestial sphere (ecliptic)
3. Relationship of the sun and full moon in the sky relative to the ecliptic.
4. The planets and their motions among the stars and relationship to the ecliptic.
5. Changes in the sky due to daily, annual, and precessional motions.
6. Changes in the azimuths of rising and setting stars with a change in latitude.
7. Steering stars for March through July as well as the stars for backsighting.
8. The solar and sidereal day as well as the synodic and sidereal month.

PROPOSED NONINSTRUMENTAL NAVIGATION TRAINING PROGRAM (continued)

9. Major zenith stars of Polynesia.
10. Terms: celestial equator, declination, meridian

Training

Training in the Planetarium and at sea as well as the knowledge to be gained through books will provide crew members the information they need to perform their steering tasks.

Five two-hour sessions in the Planetarium by Thompson/Kyselka will provide background information on the needed terms, concepts, and movements in the celestial sphere. Cost of training: \$50.00 per hour Planetarium fee. However, since the Bishop Museum views Polynesian voyaging with its domain of research, the fee is waived. Mention is to be made of the Museum's support of such research in pertinent publicity releases.

Crew members are expected to further their own knowledge through such sources as the following: STARS OVER HAWAII, Ed Bryan; STARS, H. L. Rey' NORTH STAR TO SOUTHERN CROSS, Kyselka/Lantermann; TWELVE SKY MAPS, Lantermann/Kyselka; POLYNESIAN STARS AND MEN, Kyselka/Bunton; and the articles BY STARS TO TAHITI, Kyselka/Thompson, and KEALAIKAHIKI, Kyselka/Thompson.

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PROPOSED NONINSTRUMENTAL NAVIGATION TRAINING PROGRAM (continued)

The work in the Planetarium will be followed by practical work on land and at sea in star identification and further knowledge of the celestial sphere.

Noninstrumental Navigation at Sea

Here we encounter the problems of holding a course when the steering stars are visible as well as maintaining direction when stars are obscured.

1. Sensing the weather. What signs to look for.  
Prediction for days in advance. Checking with weather satellite pictures.
2. A study of swells for direction-keeping.  
Indication of open sea swells and identification.  
Daytime clues for nighttime steering.
3. Steering--holding a desired course at any given wind direction or condition.
4. Extensive use of steering paddle, sweep, and center sweep.
5. Sail setting for self-steering and changes of sail setting for maximum efficiency.
6. The retaining of knowledge and experience will be done by chant, song, dance.
7. Overnight trips or weekends on Hokule'a will provide opportunity for experiencing the sea and learning the celestial sphere.



c) Communication Training

(Refer to Budget Report)

d) Field Studies

### Field Studies

Actual experience in sailing aboard Hokule'a will give the opportunity of putting theory into practical use in moving the vessel over the sea.

1. Short sails<sup>o</sup> (seamanship)  
Steering. Sail setting. Mechanics of the vessel. Duties of the crew.
2. Navigation  
Putting basic knowledge into practical use.  
Learning how to hold a course.
3. Special projects  
Training of individuals. Application of projects.
4. Fishing  
Catching and landing fish. Preserving and preparing fish as food source. May be a special project.--
5. Provisions and gear  
Storage of food and water. Usage and storage of personal gear.
5. Emergency and safety procedure  
On-the-ocean training. Testing of the gear and equipment. Drills.

### Simulated Voyaging

Extended voyaging on the Hokule'a will give prospective crew members a chance to experience the rigors of the sea. And it will also help them decide if the way of the sea is a way of life for them.

#### Interisland sailing--extended voyaging

Seamanship. Watch duties. Learning to live compatibly with others and to communicate clearly. First-hand sailing experiences. Navigating far outside the sight of land. Reading the signs in the sea, air, and sky.

### Areas of Study

The following include some of the possible areas of study.

1. Canoe performance  
Lee drift, windward performance, maximum efficient water line (carrying capacity), speed under various conditions, efficiency of various sail designs,
2. Noninstrumental navigation  
Testing research ideas en route. First-hand experience and generation of ideas of the clues that ancient man had related to his survival at sea.
3. Food preservation  
Types of food, storage, nutritional values.
4. Physical and mental health study  
Stresses in living together in small quarters for extended period of time.
5. Fishing  
Comparative study of modern lures and techniques with those of ancient times.
6. Survival at sea  
Anticipating the wind, wave, and weather from reading the signs in the sea.

# POLYNESIAN VOYAGING SOCIETY

BOX 6037 / HONOLULU / HAWAII 96818 / (808) 841-3966

## HOKULE'A TRAINING PROGRAM

(Initial Field Exercise)

### FOUR DIVISIONS

PRE-SAIL ORIENTATION  
RIGGING AND PREPARATION FOR SAIL  
SAILING  
DOCKING

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#### VICE PRESIDENT

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REVEREND

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FRANCIS KAIRIOA LEE

GORDON PHANAIA

#### A. PRE-SAIL ORIENTATION

(For individuals not familiar with sailing on the Hokule'a.)

1. Assemble on Hokule'a
2. Pass out informational materials on basic theory on sailing in general and specifically sailing Hokule'a.
3. Take crew through quick excursion of the canoe covering the areas of:
  - a. hulls
  - b. compartments
  - c. hale
  - d. both sails
  - e. side and middle sweeps
  - f. steering blades and steering compartments
4. Detailed and basic discussion of sailing Hokule'a by dividing the crew in five different stations
  - a. Stations One and Two - covers the front and back sails. Discuss the various parts and their function and what materials used
    1. Mast
    2. Mast step
    3. Boom
    4. Spar
    5. Mast head

HAWAII



TAHITI

BICENTENNIAL VOYAGE OF REDISCOVERY  
HOE AKU I KA WA'A

( A. PRE-SAIL ORIENTATION

Lines

1. Stays
2. Shrouds
3. Halyards
4. Triesting
5. Sheets

Sail

1. Design
2. Purpose and effectiveness

b. Station Three - Steering Sweep

1. Construction (material) how it is rigged
2. Purpose
3. Effectiveness - What is it doing to the canoe
4. When to use the sweep
5. How to operate it
6. What are its dangers

( c. Station Four - Steering Blade

1. Construction (material) how it is rigged
2. Purpose
3. Effectiveness - What is it doing to the canoe
4. Under what condition is it used
5. How to operate the blade within the steering compartment
6. What are its dangers
7. How to use it to supplement the steering sweep

d. Station Five - Duties on canoe (a more detailed inspection of canoe) Areas to cover:

1. Pumping hulls
  2. Fishing
  3. Storage of food, water, supplies, equipment
  4. Iakos and rigging
  5. Railing
- Tow lines  
Anchor and anchor lines  
Man overboard procedures  
Positioning to avoid accidental jibe dangers

( A. PRE-SAIL ORIENTATION (continued)

5. Short Discussion on:

a. Maneuvers

1. Come about
2. Jibe

b. Changing direction in respect to wind and swell:

1. Changes in sail setting
2. Changes in steering methods
3. Performance of Hokule'a
4. Description and performance of Hokule'a in:

- a. close reach
- b. beam reach
- c. broad reach
- d. running free

B. RIGGING AND PREPARATION FOR SAIL

- (
1. Assembly of crew
  2. Raising of sails
  3. Tying of lines
  4. Dropping of sails and triesting of sails to make sure operable
  5. Preparation of steering equipment
  6. Storage of food, water, safety equipment and medical kit so that everyone knows where the equipment is located
  7. Organizing crew by dividing them into five groups - one group for every station
  8. Pule

C. SAIL

1. At each of the five station, would be a crew member from either one of the voyages to or from Tahiti to do the instruction of that particular station. The material covered would basically be what each instructor felt like teaching.
  2. The crew at one particular station would receive instruction similar to the format given in the pre-sail orientation, but in more detail and actually doing it.
  3. Each group would rotate after spending approximately  $\frac{1}{2}$  hour at each station and completing a maneuver (either coming about or jibing) and re-setting the canoe for its new tack.
- SP



C. SAIL (continued)

4. Also attempt (but not really possible) to have the canoe change its direction in respect to the wind and swell direction under the categories of close reach, beam reach, broad reach, and running free. This would show the changes in sail setting, steering methods and techniques.

D. BRINGING CANOE BACK TO DOCK

1. Each group would remain at their respective station
2. Group at Station five would prepare tow and mooring lines
3. Entire crew would participate in dropping sails, taking care of equipment and cleaning Hokule'a

1979  
Navigator's sail

Thoughts on a Micronesian Venture  
February 27, 1979

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We propose selecting a Micronesian navigator and bring him to Hawaii for the purpose of training a

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#### Tentative Schedule

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Clarity of communication is essential, and we suggest that a translator of his choice accompany him.

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## AUGUST

### Along the Sun's Path

Spica glows for a while above the setting sun, then Virgo plunges unceremoniously, head downward beneath the horizon. Early in October the sun and Spica will be together in the sky, and Spica will not be seen.

Libra the Scales is hardly noticeable in the twilight. But the Heart of Scorpius twinkles brilliantly in the southwest. Scorpius drags his tail along the horizon, pursued by the arrow-shooting Sagittarius. Capricornus and Aquarius follow.

The "Teapot" is an asterism in Sagittarius--a fine, strong geometric pattern. Just above the Bow of the Archer (or above the spout of the Teapot) is the winter solstice--the place where the sun is when it is farthest south of the equator. Here it seems to stand still for a while, gaining momentum for its six-month journey north.

### About the Meridian

Ophiuchus, above the head of Sagittarius, is busy wrestling Serpens. The physician-serpent duo symbolizes the renewal of life. Serpens almost wears the Northern Crown, and his tail lies in the Milky Way.

Giants Ophiuchus and Hercules have their heads close to each other, 13 degrees north of the celestial equator, and their feet go in opposite directions. Hercules has one foot on the head of Draco. The Dragon itself is coiled about the Little Dipper with his bright eyes near Vega.

### Around the Sky

While the strong curve through the Big Dipper's handle to Arcturus and Spica moves solemnly to the west, Vega culminates, leading the Vega-Deneb-Altair triangle. Spanning the Milky Way, the triangle is at its best about midnight in August.

Orange Arcturus sparkles in the thick atmosphere near the western horizon. Merak and Dubhe are pointing eastward to Polaris, and, beyond, to Cassiopeia just rising.

Feb 27, 1979 -3-

### Steps

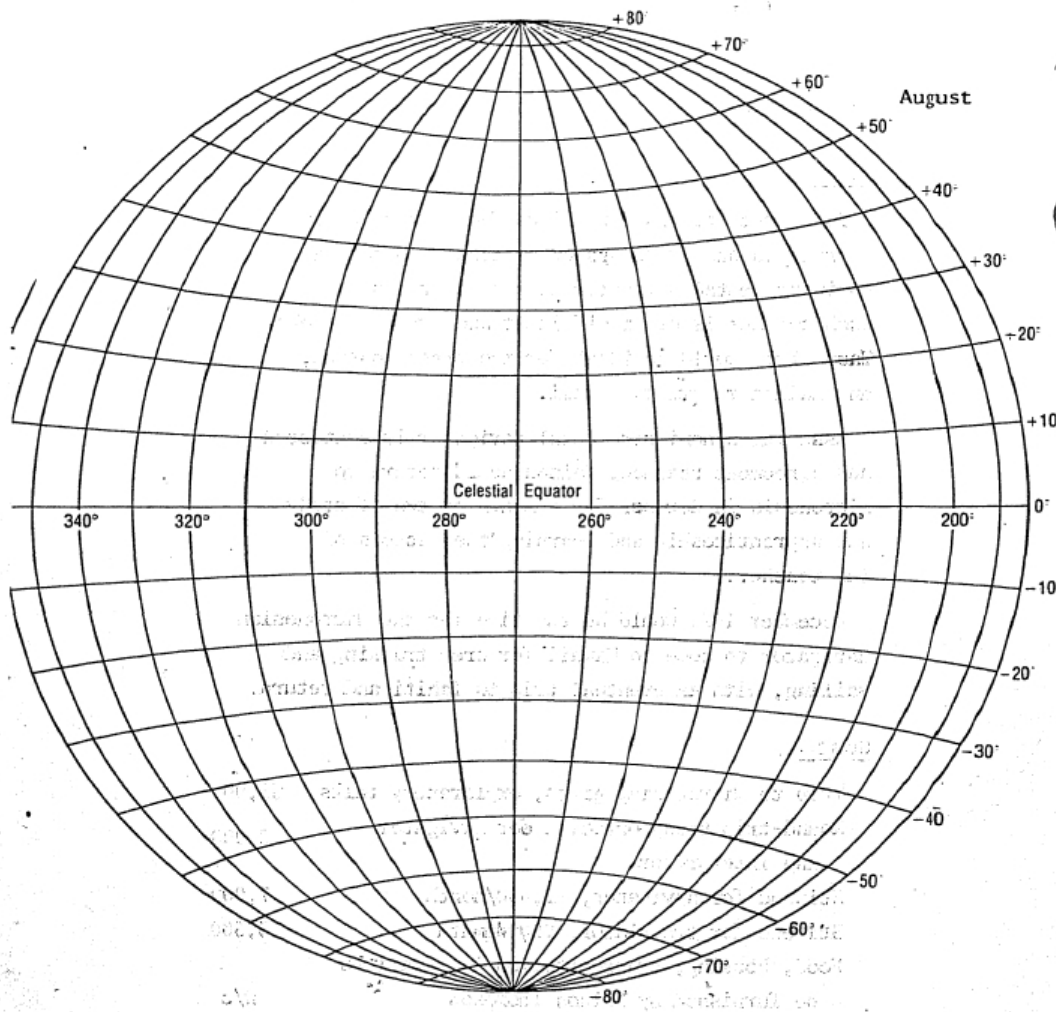
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December 1979 would be the time for the Micronesian navigator to come to Hawaii for crew training and sailing, with an eventual trip to Tahiti and return.

### Cost

Trip to Micronesia, gifts, exploratory talks	\$3,000
Round-trip transportation for navigator and interpreter	2,000
Stipend for navigator, \$1,000/month	7,000
Stipend for translator, \$500/month	3,500
Food, housing, transportation in Hawaii to be furnished by Nainoa Thompson	n/c



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