HAWAI'I UNDERSEA RESEARCH LABORATORY

QUICK LOOK REPORT
DIVE: Pisces V-652

MISSION STATUS

Location: SW ocean reef slope, Rose Atoll National Wildlife Refuge, American Samoa

Latitude: 14 ° 33.149'S **Longitude:** 168° 10.465'W

Mission Date: 14 July 2005 **Duration:** 8 hours, 9 minutes

Maximum Depth: 820 meters

Project Title: Deep reef slope investigation of the marine biodiversity of the southwestern side of Rose Atoll National Wildlife Refuge, American Samoa

Principal Investigator: James E. Maragos, Ph.D., Coral Reef Biologist

Address: Pacific Remote Islands, National Wildlife Refuge Complex,
U.S Fish & Wildlife Service
300 Ala Moana Blvd., Rm 5-231, Box 50167
Honolulu, HI 96850, USA

Phone: 808-792-9557

Observer 1: James E. Maragos
Address: same as above

Observer 2: Bruce Mundy, Fisheries Biologist
Address: Pacific Islands Fisheries Science Center
National Marine Fisheries Service
2570 Dole St., Honolulu, HI 96822

Pilot 1: Max Cremer **Pilot 2:** none

Scientific Data Acquired: Prepare an abstract outlining your objectives, techniques, findings, etc.

Objectives:

1) extend spatial extent of search for, and environmental assessment of, shipwreck debris in a downdrift direction of the original 1993 grounding site, proceeding in a northwestern direction from HURL bottom marker 46 set at the completion of dive 651 of the previous day,
2) Inventory and document via notes, video, and photography, the marine biodiversity, bathymetry, oceanography, and anthropogenic disturbance in the deep reef study area,
3) Provide the basis and need for further biodiversity and environmental investigations at Rose Atoll NWR using HURL submersibles over the next decade.
4) Collect photographic and scientific data for use in the planned nomination of Rose Atoll NWR as a World Heritage Site.

Observations, findings, etc:

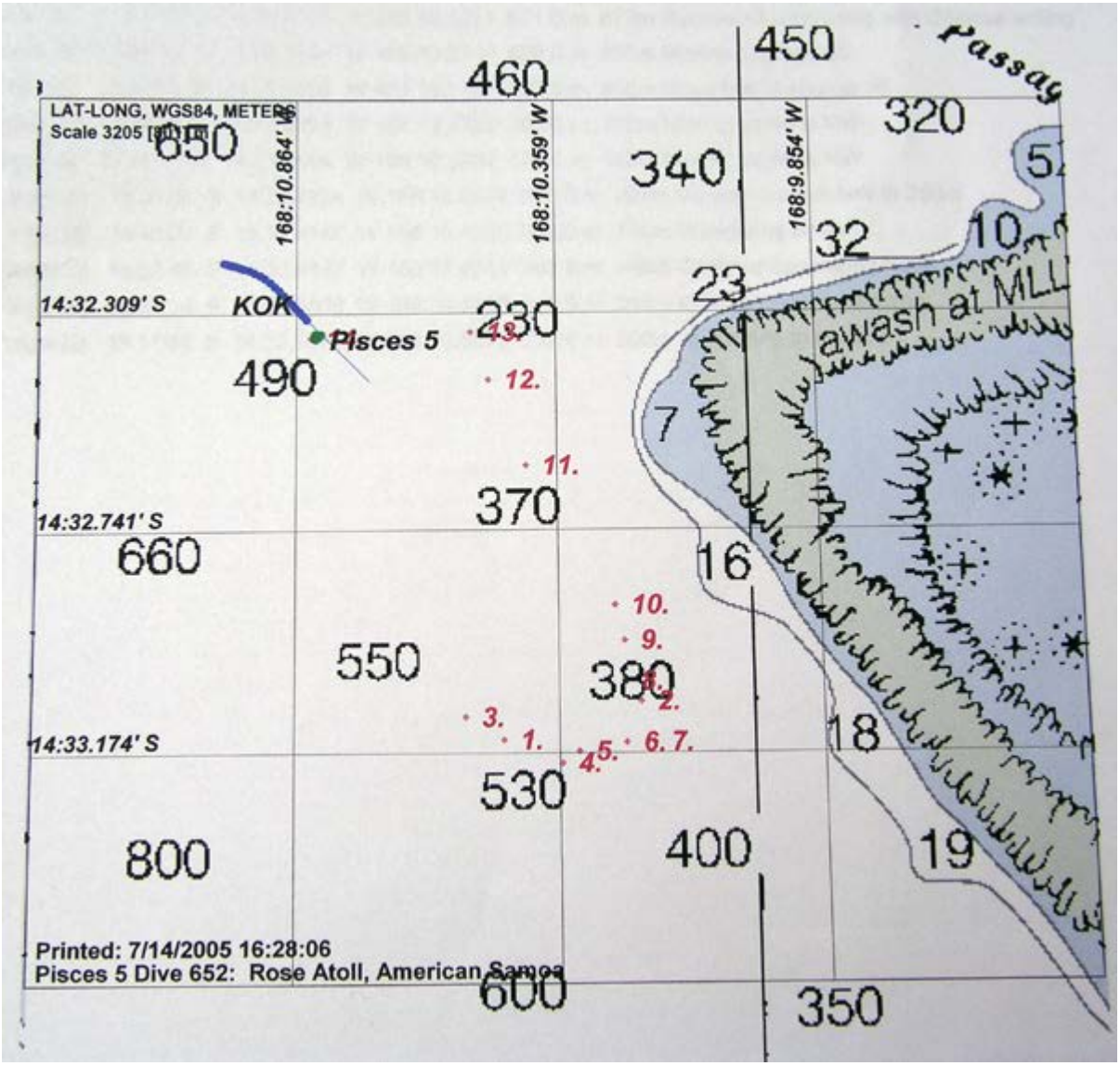
The submersible began her dive at 0815 am and descended to the bottom and deepest point of the dive at 0902 am and then began heading towards marker #46 left behind the previous day and then gradually moving back upslope over the next several hours (see attached map). Reef life was photographed and taped throughout and reached the marker at depth 401 m at 1204 pm. At a few sites, small strands and coils of fishing line were observed, and at depth 677m a small cloth bag with Chinese lettering and holding a rain hood was collected for analysis by Suzanne Finney. Other than the line and bag, no other anthropogenic materials or disturbance were observed.

After reaching the marker, the submersible began moving to the northwest and gradually ascended to its shallowest depth from 400 m to 240 m. Marine life of all kinds achieved highest abundance and diversity between 300-400 m, but abundance and diversity were low compared to those depths in the Hawaiian Islands. Particularly noteworthy were many rare and never-before-seen species of fish, crinoids, holothurians, anemones and sea urchins, ctenophores, soft corals, corallimorphs, shrimp, brittle stars and stony corals. Over 60 species of marine life were photographed adequately to identify organisms to species, with additional species not photographed captured in the video tapes. About a quarter of the species could not be identified to species level with the references available, and many may be new to science. The list below covers the species photographed plus a few that were only observed. It is likely that additional species will be added to the list once the video tapes have been analyzed. The principal investigator would like to acknowledge the assistance of observer Bruce Mundy in compiling the species list. Without his extensive experience, expertise, access to key references and time, the list below could not have been assembled.

At 1535 pm the submersible began moving offshore to the recovery point and ascended to the surface at 1624 pm and recovered by the R/V *Ka‘imikai O Kanaloa.*

Rose Atoll National Wildlife Refuge was established more than 30 years ago and was among the most pristine of atolls in the central Pacific prior to the 1993 grounding of a Taiwanese long-liner on the southwestern reef of the atoll. The Refuge still supports the largest populations of nesting seabirds, nesting sea turtles, giant clams, and *Pisonia* beach forest in the Territory of American Samoa, and supports large populations of reef fish and other reef life. Although the cleanup of the final few pieces of the shipwreck will be completed in mid July 2005, a long-term monitoring program was initiated in 2004 that will continue through 2015, supported by funds of the Oil Spill Liability Trust Fund Act. The HURL dives at Rose on 13-14 July were extremely beneficial in reaching the decision not to pursue additional cleanup efforts offshore and to focus more attention on monitoring both the lagoon and marine facing reefs. The high levels of biodiversity reported during dive 652 were unexpected in comparison to shallow water reef life and will lead to efforts to redirect additional assessment and exploration to deeper offshore waters. For one, the hypothesis that deeper reef habitats beyond the direct influence of the natural disruptive episodes of ice ages and sea level changes are more stable and serve as species refugia, will be evaluated and possibly tested. Moreover, the addition of 60+

species of marine life, many unique or rare to science, will further enhance the atoll's value to move through the nomination process to World Heritage status.



Map 1. Track of the Pisces V dive 652 off the SW ocean reef of Rose Atoll NWR on 14 July 2005

Species list: (*Notes:* 1) species marked by asterisk (*) were not photographed but were observed or taped by video; 2) numbers and names used below for entries correspond to those of the photo captions in the attached CD)

actinostolid anemone tan*- gigantic purple anemone, briefly video-taped
alcyonacean coral sp.1- on hard surfaces at 300m depth
alcyonacean coral sp. 2- resembles dendronephtheid coral, on hard surfaces
alcyonacean fan coral sp 3- supports unidentified pink ophioroid species 2
anemone sp. 1- red tapering, transparent tentacles, up to 900 m depth
anemone banded sp 2- in HURL organism ID booklet

anemone sp. 3- long transparent cream tentacles and a peach colored oral mouth
actinostolid anemone sp. 4- small tan colored, possibly a cerianthid anemone
anemone sp.5- a purple anemone with crowded short translucent purple, tapering tentacles
anemone sp. 6- stocky with wide cylindrical stalk, pinnate tentacles, often fluorescing
anemone sp. 7- often clustered in groups on hard surfaces each with long banded tentacles
Antedon sp.- yellow crinoid with 20 folded arms, clinging to *Stichopathes* sp.
Antipathes intermedia- erect small narrow fan, reddish or brown
Asteroschema sp.- small orange brittle stars associated with the fan coral *Callogorgia*
*Aulococephalis temmincki**- blue sea bass with yellow dorsal fin
Aulotrachichthys sp- fish in family Trachichthyidae
Bodianus sp.- yellow wrasse with white bars, large scales and red eyes
Brisinga fragilis- large pink sea star with 8 long wavering arms with spines
Callogorgia cf. *gilberti*- large common flesh colored sea fan & host for ophioroids above
Chironema sp.- small elongated blue-green squatting fish
Chrysogorgia geniculata - bottlebrush gorgonian coral at 800 m
comanthid crinoid- with 10 long arms with alternating red and white bands
Cookeolus japonicus- reddish fish (aweoweo) at 250 m
Corallimorphus sp. 1- HURL organism ID booklet, pink
ctenophore, unid- attached to *Callogorgia*
Cypraea sp.- dead shell of mole cowry
Desmophyllum sp.- small stalked solitary ahermatypic scleractinian coral, 400m common
Distichopora sp.- hydrozoan stony fan coral, yellow under ledges, white out in the open
Emmelichthys sp.- orange-red, cigar-shaped fish with spiny dorsal fin
Etelis carbunculus- pink snapper (ehu), common at 250 m
Fannelia sp.- erect white delicate alcyonarian coral
fish unidentified- small elongate hovering above the bottom
~Flabellum sp.- however not solitary and attached to bottom on short stalk
Glossandon sp.- small metallic blue-green hovering fish
gorgonian sp. 1- small purple fan coral on hard surfaces at 290 m
gorgonian sp. 2- small red fan coral at 300 m
gorgonian sp. 3- small red fan coral at depths of 400 m
Holanthias sp.- large brilliantly colored basslet, perhaps new to science
Leptodiadema purpureum- small red sea urchin with very long & thin spines in cave 300m
Liponema brevicornis- sea anemone
Lyrocteis sp.- white bulbous ctenophore with two large lobes curling towards each other
Nemacarcinus cf. *tenuirostris*.- mostly red medium-sized shrimp at 800 m depth in rubble
Orphnurgus insignis- reddish holothurian with tentacular spines, 730 m
Ostichthys sp.- deep water squirrelfish, red with white stripes
Pecten sp.- dead scallop shell at 705 m
Plesionika pacifica- small red shrimp with vertical white bands around the body
Plesionika sp.- small white shrimp with red thorax and head, and long chelae
Prionocidaris sp.- red bodied urchin with black spots & bumpy thick spines, undescribed?
Pristipomoides auricilla- first live photo(?) of this blotchy blue and yellow deep water snapper at 300 m
Pristipomoides zonatus- banded golden and pink deep water snapper (gindai), 305 m
Prognathodes sp.- deep water butterfly fish with vertical dark & light bands, undescribed?
Ptilocrinus sp.- reddish-orange stalked crinoid at 425 m
Randallichthys filamentosus- orange-copper deepwater snapper, 244 m
Saloptia powelli- first live photos in habitat(?) of this yellow deep water grouper, 250 m
scorpion fish, unid- small mostly red fish with white or orange patterns, 700 m
sea urchin unid.- reddish like *Pseudoboletia*, but spines are needle thin & numerous
Stichopathes sp.- red-white wire coral, polyps out, with yellow crinoid *Antedon* sp.
Taeniura meyeni- large mottled ray with black & white freckles that *bumped* the sub
Tridacna sp.- shell of large dead giant clam at 451 m

Uroconger lepturus?- eel with blunt protruding mouth & thin yellow lateral line, 801m
Ventrifossa sp.- small rat-tail fish (macrourid) at 750 m
Totals: 61 species

MISSION EVALUATION:

Limitations, failures, or operational problems noted:

The submersible was unable to work effectively at depths less that 150-250 m due to severe fogging of the view ports. This is likely due to the high atmospheric humidity in the vicinity of the Samoan archipelago, and warm water temperatures above the thermocline. This problem is largely unavoidable unless there is some ingenuous way to dehumidify the submersible before the hatch is shut. For example, I use a hair dryer to dehumidify my camera housings immediately before loading my cameras. This is not such a problem unless scientists need to work at photic zone depths too deep for safe SCUBA. Otherwise the submersible operations were magnificent and the dive results very rewarding.

Recommendations for corrective action or improvement:

See above. Perhaps a tarp can placed over the tent while dehumidifying the submersible and then removed after the observers and pilot boards and the hatch is shut.

In your opinion, did the mission essentially achieve its purpose? Compare actual work accomplished with the work that was expected to be accomplished.

The mission not only met but exceeded all expectations. The large number of species, many undescribed was unexpected but pleasant surprise.

List specimens or samples collected on the mission.

No live or biological specimens collected. The rainhood bag from the shipwreck was provided to Suzanne Finney for examination.

DATA RELEASE

Data may be retained by the project leader for up to 2 years after the mission date with the following exception. NOAA may request to use low resolution versions of my photos for publication or publicity purposes at any time. However, NOAA must first notify the photographer of the intended use and properly credit their use of the photos as follows. "Jim Maragos USFWS"

Fill in the appropriate statement below and sign this form.

I hereby release the data archived by HURL for public consumption following mission (project title) "Deep reef slope investigation of the marine biodiversity of the southwestern side of Rose Atoll National Wildlife Refuge, American Samoa"

held on 14 July 2005 (date) in the following way:

a. CTD data by 16 July 2005 (date)

b. video and images by 14 July 2007 (date)

c. other: release to NOAA and public only low resolution editions of my digital photos (< 1 MB each) on 14 July 2007. HURL will retain copies of all my high resolution images on 16 July 2005 for non-commercial, educational, publicity, and scientific purposes, subject to my prior written consent and proper crediting (date) 16 July 2005

d. Yes, I will give my written consent to individuals wishing to use these data prior to the above dates depending on the nature of the non-commercial request(s).

_____ Principal Investigator

James E. Maragos