

**\*\*\* RaDyO Planning Meeting: 8-9 March 2008 \*\*\***  
**Homewood Suites**  
**8745 International Drive**  
**Orlando, FL**

**Saturday 8 March**

08:30 Meeting Registration/Check-in.

09:00 Welcome and review of Scripps Pier Test.

15-minute PI presentations.

Results of Scripps Pier Test. Please review your Pier Test sampling method and discuss successes and failures. Provide a brief review of your plans for the Benign Conditions Experiment and discuss improvements given the results of the Pier Test.

09:15 Mike B., Chris, Howard, Russel, and Johannes (two time slots)

Howard presented polarimetric camera – development and early results. Good results but system needs to be ruggedized for FLIP deployment.

Steve asks if animated gifs can be turned into 3d movies. Can you mask out anomalies (candy wrappers)?

Russel – scanning lidar

Johannes – whitecap observations with aerial video cameras. Need to remove sun glint. Two questions for group – Johannes only wants active breaking – anyone need any video during calm periods?? Let Johannes know. Dariusz and Dick want video during calm periods. Need to discuss sampling rate and space.

09:45 Ken M. and Luc

Ken – Cadillac & MET station with underwater screen. Investigating disturbance of test patterns due to waves and wave breaking. Refractive model for underwater light intensity disturbances (Luc). Initial data analysis for increase in wind speed of 6-7 m/s over 15-minutes. Underwater LED display highly distorted at high winds and breaking waves.

10:00 Mike T. and Ron

Ron – IOPs for radiative transfer models and particle distributions (bubbles! And size distributions and distinguished from particles). Invert VSF to get bubble size distribution. VSF has a shelf for bubbles at ~60deg. Can identify bubbles from sediments using ratio of VSF60deg/VSF120deg. When ratio increases, bubbles. Can they get size distributions from inversion?

10:15 David and Svein

David – bubble size distribution using acoustics. Bubble rise rate and the role of surfactants. Looking at smaller bubbles – can they be discriminated from larger bubbles? Steve: Can you detect background microbubbles? Scattering by microbubbles is not insignificant.

10:30 Coffee Break

10:45 Marlon and Scott

Marlon – RADCAM – up and down looking fisheye cameras and skycam. Cool videos, make downloadable (12 MB). Tethered RADCAM (w/ 4-wavelength Ed and Lu and beam c) off K/M (to 100-150 m water depth), integrate other camera onto the AUV (in the ADCP port). This one will also be integrated with MASCOT.

11:00 Dariusz and Mirosław

Dariusz - Measure wave induced fluctuations in underwater light field. Porcupine radiometer system. Over 20 radiance sensors, some downwelling irradiance (532 nm). 2 azimuthal planes, different zenith angles. Challenge of maintaining orientation underwater for time series. Fin works except for regions lacking steady current. Probability distribution functions with depth and varying zenith angles. Dariusz adding sensors on FLIP and 2-people on K/M to do discrete water samples, PSDs.

11:15 Ken V.

Ken – Polarized in water spectral radiance distribution and also for sky. Data from 1/17/08, upwelling radiance, cloud-free. Downwelling data from 1/13/08 and 1/18/08. Changing sky cam to stabilize. Questions: winches? Sky camera mounting? ROV maneuverability? Electronic compass (Howard: buy a GPS compass but not very sensitive)? Wire time?

11:30 Grace and Tommy

GET EVERYONE'S SAMPLING TIMELINES TO INTEGRATE FOR STEVE.

11:45 Scott and Hemantha (review Benign Conditions sampling plan)

Scott – AUV spatial variability of IOPs and physics, variability in downwelling irradiance, radiance measurement platform. Missions: Survey to determine variability between K/M and FLIP – sawtooth pattern; Horizontal ladder (one depth).

12:00 Lunch provided (covered by your meal cost).

Begin modelers' discussion.

Brief overviews of model performances so far, possible enhancements to the models given Pier Test results, missing data(?), missing scales(?), etc.

13:00 George

George – use measured radiance in model. Also 2d slope distribution from Howard. Input measured IOPs and bubble distributions – also need ocean water scattering matrices.

13:15 Dick and Lian

Dick – merge RT simulation with surface models. Long-short wave interactions integrated. Compare Monte Carlo to Invariant Imbedding – results are very satisfactory. Nonlinearity on underwater radiance distribution – airy waves and Stokes waves.

Lian – wind-wave evolution modeling. Need to increase resolution to get pulses observed by Dariusz. Should be able to apply to what was observed. Given underwater radiance field, can we obtain surface geometry? Lots of issues to resolve. Sun in the black sky is modeled now.

13:30 General model discussion.

Can we statistically invert the observed modulated edge of the Snell cone to get the wave field? YES. Each image is unique to surface processes. Can we de-blur the image?

14:00 Big-picture review.

Discuss potential scientific topics that can be addressed with Pier Test results and data QA/QC, sharing, dissemination, and storage issues.

Data timeline – need timing of all data collection. Put together environmental conditions (eddy flux system – mets), wave spectra, IOPs. Data on web password protected. Need metadata file. WAMOS data?

Date of data availability from Pier? JULY 1<sup>ST</sup>, everyone must have data in a “sharable” state!

Steve needs list of papers/talks/presentations given about RaDyO. Put ppts online if possible.

Need really accurate time sync for SB Channel experiment. NTP server will be aboard FLIP – everyone needs to figure out their PC time drift and be able to correct for it. Comparisons need to be made in a statistical manner, not comparing one snapshot in time with model output.

George will need synchronization between Howard’s slope fields and Ken’s polarized radiance measurements in order to drive his model. IOPs can be time-averaged over several minutes to provide IOP information.

Can get to 1/10 to 1/100 s.

(15:00 Coffee Break.)

16:00 Begin group discussion on details of the Benign Conditions Experiment.

Discuss experiment set-up period, wire-time, time for winding down. Daily start time for data collection – what will be autonomous (continuously running) – if anything, what will not. Discuss daily PI meetings – what needs to be discussed each day to ensure we are meeting our goals, what are the time limits for providing QA/QC’ed data to modelers and other RaDyO participants, etc.

Need to post on website, what information is necessary to give to Luc and Frank for FLIP and K/M.

Face boom: UCSB

Blue boom: Svein/David

Starboard: Banner et al. and Dariusz or Ken

Port: Ken/Luc and Dariusz or Ken

16:45 Santa Barbara Channel Experiment Media Day Discussion (Steve)

Date of media day in SB Channel will be: 16-17 September 2008.

Two days of footage on K/M. 15-minute chat with camera.

Zodiac over to FLIP and interview.

Need to prepare an explanation of what we are doing and how it fits into RaDyO – make it understandable to Grandma.

17:00 Recess for the day.

### **Sunday 9 March**

08:30 Continue group discussion on details of the Benign Conditions Experiment.

UCSB - Mooring (Frank and Grace) – Day 1 arrive onsite, deploy mooring as close to NDBC buoy as possible.  
Back deck space on day 1.

Scott and Hemantha (+Tim + 2, US citizens) – AUV. Deploy using A-Frame. 0900 – 1600 typical sampling period. After 17<sup>th</sup>, one to two days of nighttime sampling, from 0400 – 1000. Recover with zodiac and A-frame. Need about 2 in the zodiac, 3 on back deck, ideally 5. Can coordinate zodiac with Svein during these sampling periods. AUV will be driven down from Monterey. May need to store equipment for 1 month. 10'x8'x8' storage locker. 2500 lbs. Load AUV in science bay, repairs in science bay. Need to mount RF antenna on mast and transducer below water. Day 1 will need ballasting support.

Svein – Oliver Wurl (German), Masaya Shinki (Japanese), Russel (Australian). Surfactant skimmer. Deploy and recover using port side crane with zodiac in water for support. Deploy after AUV enters water, from 1000-1200. Would like option of deploying in the afternoon, coordinated with AUV zodiac deployment. Zodiac follows skimmer for a couple of hours. Ideally, will not need zodiac support after sampling routine is established, can control skimmer off K/M. Will need to freeze samples. 5'x4'x2', weighs 250lbs. Need bay space for storage/ repairs while underway.

Marlon and Scott – Marlon (US), Ronnie (Canada), Jian Wei Wei (Chinese), + 1 (Canada). Freefall Radiometer, hand-deployed off stern, need A-frame for recovery, 20-30 minutes between 1000-1400. SkyCam on ship, hyperspectral profiler (maybe – 20 –30 min deployment) (camera on AUV maybe swapped onto MASCOT).

Jules – Jules (US) and Fernando (Uruguay). Birthday September 16<sup>th</sup> Nighttime sampling. Two options: \*(1) Load on the 7<sup>th</sup>, board on the 16<sup>th</sup> or 17<sup>th</sup> with ONR Media, start sampling either the night of 16<sup>th</sup> or 17<sup>th</sup> through the 22<sup>nd</sup>. Work 7pm-12am. Will need 2 Ship Crew. A-Frame to deploy and recover system – cables to connect to ship (real-time). 500-1000 lbs. (2) Load on the 7<sup>th</sup>, board, sample until the 16<sup>th</sup>, depart when ONR Media arrives on the 16<sup>th</sup>.

Mike and Ron – Mike (US), Scott F. (US), Ron (US), +1. Water samples for TSM (coordinated with Dariusz). MASCOT self-contained IOP package. Deploy off starboard with CTD winch. Bubble resonator requires conducting wire, needs someone to feed wire. KM will need to be underway while sampling. 11am and 3pm deployments, profiles to 50 m, ½ an hour in the water. Flexible sampling – want wind-generated bubbles. 4'x3'x3', 400lbs total, boxes for cals. One pallet.

Dariusz – Dariusz (US), Ruediger Roettgers (German, GKS, Hamburg), Selda Yildiz (Turkish). May have one student boarding on the 7<sup>th</sup> and departing with media when Jules comes on board. Discrete water samples from CTD rosette around noon (just after MASCOT deployment). PsiCAM (benchtop; hyperspectral a), VSF (benchtop), coulter counter, HPLC (?), LISST (532 nm). May want to deploy self-contained instrument package (LISST and bb sensors) at 1pm from CTD winch. Will drive equipment up from San Diego. All equipment in one wet laboratory.

Russel – Scanning lidar and video camera, transmitter for networking. Mounted near bow, ideally under bridge. Equipment carried on board with Russel. May board in Hawaii. Will transfer with Svein on the 11<sup>th</sup> or 12<sup>th</sup>.

Howard may be on board the K/M.

(10:15 Coffee Break.)

12:00 Lunch Provided. Any issues related to the Pier Test and Benign Conditions Experiments must be resolved by this time. We should all be prepared to show up in San Diego or Port Hueneme and conduct the Benign Conditions experiment in Sept. 2008.

13:00 High Sea State Conditions field experiment discussion.  
Overview of what has been discussed so far- Summer/fall 2009. Review ship use (R/P FLIP and R/V Kilo Moana).

Presentation of climatologies of the Hawaiian Islands.  
(1) Currents and hydrography and optics: Tommy

Send student and post-doc names and contact information!

13:30 (2) Wind and waves: Russel

14:00 Group discussion on other important experiment issues: steam & tow time, FLIP mooring requirements (water depth), marine hazards (submarine operation areas, whale sanctuaries, submerged cables, etc.).

14:30 Group discussion on the ideal location, dates, and duration of the High Sea State Conditions field experiment. Open the floor for all suggestions – La Paz, Mexico?  
Get consensus on exact dates and location.

Off Oahu or south of Lanai. Get climatologies for those two sites within 1 month.

March 2009 meeting, 3 days,  
Ocean Sciences 2010, Ocean Optics 2010.

Remember dominoes

15:00 Coffee Break

15:15 Group discussion on data collection plans.  
What instrumentation must be co-located in order to meet the goals of the RaDyO project? What measurements must be collected from R/P FLIP vs. R/V Kilo Moana? Keep in mind that berthing is limited on FLIP. What supporting measurements can/will be collected nearby? How close is “nearby”? What sort of time synchronization methods will be used?

If group discussion goes smoothly, continue data collection discussion in detail. If necessary, break out into smaller groups. Recommend grouping together by instrumentation, i.e. co-location of, e.g., wave field camera with radiance camera or bubble package with MASCOT. There will of course be much overlap.

17:00 End of Meeting.