

CIOSS – NESDIS/STAR/SOCD Interactions, Partnerships and Projects
Long-Term and Short-Term Plans
Discussion Summary: Sept 4, 2008

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Long-Term (Next 3-5 Years) Interests of STAR and CIOSS:

- **Increase real, active interactions between CIOSS and NOAA partners –**
 - **SOCD Science Teams, POP Teams and Branches.**
 - **Other NESDIS CI's and Centers.**
 - **Other NOAA Line Offices, CI's, Centers and Labs.**
- **Help NOAA in Critical Areas**
 - **IOOS – Integrating Remote Sensing and Modeling Products, Especially in Coastal Applications; Helping NOAA to Develop the “National Backbone.”**
 - **Ocean Color – VIIRS and International Satellite Preparation and Use.**
 - **Scatterometer – Coastal & Deep Ocean Applications and XOVWM preparation.**
 - **Altimeter – Coastal & Deep Ocean Applications and Future Satellite Preparation.**
 - **SST – Fronts and Feature Detection; Improved Merged SST Fields.**
 - **Cross-Cutting (Multi-Sensor) Research.**

In 3-4 years, NOAA will closely examine STAR/CoRP's and STAR/SOCD's interactions with CIOSS to determine: *Whether CIOSS has contributed to NOAA's ability to accomplish its Mission Goals and whether NOAA continues to need a CI for Oceanic Remote Sensing.* From the NOAA side, the question will be how well SOCD and CoRP have used their resources (people, funds, advice, equipment) to help CIOSS integrate into their activities; from the CIOSS side, the question will be how well CIOSS has been able to engage its academic scientists in partnering with NOAA colleagues and conducting research and outreach activities of mutual interest to NOAA and CIOSS.

The existence of CIOSS allows any NOAA entity (not just NESDIS STAR/SOCD or STAR/CoRP) to partner with CIOSS academic Fellows and we have had the most success in establishing partnerships outside of our “Core” funded projects. The major successful partnerships were supported by funding from GOES-R (the COAST activities) and the “Research-And-Operations” funds (various workshops and directed transition projects). Our Core funding has supported a number of Post-Doc's and directed research projects related to remote sensing and modeling. These all have NOAA connections; but less than half involve active NOAA collaborations.

The CIOSS projects that mostly involve model development (ocean modeling, data assimilation, prediction and coupled atmosphere-ocean modeling) contribute to NOAA Mission Goals and the development of the coastal IOOS system but are less directly relevant to NESDIS/STAR's objectives and performance measures. More natural NOAA connections of these projects are to NOS (coastal modeling), NWS/NCEP (basin-scale modeling) and the JCSDA (data assimilation

and transition of mature techniques to NOAA modeling centers). But (to date) these NOAA modeling groups have not contributed support to the modeling efforts within CIOSS. The CIOSS leaders continue to strongly support these modeling activities and believe that they are vital for the developing IOOS coastal observing/modeling system. They are also vital to NCEP's goal for ocean and atmospheric weather and climate prediction, given the growing realization of the strength of air-sea interactions and strong ocean-atmosphere feedbacks on all time and space scales. But they need to find broader NOAA support over the next several years.

The way to continue to develop projects that contribute to NOAA's goals and objectives (in NESDIS and other Line Office research groups), while expanding the support base within NOAA, is to increase the degree of interaction between CIOSS Fellows and NOAA colleagues. Both CIOSS and SOCD can motivate this by giving a priority to internal projects that involve active CIOSS-NOAA partnerships. Mechanisms that can be used include:

- **CIOSS Internal Proposals for Core Funding:** This support is limited to approximately 4-6 projects each year, including the Outreach projects (such as the SMILE and REU programs). CIOSS will solicit directed research projects that involve active NOAA partnerships. Since it is likely that more projects will be proposed than can be funded, the full CIOSS Council of Fellows (COAS and NOAA members) will review and select the proposals, also looking for other sources of NOAA support for these proposals. Since CIOSS lacks on-site NOAA personnel, it is crucial for NOAA personnel in SOCD, CoRP and the other CoRP CI's to help look for other sources of support for the best CIOSS proposed projects.
- **SOCD Internal Proposals for ORS Funding:** Each year SOCD Science Teams submit annual work plans for the use of SOCD Ocean Remote Sensing research funding. CIOSS academic scientists should be included in each of the Science Teams to participate in the discussions that develop these plans. Some increased weighting should be given to funding those projects that involve academic-NOAA partnerships.
- **Other NESDIS/CoRP Funding Sources:** Within SOCD and the broader CoRP structure, there are additional funding sources, such as the Ground Systems funds, NASA funds for specific sensors/fields (OVW, SSH, Bio-Optics, etc.). Sources such as the Research-and-Operations support are likely to appear periodically. It is critical for the growth and success of CIOSS, that NOAA personnel let CIOSS know of these opportunities and suggest possible collaborations with CIOSS that can be funded by these funding sources. This again helps to make up for CIOSS' lack of NOAA personnel.
- **CIOSS Collaborations with IPO, NOS, NCEP, OAR, NMFS, JCSDA, etc:** CIOSS should continue to seek collaborations with NOAA labs, centers, programs, etc., outside of NESDIS. CIOSS projects that establish active partnerships with these groups may be supported with CIOSS Core funding for limited periods of time, while the partnerships grow and seek other funding. Projects that contribute to the development of products that are of use to IOOS and other government decision makers (Local, State or Federal) are especially welcome. These products should use or promote the use of remote sensing data sets to justify NESDIS funding.
- **Other suggestions?**

Short-Term (Next Year) Interests of STAR/SOCD, CoRP and CIOSS: Possible Projects for 2008-09 Core Funding (Year 7): (Note, \$60K covers ½ of a post-doc's salary.)

- **Outreach (SMILE and REU): Ted Strub, Eda Davis-Lowe, Bob Duncan & Ingrid Guch, Kent Hughes, NOAA Office of Education (\$60K).** Continuation of support for the SMILE high school program costs approximately \$42K per year. This program received outstanding support from the external review panel. A proposal to the NOAA Office of Education Environmental Literacy program is under review. If funded, it would begin to address the recommendation of the CIOSS review panel to make SMILE a model for a larger NOAA program. CIOSS also has been contributing support for three additional students to take part in the (mostly) NSF-funded Research Experiences for Undergraduates (REU) program during the summer. This allows NOAA to take advantage of the infrastructure supplied by the NSF program to introduce three high-achieving undergraduate students to oceanographic remote-sensing research.
- **(3 Projects) Ocean Color**
 - **MODIS-MERIS: Curt Davis, Ricardo Letelier & Paul DiGiacomo, Mike Ondrusek, Chris Brown, Dave Foley (\$60K).** Cal/Val, cross-calibration and development of high-resolution (250-500 m) products; working initially with MERIS data from along the US west coast, collected by Canada, and MODIS data collected at OSU. Connections to the IPO interest in mitigation of VIIRS problems, IOOS interests in high-resolution products that extend within estuaries, etc. Internal SOCD proposals from Mike O., Paul D., Chris B., others?
 - **HOTS and Coastal Data: Ricardo Letelier & Mike Ondrusek, Chris Brown (\$60K).** Assembly of time series from the HOTS location with both IOP and biological measurements, with which to link and provide cal/val comparisons to SeaWiFS, MODIS, VIIRS, MERIS, Other International Satellites. This helps to build color CDR's. Work with Mike O. to collate and use existing coastal data sets to extend the deep ocean data sets from HOTS into the coastal waters. Internal SOCD proposals by Mike and Chris? Internal proposal for a new Hyperpro (?) for Ricardo to use during ongoing coastal field surveys off Oregon?
 - **HAB's: Peter Strutton, Michelle Wood, Curt Davis & Chris Brown, Rick Stumpf, Bob Arnone (NRL) (\$60K).** Extend MERHAB funded work to include more spectral analysis of water masses off Oregon. Partners include HAB research scientists off WA and State/Local government coastal managers. Internal SOCD proposals by Chris, Mike, others?
- **IOOS-ORCOOS: Jack Barth, Ted Strub & Dave Foley, Tim Mavor, Chris Brown, Paul Chang, Laury Miller, Kent Hughes (\$60K).** ORCOOS is the Oregon Coastal Ocean Observing System, a sub-region of the NANOOS Pacific Northwest IOOS RA. See <http://agate.coas.oregonstate.edu/>. Craig Risien manages the ORCOOS web site and helps develop products of interest regionally and globally (such as the global climatology of QuikSCAT surface winds). Here we propose to use Craig's efforts to develop new products that extend work already done at CIOSS/COAS or elsewhere. For instance, products derived from the high-res winds and land mask, modified coastal altimeter SSH and surface current maps, the pilot forecast model fields compared to remotely sensed fields, ocean SST and frontal maps from Tim Mavor, ocean color fronts and other products (MERIS/MODIS higher-resolution fields), etc. This might result in internal

proposals for SOCD funds from Tim Mavor or others, working with Jack and Craig. There might also be internal proposals from Laury Miller's group for altimeter products, Paul Chang's group for winds, other SST products, etc. This project could provide high visibility in terms of NESDIS products for IOOS and CoastWatch.

- **SCAT – SAR: Barry Vanhoff, Dudley Chelton, Ted Strub & Bill Pichel, Paul Chang, Zorana Jelenak, Dave Foley (\$0K).** Continued development and evaluation of the high-resolution coastal land mask along the US West Coast and Coastal Gulf of Alaska. SAR wind speeds will be used, along with meteorological buoys, to validate the new, empirical coastal land mask for QuikSCAT 12.5km data. This product is in the process of being transferred to Paul and Zorana for the US West Coast. It can also be made available to Dave Foley and IOOS, although it still needs some evaluation (a manuscript is being written). Along the west coast, comparison to SAR winds and met buoys will allow an evaluation of how well SAR winds can be used for SCAT wind validation. Along the Alaska coast, the SAR winds will form the basis of the validation. Future extensions will include the other US coastal regions, where SAR data will again be needed. We presently think no funding will be needed at CIOSS for the coming year (this is tentative). Help internal SOCD proposals by Bill Pichel or Paul Chang?
- **Air-Sea Interaction: Dudley Chelton & Ming Ji (NCEP) (\$10-20K?).** Dudley has been working with NCEP to run several experiments using alternate SST boundary conditions with the NCEP forecast models. He may send his post-doc (Qingtao Song) back to NCEP for 6-12 weeks to help run these models, but needs help from NCEP to cover part of the cost of doing this. If CIOSS needs to cover those costs, they may be \$10K - \$20K, depending on the length of stay. Are there SOCD or other CoRP CI personnel interested in this? Mark DeMaria is working with Dudley on another (related) project. Is he interested in this too?
- **(3 Projects) Modeling, NESDIS, IOOS, NOS:**
 - **Adding Biology and Chemistry to the 2-Day Forecasts: Alexandre Kurapov, Hal Batchelder, Yvette Spitz & Chris Brown, Dave Foley, Mike Ondrusek. NOS (Rich Patchen, Frank Aikman). Others? (\$60K).** Several components could be added to the 2-day forecasts that would be of interest to coastal managers and other IOOS product users. These could be made available through the ORCOOS, NANOOS and CoastWatch web sites. The fields to be added include: Surface chlorophyll or phytoplankton, differential CHL/phytoplankton (increases over a given time period to show blooms); and bottom oxygen. These can be included directly in the models by adding ecosystem (NPZ) models to the physical models and indirectly by using the model surface current fields to advect the present/recent satellite surface chlorophyll fields into the near future. During cloudier times, the models can simply advect passive tracers from offshore regions known to be historically high in surface chlorophyll, to provide indexes of offshore waters impacting the coast. Oxygen can be parameterized or modeled (as biological demand) in the models as well. This is of interest to IOOS government managers and to NOS. We need to more actively engage NOS in this work and

increase their interest to the point where they will push for their own funding. Internal proposals by Chris or others? This work may have the most direct operational utility for the present and short-term future.

- **Coupled Atmosphere-Ocean Coastal Modeling: Roger Samelson, Dudley Chelton, Jim McWilliams (UCLA) & Paul Chang, Chris Brown, NOS Modelers, NCEP Modelers. (\$60K).** This work was started at OSU/COAS and is now being carried out at UCLA. The SST-surface wind coupling modifies both the winds near the coast and the ocean currents/upwelling. This affects the vertical motions in the atmosphere (changing cloud dynamics) and vertical motions in the oceans (changing plankton growth and ecosystem dynamics). Thus it could be used to enhance internal proposals by Chris, Paul, NCEP or NOS modelers. This work may have the most long-term scientific and operational importance for coastal ocean forecasting of atmospheric and oceanic systems.
- **Extensions of the Pilot Prediction System Into the Columbia River Estuary: Roger Samelson, Jim Lerczak & Dave Foley, IOOS, NOS (Rich Patchen, Frank Aikman). (\$60K).** A very high-resolution model of the Columbia River mouth and estuary would be nested within the present coastal ocean forecast system by Jim Lerczak. Other estuaries could be included in the future, but the Columbia River is the most active. All of the west coast estuaries are of interest to IOOS and the Columbia River is especially important for navigation/transportation. Fields would certainly be of interest to IOOS/NANOSS/ORCOOR and NOS. This really needs active support from NOS.

Besides these 11 (including 2 Outreach) possible projects that could be supported with Core CIOSS funds, there are ongoing (we hope) activities between a group led by Curt Davis and the IPO for VIIRS Risk Reduction. Ted Strub is funded by NASA to improve SSH and surface currents from altimeter data in coastal regions. Bob Miller is funded by the JCSDA to develop error maps for basin-scale ocean models.

Ted Strub will send this summary first to CIOSS Fellows who are involved in the possible proposals and eventually to all CIOSS Fellows to inform them of the ongoing activities. The action needed on their part is to contact leaders of the SOCD Science Teams who might either be partners in the CIOSS proposals or who could benefit from input from CIOSS Fellows in developing their “annual work plans.” Possible NOAA partners outside of SOCD should also be asked to indicate how they will actively collaborate with proposed CIOSS projects

Kent Hughes will communicate the results of the discussion to his Science Team Leaders and Branch Chiefs and ask them to encourage interactions with CIOSS Fellows. These are:

Branches:

- Laury Miller: Branch Chief for the Laboratory for Satellite Altimetry and Ocean Physics
- Paul DiGiacomo: Branch Chief for Ecosystems and Climate
- Alexander Ignatov: Branch Chief for Ocean Sensors

Science Teams:

- Mike Ondrusek: Ocean Color

- Paul Chang (off flying in planes, chasing hurricanes?): Ocean Vector Winds
- Bill Pichel: Surface Roughness and SAR Wind Speed
- Karen Marks: SSH and Altimetry
- Alexander Ignatov: SST
- Paul DiGiacomo: CoastWatch
- Pablo Clemente-Colon: Sea Ice

NOTE: The Science Teams often overlap with the POP (Product Oversight Panel) members.

A list of the CIOSS Fellows and their emails can be found on the CIOSS web site <http://cioss.coas.oregonstate.edu/CIOSS/> under personnel. These include all of the NOAA personnel listed above except Karen Marks (Karen.Marks@noaa.gov) and the academic personnel available to participate in partnerships.