HIWPP Project Lessons Learned Summary

Final full-project Science Team Meeting
9 February 2016, College Park, MD

At this stage, many of the 19 tasks in the HIWPP project will be completed within the next few months. Therefore, this meeting was the optimal time to have all PIs participate in a reflection back over the project and discussion of what worked well and what could be improved for future similar efforts. The final Science Team Meeting of all project members was held at NCWCP in College Park, MD, and 2 hours was set aside during this meeting for a session where all participants were invited to participate in an open and honest discussion of the project. The goal of this session was to produce a concrete, practical output with recommendations to senior management for future projects.

Project Coordination and Communication

All participants agreed that overall HIWPP project coordination was very good. The group noted that communication between project management and the task leads was good, and that there was a sense of pride in accomplishing project goals. Some felt that communication across teams could have been improved, with particular note of the hydrostatic and non-hydrostatic groups.

Funding Delays and Schedules

The project schedule was impacted in a major way by the delay in deployment of funds to the teams, in some cases causing delays in hiring that delayed project milestones. It was noted that, due to the size of this project, CIs had extra stringent requirements for reporting and other restrictions related to funding. All hoped that this could be improved in future.

Unrealistic expectations and over-commitments impacted the schedule, but were not considered a major issue.

HPC Resources

Adequate HPC resources were a critical risk in this project and were initially inadequate to execute tasks in the plan. This risk was addressed by NOAA management by taking advantage of the installation of the new Theia system and dedicating it to Sandy Supplemental projects while it ran in parallel with the old system Zeus. Management also optimized existing allocations on Zeus and Jet to support project efforts. Additional support could have been provided by delaying the decommissioning of Zeus to extend the time it could be dedicated to Sandy Supplemental efforts.

HIWPP's place in the R2X funnel

How HIWPP contributed to R2X efforts within NOAA was discussed in some depth. Participants felt that HIWPP had filled a critical role in the R2O (or R2X) funnel, and that it was important that this role continue beyond the end of the HIWPP project. Participants asked what follow-up was planned by OAR. John Cortinas noted that OAR and NWS are

looking at improving the paradigm with OAR research in the middle of the funnel and NWS at the end of the funnel, but the budget process poses challenges.

Participants asked how we can take advantage of lessons learned from HIWPP to build a plan for budgets in both organizations (OAR and NWS) to allow projects to continue to move research through the funnel. It was suggested that each HIWPP task should identify how follow-on projects would help keep momentum going.

Some recommendations for optimizing the R2X transitions included:

- Initial proposals in future should identify how projects would make the R2X transition.
- The impact of each project needs to be evaluated, not just the ultimate R2X transition, noting the "end of the funnel is narrow". Some projects will move research part-way through the funnel, but not all the to a transition.
- Technical Readiness Levels provide a tool for evaluating progress along the pipeline.
- Look at the evolution of quality of forecasts and really target items you want to improve, as was done with HFIP.
- Design metrics to systematically measure improvements in your targeted area.

Outcomes of HIWPP feeding into NGGPS and other future efforts

Participants note that HIWPP project members did not become aware of NGGPS until HIWPP was well underway. HIWPP worked well to modify plans in order to align goals between the projects.

As a result of HIWPP dycore testing, development ended on 2-3 models. By eliminating some dycores and focusing on others, we expect to see payoff in future years. By focusing resources and talents on fewer solutions we will avoid under-resourced projects and a problem with all resources being spread too thin. Could we document money was saved as a result of reducing dycore development, and could this be used as a good argument for the path forward?

Going forward, we need to be sure that once a single dycore is finally selected we "don't circle the wagons" and prevent resources from being re-directed effectively. On all sides, individuals naturally become attached to their project. We need to encourage everyone to think more strategically to align strengths properly.

Collaboration

HIWPP was a large collaborative project integrating work within many different organizations and organizational units. The participants discussed how well this approach worked.

It was noted that a technical framework for communication was created under HIWPP, enabling sharing of large data sets. Participants agreed that this was an enabling and accelerating factor and would be useful for future efforts, eliminating technical barriers to collaboration.

This was a collaborative environment that should live on beyond HIWPP and NGGPS, allowing partners, including universities, to continue collaboration. It would be good to have a longer-term sustained project involving the experts wherever they may be employed, perhaps adopting a broader strategy looking at all aspects of R2O/R2X (Research, Transition, Applications, and Operations). It would be advantageous for all to become advocates for each other and funding. Individually, researchers spend a lot of time on proposals.

Engagement of university community is important. How do we continue to improve this? Some projects that have worked well involve funding for collaborators inside and outside NOAA, rather than just funding a single academic with no NOAA funding attached. It was noted that the maintenance of infrastructure to support university collaborators through the DTC is rather large, and that without funding larger projects, as opposed to funding many smaller projects, this might not exist. Climate Process Teams seem to have worked well and might be a productive way for NOAA to collaborate with the research community.

Collaboration tools

With more collaborative projects, the cost of collaboration increases, including many meetings and travel required by participants. Good collaboration tools are therefore very important. Here are some suggestions and comments about collaboration tools:

- We really need better tools for virtual meetings in order to reduce travel between organizations. When dialing into a teleconference, it is difficult to hear and be involved in the conversation, especially for discussions in the room as opposed to presentations. Face-to-face meetings are much better, but when this isn't possible due to traveling constraints, seeing faces and interactions would help improve communication. Having good equipment for visual teleconferences (VTC) would be an important step forward.
- A Science-on-a-Wall type installation to make it seem like one room would improve communication. A shared screen and microphone is the most reliable currently. We need to look at other options, and consider what works best across the variety of environments. Passing a microphone around the room for comments is not very effective, especially for those on the phone.
- CoG provided many useful tools, and the CoG team was extremely responsive to specific project needs. However, it also had limitations that limited its effectiveness for sharing information among project members, such as information and materials from meetings. Specifically, the requirement that project members had to create a login different than their NEMS account (for NOAA members) inhibited interaction. The CoG team responded to the need for an OpenID requirement, but the long userid was difficult for users to remember and manage. During the life of the HIWPP, VLab emerged as another alternative for project communications, and

discussions were held between CoG and VLab managers on how to build on the strengths of each.
- CoG did work well for managing access to data for the Open Data Initiative.
- The business community has standardized around the github environment, why doesn't NOAA?
- NOAA owned tools make it difficult to collaborate with users outside of NOAA.
- The Navy is using the Atlassian tool suite internally (similar to the github tool suite) and have been very happy with it. https://www.atlassian.com/

Open Data Initiative

The Open Data Initiative was somewhat of amixed bag. The hoped-for feedback from the broader weather community was limited. The community was very excited about having access to research data and very much encouraged NOAA to continue to make research data available earlier in the process, however the community was not very motiviated to become involved in providing feedback to model developers.

Recommendations

1. Good project management is critical to the success of a large project such as HIWPP.
2. Improve the process to release project funds sooner.
3. Insure adequate HPC resources have been planned to support project activities.
4. Task plans should specify specify how the task will move research toward implementation and what follow-up efforts will be needed to continue that progress.
5. Budgets should be coordinated and aligned between OAR and NWS to support the R2A process in new projects.
6. Following the selection of a single dycore for further development, NOAA leaders need to think and plan strategically to align strengths optimally across organizaitonal units.
7. Invest in good VTC infrastructure to support virtual meetings in order to reduce travel.
8. Create a team to investigate and recommend best technology solutions to facilitate virtual meetings.
9. Continue discussions to possibly merge the best features of CoG and VLab.
10. Going forward, create a broad strategy for a longer term, sustained effort to continue the collaborative effort begun in HIWPP. Include university partners together with NOAA participants and fund larger, focused projects as opposed to many smaller projects.