

Statement of a Vision for the In-Situ Sensing Facility (ISF)

Stephen A. Cohn

August 15, 2005

ISF has an important job to do and well qualified, motivated staff to do it. Maintaining, deploying, and participating in development of surface-based and sounding in-situ sensors and wind profilers is a critical part of NCAR's mission to support field observations for atmospheric science research. A priority for ISF, and for EOL, also is maintaining and developing our staff. This Statement of Vision describes my views of the areas I think are most important to emphasize in the near-term evolution of ISF.

EOL's mission ("to provide observing facilities and related services otherwise difficult to mount by any single university department or small groups of NCAR scientists." [ATD Strategic Plan]) requires a breadth of capabilities. Some sensors are unique to EOL while others may be more widely (even commercially) available but have a level of complexity that makes them difficult for a university to use. Although a sensor may be simple, the deployment platform (e.g. driftsonde), mobility (e.g. MISS), or arrangement in a network (e.g. several GAUS) can create complexity that makes it appropriate for EOL to field. This breadth allows us to serve a larger community.

Starting from a strong position. The groups forming ISF, a combination of the sounding, surface, and ISS subgroups from the former RTF, are already well organized and need not change greatly in the near term. As components of ISF these groups should *evolve* to better accept new challenges rather than undergo any abrupt change in structure.

Future evolution. In situ sensing and profiling encompass much more than the specific areas in which we now have expertise and capabilities. Decisions on the most fruitful areas for increased emphasis will be made in conjunction with all of EOL, relying in part on analyses like that presented in the ATD Strategic Plan. However, there are goals which pervade our work, regardless of the specific measurements.

- Improved data quality. The data we produce must be of the highest quality. We should have a continuing process of evaluating our data, improving tools and software to do this evaluation (working also with CDF), and improving the meta-data documenting issues and uncertainties. Keys to data quality are close monitoring of real-time data and structured procedures to document and audit data at all steps in its collection and processing.
- Improved deployment efficiency and portability. A large fraction of our resources go into equipment preparation, setup/teardown, and continuous monitoring during field operations. There is no substitute for close monitoring of equipment operation and incoming data. However, if we can perform these tasks more efficiently (without compromising data quality!) we can support a wider range and size of projects. These improvements may come through hardware redesign (emphasizing transportability, portability, miniaturization, autonomous operation, and maintainability) and efficient operational procedures. Improved efficiency is especially important for the much longer and more autonomous deployments needed for

climate and monitoring studies rather than the process studies we have traditionally conducted.

- Flexibility of instrument configurations and of inclusion of “one-time” sensors. While there are limits to what we can support, we should strive to maintain flexibility, for example, to include a PI’s ice replicator with our radiosondes, or to integrate extra temperature or snow gauge sensors into our data stream. The added effort to build in flexibility nearly always leads to large and unforeseen added value for the PIs. It should be a component of our “service” role.
- Emphasis on planning and organization. We should take advantage of the Project structure of EOL in most of our activities. While many projects will cross several Facilities, activities that are entirely within ISF (e.g. continuing maintenance and small upgrades) can also be managed as projects. A Project plan implies having specific goals, budget, and resources, and timeline. This does not imply a lack of flexibility – the plan can be modified as needed.
- Growth into new measurement areas. Specific areas will depend on the larger goals of EOL, NCAR, and the community, but growth should be a goal and should be planned for.

Connections. ISF will create and maintain strong connections to other EOL facilities and to our community of users. There are natural areas of common interest with each of the EOL facilities, but especially with RSF whose expertise in radar overlaps with and compliments the wind profiler technology in ISF, and whose APOL expertise compliments ISF in-situ capabilities; with RAF which also maintains and deploys (airborne) in-situ sensors; with CDF whose display, perusal, and analysis tools should be tailored to sensor data and will be invaluable for evaluating data quality; and with TDF which can help us understand and prioritize measurement needs and develop solutions based on our field experiences and PI interactions. In addition, informal discussions with our users, potential users, colleagues, and funding agents provide excellent feedback on how we are doing and indications of future requirements. ISF also will take advantage of the EOL visitor program, and hopefully the ASP Faculty Fellowship Program, to work closely with scientists from our user community.

Work environment and staff development. NCAR has always been an outstanding place to work. To maintain this, there must be emphasis on good supervision, mentoring, skills and knowledge development, and a path for potential advancement for each employee. Every level of management, from the UCAR director to an individual’s supervisor, is responsible for ensuring this emphasis remains present. ISF should be the example of success in this area.

Contributions to education. With a wide variety of sensors deployed on the ground for many weeks at a time, ISF is in a unique position to contribute to direct, hands-on education of the public and students at all levels. Historically this has been done informally through class and club visits to our sites and with informal presentations and demonstrations by staff. The effectiveness of our contributions should be amplified through partnerships with UCAR Education and Outreach and with professional educators. Although in many cases ISF would be the junior partner in such alliances (for example, E&O would be better prepared to write grant proposals, and professional teachers would be better suited to translate our lessons for a class) our participation can make a difference to hundreds of students and visitors each year.