

January 22, 2010

Dr. Harry Teplitz
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Dear Harry:

This letter is the report of the IRSA User's Committee meeting of November 16, 2009. The members who attended and contributed to this report were Tom Brown (Space Telescope Science Institute), Kelle Cruz (Caltech & Hunter College), Kevin Huffenberger (Miami), Michael Jura (UCLA), Tom Megeath (Toledo), and Karín Menéndez-Delmestre (Carnegie Observatories). The full day meeting also was attended by much of the IRSA staff as well as George Helou, director of IPAC.

The meeting consisted mostly of presentations by yourself, Steve Groom, Bill Reach, and Luisa Rebull. Topics included (1) an overview of IRSA's mission, responsibilities and ambitions (2) technical challenges faced by IRSA and (3) presentations of IRSA's external relationships both with users and in public outreach. In your opening remarks, you requested the User's Group perspective on 3 over-riding questions:

- From a user's perspective, how do we view IRSA's activities
- Help decide how to best use limited resources
- Suggest improvements or new business, not covered in the current work plan, which should be either (a) implemented within the present resource limitations or (b) used to seek new funding from other missions or the next Senior Review.

Before describing our response to the charge, it is important to place IRSA's role into context. Data management has become a speciality in its own right. With modern computers and detectors, enormous amounts of data are created and stored and the ability to process these results has empowered many investigations which were previously impossible. The multi-wavelength sky is complex and dynamic; the synthesis of useful insights is a major challenge.

We support IRSA's self-description of its role as a curator of data. There are other organizations such as MAST in the United States and CDS in France which have responsibilities similar to those of IRSA. Each group approaches their tasks somewhat differently, and there is no obvious unique way to operate a data archive. Some of the challenges faced by IRSA and the project include what to maintain. For a sky survey such as 2MASS or

WISE, a point source catalog is appropriate. However, even this well-defined task faces challenges with variable, extended and moving targets. For missions with spectra or for a mission like Planck with relatively limited angular resolution, the nature of data curation needs serious thought. While the Virtual Observatory is designed to grapple with these ambitions, the issues are not fully solved and IRSA can play a role. IRSA may wish to compare its tools with VIZIER and SIMBAD which have a somewhat different approach to accessing the data. While the two systems should not be identical, some of the IRSA interfaces are slower and less easy to use than those provided by other groups.

To begin, the overall sense of the committee is that IRSA is doing an excellent job. Overall, more than 10% of refereed papers in the astronomical literature use 2MASS or IRAS data. IRSA plays an important role in facilitating reliable access to these data that are maintained in a trustworthy fashion. The fluxes and positions obtained from both surveys are reliable to within the quoted errors.

Our impression is that IRSA will change very substantially in the next 3 years. It has three major new responsibilities: the maintenance of the WISE data, the acquisition of the *Spitzer* cryogenic archive and the development of a *Planck* data base. These tasks are projected to increase the amount of stored data by approximately a factor of 10. IRSA also has played a major role in a proposal to the National Science Foundation to create a National Virtual Observatory.

Most of the technical challenges faced by IRSA remain invisible to the users. For example, the migration to LINUX is a vital and significant task but ultimately should not be obvious to the scientist-user.

Below are our responses to the specific charges. We separate them into highest priority major projects and important but secondary projects. The highest priorities are:

- The curating responsibility for the *Spitzer* data is central. For example, we expect that the 10σ point source catalog extracted from *Spitzer* images will be widely used.
- We fully support IRSA's role in serving the WISE data products.
- We support IRSA's ambition to develop the *Planck* data base. Without constraining IRSA's options too much, we suggest that their Planck data repository should add value to the archives based in Europe. IRSA should leverage its expertise with the data sets it already curates to ease concurrent access to Planck data and to maps and catalogs at other wavelengths..

The next set of projects to be undertaken are:

- The IRSA supported software would benefit from consolidation and uniformity. Currently, the support of different tasks has led to a variety of solutions, but the price has been to create complexity of the IRSA interfaces to the data. IRSA faces a major challenge in meeting its responsibilities, and simplification of its tools may help.

- We endorse IRSA's plans to re-structure its tools for target/coordinate searching and in doing so to make them more transparent to the user. We suggest that links to surveys beyond the infrared might include informational icons that will facilitate the immediate perception of what each survey/catalog provides.
- The art of using large databases is evolving. We suggest that IRSA use the ADP process to develop partners outside itself. Rather than just curate data for the community, IRSA should be open to working on joint science projects to understand better what is required for scientific insight. IRSA development should draw from researchers with an invested interest in the problem being studying. For example, the development of a local catalog of brown dwarfs required this kind of cooperation
- IRSA may wish to support an e-mail/wiki/blog group to facilitate user feedback to help with new interfaces, surveys, etc. These efforts could be incorporated into IRSA's outreach program.
- We encourage IRSA to consider establishing a capability to archive/host data and high-level data products. This could include user-contributed materials.
- We support IRSA's ambition to catalog variable and moving targets.

Finally, we are concerned that IRSA may not have enough resources to achieve all of its goals. The people at IRSA are skilled, but there is a lot of work to be done. This problem is not unique to IRSA, but it must be recognized by everyone – IRSA itself, users and NASA Headquarters – that the challenge of increasing its data holdings by a factor of 10 is very large. It may be most useful for IRSA to distribute efficiently and transparently well calibrated, astrometric images and spectra, as well as catalogs of point sources.

Sincerely yours,

Michael Jura
Chair