

ILWS panel discussion on future collaborations

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On the evening of February 24, 2006, a panel discussion on future collaborations was held for all the attendees of the International Living with a Star (ILWS) Workshop in Goa, India. The panel was comprised of representatives of several space agencies and R. Sridharan moderated the discussion. Those on the panel were P. B. Rao (ISRO), R. Marsden (ESA), T. Kosugi (JAXA), C. Wang (China), W. Liu (Canada), M. Guhathakurta (NASA/HQ), and J. Spann (NASA/MSFC). There were several threads that surfaced including

- the need for collaborations to be based on scientist-to-scientist interactions,
- the need to enhance the combination of space- and ground-based data in analyses, and
- that opportunities to make existing data known, available, and comprehensible to a wider multinational audience should be pursued.
- Additionally, the community strongly felt that individual agency mission planning should be done in a complementary fashion both with regard to content and timing so as to maximize the impact of the overall effort to understand the solar terrestrial system.

Each panelist was invited to make a brief opening remark, after which the panel entered into a dialog with and entertained questions from the workshop attendees. A brief summary of each opening remark is provided below that is followed by a synopsis of the questions and dialog.

P.B. Rao (ISRO) pointed out that while agency-to-agency meetings are important, a more effective interaction may be institution-to-institution agreements. The agreement between Boston University (US) and the Space Physics Laboratory (India) was pointed out as a good example. R. Marsden (ESA) shared that the current science program for ESA is scheduled until 2015 and it is difficult to impact the content. The call for Cosmic Vision missions for 2015-2025 will be forthcoming soon. Solar Orbiter and participation in KUAUFU are the areas that ESA is working related to ILWS. T. Kosugi (JAXA) made the poignant personal statement that all collaborations should be motivated by science and that successful collaborations are those that address solvable

problems, have clear science questions and are based on interactions between individual scientists. He referenced several ILWS efforts that JAXA is involved with including the Solar B mission, auroral mission REIME, and lunar mission SELENE. C. Wang (China) shared that while China only recently entered the space science field, since 2000, it is actively engaged in this area. The Double Star and Lunar mission were cited as examples. The Chinese KUAUFU mission and the Meridian Project, a 15 station ground-based multi-instrumented array, were cited as future key ILWS related activities. He also made the point that agency-to-agency agreements are important and that collaborative efforts with China are most effective when a scientist residing in China is an integral part of the collaboration. W. Liu (CSA) highlighted the fact that historically Canada relies heavily on international collaboration and continues to do so as exemplified by the KUAUFU mission. The ground-based component is its traditional strength and that ILWS should encourage its members to do the same. J. Spann (NASA/MSFC) echoed the sentiment that collaborations should be motivated by science and based on scientist interactions. He pointed out that the need exists to improve the melding ground- and space-based data in analyses among the ILWS community and that the upcoming C/NOFS and STEREO missions and eventually the KUAUFU, THEMIS, ORBITALS/RBSP, SDO missions are opportunities for this to occur. M. Guhathakurta (NASA/HQ) shared the point that ILWS has a broader focus beyond the Sun and Geospace, which includes the interplanetary space and its impact on other solar system bodies. The NASA LWS program defined a concept for solar-terrestrial science; however, ILWS and the implied collaborative efforts are required to implement it. The upcoming NASA LWS mission Ionospheric Thermospheric Storm Probe is an excellent opportunity for ILWS collaboration, referencing the ISRO Aeronomy mission as a possibility. She indicated that the science definition document of the NASA LWS Solar Sentinels mission to study the interplanetary medium is due out soon and that all the science definition documents for the LWS missions are available on line. In closing, she shared the idea that three ingredients are required in order to effectively collaborate: relationship, political will, and resources. This ILWS Workshop in Goa was identified as the beginning of

establishing the relationship component. Finally, R. Sridharan (ISRO) added that India has a strong ground-based component and that ILWS can provide the framework for collaboration with other ground-based efforts. He also indicated that India may be able to launch small satellites that complement other missions such as MMS in much the same way that Double Star complements the Cluster mission.

Several questions from the attendees of the ILWS workshop were asked of the panelists. A synopsis of the questions and responses follows.

#1 Q: We seem to have the resources for the small satellite program, what is the plan for human resource development in this critical area?

#1 A: (R. Sridharan, ISRO) The response was that the ISRO small satellite program is not implemented at the same level as the operational satellites, thereby saving funds. There are limited resources and this is the beginning of the small satellite program. They are launched as co-passengers of already approved missions, and thus do not incur the launch costs. This enables the program to proceed without the large manpower that is required for other satellite programs. The human resource issue is being given attention and a national space science instrument facility is being initiated to address some of these concerns.

#2 Q: Why does ISRO not provide seed funds on a 10 year time scale to develop flight programs/instruments instead of requesting proposals? This would allow a more strategic and stronger basis for the missions that are launched.

#2 A: (R. Sridharan, ISRO) The ionosphere community has been working on what the mission content should be for quite some time. So this is not a sudden development. At the appropriate time, an opportunity to submit proposals will be provided. (M. Guhathakurta, NASA) NASA has a strategic planning exercise where the community defines the science. Perhaps ISRO ought to support such an effort to develop a similar plan.

#3 Q: Not since SOHO has ESA really had an multi-agency mission. Is there the opportunity to complement SDO in a much nearer time frame than the delayed Solar Orbiter?

#3 A: (R. Marsden, ESA) In ESA there are other activities in the near term such as small technology demonstrations, but not prime missions. So there are opportunities to address some solar science. Solar orbiter is delayed because member states do not have the funds, ESA is not the cause for the delay. The science program in ESA is everywhere constrained by politics and funding.

#4 Q: Another collaboration that has not been mentioned is that there is a lot of freely available data. This is science waiting to be done. With a modest investment in training with workshops that are focused on training to use existing data systems, much can be done. There is no science that is limited by data, but by people. We need to look at what we have already available - how can the agencies find a way to support this in a practical way? Perhaps each member nation

should take it upon themselves to identify and coordinate/sponsor an activity to train its science community to use existing data sets that are not being taken advantage of. This should be tailored to each member nation as to how this should be implemented. This could require coordination with the nation who generated the data. Perhaps it may evolve into establishing multiple multi-national data centers. There are many ways to implement this concept, but the main point is that making the maximum use of existing data should be a priority in ILWS.

#4 A: (W. Liu, Canada) The ILWS steering committee has agreed to form a task group to look into how to make the data available for the world wide community. ILWS should establish a program to allow scientists to access the data.

#5 Q: There is enormous manpower to study the space weather effects on the ground and there are many areas to be investigated such as cloud formation and weather. ILWS can lead the effort to do this using space- and ground-based data.

#5 A: (W. Liu, Canada) From day 1, ILWS has recognized that ground-based data is important – There are considerations of having an ILWS ground-based data meeting.

#6 Q: Where does ISRO stand on establishing international collaboration? Does ISRO have any plans to study the sun?

#6 A: (R. Sridharan ISRO) ISRO has always had international cooperation in its space program, beginning with the very first launch with the US and France. The upcoming Chandrayaan lunar mission is also a perfect example of international collaboration with participation from ESA, and individual European countries and US as partners. On the national front, ISRO is in process of preparing a roadmap under four themes; astronomy/astrophysics, planetary sciences, solar terrestrial physics, and climatology. The solar component is being covered under these themes.

#7 Q: Is there international funding for ground-based research?

#7 A: (T. Kosugi, JAXA): I agree that international collaborative funding should be pursued in order that 1+1>2. Space programs are expensive, so we should maximize the results. We should make the data open. Solar B will have full open data policy after its 6 months commissioning phase. Instrument teams should have some sort of support after launch so as not to lose the expertise. The same is true for data analysis groups after the mission is completed.