

ILWS Meeting, Nice, France  
Questions, Answers, and Discussions

**Opgenoorth.** Introduction describing the background, mission and charter of ILWS, some major cornerstones provided by the big participating agencies, and a first outline of a mission map and timetable. Some of the greatest identified remaining needs for the ILWS program include multipoint in situ measurements of Magnetospheric and ionospheric phenomena, imagers, one or more solar wind monitors, and observations of high energy solar phenomena and solar irradiance. We are going to hear presentations from each agency concerning its plans for the future. We are pleased to note that India, the Republic of China, Ireland, and Australia have submitted letters of interest in participating in the ILWS program.

**Guhathakurtha (from NASA).** There are now two SEC missions lines: **STP** (TIMED, STEREO, Solar-B, MMS, GEC, MAG CON) and **LWS** (SDO, Ionosphere, Magnetosphere, Sentinels). Solar Probe, which is not in the current budget profile, belongs to the latter line. Its science definition team will form in summer/fall 2003. There are also cross-disciplinary missions lines: e.g., **Explorer** (which supports CINDI TWINS, THEMIS, AIM mesospheric clouds), and **New Millennium Technology** (which supports ST-5). LWS's Targetted Research & Technology program is a means for binding all these programs together to obtain coherent results.

**Opgenoorth (from ESA).** Here are our plans concerning solar physics. We are currently operating SOHO and have

agreed on a mission extension. There is also a decision to provide ground support in Solar-B (to be launched in 2005/2006). We still have plans to participate in either STEREO (2005) or SDO (2007), where Europe provides a considerable payload contribution but no dedicated ESA contribution has yet been identified. Furthermore, ESA will try to coordinate the European role in these and similar future missions and ease problems that have arisen via multiple contacts with individual countries. We plan to launch Solar Orbiter (2011+) and seek US and NASA collaboration for this mission.

Here are our plans for in situ missions. We plan full orbital coverage for the currently operating Cluster Magnetospheric mission throughout 2003-2005. We are participating in China's Double Star mission, to be launched in 2003 and 2004 (equatorial orbit 550x60000 km, polar orbit 350x25000 km). We have instituted an active archive for Cluster at a cost of 6.8 MEuroes. The management plan is being prepared, but will include building the system in 2003-2004, and operating it in 2005-2007. Staff will be added at ESTEC and in ESA member countries. We continue to plan for the launch of Bepi-Colombo. ESA will henceforth support nationally-led missions with 15% of the mission cost. There are several outlines of candidates for nationally-led mission proposals being discussed in the scientific communities of the member states, with varying seriousness and varying chances for future funding.

A vision statement including hopefully some mission priorities is planned for June/July 2003.

HO adopts as a priority helping maintain ground networks in Europe.

Having noticed a big gap in ESA's programs between SOHO and Solar Orbiter. It will be essential for ESA to work with NASA national programs, as targets of opportunity.

**Kosugi** (Japan). Planned missions include: Solar-B (now confident of launch in 2006), SCOPE (Formation flying of 1 mother and 4 tiny spacecraft in the magnetotail, for launch in 201?), Venus Climate Orbiter (2008), Bepi-Columbo MMO (2011), L5 (to offer a side view of Coronal Mass Ejections at solar maximum from 2008-2013).

**Petrukovich** (Russia). Coronas-F (an IZMIRAN project, amongst other instruments carries an optical photometer, x-ray imager, ultraviolet flux variations, and an X-ray spectrometer, launched in 2001)

Coronos-Photon (funded for hardware, main goal to study solar electromagnetic radiation from Extreme UV to high energy gamma radiation, a joint project with India, Germany, Madrid, Ukraine for launch in 2006).

Under consideration:

Resonance (wave-particle interactions, a joint project of IKI in Moscow and IPF in Nizhni Novgorod, with an orbit of 1800x30000 km, will stay in a single magnetic flux tube, observe the effects of a ground heating facility on that flux tube, carries a cyclotron maser),

Interhelioprobe (an IZMIRAN-led project to investigate coronal heating and solar windformation, the fine structure of the solar atmosphere, the origin of solar flares and CMEs, and solar energetic particles, 2007-2008)

Roy (joint RASA and DLR program, apogee 75000-100000 km, perigee 10000-12000 km, group of spacecraft to conduct Magnetospheric radio tomography)

Interball-Prognoz (Russian-Brazilian project, for launch in 2006-2007, first orbits in an L1 halo upstream from Earth and then moves to a position 400,000 km down the magnetotail, Ukrainians might simultaneously launch a low-altitude dawn-dusk ionospheric spacecraft to measure the potential drop across the polar cap).

Obstanovka (on International Space Station)

Radiation Belt contributions from Skobeltsyn, Space Station, Coronas-F, Express, Meteor, and Molniya 3K.

[www.aari.nw.ru](http://www.aari.nw.ru) WWW site providing near-real time plots of ground data from arctic and Antarctic

**Liu** (Canada). Our primary goals are:

1. to continue support for an extensive suite of ground-based geomagnetism and aeronomy observations, including an array of magnetometers (which can be used to obtain magnetospheric densities), optical imagers, and SuperDARN radars
2. to launch the small ePOP (Enhanced Polar Outflow Probe) spacecraft. Its primary objective is to determine how ion outflow is accelerated over the polar cap and the corresponding effects on neutrals. However, it will also carry radio transmitters for ionospheric radio tomography in conjunction with ground stations. The orbit will be 300x1500 km, and launch is expected in 2006,

3. and to launch the RAVENS spacecraft pair to provide continual auroral imaging during geomagnetic storms in the 2007-2010+ time period.

Waves are important (form and destroy structures, transfer energy). Waves are nonlinear (require multiscale observations).

Comment from Opgenoorth. ILWS can help by giving the RAVENS mission prominence. Europeans might participate in the RAVENS mission by providing in situ sensors.

### **Gonzalez (Brazil).**

There are two major centers in Brazil with objectives related to ILWS: the Space Weather Laboratory at INPE in Sao Jose dos Campos and the Space Weather Forecasting Center in Santa Maria.

EQUARS (Equatorial Atmosphere Research Satellite) will address stratospheric temperature variability, mesospheric wave propagation and temperature variability, and the generation and propagation of ionospheric plasma bubbles. The spacecraft is in Phase A now. Partners include Japan and Canada. David Sentman from the USA will provide a Sprite imager. It will be launched in July 2006 into an equatorial orbit with a 700km altitude and 20° inclination.

Space Weather spacecraft (MCE) with Russians. See the presentation by Petrukovich. Will measure electric and magnetic fields, cosmic rays, plasma, x-rays. Launch 2007-

2008. It will spend about 1 year (more or less) in the solar wind and then move to the magnetotail.

### **Liu (People's Republic of China).**

The government of China strongly supports a space physics research program. Because money has already been allocated, the missions described below have a high probability of being launched and participating in the ILWS program. A white paper on Space Activities was issued in November 2000. The Double Star program was approved for the period from 2003 to 2006 in December 2000. The country is now planning for the period from 2006 to 2020. The plan now is for a set of three Space Wind and Storm Exploration (SWISE) spacecraft. They will be launched in 2010-2012 on one rocket if approved. All have inclinations of  $65^\circ$

SWISE-1 will have an orbit that ranges from 300 to 700 km in altitude. It will provide observations concerning the ionospheric and thermospheric response to storms. It will carry instruments capable of measuring the magnetic field, ionospheric, low-, and high-energy particles, waves, energetic neutrals, thermospheric winds and temperatures, Solar UV radiation, and auroral images.

SWISE-2 will have an orbit of  $700\text{km} \times 7.5 \text{ RE}$ . It is intended to study the geomagnetic storms in the magnetosphere. It will carry instruments that measure the magnetic field, low- and high-energy particles, energetic neutrals, auroral imager, and a potential controller.

SWISE-3 will have an orbit of  $2 \times 22 \text{ RE}$ . It will make observations of the magnetospheric boundaries and solar wind.

SST (a space solar telescope) offers possibilities for cooperation. It will be built by the Chinese national astrophysical observatory (CNAO). It will consist of 5 telescopes designed to measure (1) the solar magnetic field, and (2) temperature. It is almost approved and in Phase A studies.

### **Kecskemet (Hungary)**

Hungary wants to be part of ESA. They flew a dosimeter on the space shuttle.

### **Korepanov (Ukraine).**

The Ukraine continues to be tightly connected to Russia. They frequently provide electric and magnetic field experiments to Russian missions.

The Variant experiment will fly on the Sich-1 remote sensing mission in a circular orbit with an altitude of 670 km. The experiment will measure electric and magnetic fields that will characterize field-aligned currents. Launch will be at the end of this year, with an expected lifetime of 5+ years.

The Ukraine makes ground observations of the electric and magnetic field from a magnetically clean Antarctic station at  $L = 2.4$ . They also observe gravity waves from this site.

Some of the equipment at the Kharkov incoherent scatter radar station currently has problems. Part of this activity will be terminated in a few years.

**Rucker (Austria).** Provided very clear viewgraphs. See them.

**Belgium** (contributed a 1 page handout).

Radiation Belt and Cosmic Rays: First principle and statistical models. Constructing a directional Energetic Particle Telescope.

Kinetic modeling of solar wind, polar wind, and auroral field-aligned currents.

Kinetic models for the magnetopause structure and work on impulsive penetration. Analysis of Cluster magnetopause observations.

Theory (interchange instability) and observations (Cluster, IMAGE) of the plasmopause.

Using VIKING radio wave observations to develop a magnetospheric VLF model.

**Neubert (Denmark).** Denmark builds upon a heritage of magnetometers and GPS techniques for measuring atmosphere-ionosphere phenomena.

Denmark operates a network of ground stations in Greenland

ESA has a 'small' Earth Explorer Opportunity Mission program that supports missions for up to 120 MEuros. Proposals were last due on January 8, 2002. Three of 27 submitted were selected for phase A. These three are: ACE+, EGPM (precipitation), and Swarm. Two of the three will be selected for continued development. Phase A studies include the scenario of merging of the ACE+ and Swarm while retaining the capabilities of both. Launch will be in 2007 on an unknown vehicle.

ACE+ (Danish Meteorological Institute) is a radio occultation mission of 4 spacecraft in low Earth, polar orbit that uses GPS, GALILEO and intersatellite signals to conduct atmospheric profiling (density, temperature, and humidity). It will provide more than 4000 profiles each 24 hours. The mission can be used to obtain electron density profiles, electron densities in the E region, E and F region scintillations, and information on gravity waves.

SWARM (Danish Space Research Institute) is a high-precision magnetometry mission of 4 spacecraft in low Earth, polar orbit that carries magnetometers, accelerometers, and GPS receivers. There would be a single launch.

The ILWS program could benefit by helping getting the missions merged, selected and opening the missions to additional instrumentation relevant to ILWS objectives such as particle spectrometers, imagers, ion drift and plasma diagnostics, and electric field measurements.

A Phase A study on merging the missions will finish by the end of 2003.

**Pulkinnen (Finland).** Finland operates an extensive network of ground stations including magnetometers, radars, and all-sky cameras. Finnish scientists run a wide array of simulations, including magnetohydrodynamic, empirical, ring current, and solar acceleration models.

Finland is participating in the Bepi-Columbo mission (in particular in experiments to study the solar wind/planetary interaction, and solar x-rays). It is also participating in Solar Orbiter (the experiments to study energetic particles, UV and x-rays). Finland has a strong interest in STORMS, which will offer a synoptic view of the ring current. Finland is very interested in the future of the EISCAT radar, and European space weather activities.

**J.-V. Prado (CNES).** We are in deep financial trouble. There is an April 16 review of CNES missions. It is expected that a few CNES-led projects will be cancelled. New set of microsat selections is on hold (e.g., TARANIS- particles, cameras, and electric field measurements intended to study the atmosphere-ionosphere magnetosphere coupling during atmospheric storms, and LYOT - imagers to study solar, geocoronal physics, and interplanetary space).

PICARD is a mission designed to determine the absolute total and spectral solar irradiance, the diameter and solar shape, and use helioseismology to probe the solar interior. We can say that PICARD is frozen, but not dead. Picard, a priest made simultaneous sunspot and solar diameter measurements during the 17<sup>th</sup> century. Recent results confirm an anticorrelation between these parameters.

French will want to invoke ILWS to review Picard. Launch is presently scheduled for 2007.

DEMETER is a mission to detect electromagnetic emissions from earthquakes. It will be launched at the end of this year or start of next year.

**Frings (Germany).** Amongst other topics, they study the solar-terrestrial interaction. The trend is towards solar observations.

SOL-ACES measures EUV/UV fluxes from the Sun. It should have flown on the International Space Station in 2002. Relaunch is scheduled for 2005.

**Antonucci (Italy).** Italy contributes at the level of mission payloads.

They will contribute the spectroheliograph SPECTRE (OV channel 629 Å) to the NRL's SHARPP instrument on SDO.

Herschel is a sounding rocket to make coronal and disk observations. The purpose is to measure coronal helium abundances and investigate the solar wind acceleration from a range of solar source structures. This will establish a proof-of-principle for the Ultraviolet Coronagraph Imager (UVCI) to be flown on Solar Orbiter.

They are participating in solar orbiter and have an interest in several instruments.

Their wish list includes Triana, Proba II, Ground, Theory...

They are interested in Bepi Colombo

**Andersen (Norway).** See very clear presentation.

### **Opgenoorth/Kosugi**

With respect to Solar-B, there will be two European experts on the science working group with full access to data and input to operations. This working group will issue a call for proposals. Any scientist can respond. This is an open project. **Guhathakurtha**- I hope we will all have open access to all our missions. **Pillet** wants the possibility to determine what gets observed and therefore what data goes into the data base.

**Pillet (Spain).** There are many solar observatories in Tenerife. The SUNRISE balloon-born solar telescope project will provide important information on the structure and dynamics of the solar magnetic field. The balloon will carry a main telescope feeding three focal plane instruments: the spectrograph/polarimeter, the filtergraph, and the magnetograph. There will be a test flight in 2005 from White Sands. If this is successful they will then fly the mission from Antarctica. The mission will provide the magnetic context for the visible-light imaging magnetograph (VIM) on Solar Orbiter. There is some interest in in situ measurements.

### **Magnusson (Sweden).**

There is Swedish hardware involvement in a number of ongoing projects such as Cluster, Rosetta, Mars Express,

Nozomi and Cassini. These are not further included in this document.

*Recent developments*

**ASPERA-4 on Venus Express.** Hardware similar to ASPERA-3 (Mars Express) will be built for Venus Express to measure electrons, ions, and energetic neutral atoms. The PI is S. Barabash of the Swedish Institute of Space Physics in Kiruna (<http://www.irf.se/>).

**Space Weather.** The Swedish Institute of Space Physics in Lund, under leadership of H Lundstedt, has become a Regional Warning Center of the International Space Environment Service (ISES). For further information, see RWC-Sweden at <http://www.lund.irf.se/rwc/>.

The institute in Lund is also involved in the ESA GIC Pilot Project "Real-time forecast service for geomagnetically induced currents" (see <http://www.lund.irf.se/gicpilot/>).

**Solar Telescope on La Palma.** In May 2002 the Swedish 1-meter Solar Telescope on La Palma started operation with its full aperture. A spatial resolution of 90 km is reached repeatedly. It is operated by the Institute for Solar Physics of the Royal Swedish Academy of Sciences. For further information, see <http://www.astro.su.se/English/groups/solar/solar.html>.

### *Proposed Future Projects*

A Call for Ideas was issued to the Swedish space science community in the autumn of 2001. The purpose was to get a good survey of topical scientific questions that could be addressed with a continuation of the Swedish national satellite programme, through stand alone or multilateral satellite projects or through Swedish hardware participation in projects under a foreign leadership. The most realistic proposals for the near future have undergone pre-phase A studies and a scientific evaluation by the Space Research Advisory Committee of SNSB. The project favoured from a scientific stand point was STEAM, a mission to study the interaction of climate, chemistry and dynamics in the upper troposphere and lower stratosphere by microwave mapping from space.

The projects mentioned below includes only proposed projects connected to the theme of ILWS and deemed of interest to pursue in the near term by the Swedish National Space Board.

**TechnoSat.** The SNSB will procure a phase A study in the Spring of 2003 for a technology demonstration satellite, intended to be flown within 2-3 years. There are many potential elements that have been proposed for testing on such a mission, in particular miniaturized spacecraft technologies from the Ångström Space Technology Centre (<http://www.astc.material.uu.se/>), but also technologies from the Swedish Space Corporation (<http://www.ssc.se/>) and Omnisys Instruments (<http://www.omnisys.se>). Of particular interest to the ILWS initiative is the proposed tests

of a new wire boom system SCALE for plasma instruments from the Alfvén Laboratory (<http://www.plasma.kth.se/space/>). A more futuristic proposal, which probably cannot be implemented on the currently envisioned TechnoSat mission, is to test space craft propulsion through interaction of the solar wind with an artificial magnetosphere (Swedish Institute of Space Physics, Orbitum AB, Swedish Space Corporation).

### **Other studied satellite projects**

A set of four almost identical satellites, **Auroral Quartet**, is proposed for studies of the dynamic and multiscale plasma above the auroral ionosphere and out to 1 Earth radius. The proposers come from the Alfvén Laboratory, the Swedish Institute of Space Physics and the Danish Space Research Institute. The project is considered mature and has previously been studied. A broad international collaboration is required to make the project feasible. ILWS could be a forum for such collaboration.

There is a proposal for a series of advanced low-altitude multi-satellite missions, called **Atmosphere-Ionosphere Missions (AIM)**, for correlated studies of electromagnetic radiation phenomena and effects, from DC, via radio, to optical, X-ray or even gamma, together with basic gas and plasma dynamics, in the upper atmosphere/lower ionosphere. The project has many proposers, under leadership from the Swedish Institute of Space Physics.

## **Proposed involvement in other space missions**

There are proposed Swedish participations (hardware) in several additional space missions:

1. **BepiColombo**, ESA/Japan (both in the Mercury Planetary Orbiter and the Mercury Magnetospheric Orbiter)
2. **Solar Orbiter**, ESA
3. **Magnetospheric MultiScale Mission (MMS)**, NASA, specifically in the instrument suite Solving Magnetospheric Acceleration, Reconnection, and Turbulence (SMART)
4. **Jupiter Icy Moon Orbiter (JIMO)**, NASA, specifically Langmuir probes, Plasma wave instrumentation, and Ground Penetrating Radar

## **Swedish sounding rocket programme for aeronomy**

A programme of sounding rockets for studies of the atmosphere, primarily the mesosphere, is currently under consideration in Sweden. A decision on funding is expected in the near future.

## **Schmutz (Switzerland).**

He wishes to emphasize the need for the Davos Observatory Radiometer Experiment (DORADE) on SDO.

There are some potential UV Irradiance measurements coming up:

PREMOS is a radiometer with 4 spectral channels. It should fly on the now frozen PICARD project (2007).

LYRA on the Proba-2 ESA technology mission.

The real question is whether there a long term trend in total solar irradiance? To answer this question, we need to splice together experiments over a long period. The answer won't be clear unless we continue the steady measurements.

Something is needed between Virgo/SOHO and NPOESS. What about SDO? It is proceeding and mustn't be slowed down. In principle NASA welcomes a total solar intensity (TSI) instrument provided by ESA, but requires \$4.6M for integration and launch costs. Switzerland cannot provide that and requires ESA support. A topic for this body to decide. Switzerland will wait until it hears from ESA.

Even if selected for this activity, Switzerland would still be interested in flying a UV experiment on Picard. Different from this.

CAWSES project strongly supports this activity.

ESA is aware about all this. ESA expects a request from the European community. There have been several country-by-country requests on an individual basis for SDO. Opgenoorth has called a dinner meeting this evening to sort this out.

**HO.** This group must not turn into a pressure group or it will lose credibility. The group can underline the importance of TSI continuity.

**Horne (UK).** I have no viewgraphs. Most of the missions on my list have already been covered, so I am going to talk about politics within the UK- with an emphasis on interests and possible collaborations. We are fully committed to ILWS, Bepi-Columbo, SDO, ionosondes, and the solar oscillation network. There isn't enough money to go around- we have to develop a strategy to prioritize. Let's not talk about origins and planetary. The Sun-Earth Connection has 3 foci: energy flow, understanding fundamental small scale plasma processes, and the solar interior connection to surface and atmosphere. We've been asking for proposals over the past year. We've just learned our budget for the next 3 years. This is painful. Our highest priority is to evolve within ESA missions. When there are gaps, we will engage in bilateral missions. We are interested in technology development for future ESA missions. Having a national program is a good way to get further money from our own government.

We are involved in Solar-B and Stereo. We have a high priority to become involved in Solar Orbiter. The painful decision is that we cannot afford hardware for SDO. We have increased the money from pitiful to less pitiful for Bepi-Columbo. We maybe able to support two PIs. We have a line for bilateral cooperation. Things are positioning themselves for that. We cannot commit to a lot of them. The key thing is that we would like to be involved in UK's Earthshine mission. We are looking for partners. This

mission addresses solar variability and the response of the Earth's albedo. We need total solar irradiance measurements. The other ideas are reconnection and Frisbee. We expect funding in 2-3 years time. We would like to provide the 5<sup>th</sup> spacecraft of MMS. We can't afford both Earthshine and Frisbee. We want to study auroral particle acceleration (APEX and Maxwell). We could have links with Canada's RAVENS mission. We could work with the community. These would come later.

Our strategy gives equal importance to modeling, theory, ground, and space-based. We will be putting a lot of money into bringing data together because this is as important as putting up another mission. We must also develop models for understanding. Tomorrow we need to think about data. Don't split into ground and space-based task groups.

### **Viereck (NOAA/SEC).**

He works in a group that alerts and supports forecasters by transitioning models, data, missions, and science.

NOAA provides the connection to societal needs.

His group monitors GOES (solar x-ray, EUV, Magnetospheric fields and particles, x-ray imaging), POES (solar UV, particles), and Ground-based (total electron content- TEC) data.

They could make operational observations.

They are trying to sell the GEOSTORMS L1 solar wind monitor to NOAA to follow up on ACE.

GOES has space for Mission of Opportunity instruments.

Japan may buy a GOES spacecraft and move it to lie over Japan.

Officially NPOESS should be ready for launch in 2008, but 2010 is more likely. This is not a good route for the TSI people because the spacecraft might be launched but not turned on.

### **Basu.**

The president of SCOSTEP is Geller. The vice-president is R. A. Vincent. SCOSTEP is a council of various scientific unions.

SCOSTEP ran STEP, MAP, IMS activities. Now they run smaller programs, e.g. S-RAMP.

The chair of CAWSES is Sunanda Basu (BU). They have been holding meetings all over the world (Maastricht, Rio de Janeiro, Nice, Sapporo).

There are four themes under CAWSES

1. Solar influence on climate (Mike Lockwood)
  - a. atmospheric, irradiance, extreme environments...
2. Space Weather (Kozyra and Shibata)
  - a. humans in space, telecommunication, navigation, aircraft passengers

3. Climatology (Sojka and Frohlich)
  - a. Regular and irregular variations, extreme events, long-term trends
4. Atmospheric Coupling (Luebken)
  - a. coupling of spatial domains, dynamic, radiative, electrodynamic, atmospheric constituents, theory

CAWSES will hold meetings and conduct specialized training for scientists from developing nations. They will partner with developing nations and develop educational material.

They might be able to run workshops and set up WWW pages. They might provide endorsements that help national programs to get funding.

### **HO questions:**

1. Is someone or something missing from this meeting?  
Answer: Poland, Czech Republic, Slovakia, and Israel, US Department of Energy representatives.

Perhaps we should invited ESA Earth-Observation people.

On the other hand, large agencies should speak with one voice. But that isn't the reality now. NASA doesn't mind if Earth Sciences sends its own observer. There are similar communication problems within ESA. We are not

inviting them now because it might ultimately have a negative effect.

2. Will the proposed structure suffice: namely a standing steering committee with annual working group meeting? General agreement that it suffices.

What about ground observations? Because this is an agency initiative, it is space-based. However, we are going to discuss task groups tomorrow with an open mind. When we talk about ground observations, it is a completely different organization and funding situation, attitude, and people. Let's let the ground-based people coordinate themselves first and then merge the science.

Our task groups have 2-year lifetimes. We need cross-membership. Chairs could attend meetings of other groups. Even the Canadian Space Agency prefers separate task groups for ground and space-based. Having a separate ground based task group increases the profile of these activities. Now lets have these groups find the gaps and propose ways to fill them. Two years from now- we will reconsider what measurements are needed.

3. **HO** has identified missions that match:

Low-altitude:

Europe Danish ACE+/SWARM, US LWS IT probes,  
China SWISE-1

Magnetospheric:

European STORM, US LWS storm probes, Canadian RAVENS, UK MAXWELL/APEX, China SWISE-2

Heliosphere:

Europe Solar Orbiter, Europe Bepi-Columbo, Sentinels

Eckart Marsch from Lindau will be chairing the joint ESA-NASA Solar Orbiter Science Definition Team. This group should be kept distinct from any 'Sentinel' or better yet 'heliospheric' task group. We may need a solar monitor task group.

Petrukovich suggests I. Veselovsky and G. Zastenker as members of the Heliospheric task group. He suggests Victor Sergeev, himself, and Michael Panasyuk for the Magnetospheric group.

We would like Rod Heelis to go through the ionospheric missions identifying synergies in a more extended version of what Hermann did above.

Who should chair the solar monitoring task group? There are diverging opinions on the need to include ground-based observations. We need some definition of the vision for this task group. Various proposals are stated concerning its organization. Here are some names suggested for members:

Bougeret (member)

Ken Tapping (NRC Hertzberg, F10.7)

Helmut Rucker

Valentin Martinez Pellet

Leibacher

Gottfried Mann (Potsdam)

Matts Karlsson (a Swede in Oslo)

Scharmer (Sweden)

Von der Luhe (germany)

Valery Korepanov suggests including Professor Yaroslav Yatskiv, Main Astronomical Observatory of National Academy of Sciences of Ukraine, [knk@nas.gov.ua](mailto:knk@nas.gov.ua) as a member of the Solar Sentinel Task Group. Prof. Yatskiv is the focal person of solar study in Ukraine (Coronas experiment, ground observations)

Presentations of the ionospheric task group members and tasks by Sibeck.

Per Magnusson suggests that Donal Murtagh (aeronomy) of Chalmers University of Technology, Sweden participate in this group. He is an expert on middle and upper atmosphere and has been actively involved in Swedish sounding rockets. He is the Aeronomy mission scientist for the microwave observatory 'Odin'

Prof. Donal Murtagh  
Dept. of Radio and Space Science, Chalmers University of Technology, S-416 92 Göteborg, Sweden  
E-mail: <mailto:donal@rss.chalmers.se>donal@rss.chalmers.se  
Phone: +46-31-7725651  
Fax: +46-31-7721884  
<http://www.rss.chalmers.se/gem/>http://www.rss.chalmers.se/gem/

Sunanda Basu suggests equatorial and mid-latitude people participate in this group.

Presentation of the ground-based task group by Donovan

NASA MIDEX Themis and Data Environment Initiative VxO presentations by Sibeck. Interest in latter by Horne, Petrukovich, and Donovan

## **CNES Program Decision Making**

This was a presentation to describe the different ways projects might be undertaken within ESA member states.

1. Mandatory ESA Programs (e.g., Solar Orbiter, Bepi-Columbo)  
ESA Advisory Committees  
SPC  
Commitment for P/L provision after CNES/CNRS agreement
2. National program (Microsats Picard, Taranis, Lyot)

Focussed AO's  
CNES Advisory Committees  
Final recommendation from 'CPS'

### 3. Other Participation (SDO, THEMIS, MIDEX, CORONAS-F, VARIANT)

Scientists have been free to participate in any proposal without any supervision. They can get vague letters of endorsement from their national agencies. There simply is no budget visibility at this stage.

Advisory committee recommendations  
LoA's in case of important participation  
Need to improve this process

Bo Anderson. We are not a lobbying organization. But we can share information to know what is coming up.

Lika. Would like to know how we will work with ESA. Southwood does not like the way we run STEREO, which has a large European contribution. It has been a problem for ESA. When member states contribute funds, they don't have it left over. We prefer to see things in an ESA package. HO. You understand Southwood's position correctly. He is unhappy about national-US cooperation ending up costing ESA money. If the member states agree- ESA could be the single contact point with NASA.

Schmutz: But ESA invited member states to propose to SDO.

HO. There was a long sequence of negotiations about a common AO. But that didn't happen. So ESA endorsed participation by individual member states.

Lika. Do you have a timeframe for resolving this problem? We have some AOs coming up.

Bill Liu. ILWS should coordinate common AOs. This would bring the processes in line.

HO. IT task group should look into compatibility.

Lika. We can't wait that long.

HO. How about doing it for Magnetospheric? Give us a deadline.

**Lika. Need a meeting with the IT group by Summer at the latest.**

Cao. The future Chinese missions have high likelihoods of occurring. Money has already been allocated.

Bo Anderson. There is an urgency to determining whether or not ESA will do anything for SDO. There is a working group meeting next Wednesday leading to the SDC meeting in May. I have been writing a document that underlines the importance of ESA participating in a mission in which a significant part of the payload is funded by European taxpayers. ESA expects US participation in Solar Orbiter. We can add value to a NASA mission. They could give added value to the European scientific utilization. I volunteer to transmit this document with my name to the ESA advisory structure and ask that it be discussed at the forthcoming solar system working group meeting. ESA's participation would help with the budget and would give ESA a role to play. Agreed to do this. Send to SSWG.

HO. This is a very good initiative. But officially I know nothing about it.

TN. Is this quid pro quo? Help SDO in return for Solar Orbiter?

Lika. Can't say so. But could lead to that kind of attitude.

TN. What level of help from ESA would make a difference?

BA. NASA shopping list contains items with costs ranging from \$0.5 to 20 M. ESA might have about several million.

Lika. \$470 M is the NASA cost for SDO.

BL. Several M is therefore only symbolic.

Lika. We have budget troubles in 2004 and 2005. Even a small amount helps.

BA. I hate it when countries say they have money for NASA participation, but not for ESA projects.

Next Meeting. Could be held in Banff, Canada in conjunction with the Spring AGU. Holding meetings in conjunction with science would be easier for Petrukovich and Eastern European representatives. Canada is cheap. Tentatively May 24-26. It was also noted that the Paris COSPAR meeting on July 18-25 would be a possible place to meet, but on the other hand, we are expecting to present a progress report and results there, so a meeting in Banff before that would be better.

Lika. We need to represent ILWS to other nations and programs. We will prepare materials and talks. I am going to the space weather meeting in Boulder. We should coordinate forthcoming talks- pass on similar ideas to the outside world. Popularizing our activities is important.

JYP. What about a roadmap? Large agencies have identified clear projects. How will we coordinate lower-level programs?

Lika. You are raising a good question. I don't have a picture yet, but it will happen. I foresee that we will maintain an up-to-date WWW site. George Withbroe is going to take charge of developing a scientific rationale and programmatic. We should send information through Dave to George so that he can keep the WWW site up-to-date. That is the vehicle to make news releases, e.g. AO, drafts, etc. In the absence of a roadmap, we will use the WWW as our tool.

BL. I want to know what a cornerstone mission is. MMS is not an LWS mission. It is an ILWS mission. Does NASA mind?

Lika. It's no problem.

BL. What constitutes a medium or a small mission?

Lika. \$140M is a small explorer. \$200M is a medium explorer.

Lika. Please send your criticisms of the ILWS WWW site to Dave Sibeck. He will pass it on to a WWW curator.

BL. Deadline to form these task groups?

Lika. We are going to look again at the IT group membership. We are going to change their charter. Need to start work May 1.

BL. Suggest June 1 for the ground group to get under way.

The meeting was adjourned.

Steering committee to pick a leader for the Solar Group. Circulate names and decisions.