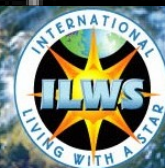


Toward the ILWS Decade

William Liu
Canadian Space Agency

4th ILWS General Meeting
Beijing, July 22-23, 2006

International
Living With
a Star



Report and Outlook

- State of the Program
- State of missions
- Future needs



ILWS Mantra (<http://ilws.gsfc.nasa.gov>)

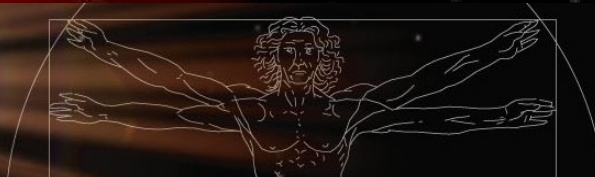
- **MISSION:**

Stimulate, strengthen, and coordinate space research to understand the governing processes of the connected Sun-Earth System as an integrated entity.

- **OBJECTIVES:**

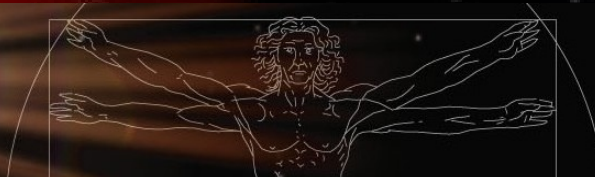
To Stimulate and Facilitate:

1. Study of the Sun-Earth connected system and the effects which influence life and society.
2. Collaboration among potential partners in solar-terrestrial space missions.
3. Synergistic coordination of international research in solar-terrestrial studies, including all relevant data sources as well as theory and modeling.
4. Effective and user driven access to all data, results, and value-added products.



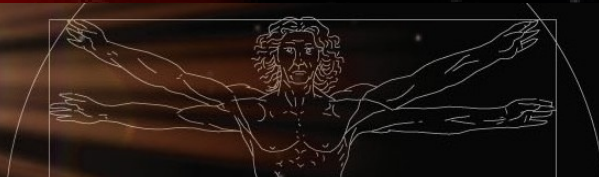
The ILWS Decade

- In the next 10 years, more than 20 missions for Sun-Earth System Science will be launched by ILWS agencies
- The collection of these missions is International Living With a Star
- The Question:
 - How to make the ILWS Decade also the renaissance of our science?



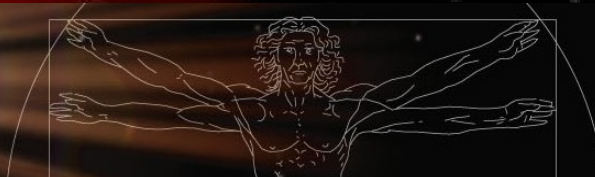
Program Update

- Greece and Taiwan joined, giving a total membership of 28
- Steering Committee meetings
 - Goa, February 2006
 - Telecon, May 2006
- Solar Task Group formed (T. Hoeksema chair)
- Various discussions with CAWSES/SCOSTEP, IHY, eGY on matters of common interest, especially on data exploitation and preservation
- Conducted an independent peer review of Kuafu mission assessment study at the request of CNSA

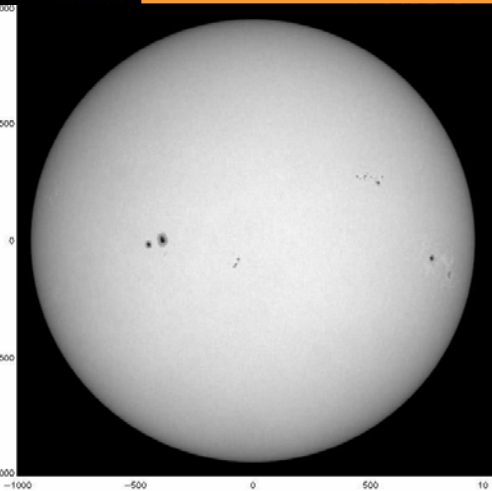


Program Update -cont.

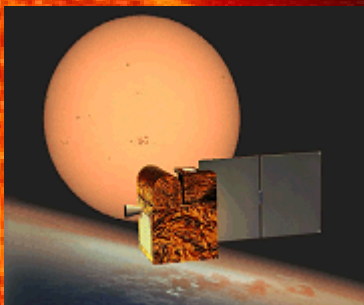
- Several workshops, conference sessions
 - Goa Workshop
 - IAGA (2005) and COSPAR (2006) sessions
 - Varna Workshop (September 2006)
- Several mission launches this year
- NASA (Lika) is Vice Chair and will become Steering Committee Chair for 2007-8
 - Hurah! Je peux faire de la recherche à temps plein!



Mission Update 1

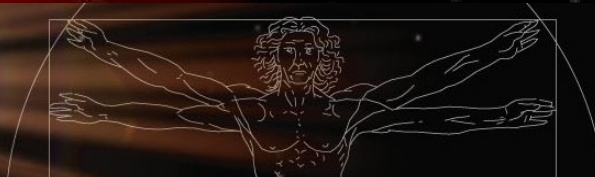


- Solar B (2006)
- STEREO (2006)
- Proba-2 (2007)
- Corona-Photon (2007)
- PICARD (2008)
- SDO (2008)
- Solar Orbiter (2015)

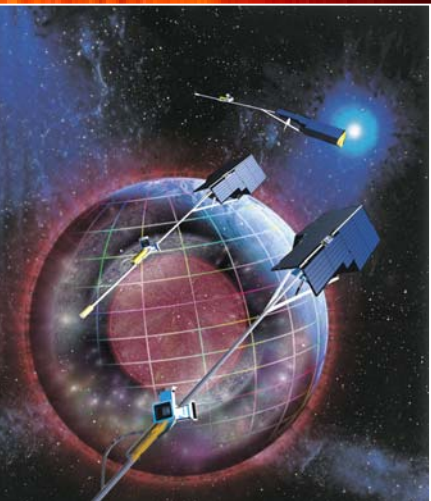
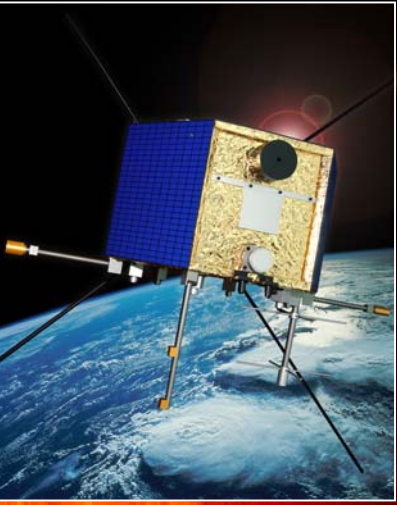


-
- SMESE
 - Kuafu
 - Solar Sentinel
 - Solar Probe

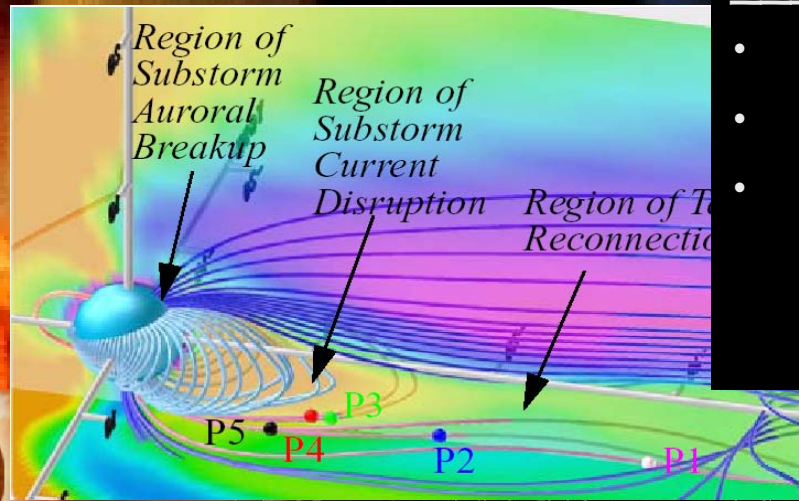
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Mission Update 2



a Star



- THEMIS (2006)
- ePOP (2007)
- Argo (2008)
- SWARM (2010)
- RBSP (2012)
- MMS (2013?)

- ERG (2013)
- ORBITALS (2013-4)
- M³/SCOPE (>2016)

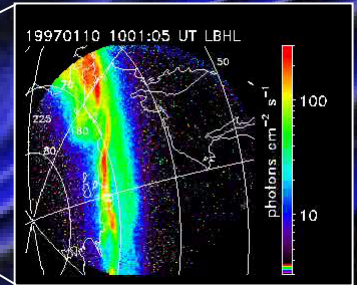


New Opportunity 1

Kuafu A



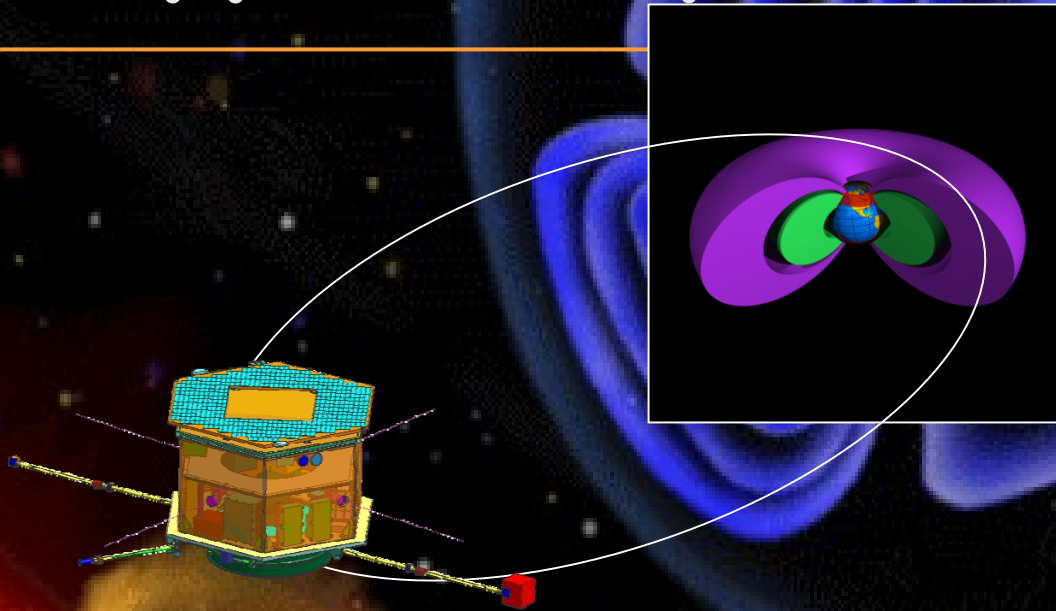
Kuafu B



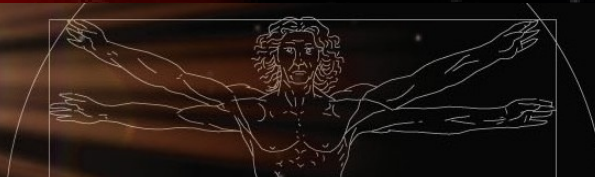
- Kuafu will be the first-ever coordinated simultaneous 24/7 imaging of the Sun and magnetosphere
- A large Canadian-Sino-European collaboration



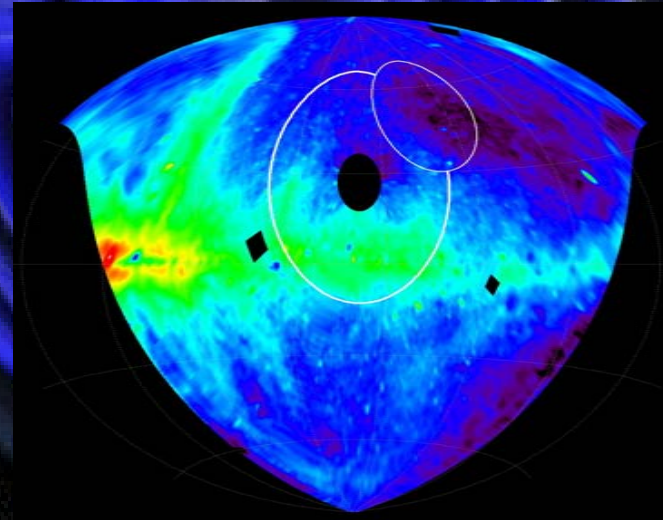
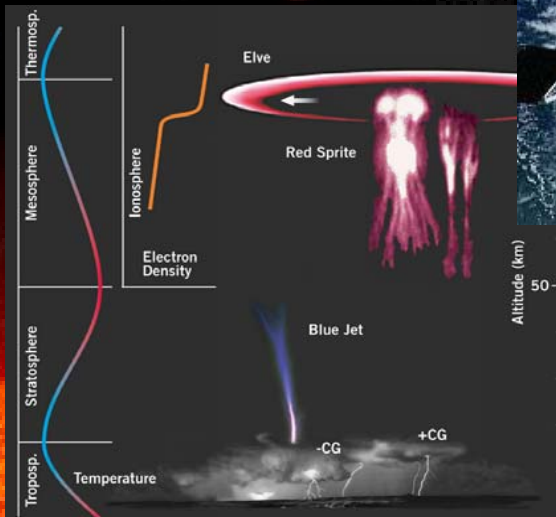
New Opportunity 2



- Canadian-US ORBITALS and Japanese ERG for radiation belt science



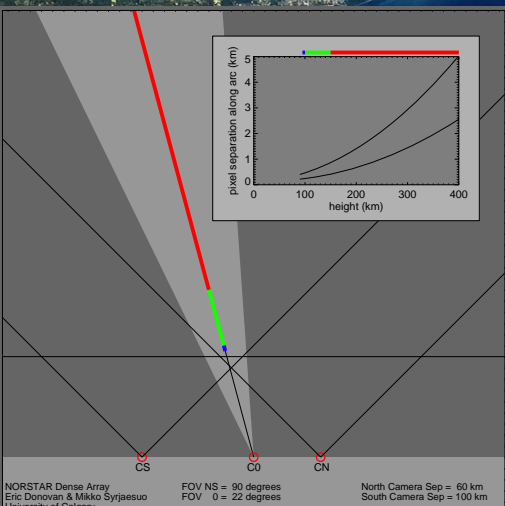
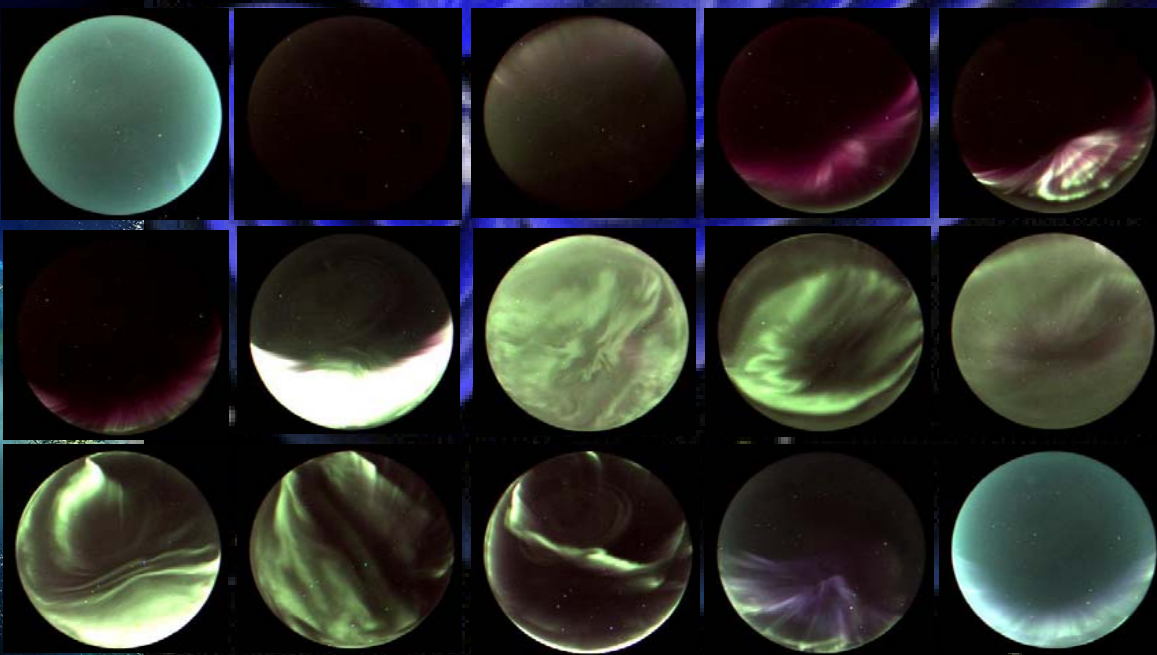
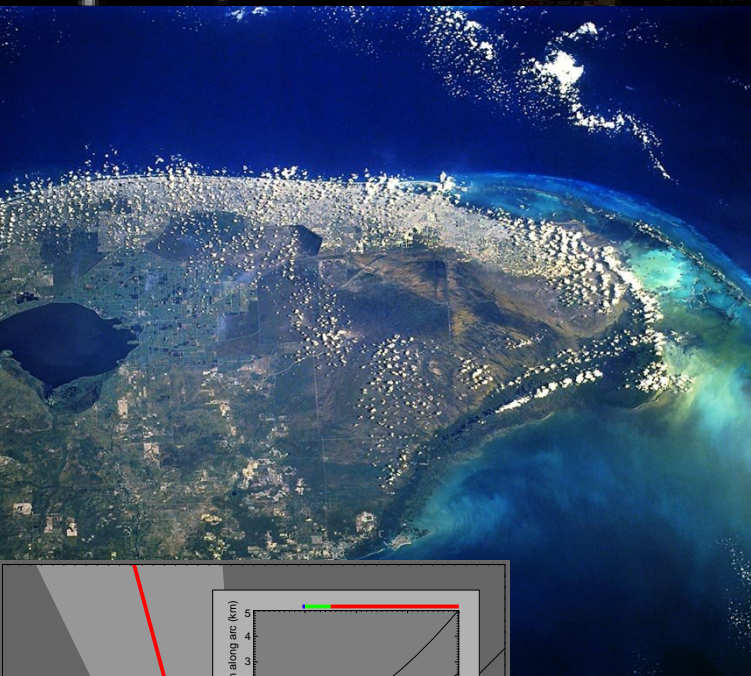
New Opportunity 3



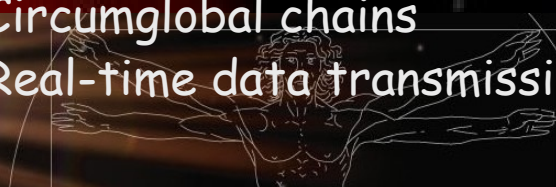
- ASIM (Atmospheric-Space Interaction Monitor) is a photometer-x-ray sensor package for flight in ISS



Ground-based Science

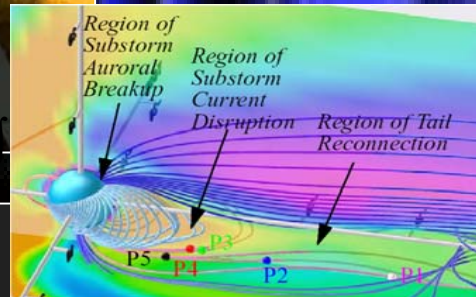
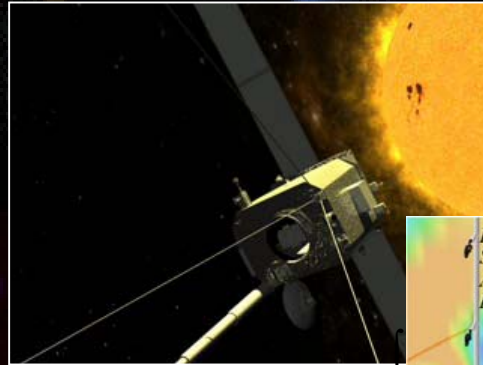


- Emergence of Super-Mag and GAIA
- Further expansion of remote-sensing radar networks
- Circumglobal chains
- Real-time data transmission solutions



Issue 1: Data

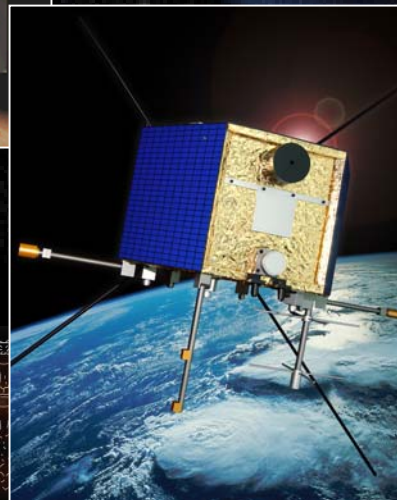
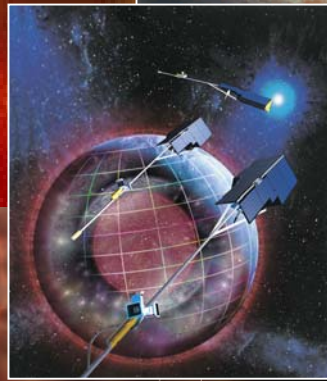
- Solar B
- STEREO
- Proba-2
- Coronas-Photon
- PICARD
- SDO
- Solar Orbiter
- THEMIS
- ePOP
- Argo
- SWARM
- RBSP
- MMS
- ASIM
- ORBITALS
- SMESE
- Kuafu
- M³/SCOPE
- ...



= ?

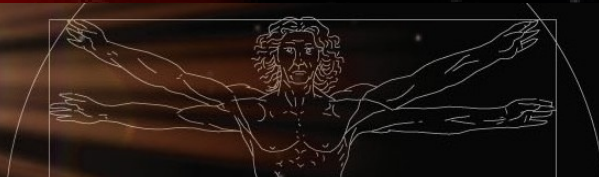
Cooperation with
eGY, IHY,
CAWSES, etc

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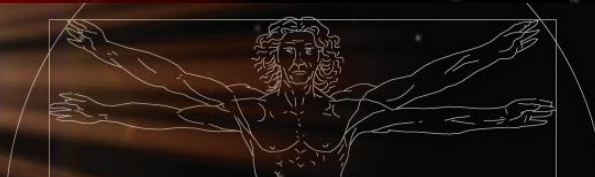
Issue 2: Coordination

- A new wave of solar missions accentuates the importance of coordination
 - A principal task for Solar TG
- Proactive steps should be taken on the geospace side as well



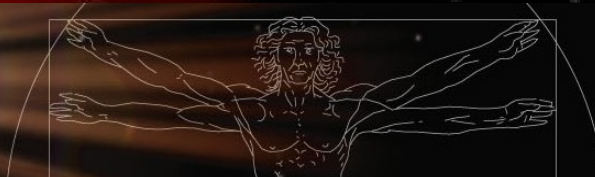
Issue 3: Missions under Planning

- Kuafu is an important test case on how ILWS can help optimize its science and fill important gaps
- Coordinated European action is very important
 - Not necessarily a zero-sum game vis a vis Solar Orbiter
 - China is important enough for Europe and Canada to invest more



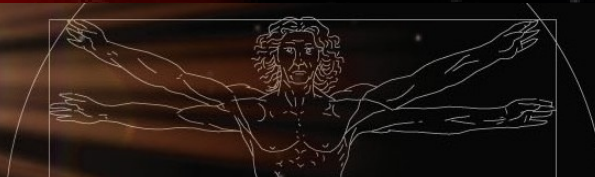
Issue 4: Ground-based

- Most ILWS agencies do not have direct mandate on GB
- ILWS won't be a scientific success if it is disconnected with GB community
- Creative links with this community need to be established
- A GB workshop to discuss how to best synergize ILWS missions and GB activities



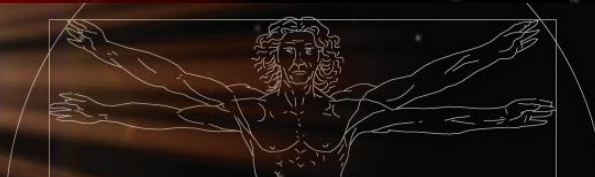
Issue 5: Break down boundaries

- Systems science requires scientists from different disciplines to communicate
- An ILWS symposium series (biannual?) over the ILWS Decade to focus on interdisciplinary problems and system-level approach to their solution



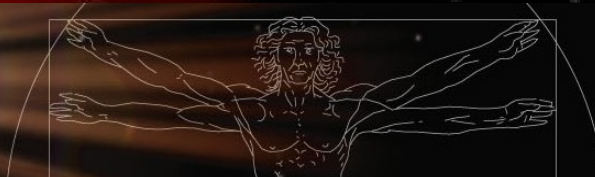
Issue 6: IT and Atmosphere

- IT is now a weakness of the program
 - Falling in no-man's land
 - Needing a compelling science or practical argument
- IT can be a gap that can be filled by emerging ILWS countries
- IT can benefit from nontraditional partners (SWARM and ASIM examples)
- IT should look more seriously at geospace impact on the atmosphere (Sun-Climate Connection)



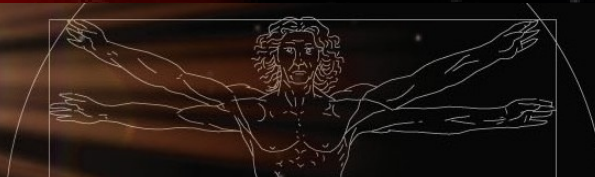
Issue 7: Coordinated ILWS Mission Planning Framework

- An optional framework to plan a specific ILWS endorsed mission from the outset
 - E.g., M³/SCOPE
- Plus
 - Longer planning horizon
 - Allow participation from smaller agencies
- Minus
 - Increased legalism
 - May reduce agency flexibility due to international commitment



Issue 8: Program Operation

- Program budget
- Program newsletter
- Next ILWS Meeting
- etc



Toward the ILWS Decade

- We are on the verge of an exciting decade of discovery and international cooperation
- Much remains to be done
 - Articulate a powerful and sustainable vision for our science
 - Strengthen the international framework of cooperation
 - Establish a data infrastructure
 - Last hence the most, renew our human resource in space research
- A well-organized ILWS will help address all these needs.

