Standards Activities in IEEE’s Geosciences and Remote Sensing Society (GRSS)

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What is the GRSS?

- The Geoscience and Remote Sensing Society works to promote dissemination of information, encourage the exchange of new ideas, and recognize engineering and scientific achievements as they benefit geoscience and remote sensing.
- Since 1981 it has sponsored the highly successful International Geoscience and Remote Sensing Symposium (IGARSS) series of conferences.
Interdisciplinary membership

- Members come from both engineering and scientific disciplinary fields
  - Those with engineering backgrounds often support geoscientific investigations with the design and development of hardware and data processing techniques
  - Conversely, discipline scientists find in GRSS a forum for the dissemination and evaluation of remote sensing related work in these areas.

- This fusion of geoscientific and engineering disciplines gives GRSS a unique interdisciplinary character and an exciting role in furthering remote sensing science and technology.
FIELDS OF INTEREST

- The fields of interest of the Society are the theory, concepts, and techniques of science and engineering as applied to remote sensing the earth, oceans, atmosphere, and space, as well as the processing, interpretation and dissemination of this information.
Transactions on GRS

- An internationally subscribed bimonthly journal which publishes papers dealing with:
  - advances in instruments and sensing technology used in the acquisition of geoscientific information,
  - theoretical and applied models of radiative transfer as they pertain to the remote sensing process, and
  - techniques for processing, enhancing and interpreting information derived from such instruments.
GRSS Technical Committees

- To provide a focus on certain research and technology areas, to assist in bringing them to maturity in some cases, or in fostering applications in others; all with a view toward encouraging and promoting the technical activities of the Society.

- Current Technical Committees are
  - Data Archiving and Distribution
  - Instrumentation and Future Technologies
  - Data Fusion
  - Frequency Allocations in Remote Sensing
GRSS TCs and Image Processing

Sensor System

- Scene (reality) Observable Phenomena
- Sensor subsystem
- Image Data Package

Image/scene link distortions in EM spectrum

Decision System

- Pre-processing
- Decision Criteria
  - Image interpretation
  - Classification

Algorithm: Image processing

Delivery System

- Archive & Distribution
- Data Archival & Distribution TC
- Information products of socio/economic & scientific merit in the marketplace
- Search Distributed archives

Instrumentation & Future Technology TC

Data Fusion TC

Figure 1 Model of the Remote Sensing End to End Information Channel
Relationship w/ TC211

- The DAD and DF TCs initiated the relationship with ISO/TC211, because of shared interests.
- The initial effort was getting membership to comment on 19101-2, but there was little feedback
  - Not accessible as a stand-alone document
  - Few can invest the time necessary to acquire familiarity with all the 19*** documents as is needed to understand any one!
GRSS and TC211

- GRSS has not seen a need to pursue standards development on its own.
- Rather, the GRSS seeks to ensure that emerging standards in the field of geospatial information are compatible with, and adequately represent, the activities of its membership.
IEEE- Largest technical professional organization in the world

- 360,000+ Members in over 150 countries
- Publishes 1/3rd of the annual world’s literature within its technical scope
- Operates in 10 Geographic Regions
- 41 IEEE Technical Societies including key standards sponsors
- Corporate/Entity Standards membership
- IEEE-SA Corporate Standards program
IEEE Societies and Councils

IEEE Aerospace & Electronic Systems
IEEE Antennas & Propagation
IEEE Broadcast Technology
IEEE Circuits & Systems
IEEE Communications
IEEE Components, Packaging & Manufacturing Technology
IEEE Computer
IEEE Consumer Electronics
IEEE Control Systems
IEEE Council on Superconductivity
IEEE Dielectrics & Electrical Insulation
IEEE Education
IEEE Electromagnetic Compatibility
IEEE Electron Devices
IEEE Engineering Management
IEEE Engineering in Medicine & Biology
IEEE Geoscience & Remote Sensing
IEEE Industrial Electronics
IEEE Industry Applications
IEEE Information Theory
IEEE Instrumentation & Measurement
IEEE Information Theory
IEEE Instrumentation & Measurement &
IEEE Intelligent Transportation Systems Council
IEEE Laser & Electro-Optics
IEEE Magnetics
IEEE Microwave Theory & Techniques
IEEE Nanotechnology Council
IEEE Neural Networks Society
IEEE Nuclear & Plasma Sciences
IEEE Oceanic Engineering
IEEE Power Electronics
IEEE Power Engineering
IEEE Professional Communication
IEEE Reliability
IEEE Robotics & Automation
IEEE Sensors Council
IEEE Signal Processing
IEEE Social Implications of Technology
IEEE Solid State Circuits
IEEE Systems, Man and Cybernetics
IEEE Ultrasonics, Ferroelectrics & Frequency Control
IEEE Vehicular Technology
IEEE Standards Association

An international membership organization serving today’s industries with a complete portfolio of standards programs
Century+ of Stability and Evolution

- 1890 Established the Henry - a practical unit of inductance
- 1898 First dedicated effort toward standardization of electrotechnology in US
- 1912 Institute of Radio Engineers formed its first standards committee
- 1958 Joint Standards Committee of AIEE and IRE
- 1963 Merger of AIEE and the IRE
- 1973 Establishment of the IEEE Standards Board
  - 1998 IEEE Standards Association (IEEE-SA)
  - 1999 IEEE Industry Standards and Technology Organization (IEEE-ISTO)
  - 2004 IEEE-SA Corporate Standards Program
IEEE-SA Alliances
with Major International Standards Organizations
What is GEOSS?

The Global Earth Observation System of Systems (GEOSS) will address the need for timely, quality, long-term, global information as a basis for sound decision making.

The exchange of information is aggregated and coordinated for use in situ, aircraft, and satellite networks in a full and open manner with priorities to delay and minimize cost and effort.

The Global Earth Observation System of Systems (GEOSS) will address the need for timely, quality, long-term, global information as a basis for sound decision making.
GEOSS - an end to end process with Integrated Solutions

Earth System Models
- Oceans
- Ice
- Land
- Atmosphere
- Solid Earth
- Biosphere

Earth Observation Systems
- Remotely-sensed
- In situ

Predictions
- High Performance Computing, Communication, & Visualization

Decision Support
- Assessments
- Decision Support Systems

On-going feedback to optimize value and reduce gaps

Societal Benefits
- Policy Decisions
- Management Decisions

DATA

Standards & Interoperability

Observations

GEOSS - an end to end process with Integrated Solutions

ISO/TC211 Stockholm '05
Technical Challenges for GEOSS

- Making a system of systems speak many languages
  - Integrate disparate data and information into a coherent accessible source for management decisions

- Interoperability at a new level:
  - “The magnitude and scope of the standards effort essential to achieving a fully interoperable GEOSS are unprecedented and will require the combined efforts of many national and international organizations.”
GEOSS Societal Benefit Focus Areas

- Reducing loss of life and property from natural and human-induced disasters
- Understanding environmental factors affecting human health and well-being
- Improving management of energy resources
- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change
- Improving water resource management through better understanding of the water cycle
- Improving weather information, forecasting, and warning
- Improving the management and protection of terrestrial, coastal, and marine ecosystems
- Supporting sustainable agriculture and combating desertification
- Understanding, monitoring, and conserving biodiversity
What is GEO?

- Group on Earth Observation is the operating body for creation and operation of a Global Earth Observation System of Systems (GEOSS)
- GEO is an International body of 60 countries & 40 participating organizations
- Three Earth Observation Summits and seven working group meetings to date
- 10-year Implementation Plan endorsed
What is IEEE’s CEO?

- In February 2004 IEEE decided to form an ad hoc committee called the Committee on Earth Observation ("CEO")
- Three societies (GRSS, OES and AESS) and the Sensors Council joined together to form the CEO
- Four subcommittees will address key GEOSS areas: technology, standards, outreach and user requirements
Why is the IEEE interested in GEOSS?

- Further develop technology leadership in Earth Observation Systems
- Focus for international members of IEEE in Remote Sensing and information systems
- Increased visibility and opportunities for the IEEE members
- To do something important for the planet Earth
IEEE CEO Background

- The IEEE CEO has supported the international GEO and Earth Observation Summit meetings
- Its participation and recommendations have been well received because it brings international technical expertise necessary to create and maintain a robust GEOSS.
Standards WG

- Work cooperatively with GEO and other SDOs to provide a global facilitation of standards development
- Facilitate the adoption of existing standards into the GEOSS and the creation of new standards consistent with needs of GEOSS development and operations
Status

- CEO has had strong support from IEEE members;
- CEO has actively participated in international GEOSS meetings, providing reviews and recommendations;
- GRSS and OES are supporting creation of a web-based interface for GEOSS;
- The Standards Working Group is being assembled by S.J.S. Khalsa.
Thank you!

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