



## IEEE-GEO Collaboration

Excellence and Innovation for the Benefit of Humanity  
Supporting the Societal Benefit Initiatives and Interoperability of GEOSS

### Water for the World

IEEE’s Three-Phase (Actionable Vision, Pilot Projects, Institutionalization) Water Project, Water for the World, is a GEOSS Development Task now in Phase 2. The Actionable Vision is being prepared for publication.

The project began in 2008, funded by a grant from the US NASA. Two workshops outlined the Actionable Vision and reviewed the initial Pilot Projects. The Pilot Projects are realizable in the field in one year, focused in developing countries, persistent, sustainable, repeatable, scalable, reusable, and fundable.

One Pilot Project, Water Harvesting in India, is already underway. (See story below.)

The Project Leaders, Dr. Prasad Thenkabil (USGS) and Dr. Tom Wiener (ICEO), are working with a team of six GOLD IEEE Members to refine the proposals for the remaining Pilot Projects.

Once the proposals are refined, the Project Team, working with the proposer, will seek funding for the project. They will develop a working relationship with the local beneficiaries of the project and with appropriate local, regional, and national agencies. After funding is obtained, the local team, with the support of the IEEE volunteers and participating agencies, will execute the project.

A vital element of Water for the World is Phase 3, Institutionalization. It is important to the project concept that the local beneficiaries take ownership of the project with sufficient knowledge and material resources to continue successful operations. Further, each Pilot Project has embedded within it training processes to pass the successes and lessons learned to nearby potential users and to similar users around the world.

#### Pilot Project Features

- Realizable in the field in one year
- Focused in developing countries
- Persistent
- Sustainable
- Repeatable
- Scalable
- Reusable
- Fundable

### Water Harvesting In India

Water Harvesting in India, the first Water for the World Pilot Project, is underway in Village Melva in Jodhpur.

Life in semi-arid villages like Melva is not easy. Rain-fed agriculture, along with animal husbandry, are the main occupations. Their success is totally dependent upon monsoon rain, which is highly variable in time and space. In such areas better rainwater management is the key to helping the large number of poor people because most of the poor depend on farming systems and natural ecosystems that rely mainly on rainfall for food and domestic needs. Improving the availability of water through water harvesting and storing is

the first step in raising farm productivity because farmers will have assured production of higher value crops.

This Pilot Project will be a living example of the value of supplemental irrigation. Field experience suggests that the target for sustainable livelihood in the Melva area is supplemental irrigation for the staple pearl millet crop as well as orchard crops. The supplemental irrigation requirement would be 1020 m<sup>3</sup> of water. Note that water conservation irrigation will be practiced in the

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## GEOSS COMMON INFRASTRUCTURE

In June 2008 the GEOSS Common Infrastructure (GCI) entered an Initial Operating Capability (IOC) Phase. The GCI Task Force developed a Concept of Operations for GCI components and began evaluating the existing GCI components and their sustained operation in light of known and emerging provider and user requirements, reliability, suitability, sustainability, and quality of service. The GCI Task Force also produced recommendations regarding models of GCI operational solutions addressing sustainability, maintenance, enhancements, access control and security, and software licensing and ownership. In response to these recommendations, the GEO Plenary established a GCI Coordination Team, or GCT. The GCT includes two IEEE members. Further details on the GCI may be found at [http://earthobservations.org/gci\\_gci.shtml](http://earthobservations.org/gci_gci.shtml)

## Chair's Column

It is with great admiration for my predecessor that I step into my new position as Chair of the IEEE Committee on Earth Observation. Jay Pearlman's vision and energy are an awesome example and inspiration.



Jay initiated the extremely fruitful collaboration between GEO and the IEEE because he saw the opportunity this presented for the IEEE to fulfill its vision: "The IEEE community and its technologies will positively impact global prosperity and quality of life."

Jay is also a leader in GEO, being one of the Co-Chairs of its Architecture and Data Committee. Because of his effective performance, he enhanced IEEE's global standing at the ministerial level. As a result, IEEE is now sought by government agencies as a partner and advisor.

My job is to build on his good works, publicize IEEE's successes to date, and enroll a broad spectrum of IEEE volunteers in this rewarding collaboration. We should be clear on this vital point. The strength of IEEE is its volunteers. They are poised to embrace activities that will make a difference in the world. The IEEE-GEO Collaboration offers exactly this opportunity.

I look forward to working with you all.

### IEEE Committee on Earth Observation

Chair	<a href="#">Thomas Freud Wiener</a>
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IEEE-USA	<a href="#">Martin Sokolowski</a>

## GCI AND STANDARDS

The GEO Standards and Interoperability Forum (SIF), led by IEEE Member Dr. Siri Jodha Khalsa, conducted a **GEOSS Interoperability Workshop** at IEEE-USA Headquarters in Washington, D.C. November 12-13, 2009 preceding GEO Plenary VI. The goal of the workshop was to assess the status of, and develop recommendations for improving, interoperability within GEOSS. Joining long-term SIF members were participants from several US Federal agencies, the European Commission, Asia, consortia, and academe. Achieving interoperability among data and information resources contributed to GEOSS is essential to its success. The Standards and Interoperability Registry (SIR), a key GEOSS component operated by the IEEE, plays a prominent role in enabling contributed systems to interoperate. A report is in preparation detailing the analysis and recommendations of the workshop.

## Financing the IEEE-GEO Collaboration

The IEEE Committee on Earth Observations (ICEO) is a Technical Committee of the IEEE Technical Activities Board that coordinates the IEEE and TAB efforts on matters relating to the Group on Earth Observation (GEO) and its Global Earth Observation System of Systems (GEOSS). ICEO serves as the focal point for all IEEE GEO and related activities.

With one exception, the ICEO's activities do not include traditional TAB revenue-generating mechanisms. Thus, ICEO needs funding from other sources.

The initial activities of ICEO were supported by IEEE Technical Societies and Councils that paid expenses for volunteers. Direct contributions of \$5K - \$10K per year from some Societies continue. Additional in-kind support comes from generous employers who see the involvement of their employees in GEO activities as advantageous to their companies.

As the IEEE-GEO Collaboration grew, the IEEE NIC, NASA, NOAA, EPA, and NSF provided grants and contracts. Additional funding comes from South Africa and the European Commission, the latter through the IEEE France Section.

The IEEE Water for the World Project (see related article) is beginning Phase 2, Pilot Projects, that will result in working projects contributing to the Water for the World Actionable Vision. To fund these projects, ICEO is seeking grants from government agencies and philanthropic organizations.



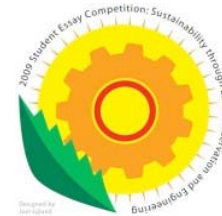
In 2009, Earthzine's first student essay contest, Sustainability through Earth Observation and Engineering, drew essays from undergraduate students in Africa, India, Russia and the US.

The winners: **First Place David Tshimba**, Uganda Martyrs University, Kampala, Uganda, "[By Trying to Solve a Problem, Human Beings Have Now Created a New Issue](#)"; **Second Place Sulaiman Tejan Jalloh**, Institute of Advanced Management and Technology, Freetown, Sierra Leone, West Africa, "[Agriculture](#)"; **Third Place Benjamin-Axel Mugema**, Uganda Martyrs University, Kampala, Uganda, "[Sustainability: From Modernity to Humanity](#)"; received cash awards totaling \$900 from the IEEE Foundation sponsorship, certificates, award letters to their academic administrators,

and t-shirts. We are currently planning a 2010 essay contest.

Earthzine has also expanded its staff. Christoph Aubrecht, who is based in Vienna, Austria, is Deputy Editor and a contributor to European EO content. Staff writer Julia Cechvalla will contribute more education, citizen science, and feature interviews. Kara Gergely and Karla LeFavre, Communications Research Associates, are charged with expanding Earthzine's readership and content submission. Paul Mogan has joined the staff as Equal Accessibility Officer.

Theme issues for 2010 will expand our coverage in four areas essential to GEO: Earth Information Systems/Capacity Building, Observing the Oceans, Global Human Health, Ecosystems.



**2010 Earthzine Essay Contest Details soon**

See [www.earthzine.org](http://www.earthzine.org)

## GEO, GEOSS, and the IEEE

The Group on Earth Observations (GEO) formed itself in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries. These high-level meetings recognized that international collaboration is essential for exploiting the growing potential of Earth observations to support decision making in an increasingly complex and environmentally stressed world.

GEO is a voluntary partnership of governments and international organizations. It provides a framework within which these partners can develop new projects and coordinate their strategies and investments. As of September 2009, GEO's Members include 80 Governments and the European Commission. In addition, 58 inter-governmental, international, and regional organizations with a mandate in Earth observation or related issues have been recognized as Participating Organizations.

GEO is governed by a [Plenary](#) consisting of all Members and Participating Organizations. It meets in Plenary at least once a year at the level of senior officials and periodically at the ministerial level. Members take decisions at the Plenary by consensus.

GEO is constructing GEOSS on the basis of a [10-Year Implementation Plan](#) for the period 2005 to 2015. The Plan defines a vision statement for GEOSS, its purpose and scope, expected benefits, and the nine "Societal Benefit

Areas" of [disasters](#), [health](#), [energy](#), [climate](#), [water](#), [weather](#), [ecosystems](#), [agriculture](#), and [biodiversity](#).

GEO has established four [Committees](#) to guide the implementation of the 10-Year Plan. The Committees are organized around the four Transverse Areas of user engagement, architecture and data management, Science and Technology, and capacity building, which cut across, and are relevant to, each of the issue-specific Social Benefit Areas. The four permanent bodies are the [Architecture and Data](#), [Science and Technology](#), [User Interface](#), and [Capacity Building](#) Committees. Further, there is a Co-Chair Coordinating Committee comprising the Co-Chairs of the four Committees. The IEEE is Co-Chair of the Architecture and Data Committee, the User Interface Committee, and Co-Chair Coordinating Committee.

Pursuant to the 10-Year Plan, GEO has developed a series of two-year Work Plans. The Work Plan contains specific tasks that will lead to a functioning GEOSS. Of the 116 Tasks in the Work Plan, IEEE is Co-Lead for twelve. Among these are AR-09-03c Global Ocean Observing System being led by the IEEE Oceanic Engineering Society, and HE-09-01 Information Systems for Health being led by the IEEE Engineering in Medicine and Biology Society. These Societies are providing the resources needed to conduct their portion of the tasks.

**Of the 116 Tasks in the Work Plan, IEEE is Co-Lead for twelve.**

**OES and EMBS are leading their own GEOSS Tasks.**

## IEEE-South Africa Cooperation

The National Research Foundation of South Africa and the IEEE have signed a Memorandum of Understanding to pursue a broad spectrum of cooperation in space science and technology, capacity building, health and telemedicine, water, and energy. This activity will be conducted with the participation of the IEEE South Africa Section,

One of the first two areas of cooperation is Human Capability Development including Course Development for University post-graduate programs in Earth Observation, continuing education for technical and government professionals, internships at CSIR and elsewhere, and conferences and workshops for professionals and graduate students.

With an international team of university faculty members led by Professor Ellsworth LeDrew of Waterloo University in Canada, the IEEE will review the plans for the 10-year program of capacity building in science and technology being developed by the South African government.

Working together, South Africa's Department of Science and Technology (DST) and IEEE will engage universities and research institutions to further refine an understand-

ing of the gaps in capacity for Earth Observation in South Africa.

The team will define courses, training and outreach materials and plans for workshops and conferences. The material will be drawn from existing graduate courses, tutorials, and on-line training resources as much as possible. The team will establish processes and protocols for remote training using new web-based and electronic media approaches. To minimize program costs, leverage existing planned conferences and training opportunities.

IEEE will participate with DST by advising on the implementation of the capacity building program and provision of content with 1-3 year goals and a ten-year strategic plan based on approval by the government of South Africa of the proposed ten-year plan. In the implementation, milestones and metrics will be established to monitor program progress on an annual or more frequent basis consistent with the South African plan. Resources for the program implementation will be addressed in the context of the capacity building initiative.

The second collaboration deals with space capability. (See following story.)

## South Africa, Space, and the IEEE

The South African Department of Science and Technology (DST) is spear-heading the Country towards space science and technology. To support this, the DST desires to tap the expertise of IEEE in calibration and validation (CalVal) of South African Earth observation space systems.

This collaboration is for present and future South African satellite missions and applies to the full life cycle of the missions, including Sumbandilasat. Sumbandilasat, launched on 17 September 2009, is South Africa's second Micro-Earth Observation Satellite.

Objectives of this work are sharing of best practices; human capital development; and international cooperation.

For the in-flight CalVal of Sumbandilasat and for building of expertise in the field of CalVal for future satellite missions, the IEEE and South Africa will consult on pre-launch calibrations; site selection; site instrumentation; vicarious, cross-sensor and lunar calibrations; human capital development in calibration; and support of applications user communities.

Additional activities are anticipated as the South African space programme develops.

## Water Harvesting In India (continued)

Pilot Project and will be taught to the villagers as part of the program. We estimate that supplementary irrigation will at least triple current food productivity.

The most exciting aspect of this Pilot Program is that of the original estimated cost of US\$200,000, because of the IEEE sponsorship of the project and the work of the Proposer, Dr. J.R. Sharma (General Manager (Western Re-

gion), National Remote Sensing Office), the local government and contractors built the needed new infrastructure, which covered half the required project funding

Scaling up and spreading the programme will occur through the Village Resource Centre. These Capacity Building activities include training sessions, workshops, documentation, radio talks, and film and television documentaries .

## Scenes From Melva



Melva Village Pond



Water harvest cistern installed in Melva



Melva Resource Centre