

## BRIEF WORKSHOP REPORT IN *EOS ON*

*“Globalizing Societal Application of Scientific Research and Observations from Remote*

*Sensing: The Path Forward” held in Tacoma (Washington), June 23-25, 2015*

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As a community comprising scientists and stakeholders who both develop actionable information and use them, we need a roadmap to take advantage of the prolific amount of scientific output and remote sensing data that are emerging rapidly from earth observing (EO) missions and convert them efficiently into decision-making products for end users. The current application framework used by EO-based scientific community appears to lack necessary capacity required to handle scientific research and the voluminous (petabyte-scale) EO data in order to accelerate the growth of societal applications around the world.

To address this key issue, a three day workshop was held in Tacoma (Washington) during June 23-25, 2015. A key motivation was the NASA Decadal Survey-2017 that relies on the science community to identify and prioritize leading scientific questions and the observations needed to address them. The National Research Council (NRC) is a key mechanism by which NASA’s Science Mission Directorate engages the science community in this task. The workshop brought together twenty-seven experts on various themes who are already engaged in remote sensing-based capacity building. This number included several international stakeholder agency

representatives with a history and need for EO systems and data. The workshop debated issues in order to formulate a path forward for EO-based capacity building community in the coming decade (i.e., a vision for 2027). The key discussion point of the workshop throughout the 3 days was *‘What do we need to do now as a capacity building community that will enable more successful societal application of earth observations from space?’*

Workshop participants were asked to discuss the following questions:

1. *What does the Global Applications and Capacity Building Community wants the 2017 NRC Decadal Survey to say?*
2. *What guidance does the scientific community want NRC to give on advancing societal applications of satellite-based observations of Earth?*
3. *What priorities should the scientific community state or confirm?*

The workshop participants noted that the goal of the EO-based capacity building community should be to play a pivotal role using EO system (i.e., orbital and non-orbital platforms) in solving the three grand challenges facing humanity -1) food security 2) water access and availability and 3) disaster risk reduction. In addition, the EO-based capacity building community can be a catalyst to help the world achieve the 17 Sustainable Development Goals (SDG) set by the United Nations (UN). In noting lessons learned, the current capacity building community now recognizes the need to build capacity in the human (ergonomic) dimension rather than confining efforts only in the technological (data access) dimension. The importance of long-term relationships with the stakeholder community through regular site visits and co-development of science-based decision support tools was underscored as a prerequisite for global

capacity building. The workshop therefore called for champions, who can serve the dual role of supplying scientific solutions and understanding unique insights on connecting solutions with societal demand, to provide influence, vision and long-term stewardship to globalize societal applications.

Using water as an example, participants noted that one key capacity building vision for the community is to provide the people of the world with locally-relevant information from EO on where the nearest source of safe water location is at various time horizons (day, month, year and decade). The workshop participants also noted the need for a balance between research products and real-time products given that it was often the real-time products that constitute prime-time news stories on societal impact. Together with other types of research products that improve scientific understanding of non-prime time but important events (e.g. drought or climate change), such stories help with the public understanding of the value of an EO mission. A greater focus on the use of nanosatellites was also stressed for globalizing capacity for societal applications of EO systems and data.

A question raised during the workshop was whether space agencies that produce EO data have a capacity building role to play for growing challenges of energy supply and demand. Currently, there appears to be no clear activity that addresses the energy grand challenge. The workshop participants also engaged in a very creative discussion on new and more efficient ways to solicit game changing ideas on capacity building through earth observing system and data. Many participants supported the idea that co-development of proposals with stakeholders as accompanying principal investigators could strengthen capacity building and eventual uptake of EO results more efficiently than what is possible today. The panel also noted that proposals could be sponsored in a way that allows progress to be made incrementally in the form of a

‘learn as you go’ process while executing capacity building proposals. This can potentially reduce the use of precious funding and paperwork in managing solicitations and making dynamic management decisions based on ‘real-time’ project conditions. Another approach suggested during the workshop was to develop a venture that brings experts from diverse and cross cutting disciplines together to develop a joint concept leading to a proposal.

The workshop also discussed how the EO community could make the pursuit of capacity building through earth observing systems an attractive career choice early on as a profession. Currently there appears to be no equivalent of young investigator (early career) grants tailored exclusively for EO-based capacity building for young academic professionals. On the other hand, there are several short term opportunities for student internship and trainings co-funded by space agencies such as NASA. Department of Education Graduate Assistance in Areas of National Need (GAANN) is a program that has been in place for many years. GAANN funds the creation of a cohort of PhD students to work as a team on a ‘national need’ topic. The goal is to produce both outstanding scientists and educators who can train the next generation workforce based on demands and challenges faced by the nation. The workshop participants agreed that there should be an exploration of more efficient approaches to solicit proposals that encourage more capacity building projects and workforce development for earth observing systems and data.

The 3-day workshop provided consensus-based input on key questions and recommendations for mapping an agenda on globalizing societal applications of EO systems and data. Several themes such as health and air quality, water, agriculture, ecosystems function and disasters were addressed in detail. The key findings and recommendations that emerged on those themes will appear in a separate and forthcoming publication in the Bulletin of American Meteorological Society (BAMS). Overall, many of the workshop findings are expected to sustain

a meaningful interaction between the scientific and stakeholder community in the coming years to achieve a global capacity building vision for societal applications of earth observations.