

# DBAR Initiative: Big Earth Data for “Belt and Road” Development

By SONG Jianlan (Staff Reporter)



Remote sensing image map of Belt and Road regions. (Image: Courtesy of NASA.)



“The 65 countries within the ‘Belt & Road’ regions are facing some common challenges,” introduced Prof. GUO Huadong, Member of both CAS (the Chinese Academy of Sciences) and TWAS (the World Academy of Sciences for the advancement of science in developing countries), at the opening of the “International Symposium on Earth Observation for One Belt and One Road (EOBAR)”. GUO welcomed the delegates on May 16 as Chairman of the Symposium: “Taking advantage of Earth observations, we might be able to address such problems better.” Citing global environmental change, food security, protection of world heritage sites, unbalanced economic and urban development, disaster risk assessment and other issues calling for cooperation across borders, he proposed a new concept called the “Digital Belt and Road (DBAR)” and advocated a grand program named the “Digital Belt and Road Initiative” to cope with common economic, developmental and environmental challenges pertinent to involved countries.

### Grand Initiative

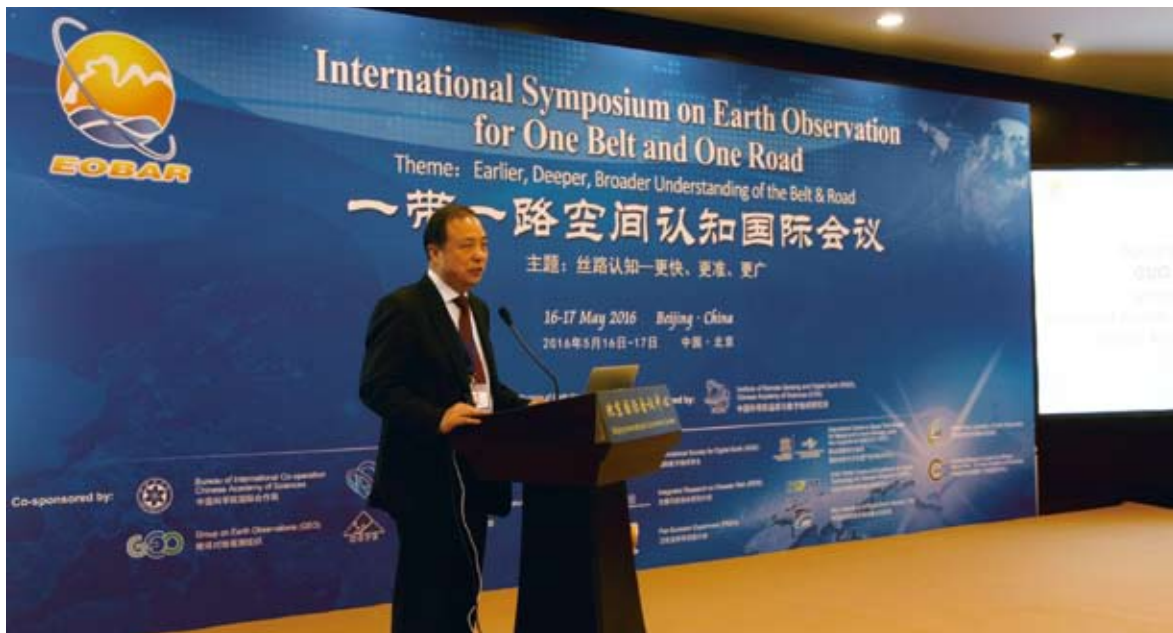
In 2013, Chinese President XI Jinping proposed an initiative to create a New Silk Road along the historical

Silk Road, a network of trade routes through Asia connecting the East and West from ancient China to the Mediterranean Sea. Together with the Maritime Silk Road (officially the 21<sup>st</sup> Century Maritime Silk Route Economic Belt), and later iterated and abbreviated as the “the Belt and Road Initiative”, the initiative represents China’s most grand framework for international cooperation since its establishment in 1949, and an effort to seek reciprocal ways of economic and social development for the 65 countries along the Belt and Road. Following this great blueprint, GUO proposed the DBAR initiative on behalf of the CAS Institute of Remote Sensing and Digital Earth (RADI), urging efforts from involved countries and international organizations to promote bilateral and multi-lateral collaboration in Earth observation, as well as early involvement of decision makers in strategic research, planning and necessary fund raising.

The Symposium on EOBAR, sponsored by the CAS Academic Division of Earth Sciences and hosted by RADI, attracted over 300 participants from over 40 countries. Participants included scientists, leaders of scientific organizations and government officials in charge of S&T affairs coming from Belt and Road regions, engaging in research on Belt and Road and the



A view from the conference. (Photo: Courtesy of RADI.)



Symposium Chairman Prof. GUO Huadong addresses the EOBAR opening. (Photo: Courtesy of RADL.)

applications of spaceborne Earth observation technologies. Revolving around the theme of “Earlier, Deeper, Broader Understanding of the Belt and Road”, the conference aimed to provide an international platform for discussing rising issues in fields where Earth observation has found important applications, such as infrastructure and capacity building, spaceborne observation for the economic belts along the Belt and Road, urban layout and construction, world heritage site protection, and space technologies for disaster mitigation. The brainstorming at the symposium, as anticipated by the organizers, might help establish needed platforms and mechanisms for proper technology/data sharing and enhanced cooperation.

“Challenges like climate change, like disaster risk... all these must be addressed across borders, and this requires international cooperation. We believe that people in countries along the Belt and Road are aware of the benefit brought by the Initiative,” remarked GUO when addressing the opening of the EOBAR. “Earth observation, valued for its quick, dynamic data production, is an effective approach for Belt and Road to address such common issues.”

“Countries have borders; Earth observations don’t.” Just like science, it knows no borders, Prof. GUO emphasized.

A renowned expert in radar for Earth observations and applications, GUO presently serves as President

of the International Society for Digital Earth (ISDE). Meanwhile he also heads the International Centre on Space Technologies for Natural and Cultural Heritage (HIST) under the auspices of UNESCO, and the CAS-TWAS Centre of Excellence on Space Technology for Disaster Mitigation (SDIM).

Echoing GUO’s ideas, Ms. Barbara Ryan, Secretariat Director of the Intergovernmental Group on Earth Observations (GEO), expressed her support for the DBAR Initiative and the event in her brief address on behalf of GEO.

“I just want to say on behalf of the Group of Earth Observations that we very much applaud the efforts of China and its partners for the One Belt One Road initiative,” she said. “I can tell you that for us in Earth observations, initiatives like this are absolutely essential for realizing the power of Earth observations.” “While working at a global level,” she explained: “it is going to be really important to down scale the international global efforts to more regional areas and then ultimately international areas. ... You know countries of the world are spending a lot of money on the collection of Earth observations, whether they are from space or ground, whether to the atmosphere or the rain and coastal areas ... and we absolutely must leverage Earth observation if we are going to address society’s biggest environmental problems.”



"If you want to go fast, go alone; if you want to go far, go together," Ms. Barbara Ryan emphasizes when expressing her support for the DBAR Initiative. (Photo: SONG JL.)

To further assert the importance of working together for the countries along the Belt and Road, Ms. Ryan cited a Chinese saying she learnt from a Chinese colleague. "In that regard I am looking at ZHANG Wenjian in the audience, my former boss when I was with WMO," she began, "who told me a Chinese proverb that has certainly lived with me since I worked with him, and that was: If you want to go fast, go alone; if you want to go far, go together." Her words triggered warm applause from the audience.

Later on the same day, Ms. Ryan gave a plenary lecture to urge enhanced data sharing in the field of Earth observation. "Not until we really unleash the power of that information can we in fact address the problems of society," she stressed.

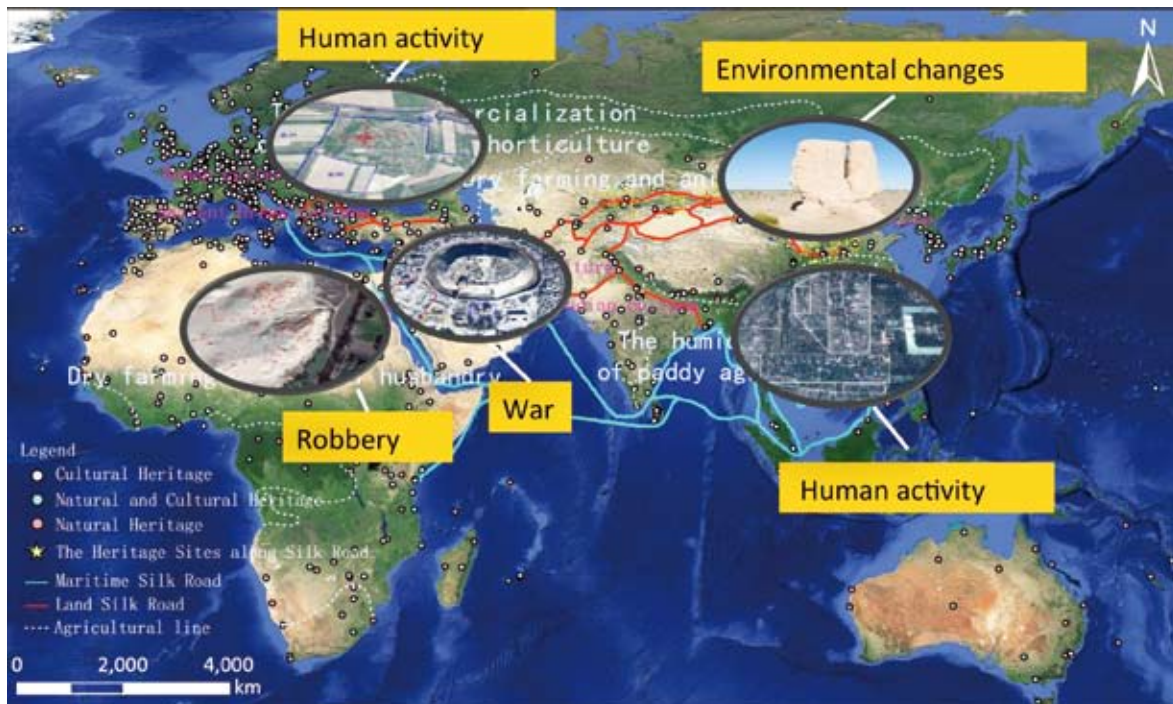
### Intent and Content of DBAR

Prof. GUO Huadong later gave a keynote speech at the opening to detail his initiative on DBAR and explained why they decided to advocate the initiative.

"Why is it called Digital Belt and Road? First of all, there would be no science without data," he explained: "data is important for science, especially nowadays, when we are facing the challenge of big data."

He continued that building the Belt and Road entails addressing great challenges, including those of the environment, natural resources, disaster assessment and mitigation. To address these challenges, he emphasized, first of all asks for necessary recognition of the challenges themselves. This involves not only scientific assessment of the overall situation of the local natural resources, environment, and economic and social development capacity of the involved regions, but also thorough analysis and early alerts of possible risks. Only after this, he insisted, can humankind cope with the common issues at hand.

Spaceborne Earth observation technologies, he introduced, with their great ability to obtain large-scale data quickly and accurately, have great advantages in addressing the aforementioned challenges. To illustrate this, he cited cases in ecological and environmental monitoring, city expansion and urbanization management, and sea level rise monitoring and simulation. Logically, he asserted, before addressing the common challenges, we need to put these technologies into full play to understand the situation along the Belt and Road better, so as to support the needed scientific analysis and assessment preceding sound decision-making with space data and environmental information.



“Cultural heritage protection along the Belt and Road is not optimistic, greatly impacted or damaged by environmental change, weather, animals, human activity, over-tourism, wars, and illegal excavation”, GUO introduces in his keynote speech. (Image: Courtesy of RADI.)

## The Beginning of the Story

GUO subsequently outlined the vision of DBAR—it aims to contribute to sustainable development in the Belt and Road regions. This further involves (a) earlier, deeper and broader understanding of the B&R to address common challenges such as climate change, water resources, eco-environments, and food supply, in an integrative way; (b) efforts to build up a scientific community for exchanging and sharing Earth observation developments and solutions along the Belt and Road, including capacity building; (c) efforts to strengthen and enhance Earth observation infrastructure; and (d) joint efforts to promote big data science methods.

According to him, DBAR represents an emerging discipline of Digital Earth, and its framework involves integrating Earth observation data sets from different areas and other related data to build a platform for spatial big data. On top of this, he advanced, with aid from international organizations and scientific cooperative programs, extensive research in six areas would be conducted, hence forming a spatial information system and a scientific mode for Belt and Road.

The idea of the initiative can be traced back to a consultative project conducted by a group of academicians from the Consultation and Evaluation Committee of CAS and led by Prof. GUO. Focusing on the resources and environmental situation of the Silk Road economic belt and its potential for future development, the project launched in June 2014 with the objective to establish an S&T panorama for S&T construction in this region from spatial, temporal and disciplinary dimensions. The first phase of the project focused on the Mid-Asia section of Belt and Road, stretching across a phoenix-shaped area of five countries—and from this it got its nickname “phoenix project”. Resulting from their investigations and research, the consultative project produced an advisory report titled “*Space Technologies to Back Belt and Road*”. The report passed the assessment by the Consultation and Evaluation Committee of the CAS Academic Divisions, and received favorable comments from State leaders.

Among others, the report articulated a suggestion on establishing a framework for multilateral S&T cooperation integrating the Shanghai Cooperation Organization and the Silk Road economic belt, and this has since evolved

## Framework of DBAR Initiative



The framework of the envisioned Digital Belt and Road (DBAR). (Image: Courtesy of RADI.)

into subsequent ideas to build a digital Belt and Road.

### Early Efforts to Promote DBAR

To make the idea of DBAR come true, RADI has established two regional research centers respectively in Sanya, a city of Hainan Province located at the southern tip of China, and Kashi, a city in Xinjiang on the crossroads of Europe and Asia. So far these centers have developed a sound basis for cooperation with the countries along the Silk Road economic belt and in South Asia, and cooperative research in multiple areas is ongoing. Meanwhile, RADI has initiated a series of academic conferences to promote DBAR and knot regional partnerships with countries along the Belt and Road in multiple fields of space science. Among these efforts was the International Symposium on

Earth Observation for Maritime Silk Road convened in Sanya in November 2015. The symposium heralded the EOBAR and witnessed an intention for cooperation in establishing a network for Earth observations over the Maritime Silk Road, inked by participant countries along the Maritime Silk Road. Immediately after the EOBAR, the 2<sup>nd</sup> Pan-Eurasian Experiment Science Conference (“PEEX conference”), convened from May 18 to 20 in Beijing, also highlighted regional scientific cooperation among countries along Belt and Road in the field of Earth observation for the Arctic and Pan-Eurasian regions, under the framework of the Pan-Eurasian Experiment (PEEX). The co-organizers of PEEX hoped to accommodate its roles to a framework for solving environmental problems in Belt and Road countries, and turn it into a community of shared interests.



Delegates from over 20 countries and international organizations meet at a round table conference to discuss the Beijing Declaration on EOBAR and DBAR Initiative. (Photo: Courtesy of RADL.)

### Beijing Declaration on EOBAR

On the afternoon of May 16 at the venue of the EOBAR Symposium, delegates from 20 countries and international organizations met to discuss the text of the *Beijing Declaration on Earth Observation for Belt and Road*, an important document that signals the willingness of involved countries to join the DBAR Initiative and stipulates the missions, duties and urges of the signing parties concerning EOBAR. After careful discussions, the text formed at the round-table conference was read to the whole symposium the next day at the closing ceremony, and was subject to further possible amendments.

The mission of the initiative is, as stipulated by the Declaration, to optimize Earth observations and address global issues of common concerns, such as

climate change, environment, meteorology, and world cultural heritage, among others. With the Declaration, the countries agreed to strengthen cooperation among them in the Belt and Road region, and to this end, they urged early involvement of decision-makers in development of strategies, plans, policies, regulations, standards and criteria related to Earth observations, to provide support for cooperation and development. Also they call for efforts from decision-makers to provide appropriate funding for joint research, technology transfer and education.

The Declaration was read at the closing ceremony and passed the reading with unanimous agreement from the audience.

(For the full-text announcement please turn to the next page.)