Bando n. 15/2024 – Procedura selettiva, per titoli e colloquio, riservata al personale titolare di contratto a tempo determinato, in possesso dei requisiti di cui all'art. 12-bis del D.Lgs. 25 novembre 2016, n. 218, per la copertura di n. 2 posti a tempo pieno e indeterminato nell'Agenzia Spaziale Italiana, nel profilo di Tecnologo, del livello professionale III, 1^ fascia stipendiale - Profilo codice T1.

TRACCIA 3

Il candidato descriva la propria esperienza lavorativa pregressa inserita nel CV evidenziando in che modo può rapportarsi con il profilo oggetto del bando.

Il candidato descriva gli elementi architetturali principali di un Centro per Osservazione della Terra con riferimento a tecnologie e strumenti utilizzati per raccogliere dati sulla superficie terrestre e l'atmosfera e come vengono analizzati questi dati per monitorare i cambiamenti ambientali globali

Il candidato descriva genericamente i principi di economicità, efficacia, imparzialità, pubblicità e trasparenza nel diritto amministrativo.

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A review of applications of satellite earth observation data for global societal benefit and stewardship of planet earth

Pratistha Kansakar, Faisal Hossain*

Department of Civil and Environmental Engineering, University of Washington, Seattle, WA 98195, USA

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ABSTRACT

Remotely sensed data can be used to understand and devise measures to address important global issues such as climate change, disaster and disease outbreak. National Aeronautics and Space Administration (NASA) is one of the largest producer and gatekeeper of satellite earth observation (EO) data that plays a crucial role in ensuring that these resources are used for solving global societal problems. However, the extent of remote sensing application is highly disparate in different parts of the world. This paper provides a general overview of key societal applications that have been enabled globally with the use of EO data. It also summarizes the impact of various NASA-supported programs for promoting applications on the targeted beneficiary communities. The themes addressed here are land cover/land use mapping, carbon biomass assessment, food security, disaster management, water resources, ocean management and health and air quality. The paper also argues for capacity building that is crucial to building sustainable solutions when using EO data for science-based decision making.

1. Introduction

Remote sensing is the science of obtaining information without physically being in contact with it. This process involves detection and measurement of radiation at different wavelengths reflected or emitted from distant objects or materials, by which they may be identified and categorized by class/type, substance, and spatial distribution. Through various remote sensing platforms such as satellites and aircraft, supplemented by surface and subsurface measurements and mapping, Earth's physical, chemical, and biological systems can be obtained, which is collectively known as Earth Observation (EO) [2].

The capacity of satellite remote sensing and satellite technology is distributed quite disproportionately in the world. As of November 2015, only 74 countries have been able to make satellite launches independently or with the help of others (see Fig. 1; [4]. Out of the satellite launches since 1962, more than 320 have been EO satellites launched worldwide covering the atmosphere, oceans, land, and other Earth systems. The United States, Russia, France, Italy, and Germany are at the forefront of the EO satellite launches. They are followed by China, India, Canada, Brazil, Argentina, South Africa, Nigeria, and Australia [7].

The history of earth observation began in 1840s, during the era of geographical exploration, when pictures were taken from cameras secured to the tethered balloons for the purpose of topographic mapping. It took a further 100 years for earth observations to evolve to a platform based in space called satellites. In 1958, the National Aeronautics and Space Administration (NASA) was established. Much of the technological advances in human and robotic space flight had already started in response to the early Soviet space achievements [13,14]. Initially, a lot of the applications were defense-centric. Later, NASA missions like Environmental Science Services Administration (ESSA) and Synchronous Meteorological Satellites (SMS) came on board to improve meteorology and weather science. The first major land monitoring camera system from the sky, called Landsat mission, was launched in 1972. It has produced over 2 million images since the first launch. In 2008, a new era of open-access satellite data began when the US Geological Survey (USGS) publicly released its Landsat archive, dating back from the 1970s. Currently, this is believed to be the world's largest collection of Earth imagery [2]. This availability of open source data has also helped developing countries that are not capable of launching or maintaining their own EO satellite but are in dire need of remotely sensed data to solve problems.

NASA has been an important catalyst for international cooperation in changing the mindset of how and why humans need "space" as the final frontier for stewardship of Planet Earth [13,14]. When the National Research Council (NRC) completed its first decadal survey in 2007 for Earth science and applications for NASA and National Oceanic and Atmospheric Administration (NOAA), and USGS, it highlighted the need of the U.S. government to work in concert with private sector, academe, the public, and its international partners in renewing the EO systems and restoring leadership in Earth and science applications. That survey set a new agenda for satellite EO missions in which practical societal benefits were of an equal importance as were the efforts in acquiring new knowledge about Earth.

Fig. 2 shows select programs that NASA launched in the past 5 years that have direct societal benefits associated with its science focus area. The goal of all these missions are to find answers to how the global earth system changing, how will it change in the future, and how does the Earth system respond to natural and human induced changes – all driven by the need to make planet earth a more sustainable place for humans to live with other forms of flora and fauna [13,14] (see Fig. 3).

* Corresponding author.
Email address: fhossain@uw.edu (F. Hossain)

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