



# Rwanda Space Agency (RSA) status, undergoing projects and prospects of development

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## ABSTRACT

**TITLE: Rwanda Space Agency (RSA) status, undergoing projects and prospects of development**

### BACKGROUND:

A Space working group was established in 2018. After one year, in 2019, the Rwanda's first satellite, RWASAT-1 was launched with a mission of monitoring agriculture, coastal areas, forests and biodiversity. The establishment of Rwanda Space Agency followed in 2020, and its law gazette early in 2021.

### OBJECTIVE:

The objective of RSA is to develop Rwanda's space sector towards socio-economic development.

### Previous achievement and targeted projects

- Development and deployment of RWASAT-1, the first Rwanda's satellite
- RSA is currently collaborating with local organizations concerning with space activities
- RSA staff are making use of NASA's publicly available data for analysis and publication to validate the methods to be used locally

### Challenges:

- Rwanda is located in geographic region that experience a disproportionately large amount of natural disasters
- Scarcity of local ground based equipment leading to the failure in obtaining timely information about the state of our environment
- The development of space application products and services require the creation of additional capabilities in industry
- Maintaining a high quality research and education infrastructure to participate in space science.
- Space development require multi-year high investments
- The country is landlocked, hence difficult to launch satellites from the homeland.

## Space science and technology development in Rwanda

### Development and deployment of RWASAT-1

- On November 18, 2019, RWASAT-1 was deployed into orbit from the Japanese KIBO module on the ISS in the frequency range 150 MHz-450 MHz in solar cycle 24
- On September 24, 2019 at 18:03 Rwanda time, an H2-B rocket carrying Rwanda's first satellite, RWASAT-1, was launched from the Tanegashima Space Center by the Japanese Aerospace and Exploration Agency (JAXA).
- The HTV-8
- "Kounotori 8", a cargo ship which stores RWASAT-1 was captured by the robotic arm of the International Space Station (ISS) on September 28 at 13:13

### RWASAT-1 mission

**Making use of RWASAT-1's antennas alongside the two multi-spectral cameras on board the satellite communicating with already deployed ground sensors in Rwanda,**

**Relevant stakeholders from the Rwandan Ministry of Agriculture will, via a remote ground station in Kigali, utilize data received from RWASAT-1 to make informed decisions in the prediction of crop yields as well as soil moisture monitoring**

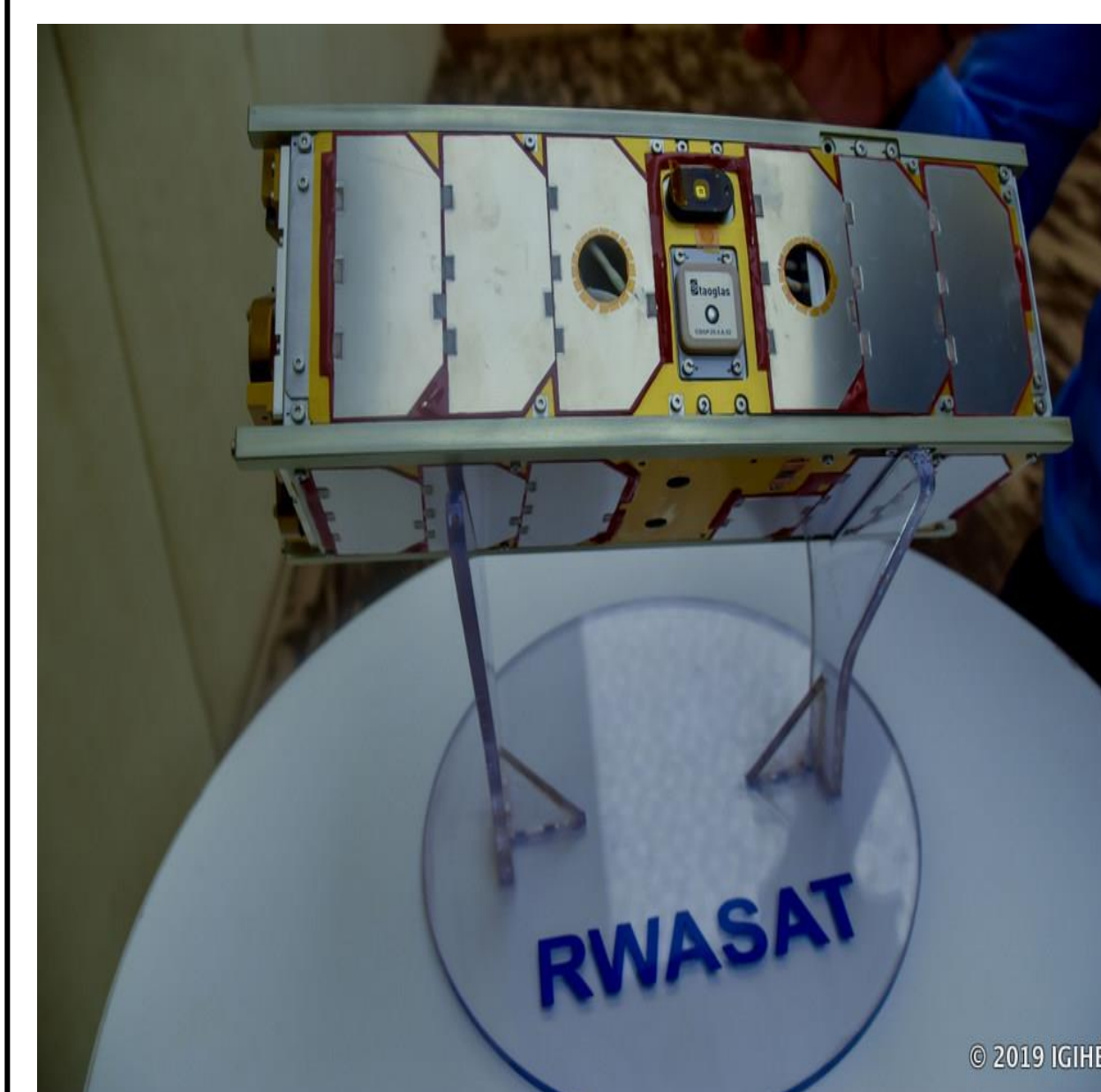


Fig. 1: RWASAT-1 had a mission of monitoring agriculture

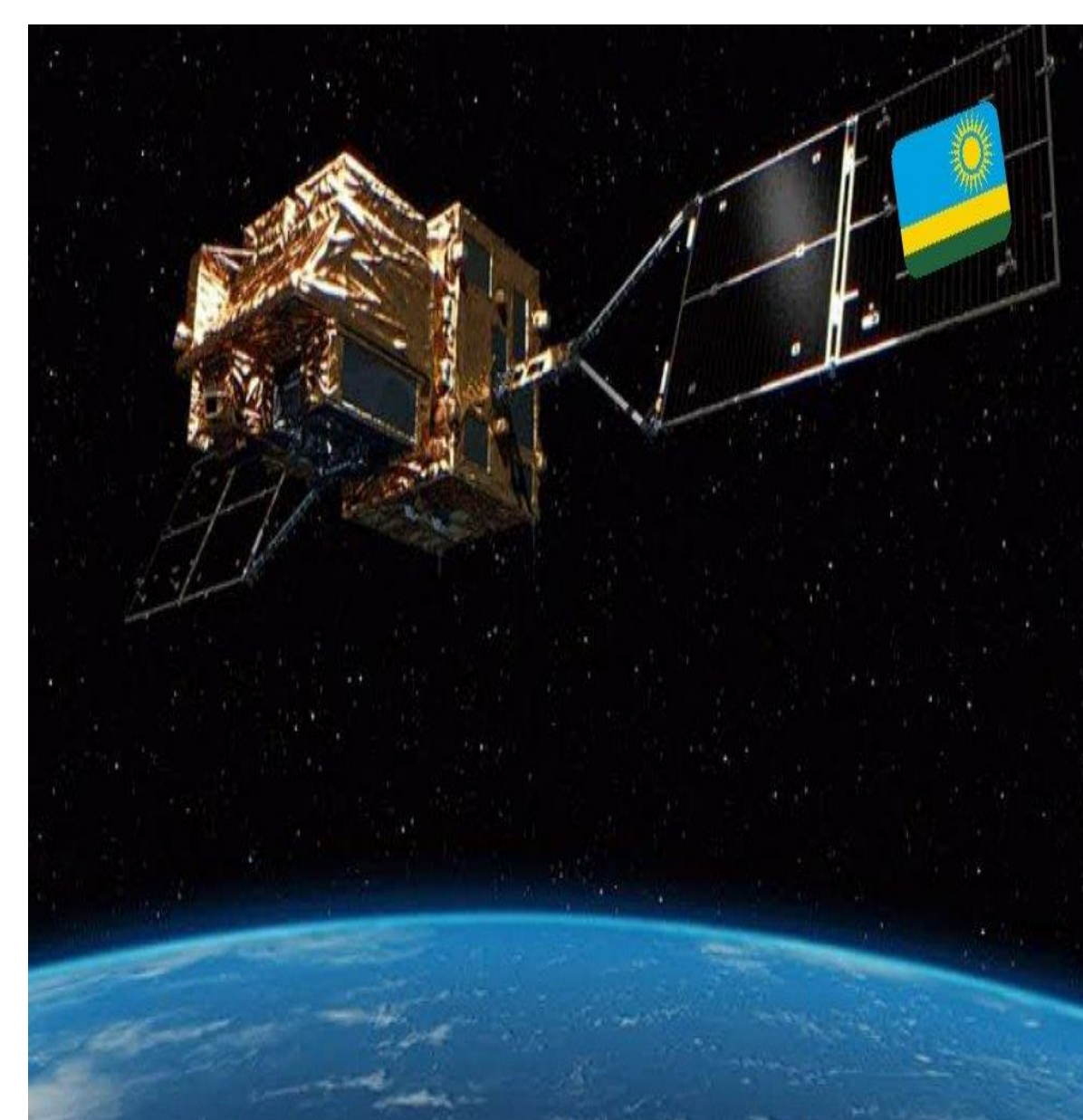


Fig. 2: RWANDA'S first satellite in the Low Earth Orbit (LEO)

Ref.: Quentin Verspieren and Takeshi Matsumoto and Yoshihide Aoyanagi and Takayoshi Fukuyo and Toshihiro Obata and Shinichi Nakasuka and Georges Kwizera and Joseph Abakunda, 2020, Store-and-Forward 3U CubeSat Project TRICOM and Its Utilization for Development and Education: the Cases of TRICOM-1R and JPRWASAT, Transactions of The Japan Society for Aeronautical and Space Sciences, 63, 206-211

## RSA targeted applications



- (a) Biodiversity monitoring
- (b) Flood prediction and management
- (c) Wildlife conservation
- (d) Drought management
- (e) Climate monitoring and adaptation
- (f) Agriculture monitoring
- (g) Disaster management
- (h) Teleports installation, maintenance and utilization
- (i) Ground Transportation management
- (j) Air transportation and control
- (k) Research and capacity building
- (l) Health

### Local and International collaborators/ partners

### Locally, RSA is currently collaborating and coordinating space activities in

- Different sectors such as agriculture, forests, biodiversity, disaster management, health, mining, land management Climate change adaptation, Air quality control and others
- The universities, research groups and centers of excellence for capacity building in space sciences and technologies and their applications

**Internationally, RSA is in discussion with different agencies and organizations having the similar mission.**

## Data, Research, findings and challenges

Some RSA staff have already published articles based on NASA's publicly available data from:

- Solar and Heliospheric Observatory (SOHO)
- Advanced Composition Explorer (ACE)
- Large Angle and Spectrometric Coronagraph (LASCO)
- Solar Terrestrial Relation Observatory (STEREO)
- Solar Dynamic Observatory (SDO)
- Global Navigation Satellite System (GNSS)
- Land Remote-Sensing Satellite

Satellite data are currently being combined with data obtained from the Compound Astronomical Low cost Low frequency for Spectroscopy (CALLISTO), to analyse the impacts of solar transients phenomena in the Upper and lower atmosphere

In collaboration with local, regional and international companies/ organizations, more projects are being initiated.

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For additional information please contact:

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