

NORISK - Contributing to Kenyan space weather research capabilities

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The “Broglgio Space Center”

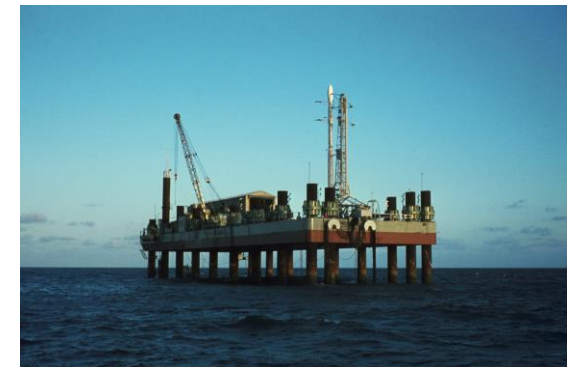
The Luigi Broglgio Space Centre (BSC) is an Italian-owned spaceport near [Malindi](#), [Kenya](#), named after its founder and Italian space pioneer Luigi Broglgio. Developed in the 1960s through a partnership between the University of Rome La Sapienza's Aerospace Research Centre and NASA, the BSC served as a spaceport for the launch of both Italian and international satellites.

Number of launches: 27 (9 with NASA Scout Launcher): 100% success.

Primarily [sounding rockets](#) including the [Nike Apache](#), [Nike Tomahawk](#), [Arcas](#) and [Black Brant](#) launchers

List of launches carried out at Broglgio Space Center

N°	Launch vehicle	Satellite
1	Scout SV 153	SM 2, San Marco 2 (IT), 26 Dec. 1967
2	Scout SV 175	UHURU, Small Astronomic Satellite (USA), 12 Dec.1970
3	Scout SV 173	SM 3, San Marco 3 (IT), 24 April 1971
4	Scout SV 163	SS 1, Small Scientific Satellite (USA), 15 Nov. 1971
5	Scout SV 170	SAS 2, Small Astronomic Satellite (USA), 15 Nov. 1972
6	Scout SV 190	SM 4, San Marco 4 (IT), 18 Feb. 1974
7	Scout SV 187	UK 5, United Kingdom 5 (UK), 15 Oct. 1974
8	Scout SV 194	SAS 3, Small Astronomic Satellite (USA), 8 May 1975
9	Scout SV 206	SM 5, San Marco 5 (IT), 25 March 1988



Role of the Italian Space Agency (ASI)

The Luigi Broglio Space Centre (BSC) is managed by the Italian Space Agency since 2004 based on the inter-government agreement initially signed by Italy and Kenya in 1995.



At present, the main activities carried out at BSC include:

- Support to the operations of several scientific and operational programs (ESA, NASA, CNES, CLTC, Space X) by using ground based remote sensing facilities;
- Scientific and technological research in the fields of space and aerospace;
- Scientific and technological cooperation with Kenyan institutions (e.g. KSA, Universities) from different activities including training of Kenyan personnel.

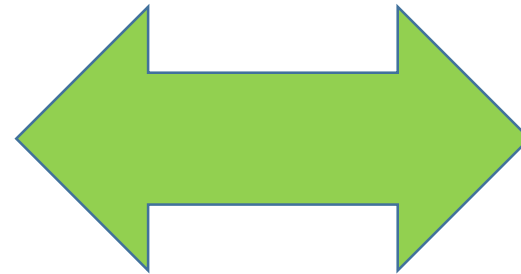
ASI – INGV collaboration

In 2017 Italian Space Agency and Istituto Nazionale di Geofisica e Vulcanologia (INGV) signed an framework agreement (valid for 5 years) to collaborate in fields of common interest including:

- Research on geophysical phenomenon;
- Development of innovative geophysical monitoring systems;
- Development of innovative systems for Earth Observation, Space geodesy and telecommunications;
- **Research activities in the field of Sun-Earth interaction and monitoring system for Space Weather;**
- Research and development of Earth Observation system for seismic and volcanic risk management;
- Research for new Earth Observation space missions;
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What do we need for improving African ionospheric research capabilities?

From the lectures of the previous days...

- More observation infrastructures especially in peculiar regions (equatorial, EIA crests, etc..) of the African continent;
- More research activities on Low Latitude (especially African) ionosphere
- More African young researcher doing good and cutting-edge ionospheric/space weather research;

NORISK project

New Observatory for Real-time Ionospheric Sounding over Kenya (NORISK) is a 3 years project (kick-off on July 2021, 0.5 M€ budget) with the following objectives:

- O1. Design and development of a new ionospheric observatory in BSC;
- O2. Development of models and algorithms for the low-latitude ionospheric monitoring and research by exploiting data from the new observatory;
- O3. Training of a new generation of Space Weather scientists in Eastern Africa.



New ionospheric observatory @ BSC



Data (ionosonde and GNSS) and products (TEC and scintillation) will be stored in:

- A local processing and storage facility;
- The Italian INGV SWIT (Space Weather Information Technology) infrastructure.



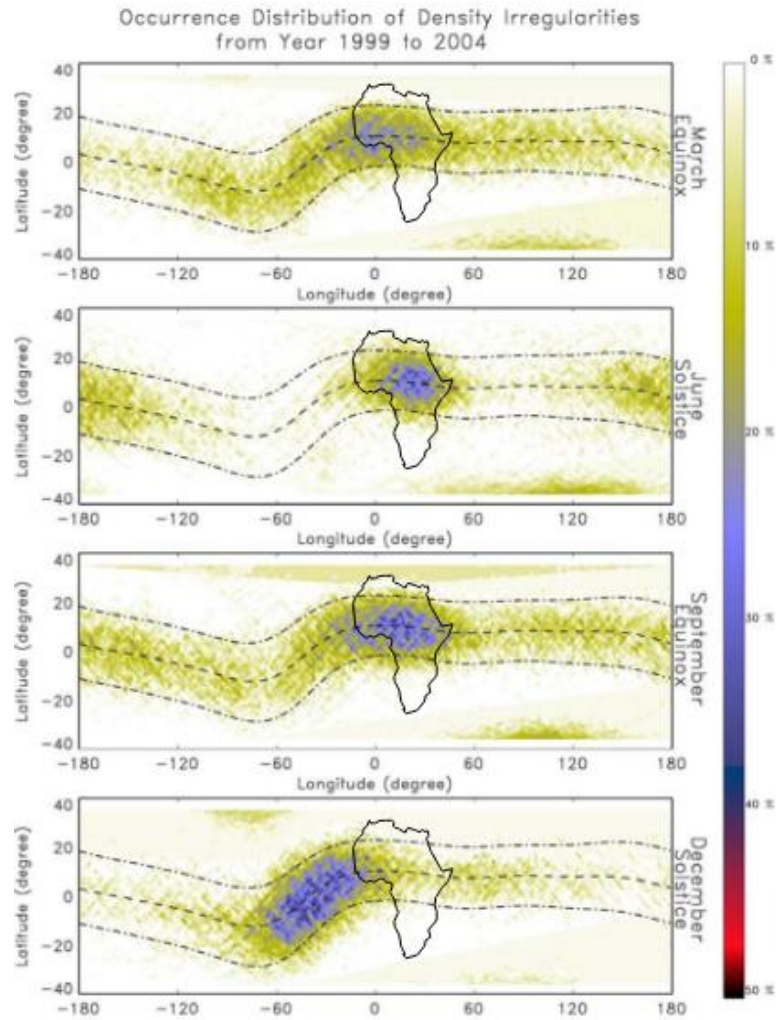
kilón - s4 vertical map (elevation mask 15°) from 2021-06-22 04:25:00 to 2021-06-22 07:25:00



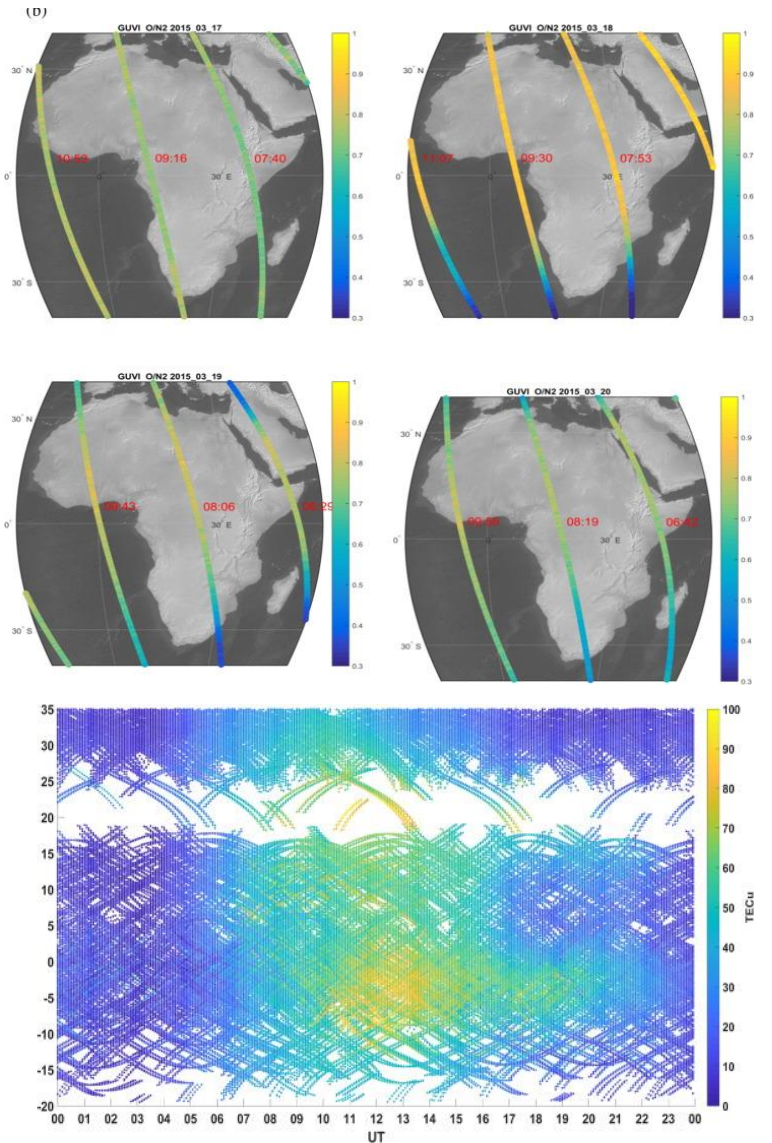
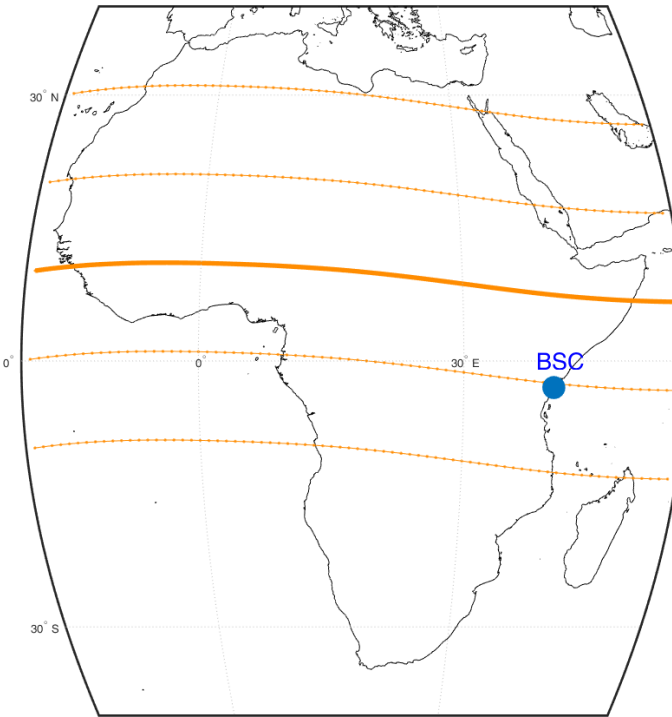
They will available in **real-time** through:

- A dedicated GUI installed on local facility;
- The eSWua webportal (www.eswua.ingv.it);
- The eSWua web service (<http://ws-eswua.rm.ingv.it/>)

Low-latitude ionosphere monitoring and research



Adapted from S.Y. Su, 2005



Olwendo, O. J., & Cesaroni, C. (2016)

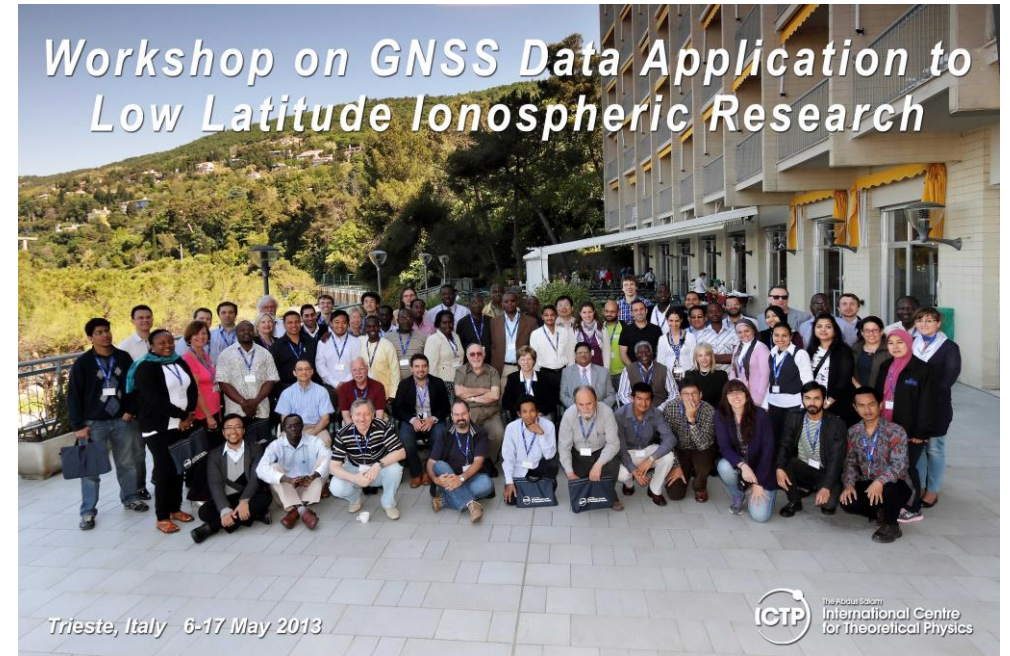
Training of Space Weather scientists

NORISK foresees the organization of 2 capacity building workshops for Eastern Africa young scientists:

1. Capacity building workshop @ BSC, Malindi, Kenya (2° year)
2. Capacity building workshop @ ICTP, Trieste, Italy (3° year)



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Open position...

We are going to open a new position for a **2.5 years post-doc (starting late 2021 / early 2022) @ Istituto Nazionale di Geofisica e Vulcanologia (Roma, Italy)** in the framework of NORISK project. Selected candidate will be in charge of:

- Contributing to the design and realization of the ionospheric observatory @ BSC;
- Analyzing data from the observatory for quality check;
- Exploiting (not only) data from the observatory in order to develop new ionospheric regional models for (Eastern) Africa;
- Disseminate the results of the research activity in international scientific conferences and papers;

Looking forward to having you on board!!



Thank you for your attention!!

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Eastern Africa GNSS and Space Weather Capacity Building Workshop, 21-25 June 2021