Overview of Ethiopian Space Program Development

Yeshurun Alemayehu (PhD)

Deputy Director General

Ethiopian Space Science & Technology Institute

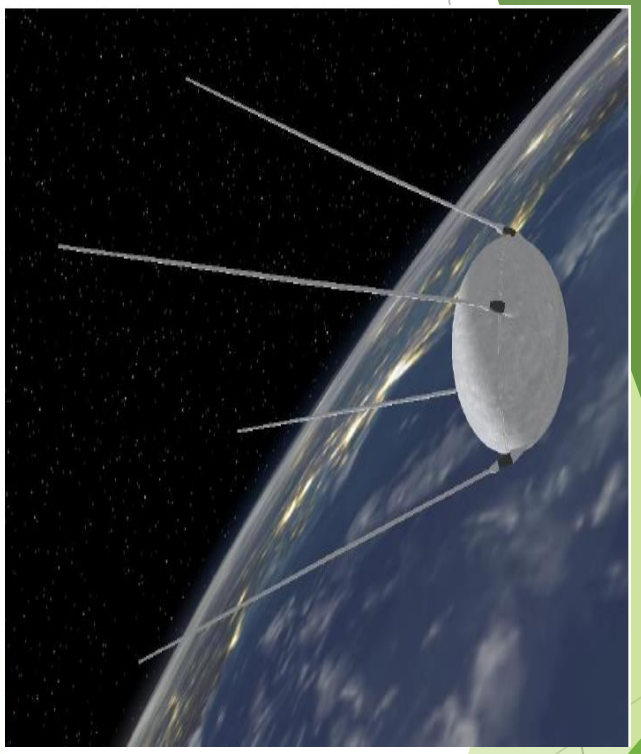
Contents

History of Space Technology

History …

1957: Sputnik

1958: Explorer



History …

1957: Sputnik

1958: Explorer

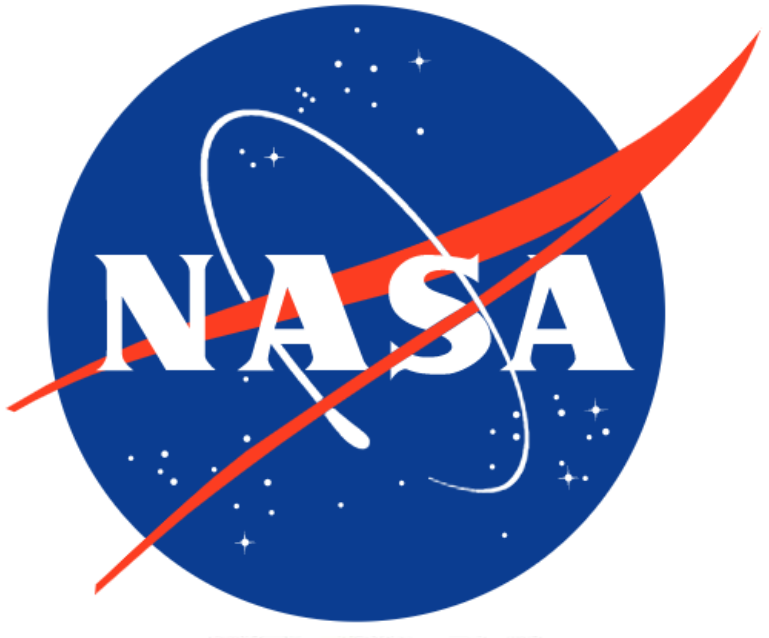
1959: Soviets launch Luna 1, the first spaceship on the moon

History …

1957: Sputnik

1958: Explorer

1959: Spaceship on the moon
NASA is formed



History …

1957: Sputnik

1958: Explorer

1959: Spaceship on the moon
NASA is formed

1961: Yuri Gagarin - a Russian Soviet pilot and cosmonaut was the first human to journey into outer space, when his Vostok spacecraft completed an orbit of the Earth on April 12

History …

1957: Sputnik

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NASA is formed

1961: Yuri Gagarin

Alan Shepard - became the second person and the first American to travel into space

History …

1957: Sputnik

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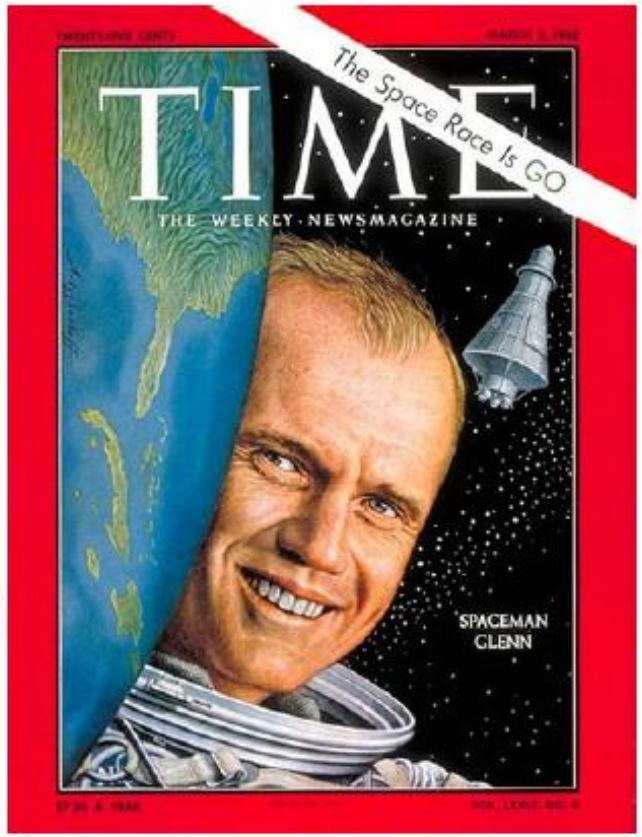
NASA is formed

1961: Yuri Gagarin
Alan Shepard

1962: John Glenn piloted the Mercury-Atlas 6 "Friendship 7" spacecraft on the first manned orbital mission of the United States. He completed a successful three-orbit mission around the earth in 4 hours, 55 minutes, and 23 seconds.



History …

1957: Sputnik

1958: Explorer

1959: Spaceship on the moon
NASA is formed

1961: Yuri Gagarin
Alan Shepard

1962: John Glenn

1963: Valentina Tereshkova becomes the first woman to have flown in space, having been selected from more than four hundred applicants and five finalists to pilot Vostok 6.

History …

1957: Sputnik

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Alan Shepard

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1963: Valentina Tereshkova

2019: ETRSS-1

Ethiopia launched it's first ever satellite into orbit on December 20, 2019

Establishment of Ethiopian Space Science & Technology Institute

Introduction to Ethiopian Space Program

2019- Ethiopia Launched it's first ever satellite(ETRSS-1)

2016- Establishment of Space Council & Ethiopian Space Science & Technology Institute(ESSTI)

2012-Entoto Observatory & Research Center (EORC)

2004- Ethiopian Space Science Society (ESSS)

There were some space related activities, though discontinued for different reasons at the time of Emperor Hailesillassie, in 1957, and during the Derg regime.

Establishment of Ethiopian Space Science & Technology Institute

On October 14, 2016, the Council of Ministers approved the Establishment of ESSTI & ESSTC

The objectives of establishment of ESSTI:-

- to enable Ethiopia to fully exploit multidimensional uses of space science and technologies;
- to produce demand based knowledgeable, skilled and attitudinally matured professionals that enable the country to become internationally competitive in the area of aerospace science & technology;
- to develop and strengthen infrastructures to speed up space science and technology development in the country; and
- To enable the country to be robust contributor for the development of aerospace science and technology.

Establishment of ESSTI…

Powers and Duties of the Space Council (ESSTC):

a) provide directions and leadership by evaluating space science policies, plans and strategies in order to contribute to accelerated and sustainable development of the country;

b) approve plans of the Institute, evaluate performance and provide direction for further actions as deemed necessary.

c) provide the necessary guidance and support for the proper and timely implementation of space science and technology plans.

ESSTI's MANDATE

ESSTI has the following mandates:

- ✓ Undertake research in the areas of aerospace science and technology;
- ✓ Formulate and implement space policy and strategy consistent with the present and future needs of the country;
- ✓ Prepare and implement space science & technology development plans of the country;
- ✓ Support space science & technology related activities carried out at national level and regulate their alignment with national development needs;
- ✓ Design, manufacture and launch aerospace products (spacecrafts);

ESSTI MANDATES (Contd…)

- ✓ Design strategies that ensure the fulfillment of human resource;
- ✓ Establish research centers supporting capacity development of the country's space science and technology;
- ✓ Support local manufacturing industries in order to produce various equipment to be utilized in space development service;
- ✓ Gather and compile information supporting aerospace development and carry-on fact-finding missions;

ESSTI MANDATES (Contd…)

- ✓ Issue permit to persons/institutions who desire to engage in space activities; control their operation; register space objects and regulate in collaboration with other relevant bodies;
- ✓ Works in cooperation with other concerned bodies on space flight and activities that are related with the country`s peace and security matters;
- ✓ Establish and strengthen cooperation with different institutions from countries having similar objectives and may provide support to the sector;
- ✓ Sign regional and international agreements consistent with the national interest and implement same upon ratification;
- ✓ Carryout other related activities necessary for the attainment of its objectives.

Ethiopian Space vision

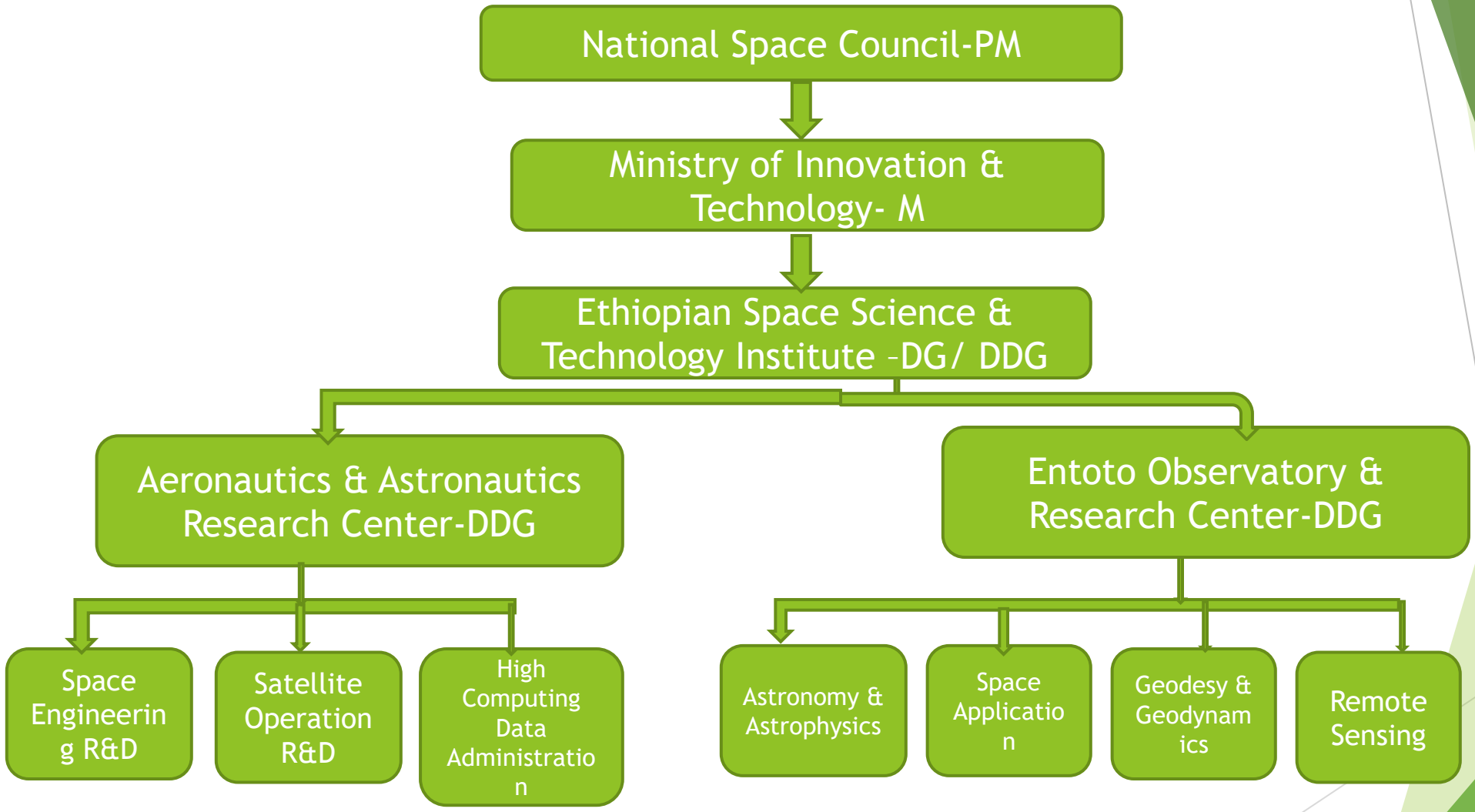
To ensure Ethiopia's home-based competence in space science and technology that is capable of responding national development demand.

Ethiopian Space Program Mission

To build national capabilities in space science and technology through human resources, institutional and infrastructural development and practice of a sound regulatory framework that maximizes effective utilization of the sector, thereby aligning with national development programs

To ensure Ethiopia's home-based competence in space science and technology that is capable of responding national development demand.

ESSTI's Governance/Organizational Structure



Facilities & Infrastructures at ESSTI

Twin Optical Telescopes

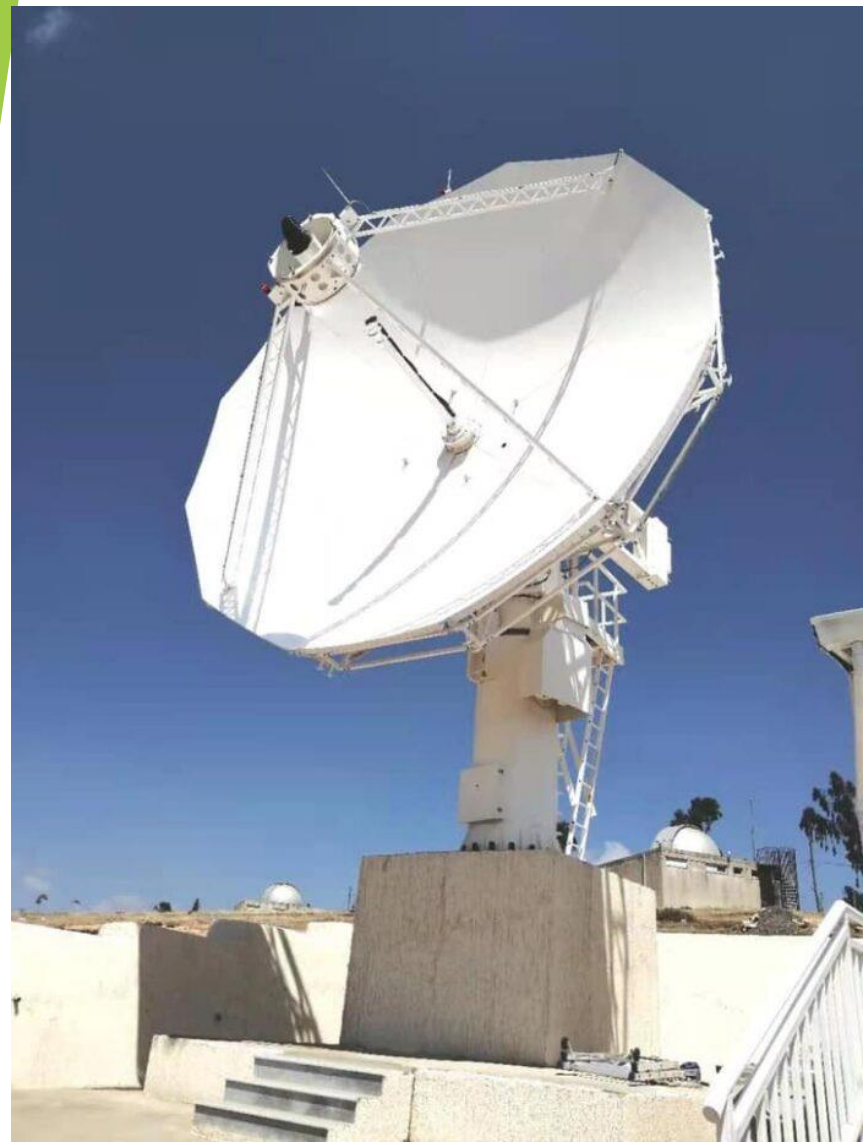
Entoto Observatory and Research Center is engaged in:

- Taking observations (two identical 1 m telescopes)
- Site-testing projects in the highlands of northern part of Ethiopia (close to Lalibela) to put bigger-size telescopes
- ESSS and Entoto observatory to realize International Astronomical Observatory in the highland of Lalibela.
- Launch MSc and Ph.D. programs: in collaboration with AAU; study programs in the fields of astronomy and astrophysics, space science, remote sensing and geodesy

ETRSS-1 & It's Ground Station

- 4.5m Antenna
- ETRSS-1 Satellite: Resolution 13.75m
- Earth Observation

Ethiopian Multisatellite Ground Receiving Station



- 7.3m Antenna
- ETRSS-1 Satellite: Resolution up to 0.5m
- Earth Observation
- Receives from 5 different satellites
  - CBERS-4
  - GAOFEN-1
  - GAOFEN-3
  - GAOFEN-5
  - SuperView-1

Space Education Initiative in Ethiopia

Currently Run Graduate Programs

MSc Programs in

1. Remote Sensing
2. Space Science & Application
3. Astronomy & Astrophysics

PhD Programs in

1. Remote Sensing
2. Space Science & Application
3. Astronomy & Astrophysics
4. Geodesy

Graduate students have been admitted from Ethiopia and other East African Countries: Kenya, Uganda, Tanzania, etc.

Planned Graduate Programs

MSc Programs in

1. Space Engineering
2. Aeronautical Engineering
3. Space Science & Engineering

PhD Programs in

1. Aerospace Engineering
2. Atmospheric & Climate Science

Gaps and Challenges

- Shortage of Professors
- Shortage of Lab facility
- Financing/funding/grants for running the programs

Proposed Solutions

- Creating international collaboration to facilitate staff and student exchange
- Sharing lab facilities
- Running the graduate programs in a sandwich modality
- Looking for financial aids/grants for conducting researches, travel grants, research support, etc

Thank you