

Egyptian Space Agency (EgSA) Achievements in Capacity Building in 2021

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Deputy CEO

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Content

- Self-Introduction
- Background about EgSA
- National Space Program
- EgSA Capacity Building Activities
 - Pre-University Program
 - University/Undergraduate Program
 - Post-Graduate Program
 - Professional Training Program
- Challenges

Self-Introduction

• Professional Career

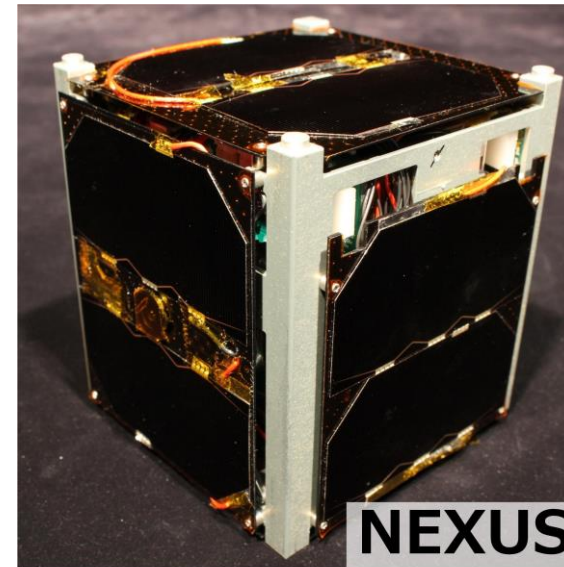
- B.Sc. in AE 1991 (Cairo University)
- M.Sc. in AE 1996 (Cairo University)
- Ph.D. in AE 2002 (Nagoya University, Japan)
- Assistant Professor (2003-2008)
- Associate Professor (2009-2013)
- Professor (2014 – Present)
- Deputy Executive Director of the Egyptian Space Agency EgSA (September 2019-Present)
- Sabbatical (MHI, Volvo, NU, KFUPM, Nihon U./UNISEC)
- Instructor for CLTP7-8 (2016-2017)
- Founder of Space Systems Technology Lab. @ Cairo University in 2011.

• Research Interest

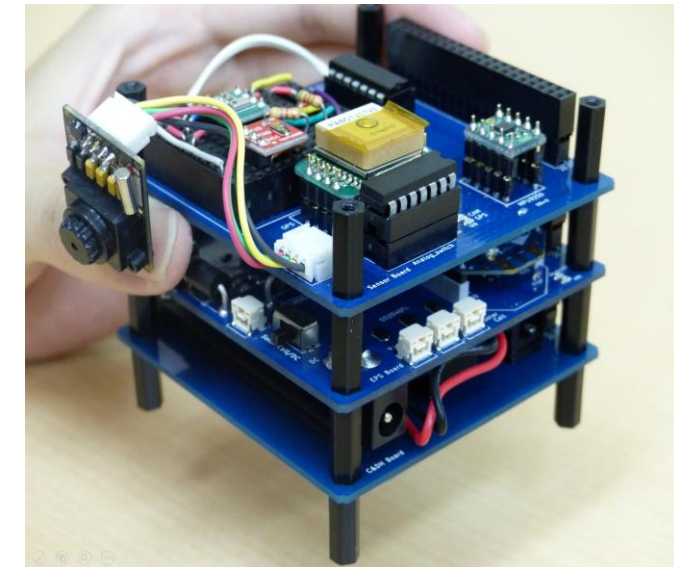
- High Speed Aerodynamics, Aeroacoustics, and Micro/Nano-Satellite Developments



First CLTP in Japan (Feb-March 2011) @ Wakayama University



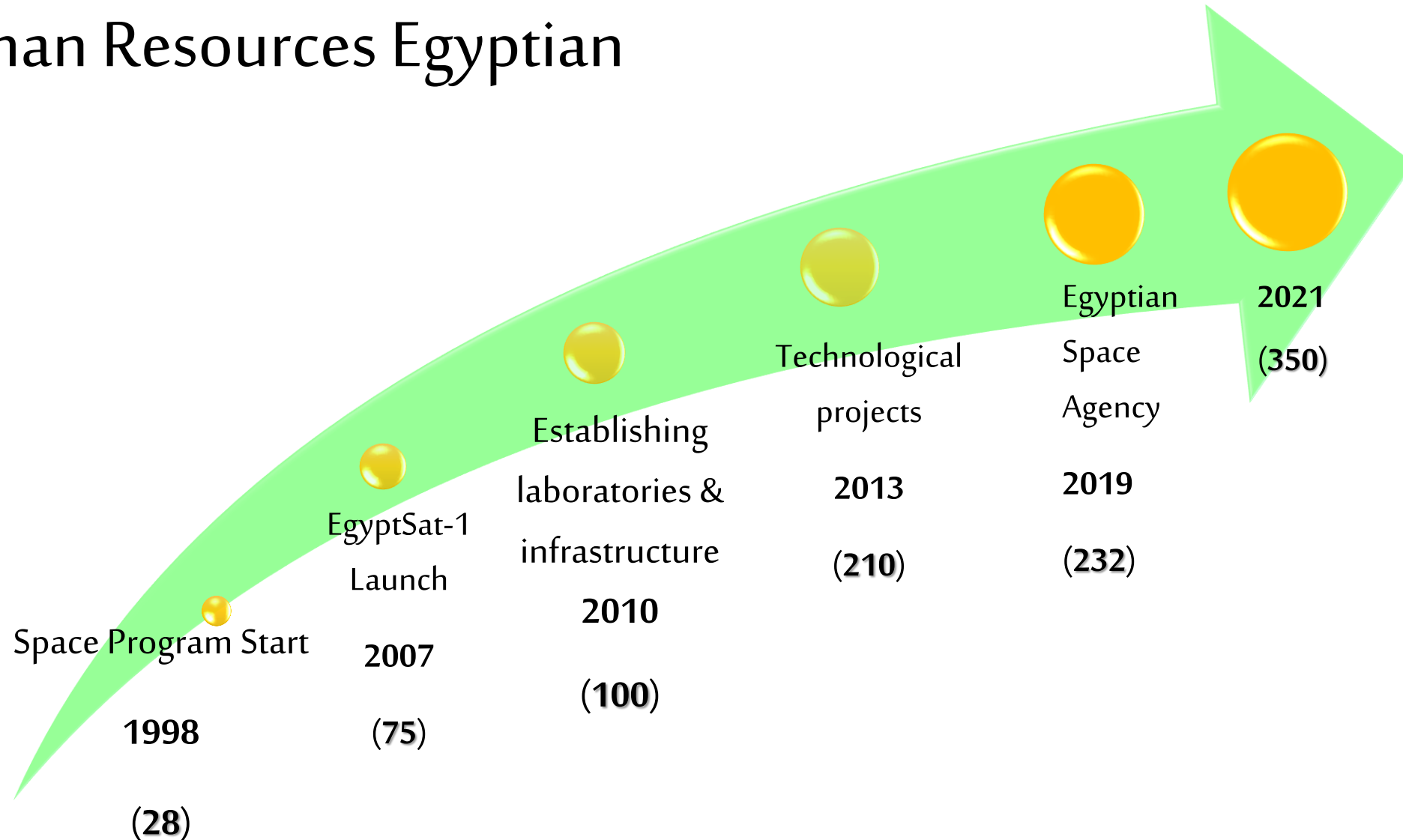
NEXUS 1U CubeSat Launched in January 2019



HEPTA-SAT - II

@ Nihon University (2016-2017)

The Development of the Egyptian Space Program – Human Resources Egyptian



Egyptian Space Program – EgyptSat-1



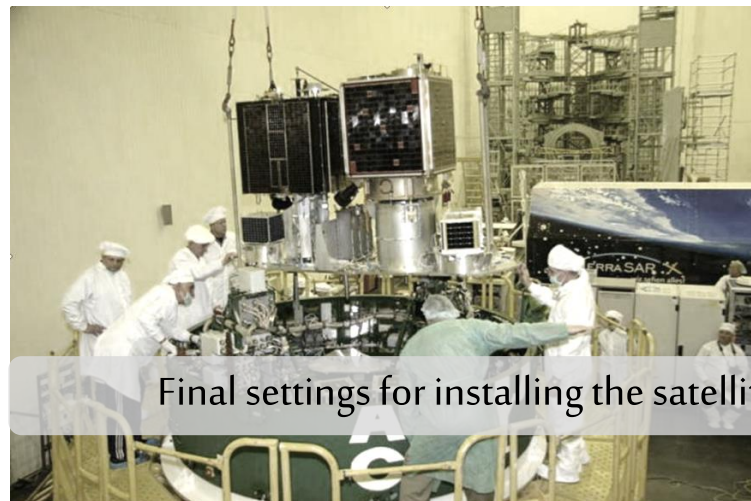
Engineering model and camera simulator tests



Finishing The engineering model tests with the work team



The final tests of the EgyptSat-1 satellite



Final settings for installing the satellite on the launch rocket



Egyptian Space Program - Specialized laboratories



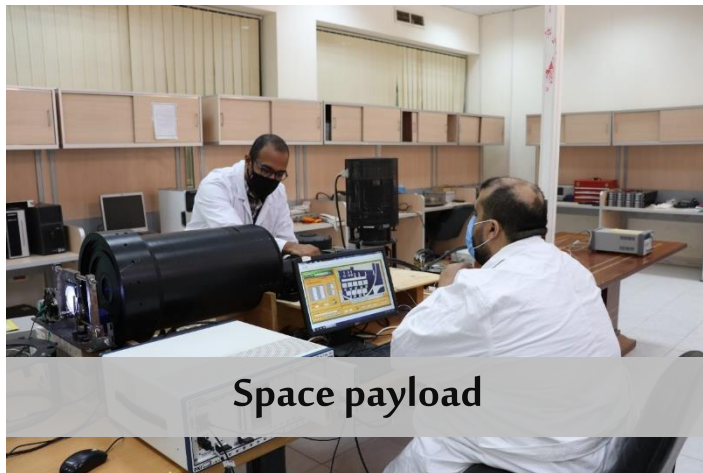
Environmental tests



Functional tests



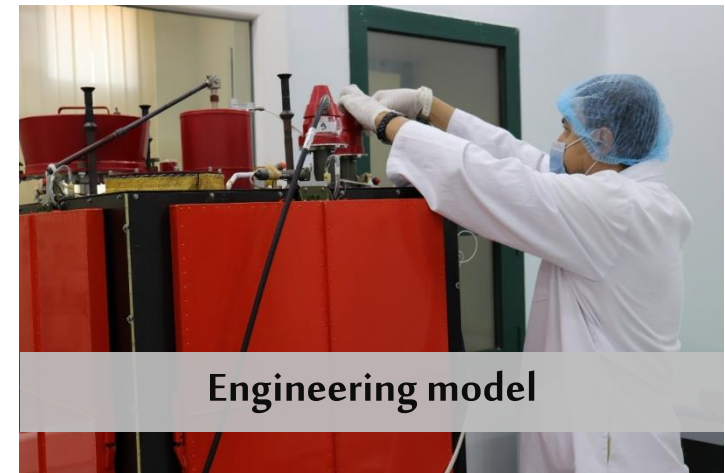
Space systems implementation



Space payload



Assembly, integration and testing



Engineering model

Egyptian Space Agency

“A general economic body called "the Egyptian Space Agency" shall be established, with a legal personality, affiliated with the President of the Republic, as well as, it shall enjoy the technical, financial and administrative independence, it is headquartered in Cairo City, and it has the right to establish branches throughout the Arab Republic of Egypt by decision of its board of directors.”

Article 1 - Law No. 3 of 2018

The Egyptian Space Agency's Objectives

“The agency aims to create, transfer, localize, and develop space science and technology and possess the own capabilities to build satellites and launch them from the Egyptian lands in a manner that serves the country's strategy in the fields of development and achievement of the national security.”

Article 2 - Law No. 3 of 2018

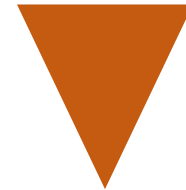
Agency's Organizational Structure

- Prime Minister
- Minister of Higher Education and Scientific Research
- Minister of Communications and Information Technology
- Agency CEO
- President of the Academy of Scientific and Technological Research
- Representative of the Ministry of Justice
- Representative of the Presidency of the Republic
- Representative of the Ministry of Defense
- Representative of the Ministry of Interior
- A representative of the Ministry of Finance
- Representative of the Ministry of Military Production
- Representative of the General Intelligence
- Representative of the Administrative Control Authority
- A representative of the Arab Organization for Industrialization
- Three experts in the field of space

Supreme Council



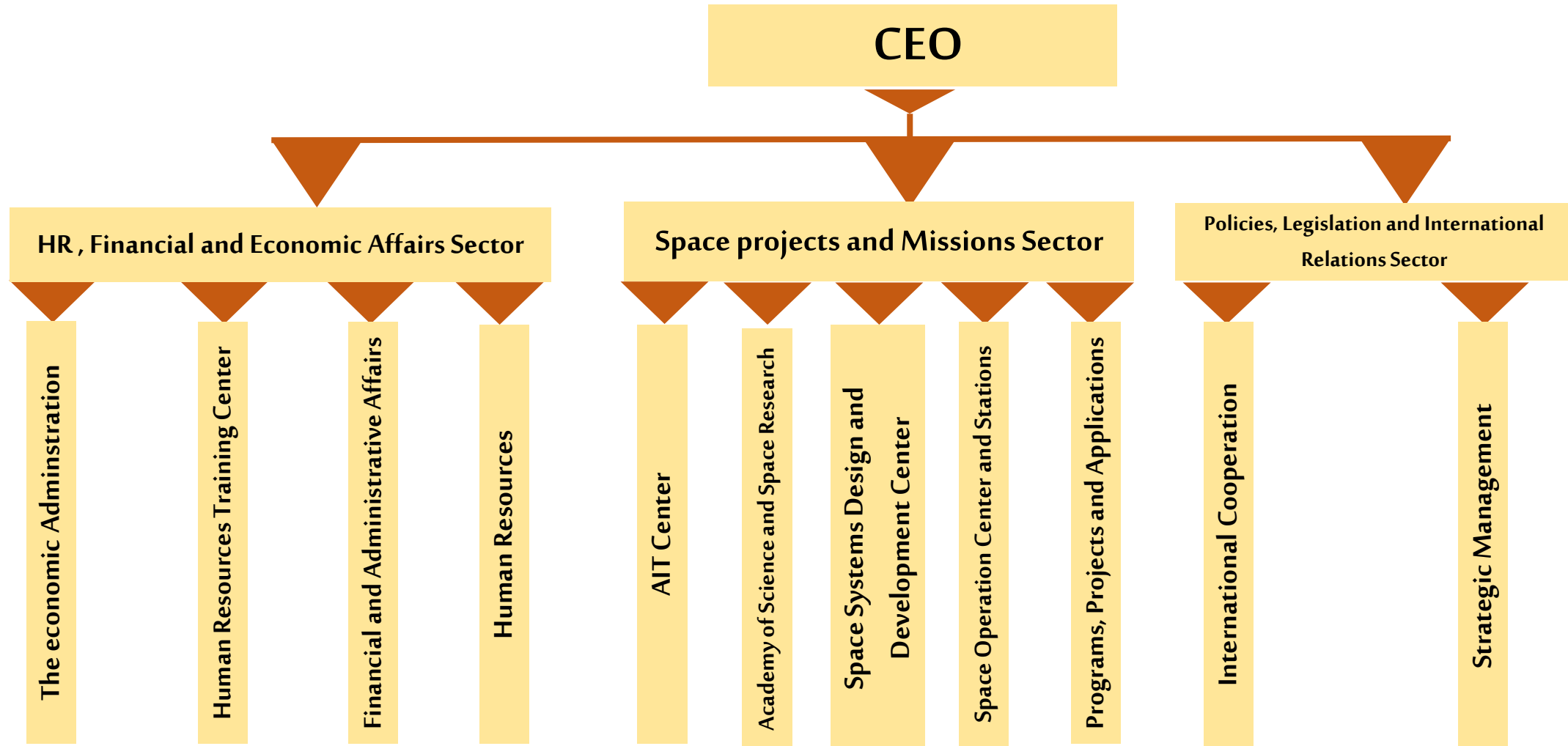
Board of Directors



CEO

- President of the Republic
- Minister of Defense
- Interior Minister
- Minister of Communications and Information Technology
- Minister of Finance
- Minister of Higher Education and Scientific Research
- Minister of State for Military Production
- Head of General Intelligence
- Head of the Administrative Control Authority
- Agency CEO
- President of the Arab Organization for Industrialization

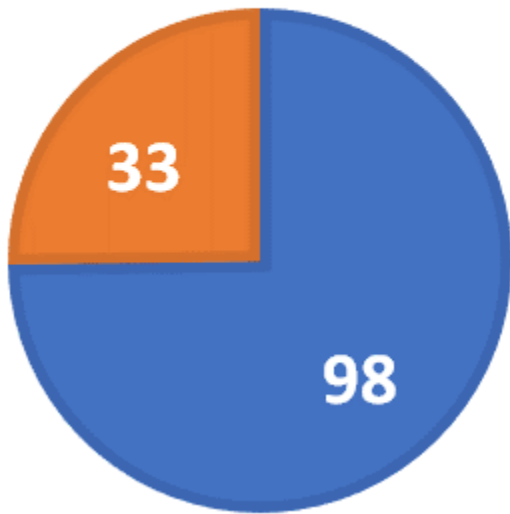
Agency Organizational Structure



Technical Sector

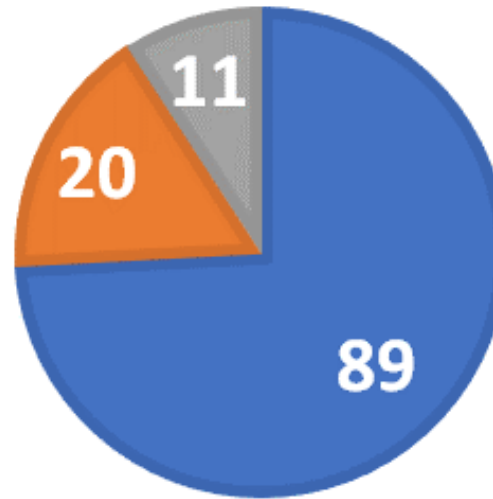
MALE / FEMALE

■ Male ■ Female



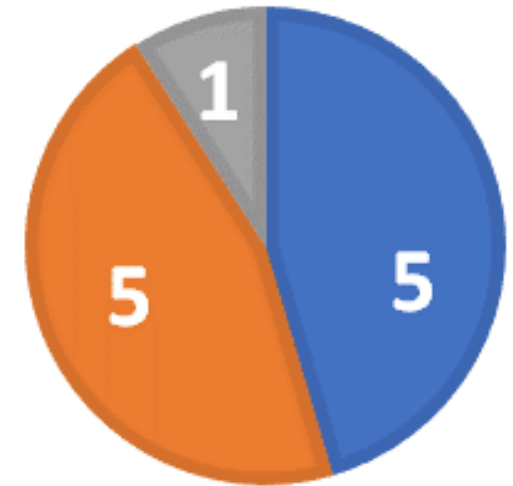
ENGINEERING

■ B.Sc. ■ M.Sc. ■ Ph.D.



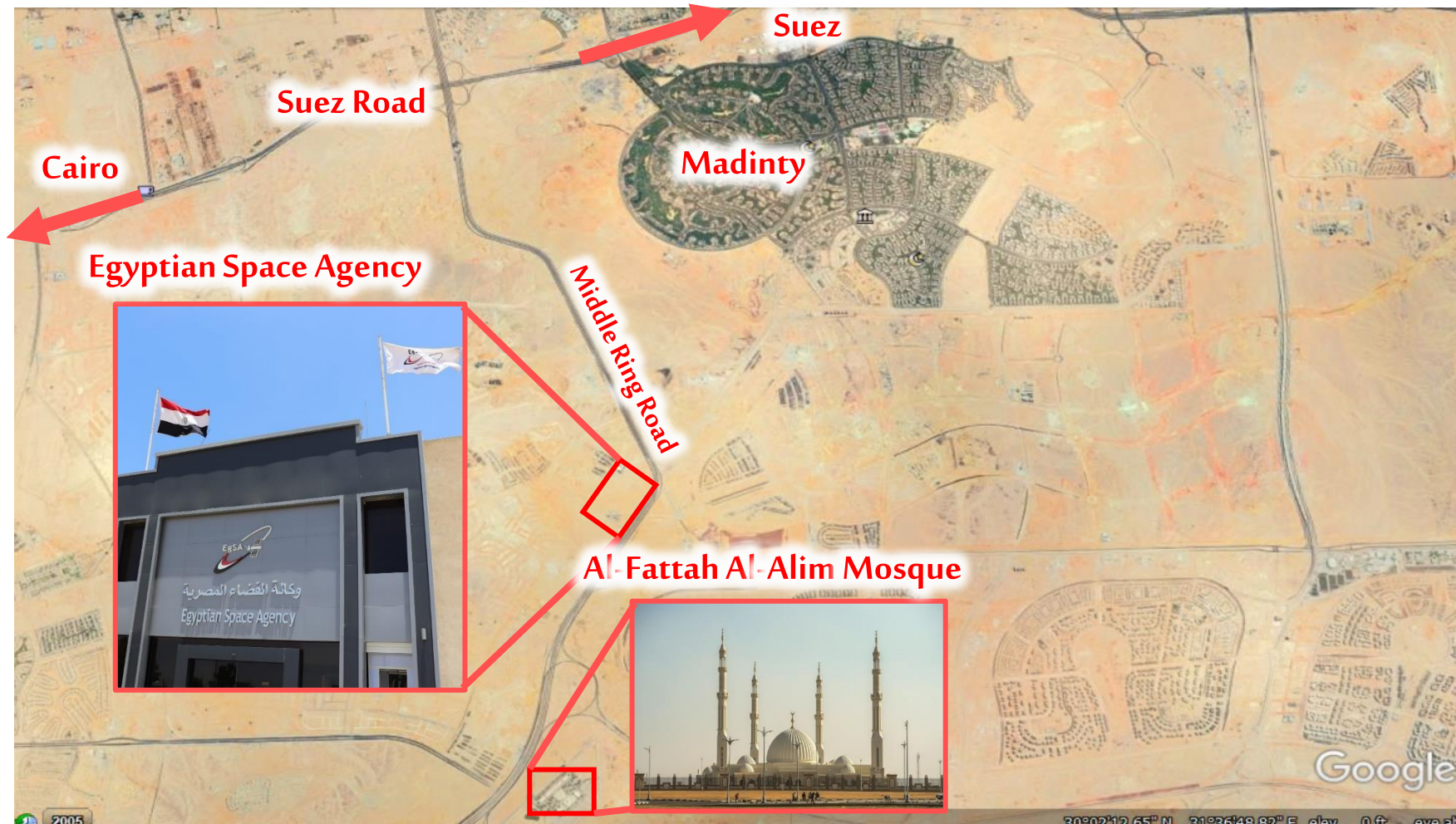
SCIENCE

■ B.Sc. ■ M.Sc. ■ Ph.D.

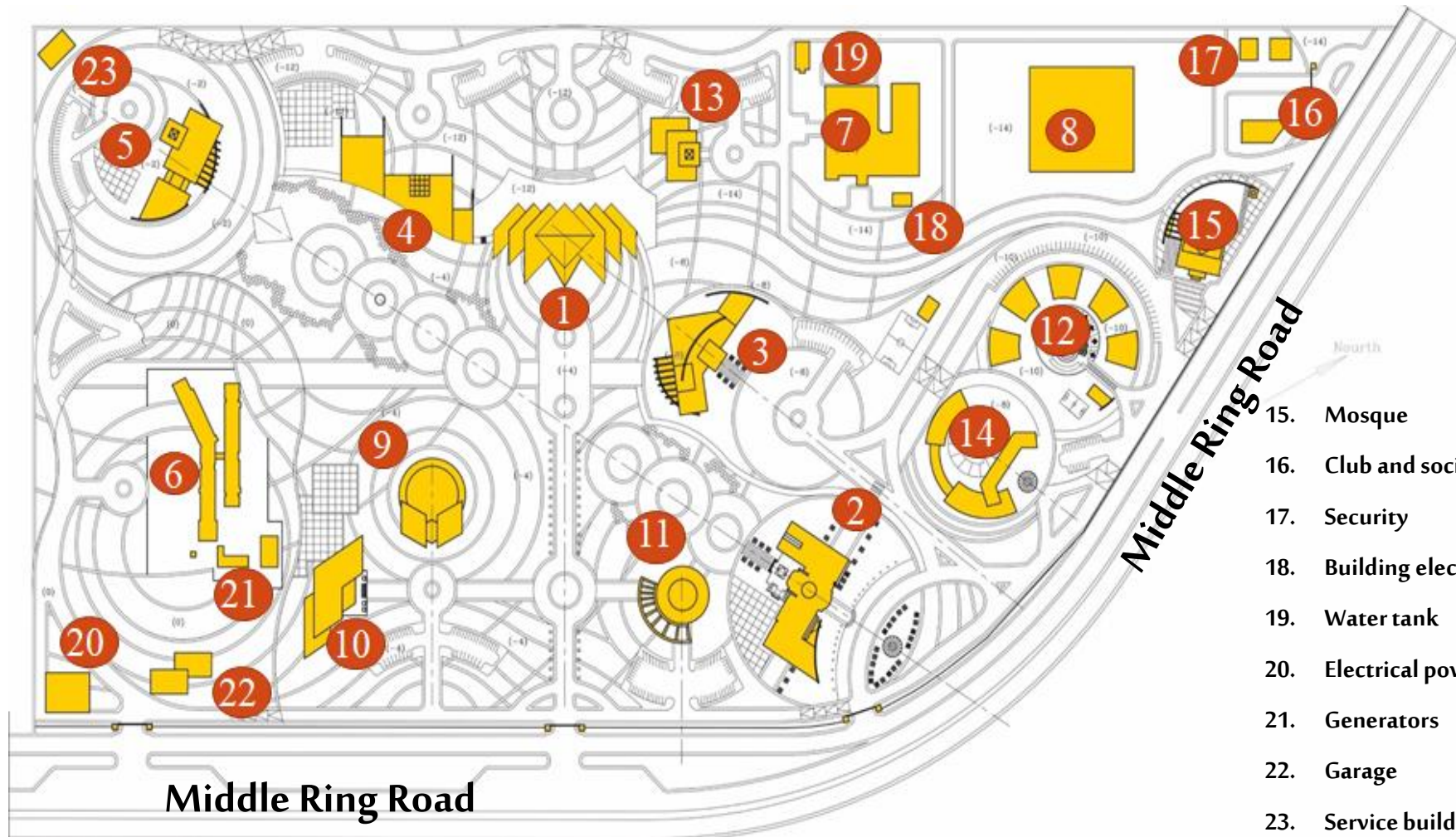


131 Engineers/Scientists

Agency's Headquarters



Space City



1. Egyptian Space Agency
2. African Space Agency
3. Space Academy
4. Space Systems Development Center
5. Free Zones Administration Building
6. Satellite reception center
7. Building, integration and testing of sensor satellites
8. Building, integration and testing communications satellites
9. Space Museum
10. Library and conference hall
11. Planetaryarium
12. Space City workers housing
13. The administrative building for assembly, integration and testing
14. Hotel
15. Mosque
16. Club and social services
17. Security
18. Building electrical transformers
19. Water tank
20. Electrical power building
21. Generators
22. Garage
23. Service building

National Space Program

"**The development of the national space program** and its approval by the Supreme Council of the Agency in the short, medium and long term, and follow up its implementation"

One of the competencies of the Egyptian Space Agency - Article Three - Law No. 3 of 2018



Building human and scientific capabilities



Exploration of outer space



International relations and international cooperation



Infrastructure and industrial development



Space legislation and standards



Building space mission systems

Building Human Resources and Scientific Capacities

- Pre-University Program
- University/Undergraduate Program
- Post-Graduate Program
- Professional Training Program

Pre-University Program

- Space Dream Series for Kids
- Workshops/EgSA visits for school students (on Premises)
- School visits outside EgSA (off Premises)
- Children University
- CanSat Workshops (Project Based Education)

Space Dream Series for Kids



K12 Students



April-May 2021



Egypt and Middle East



Best award of drama series from
Egyptian Human Rights Foundation

Workshops/EgSA visits for school students (on Premises)



1/4 Days



240 Students



- CubeSat Workshop
- Satellites Mission Analysis, Subsystems and Their Applications
- Astronomy



2021



1st to 12th grade



Mission Design Workshop



CubeSat Workshop



Astronomy Workshop

School visits outside EgSA (off Premises)



3 Days



1000 Student



36 Teachers



- Solar System
- Rockets and Orbits
- Satellites
- International Space Station



2021



1st to 8th grade



Children University



4 Years



50 Students



2021



9 – 11 Years old



27 Governorate



- Introduction to Space Science and Technology
- Rockets and Rocket Science
- Space Robotics
- Satellites



CanSat Workshops (Project Based Education)

Support three levels of applications:

- Plug and Play
- SW Development
- Payload Development



High Schools Students

Space Amateurs



100 Kitس



2021



Egyptian Space Agency, EgSA

EgSA-CanSat Satellite for Practical Learning of Space Technology

What is a CanSat Satellite?
A CanSat is a small satellite that provides an affordable way to provide students with basic practical knowledge to many challenges in space technology such as building a satellite by themselves! Students will be able to design, build, launch and control a small plug and play satellite with electronic payload that can fit inside a small space such as a coke can. CanSat is launched and ejected from a high building or a balloon. Using a parachute, a CanSat slowly descends back to earth performing its mission while transmitting telemetry. Post launch and recovery data acquisition will allow students to analyze the level of success of the entire mission.

Hands-on experiments to simulate the whole space system: Students will perform hands-on experiments by themselves at low cost and short time for the entire space system components with its three segments which are:

- **Space segments:** EgSA-CanSat
- **Ground segment:** student's computer/ mobile phone as a command, control & receiving station
- **Launcher:** Drop from a high building, balloon, or drone by parachute.

What will students learn in the EgSA-CanSat course?

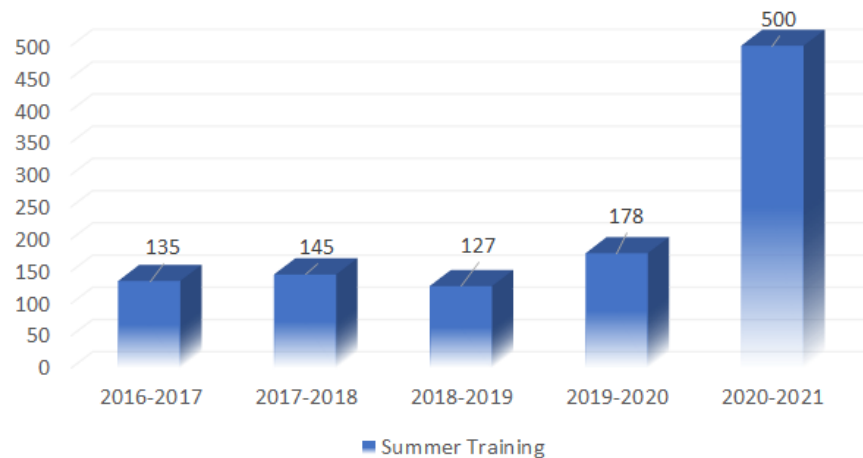
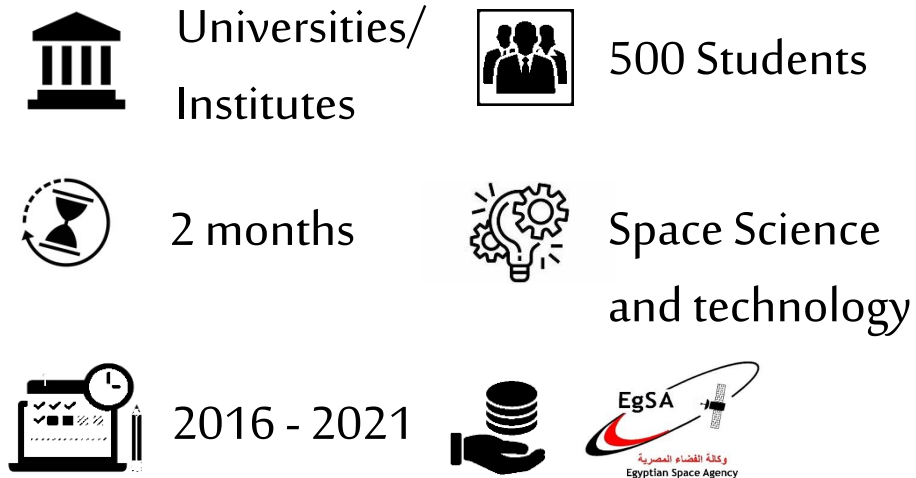
- Experience the whole cycle of satellite development from mission definition and specification to full operation, including satellite assembly, integration, testing, launching, command & control, then finally receiving its captured images and other sensors measurements.
- The basic function of each satellite subsystem
- The different On-Board Computer (OBC) interfaces (Serial, I2C, SPI, PWM, Digital, and Analog) used in real satellite.
- **Innovation Skills:** The Satellite Educational Kit enables students to develop their own new modules or sub-systems through the user defined board to increase their hardware and software innovation skills.
- Design and build autonomous systems that can counter measure any unplanned situations.
- Designing a Fly-Back Type and a Rover-Back Type CanSat can be done based on the EgSA-CanSat platform because it has sufficient interfaces for servo actuators.
- A user can make his/her smart phone ground station and create their own ground station software application.
- Open source OBC (ATMega 2560) has a big community which enables users to share experience & learn from others.

info@egsa.gov.eg
egsa.gov.eg
Global Online Education Website:
egsa-space-technology-portal.com

University/Undergraduate Program

- Egyptian University Satellite Training (EUTS)
- Space Event Days
- Capstone Project Sponsorships
- Space Lab. Establishment (Space Keys Platform)
- International Training for University Students
- Space Technology Educational Portal

Egyptian University Training Satellite Program (EUTS)



Space Event Days



Universities/ Institutes



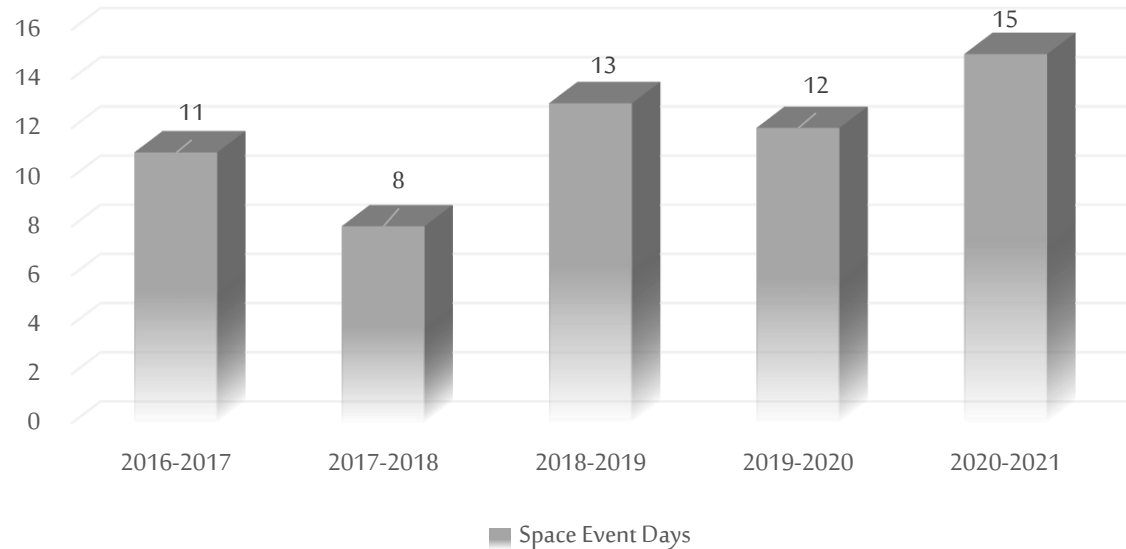
1 Days



2016 - 2021



Introduction to Satellite
Technology and Its Applications



Capstone Project Sponsorships



Universities/ Institutes



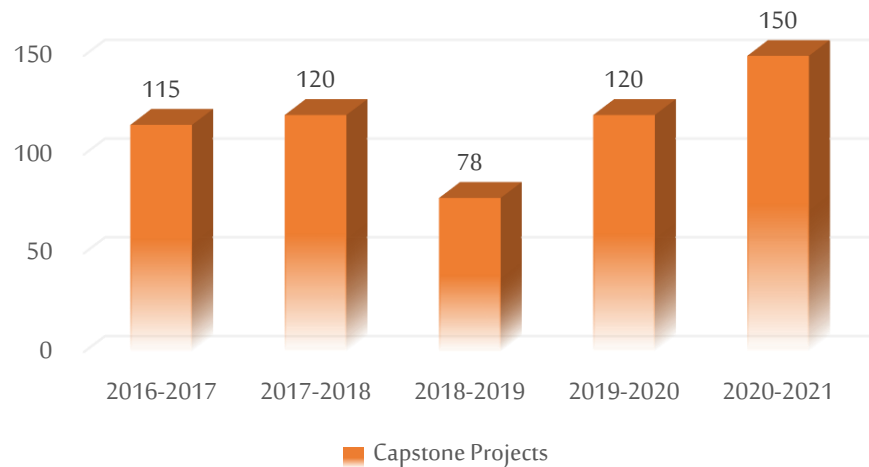
One academic year



2016 - 2021



CubeSats Subsystems
Development



Space Lab. Establishment (Space Keys Platform)



Space Science & Technology Related Colleges
And High Schools



6 Countries



2021



25 Universities (32 Faculties)

1 School

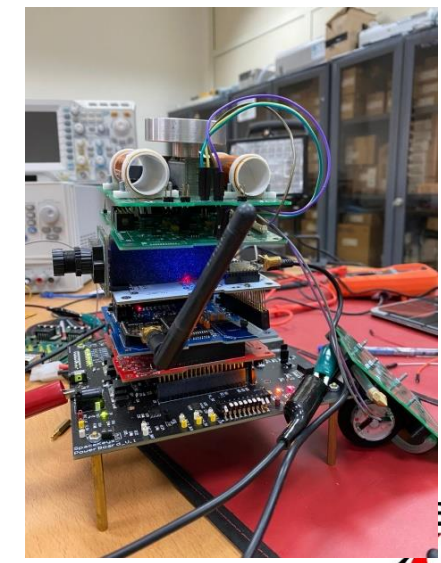
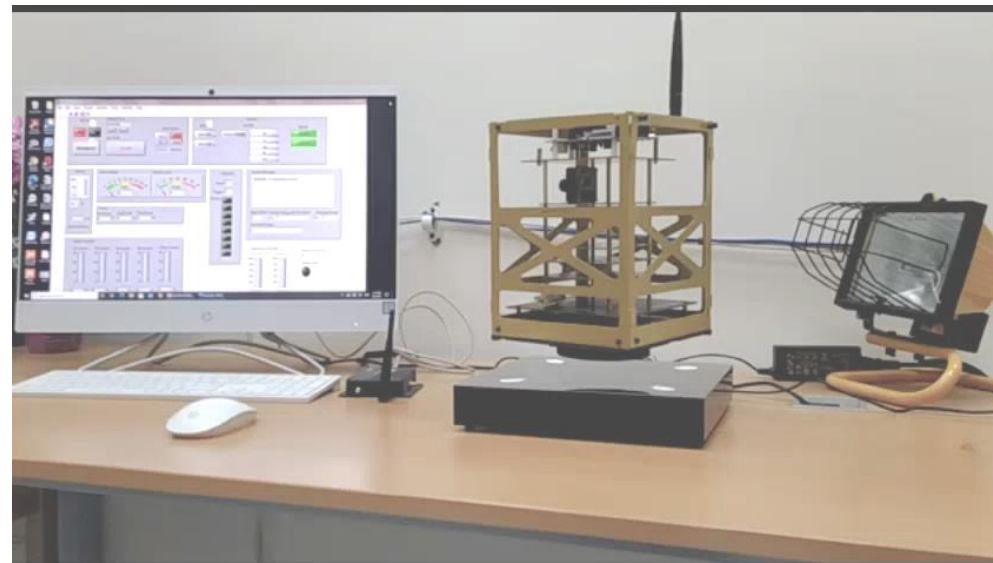
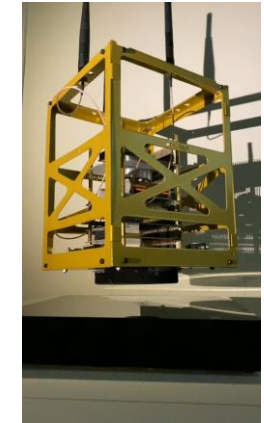


40 Kits



وزارة البحث العلمي
أكاديمية البحث العلمي والتكنولوجيا

EgSA
وكالة الفضاء المصرية
Egyptian Space Agency



International Training for University Students



10 Days



46 Students



Space Technology Educational Portal



+100 Recorded lectures



+20 Professional Engineer



17 Specialized Courses



3 Certificates



Certified Space Science And Technology Supervisor (SSTS)™



Certified Space Technology Specialist (STS)™



Certified Space Operation Control & Management Specialist (SOCMS)™



<https://www.egsa-space-technology-portal.com/>

Post-Graduate Program

- M. Sc. / Ph.D. Scholarship Program
- Joint Space Technology Research Projects

M. Sc. / Ph.D. Scholarship Program



4 M.Sc. students



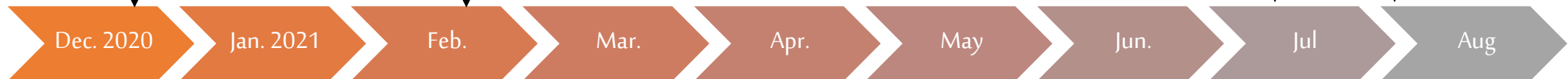
3 Ph.D. students

Announcement
(Governmental Universities in Greater Cairo)

Application Deadline

Announcement of
the Screening Results

Starting of the Scholarship



Joint Space Technology Research Projects



Universities/ Institutes



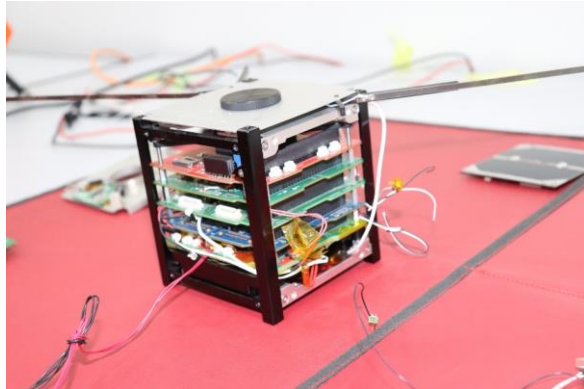
2019-2022



FM/EM of CubeSats, Satellite
Subsystems



FM of 1U CubeSat, Banha University



EM of 1U CubeSat, Zagazig University



FM of 1U CubeSat, 17 Universities



High-Speed Communication
Subsystem

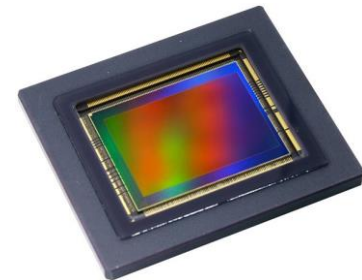


Image- Sensor
Development

Professional Training Program

- EgSA Employees Training Program
- African Developments Satellite Initiative

Ukraine – Satellite Technology Transfer



65 Engineer



Ukraine



6 years



2001 – 2005

2006 – 2008



- Systems engineering
- Satellite Subsystems Development
- Assembly and Integration



China – Satellite Assembly and Integration Technology Transfer



20 Engineers



China



78 Working days



2017 - 2018



- Assembly, Integration and Testing of Satellite.
- Operating AIT Centre



EgSA Employees Training Program (on Premises)



15 Engineers



Three months



Practical training of AIT



June – August 2020



Egypt



African Development Satellite Initiative (AfDev-Sat)



16 Engineers



Two weeks



July 25 – August 5, 2021



4 Space Technology branches



Challenges

- Funding limitations.
- Weak space awareness.
- Intellectual property rights, national regulations and export control rules.
- Protected information and unauthorized access.



Thank you

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