# UNISON-Egypt

## A look into space education future

Hassan Ali Hassan, Teaching assistant
Aerospace Engineering Department,
Cairo University

# What is SSTLab?

- Space Systems Technology Laboratory (SSTLab)
- SSTLab is a student based laboratory established in Aeronautical and Aerospace engineering department at Cairo University.

- Established in August 2011.
- Its activities are more aligned with UNISON activities, basically student driven.

# Vision

- Spread space awareness among university students.
- Utilize space technologies to solve nation's problems.
- To be center of excellence in Egypt and middle east regarding space activities.

# Mission

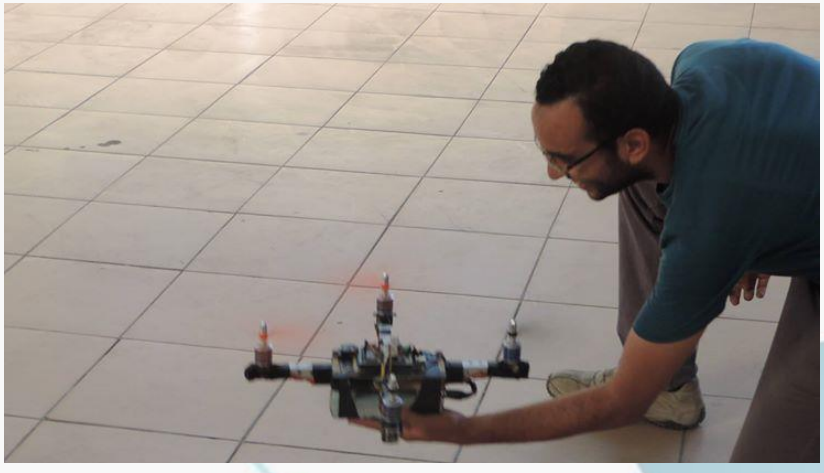
- Carrying out projects that teaches students teamwork, good planning and technical skills.
- Increasing our outreach through different channels.
- Making training programs that aims at increasing awareness, technical abilities, and preparing calibers to work in this field.

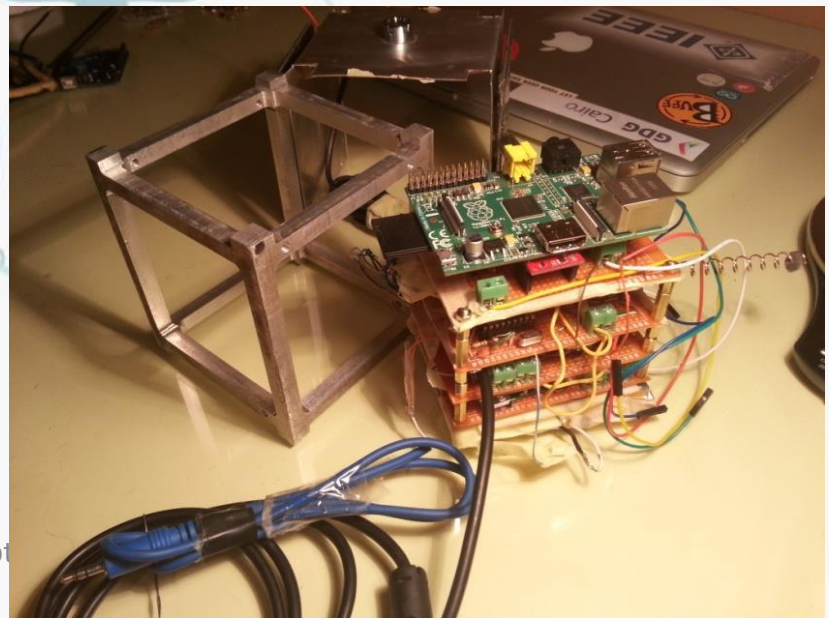
# Academic contribution

- SSTLab has incubated and supported many graduation projects since it started:

➢ Horous quadcopter project (2012).
➢ Helal cubesat project (2013).
➢ Grippy rover project(2013).
➢ Octa copter project (2013).
➢ Solid rocket propulsion project (2013).
➢ ARLISS Rover project (2014).

- It also supported Master thesis about quad copter control methods.





# UNISEC-Egypt

- Trying to be part of UNISEC-Global, as we have common goal.
- UNISEC: introductory seminar and panel discussion.
- Partnerships with other universities and scientific institutions.
- Participating in UNISEC activities.

# UNISEC: introductory seminar and panel discussion

- It was held in July 2012 in CUFE.
- Attended by the director of Information and Culture Center of Japanese embassy, JICA Advisor, and a great collection of professors from Aerospace department and other scientific institutions and universities.
- In this session, the concept of UNISEC-international was introduced.
- Discussions made about the legal issues, constraints, pros and cons and participants' experience in space engineering.

# Partnerships with other universities and scientific institutions.

- The partnership between Cairo University (represented in SSTLab) and Alexandria University is in progress to establish UNISEC-EGYPT.

# Participating in UNISEC activities

- SSTLab participated in many of the UNISEC activities like:

➢ Nano Satellites symposium in November 2011.

➢ CLTP1 and CLTP3 in 2011 and 2013.

➢ First UNISEC-Global meeting in November 2013.

➢ Mission idea contest

- MIC 1 in December 2011.
- MIC 2 in October 2012 and we were selected as one of the finalists.
- Pre-MIC 3 in November 2013 and we won the first place.

➢ ARLISS competition in September 2014.

# Projects and activities (2013 – 2014)

- CubeSat project.
- Mission idea contest.
- CanSat training program (CTP-4).
- CanSat projects.
- Space rover projects.
- Space propulsion projects.
- Quad copter project.

# Cube Sat project

- It was a graduation project for the CubeSat team in 2014.
- Mission: taking photos for Egypt from above and send them to the ground station.
- It was a continuation for the work started in 2013 (which was also a graduation project).
- This project is running currently as a research project.

# Mission idea contest

- SSTLab participated in pre-mic 3 in 2013 and won the first place.
- The idea was about using cube satellite constellation to monitor the level of pollutants in river Nile.

# CanSat training program (CTP4)

- It started in February 2014, and lasted for 6 weeks.
- 12 students participated in this program.
- Students learned a lot of skills like:
  - ➢ Embedded system design using Arudino.
  - ➢ System integration, electronics and PCB design.
  - ➢ Structural design and recovery system design.


# CanSat projects

- CanSat projects are very important learning tools that introduce the very basic concepts of space  satellites and space missions.
- Several CanSat projects were carried out like:

➢ ICC CanSat project.

# ICC CanSat model

- Basic CanSat mission:

1. Data acquisition.
2. Sending data to ground station.

- Participated in Iran Cansat Competition (ICC) in 2013.
- Achieved the 7th rank among the participating teams.

# Space Rover projects

- Space rovers are very important for research and exploration of other planets.
- Many space rovers projects were carried out:

➢ ICC rover project.

➢ Martian rover project (Khensu-1)

➢ ARLISS rover project.

# ICC Rover Project

- Basic rover back mission: gets launched and deployed, lands then navigates to target point.
- Participated in Iran Cansat Competition (ICC) in 2013.
- Achieved the 5th rank among the other participating teams.


# Martian Rover project (Khensu-1)

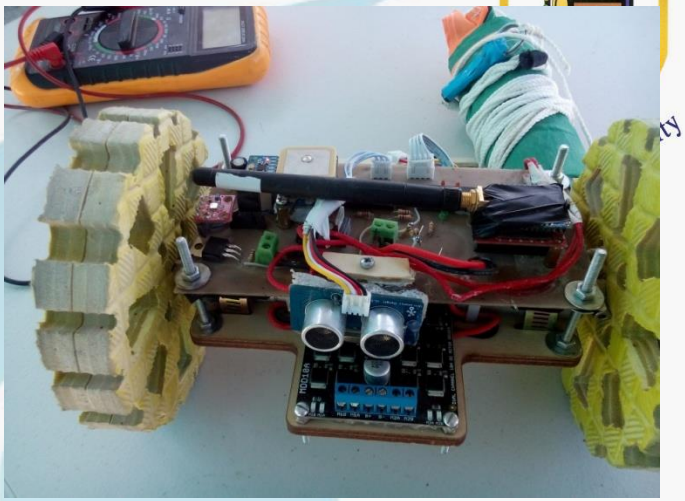
- Space rover with various missions:

1. Servicing.
2. Sample return.
3. Navigation through uneven terrain.

- Participated in University rover challenge in 2014 held in Utah, United states.
- Achieved the 9th rank among the participating teams.

# ARLISS Rover project

- Basic rover back mission:
  - gets launched by a rocket and deployed
  - lands and navigates through un even terrain to reach a goal point.
- Participated in ARLISS competition held in Nevada, United states.

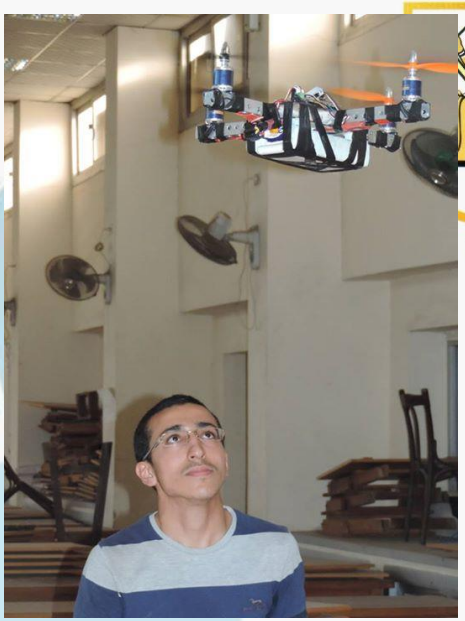


# Quad copter project

- It is one of the running projects in SSTLab.
- It started 3 years ago as a graduation project.
- Goal: to produce a reliable platform for testing CanSats.
- Why quad copters?

➢ Attractive learning outcome.

➢ Lot's of hands on experience.



# Challenges

- Lack of appropriate fund sources.
- Lack of availability of high tech devices.
- Establishment of reliable test facilities.
- Political and regulatory constraints.
- The space culture is not well spread.
- Training calibers takes a lot of time and effort (specially with our modest resources)

# Hopes and aspirations

- To have an edge in space technologies and nano satellites technologies.
- Launching our first CubeSat in orbit.
- Establishment of a consortium of several Egyptian universities and institutes aiming at spreading space technology among students.

# What do we expect from UNISEC-Egypt?

- Technical support.
- Regulatory and legislative issues.
- Financial support.
- Educational support.

# THANK YOU

For any questions or further information, contact me through e-mail:
eng.hassan.ali.hassan@gmail.com