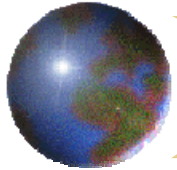


# Space Sciences, Technologies and Applications at Cairo University

Mohammed Khalil Ibrahim, Ph.D.

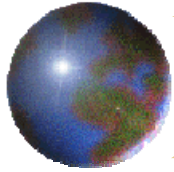
Department of Aerospace

Faculty of Engineering- Cairo University



# Presentation Layout

- Introducing Cairo University
- Introducing Faculty of Engineering
- Introducing Aerospace Department
- Academic Programs
- UAVs and Cubesat Project

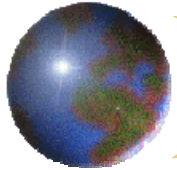


# Cairo University



- **Located in Giza, Egypt.** Founded December 21, 1908.
- **Ranked among World Top 500 Universities**
- **More than 200,000 Students**
- **21 faculty and 4 Institutes**
  - The Faculty of Agriculture
  - The Faculty of Arts
  - **The Faculty of Computer and Informatics**
  - The Faculty of Medicine (1<sup>st</sup> in Africa and ME)
  - The Faculty of Oral Dental Medicine
  - **The Faculty of Engineering**
  - The Faculty of Mass Communications
  - The Faculty of Physiotherapy
  - **The Faculty of Science**
  - African Studies and Research Institutes
  - The Faculty of Kindergarten
  - **Statistical Studies and Research Institute**
  - The National Laser Institute
- **Center of Space Studies and Research** Established January, 2003
- **More than 200 Centers Providing support to Government, Public and Private sectors in Research and Development activities**

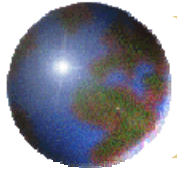
The Faculty of Archaeology  
The Faculty of Commerce  
The Faculty of Political Sciences  
The Faculty of Dar El-Ulum  
The Faculty of Economics and Political  
The Faculty of Law  
The Faculty of Pharmacology  
The Faculty of Regional and Urban Planning  
The Faculty of Veterinary Medicine  
The Faculty of Nursing  
The Institute of Educational Studies and Research  
The National Cancer Institute  
Faculty of specific education



# Faculty of Engineering

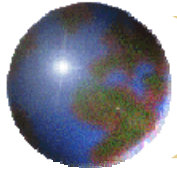
- ⊕ The College of Engineering (Mohandes khana مهندسخانة) was established about 1820,
- ⊕ New Campus Extension at AlSheikh-Zayed Suburb More than 14,000 Undergraduate Students and 4000 Postgraduate Students
- ⊕ 15 departments, 5 New Programs and 2 more to come
  - Aerospace, - Architectural
  - Biomedical and Systems - Public Works
  - Chemical Engineering, - Civil Engineering
  - Computer Engineering - Electric Power and Machines
  - Electronics and Communication - Structural Engineering
  - Engineering Mathematics and Physics - Irrigation and Hydraulics
  - Mechanical Design and Production - Mechanical Power Engineering
  - Mining, Petroleum and Metallurgical
- ⊕ **New Programs**
  - 5 Credit Hour based Programs Already Running: Information Technology and Communication, Construction Management, Design, Petro-Chemicals, Water Resources Management
  - 2 More to Run 2010-2011: Aeronautics and Aviation Management, (Environmental Engineering, Architecture)





# Aerospace Department

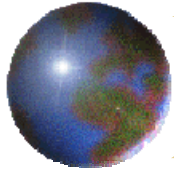
- ⊕ Department of Aeronautics, Early 1950s.
- ⊕ Changed to Department of Aerospace 1990
- ⊕ More than 400 Undergraduate Students, more than 60 Postgraduate Students
- ⊕ More than 35 Staff members and Assistants
- ⊕ Specializations and Labs.
  - ▣ Aerodynamics, - Structure,
  - ▣ Propulsion, - Flight Mechanics and Control
  - ▣ Operations Research and Management (Computing only)
  - ▣ Flow Visualization Lab.
  - ▣ UAV and Remote Sensing Lab. (Under construction)
  - ▣ Space Systems Lab. (Under construction).
- ⊕ Since 1990, 5 Space related courses were introduced and prepared, more than 15 Space Related B.Sc. Graduation Projects, 20 M.Sc. Were granted.
- ⊕ Department and Faculty staff participated in many Research Projects and Assignments related to Egyptian Space Program



# Academic Programs

- Activation of B. Sc. Program Tracks  
**"Space Technologies and Applications"**, (Expected academic year 2010-2011)
- Postgraduate Diploma  
**"Space Technologies and Applications"**
- Postgraduate Master of Engineering **"Space Technologies and Applications"**

**All Programs are Multidisciplinary and are coordinated by Aerospace Department with Active Participation of Related Departments and Faculties**



## B. Sc., Diploma and M.E. Programs “Space Technologies and Applications”

**4 Optional Courses per year + Project for 2 Years**

### Two Tracks

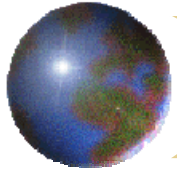
- **Space Technologies**  
Satellite Platforms, Subsystems, Sensors, Launch vehicles, Tracking and Flight Control Systems

Involved Departments: Aerospace, Mechanical, Electrical and ICT

- **Applications of Space Technologies**  
Data Acquisition, Archiving and Retrieval. Monitoring, Tracking and Early Warning Systems, Modeling and Scientific Data Visualization, Large Scale HPC and HPC-Network Technologies.

Involved Departments: Aerospace, ICT, Mechanical, Civil, Architecture, Hydrology, Petroleum and Mining. Faculty of Agriculture, Faculty of CIT and Faculty of Science (Physics, Geology, Astronautics and Meteorology)

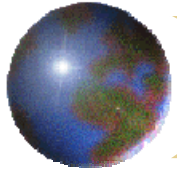
- **For the 1st Time,**  
University Graduate for all Science based Faculties may Join Postgraduate Professional Diploma.  
Graduates for all Departments of Faculties of Engineering May Join the new Master of Engineering.



## Graduates Knowledge and Qualities:

- **Physics of Atmosphere and Space Physics**
- **Electromagnetic and Gravity Fields**
- **Introduction to satellites and satellite systems**
- **Introduction to Sensors and Sensor Technologies**
- **Acquisition of, Archiving and retrieval of Space Data (Large and Huge Data Base Systems)**
- **Estimation of Physical parameters from Space Data**
- **Applications involving Multi and Hyper Spectral Techniques**
- **Modeling of large Scale Phenomena (Air, Water and Solid Earth)**
- **Visualization of scientific data**
- **Appreciation of HPC and HPCNs**
- **Space standards and Materials**
- **Appreciation of and Conversant with Subject Matter Specialists in Related Fields (Geologists, Marine Sciences and Oceanography, Atmospheric Sciences, GIS, GPS, ICT, Mapping, ... etc)**



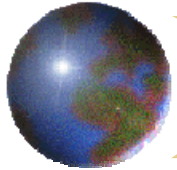


## B.Sc. Projects and Postgraduate Thesis

**In the period from 1995-2009**

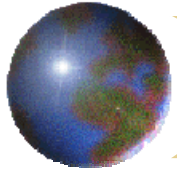
	<b>Space</b>	<b>UAV</b>
<b>B.Sc.</b>	<b>10</b>	<b>12</b>
<b>M.Sc.</b>	<b>15</b>	<b>9</b>
<b>Ph.D.</b>	<b>8</b>	<b>-</b>

**\* Aerospace Department ONLY**



# Proposed Academic Cooperation

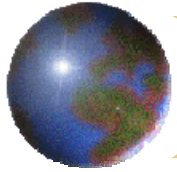
- **Program Design and Degree Granting**
- **e-Courseware Design and Development**
- **Development and Modernization of Labs.**
- **Development of Modern Educational Environment**
- **Joint Development of a CubeSat Project**
- **Exchange of staff and Students**  
(Visits/training/Postgraduate Research)  
Examples include new initiatives with Canada B&W and Japan Nagoya Univ.
- **Joint R & D Projects**



# Partners

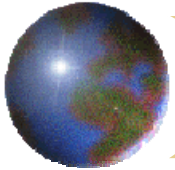
- Arab Organization for Industries, AOI
- national authority for remote sensing and space sciences, NARSS
- Others



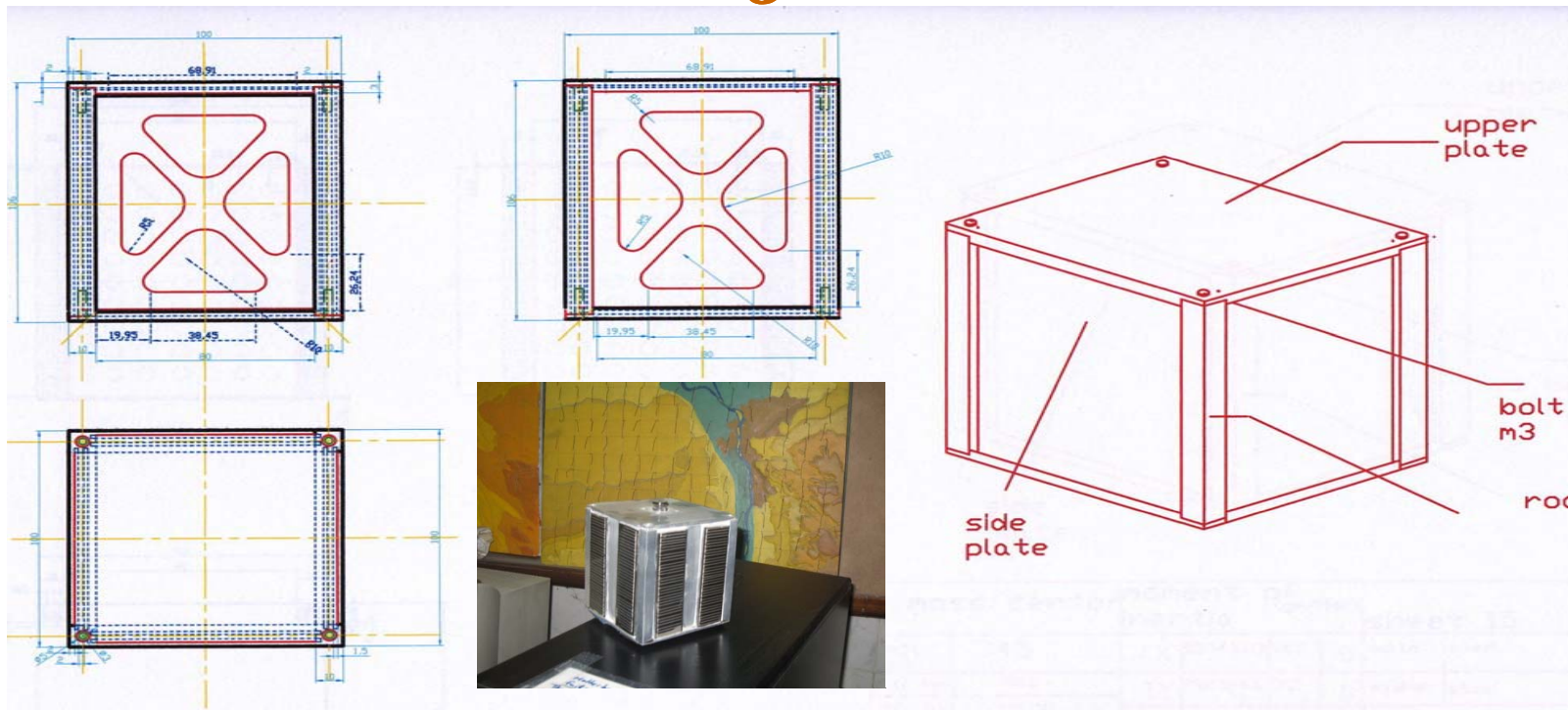


# UAV



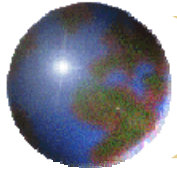


# CU-CubeSat Project



mass center		moment of inertia			sheet14	
MASS (gm)	350	IX	925311.3	IXY	0	bolts steel
XC mm	530.45	IY	95223.3	IXZ	0	washer steel
YC mm	530.39	IZ	109555.5	IYZ	0	scale 1:1
ZC mm	534.57					

AEROSPACE DEPARTMENT FACULTY OF ENGINEERING CAIRO UNIVERSITY		
MATERIAL ALMUN	PROJECT GRADUATION FOURTH YEAR CUCUBESAT	IASSEMBLY PART
DATE 1-7-2008		ALL DIM IN MM



# Thank You for Your Attention