




(بسم الله الرحمن الرحيم)

قسم هندسة الطيران والفضاء

1938 - 2019



A sunset scene over a body of water. The sun is low on the horizon, casting a bright orange glow across the sky and reflecting on the water. A silhouette of a bird is in flight on the left side of the frame. In the background, there are dark silhouettes of mountains or hills. A white rounded rectangle with a blue border is positioned in the upper right quadrant, containing the text.

Aeronautical Engineering and Aviation Management (AEM)

Content

A large commercial airplane, likely a Boeing 747, is shown from a low-angle perspective on a runway. The aircraft is white with a blue tail and engine nacelles. The background is a clear blue sky. The text 'Content' is overlaid in a dark blue rounded rectangle at the top left. A numbered list of six items is overlaid on the left side of the image.

1. Aviation world
2. World growth of airtransport
3. Program outlines
4. Engineering Maintenance
5. Aviation Management
6. Our senior 2 students status

1. Aviation World

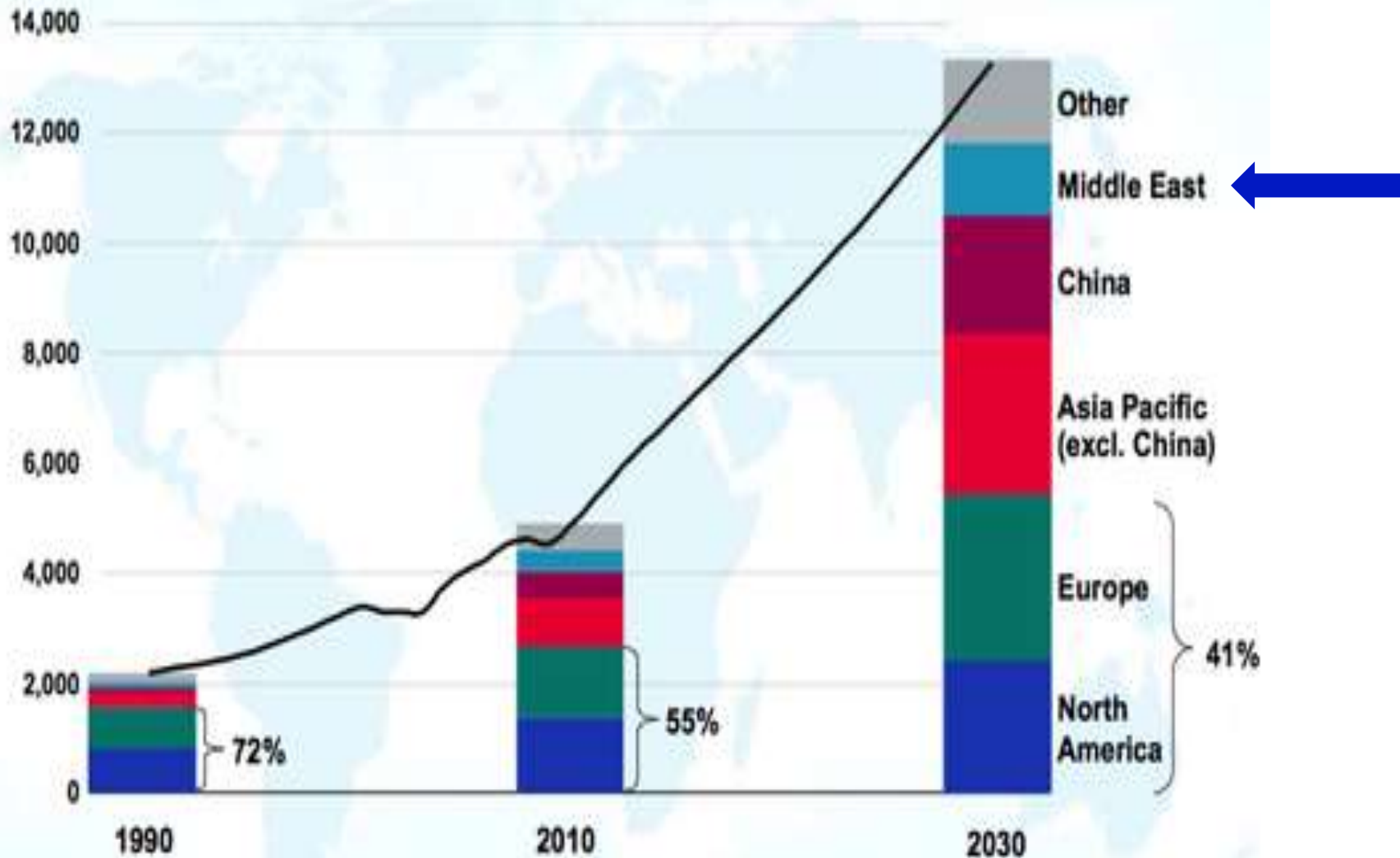


2. World Growth of Airtransport



Passenger Demand Growth 1990-2030

Revenue Passenger Kilometers (RPK) Billions

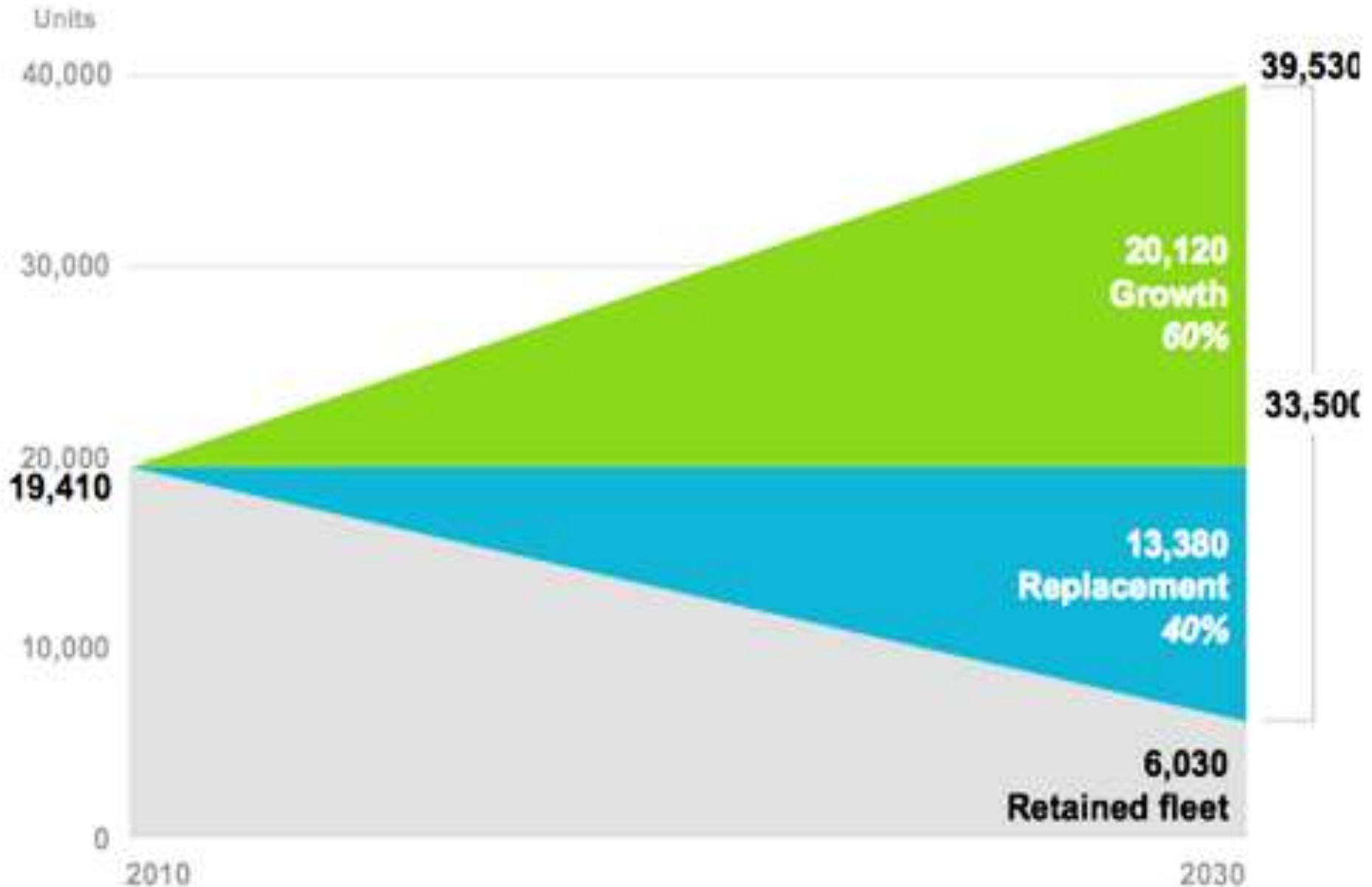


Air traffic growth by area

Area	Passenger annual growth	Freight annual growth
Africa	6.1%	6.9%
Middle East	5.9%	6.3%
Asia	6.0%	5.7%
Latin America	5.8%	5.5%
Europe	3.7%	3.1%
North America	3.1%	2.9%



World Fleet Forecast 2010-2030



Egyptian Airlines

Airline	COMMENCED OPERATIONS	Airline	COMMENCED OPERATIONS
<u>Air Arabia Egypt</u>	2009	<u>Aviator Airlines</u>	2015
<u>Air Cairo</u>	2003	<u>Cairo Aviation</u>	1998
<u>Air Go Airlines (Egypt)</u>	2013	<u>EgyptAir</u>	1932
<u>Air Leisure</u>	2013	<u>EgyptAir Cargo</u>	2004
<u>Air Sinai</u>	1982	<u>EgyptAir Express</u>	2006
<u>Alexandria Airlines</u>	2007	<u>FlyEgypt</u>	2014
<u>AlMasria Universal Airlines</u>	2008	<u>Nesma Airlines</u>	2010
<u>AMC Airlines</u>	1992	<u>Nile Air</u>	2008
<u>Smart Aviation Company</u>	2007	<u>Petroleum Air Services</u>	1982

Status of Aeronautics

- ★ Some countries are involved in aerospace industries but too many are not.
- ★ Almost all countries are involved in civil aviation. A field that is exponentially growing.
- ★ Fleet doubles every 20 years, confirmed by multiple studies including:



- ★ This creates high demand for jobs in a top level field locally and abroad.

Demand for Civil Aviation Maintenance Engineers

Total number of required new engineers in the next 20 years in the airtransport field is estimated at

550000

Evolution of a new program

Aeronautical Engineering and Aviation Management

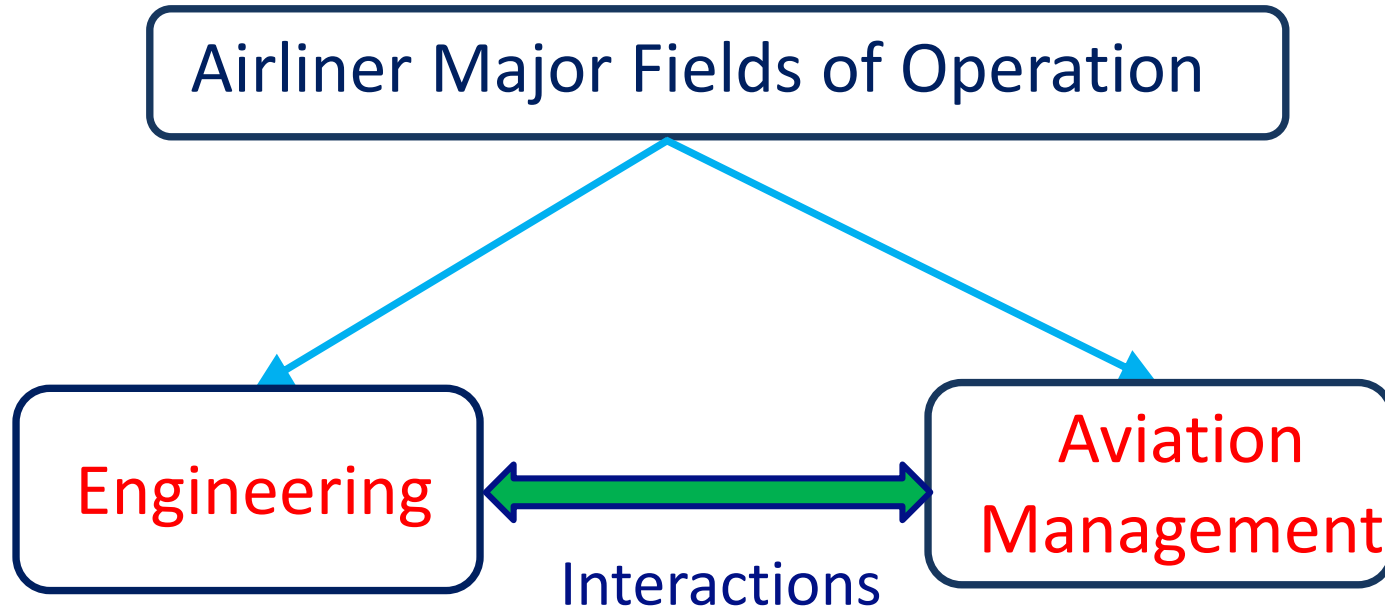
- ★ The Aerospace Department appreciates the ever growing field of **airtransport** world wide and its very **high growth rate** in our sphere (**Middle east and Africa**) and further on its **direct and indirect** impact on the **Egyptian economy**.
- ★ The Aerospace Department has taken a due step to launch this program which **serves** the **Egyptian and other** spheres of interest.

3. Program Outlines



Aeronautical Engineering and Aviation Management

Program Outlines



- ★ Interactions between engineering “maintenance” and aviation management is vital and essential for **Safety, availability/scheduled service timing and cost minimization.**
- ★ This Type of engineers with both backgrounds is this program target.

Program Outlines

Aeronautical Engineering and aviation Management			
Basic Science	Basic Aeronautics	Applied	
		Eng. Maint.	Aviation Mang
23%	32%	33%	
Math	Aerodynamics	Common mixed core 21%	
Physics	Structures		
Mechanics	Aero Engines	Maintenance Specialty 12%	Management Specialty 12%
Chemistry	Control systems		

4. Civil Aviation Engineering Maintenance



Sample engineering topics in Airplane Maintenance

- ★ Monitoring
- ★ Diagnostics
- ★ Prognostics
- ★ Availability
- ★ Safety and risk analysis
- ★ Fracture modes and repairability
- ★ Maintenance cost minimization



5. Aviation Management

A Garuda Indonesia Boeing 747-400 aircraft is shown from a front-quarter perspective on a runway. The aircraft is white with blue accents on the tail and engines. The Garuda Indonesia logo is visible on the fuselage. The aircraft is parked on a tarmac with yellow ground markings and a clear sky in the background.

Airline operations

Network Operation - Fleet Assignment



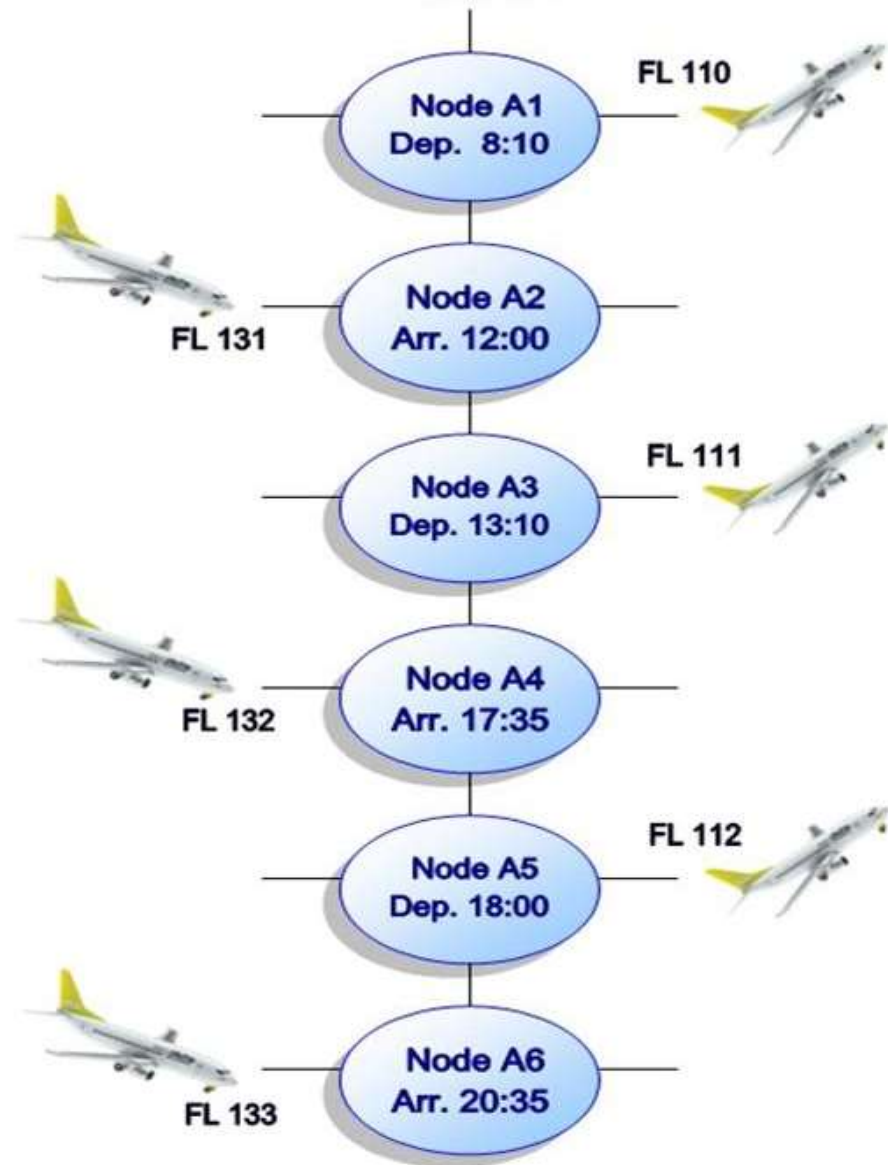
For a **network** of an airliner with **market forecast**?

What is the best fleet?

- ★ **types of airplane**
- ★ **numbers of each type**

Aircraft Routing

Which Airplane to fly which trip?



Maintenance Schedule Interactions

- ★ What are the **interactions** between **maintenance program** and airplane **availability** for a scheduled trip?



- ★ **Routing** plans has to be adjusted to:
 1. **Network schedules**
 2. **Meet maintenance schedules**

Crew Scheduling



- ★ Tracking accurately crew duty limits.
- ★ Attempt to schedule crew duty such as to minimize crew cost within duty limits.

B.Sc. Graduation Projects Awards - 2007

Design and Development of a MINI Unmanned Air Vehicle

Awarded: Best Project in Mechanics

Egyptian Engineering Day (EED), IEEE, August 2007



B.Sc. Graduation Projects Awards - 2009

Design and Development of a Micro Air Vehicle

Awarded: Best B.Sc. Project

SAMSUNG Real Dreams Contest

(10000 Egyptian pounds prize)

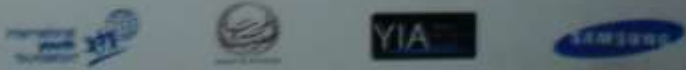


Samsung REAL DREAMS Date 28/9/2009

Pay to
The Order of Micro air vehicle design and manufacturing EGP 10,000

The amount of Ten Thousand Egyptian Pounds

Signature M. ZARKANI



B.Sc. Graduation Projects Awards - 2010

Design and Development of a Flying Wing Unmanned Air Vehicle

Awarded: Best Project in Mechanical Engineering

Egyptian Engineering Day (EED), IEEE, August 2010

Awarded: Best B.Sc. Graduation Project

Nahdet El Mahrousa Contest, (6000 Egyptian pounds prize)



B.Sc. Graduation Projects Awards - 2012

Horus Quad Copter

Awarded: Best Project in Mechanical Engineering

Egyptian Engineering Day (EED), IEEE, August 2012



B.Sc. Graduation Projects

UDC – Aerospace Department Team



Design, Build, Fly Competition 2019



16th
out of 104 teams
World Wide

2019
AIAA



16 th
World Wide

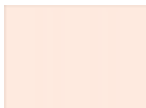


Senior 2 Students Status 2 Semester Program



B.Sc. Graduation Project 2016-17

Quad Rotor



Thank you

