



بسم الله الرحمن الرحيم

Aeronautical Engineering and Aviation Management

AEM

B.Sc. Credit Hours Program



AEROSPACE ENGINEERING
CAIRO UNIVERSITY

Aerospace Department

New Students



Content

1. Aviation world
2. AEM Program Basic Features
3. World growth of airtransport
4. Engineering Maintenance
5. Aviation Management



1. Aviation World



Hydrogen propelled aircraft demonstrator-zero emission 2026.

How much is a civil airplane?

Airplane	No Passengers	Range [NM]	Price [M\$]
A319	120	3600	92.3
A319neo	150	3750	101.5
A321neo	180	3750	129.5
A330-200	230	7250	238.5
A330-800	300	8150	259.9
A330-300	406	8300	264.2
A350-1000	440	8250	366.5

- ★ very precious
[Billions EGP]
- ★ Top technology
- ★ Internationally regulated
- ★ Relatively highly rewarded

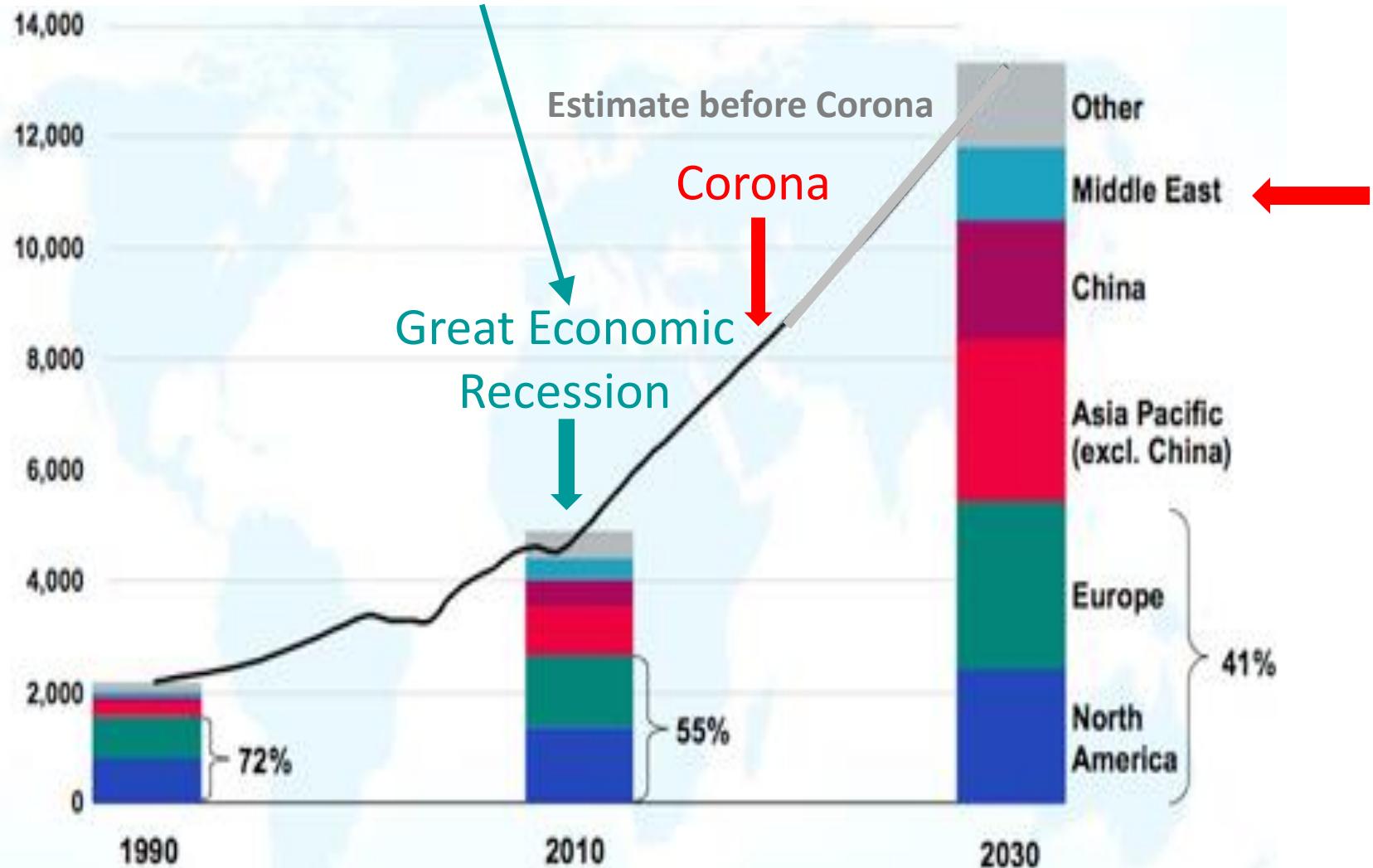
2. World Growth of Airtransport



Passenger Demand Growth 1990-2030

Airtraffic Revenue Passenger Kilometers (RPK) Billions)

Note Airtraffic has recovered quickly after great recession 2008



Post Corona Forecast



Boeing says Global air travel to return to pre-pandemic levels by 2024.



Airbus 2020 - 2040 Forecast

- ★ The demand for new aircraft includes around 29,700 Small aircraft like the A220 and A320 Families. About 5,300 in the Medium aircraft category such as the A321XLR and the A330neo. In the Large segment 4,000 deliveries covered by the A350.
- ★ Having lost nearly two years of growth over the COVID period, passenger traffic has demonstrated its resilience and is set to achieve an annual growth of 3.9% per year.

Status of Aeronautics

- ★ Some countries are involved in aerospace industries but too many are not.
- ★ Almost all countries are involved in civil aviation.
- ★ Civil Aviation has shown resilience over all economic crisis and is forecast to go on.



- ★ Based on these facts the Aerospace Department has established the,

Aeronautical Engineering and Aviation Management (AEM)
Program in 2018.

الخطوط الجوية المصرية

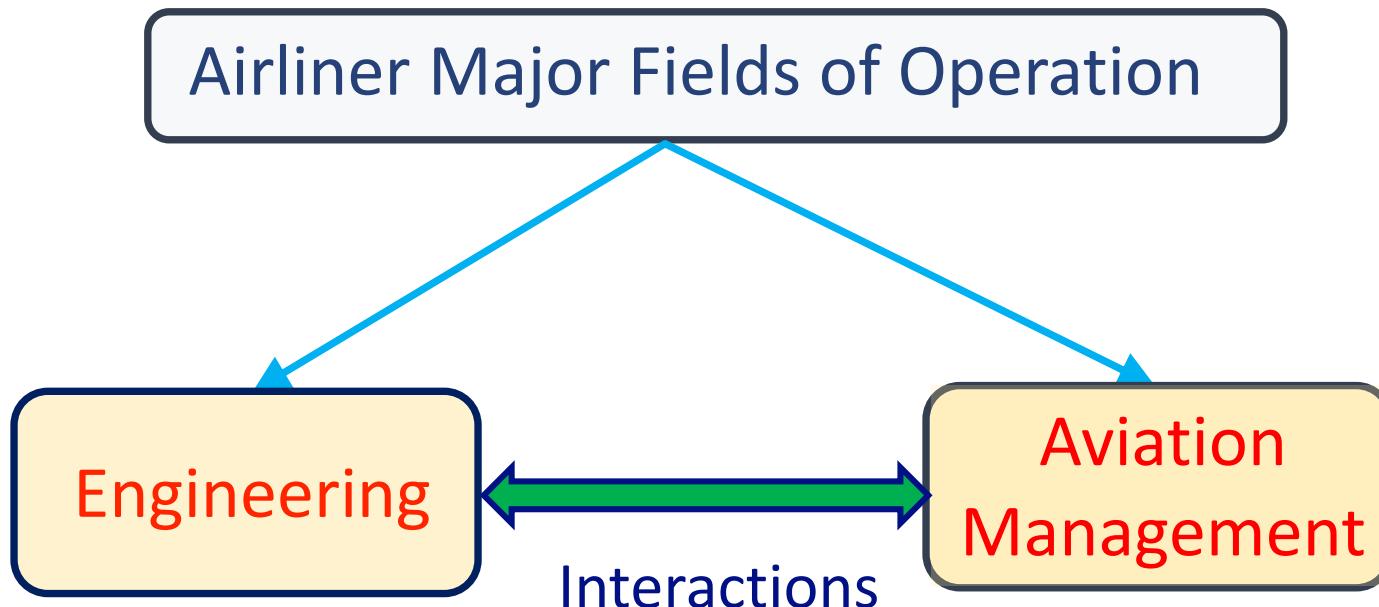
مسلسل	شركة	إيكاو	إياتا	سنة التأسيس	النوع
1	<u>مصر للطيران</u>	MSR	MS	1932	حكومية
2	<u>اير كايرو</u>	MSC	SM	2003	خاصة
3	<u>المصرية العالمية للطيران</u>	LMU	UJ	2008	خاصة
4	<u>العربية للطيران مصر</u>	RBG	E5	2009	خاصة
5	<u>النيل للطيران</u>	NIA	NP	2008	خاصة
6	<u>الأهلية للطيران</u>			1986	خاصة
7	<u>خطوط إيه إم سى الجوية</u>	AMV	9V	1988	خاصة
8	<u>الاسكندرية للطيران</u>	KHH	XH	2006	خاصة
9	<u>الكان للطيران</u>			1996	خاصة
10	<u>تراي ستار إير</u>	TSY	YS	1998	خاصة
11	<u>خدمات البترول الجوية</u>	VPS	PS	1982	خاصة
12	<u>خطوط كورال بلو الجوية</u>	KBR	K7	2006	خاصة
13	<u>سمارت للطيران</u>	SME	M4	2007	خاصة
14	<u>سيناء للطيران</u>	ASD	4D	1982	خاصة
15	<u>فلاي إيجيبت</u>			2014	خاصة
16	<u>القاهرة للنقل الجوى</u>	CCE		1998	خاصة
17	<u>لوتس للطيران</u>	TAS	T2	1997	خاصة
19	<u>ممفيس للطيران</u>	MHS		1995	خاصة
20	<u>ميدوبيست للطيران</u>	MWA	MY	1998	خاصة
21	<u>نسما للطيران</u>	NMA	NE	2010	خاصة

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.

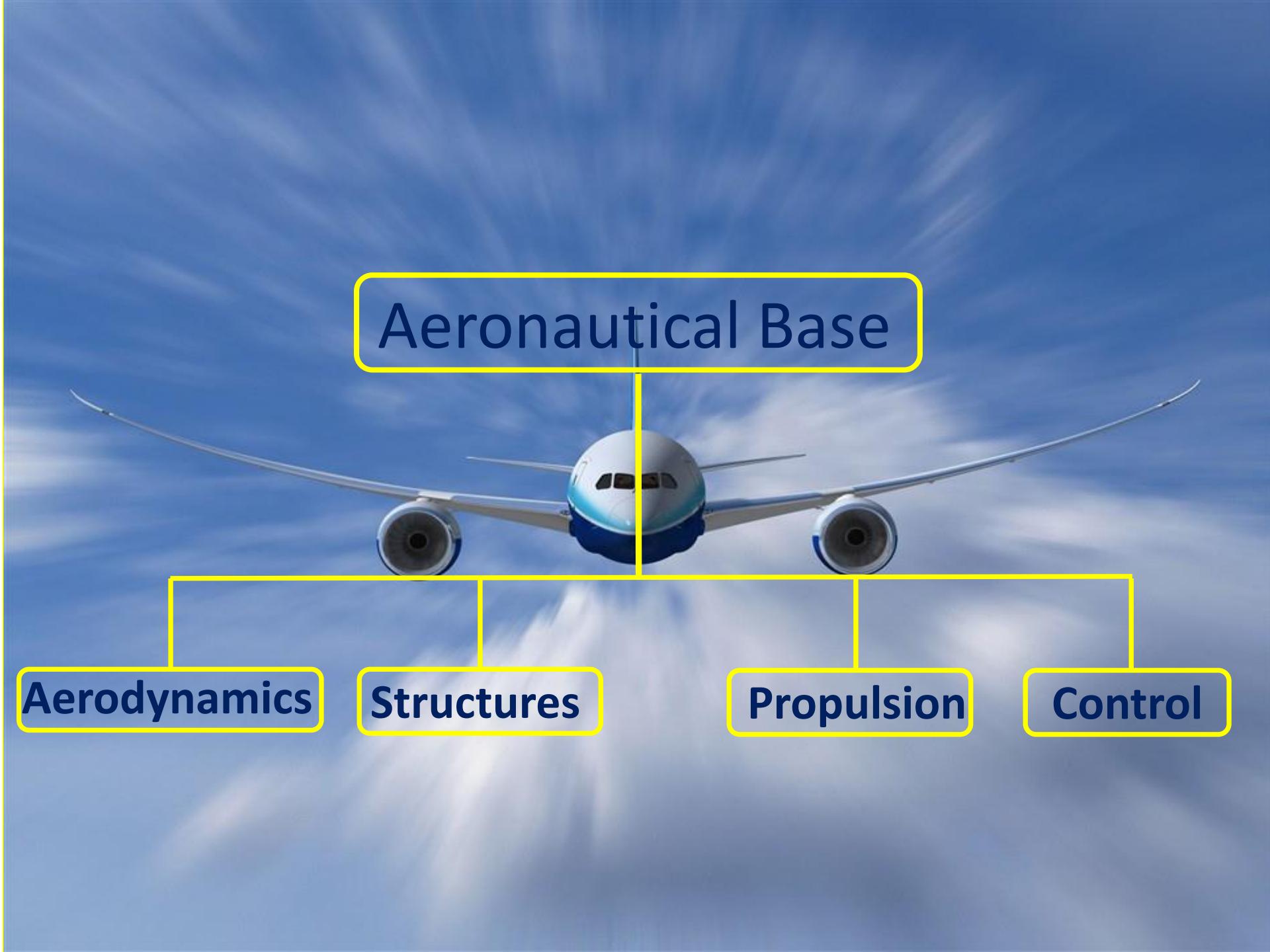
Characteristics of AEM Credit Hours Program

1. Basic aeronautics foundation
2. Engineering Maintenance
3. Aviation Management

- ★ Maintenance and Management in almost most educational institutes **are treated as separate identities.** Each covering 3-4 academic years. We cover both in 5 years.
- ★ Outstanding students can finish the program in **up to 4 years.**
- ★ Such program is one of very few worldwide.

Program Outlines

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

A large white and blue airplane is shown from a front-on perspective, flying towards the viewer against a backdrop of a blue sky with wispy white clouds.

Aeronautical Base

Aerodynamics

Structures

Propulsion

Control

Sample Management Topics

- ★ Airtransport System Analysis
- ★ Airline Operation and Management
- ★ Aviation Economics
- ★ Strategic Planning and Management
- ★ Maintenance systems Management and Reliability
- ★ Human Resources Management
- ★ Logistics and Transportation

4. Engineering Maintenance



Airframe Maintenance



Flight Control Surfaces Maintenance



Undercarriage Maintenance



Brake Maintenance



Engine Maintenance Preparation



Engine Maintenance



Engine Maintenance



Engineering Maintenance

While most maintenance programs are descriptive our program includes analysis capabilities within the courses.

Samples include:

1. Hydraulic and pneumatic systems
2. Analysis of fluid systems
3. Stress analysis for metallic and composite materials
4. Control systems

5. Aviation Management

- ★ Managing airtransport of specified network of destinations is a very involved topic. It is essential for profitable operation of a **fleet** of airplanes serving such network.
- ★ This covers operating and managing the **fleet** of airplanes, **personnel** (including flight crew, maintenance technicians,...), and in addition, managing the **maintenance tasks** and work force.
- ★ Aviation management is as sophisticated as engineering.

Fleet Assignment



Inputs:

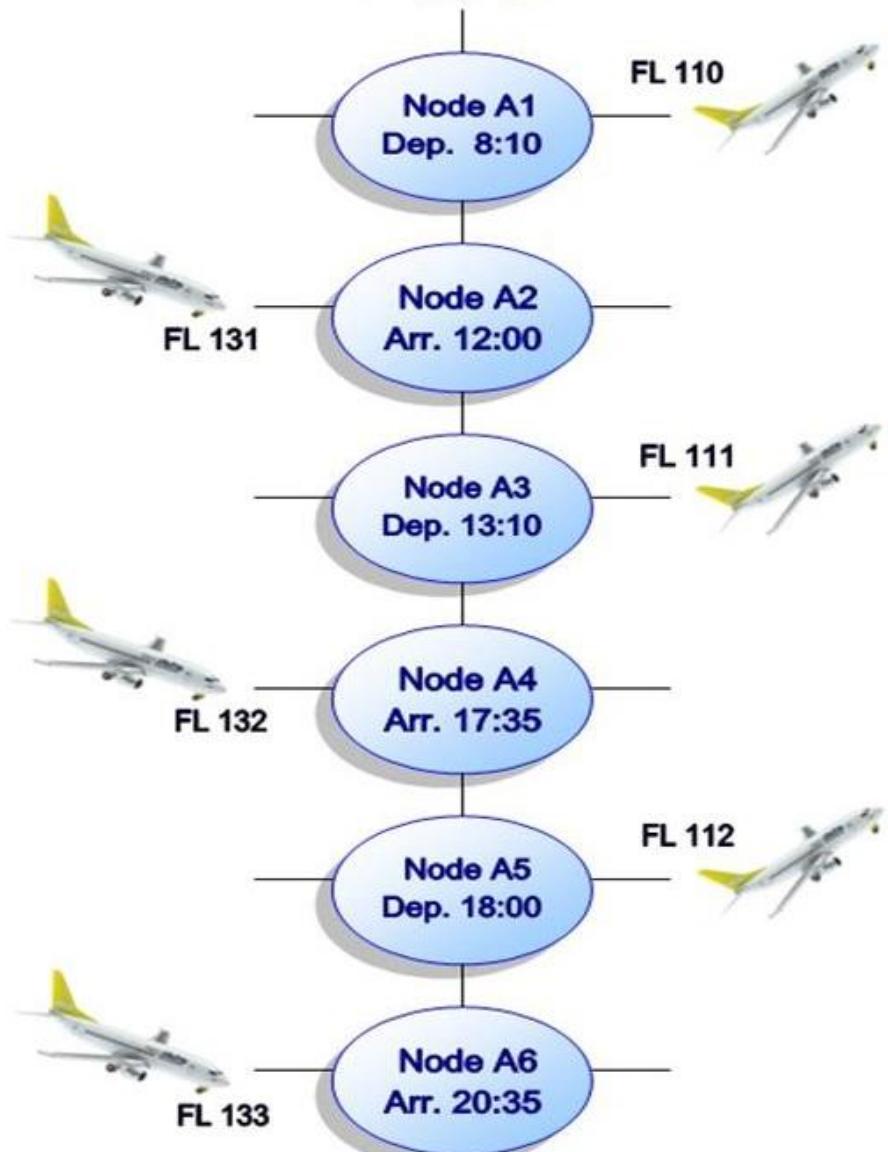
1. Network of **flight destinations**
2. Forecast of **number of passengers**

We need to answer what is the best fleet to cover the task?

1. Types of airplane?
2. Numbers of each type?

Fleet Routing

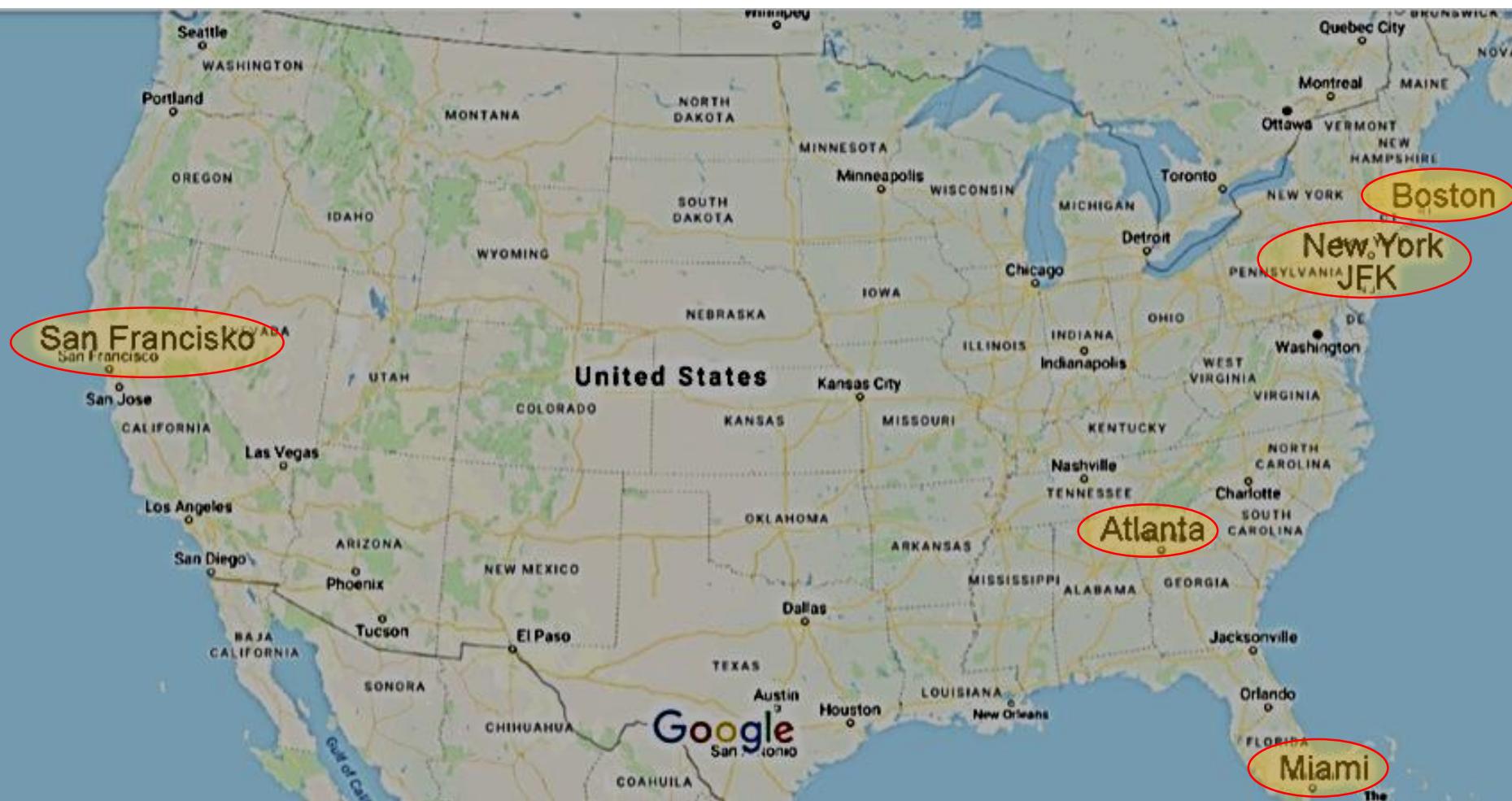
- ★ This a dynamic process tracking the movement of the fleet with time-location.
- ★ Which Airplane to fly which trip?
- ★ How to arrange maintenance with flight schedules?
- ★ Simultaneously one may address how to load crew?



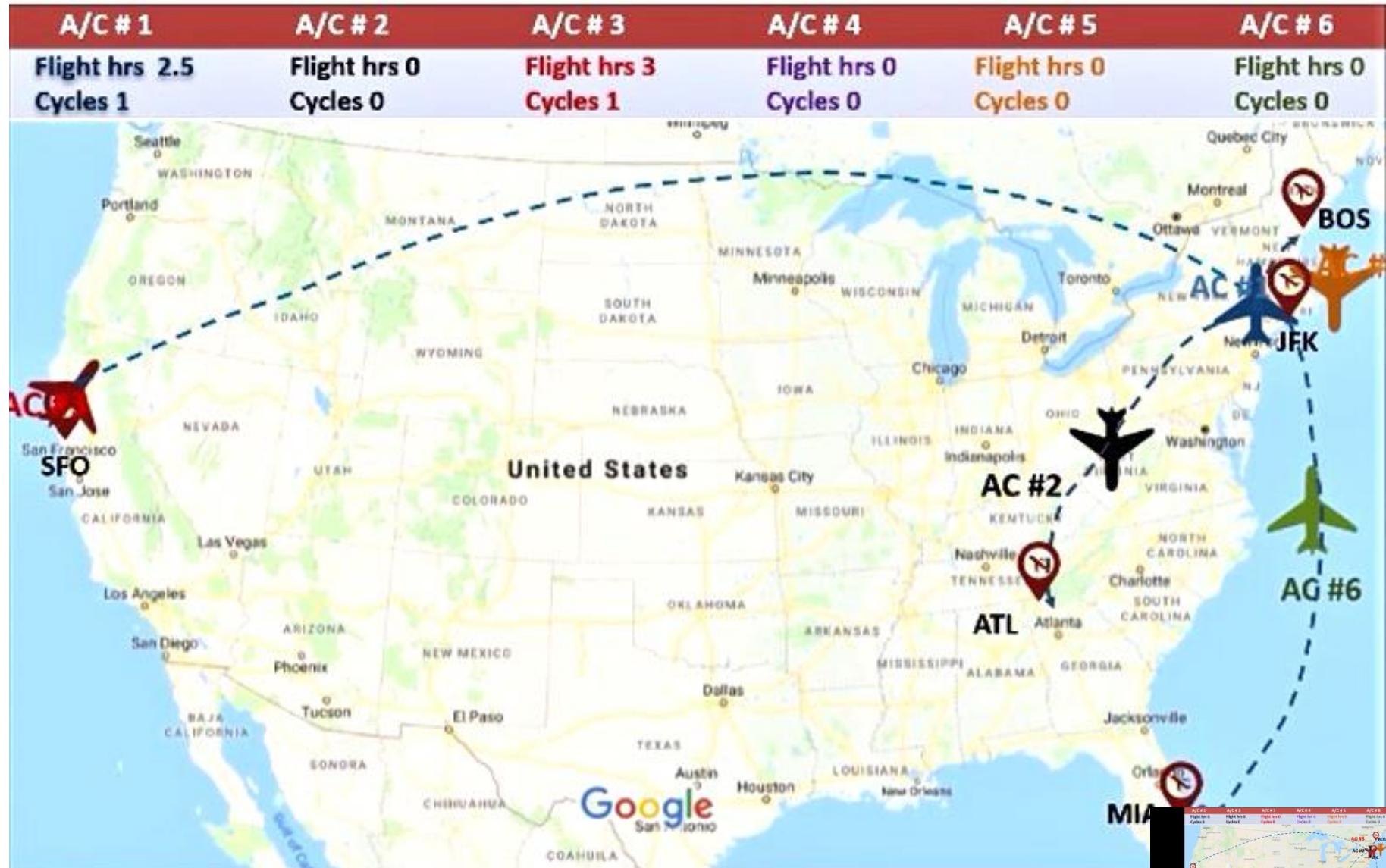
Airplane Routing

Airplane Routing - Five Destinations Network - 6 Airplanes Fleet

New York - JFK	Boston
Atlanta	Miami
San Francisco	



Fleet Routing Snapshot



Timeline of one day flights
06:00 AM



Thank you

