



中華民國交通部民用航空局
Civil Aeronautics Administration
Ministry of Transportation and Communications



Composite Program in Taiwan Aviation Industry and Areas of Interest(s)



Eric Chen
Initial Airworthiness Section
CAA of Taiwan
Singapore, September 3, 2015





Outline



CAA FSD Introduction



Composite Activities



Area of Interests



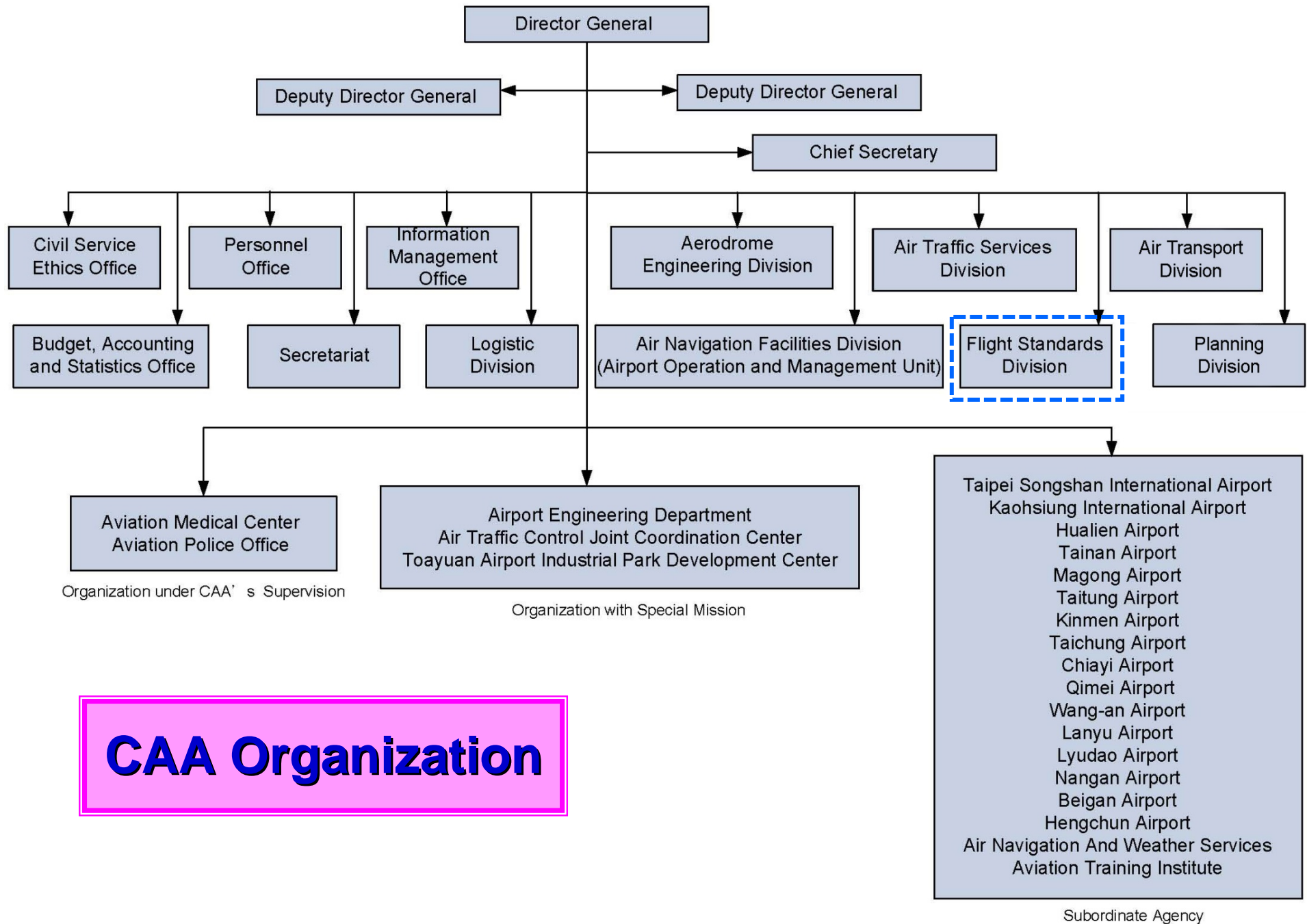
CAA Flight Standards Division (FSD)

Introduction



Trend of Global Flight Safety Management

- ❑ Establishment and Implementation of State Safety Program (SSP)
- ❑ Enhancement & Improvement of Regional Integration & Cooperation

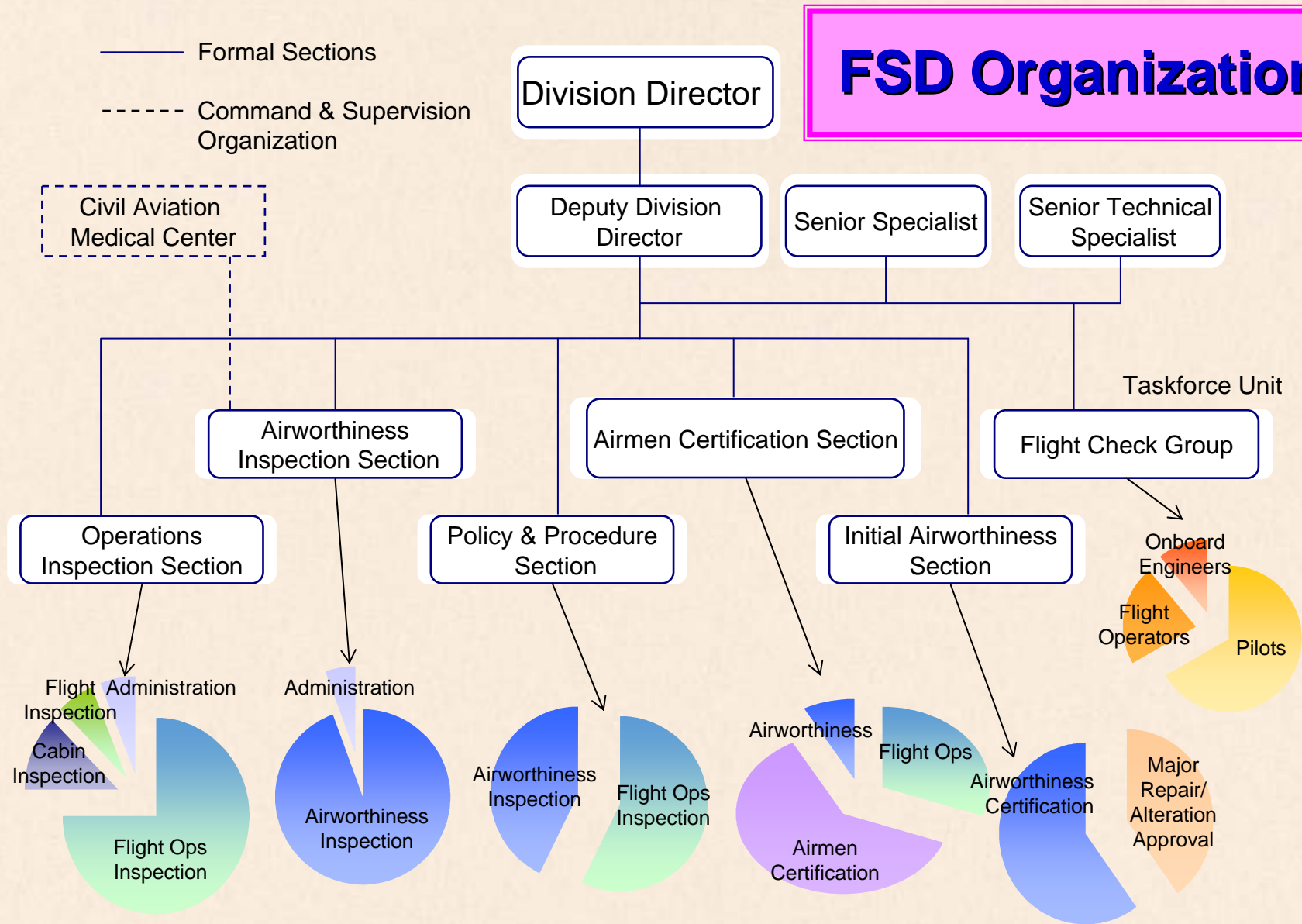


CAA Organization

FSD Organization

— Formal Sections

- - - - Command & Supervision Organization





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Regulation Structure

Civil Aviation Act § 1 : This Act is enacted to insure the **aviation safety**, a sound civil aviation system, **compliance** with international civil aviation standards, and **promote** the development of civil aviation.

§ 9 delegates MOTC the authority to prescribe 06-07A
§ 23 adopts international airworthiness standards

FAR Part 23, 25, 27, 29, 31, 33, 34, 35, 36
EASA CS 23, 25, 27, 29, 31, E, 34, P, 36

FAA Technical Standard Orders
EASA European Technical Standard Orders

Advisory Circulars, Aviation Safety Bulletins



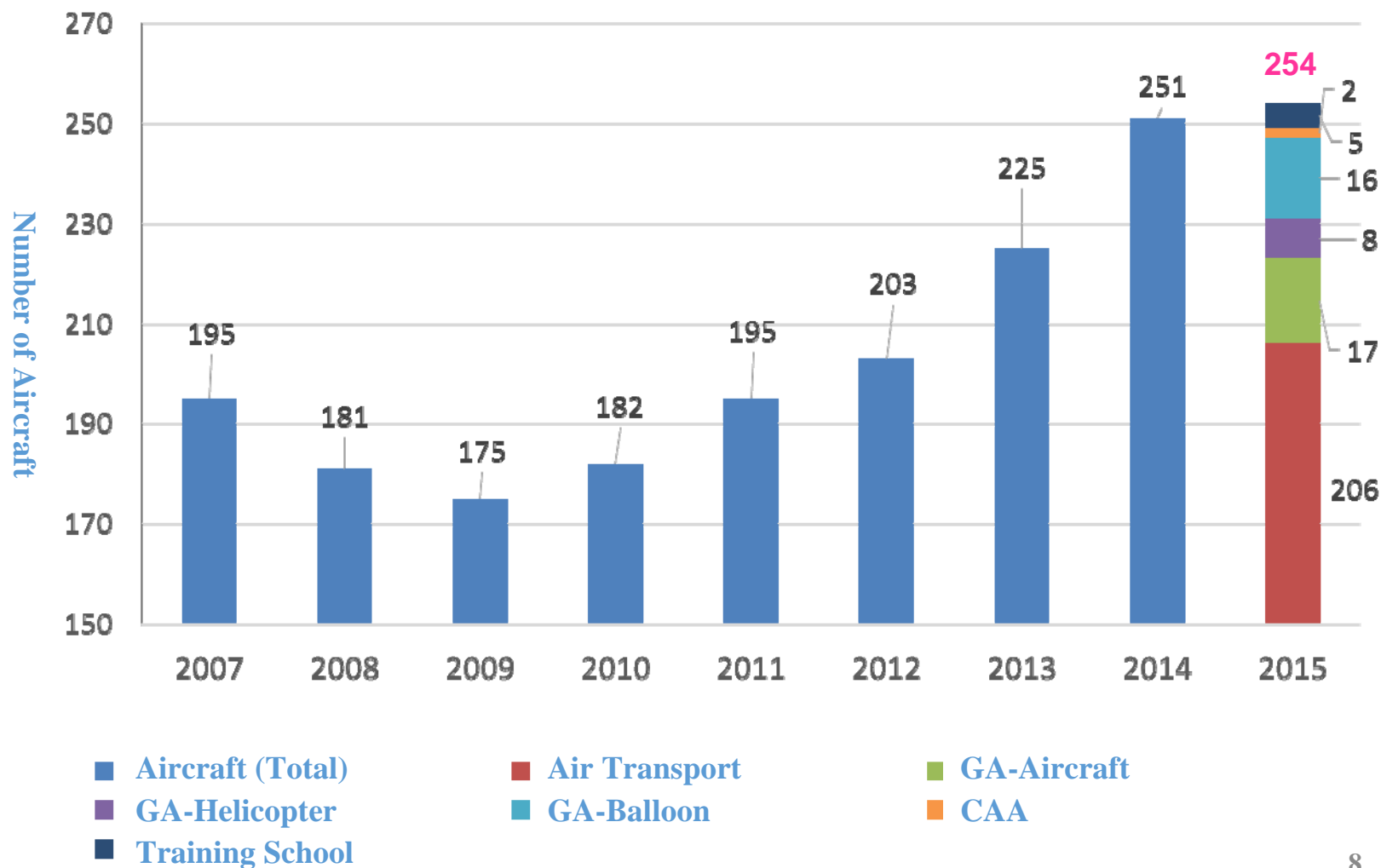


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Increasing Number of Aircraft





Composite Activities in Taiwan Aviation Industry

Introduction



Aerospace Industrial Development Corp. (AIDC) Taiwan Advanced Composite Center (TACC) Composite Design, Development and Manufacturing



AIDC Profile

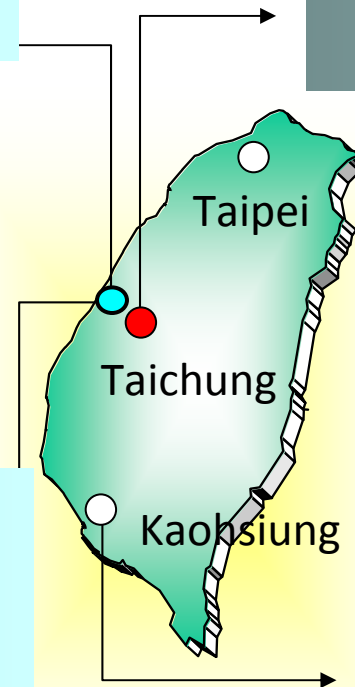
Sha-Lu (604,580 m²)

Aircraft Assy. & Testing
Avionics & Flight Control Engineering
Harness Fabrication & Installation
Flight Test / Maintenance



Taichung (285,260m²)

AIDC Headquarters
Engineering
Aircraft Parts Fabrication
Avionics Assembly & Testing



TACC (42,000m²)

Composite Design & Analysis
Composite Process Development
Composite Manufacturing
Composite Assembly
Complex Area: 10.4 Acres
Inaugurate at Nov. 2010

Gang-Shan (191,580m²)

Engine Parts Fabrication
Engine Assembly & Testing

TACC Facility Layout

NADCAP certified facility: 210 m long x 120 m wide.

Total working area: 33,000 m² (360,000 ft²)

100,000 class clean room: 8,900 m² (96,500 ft²)

1st Floor: Receiving & Parking Lot

Production Floor: Lay-up, Curing, Machining, Inspection, Painting and Assembly

2nd Floor: Freezer, Material Preparation

3rd Floor: OOA Process Production



TACC Composite Capability

Design, Analysis, Test and Integration

Material & Process Engineering

NDI and NDT

Production Engineering

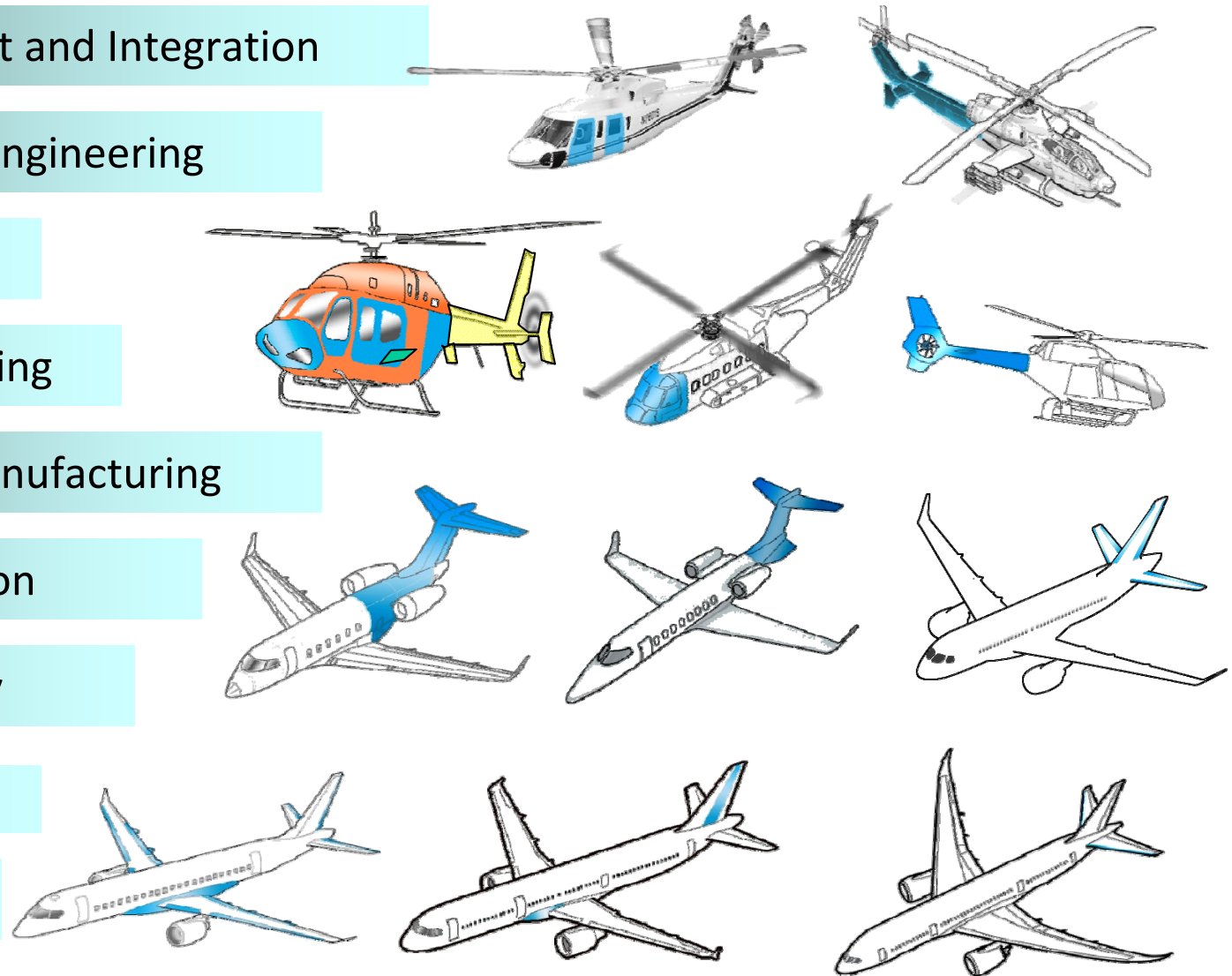
Tooling Design & Manufacturing

Composite Fabrication

Composite Assembly

Composite Painting

Composite Repair



Worldwide Customers

TACC provides high quality and high production rate products to worldwide prime aircraft manufacturers including:

Airbus, Boeing, Alenia, MHI, KHI, Bombardier, Bell, Sikorsky, Eurocopter, Honeywell.



 **A320**



 **B787**



 **B787**



 **MRJ**



 **ERJ-190**



 **C-Series**



 **M429**

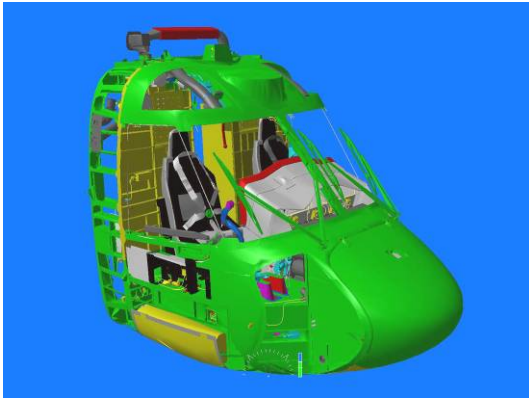


 **S76**

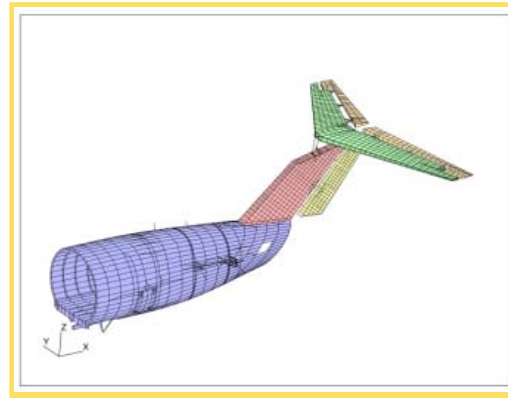


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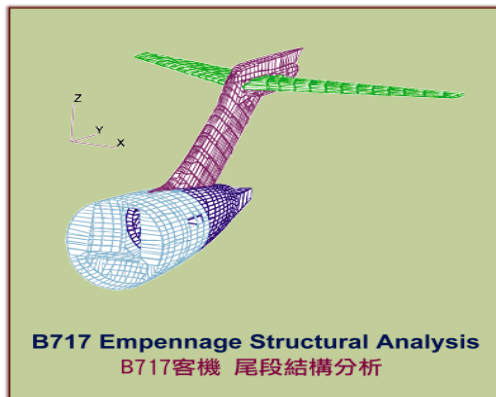
Design and Production Composite Projects



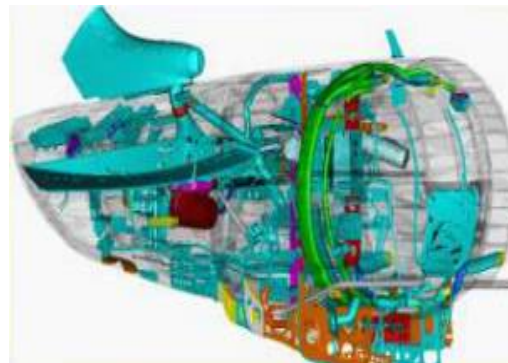
1997- Sikorsky S92



1998- Alenia C27J



1997- Boeing B717



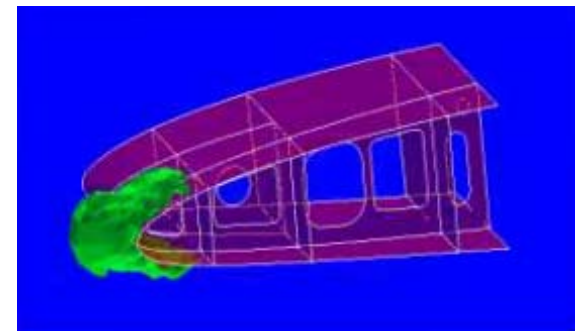
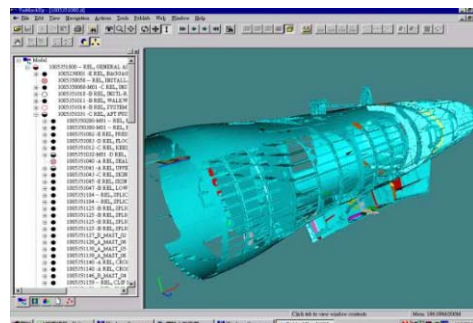
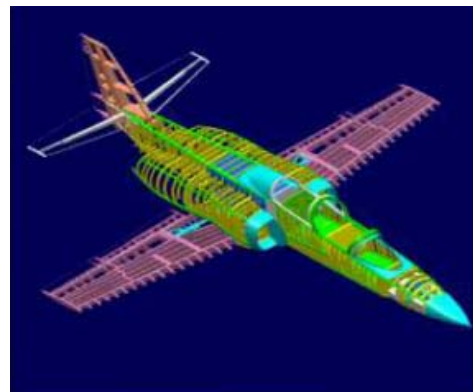
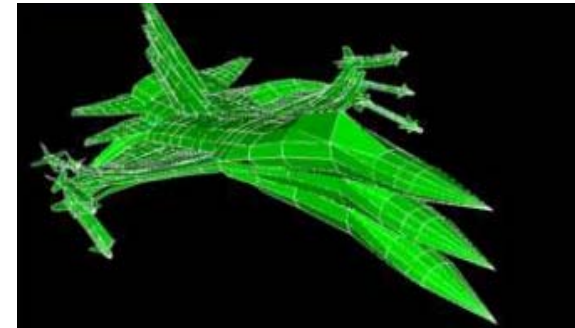
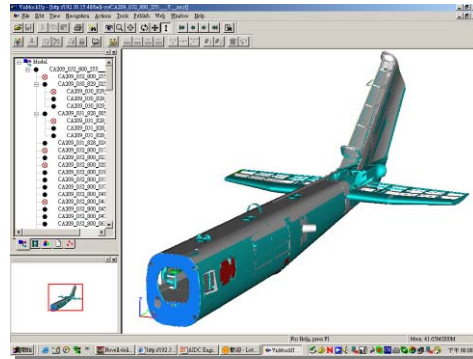
2000-Bombardier CL300

2008-Mitsubishi MRJ

Engineering Capability

AIDC has 30 years experience and knowledge in:

- ❖ Airframe Design
 - ❖ Stress Analysis
 - ❖ Static Test
 - ❖ Fatigue Test
 - ❖ Dynamic Test
 - ❖ Damage Tolerance
 - ❖ Bird Strike Test
 - ❖ Subsystem Design
 - ❖ Electrical Design
 - ❖ M&P Engineering
- Meets FAA/EASA/JCAB Requirements



Material & Process Engineering



Test Lab (NADCAP Certified)

Perform material receiving test, curing specimen test and part destructive test with:

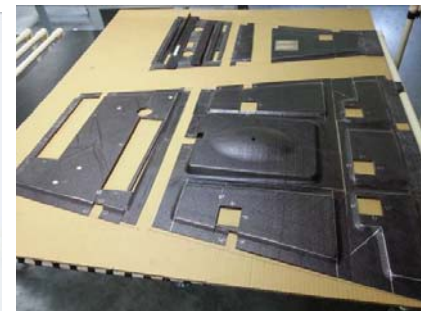
HPLC (High-Performance Liquid Chromatography)

FTIR (Fourier Transform Mid-Infrared Spectrometer)

DSC (Differential Scanning Calorimetry)

DMA (Dynamic Mechanical Analysis)

TMA (Thermal Mechanical Analysis)



Manufacturing- Technology

Hand Lay-up

Over 30 years experience.
Expertise in severe contour parts.



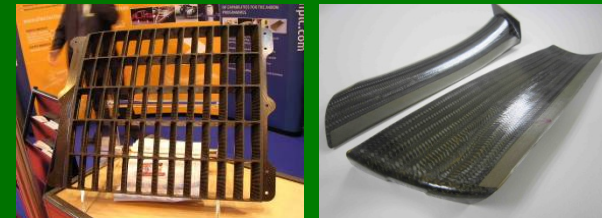
Auto Lay-up

The future of manufacturing.
Machine installed and start
production at August 2012.



OOA Process

Fully developed capability in RTM,
RFI, VaRTM processes
In development of other out of
autoclave process



TACC-19 Facility Re-Construction



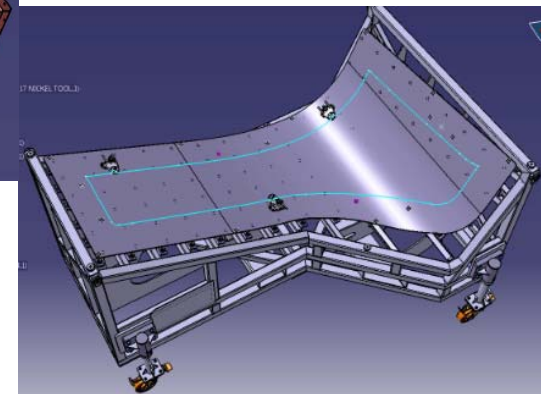
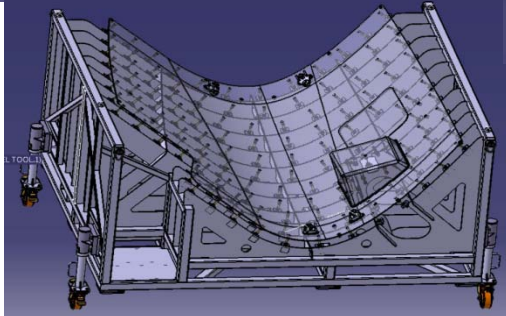
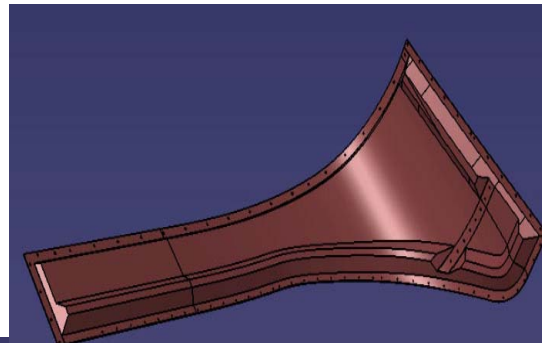
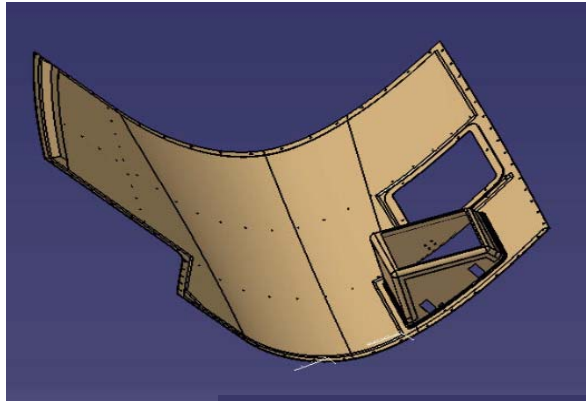
TACC-19 Equipments

- **Autoclaves:**
 - Expanding area for more autoclaves
 - Heating up system: Electrical type
 - Stable and reliability system



TACC-19 Facility

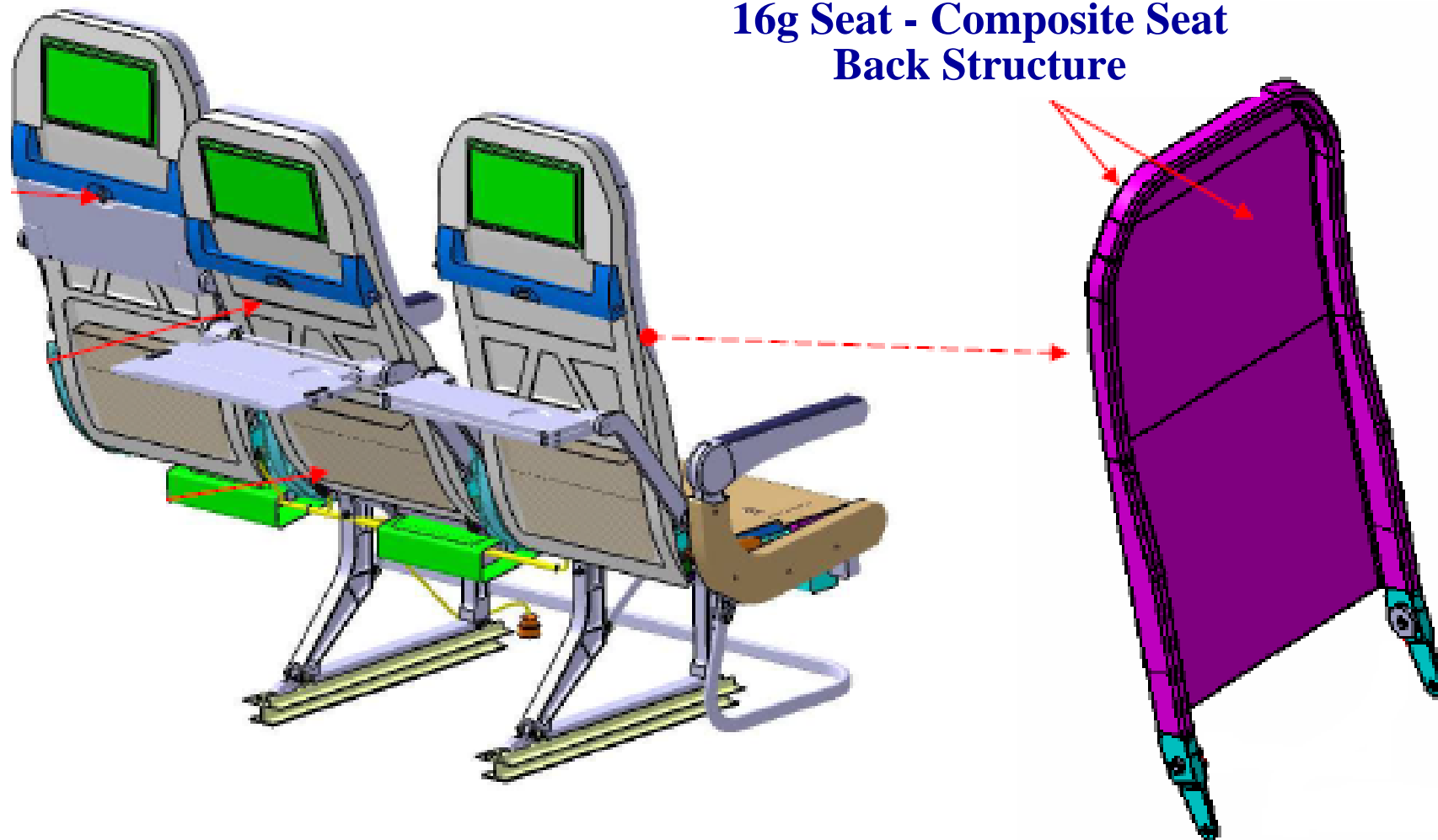
- Dedicated For SA AFT BF Project :





Composite Applications in Appliance

16g Seat - Composite Seat
Back Structure





Composite Applications in Appliance

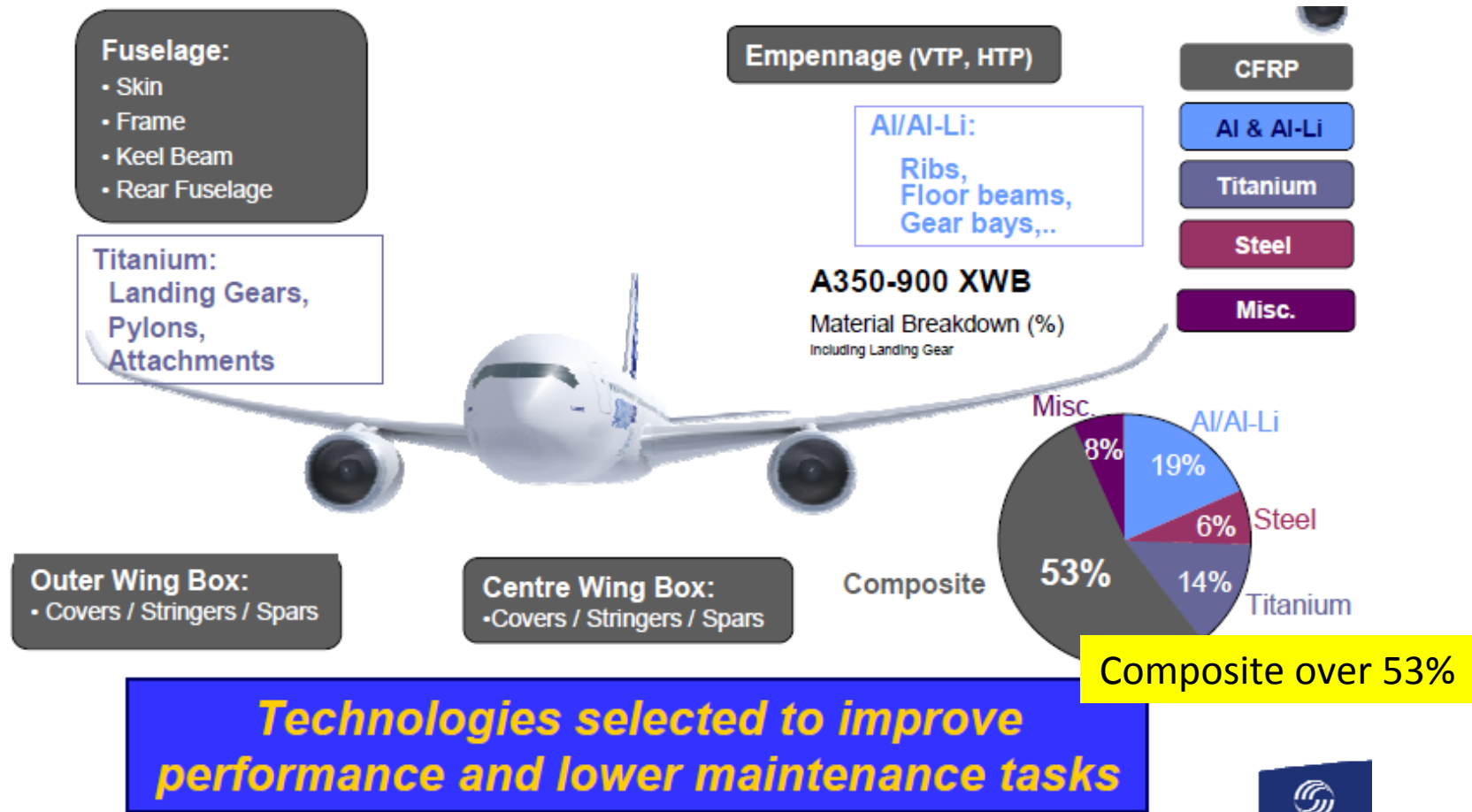
**Cargo
Container
Composite
Structural
Panels**



Taiwan Fylin Inc. (TFI)



CAL sets up the ability to maintain A350



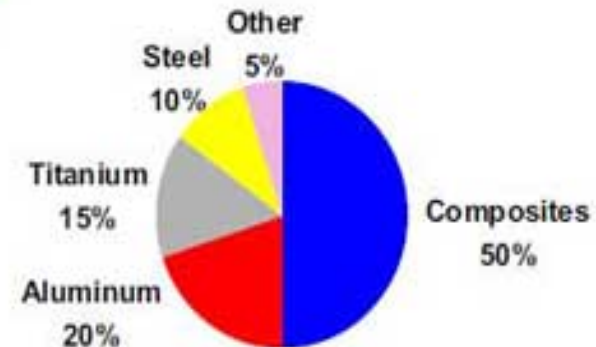


EGAT sets up the ability to maintain B787



Composite over 50%

- Carbon laminate
- Carbon sandwich
- Fiberglass
- Aluminum
- Aluminum/steel/titanium pylons





Areas of Interests

A proposal of
safety thinking



Areas of Interests

- ❑ Damage tolerance capability for composite material
- ❑ Inspection/Maintenance program for ensuring continued safety of transport airplane composite structure
- ❑ Accidental damage (HEWABI)
- ❑ Fuselage segment replacement
- ❑ Lightning strikes
- ❑ Supplier audit: NADCAP vs company audit
- ❑ Cooperation between authorities on supplier surveillance



Thank you!

謝謝!