



# AEROSUD

Innovative solutions in Aviation



AS/EN 9100



EASA POA

# Welcome to Aerosud

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## Proceedings this afternoon

- Introduction to Aerosud and CFRTP in Aerosud  
Mr. Johan Steyn  
MD: Aerosud Aviation
- Relocate to WS#1 and the 600T CFRTP Press
- Message from Airbus and “cutting of the ribbon”  
Mr. Peer Wiebe  
Procurement: Head of Monuments & F2F
- Short demonstration of the Press – actual part manufacture
- Return to the marquee for closing comments and thank you  
Dr. Deon Labuschagne  
Aerosud Technical Director
- Cocktails and snacks in the marquee
- Workshop visit on request

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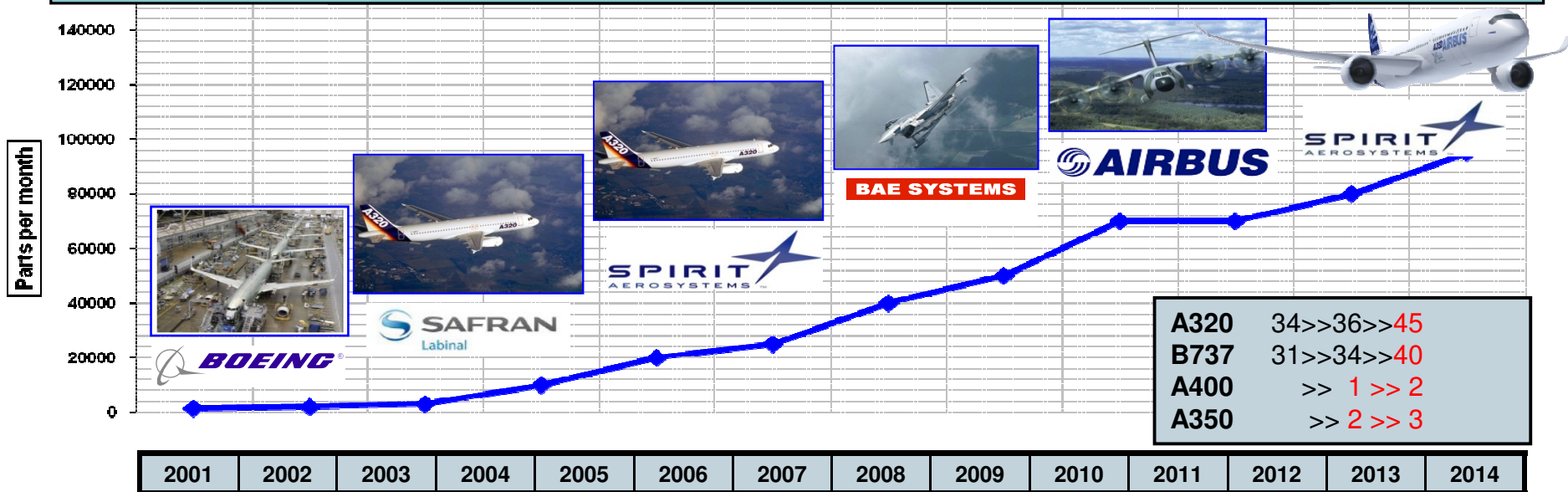
**AEROSUD**

# Aerosud Aviation Business Model

Vacuum Formed and Lay-up parts and Assemblies	Sheet metal Electrical Rack assemblies	C-class wing parts and welded track can assemblies	C-class parts	Cockpit linings, Cargo lining Wing Tip and Galley	Track Cans and CFRTP Frame Clips
600 part number	600 part numbers	500 part numbers	1 000 part numbers	3 000 part numbers	800 part numbers
4 500 p/m	25 000 p/m	40 000 p/m	4 000 p/m	10 000 p/m	10 000 p/m

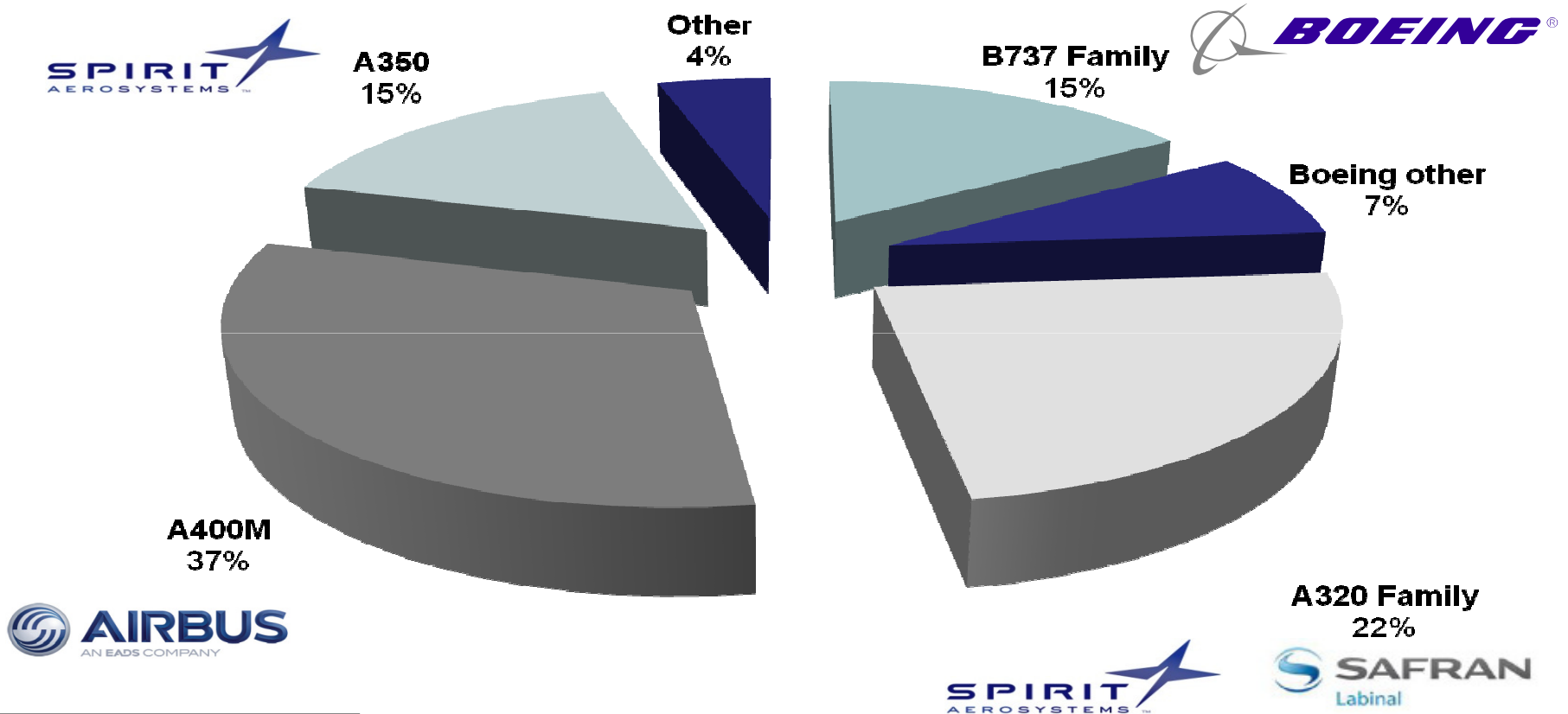
**Aerosud Aviation parts delivered to:**

<b>4 000 B737</b>	<b>800 B777</b>	<b>3 000 A320</b>	<b>20 A400M</b>	<b>10 A350</b>
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## AEROSUD

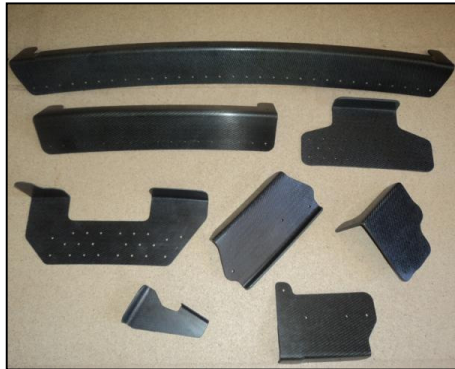
# Aerosud Aviation Business Model



Based on 2016 scenario

## AEROSUD

# A350 - Program Participation



CFRTP Frame Clips

Track Cans

# A400M - Program Participation



# Aerosud 600T CF RTP Press

## What makes it different...

### **CF RTP = Continuous Fiber Reinforced Thermoplastic Composites**

Out of autoclave process – energy efficiency

Hot forming process with significant heat and pressure applied during the forming process and very accurate automated process control

Rapid manufacturing process of 6 - 8 minutes per part  
(compared to 6-8 hours for autoclave process)

Materials are highly specialised Engineering materials such as:

Glass-PEI Glass Fiber Polyethirimide

Glass-PPS

Glass Fiber Polyphenelynesulphane

Carbon-PPS

Carbon Fiber Polyphenelynesulphane

Carbon-PEEK

Carbon Fiber Polyetheretherketone

Primary structure components – widely used on B878 and A350 and A400M

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# CFRTP Technology

## How it started...

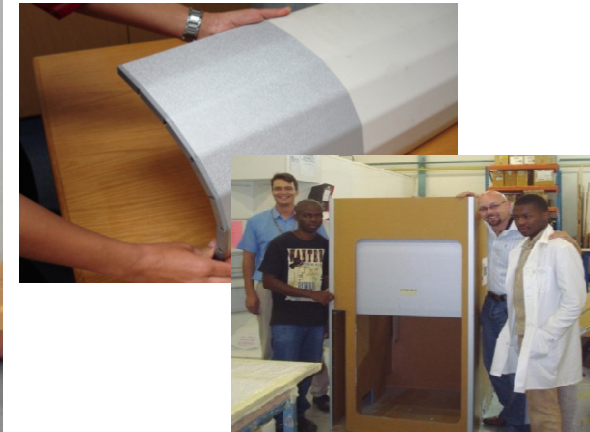
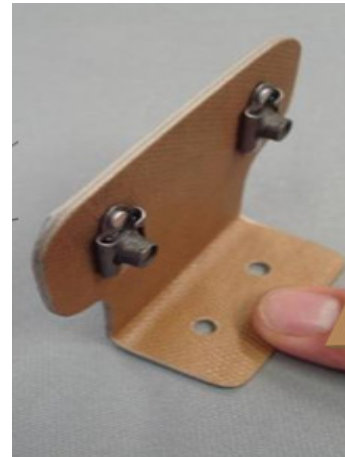
### Initial contacts:

Hamburg Interiors Show 2006  
Contacts with DTC and TenGate

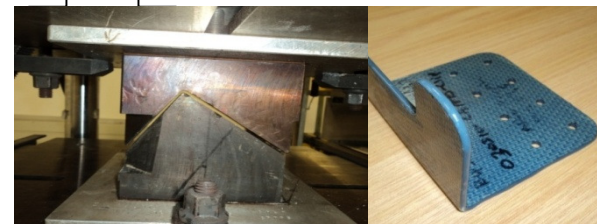
### Project: A400M internal development

*“CFRTP Processing Technology”*

**Scope:** Establishing a basic capability for  
designing, press-forming,  
finishing and testing CFRTP parts  
Commissioning of Lab-Press at the  
Aerosud ITC  
Prototype Development



Airbus A400M CFRTP



Airbus  
A350  
CFRTP  
Frame clips



# Airbus A350 CFRTP Frame Clips

## Industrialisation of CFRTP Technology

**Opportunity:** Spirit Aerosystems on **A350 WXB**

**Partners:** Toho-Tenax, African NDT Centre,  
NDT Expert

**Project:** CFRTP Frame Clips for the A350  
Centre Fuselage Section

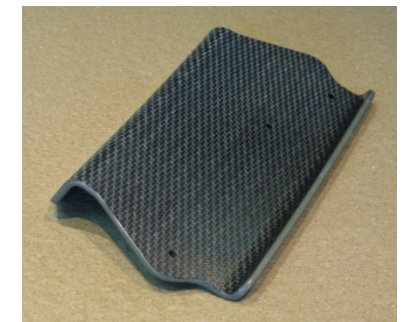
**Scope:** Development and Qualification of In-  
House Built Clips Press – 6 months

- Fully automated forming cycle
- Barcode scanned forming recipes

**Industrialisation of 700 P/Ns (50 tools)**

**Current:** 2 000 clips pm, ramping up to 3 000

Qualified for PPS and PEEK materials  
in accordance with AIPS 03.02.020.



||| Toho Tenax |

**3M**

# Airbus A350 CFRTP Frame Clips

## Industrialisation of CFRTP Technology

### Edge Sealing:

Epoxy seal along trim line

### CMM:

Verification of flatness, profile, trim line, hole position and hole roundness

Equipment: DEA-Global CMM with PC-DMIS software

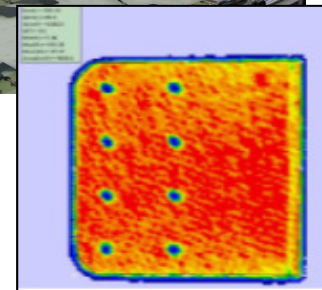
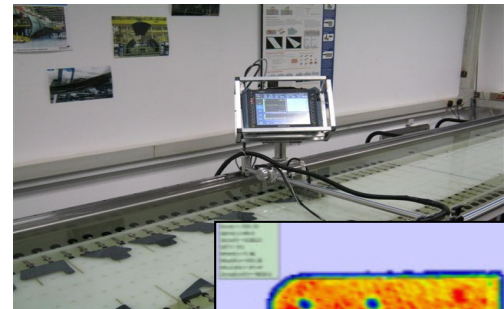
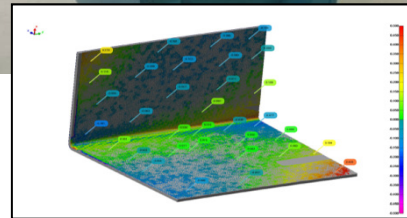
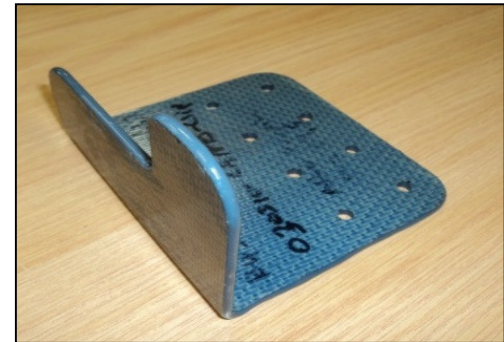
### NDT:

Verification of internal porosity and delamination

Combination of automated C-Scan and manual A-Scan

Airbus approved facility: AITM6-0011, AITM6-4010, AITM6-4011, AITM-4005

Equipment: OMNISCAN MX2



# Airbus A400M CFRTP Cargo Liner

## Industrialisation of CFRTP Technology

**Partners:** Airbus, TenCate Advanced Composites, Aerosud

**Project:** CFRTP Cargo Liner for the Airbus A400M

**Scope:** Design, Manufacture and Qualification  
**86 CFRTP P/Ns**

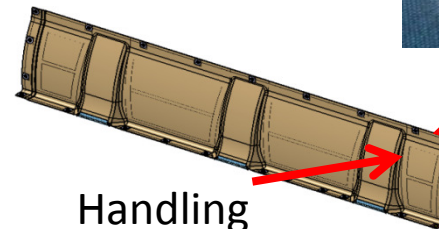
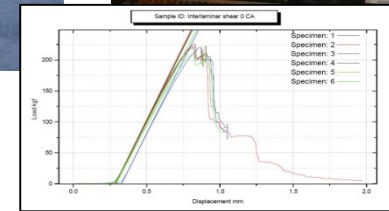
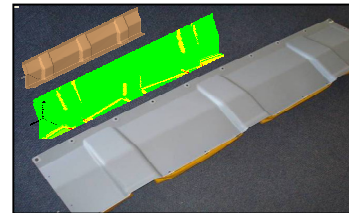
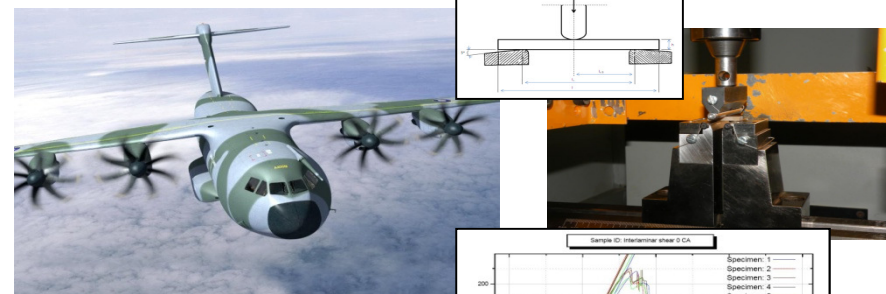
Functional Requirements:

- FSTH compliance
- EMI Shielding
- Lightweight
- Resistant to decompression and (military) handling loads

Glass reinforced PEI with Bronze mesh

**Parts:** Connection units: 2000x600mm (max)

Stowage box: 300mm deep



Handling

Rapid decompression

**TENCATE**  
materials that make a difference

**AIRBUS**  
AN EADS COMPANY

**AEROSUD**

# Aerosud 600T CF RTP Press

## Press-Forming Equipment

**Start:** “Brown” Pneumatic Press  
- Insufficient Pressure  
- Too slow to form parts  
- Insufficient in-process control

**Project:** Development of the Aerosud 600Tons  
CF RTP Press  
October 2012 – December 2013

**Partners:** Airbus  
Aerosud (Design, Integration)  
UV+IR Engineering (IR Oven)  
HZM Heavy Engineering (Press  
mechanics)  
Ernest Lowe (Hydraulics)  
Kairos (Software, Automation)  
McCormick (Tool conveyor)



# Aerosud 600T CFRTP Press

## Press-Forming Equipment

### System Performance

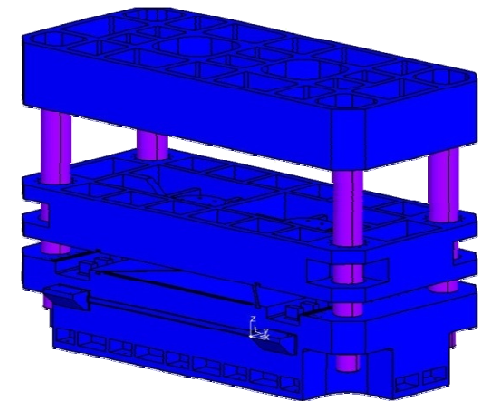
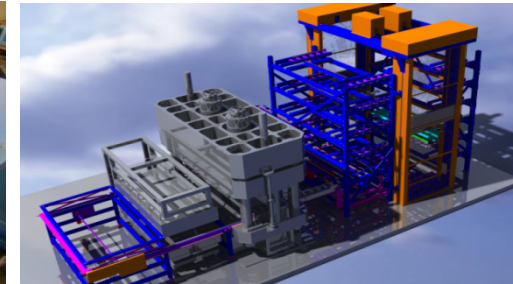
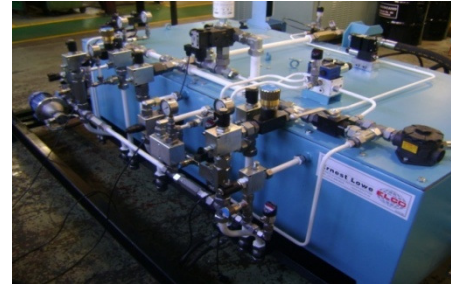
**Largest CFRTP Press in the World:**

- 2.5m x 1.5m press bed
- 600 Tons max Force

**Material from oven to closed press within 5 sec**

Motorized tool loading. Tool pre-heat station

- IR oven to heat up material to 360°C at a controlled 150°C/min**
- 8 independently controlled zones
  - 226 IR lamps
  - 312 kW



# Aerosud 600T CF RTP Press

## Press-Forming Equipment

### Integration Features:

**AIPS 03.02.020 compliant**

SmarTeam controlled forming recipes

Barcode scanned forming recipes

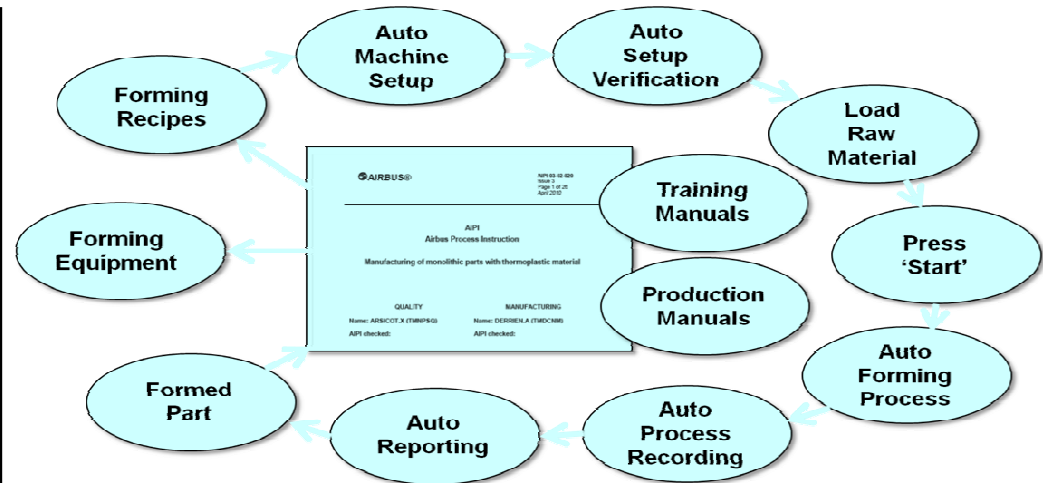
Auto setup and setup verification

Internal database for managing in-process data

Integrated safety system to protect both men and machine.

### Facility upgrade:

On-site installation of a **1MW electrical substation.**



PART NUMBER	OPEN	REVISION	OPERATION	PRIC ISSUE	B	QTY	LOT NUMBER	IMPACT	PRODUCTION DATE
Y-CHM	8		Part of the program...						
B-EDG	8		Cover plate being specified in Blue...						

# Aerosud 600T CFRTP Press

## Press-Forming Equipment

### Development Schedule:

**July 2012:** Press spec completed

Nov. 2012: Mechanical design completed

**Dec. 2012:** First order placed

May 2013: Assembly trial in China

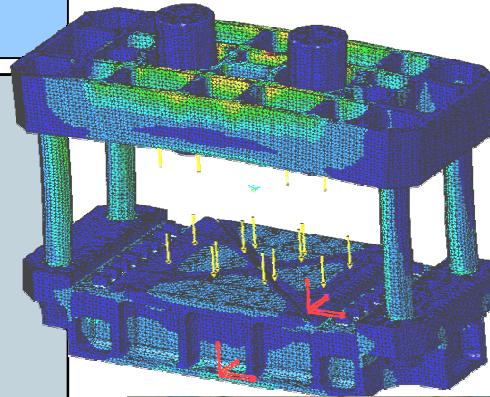
**July 2013:** Arrival of the press mechanics

Sept. 2013: Completion of assembly

**Oct. 2013:** Press commissioned

Nov. 2013: Qualification completed

**Dec. 2013:** Start of production



# *Welcome to Aerosud*

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## Proceedings this afternoon

- Relocate to WS#1 and the 600T CFRTP Press
- Message from Airbus and “cutting of the ribbon”

**Dr Deon Labuschagne**

**Mr. Peer Wiebe**

**Procurement: Head of Monuments & F2F**

### Safety Arrangements

- No PPE required
- Please follow Deon
- Stay in demarcated area

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