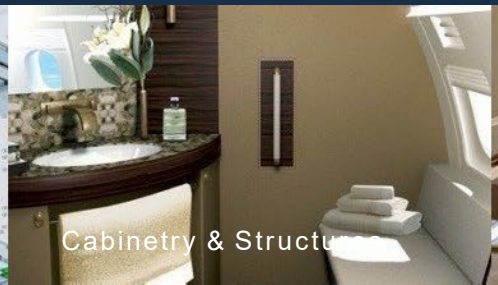
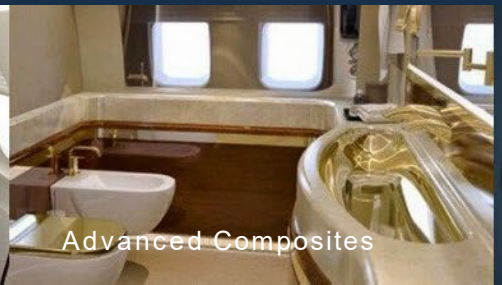
GAL AEROSPACE

GLOBAL CAPABILITIES



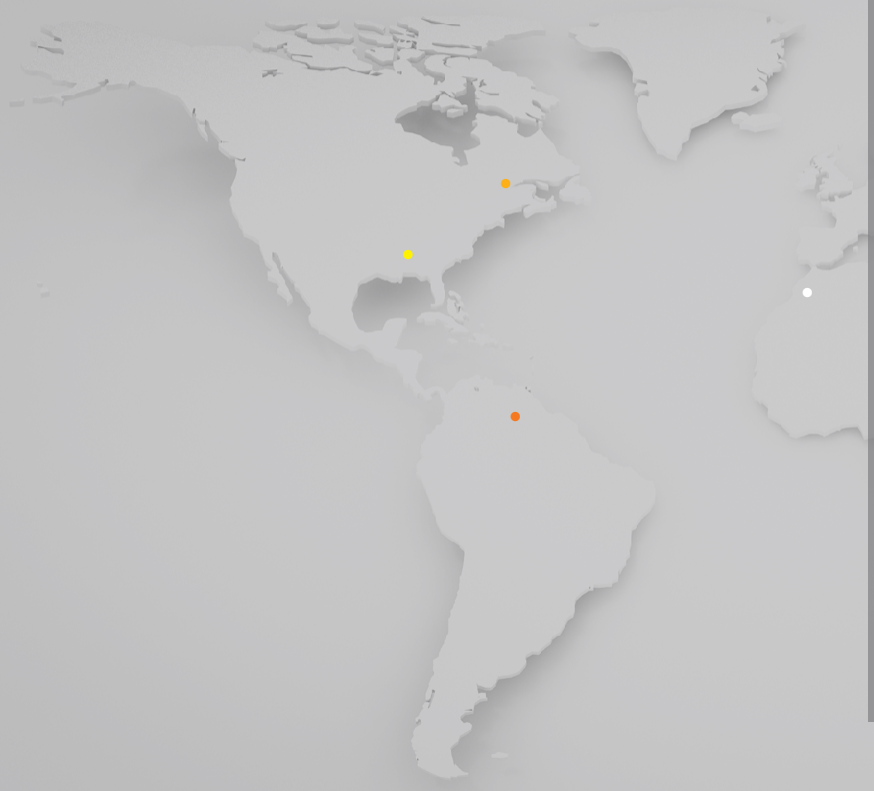



GAL Aerospace Corp.
GAL Aviation
Aeroquest
GAL AeroStaff

About GAL Aerospace

- Privately Held
- Celebrating 22 years as a global supplier of aircraft interior components and technical Man Power
- Commercial, Business & VVIP/VIP Aircraft Interior Components
- AS9100 Rev D, FAA145, Transport Canada AMO & 561 Production Approval

Worldwide Locations



Engineering

- Bogota Columbia

Manufacturing

- Montreal - 42,000 Sqft
- R&D department
- Cabinet Fabrication
- Machining
- Paint and finish
- Bins, Headliners and Sidewalls

Sales Office

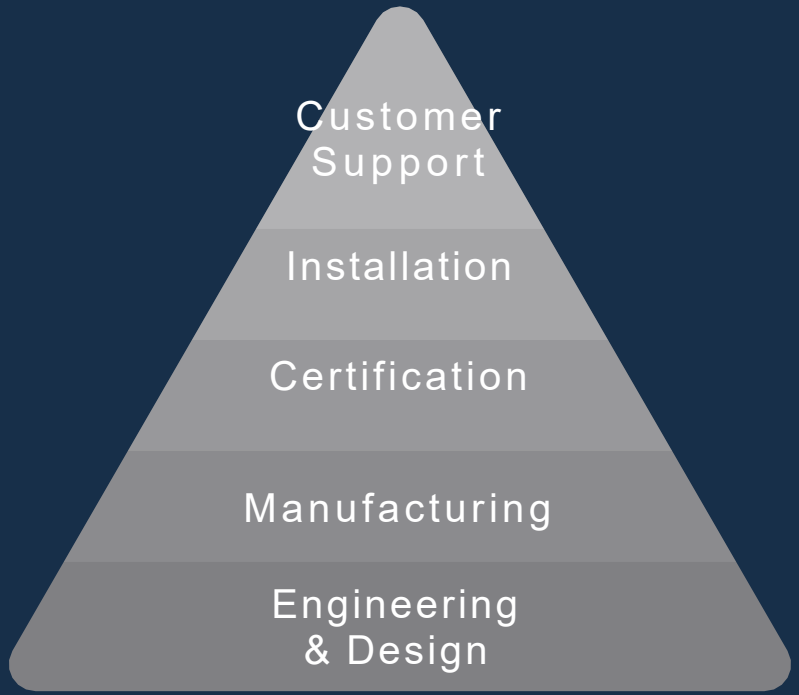
Atlanta - 27,000 Sqft

- Cabinet Fabrication
- Paint and finish
- Bins, Headliners and Sidewalls
- Countertops
- Showers

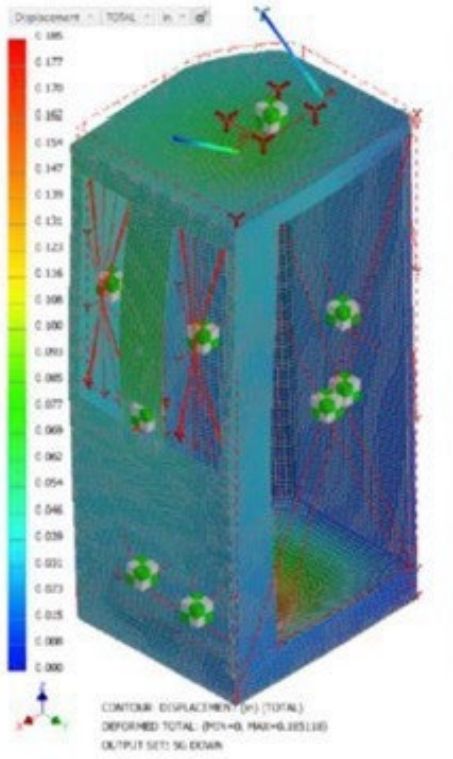
Product Support

- North and South America
- Asia
- Africa
- Europe

Vertically Integrated Company



G A L Engineering



Complete Engineering & Certification

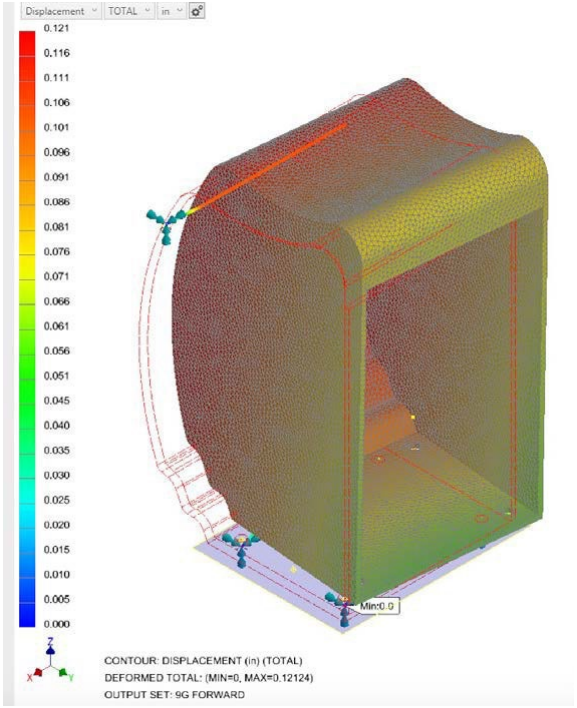
Engineering

- Mechanical Design
- Electrical Design
- Shell/periphery Design and installation
- Structural Design
- SystemDesign
- StressAnalysis

- Extensive library of allowable testing

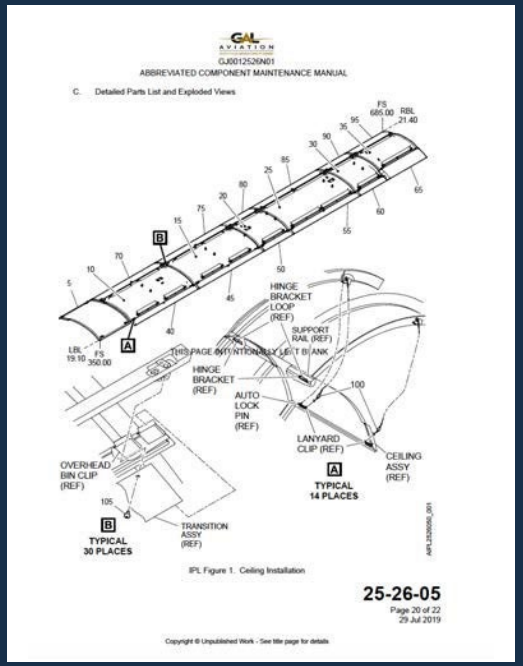
Certification

- Transport Canada, FAAand EASASTC's
- Reverse engineering



Inhouse Testing

Technical Documentation

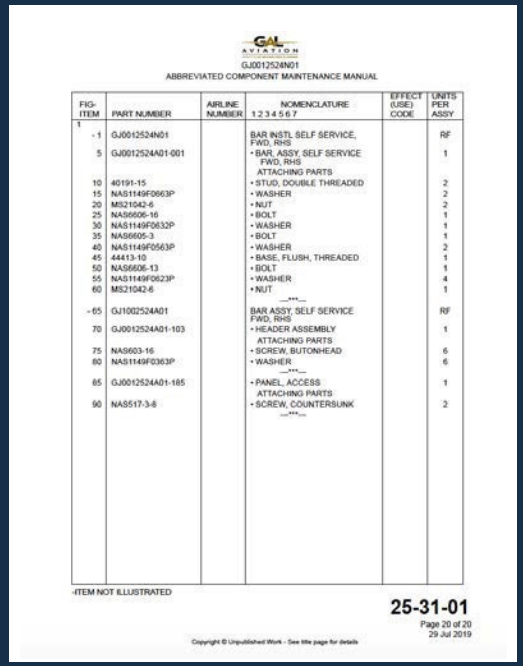


GJ0012526N01
ABBREVIATED COMPONENT MAINTENANCE MANUAL

C. Detailed Parts List and Exploded Views

IPL Figure 1. Ceiling Installation

25-26-05
Page 20 of 22
29 Jul 2019

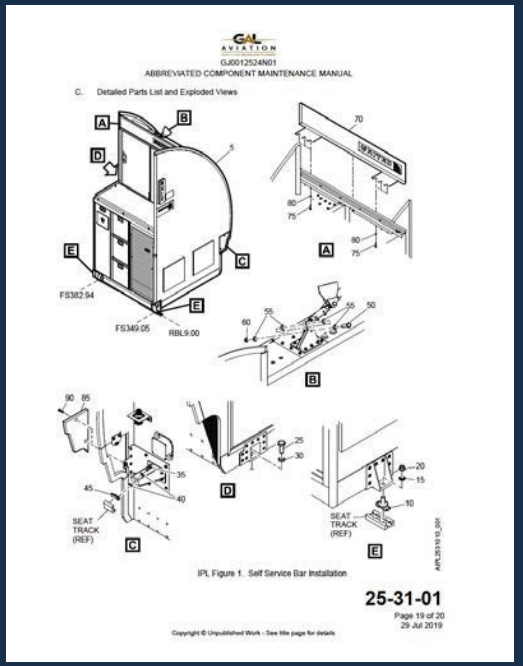


GJ0012524N01
ABBREVIATED COMPONENT MAINTENANCE MANUAL

FIG-ITEM	PART NUMBER	AIRLINE NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFFECT (USE) CODE	UNITS PER ASSY
1					
-1	GJ0012524N01		BAR INSTL SELF SERVICE, FWD, RHS		RF
5	GJ0012524A01-001		• BAR, ASSY, SELF SERVICE FWD, RHS		1
			ATTACHING PARTS		
10	40191-15		• STUD, DOUBLE THREADED		2
15	NAS1149F0663P		• WASHER		2
20	MS21042-6		• NUT		2
25	NAS6606-16		• BOLT		1
30	NAS1149F0632P		• WASHER		1
35	NAS6605-3		• BOLT		1
40	NAS1149F0563P		• WASHER		2
45	44413-10		• BASE, FLUSH, THREADED		1
50	NAS6606-13		• BOLT		1
55	NAS1149F0623P		• WASHER		4
60	MS21042-6		• NUT		1
			---***		
-65	GJ1002524A01		BAR ASSY, SELF SERVICE FWD, RHS		RF
70	GJ0012524A01-103		• HEADER ASSEMBLY		1
			ATTACHING PARTS		
75	NAS603-16		• SCREW, BUTONHEAD		6
80	NAS1149F0363P		• WASHER		6
			---***		
85	GJ0012524A01-185		• PANEL, ACCESS		1
			ATTACHING PARTS		
90	NAS517-3-8		• SCREW, COUNTERSUNK		2
			---***		

-ITEM NOT ILLUSTRATED

25-31-01
Page 20 of 20
29 Jul 2019



GJ0012524N01
ABBREVIATED COMPONENT MAINTENANCE MANUAL

C. Detailed Parts List and Exploded Views

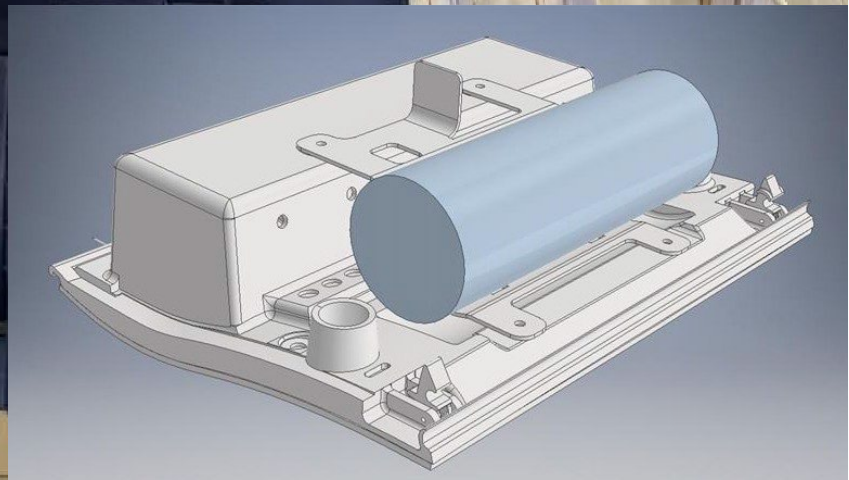
IPL Figure 1. Self Service Bar Installation

25-31-01
Page 19 of 20
29 Jul 2019

Countertops

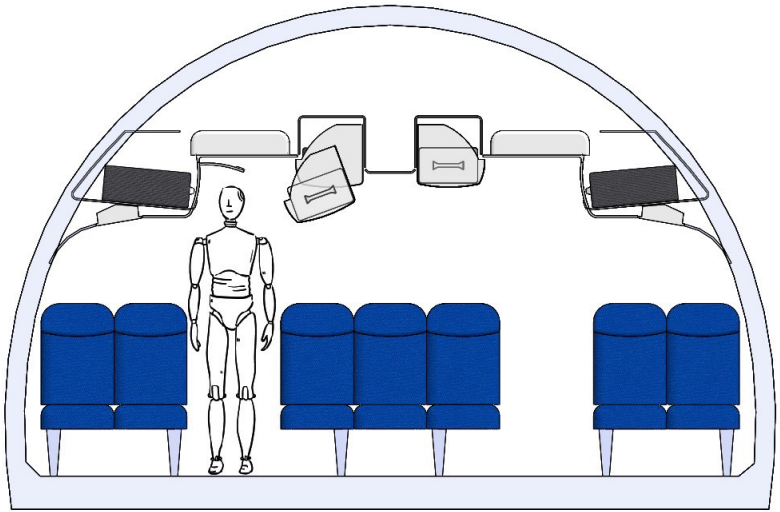
767 VVIP Interior Kit

Q400 Passenger Oxygen and LED lighting



Q400 Enhanced Overhead Bins

767 Bin Extensions



767 Enhanced Overhead Bin Mods

E175 Overhead Bins

E1 Overhead bin Production

E1 Overhead bin Fit Check


Business Class Pods

Galley and Lavatory Project

777 Galley

C R J 5 5 0

Closets / Wardrobes

CRJ550 – Achievements

- Program doubled in scope
- First Article installation - 6 months
- First STCand 9 Aircraft Inservice - 8½ months
- 5 Certified configurations and 30 kits delivered - 12 months
- Producing kits at rate 6

GAL AEROSPACE

STRESS CAPABILITIES

Material and Manufacturing Process

IT 7.5.1-001	Identification
IT 7.5.1-002	Manual Solvent Cleaning
IT 7.5.1-003	Potting, Sealing and Filling of Composite Panels
IT 7.5.1-004	Surface Preperation for Adhesive Bonding
IT 7.5.1-005	Bonding using Contact Adhesive
IT 7.5.1-006	Structural Bonding using two-part Epoxy
IT 7.5.1-007	Installation of Hinges
IT 7.5.1-008	Installation of Hardwood Molding, trims, inlays
IT 7.5.1-009	Installation of Inserts (Plug&Sleeves)
IT 7.5.1-010	Installation of ATR Pins in Structural Composite Panel
IT 7.5.1-011	Potted Insert Installation in Sandwich Panel
IT 7.5.1-012	Installation des helicoils Inserts
IT 7.5.1-013	Tracing & Cutting of Veneer
IT 7.5.1-014	Gapping
IT 7.5.1-015	Bonding using RTV Silicon Adhesive
IT 7.5.1-016	Fabrication of Reinforced Composite Panels Kerfing
IT 7.5.1-017	Mortise and Tenon Connection Method for Sandwich Panels
IT 7.5.1-019	Flushness Tolerance
IT 7.5.1-020	Varnish Application
IT 7.5.1-021	Polishing Surfaces
IT 7.5.1-022	Surface Preperation Before Painting

Material and Manufacturing Process

IT 7.5.1-023	Primer Application
IT 7.5.1-024	Top Coat & Decorative Coatings Application
IT 7.5.1-025	Torquing of Nuts, Bolts, Screws and Studs
IT 7.5.1-026	Veneer Application
IT 7.5.1-027	Drilling of Composites & Composites Assemblies
IT 7.5.1-030	Installation of Heat Set Inserts in Plastic Sheet
IT 7.5.1-036	Chemical Conversion Treatment for Aluminum & Aluminium Allow
IT 7.5.1-037	Passivation of Stainless Steel
IT 7.5.1-038	Cleaning of Spraying Equipment
IT 7.5.1-039	Jointing Connection from Sandwich Panels
it 7.5.1-040	Welding Specifications
IT 7.5.1-041	Fill & Relocate the Potted Insert Holes
IT 7.5.1-100	Sheet Metal
IT 7.5.1-101	Machining
IT 7.5.1-102	Assembly and Riveting
IT 7.5.2-001	Upholstery Seat & Divan
IT 8.2.4-001	Torque Tightening
IT 8.2.4-002	Security Seal

Material and Manufacturing Process

GAPS 100-020	Chemical Conversion Treatment for Aluminum & Aluminum Alloys
GAPS 100-021	Anodizing Treatment for Aluminium and Aluminium Alloys
GAPS 100-043	Application of Primer Coatings:Epoxy, High Solids
GAPS 100-044	Topcoat Application of Polyurethane Coatings
GAPS 100-045	Decorative Film Application
GAPS 100-046	Decorative Coating
GAPS 110-001	Alkaline Cleaning
GAPS 110-009	Manual Solvent Cleaning
GAPS 110-015	Passivation of Corrosion Resistant Steels
GAPS 110-032	Acid Cleaning and Deoxidizing Aluminum Alloys
GAPS 130-001	Epoxy Primer for Aircraft
GAPS 130-002	Coating: Polyurethane, Aircraft & Support Equipment
GAPS 140-001	Chemical Waste Handling
GAPS 140-002	Cleaning of Pumps & Chemical Transfer Equipment
GAPS 140-003	Replacement Testing, Invalid Testing, Retesting
GAPS 150-001	Room Temperature Vulcanization (RTV) Molding
GAPS 150-002	Application of Corrosion Inhibitive Elastomeric Primer
GAPS 150-003	Application of Kydex Thermoplastic Sheet
GAPS 150-004	Application Guide for Schneller Aerfilm
GAPS 150-007	Composite Repairs

Procedures

P 4.2.3	Documentation Controls
P 4.2.4	Records Control
P 5.6	Management Review
P 6.2	HR & Training Program
P 7.1.1	Project Management
P 7.1.2	Risk Management
P 7.1.3	Configuration Management
P 7.2.2	Contract Review
P 7.2.3	Technical Communication
P 7.3	Engineering Management
P 7.4.1	Supplier Selection/Evaluation Procedure
P 7.4.2	Purchasing Procedure
P 7.4.3	Receiving and Receiving Inspection
P 7.4.4	Shipping and Shipping Inspection
P 7.4.4	Shipping and Shipping Inspection

Procedures

P 7.4.5	Counterfeit Part Prevention
P 7.5.1	Control of Production and service provision
P 7.5.2	Methods Department Procedure
P 7.5.3	Traceability
P 7.6	Control,Calibration, Grading and maintenance of measuring equipment
P 7.7	Maintenance tool and equipment
P 8.2.2	Internal Audit
P 8.2.3	Monitoring and measurment of process
P 8.2.4	Monitoring and measurment of product
P 8.3	Control Of Non-Conforming Products Or Services
P 8.5.1	Continuous Improvement
P 8.5.2	Corrective Action
P 8.5.3	Preventive Action
P 8.5.4	Foreign Object Debris/Damage Control

GAL Engineering Resources and Processes

Stress/Certification internal activities

- Analytical analysis
- FEM analysis (Ansys) + stress report
- Interface Load Analysis
- Structural Load Test Plan/Report
- Cycling Test Plan/Report
- Flammability Test Plan/Report
- Environmental Test Plan/Report (DO160)

GAL Engineering Resources and Processes

Development Phase

JDP Joint Development phase
- 80% of the requirements to be identified
- Preliminary Risk Assesment
- Preliminary Interface Drawing Requirement (mechanical attachement, electrical connection, water system connection)
- Space allocation Mockup

PDR Preliminary Design Review
- 90% of requirement + IDR frosen
- 80% of 3D desgin complete
- Preliminary stress analysis (structural load, interface load, ...)
- Preliminary Certification Plan
- Mockup and engineering tests performed to mitigate design risks
- Preliminary ICD
- Risk analysis: Major risks<25%

IDR Intermediate Design review
- Requirement 100% frosen
- 3D Design 100%
- Stress analysis 100%
- ICD 100%
- Preliminary material list and Long Lead Item list
- Certification Plan 100%
- Preliminary Qualification Test Plans
- Risk analysis: Major risks<10%

CDR Critical Design Review
- Manufacturing Drawing 90%
- Qualification Test Plans 100%
- Risk analysis: Major risks 0%

Certification Phase

QTR Qualification Test Review
- to review the Test plans ans setup before starting the tests

QRR Qualification Results Review
- To review tests results
- To review the DRD (Design Requirement Document) to validate compliance to all requirements

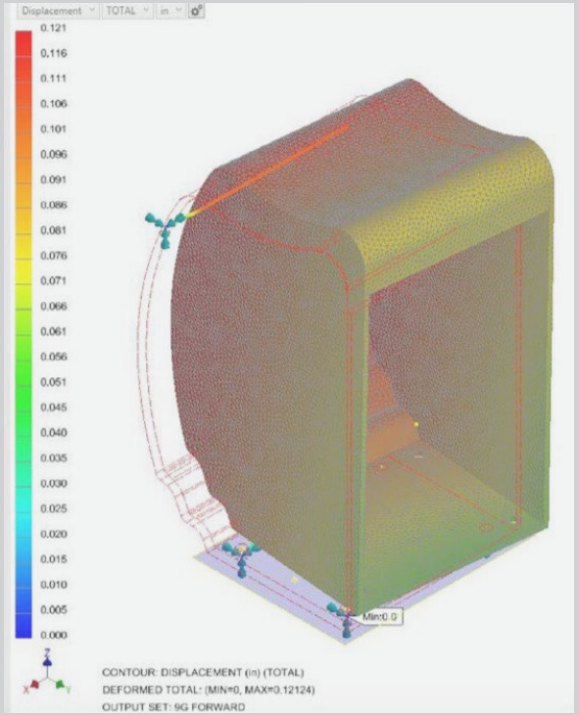
CRJ 550 Cabin Monuments

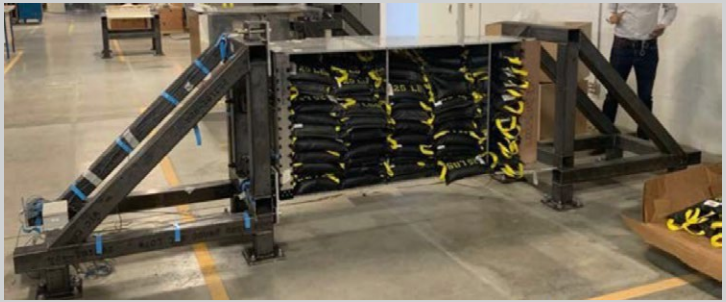
- **Develop in 8 months from KoM to certification**
- **Preliminary Design**
  - Survey of OEM Aircraft to validate A/C installation and attachment points
  - Preliminary 3D model of all monuments
  - Elevation/Interface Control Drawing to validate systems install and connections (EWIS, Water and Waste, Light, Ventilation,…)
  - Preliminary FEM analysis of 2 monuments representative of the full install (PATRAN-NASTRAN) + stress report
    - Validate panel selection
    - Validate pin joint allowable calculation
    - Validate Interface Load (Seat tracks + Tierod attachment)
    - Considering Llimit and ultimate loads specified per 14 CFR § 25.561 and 14 CFR § 25.301
  - Manufacturing of the 2 monuments (Validation unit version with just the hard attached structure and no finishes) to perform engineering test
  - Correlation of the FEM models and assumptions
  - Manufacturing of a foam based real size mockups for fit check

CRJ 550 Cabin Monuments

Fit check

CRJ 550 Cabin Monuments





FEM analysis vs Test correlation

CRJ 550 Cabin Monuments

- **Detailed design**
  - Final 3D model of all monuments
  - FEM stress analysis of all monuments (PATRAN-NASTRAN) + stress report
    - Validate pin joint allowable calculation
    - Validate Interface Load (Seat tracks + Tierod attachment)
  - Manufacturing Drawings
  - Certification Documents : ACMM, ICA, MDL and any SB needed for the aircraft retrofit
  - Certification Test Plans:
    - Structural Load tests: Main structures, Sliding doors, Tambour door
    - Flammability tests:
      - Vertical burn, Smoke Emission and Heat Release per FAR25.853
      - Fire Containment for trash can
  - EMI-RFI

CRJ 550 Cabin Monuments

- **Certification phases**
  - Manufacturing of the 2 Certification monuments (full assy without finishes) to perform test
  - Manufacturing of sub assy load tests such as Sliding doors and tambour door
  - Performing Structural tests (internal facilities):
    - Structure pull test
    - Sliding doors load test
    - Tambour door load test
  - Flammability tests (outsourced):
    - Vertical burn, Smoke Emission and Heat Release per FAR25.853
    - Fire Containment for trash can
  - EMI-RFI test (outsourced)
- STC maintainability by supporting by 16 additional configurations since original STC

E175 Extended Overhead Bins

- **Develop in 10 months from KoM to certification**
- **Preliminary Design**
  - Survey of OEM Aircraft + bin to validate A/C attachment points
  - Preliminary 3D model keeping original A/C attachments
  - Elevation/Interface Control Drawing to validate Aircraft install and connections (Light, Ventilation,…)
  - Manufacturing of the 2 prototypes bins (LHS+ RHS) to perform fit check
  - Flammability engineering test to validate new panels+ finishes stackup
  - Engineering structural load test (Down LL & UL) to validate the mortise&tenon assy

E175 Extended Overhead Bins

E175 preliminary Fit check

E175 bin Engineering inertial load test

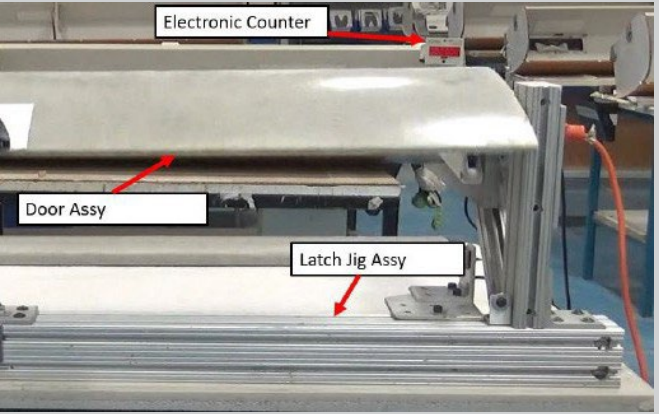
E175 Extended Overhead Bins

- **Detailed design**
  - Final 3D model of all bins
  - Manufacturing Drawings
  - Certification Documents : ACMM, ICA, MDL and any SB needed for the aircraft retrofit
  - Certification Test Plans:
    - Inertial Structural Load tests:
      - full overhead bin
      - limit and ultimate loads specified per 14 CFR § 25.561 and 14 CFR § 25.301
    - Flammability tests:
      - Vertical burn, Smoke Emission and Heat Release per FAR25.853
    - Latch Cycling Test :
    - 100 000 cycles as per 14 CFR §25.301, §25.303, §25.305 §25.307, §25.561 and §25.787
    - 200 000 cycles as per customer requirements

E175 Extended Overhead Bins

- **Certification phase**
  - Manufacturing of the worse case certification overhead bin size (full assy without finishes)
  - Manufacturing of sub assys for cycling test : Door, latche and hinges
  - Performing Structural tests (internal facilities):
    - Inertial/gust load tests in all 6 directions
  - Performing Latch cycling tests (internal facilities):
    - 100 000 cycles with LL & UL Tests every 20 000 cycles
    - 200 000 cycles with LL & UL Tests every 20 000 cycles
  - Flammability tests per FAR25.853 (outsourced):
    - Vertical burn
    - Smoke Emission
    - Heat Release

E175 Extended Overhead Bins



E175 bin door latch cycling test

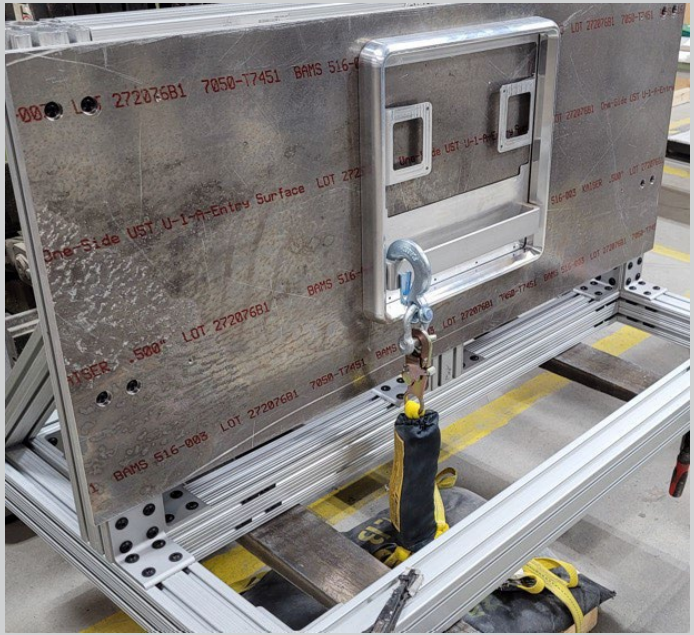
E175 bin inertial load test

Partner Test Facilities

GAL already manage external tests

- With approved TCCA/FAA partner labs (local and US)
- Flammability (vertical + SE/HR) per FAR25.853
- Slipping floor test
- Liaisons allowables
- Environmental tests

Monitor Shroud & Lit Pockets



Monitor Shroud & Lit Pockets

GAL AEROSPACE

TECHNICAL SERVICES

GAL Technical Specialist

GAL Technical consultants have over 20 years of experience helping lessors and airlines in all kind of work related to asset transactions (leasing and sales), including airline management solutions, records scanning and building into your records management system, physical and records inspections, pre-purchase inspections.

With presence all over the globe our specialists will make sure that your assets keep their value on every transaction with their knowledge of the current standards of the market and regulations on aviation industry.

With experience on the major aircraft and engines manufactures from small regional to wide body aircrafts our team has the capability to assist in any requirement you may have.

Technical Services

GAL AeroStaff technical Services include:

- Asset transaction Management (Aiframe & Engines) intercompanies / Lease returns Records transitions to your records management system (scanning, indexing and uploading)
- Airline Records management solutions
- Records and physical inspections of the aircrafts
- Pre-purchase inspections
- Heavy Maintenance on site representation
- Mid lease inspections
- MX program development from MRB/MPD

Some of our clients

UNITED

AIR CANADA

AAR

BOMBARDIER | Business Aircraft

DELTA

GoJet AIRLINES

ATR

Some of our product experience

- Airbus
- Embraer
- Bombardier
- Boeing
- Dassault Falcon Jet
- GE
- Rolls Royces
- Pratt & Whitney
- Safran
- Textron
- Messier Dowty
- And more

Latest Achievements

- Over 1,000 boxes converted from hardcopy to softcopy in 1year.
- United Airlines 96 aircraft inspection before storage in Kingman, Arizona
- United Airlines 138 aircraft BTB for record scanning in Houston
- Transfer of 18 aircraft from Express Jet to CommutAir
- Transfer of 16 aircraft from Mesa to Gojet in progress
- Transfer of multiple aircraft from Regional one to United in progress
- Multiple mid-lease inspection for Nordic Aviation Capital since 2017
- Multiple C-Check oversight for Nordic Aviation Capital since 2017
- Multiple mid-lease inspection for Goshawk since 2019
- Silver Airline 2 inspection before storage in Quebec City
- Transfer of 25 aircraft from Sky Regional to Jazz in Toronto
- Currently performing Aircraft sales support for United Airline in Kingman
- Transfer of 15 aircraft from Air Georgian to Jazz
- Multiple prepurchase inspection for Nordic Aviation Capital
- 5 Delivery acceptance check for Westjet
- 2 Delivery Acceptance check for Air Georgian
- 2 delivery acceptance check for Bulgarian Airline
- 5 delivery Acceptance check for EasyFly Colombia

Locations

Aircraft records inspections

Delivery of Aircraft to the following Airlines

- HOP / France
- Malindo / Malaysia
- Aeromar / Mexico
- Flybe / Germany
- Lao Airline / Laos
- Azul / Brasil
- Air Algerie / Algeria
- Royal Air Maroc / Morocco
- Air Botswana / Botswana
- Air Algérie / Algeria
- Air Mauritius, Mauritius Island
- Avianca / Colombia and Guatemala
- Easy Air / Colombia
- Braathens / Malmo Sweden
- PNG / Papua New Guinea
- Air Caribbean / Trinidad and Tobago
- RTAF / Thailand

Support of airlines in acceptance of their new ATR 600 aircraft

- PNG / New Guinea
- Aegan / Greece
- Bahamas Air / Bahamas
- Nesma / Saudi Arabia
- Wing Air / Indonesia
- Caribbean Air / Trinidad And Tobago
- Air Myanmar / Myanmar

C-Check supervision

- Premiere Aviation Quebec Canada
- Exeltech Montreal, Canada
- AAR Windsor
- AAR Trois-Rivieres
- Cimber Air, Sunderburg, Denmark
- Voyageur

Out of Scope rework

- We have performed work party maintenance for special rework for Avianca in Colombia and Air Botswana

AOC development

- ormed AOC a Libyan American Airlines

Airline Start Up

- ed Sky Express art up
- Deccan / Jet ATR start up

Thank you

GAL AEROSPACE

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