



# DESIGN & PRODUCTION



ADDING CAPABILITY, INCREASING UTILITY  
AN INTRODUCTION TO OUR DESIGN & PRODUCTION CAPABILITY

#### DESIGN & PRODUCTION

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# ABOUT US

Gama Aviation (Engineering) Ltd provides a one-stop solution for industry leading aerospace design, manufacture & installation of modifications and repairs.

For over 14 years we have fulfilled our client's specific requirements and applied a flexible, efficient and innovative approach using our substantial range of in-house skills, expertise & experience.

We have a library of over 1700 Minor Changes & Repairs and 70+ STC's.

We cater for all aircraft types, fixed wing, rotary, small, large, civil & military.

Due to our comprehensive scope of approval we undertake a vast range of projects from avionic upgrades, mission equipment (internal & external), surveillance fits, cabin interiors, testing & analysis.

## Gama's Design & Production Facilities U.K.

- Bournemouth International Airport
- Farnborough HQ



# APPROVALS



**UK.21J.0174**



**DAI/9961/15**



**UK.MAA.DAOS.0322**



**UK.21G.2678**



**DAI/9961/15**



**FS 620796**



# MEET THE TEAM



**Paul Bristow**  
**Head of Design & Accountable Manager**



**Paul Murrell**  
**Head of Production**



**Jamie Lomas**  
**Head of the Office of Airworthiness**



**Tim Morris**  
**Head of Independent System Monitoring**



**Martin Creber**  
**Head of Structures**



**Dan Colbourne**  
**Design & Production Project Manager**



**Peter Watts**  
**Lead Senior Mechanical Design Engineer**



**Albert Beusmans**  
**Senior Mechanical Design Engineer**



**David Bodilly**  
**Senior Avionics Design Engineer**



**Mike Shaw**  
**Senior Avionics Design Engineer**

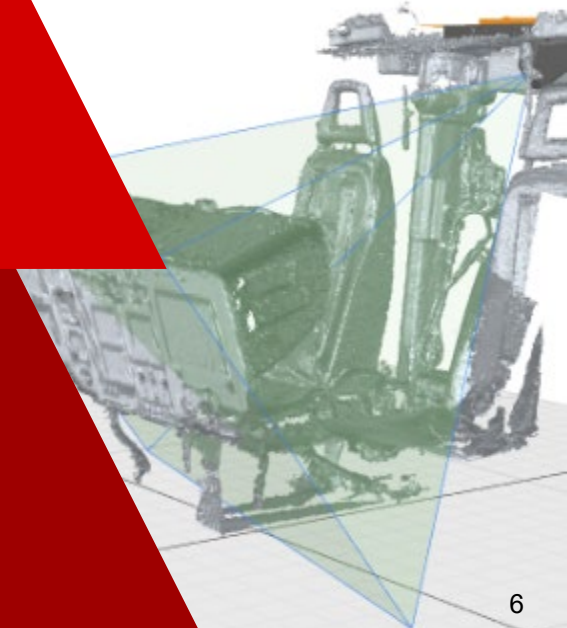
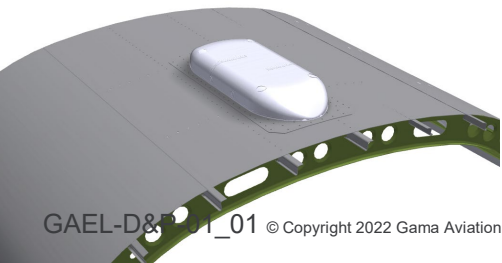
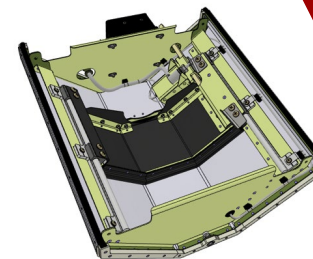
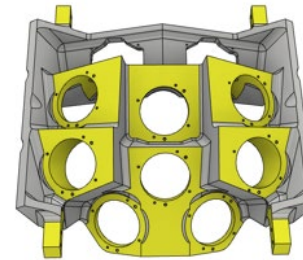
# MECHANICAL DESIGN

Using the latest 3D Computer Aided Design (CAD) software, our team are ready to support you in all of your mechanical design needs.

Modifications and repairs typically require mechanical design. The team are experienced in all aspects from technical survey, initial hand calculations, through detail design development to creation of production drawings and computer aided manufacturing data.

Examples of projects and additional services covered by our Mechanical Team include:

- 3D Scanning
- Adapter Plates
- Antenna Installations
- Anti-Vibration Mounts
- Blanking Plates
- Bulkhead Penetrations
- Chart Holders
- Circuit Breaker Panels
- Detail, Assembly & Installation Drawings
- Doublers (Internal & External)
- Empennage Changes & Repairs
- Equipment Mounts
- Equipment Racks & Trays
- Fairings
- Flooring
- Fuselage Changes & Repairs
- Ground Support Equipment
- Hard Points
- Instrument Panels
- Mission System Consoles
- Mock-Ups
- Monuments & Stowages
- Rapid Prototyping (3D Printing)
- Structural Repairs
- Tie Rods
- Wing Changes & Repairs





# ELECTRICAL DESIGN

Using the latest Electrical Computer Aided Design (ECAD) software, our team are ready to support you in all of your electrical design needs.

Modifications and repairs with electrical aspects will involve numerous assessments, such as power distribution, electrical load analysis and electromagnetic compatibility.

Typical projects undertaken by our Electrical Team include:

- Annunciator Panels
- Annunciators
- ARINC Signal Converters
- Avionic Backup Batteries
- Battery Upgrades
- Circuit Breakers
- Communication Ports (RJ45, RS-232)
- Electric Start Systems
- Generators
- Ground Use Batteries
- Instrument Panel Lighting
- Instrument Panel Plugs
- Inverters
- LED Lighting (Internal & External)
- NVIS Lighting
- Passenger Service Units
- Power Outlets
- Redundant Wiring Removal
- Switch Guards
- Switches
- USB Charging Sockets
- Warning Lights
- Wiring Diagrams
- Wiring Repairs



# AVIONIC DESIGN

Avionics, (derived from the term “*aviation electronics*”) makes up a large percentage of our work.

Our Design Team have a wealth of knowledge and experience in all areas of avionic design and integration, from simple instrument replacements to a full glass cockpit upgrade.

Typical projects undertaken by our Avionics Team include:

- ADS-B In & Out Solutions
- Air Data / Attitude Heading Reference Systems
- Airborne Image Recording Systems (AIRS)
- Angle of Attack Systems (AOA)
- Antennas (All Types)
- Audio Panels & Intercom Systems
- Cockpit Voice & Flight Data Recorders (CVFDR)
- DME, NDB's & VOR's
- Downlink Systems
- Electronic Engine Instrumentation
- Electronic Standby Instrument Systems (ESIS)
- Emergency Locator Transmitters (ELT)
- Flight Management Systems (FMS)
- Flight Test Instrumentation (FTI)
- Glass Cockpit Upgrades
- Global Positioning Systems (GPS)
- In-Flight Entertainment Systems (IFE)
- Inertial Navigation Systems (INS)
- Instrument Landing Systems (ILS)
- Performance Based Navigation (PBN)
- Primary & Multi-Function Flight Displays (PFD & MFD's)
- Radar Altimeters (RADALT)
- Satellite Communication Systems (SATCOM)
- Terrain Avoidance & Warning System (TAWS)
- Traffic Collision Avoidance Systems (TCAS)
- Transponders (Elementary & Enhanced)
- VHF & UHF Communications
- Weather Radar (WX)





# MISSION SYSTEMS

A large percentage of Gama's Design & Production projects are Mission Systems focused, our approvals allow us to produce modifications for both military and civilian registered aircraft.

The team excel in providing special mission design solutions for Surveillance, Law Enforcement and Government operators.

Typical projects undertaken by our Special Missions Team include:

- Augmented Reality Mapping Systems (ARS)
- Cabin Wi-Fi
- Customer Specific Systems
- Digital Audio Communication System (DACS)
- Downlink & Uplink Systems
- Electro-Optical & Infrared Sensors (EO/IR)
- External Pods
- Inertial Navigation Systems (INS)
- Infrared Counter Measures (IRCM)
- Light Detection and Ranging (LiDAR)
- Mission Displays & Monitors
- Mission Seating
- NVIS Lighting
- Operator Consoles
- Operator Workstations
- Retractable Camera Installations
- Satellite Communication Systems (SATCOM)
- Software Defined Radio Systems (SDR)
- Specialist Antennas
- Surveillance Role Fits
- TACAN
- Tactical Radios (TETRA)
- Threat Simulation
- VHF & UHF Communications
- Video / Mission Recorders
- Video Management Systems (VMS)



# EMERGENCY SERVICES

Gama Aviation has provided support to the emergency services for over 30 years, this has allowed us to gain a unique insight into the Air Ambulance and Police Aviation sectors.

We are extremely proud to operate fixed wing and HEMS missions on behalf of the UK's NHS and Scottish Air Ambulance Services. This position allows us to have a full understanding of the needs, wants and demands of the Air Ambulance community.

Gama also provides Maintenance Repair & Overhaul services to the UK's National Police Air Service (NPAS). This has given us the opportunity to develop many modifications and repairs to assist Police Air Operators in fulfilling their crucial role.

Typical Emergency Service projects undertaken by our Design & Production Team include:

- Air Ambulance Role Fits
- Audio Systems
- Camera Installations
- Data Recording
- Defibrillators
- Downlink Systems
- EO/IR Cameras & Imaging Systems
- Equipment Racks
- Flooring
- Hand Controllers
- Infection Control Cockpit / Cabin Partitions
- Medical Cabinets
- Medical Equipment
- Medical Lighting
- Mission Seating
- Neonatal Incubators
- Night Vision Imaging Systems (NVIS)
- Operator Consoles
- Oxygen Bottle Storage
- Patient Loading Systems
- Police Role Fits
- Power Supplies
- Search Lights
- Stretchers
- Suction Units
- Syringe Drivers





# CABIN INTERIORS

From complete interior refurbishments to a simple LED lighting upgrade, Gama's Design & Production Team have it covered. We have a wealth of experience in Cabin Interior modifications with many "off the shelf" design solutions ready to be installed.

We also design and manufacture bespoke bulkheads, monuments and stowages to meet our customers needs to store anything from medical equipment to in-flight refreshments.

Typical Cabin Interior projects undertaken by our Design & Production Team include:

- Appliances
- Bluetooth Audio
- Cabin Audio System
- Cabin Lighting
- Cabin Wi-Fi
- Cargo Conversions
- Carpet
- Child Seats
- Decorative Laminates
- Emergency Lighting
- Equipment Racks
- Galleys
- In Flight Entertainment (IFE)
- Interior Paint
- Interior Refurbishment
- LED Lighting Upgrades
- LOPA Changes
- Monitors
- Non-Textile Flooring (NTF)
- Overhead Lockers
- Passenger Service Units
- Placards
- Power Inverters
- Restraints
- Seat Retrimming
- Stowages
- Tables
- Thermal Trim and Insulation
- USB Charging Points
- Veneer Changes





# FLIGHT TESTING

Gama's Design Organisation possess the ability to carry out Flight Testing under its own approval, commonly referred to as Flight Test Operations Manual (FTOM) approval.

Flight Testing is often required when an aircraft has undergone significant modification which could have an affect on the flight characteristics of the aircraft, such as installation of an external store.

Prior to the approval of the modification the aircraft may have to be flown under Approved Flight Test Conditions (AFC) to gather compliance data needed to approve the modification.

Gama possess the in-house capability to perform the following:

- Approval for Flight Test Categories 2 & 4
- Approval of Flight Test Conditions (AFC)
- Compilation of Flight Test Plans & Reports (FTP & FTR)
- Installation of Flight Test Instrumentation (FTI)
- Issuance of Permits to Fly (PTF)
- Provision of Flight Test Engineers (FTE's)
- Provision of Flight Test Pilots (FTP's)

# EXPERIMENTAL



# CERTIFICATION

As an approved design and production organisation certification is at the heart of everything we do here at Gama. We are experienced in producing both Major & Minor Changes and Repairs that are either approved or accepted by the various National Aviation Authorities (NAA's) across the world.

With over 1700 Minor Changes & Repairs and 70+ STC's within our portfolio we often have an off-the-shelf design solution to fit your particular needs.

However, we also realise that not every aircraft is the same and every project is different, if we don't have a pre-existing design we have the capability and approvals to produce a new Change or Repair to support your particular aircraft and operation.

Our core certification activity includes:

- Minor Changes created in-house
- Minor Repairs created in-house
- Major Changes & STC's
- Validations of Minor Changes, Repairs & STC's
- Experienced in working with the vast majority of the world's NAA's
- Experienced in both Civil & Military certification

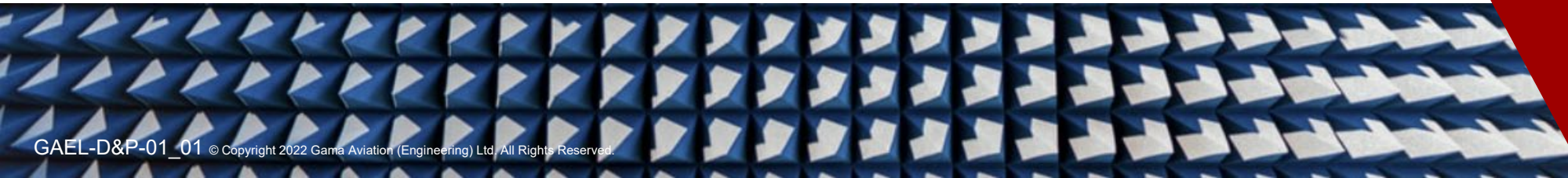


# TESTING

To ensure our modifications and parts meet both our customer and regulatory requirements, Gama regularly performs testing to establish product performance.

Typical testing activities undertaken by Gama include:

- Compilation of Qualification Test Plans & Reports
- Electrical Load Analysis (ELA) testing
- Electromagnetic Compatibility (EMC) & Interference (EMI) testing
- Flammability, Heat Release, Smoke Density & Toxicity testing
- Proof of concept tests
- RTCA DO-160 Environmental testing (temperature, altitude, vibration, shock etc.)
- Seat crashworthiness testing
- TEMPEST and Electromagnetic Security testing
- Transmitting Portable Electronic Device (T-PED) testing



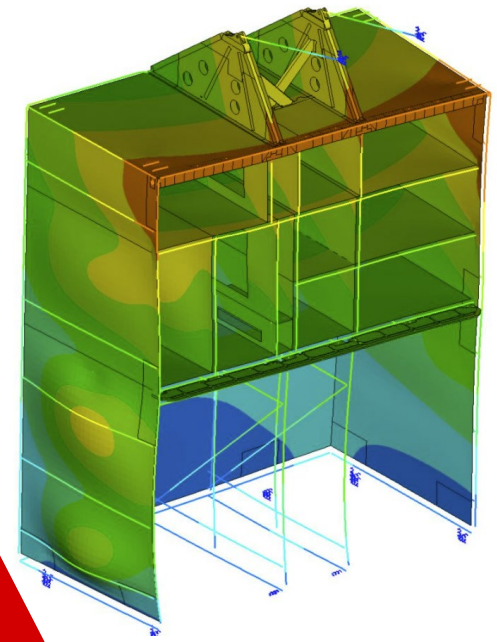


# STRUCTURAL ANALYSIS

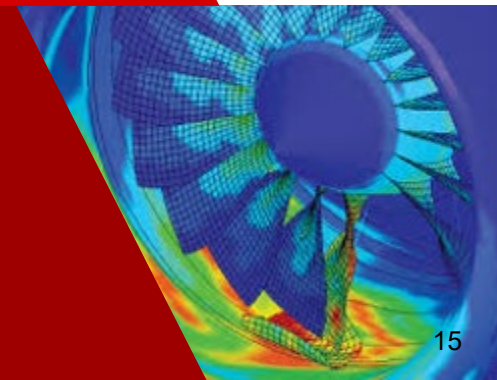
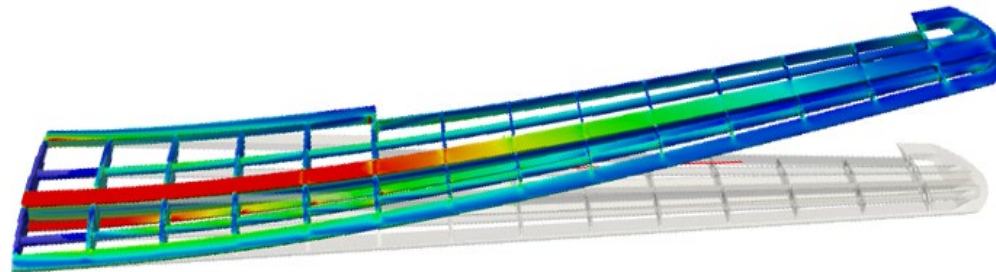
Gama carries out a wide range of structural analysis associated with air vehicle structural design, statics, dynamics and durability. The techniques utilised are those typically used in aviation certification to demonstrate compliance with airworthiness regulations and required to substantiate the strength and durability of structure for a new design, modification or repair.

Typical structural analysis undertaken by Gama includes:

- Fatigue & Damage Tolerance (F&DT) assessment
- Crack propagation analysis
- Static stress analysis
- Modelling and simulation
- Vibration assessment
- Ground Vibration Testing (GVT)
- Resonance Assessment Profile (RAP) testing



$$stress = \frac{force}{area}$$



# MANUFACTURING

Gama is an approved Part 21G Production Organisation which has approval to manufacture aircraft parts and appliances in accordance with approved design data. This allows us to produce not only the design, but parts as well, meaning we are truly a one-stop-shop.

We offer our manufacturing services to many other organisations both civil and military as a build to print service.

All manufactured parts are fully inspected and released with either a Form One or C of C.

Typical manufacturing undertaken by Gama includes:

- Additive Manufacturing
- Airframe Structure, Metallic & Non-metallic
- Cabin Interior Furnishings
- Cable Harnesses
- Composite Repairs
- Composite Manufacture
- Electrical Assemblies
- Machined Parts
- Metal Treatments
- Milling & Turning
- Mock Ups
- Placards
- Sheet Metal Fabrication
- Soft Furnishings
- Tube and Pipe Forming
- Vacuum Forming
- Welded Assemblies
- Wiring Looms





# ASSEMBLY

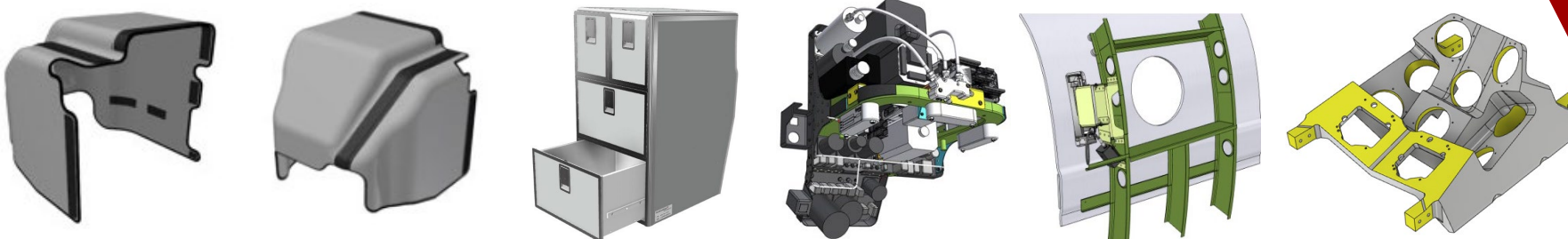
Gama's assembly shop floor has been laid out to ensure that the creation and production of parts follows a lean process. We have the capability to assemble components of any weight and size both mechanical and electrical.

We offer our assembly services to many other organisations both civil and military.

All assembled parts are fully inspected and released with either a Form One or C of C.

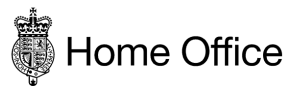
Typical assembly work undertaken by Gama includes:

- CAA approved welding
- Capability to assemble components of any size.
- Certificate of Conformity
- Composite Assemblies
- Crimping
- Electrical Assemblies
- Form One Release
- Fully configurable assembly area
- Kits of Parts with Release Certification
- Mechanical Assemblies
- Mission System Consoles
- Painting
- Surface treatments
- Threaded inserts
- Wet bonded assemblies
- Wiring Looms & Harnesses





# CUSTOMERS



# CONTACT US

## DESIGN & PRODUCTION

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