



The Lockheed Jetstar is considered to be the first private jet available to individuals. However, it was not until the Learjet 23 was launched in 1963 that the private or business jet market became feasible to a larger number of individuals and corporations. Business jet travel enabled high-value passengers the ability to reduce their overall travel times while remaining productive, or well-rested, with a trade-off in very high-costs.

Gulfstream entered the emerging market in 1966 focusing on larger aircraft sizes, luxurious interiors and ultra-comfort. During the following decades, the market expanded with manufacturers adapting their larger commercial aircraft such as the Airbus A380 to A320 series, Boeing 747 to 737 series, and new manufacturers including BAe, Beechcraft, Bombardier, Canadair, Cessna, Dassault, Embraer, Hawker, HondaJet, IAI, Pilatus, Textron, and others. The business jet market has been turbulent and has fluctuated based upon oil prices and embargos, economic growth and decline, global health issues, regional wars, social and political perspectives – leading to consolidation of the manufacturers.

recent market analysis concluded a demand for almost 8,000 business jets over the next 10 years. The market is projected to grow with a CAGR of 1.3% from 2012 to 2022. The market value is projected to reach \$250 billion by 2022.





TGC continuously invests in the research and development of chemistries, materials and processes. Some of the recent new product solutions are listed below.

**01** – developed a new product line of complex formed panel substrates that are machined into parts used within the aircraft interior. The substrate panels have multiple radii with unique tooling that utilize a vacuum bag process. The individual parts are subsequently machined from the formed substrates

**01** – launched GILIVANA®, “Vibration and Noise Attenuation”, a new product to reduce cabin noise resulting from structural vibration. The solutions are tailored to specific customer requirements that are applied to honeycomb core and sandwich panels.

Beginning with chemistry and material sciences, additives mixed into custom resins are formulated, then combined with structural filaments that are processed to form composite materials. These materials include prepregs, adhesives, honeycomb core, laminates, liners, and sandwich panels.

Honeycomb core has provided the highest strength-to-weight ratio of any structural material for decades and is used throughout aircraft interiors and exteriors. With over 50 years' structural core experience, TGC is a leading manufacturer of metallic, meta-aramid, para-aramid, and fiberglass honeycomb. Honeycomb is produced in endless combinations of cell sizes, geometries, densities and dimensions to achieve optimal weight, strength and performance requirements. Honeycomb is available in block and slice form, as well as utilizing value-add capabilities to provide machined core details, bonded core assemblies, sandwich structures, finished parts and end-item assemblies. (See *The Door* a Winter 2021 issue for more information.)

Sandwich panels are composites made by combining core materials, adhesive layers and skins to create a sandwich construction. TGC utilizes vertical integration to produce proprietary materials that create an almost infinite combination of core, adhesive and skin materials that offer maximum design flexibility and shear strength that meets or exceeds customer specified mechanical and physical properties. Sandwich panels are used in applications where durability and weight saving are necessary throughout the aircraft interior and baggage compartment. (See *The Door* a Summer 2021 issue for more information.)

- Unidirectional glass (E/S)
- Woven glass (E/S)
- Unidirectional carbon
- Aluminum
- Epoxy
- Phenolic
- Vinyl Ester
- Polyester
- Nylon

Laminates are composites made by combining proprietary prepreg with structural filaments and are used to cover baggage bay interior walls and ceilings, and as the impact absorbing backing for non-textile flooring. Cargo liners are laminates used specifically in baggage bays and are known across the industry as Gillfab® and Gilliner®. These cargo liner materials are comprised of optimized resin formulations with fiberglass or carbon reinforcements. Gillfab® and Gilliner® materials offer superior puncture and corrosion resistance and can feature a polyvinyl fluoride (PVF) overlay where surface reflectivity and resistance to cleaning solutions are desired. (See *The Door* a Summer 2021 issue for more information.)

Honeycomb can be machined, bonded and formed by special processing for all types of metallic and non-metallic honeycomb cores. TGC has multiple Centers of Excellence that utilize 3-, 5-, and 6-axis CNC machines to produce close tolerance machined core details. Our vast portfolio of value added, special processing capabilities transforms details into contoured bonded assemblies used in flight control surfaces, crash pads, landing gear doors, engine nacelles, and many other parts of the aircraft. (See *The Door* a Spring 2021 issue for more information.)

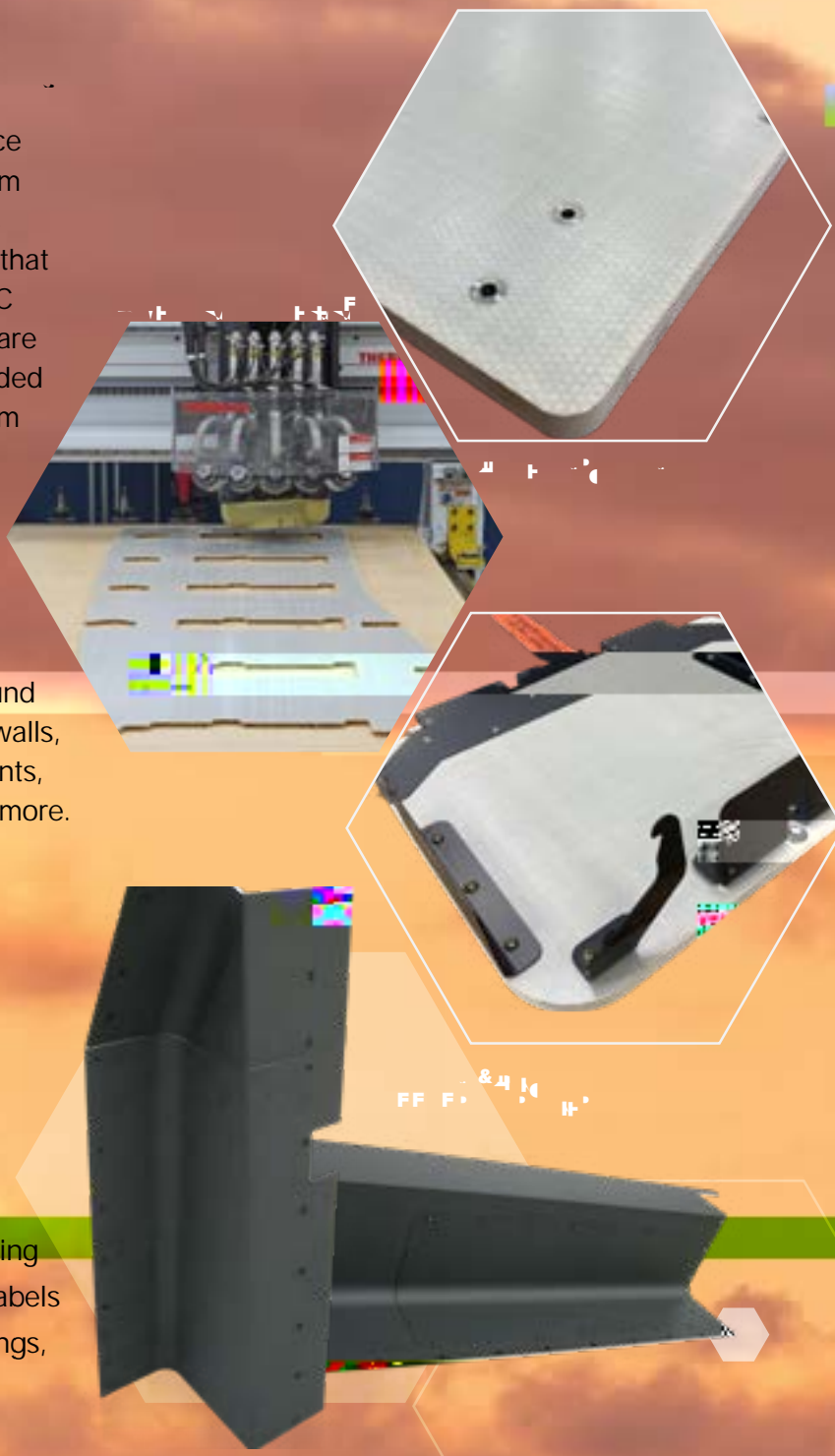


- Planform detail trimming
- Chamfering
- Die cutting
- High-speed, hand routing of doublers or rebates
- Heat forming and heat soaking to contours
- Vacuum bag process for bonding splices, septums and skins
- Potting and densification for hard attach points
- 3-, 5-, and 6-axis CNC machining
- 3-D design and modeling

TGC has multiple Centers of Excellence to fabricate semi-finished and end-item parts. The fabrication process begins with TGC laminate or panel materials that are machined with modern 3-axis CNC equipment. All required components are installed according to customer provided engineering information. The end-item assembly is inspected then kitted for delivery to the customer as drop-in ready for installation parts. Fabricated parts can be made from flat, formed, or contoured, composite and/or metallic materials. TGC fabricated assemblies can be found throughout aircraft interior furniture, walls, cabinets, doors, baggage compartments, decompression blow out panels, and more. (See *The Door* a Spring 2021 issue for more information.)



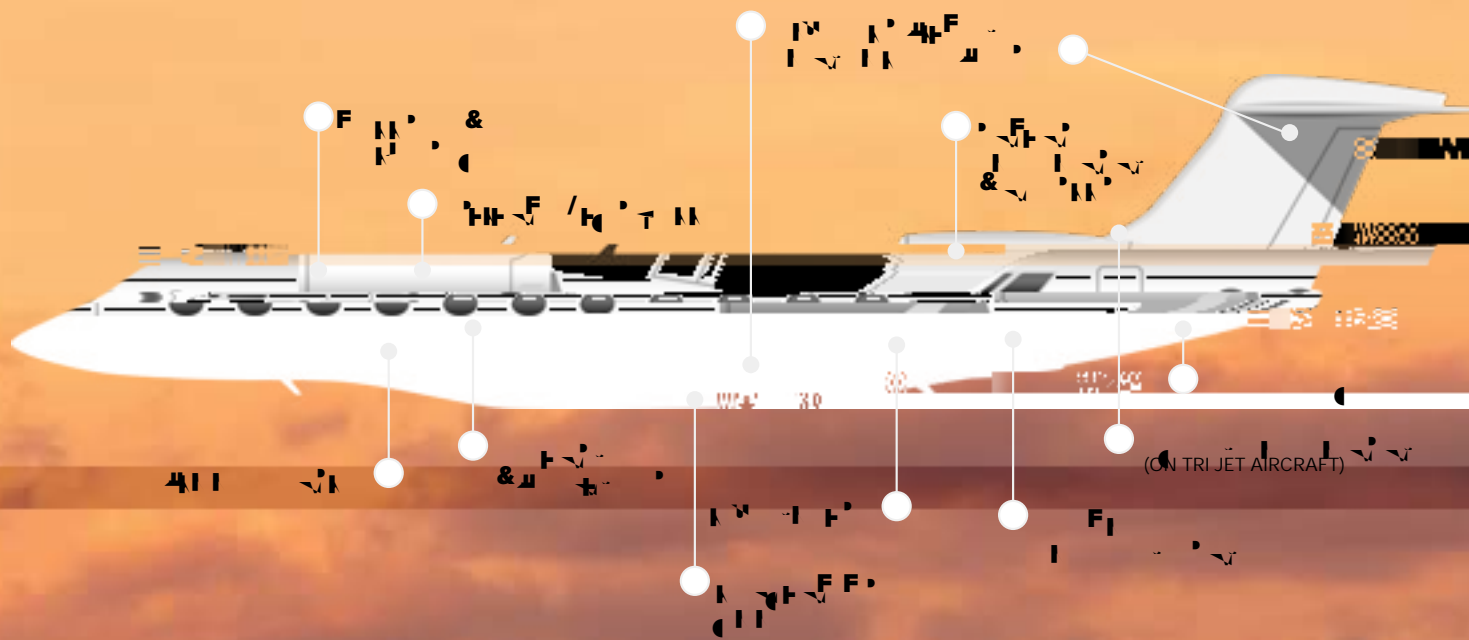
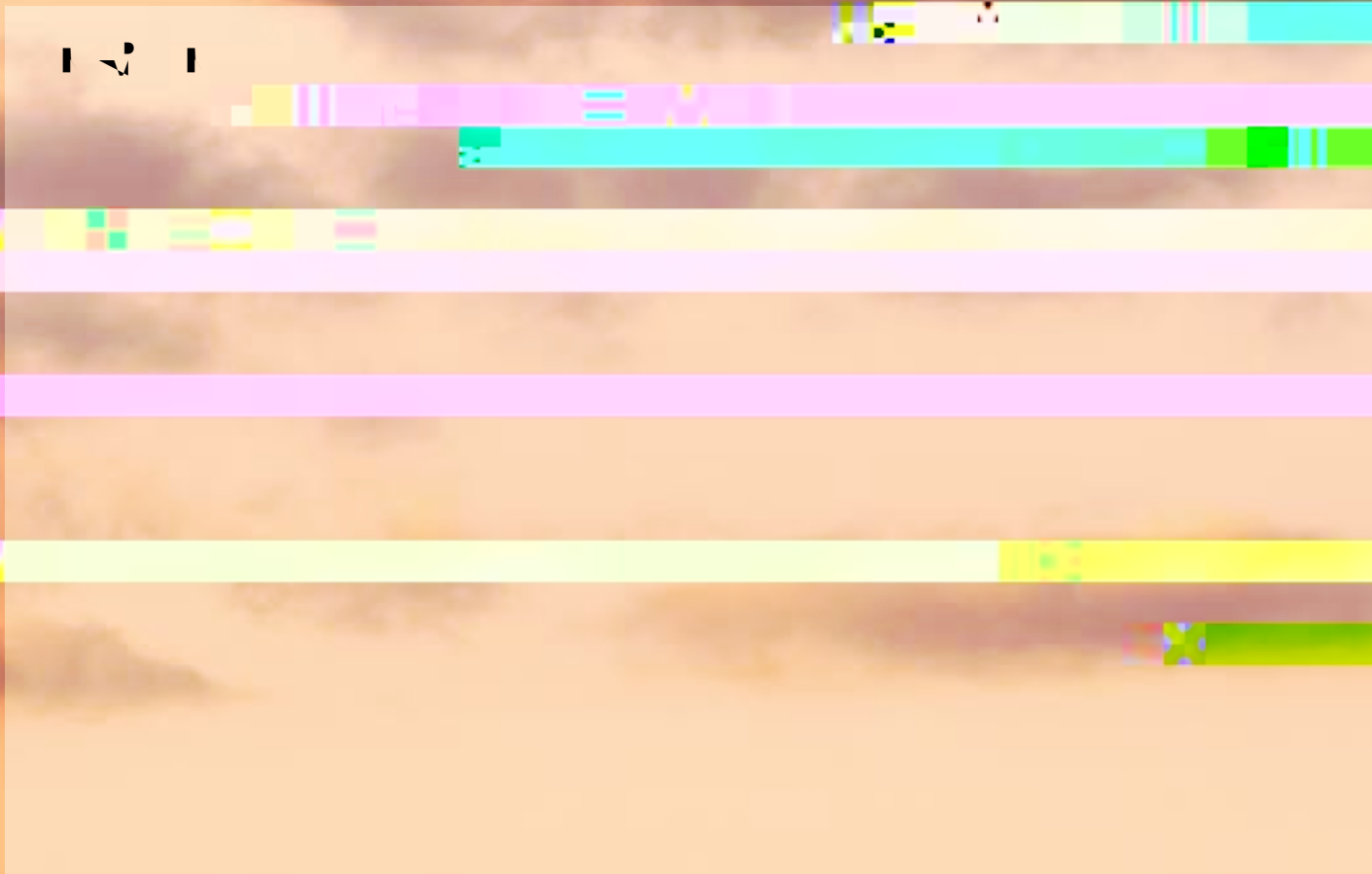
- Machining
- Design and modeling
- Cut and fold process
- Edge fill and edge seal
- Insert installation
- Attachment of insulation blankets, vibration damping and sound damping
- Anti skid tapes, part markings and labels
- Manufacturing and attaching of fittings, intercostals, splice plates



PRODUCT	CONSTRUCTION	APPLICATION	SPECIFICATION
Gilliner® 1066 1066R	Woven fiberglass cloth with a polyester resin.	Cargo liner.	FAR 25.855 App F Part I
Gilliner® 1567A	Woven E-glass cloth with a polyester resin system.	Cargo liner, bulkhead facings	BMS 8-2, CI 1 Gr A; FAR 25.855 App F
Gilliner® 1568A	Woven E-glass cloth with a polyester resin system.	Cargo liner and bulkhead facings of the lower cargo hold.	BMS 8-2, CI 1 Gr A; FAR 25.855 App F Parts I and III



PRODUCT	CONSTRUCTION	APPLICATION	SPECIFICATION
Gillfab® 4004A	Unidirectional fiberglass reinforced phenolic facings / meta-aramid honeycomb core.	Flooring, galleys, and lavatories.	BAER 3232; FAR 25.853 and 25.855 App F Part I
Gillfab® 4017T	Unidirectional fiberglass reinforced epoxy facings / meta-aramid honeycomb core.	Flooring.	BZZ 7002 Ty 1 -3; MEP 15-031 Ty 1-2; FAR 25.853 and 25.855 App F Part I
Gillfab® 4009	Unidirectional carbon fiber reinforced epoxy facings / meta-aramid honeycomb core.	Flooring, underseats, galleys, and bulkheads.	MEP 15-030 Ty 1; FAR 25.853 and 25.855 App F Part I



*This is not an all-inclusive list of where TGC products are used. TGC metallic and non-metallic honeycomb cores, panels, and laminates are sold to customers around the world for use in business jet applications.*



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