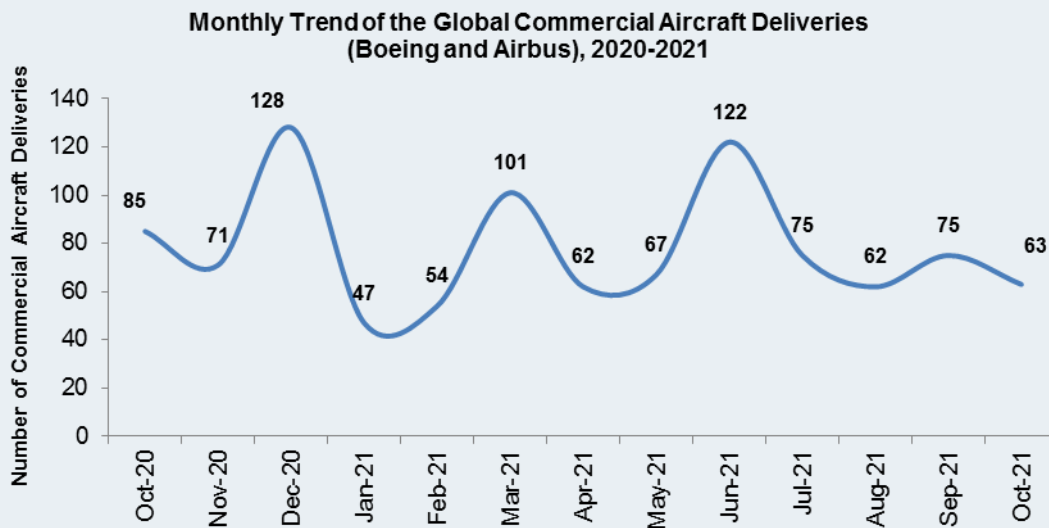


Composites Market Update for October 2021

Demand in the US Composites Market in October maintained the strong daily sales performance of September, and finished roughly flat from the previous year, which was one of the strongest months in 2020. Daily sales rates maintained their pace from September but with fewer billing days. The outlook for November appears robust, with more demand than the market can meet, due to logistics and supply challenges. Marine was particularly strong, as well as building and infrastructure. Most markets are up, with the exception of automotive, which is lagging behind demand due to component supply challenges. Generally, the demand exceeds the ability to service that demand. Raw material prices continue to increase. Labor, rail, freight, and logistics continue to be the primary external challenges plaguing the composites industry.

Aerospace

Commercial aircraft (Boeing and Airbus) deliveries decreased from 75 aircraft deliveries in September 2021 to 63 aircraft deliveries in October 2021.



Some highlights of October 2021 are as follows:

- Rocket Lab Selected to Launch NASA's Advanced Composite Solar Sail System.** Rocket Lab USA, Inc., a global leader in launch services and space systems, has been selected to launch NASA's Advanced Composite Solar Sail System, or ACS3, on the Electron launch vehicle. NASA's ACS3 technology demonstration uses composite materials - or a combination of materials with different properties, in its novel, lightweight booms that deploy from a CubeSat to support a solar sail. Data obtained from the ACS3 demonstration will guide the design of future larger-scale composite solar sail systems that could be used for space

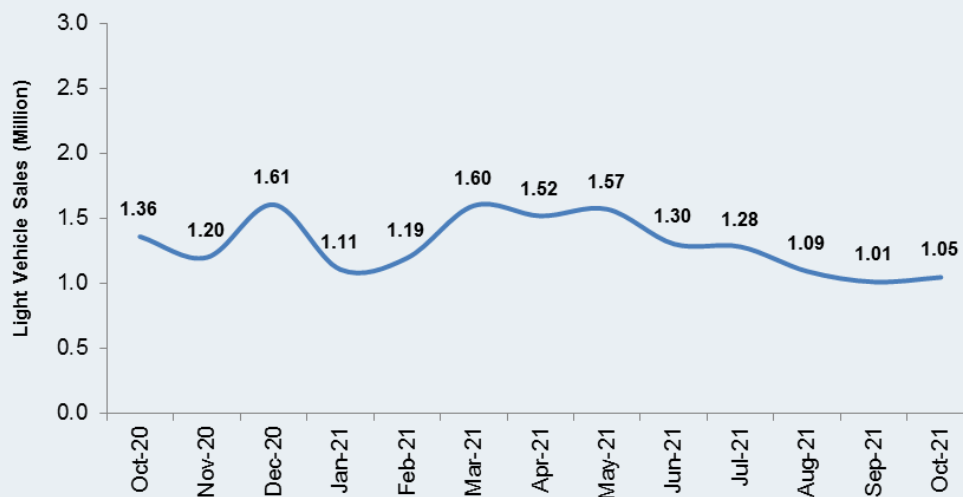
weather early warning satellites, near-Earth asteroid reconnaissance missions, or communications relays for crewed exploration missions.

- Teijin to Augment Highly Heat-Resistant Carbon Fiber Prepreg Production for Aerospace Industry.** Teijin Limited informed that its carbon fiber subsidiary Renegade Materials Corporation, a leading U.S.-based supplier of highly heat-resistant thermoset prepregs, resins, and adhesives for the aerospace industry, will expand its prepreg production by 2.5 times approximately. The increased capacity, which aligns with Renegade's capacity expansion strategy at the Miamisburg, Ohio location, is the result of a USD 4 million investments made in December 2019 and the construction was started in March 2020. Operation of the new production lines will commence January 2022.
- AITIIP is Developing Innovative RTM Tooling, ALM System for Sustainable Aircraft Wing.** HERON project methodology will be used to manufacture a composite aircraft wing demonstrator, which will be suitable to study the wing's technical parameters and kinematic and aerodynamic properties. The purpose of the project is to make the aircraft consume less fuel in flight and reduce CO2 emissions by 30%. In this regard, the technologies and tools developed at HERON seek to reduce the production cycle time by 30%. This, in turn, is projected to cut down manufacturing costs by 20%, energy consumption by 25% and environmental impact both in the production environment and in the air.
- Arris Composites and Airbus Collaborate on Composites Research for Lightweighting Cabin Brackets.** Advanced manufacturer Arris Composites reveals a research project with Airbus which focuses on the production of cabin brackets. This project aims to demonstrate significant reductions in aviation emissions by leveraging innovative manufacturing methods and materials, including composites.

Automotive

The U.S. new vehicle sales of 1,046,287 units in October 2021 represented a decrease of 23% as compared to 1,358,922 in October 2020.

Monthly Trend of Light Vehicle Sales in the US, 2020-2021



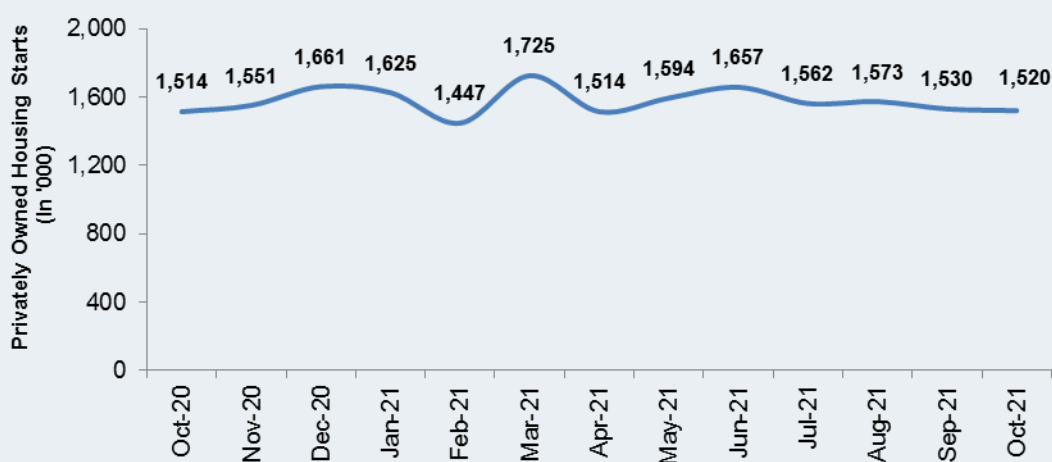
Some highlights of October 2021 are as follows:

- **LANXESS Lightweight Load Compartment Well for Luxury Sedans.** Tepex dynalite continuous-fiber-reinforced thermoplastic composite materials are increasingly being used as an alternative to metal in light-weight design. One new application for these composites from LANXESS is in the manufacture of the load compartment well installed in the Mercedes-Benz S-Class for accommodating the 48V on-board power supply battery. The composite components can withstand high mechanical stresses and are around 30% lighter than comparable sheet metal components. The composite design also ensures that the load compartment well is leaktight, preventing the ingress and egress of fluids like water and battery electrolyte.
- **AOC, Zoltek, Astar develop novel CF-SMC for high-performance automotive parts on an industrial scale.** The combination of Zoltek's low-cost split-tow fiber and Daron SMC resin from AOC and Astar produces CF-SMC with enhanced mechanical properties, low part emissions, cost efficiency and design freedom. In addition to its use for the production of structural interior automotive parts, "further potential applications of this new high-performance CF-SMC include dynamically loaded parts such as engine sub frames and steering knuckles. This makes the material system a highly desirable solution for future high-volume production series in automotive applications.
- **Joint Venture between KPX Chemical and Huntsman.** KPX Chemical, a leading polyols producer for polyurethanes in Korea, and Huntsman Corporation apprised of the establishment of a joint venture named KPX HUNTSMAN POLYURETHANES AUTOMOTIVE CO., LTD. (KHPUA). The joint venture will create and provide innovative polyurethane system solutions to Korean automakers from a specialty polyurethanes manufacturing facility at KPX Chemical's Ulsan plant. Operations are expected to commence by the end of October.
- **Vision Composite Products Selects IDI's Ultrium Carbon Fiber Composites for Their High Performance Carbon Fiber Forged Wheels.** Vision launched research into composite wheels and ultimately partnered with IDI Composites International and the 3i Technology Center to develop their Carbon Fiber Forged wheels using Ultrium carbon fiber composites. The resulting solution enables high volume production at costs competitive with forged aluminum wheels. The approach combines IDI Composites International's discontinuous Ultrium U660 Carbon Fiber Composite and A&P Technology's continuous Netshape preforms in a carbon fiber forged molding process.
- **Hemp Fiber Composites Incorporated into Electric Racecar Bodywork.** Aiming for higher sustainability, Bercella and Romeo Ferraris developed several hemp fiber composite bodywork components for the Giulia PURE ETCR vehicle. The use of hemp fiber for some bodywork components demonstrates, on one hand, constant search for improvements and innovations for the Giulia ETCR project and, on the other hand, the desire to offer a concrete contribution to eco-sustainability, a terrain on which motorsport itself plays an important part of its future.

Construction

Privately-owned housing starts in October were at a seasonally adjusted annual rate of 1,520,000. This is 0.7% below the revised September estimate of 1,530,000, but is 0.4% above the October 2020 rate of 1,514,000. Single-family housing starts in October were at a rate of 1,039,000; this is 3.9% below the revised September figure of 1,081,000. The October rate for units in buildings with five units or more was 470,000.

Monthly Trend of Privately Owned Housing Starts in the US, 2020-2021



One of the highlights of October 2021 is as follows:

- CSNRI has Added New Proven Composite Solutions—A+Max.** CSNRI has added a new product to its composite repair solutions for pipeline rehabilitation and repair. A+ Max is a complimentary product to the current A+ Wrap and provides another tool for pipeline operators to enhance pipeline integrity. A+ Max combines the same field-proven chemistry of the A+ Wrap family with a stronger and thicker fabric to reduce installation time and increase safety. A+ Wrap was developed to address the need for a quick, easy, and flexible composite repair for buried pipelines. A+ Max is intended for more severe defects, higher pressure repairs, and/or use on larger diameters that would otherwise require a higher layer count using the A+ Wrap system.

Wind Energy

According to the latest "Energy Infrastructure Update" report from the Federal Energy Regulatory Commission's Office of Energy Projects, the cumulative installed capacity of 45 units during January-September 2021 was 8,188 MW as compared to 6,102 MW of 60 units during January-September 2020. With a total installed generating capacity of 130.50 (GW), wind constituted 10.52% of the total installed generating capacity of 1,240.22 (GW) among all energy sources.

Some highlights of October 2021 are as follows:

- **Shanghai Electric Debuts 11 MW Direct-Drive Wind Turbines.** Shanghai Electric is releasing its latest offshore wind turbine model, Petrel platform SEW11.0-208. SEW11.0-208 is the first offshore wind turbine to take full advantage of Shanghai Electric's self-developed Petrel platform, which is purpose-built to withstand high temperatures, humidity and salt, as well as changeable and complex marine environments such as earthquakes and typhoons. The new offshore giant uses S102 102-meter carbon-fiber blades that deliver enormous strength and superior performance.
- **GE Renewable Energy launches second 107-meter Wind Turbine Blade Mold.** GE Renewable Energy business announced today the launch of its second 107-meter wind turbine blade mold (production line) at its Cherbourg factory in France, in order to address the industry's demand for offshore wind turbine blades. The facility has produced the world's first offshore wind turbine blade longer than 100 meters, a 107-meters long blade that will be used in GE's Haliade-X offshore wind turbine.

Marine

The US marine industry is anticipated to experience good growth in 2021.

Some highlights of October 2021 are as follows:

- **Micore Boats AB Produces Premium Scandinavian Motorboats from EcoGel, Crystic, and Crestamold Products.** Micore use Scott Bader's Crystic Ecogel S3PA, a very-low styrene marine gelcoat with superior weathering properties, for finishing their powerboat hulls and decks. Crestafix 90-82PA is used for the composition of the parts due to its high shear strength and flexibility. Crystic Topcoat, Crystic 2-420PALV, and Crystic 2-446MPALV are used for the lamination of all composite parts. Crestamould high performance matched tooling systems produce all of Micore's composite molds.
- **Sicomin's InfuGreen 810 Used in New Couach Fly 86/2600 Motor Yacht - The Largest Bio-Epoxy Hull.** Sicomin's InfuGreen 810 was used for the vacuum infusion of the 26-meter, 52-ton superyacht's hull, deck and superstructure, which is said to produce a lighter, faster, more durable yacht and significantly reduce overall fuel consumption. With 38% of its carbon content from plant-based sources, Sicomin says InfuGreen 810 is formulated to provide a more sustainable vacuum infusion resin. InfuGreen 810 resin offers the optimum solution for infusion in a large structure such as the Fly 86/2600.

Consumer Goods

New orders for manufactured durable goods in October decreased \$1.2 billion or 0.5% to \$260.1 billion, the U.S. Census Bureau announced today. This decrease, down two consecutive months, followed a 0.4% September decrease. Excluding transportation, new orders increased 0.5%. Excluding defense, new orders increased 0.8%. Transportation equipment, down three of the last four months, drove the decrease, 2.0 billion or 2.6% to \$75.3 billion.

Some highlights of October 2021 are as follows:

- **Pleko Shoes 3D Printed with Carbon Fiber.** CRP Technology has built as single unit the structural part of Pleko spike shoes: outsole, midsole, pins and ribbing. The result is a functional prototype, flexible and resistant to deformation even in thin thicknesses, which is innovative for customization, technologies and material used: carbon fiber reinforced Windform SP composite. Using a completely new and revolutionary concept for the athletics footwear market, Venetian middle-distance runner Miro Buroni developed Pleko, customized athletics track shoes with innovative features in terms of production technology and material.
- **Turkey's Metyx Glass Fibre Fabrics used for Making GRP Water Pipes.** The Metyx range of multiaxial glass fibre fabrics has recently gained accreditation for being safe to use in the manufacture of unsaturated polyester, vinyl ester and epoxy resin glass fibre reinforced (GRP) drinking water pipes and GRP potable water storage systems. The addition of this new drinking water pipe approval has extended the reinforcement product offering that Metyx is now able to supply to both new customers and our existing GRP pipe producers using Metyx's multiaxial fabrics for their water, drain and sewage pipe needs

Recent Developments in Materials

- **Solvay Launches CYCOM EP2190 for the Aerospace Market.** Solvay has launched CYCOM EP2190, an epoxy-based system offering outstanding toughness in thick and thin structures combined with excellent in-plane performance in hot/wet and cold/dry environments. One of the strengths of the new prepreg system is its superior toughness combined with excellent hot-wet compression properties offering an ideal balance of performance. In addition, CYCOM EP2190 offers robust manufacturing performance allowing for fabrication of parts with complex shapes using manual or automated fabrication methods. This prepreg system will enable customers to use the same material for multiple targeted applications.
- **Notus Composites Unveils NE7 Epoxy Prepreg.** Notus Composites (UAE), a producer of epoxy prepreg materials, apprised of the latest addition to its high-performance epoxy range with the launch of its new NE7 low temperature curing prepreg system. The entirely new Notus NE7 formulation allows composite manufacturers to cure components at temperatures as low as 70°C, reducing energy consumption and enabling more cost-effective tooling options. Notus Composites has developed the new NE7 prepreg systems for applications across the Marine, Architecture, Industrial and Wind Energy sectors, with the novel low temperature curing chemistry delivery significant cost benefits.
- **BASF's Smart Technology Enabled CosyPUR in Backrobo Wellness' Latest Bedding Solutions.** Backrobo Wellness (BackRobo) has introduced BASF's CosyPUR – an innovative, high-

performance polyurethane (PU) foam - in the mattress topper of its latest suite of smart bedding solutions. The open-celled structure of the foam, which enables air to pass through the material and in the process dissipates body heat, results in a more breathable and comfortable experience than higher density visco elastic foams. CosyPUR further enables Backrobo's smart technology by automatically adjusting to body weight and temperature when movement is detected - it gently 'fills in' and reshapes itself to the new sleeping posture.

- Allnex Launches CRYLCOAT 4478-0.** Allnex is launching the new versatile superdurable, the CRYLCOAT 4478-0. The CRYLCOAT 4478-0 has been created by allnex chemists to offer a superdurable product that will allow you to reduce your SKU, saving you both time and money. In addition, it's a versatile, broad-compatibility polyester resin that eliminates that need for multiple products, thereby saving space, time, and money.

Recent Product Launches in the Composites Market

The following table represents new product launch in the composites market in October 2021.

Product	Company Name	Description
RAM 48	Magnum Venus Products	Magnum Venus Products (MVP) is launching a new model of its Reactive Additive Manufacturing (RAM) system to enable cost-effective fabrication of thermoset materials at medium- and large-scale. The new model, named RAM 48, has a print area of four-by-eight-feet with modular, expandable four-by-four-foot sections to allow for custom build dimensions.
MTB350	SHD Group	MTB350 is a component prepreg system combining 30% bio-content. It provides the potential for reducing both the total embodied energy in a final part, as well as the costs (and risks) associated with storage and shipping of valuable prepreg materials.
LTB310-1	SHD Group	LTB310-1 is a low temperature cure epoxy tooling prepreg with 30% bio-derived content, with mechanical and processing performance on a par with other industry standard SHD tooling systems. Initial cures down to 45°C are possible with an ultimate Tg of over 200°C achievable after post cure.

The US Economic Overview – October 2021

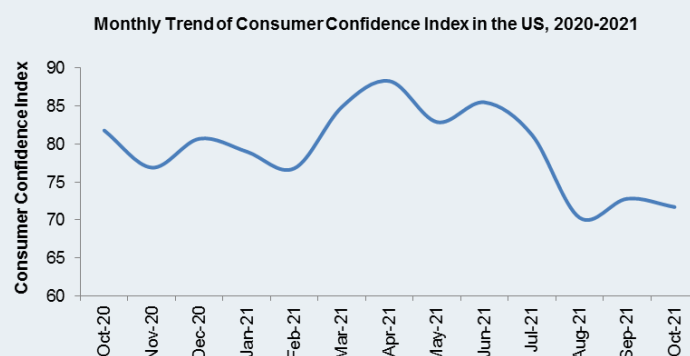
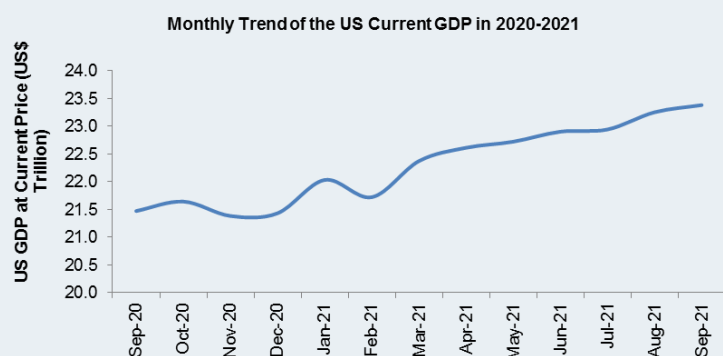
The US Consumer Confidence Index decreased to 71.7 in October 2021 as compared to 72.8 in September 2021. The GDP at current price of the US increased from US \$23.25 trillion in August 2021 to US \$23.38 trillion in September 2021.

Real gross domestic product (GDP) increased at an annual rate of 2.1% in the third quarter of 2021, according to the "second" estimate. The increase in real GDP in the third quarter reflected increases

in private inventory investment, personal consumption expenditures (PCE), state and local government spending, and nonresidential fixed investment that were partly offset by decreases in residential fixed investment, federal government spending, and exports.

The increase in third quarter GDP reflected the continued economic impact of the COVID-19 pandemic. A resurgence of COVID-19 cases resulted in new restrictions and delays in the reopening of establishments in some parts of the country. Government assistance payments in the form of forgivable loans to businesses, grants to state and local governments, and social benefits to households all decreased.

The price index for gross domestic purchases increased 5.5% in the third quarter, compared with an increase of 5.8% in the second quarter. The PCE price index increased 5.3%, compared with an increase of 6.5%. Excluding food and energy prices, the PCE price index increased 4.5%, compared with an increase of 6.1%.



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