Highlights

ADVANCED MATERIALS

Automotive

Aerospace

Marine industry

Rail industry

Cms

advanced materials technology

CMS key numbers

TEAM
700
employees

EXPERIENCE
50 years
constantly growing

WORLDWIDE
5 foreign branches

STRENGTH
139 mln
turnover

TECHNOLOGY
58
patents

RELIABILITY
100%
made in Italy

KNOWLEDGE
8.900 +
machines
installed

WIDESPREAD
124
countries
supplied

Cms

4C

Alfa Romeo

The use of ultra-light next-generation materials enables the 4C to weigh as little as 895 kg (overall dry weight) and to feature race car torsional rigidity at the same time, thanks to the optimization of the barycentre to the benefit of fast paced drivability along winding paths.

With this approach in mind, the FIAT Group partner companies involved in the project were requested to provide a production response in line with the distinguishing traits of the car and an exceptional level of commitment in all respects. It should also be borne in mind that the 4C is a car "within a product range" and with production numbers well over a limited series.

That is why the main suppliers carefully considered new systems capable of meeting this real challenge: machines and machining centres able to guarantee the quality levels required by the project, but also to optimize the production rates, the individual production chains and related costs.

The invariable preference for CMS technologies speaks eloquently of the various and complex manufacturing aspects, as a striking confirmation of the level of specialization, versatility and reliability required by the manifold components and types of materials of the car.

E.M.A.R.C

ADLER GROUP

novation

Tg
Toscana Gomma SpA

Four different Alfa Romeo' suppliers chose CMS machines in the 4C manufacturing processing: E.M.A.R.C. used a CMS Poseidon, a 5-axis interpolated machining centre, to manufacture of aluminium parts, namely the engine crankcase and the front and rear chassis frame. Adler Group chose a CMS Ares for the manufacturing of the carbon fiber chassis, a single-block part that requires complex machining and finishing operations. Novation used a CMS Athena to process some fundamental parts of the interior, among which is the seat structure (seat base and backrest), made of ultra-light high-resistance carbon fiber. Toscana Gomma chose a CMS Cronus to attend to the prototyping of padding based on ergonomic design and synergy with the carbon fiber structure.

Carbon fiber body

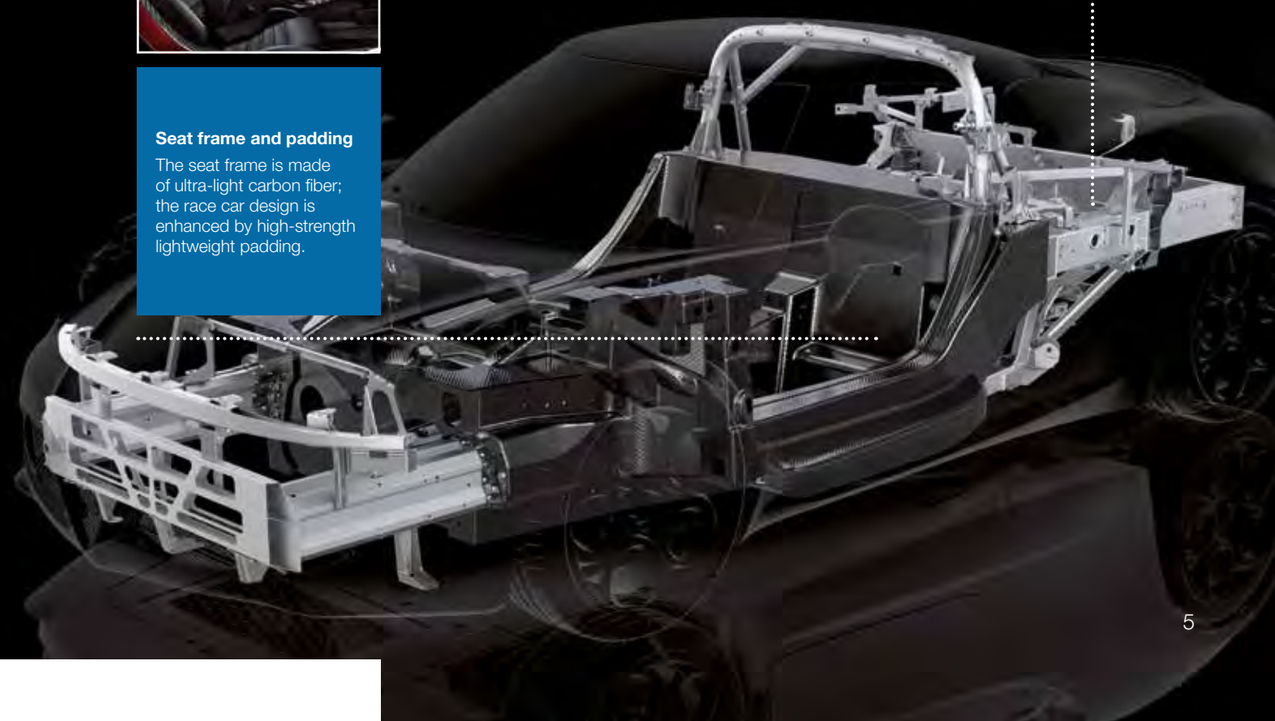
This is a natural element and the most technical material used in the automotive industry at the same time. The chassis of the Alfa Romeo 4C is made up of a carbon fiber monobloc, a prerogative of supercars, which houses the driver's and passenger's seats for a comprehensive weight of a mere 65 Kg.

Aluminium engine crankcase and chassis

Technology at the service of performance. Aluminium permits a true paradox: strength and maximum lightness at the same time. That is why the engine crankcase, the front frame and the rear frame of the chassis are made of aluminium.

Seat frame and padding

The seat frame is made of ultra-light carbon fiber; the race car design is enhanced by high-strength lightweight padding.



Artemis Racing selects CMS machining centres

The America's Cup has always been a race driven by technology-a boat's design can play as big a factor in victory as its crew. As such, carbon fiber has become the construction material of choice for modern racing yachts. To ensure that every piece of their boat is perfect, Artemis Racing has started using CMS' CNC equipment to machine the carbon fiber parts and components they need.

Artemis Racing utilizes an Ares moving bridge CNC system to create dagger foils, hull components, wing sails, and more. The Ares' large work envelope is well-suited to the cutting and machining of these oversized parts, and CMS' advanced CNC technology guarantees that each piece matches the design specifications exactly.

The nature of America's Cup competition and the ongoing struggle to be the best boat on the water leads Artemis Racing to constantly revise and refine their designs. CMS' CNC technology enables Artemis Racing's engineers to produce newly-redesigned components quickly and easily, so they can be tested in racing scenarios and evaluated for further revisions.

In late March of this year, America's Cup organizers made a significant rule change for the upcoming competition, throwing a wrench into the plans of Artemis Racing and other competitors. In an effort to reduce costs, and thereby open the field to new teams, the established AC62 boat class (62-foot foiling catamarans) was replaced with the new "America's Cup Class" of wing-sailed, foiling catamarans measuring between 45 and 50 feet in length.

As Artemis Racing had already done extensive work on their 62-footer, the rule change has them working tirelessly to develop new designs. Thanks to their CMS 5-axis CNC system, the Artemis Racing team can react quickly to their engineers' design changes, as well as those of their competitors. This gives Artemis Racing a competitive advantage they hope will help them claim the Auld Mug in 2017. In addition to our "genuinely great machines," Artemis Racing's Build Manager Mark Allanson says they have also benefitted from CMS North America's outstanding technical service and support. "Our experts on the CMS team are "very helpful, very passionate, and very knowledgeable." He also praised our fast, efficient customer support team, stating that every question his crew has posed thus far has been answered and that solutions to new problems are found quickly.

CMS is proud to be a part of Artemis Racing's quest for the America's Cup and a place in international sporting history. We wish them the best of luck in the 2017 event and beyond.

Stadler

Stadler is a leading Swiss train manufacturer operating on an international scale. Stadler has locations in Switzerland, Germany, Spain, Poland, Hungary, the Czech Republic, Italy, Austria, the Netherlands, Belarus, Algeria, Australia and in the USA. The Group has a workforce of around 7000 people. The best-known vehicle series from Stadler are the articulated multiple-unit train GTW, the FLIRT, the double-decker multiple-unit train KISS and the high-speed train EC250 in the railway segment, and the Variobahn and the Tango in the tram segment. The Metro is another addition for the commuter rail market. Furthermore, Stadler manufactures metre-gauge trains, passenger carriages and locomotives and is the world's leading manufacturer of rack-and-pinion rail vehicles.

CMS machining centres for the working of aluminium panels for the railway industry

STADLER

Stadler's has chosen a CMS machining centre after weighing and comparing the performance of the PMT machining centre with the standard metal working machines. Briefly, CMS technology succeeds in carrying out the planned machining cycle in full respect of the strict quality parameters required by Stadler. With an additional, strategic advantage: an extremely attractive purchase cost. Operating time is really good by means of three reciprocally-synergetic factors: one single set up, thanks to the features of the loading table, the operating speed of the tools and the complete automatism, still without interruptions, from the window opening phase to the next window-opening polishing step. Besides, the collection and removal of swarfs takes place in automatic mode too.

The CMS PMT performs a fully-automated continuous cycle, capable of optimizing machining times and abating operating costs for each single workpiece. The machine enables operating accurately and particularly fast when carrying out drilling, milling, window opening, blade cutting and roughing operations. It provides a wide range of multiple or independent operating units with tool change. Just as flexible is the work area configurability. The whole system is programmed and managed by numerically controlled technologies in order to ensure total cycle reliability, integration with the corporate IT facilities and user-friendly interface with the operator.

By supplying a special PMT machining centre to Stadler's factory at Bussnang, CMS confirms its state-of-the-art capabilities in the design and construction of integrated and complete solutions for the automatic machining of large-sized aluminium workpieces.

CMS 5-axis technology devoted to high speed machining of large-sized aluminium workpieces, meeting STADLER's requests of aluminium walls and floors of railway carriages.

SpaceX

Founded in 2002 SpaceX is one of the world's only privately-owned space transport services companies. In 2006, SpaceX was awarded a number of contracts by NASA for cargo and supply missions to the International Space Station (ISS). To date, the company has flown four missions to the ISS. SpaceX has also secured numerous space transport contracts with private sector companies, the United States Air Force, and several government agencies outside the US. The company designs, manufactures, and launches a variety of advanced rockets and spacecraft, all of which are designed to be reusable many times over. In May 2012, SpaceX became the first private company to send a spacecraft - an advanced iteration of the Dragon - to the ISS. They were the first private company to send a satellite into geosynchronous orbit, in December 2013.

In 2004 the company began developing a "heavy lift" spacecraft; the result is the Falcon Heavy, the world's most powerful rocket. The Falcon Heavy is capable of lifting over 117,000 lbs. into orbit at roughly one-third the cost of the next closest operational vehicle in existence. Additionally, the Falcon Heavy was designed from its inception to carry humans into space, a mission the company hopes to achieve by 2030.

To maintain quality control and reduce costs, SpaceX designs, fabricates, and tests most of their components in-house. Because cutting precision and dimensional accuracy are of utmost importance when machining parts for spacecraft like the Dragon, Falcon 9, and Falcon Heavy, SpaceX has been employing CMS' advanced CNC machining technology since 2012. In aerospace applications, there is literally no room for error and, to ensure that the parts and components going into their spacecraft meet the tight tolerances required, SpaceX employs a number of CMS machining centres, including our MBB, Poseidon, and Ares CNC systems, as well as a specially-modified version of the Cronus moving bridge. The MBB moving gantry is used to machine the special metal sheet materials that are used in outer walls of SpaceX's revolutionary Merlin rocket engines. The highly specialized, blended aluminium material must be cut with extreme accuracy and machined to a precisely-calibrated thickness in order to achieve the necessary fit and performance. With high speed 5-axis machine heads, independent tool changing capabilities, and a large work envelope, the MBB system has proven itself to be ideal for this task. SpaceX utilizes our Poseidon, Ares, and Cronus CNC machining centres to manufacture a number of parts, including lightweight honeycomb panels that provide exceptional strength and rigidity. These CNC systems include innovative features that allow for fast production with unparalleled precision and reliability. Our Poseidon machining centres are designed for the production of very large parts. A double work area and an independent, high powered, 5-axis work head allows for nonstop production of SpaceX's parts and components. A rigid, engineered framework helps to increase machining precision.

The completely self-contained Ares CNC moving bridge system is capable of nonstop, pendulous work cycles. It offers versatile machining options with a high speed, 15 kw/20.1 hp, 5-axis work head, and a rigid monobloc structure for superior accuracy. The Cronus 5-axis machining centre SpaceX uses has been modified to include a larger work envelope, allowing it to produce the extremely large parts their spacecraft need. The system's unique Torque 5 direct drive work head is designed for extremely fast machining with exceptional positioning accuracy, high static stiffness, and zero backlash.

SpaceX working to make life on Mars a reality with help from CMS

The innovative minds at SpaceX are working to revolutionize space technology and turn the stuff of science fiction into science fact. CMS is proud to supply the advanced machining technology needed to turn their vision into reality. Together, we have forged a partnership that will help take humanity to the Red Planet and beyond.

LOCKHEED MARTIN

CMS Solution for Lockheed Martin - Orion Heat Shield

Lockheed Space Systems – Denver, Colorado facilities include their CDS, or Composite Development Shop where composite structures for a variety of space applications are designed, machined and assembled. Between 2012 and 2013, Lockheed contracted CMS Industries to design and build two Poseidon machines that were subsequently supplied and installed.

ockheed Martin

The larger of the two machines is a CMS Poseidon 38/75 model, which is about 7.5 meters in length by 3.8 meters in width and includes some unique features, including:
1. A moving table system that allows for either a part to be loaded onto the moving table outside of the machining area, and then positioned into the machining area via rails, or a work fixture/work-piece setup that can be positioned into the machining area without using the table. The table is approximately 20' wide by 20' deep. When rolled into the machining area (on special rails), the table is positioned directly over six CMS supplied pneumatic lifts that when engaged into the table mounts, slightly lift and position the table so the overall surface flatness and position relative to the machine travels is within .020".
2. The machine was specially designed to fit into a space constrained room that included concrete walls on each side of the machine. The machine design incorporating modified vertical supporting structures that would still provide the necessary work area travels was created.
3. A modified version of the front door/frame unit that allows for the crane cables to pass through.

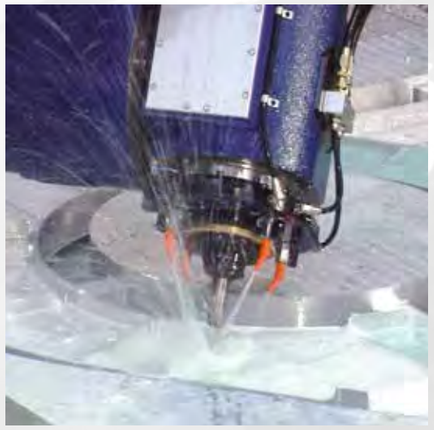
The original intended (and still current) use for this machine was for spacecraft hardware. However, after the machine was ordered, Lockheed corporate re-directed the new Orion spacecraft heat shield work to the CDS – Littleton Colorado facility as the newly ordered CMS machine was the only machine large enough to handle the work piece size within Lockheed Space Systems available machine inventory at that time.
The main machining operations were:
1. Surfacing the inside of the composite shell. Approximately 15 – 20% of the inside of composite shell required machining. These surfaces were machined to match the curvature of a mating titanium surface.
2. Drilling operation on the titanium surface. Positioning of the titanium material/work fixture assembly into the machine, utilizing the six pneumatic lifts to accurately position the assembly. Then a drilling and reaming operation began resulting in over 2,800 holes titanium/composite drill stack with the use of a speed reducer mounted to the end of the CMS spindle.
3. Match drill and ream heat shield assembly. The titanium structure and composite shield were then loosely mated, and re-positioned into the machine for a critical match drill and reaming operation to the same + 2,800 hole locations that were previously drilled.
4. Countersinking outer shell hole locations. Finally, a critical countersinking operation was needed for all +2,800 hole locations to ensure a flush mount fit of the fastener to the outer composite shield surface. A specially developed Lockheed Martin "PINC" countersinking head and tool mechanism that mounts directly to the HSK spindle interface was utilized to complete the countersinking operation.

CMS' capabilities in the aerospace industry meet Lockheed Martin's high expectations.

The widest range of solutions

LASER SCRIBING OF MASKANT FOR CHEMICAL MILLING

CUTTING OF AIRCRAFT STRUCTURAL ALUMINIUM COMPONENTS OBTAINED FROM SOLID MATERIAL

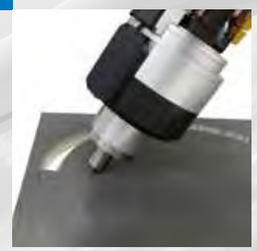


CUTTING OF STACKED ALUMINIUM SHEETS

ABRASIVE WATERJET CUTTING

HIGH-SPEED TRIMMING AND CUTTING OF HULLS AND DECKS OF YACHTS

HIGH-SPEED MACHINING OF PATTERNS AND MOULDS



CUTTING OF CORE MATERIALS AND SANDWICH

HIGH POWER 5-AXIS UNIT

PROCESSING OF WINDSHIELDS, WINDOWS AND CANOPIES OF AIRCRAFTS AND HELICOPTERS

INTERCHANGEABLE HEAD

CUTTING, DRILLING, COUNTERSINKING OF COMPOSITE PARTS OF AICRAFTS AND CARS

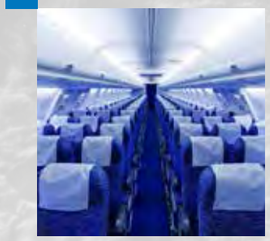
HIGH SPEED CUTTING OF CAST ALUMINIUM AND ALUMINIUM EXTRUSIONS

HIGH SPEED MACHINING OF STYLE MODELS OF CARS

PROCESSING OF RAILWAY CARRIAGES' AND LOCOMOTIVE'S ALUMINIUM WALLS

CUTTING OF CFRP MONOCOCQUE FOR RACING CARS AND SUPERCARS

TRIMMING OF INTERIORS AND PARTS OF VEHICLES



ALUMINIUM SKIN THICKNESS REDUCTION

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