

# FACTS



## ARIANE 6

- + Europe's multi-talented rocket for all types of missions.
- + Two versions Ariane 62 and Ariane 64 with 816 tons and 1,530 tons thrust.
- + First lift-off in 2020.
- + Reusable upper stage "Vinci" engine.
- + Main stage Vulcain 2.1 with 18 tons thrust.
- + Payload capacity: 12 tons for geo-stationary orbits.
- + Transport up to 100 satellites to low orbits.
- + 600 companies in 13 European countries participating.
- + Up to 50% more cost-efficient than Ariane 5.
- + More information at: [www.ariane.group/en](http://www.ariane.group/en)



## BW MACHINING CENTRES

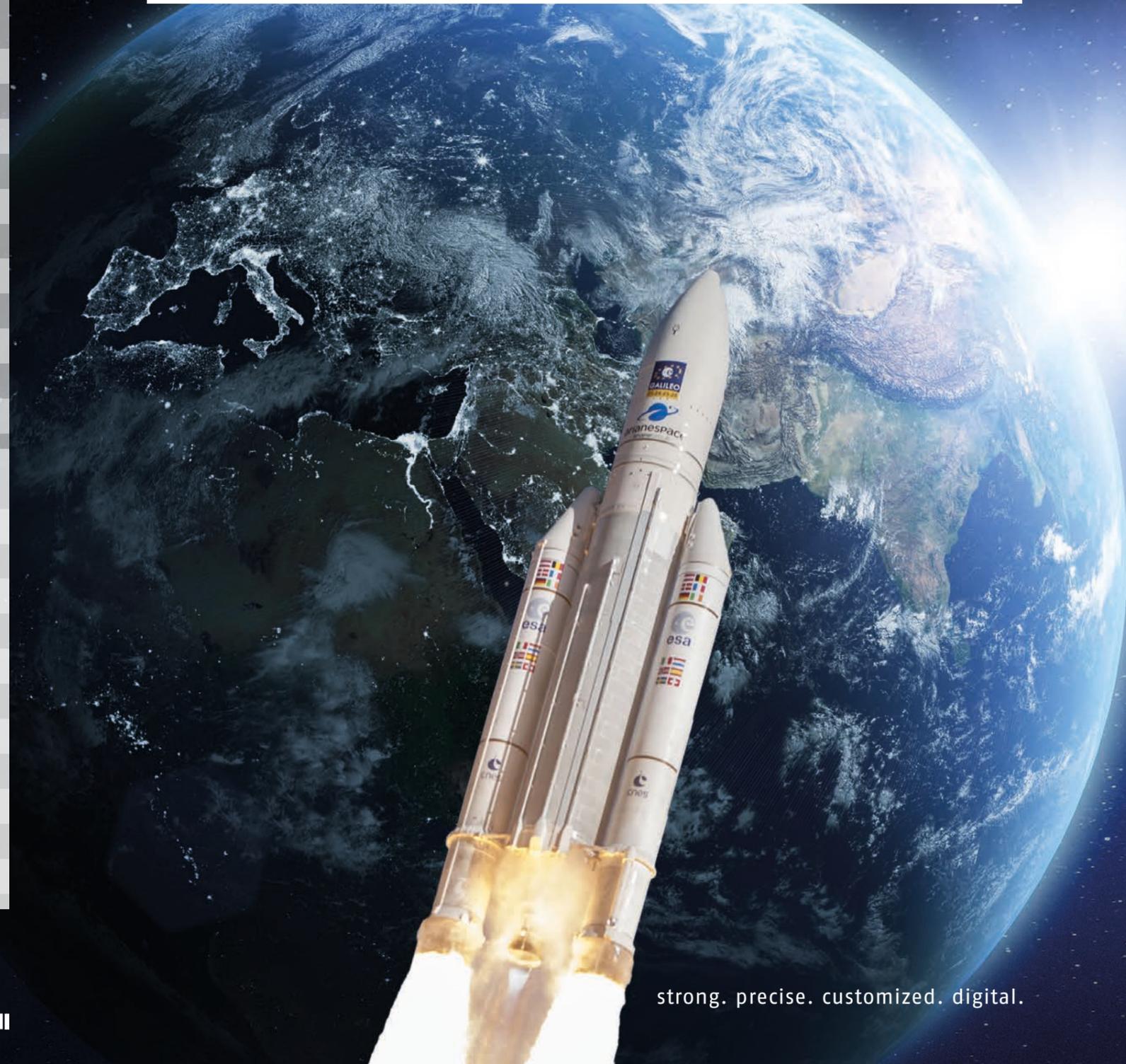
- + **MCT 900 A** – The ultra-flexible from BURKHARDT+WEBER.
- + Milling, drilling, boring, turning and more – everything on one 5-axis machining centre.
- + Advanced A-axis.
- + Interpolation turning.
- + More Y-axis travel.
- + High power density with CNC controlled A-axis swivel spindle.
- + BW-designed turn tables feature powerful torque-motors.
- + Integrated horizontal- und vertical-turning.
- + Zero-point clamping.
- + Video camera to monitor machining area.



SPRING 2019:

ARIANEGROUP

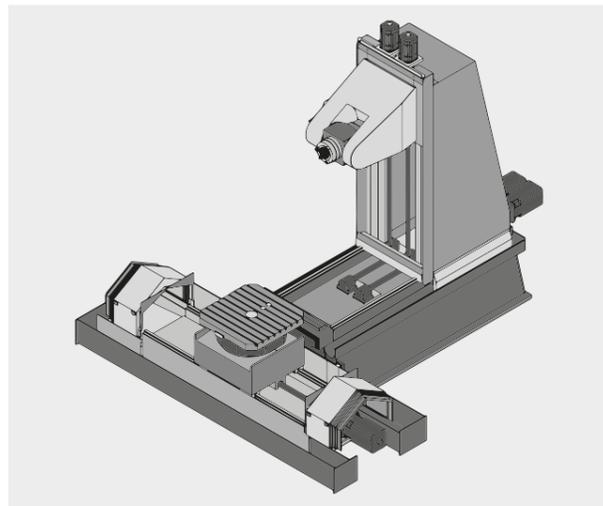
SPACE MISSION



# 1957 BW INVENTS THE NC CONTROLLED MACHINING CENTRE – TODAY THE BW MISSION IS TARGETING SPACE.

Not quite as mysterious as it was in 1957, and after 60 years experiences with machining centres, the mission space for BW is continuing now – and the circle closes 60 years later. BW conquered space again with a technical innovation and the gained values that make up the Reutlingen, Germany based mechanical engineering company for years – strong. precise. customized. digital. – all combined, this is displayed in the new MCT 900 A. With a re-engineered A-axis and an already proven multitasking approach, this BW 5-axis multitasking centre convinces the ArianeGroup.

In the future, this BURKHARDT+WEBER MCT 900 A will be advancing ArianeGroup's machining capabilities for turbine components and tank shells made from high strength steels, titanium and copper materials. In addition to performing ultra-precision machining, the machine provides superior flexibility to best meet the ever-changing demands.



Basic Structural MCT 900 A.

The Ariane 5 is the ArianeGroup's flagship rocket. It is the most reliable launch vehicle on the commercial market. No other rocket has completed that many successful launches in a row. As the benchmark for space transportation, the Ariane 5 continuously adapts

to the requirements of the operators and sets new records again and again. Starting in 2020, the modular, flexible and competitive priced Ariane 6 rocket will replace it. The Ariane 6 is featuring a larger payload volume under its fairing and can perform both classic single lifts or double lifts. However, its engine, when compared with the Ariane 5 rocket has incorporated larger turbine components, which requires more vertical Y-axis travel for machining, which finally shifted the purchase decision of the ArianeGroup towards the BURKHARDT+WEBER MCT 900 A 5-axis multitasking machining centre.

### The Main Features in Overview.

The technical specifications were obvious: A longer vertical travel is needed to machine the engine components. This is no standard solution for most machine manufacturers and creates a predestination for BW with its focus on customised standardised solutions. In addition to meeting this goal, the symmetrical twin-ball screw drive system in Y- and Z-axes ensures highest dynamic performance.

The basic machine features with polymer concrete filled hybrid base designs. Both ball screws and the servo motors are water cooled to compensate for thermal expansion even at high duty-cycles with maximum speeds. Feedback sensors and a specially developed software are perfecting the benefits for a consistent high quality of the machined parts. And the volumetric compensation further increases the machining accuracy and precision of the already precise machine.

The BW torque table design is featuring a most powerful engine for up to 600 rpm turning capacity. It is suitable for particularly high speeds and ensures optimum cutting performance results. To quickly change the part holding fixtures, the pallets integrate a zero-point clamping system. This adds great value for ArianeGroup as they have to exchange fixtures frequently due to the one-off small batch sizes.

The MCT 900 A as a 5-axis multitasking machine fully flexible performs all machining tasks including milling, drilling, turning and interpolation turning. All 3-D arranged part surfaces are machined in synchronisation with X-, Y- and Z-axis and the motor spindle as 4th axis, on one machine in one operation.

Another benefit of the customer is that his cutting tool technology is simplified, because standard tool holders can be utilised.

### 5-Axis Machining Centre with A-Axis.

The machine's A-axis is completely modified and executed as full-featured CNC-axis. The motor spindle is engineered for particularly high speeds up to 12,000 rpm in continuous operation. In addition, the spindle is equipped with a tool clamping system for accepting turning tools. For machining hard-to-reach, complex 3-D contours freely arranged in space, the spindle nose was extended for better collision avoidance. In addition, the swiveling A-axis impresses with high feed torque and holding torque capabilities.

As usual in the aerospace industry, the project topic is top secret and a part run-off at BW was not possible. Statements about accuracy requirements were thus only based on comparable technical drawings. Stefan Winter, Head of Manufacturing at ArianeGroup in Ottobrunn/Taufkirchen, has convinced himself of BW's good reputation after checking many of the success stories and customer references.



ArianeGroup produces the thrust chamber for the engines of the Ariane rocket carrier in Ottobrunn.

Is the present credo for the Reutlingen Machine Tool Company: "THE SKY IS THE LIMIT", from now on this most certainly can be changed to "THE SKY WAS THE LIMIT" – the new mission targets to conquer space.

HOW IT ALL BEGUN

## 1957 – BURKHARDT+WEBER, SPACE AND HOWARD HUGHES.

The year is 1957. BURKHARDT+WEBER enters a new era with a groundbreaking technical sensation and is inspiring the world-famous inventor Howard Hughes and his aerospace company Hughes Aircraft. Howard quickly recognizes the great potential of this completely new machine with NC control and the first NC machining centre is built.



Dr. Göbel and Howard Hughes (right side).

"Hughes Aircraft Company" sends a group of leading company managers on a secret mission to Geneva, Switzerland in 1957. Their main goal: Finding a machine tool with numerical

control. The Swiss had to pass and pointed the group to an emerging company at the foot of the Swabian Alb, in Germany. A company highly regarded for their particularly ambitious engineers. This led to the first contact with BW in 1958 and resulted to the first NC controlled machining centre being presented to the world at the international machine tool exhibition in Paris, in the year 1959.

### 1957 was also a special year for space travel.

On October 4, the first satellite was launched into space by the Soviet Union – this satellite named "Sputnik" weighted 80 kg and took the world by surprise.