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## **Alp Aviation protects its Gold supplier status with VERICUT**

**Alp Aviation is the third largest aerospace business in Turkey, dedicated to the aerospace industry and its high standards. With efficient operations and lean manufacturing methods, the company successfully competes in this global industry and continues to exceed customers` expectations for quality and on time delivery. Protecting its Gold supplier rating is VERICUT, the world's most advanced independent CNC simulation, optimisation and verification software.**

A joint-venture partnership with Sikorsky, Alp Aviation is the third largest aerospace business in Turkey, with around a 20 per cent share in aerospace exports. The company has two facilities in Eskisehir with a combined production area of 235,000 ft<sup>2</sup>; Plant 1 and the more recently opened Plant 2. Here, 13 cells follow lean manufacturing principles with skilled staff having extensive experience of machining titanium, aluminium, steel, stainless steel, copper alloys and heat resistant super alloys.

Quality systems are in accordance with the requirements of the global aerospace industry, including AS EN 9100, NADCAP, and a Flight Safety Parts Manufacturing License for Sikorsky platforms. As a part of UTC ACE (Achieving Competitive Excellence) quality management system, five of the cells have already achieved 'ACE Gold Level' supplier awards.

Within Plant 1, Alp Aviation manufactures rotary-wing dynamic components, flight control hardware for all Sikorsky platforms. As part of Turkish Utility Helicopter programme, product expansion includes the production of all major flight critical and dynamic components, and assemblies such as gears, gearboxes, rotor hub and spindle for Black Hawk and Seahawk aircraft.

Landing gear parts and subassemblies for the F-35 Joint Strike Fighter and F-22 Raptor programmes for Goodrich Landing Gear are also produced in this facility. The first JSF flight carried more than 40 Alp parts in its landing gears. The strategic co-operation between Alp Aviation and Goodrich Landing Gear is expected to bring more opportunities in the near future, not only for the JSF program but also for other programs like S70I and major commercial programmes.

Opened just three years ago, Plant 2 is a dedicated engine components facility and business unit. Here, 50 Alp Aviation staff produce engine rotating hardware such as fan rotors and fan rear hub for F135, as well as other key engine and Auxiliary Power Units (APU) components such as Boeing 787 and Airbus 380 APU diffusers for Hamilton Sundstrand, fuel and oil housings for many of Pratt & Whitney Canada engines, and sync rings for Pratt & Whitney F135 and F100 engines.

Alp Aviation is the major source for Pratt & Whitney F135 Stage 2, 3, 4 and 5 finished titanium Integrally Bladed Rotors (IBRs) as well as the fan rotor rear hub. The R&D contract between both companies also includes the development of F135 nickel IBR stages.

Cenk Akin, Engine Business Unit Manufacturing Manager, says the data files vary from project to project, sometimes the CAD model is supplied and sometimes just a blueprint for older projects. Solid models will be generated from these older files to create a base model.

He explains: "All of our NC programs are generated offline. In Plant 1 we have 17 Siemens NX and five Catia CAD/CAM software seats. The CAD/CAM path is selected simply by whichever engineer is available when the project starts. However, in Plant 2 we only use Siemens NX, with five seats, as well as specific software for turbine blade production." Advanced CNC manufacturing technology is used across the business facilities, with over 80 CNC machines include Mazak Integrex machines used for mill-turning and Mazak Variaxis multi-axis machines used for 4- and 5-axis components.

Plant 2 is equipped with 14 advanced CNC machining centres, including a Hermle and two DMG DMU 125P machines. As Cenk Akin explains: "We had a demonstration of the extent of VERICUT's capability and decided to invest in the software. With the complexity of the

parts and the resultant increase in value of the machine tools required to make the parts, as well as the value of the raw material and the security of supply, we wanted to protect our business with VERICUT.”

During the build and development phase of the Engine Business Unit, as the machine tools were being delivered and staff being trained, the simulation and verification software was used in the existing unit. CGTech’s local agent, Ucgen Yazilim, provided the support and training required. Managing Partner, Cem Alpay, says: “We created the VERICUT simulation models of the Mazak milling machines, including a Mazak flexible manufacturing system (FMS), with kinematics for each machine applied to ensure the model moves and reacts in the virtual world exactly as the machine tool does on the shopfloor.”

As VERICUT is used to verify the NC code for both CAM packages, Alp Aviation has the Siemens NX to VERICUT and Catia to VERICUT interface modules so the engineers can check the tool path and the machine axes movements using VERICUT within the CAM system. Once Plant 2 was finished a floating VERICUT licence with all modules was used between the two facilities, but now another full licence has been purchased so there is a seat available at each site.

Cem Alpay supports the customer to ensure they stay ahead of the capability of the software and also trains the new engineers that ALP need to support its business growth. Today, two staff is trained in VERICUT with five CAD/CAM engineers – two focused on milling.

The turning programmers will also be trained as projects demand it. As Recep Nazikgöl, Manufacturing Engineer, states: “We want to use VERICUT for mill-turn production going forward. New project components for an engine will require the cutting tool to be inside the component. Out of sight, so verification becomes crucial. VERICUT will prove the program safety to protect the machine tools and the component.”

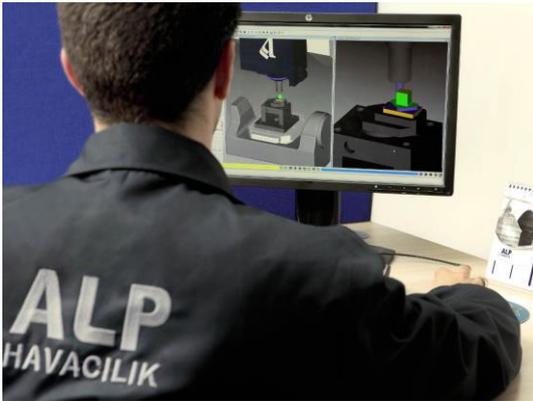
With PCs and monitors already installed on the shopfloor in Plant 2, the plan is to use VERICUT Reviewer files so the operator can see what is being machined, how it is cut with what tools, and any measurement checks required.

All of the IBRs currently machined start as forged blanks from accredited suppliers. “The IBR production follows a ‘frozen’ process to the customer’s approval. Mistakes are not acceptable, the forgings are expensive at around \$80,000 and we have no wish to lose our Gold supplier award. Thanks to VERICUT, we are confident that our manufacturing integrity and on-time delivery will remain intact,” concludes Cenk Akin.

Images and captions



(Alp1.jpg) Alp Aviation – Plant 1 and Plant 2 (left to right)



(Alp2.jpg) Complex CNC program files checked with VERICUT (Alp3.jpg) One of the company's advanced CNC manufacturing cells



(Alp4 and Alp5.jpg) Alp Aviation's advanced multi-axis machine tools are protected by VERICUT





(Alp6.jpg) F-22 Raptor (Alp7.jpg) Alp Aviation provides components for Sikorsky helicopters

## **Note to Editors**

CGTech is the developer of VERICUT, the world's leading CNC simulation and verification software product. VERICUT protects expensive CNC machine tools against potentially disastrous crashes and collisions. It allows the user to create detailed software models of all types of CNC machine tool to create a virtual machining environment. Users can then run their CNC programs through VERICUT before attempting to machine components. Errors such as axis over-travel, collision between tooling and workholding devices, rapid moves in material, and tool change collisions are detected and written to an error log.

All types of CNC machine tools are supported, including 5-axis milling machines and machining centres, as well as combination mill-turn centres.

VERICUT includes CNC program optimisation, which can reduce machining times by up to 50 per cent by adjusting feedrates and tool motion based on the material removal rate. Other benefits of optimised CNC programs include improved surface finish, greater tool life and less wear and tear on the machine tool.

CGTech, based in Irvine California, USA has European subsidiaries in UK, Germany, France and Italy and an extensive reseller network.

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