CASE STUDY

Italy

Aerospace

Transducers

Aermacchi—part of the Aeronautica Macchi Group
The Benefits of Alliances

Aeronautica Macchi Group's manufacturing facilities comprise AERMACCHI, LOGIC and SICAMB. Logic is a major Italian avionics company. SICAMB was established in 1975 as a joint venture between Aeronautica Macchi and the British Martin Baker Group. SICAMB produces ejection and crash seats for the Italian air force and many foreign air forces.

The design and production of military training aircraft has always been the main Aermacchi activity since the 1940s. The companies manufacturing facility is at its main plant at Venegono. Here Aermacchi manufactures its own aircraft models, those types which are joint venture products, sub-assemblies and components both for Italian and foreign companies. The manufacturing activities include several product lines, both civil and military. Flight testing is done at Venegono airport, adjacent to the plant. The combination of highly skilled operators and advanced concept machinery guarantees the high technological content and quality of all Aermacchi products.

Engine Nacelles

The manufacture of engine nacelles (the housing or "pod" which encloses the engine) is the latest business area into which Aermacchi has entered. This is a substantial commitment which demonstrates the companys diversification and commitment to the civil aerospace market. There are now five nacelle product lines in which Aermacchi collaborates with different companies. These include:

- sub-contractor to Alenia with full responsibility for the nacelles, including thrust reversers, of Falcon 900EX and Falcon 2000
- risk-sharing partner to Pratt & Witney with responsibility for the air intakes and engine cowlings of Airbus A330
- sub-contractor to Rohr for the supply of air intakes and engine cowlings of Airbus A319, A320 and A321 for CFM-56A and CFM-56B engines

Aermacchi, in partnership with the French aerospace company Hurel Dubois, received orders to design and build the entire nacelle for the General Electric CF34-8 engines for the Dornier 728 and Embraer 170.

Aermacchi has also been selected by Aircelle to design and build the inlet for the Pratt & Witney PW6000 engine nacelle for the Airbus A318. For each engine, Aermacchi will not only design and build the nacelles, but also perform complete ground development tests and provide support to the engine and aircraft manufacturers for the ground and flight certification tests.

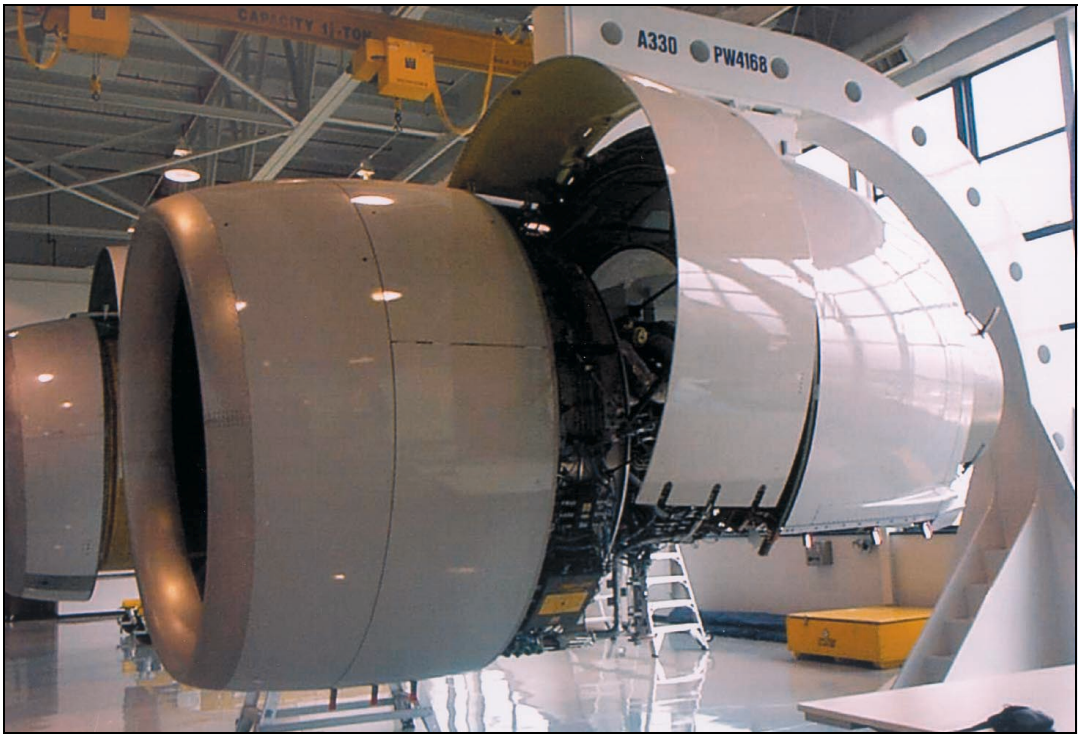

Fig. 1
A nacelle for one of the Pratt & Witney PW4168 engines which power the A330 Airbus

Transducers

Each engine will have hundreds of sensors mounted on it for testing purposes – special accelerometers (high temperature, shock, etc.) and pressure sensors. Brüel & Kjær was chosen as the supplier. The relationship between Brüel & Kjær and Aermacchi started in early April 2000 with a first meeting with Aermacchi's Flight Test Instrumentation specialists.

It was most important to gather all the relevant technical information from the customer. From the first meeting, it was obvious that the keys to a successful business relationship are:

- Technical support – quick, concise, accurate answers
- Delivery time – according to the customers' needs
- The right product range

The Alliance between Brüel & Kjær and ENDEVCO

In considering the wide product range that would be required, the benefits of the Brüel & Kjær/ENDEVCO alliance became very apparent to all parties.

The initial technical support was to help the customer to solve the problem of choosing the right transducer – to define the right sensor for each requirement and each test position on each engine. The relevant experience of Brüel & Kjær's application engineers was vital. With the addition of the ENDEVCO range, Brüel & Kjær could deliver sensors to fit all the customer's needs, and Aermacchi benefited from "one-stop shopping".

Teamwork and Partnership

And so to the next step. Brüel & Kjær has to deliver on time and, again, teamwork is a major factor. Representatives of Brüel & Kjær and Aermacchi meet regularly each month and have weekly telephone conferences. This helps both companies to plan their work, and to exchange useful information. The orders will run over the next three to four years.

Fig. 2
Airbus Industrie A318

As mentioned earlier, Aermacchi's core business is the development, production, modification and flight testing of military training aircraft and, as a result of our close cooperation, Brüel & Kjær has become a trusted "Consultant and Partner", helping Aermacchi to improve its products through the right measurements and analysis.

It Continues

As you can see, this is not the end of the story but the beginning of a strong and successful business relationship. Brüel & Kjær knows that the keys to success in the aerospace market are, together with its customers, to offer the right products, and to develop the right solutions which satisfy their customers' needs.

The future is exciting and other applications are currently being considered. These include Modal Testing, Spatial Transformation of Sound Fields and the range of Ometron Laser Doppler Vibrometers.

Owing to the collaboration with Brüel & Kjær on the measurement of noise, vibration and pressure in the prototype nacelles, Aermacchi will achieve substantial rationalisation in the development work. This will result in a shorter development period and reduced costs.

A Major Advantage

Engineer Ermanno Brughera, Flight test Supervisor at Aermacchi says, "Brüel & Kjær are assisting us in rationalising our NVH (Noise Vibration Harshness) measurements by supplying sensors and know-how for correct measurements and analysis. We see it as a major advantage to have an overall contact point for NVH applications and expertise. Brüel & Kjær and ENDEVCO together are a very strong combination. Their solutions are world-class and together they cover all areas of NVH measurement".

Fig. 3
Thai Airlines A330 Airbus

Fig. 4
Fairchild Dornier 728

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