

MTV's 0.4m-diameter Crisp model has two ten-blade rotors

## MTU continues Crisp testing

by Chris Drewer  
in Gottingen

West Germany's contrarotating integrated shrouded propfan (Crisp) programme has passed its first major milestone. The 0.4m-diameter model of the contrarotating fan has run at its 12,000 r.p.m. design speed at Germany's DFVLR aerospace research establishment.

The Crisp programme began in 1985 as part of a national propfan development effort sponsored by the Federal Ministry of Research and Technology (BMFT). Since then, MTU and the DFVLR have been carrying out research and development work on propfans for commercial aircraft.

Crisp comprises two contrarotating fan stages in tandem, with ten blades on each rotor. The model on test in Gottingen is driven by an air turbine, and can be adjusted to run at different angles of attack by means of a moveable aero-

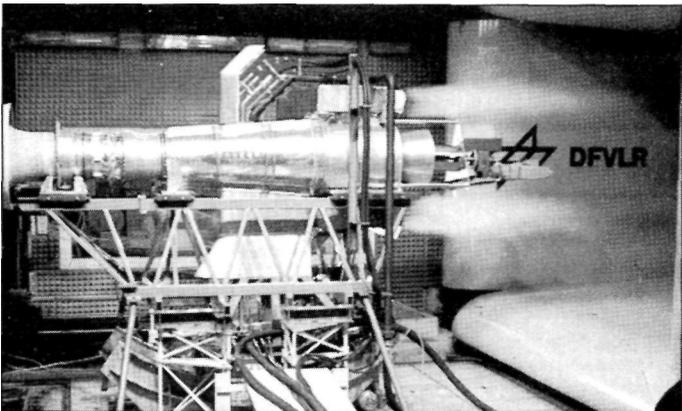
dynamic sting.

Test data from the Crisp model is obtained using pressure and thrust sensors and torque balances installed within the model. Data is transmitted from the rotating parts via a slipping transmitter for the first rotor and via a telemetry system for the second.

The first test phase now under way covers 150 days in the low-speed windtunnel. Priority is being given to functional tests of the model, determination of characteristics at different rotor-blade-angle settings, and investigation of take-off, landing, and reverse-thrust behaviour.

The second test phase will begin in DFVLR's transonic windtunnel in 1989. This will determine whether Crisp can produce high thrust levels at a cruise Mach number of 0.78. MTU expects the installation work for this part of the programme to take some time.

Crisp is being tested in the DFVLR's low-speed windtunnel



## Phoenix-replacement missile goes ahead

The US Navy has been given approval to move ahead with development of an advanced air-to-air missile (AAAM) intended to replace the long-range Phoenix in the mid-1990s.

Deputy Secretary of Defence William Taft late last month authorised the Service to proceed with demonstration and validation of the missile, adding the proviso that the two teams (General Dynamics/Westinghouse and Hughes/Raytheon) look into allied—and particularly French—involvement in the programme.

"A dialogue with the French, particularly, should be pursued concerning the ramjet concept," said Taft in a memorandum to the Navy and Air Force. Ramjet propulsion is understood to be part of the Hughes/Raytheon proposal.

Taft is also concerned that

the Navy avoids duplication with the Air Force, which plans eventually to upgrade its AIM-120 advanced medium-range air-to-air missile (Amraam). While the two Services will maintain separate programme offices, he recommends that they prepare a "joint-Service tactical air-to-air missile roadmap" annually, for review by the Pentagon's conventional systems committee.

Continued Pentagon support for AAAM is contingent, says Taft, on the Navy budgeting \$837 million for the missile during the FY1990-1994 period. AAAM development is expected to take about nine years, and initial contracts should soon be awarded to the teams.

Meanwhile, the Navy has decided to end Phoenix procurement from FY1992, and cut purchases in the previous two years.

## Belgian fighter undecided

Belgium is not ready to decide whether or not to participate in either the Dassault Rafale D or General Dynamics Agile Falcon fighter programmes, Defence Minister Guy Coeme suggests.

"A decision can only be taken with a full understanding of the strategic and political options at the beginning of the 21st Century," he says, underlining that Belgium is in no hurry to decide. According to present re-equipment plans the Belgian Air Force has no requirement for new combat aircraft before 2005.

According to political commentators, however, "no decision is a decision away from Rafale D", since the Belgian Government is being urged by Dassault to decide before the year's end to participate in development, and later production, of the aircraft.

Left-wing Belgian politicians have spoken out against engagements that may prove to be beyond the nation's financial capability. "Aircraft costing up to BFr1,000 million (£15 million) each, and which may cost twice that amount by the time the Air Force will need them in 2005, are

unaffordable," says Karel Van Miert, president of the influential socialist SF party, a Government coalition partner.

If the Air Force is to continue flying, he says, a reduction in its strength from the present eight squadrons to six is the only option. The Service should standardise on a single aircraft type, which at present is the F-16, and Belgium should review its Nato commitment, bringing the number of aircraft put at Nato's disposal down from 144 to 108.

The two squadrons that should be sacrificed, according to Van Miert, are those of 3 Wing at Bierset airbase, near Liege, the only ones left flying the Mirage 5B when conversion of 2 Wing at Florennes to the F-16 is completed.

The Air Force wants to start an extensive mid-life update of at least 36 more-recent Mirage airframes to stretch their service life into the 21st Century, in order to maintain its Nato commitment of eight squadrons. This update includes new avionics and fire control system and a new ejection seat. This programme is also under fire, being considered a waste of resources.