

FLIGHT

INTERNATIONAL

S H O W D A I L Y

TAY RETROFITS FOR DC-9 AND 737

THE Rolls-Royce Tay 670 is to be offered as a low-noise engine retrofit for older DC-9s, 727s and 737s. A memorandum of understanding was signed at the show yesterday by Rolls-Royce and Anacorp Group. The latter has an agreement with McDonnell Douglas covering access to engineering and certification data on all DC-9s, and has made proposals to Boeing for a similar arrangement.

Also involved in the re-engin-

ing programme is Dee Howard Co, which already has a programme to re-engine the One-Eleven with the Tay, and Aeritalia, which has an equity interest in Dee Howard. Anacorp, successor to Cammacorp, which managed the CFM re-engining programme for the DC-8, will manage the new programme. Frank Turner, director of Rolls-Royce Civil Engines Group, said yesterday that the re-engining would enable these older aircraft to meet Stage 3

noise requirements.

The deadline for compliance is not yet clear, but according to Turner the critical factor is increasingly the very tight restrictions now being introduced by individual US airports, notably John Wayne Airport in California's Orange County. Turner also said that an early crystallisation of international noise rules on older types would probably swamp aircraft manufacturers with new aircraft orders.

The Tay 670 is an 8,200kg-thrust version of the engine, current models of which are already in service on the Gulfstream IV and the Fokker 100. Rolls-Royce is aiming for 670 certification in mid-1991 and service by the end of that year. In addition to the noise reduction, the engine will achieve a 12% improvement in fuel burn on the DC-9, according to Turner, and probably a similar figure on the Boeing types.

Cost of re-engining a DC-9 will be \$8 million, according to Anacorp. **DW**



Guardians of the flame

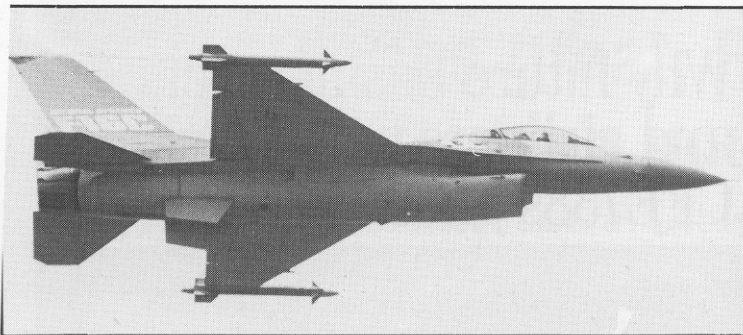
THE names may have changed but the aircraft are the same and continue to offer hope for the future of British general aviation. The SAH-1 Trago Trainer (pictured left) has been taken over by Orca Aviation and is finally to go into production. For ARV Aviation read Island Aircraft, whose Super2 is attracting interest in the US. Both the SAH-1 and the Super2 are at Farnborough 88, flying and drawing visitors in the static park.

Orca Aviation is the result of a buy-out in which the Trago management parted company with millionaire store owner Mike Robertson but kept together the team which built the much praised SAH-1. The change follows a turbulent year in which a planned deal with the Hungarian Government to build the trainer collapsed and the workforce was cut to just six.

"In February Mike Robertson said it was the end of the story," says Orca managing director Simon Milton, who joined the Trago project from Airship Industries a year ago. Initial hopes over a Hungarian deal which also involved the BAe 146 turned sour: "We began to feel that we were just the freebie in the cornflake packet and little else."

It was put to Robertson that the team should continue on money left in the bank while attempting to raise fresh finance to get the aircraft into production. Robertson agreed. "I don't need to tell you how difficult raising money for aircraft is. Legal and General just said they had tried two aircraft and they had failed," says Milton. March Engineering was interested but the proposed deal was unacceptable.

Continued on page 28



F-16C: not spinning, just rolling and diving.

JOHN FARLEY casts an aviator's eye over the flying display.

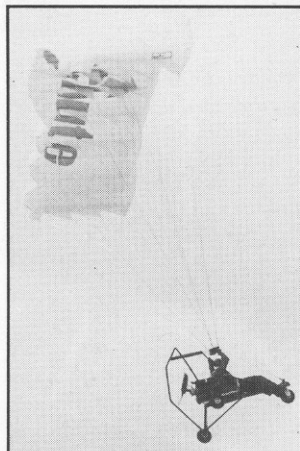
THIS year's display opens with two remarkable examples of how far aviation has progressed in different directions. On the one hand there is the PowerChute, which has to be the cheapest, safest and easiest way to take off, fly around and land that has yet to appear at Farnborough. Then there is the AH-64A Apache, a genuine fully aerobatic helicopter. It too looks safe, but perhaps that's due to the evident power and control reserves that are so well displayed by Cap Parlier.

The three-hour display con-

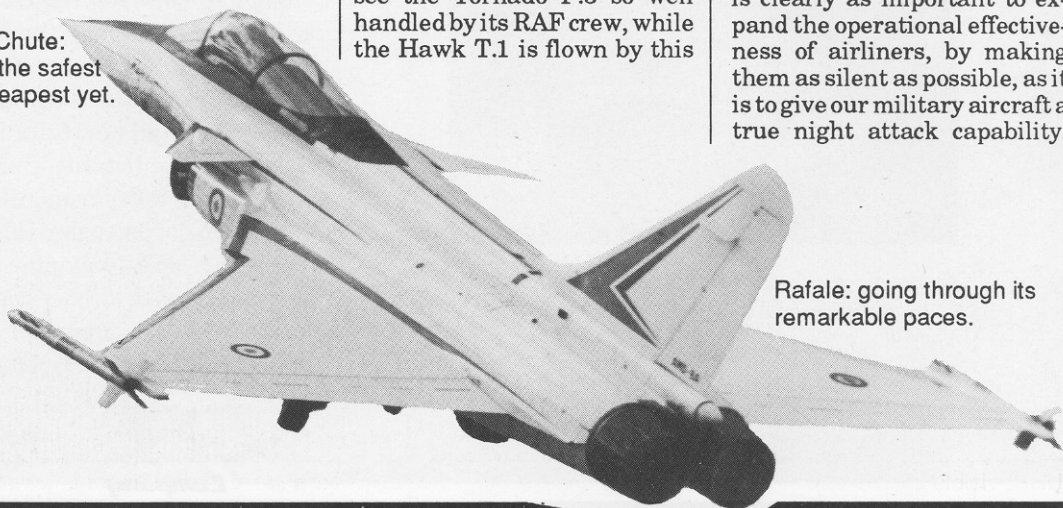
tains old friends putting on their familiar acts, though in quite a few cases they're determined to show off a capability improved since last we met. The Redigo is powerful enough for a full range of standard aerobics direct from take-off, and the Firefly makes full use of its forward stick capability with prolonged negative-g manoeuvres. The pert little SAH-1 seems to know it's going into production, which will also enormously please its many pilot fans.

The CASA combine of 101,

SAH-1: pilot-pleaser.



PowerChute: one of the safest and cheapest yet.



Rafale: going through its remarkable paces.

212-300 and CN235 fills a well co-ordinated 8min slot that includes the 101 doing a vertical eight with smoke. Napoleone Bragagnolo, pilot of the AMX, says that he badly wants to show the crowd how easy it is to put his pipper on the target.

Alan Deacon, in the Shorts Tucano T.1 does a prolonged inverted spin and later pushes up from an inverted pass, puts his wheels up and pulls through to land.

year's RAF aerobatics champion, Andy Wyatt. His sortie is a good yardstick by which to judge the extra thrust and lift of Paul Hopkins' single-seat Hawk 200. Alistair MacLaren flies the RN solo Sea Harrier. He tells me that his normal demo had to be reduced in length to fit in, but it looks perfect to me. His display is an immaculate demonstration of the ultra-slow-speed controllability and manoeuvrability that

DISPLAY DEBRIEF

The original Embraer Tucano makes up for its reduced power with an inverted spin, some really pretty aerobatics and beautifully flown inverted turns. But nothing goes up and down quicker in this class than Bob Cole in the PC-9 with his multi-turn vertical roll into an immediate spin back to low level.

Another old friend is the Do228, which still sets the standard for sustained climb after take-off, as well as excelling with a landing roll of around three aircraft lengths.

The British Aerospace combine shows some excellent contrasts among a wide range of production aircraft. It's nice to see the Tornado F.3 so well handled by its RAF crew, while the Hawk T.1 is flown by this



Apache rests from its fully aerobatic labours.

give the Harrier its take-off and landing flexibility.

The other two BAe aircraft, the ATP and the stretched 146-300, can be seen but not heard – just like any well brought up modern airliner. Seriously, it is clearly as important to expand the operational effectiveness of airliners, by making them as silent as possible, as it is to give our military aircraft a true night attack capability.



Redigo: full range of aeros.

The designers' task is the same: to enable the aircraft to operate around the clock and increase their cost-effectiveness.

The surprising thing about the UHB testbed is that the propfan blades remain visible even at high revs. And there is a bit of work to be done on that buzzsaw noise, which is quite pronounced even on the downwind leg.

The Westland combine includes the new EH101, looking remarkably commodious and very clean. The Army Lynx does what looks to me suspiciously like the first threequarters of a loop, starting from the hover. Last Farnborough this demo would have won the helicopter aerobatic competition. This year there's the Apache. Life's like that.

The F-16C, Hornet, Rafale A and Mirage 2000B are all put through their remarkable paces, and the detail is well worth checking. No, the F-16C is not spinning: it's aileron rolling at the same time as flying a steep spiral dive. And no, the Mirage 2000B doesn't have a flying control software glitch when it porpoises along the display line while carrying out rapid bank reversals. It's showing that it is better than

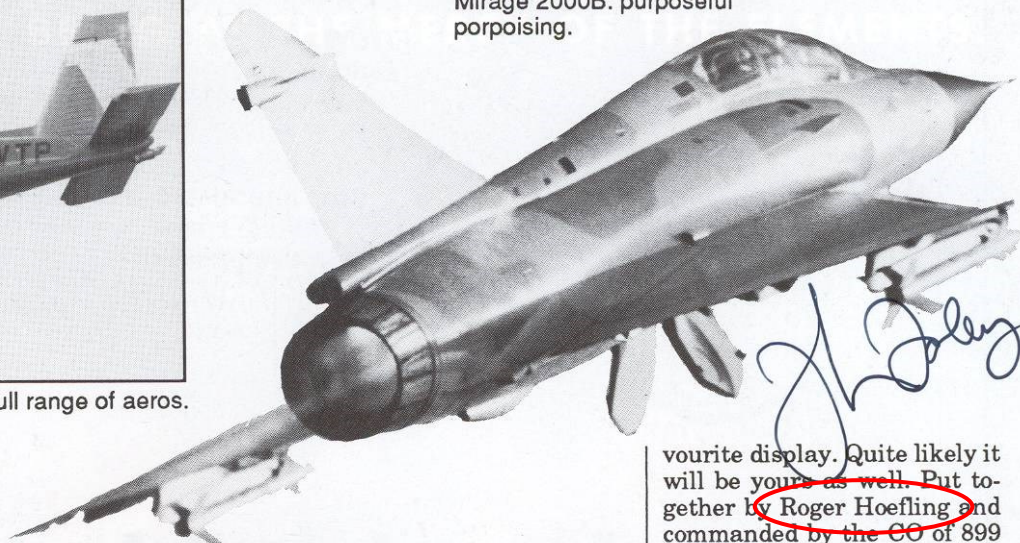
the last generation of non-FBW aircraft, which departed due to inertia coupling if they attempted roll reversals under negative-g.

Anatoly Kvotchur and his MiG-29 may be new to Farnborough, but they've certainly been around a long time somewhere to have acquired such polish. It's not the performance of the aircraft that surprises me – we all know what a high thrust weight ratio allied with a good wing will do – but rather the graceful, effortless appearance of the routine. The first time I saw it I wrote down one

note: "Stacks in hand". The Fulcrum appears to turn with as small a radius as any of the top league but without quite so much alpha and, I suspect, without losing as much less energy in the process. Given the clear quality of the aircraft and its pilot both in the air and on the ground, I for one am glad that their first visit to the UK was for nothing more serious than an airshow. To quote Kvotchur again: "My flight at Farnborough is designed to be pretty to watch". That it surely is.

I have left until last my fa-

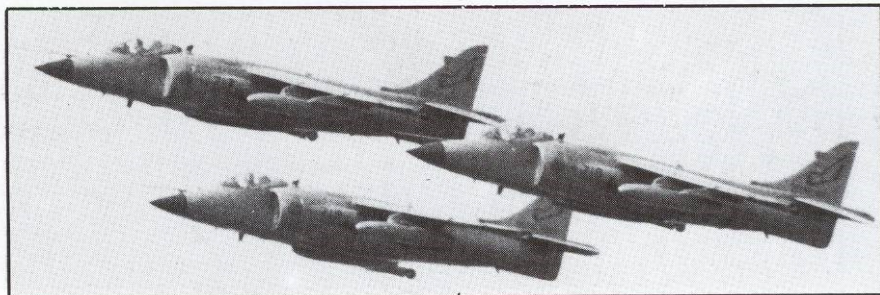
Mirage 2000B: purposeful porpoising.



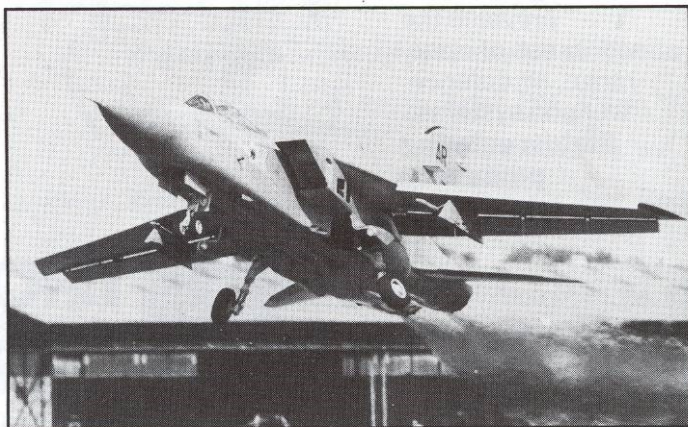
avourite display. Quite likely it will be yours as well. Put together by Roger Hoefling and commanded by the CO of 899 Sqn RN, Cdr Scott Lidbetter, the co-ordinated display of 6 Sea Harriers and 10 helicopters is simply great to watch. It will be a long time before I forget the picture of their vic of four Sea Kings, flanked by a Lynx and a Sea Harrier each side, with a box of four Gazelles tucked in behind them.

So that's the 1988 flying display. Well done the met man, the Mikoyan design bureau, the RN Fleet Air Arm, John Blake and, especially, ATC. Judging by the accuracy of this year's timings, the controllers have got the hang of it at last.

RN Sea Harriers: great to watch.



UHB: visible blades and buzzsaw noise.



Tornado F3: well handled by squadron crew.