FLIGHT International. 6 September 1980 979

Stealth breaks cover
CONSTRUCTION of an experimental
aircraft with reduced radar cross-
section began in 1977 and since then
a number of different test vehicles—
manned and unmanned—have flown.
Stealth technology enables the US to build aircraft which cannot be suc-cessfully intercepted by existing and projected Soviet air defences, says US Defence Secretary Harold Brown— a statement based on the assumption that the Soviet Union was unaware of Stealth until now.

Stealth technology is a "complex synthesis" of many techniques, says Dr William Perry, under-secretary for research and development, but the specific techniques and the success achieved with each are classified at the "highest security level." The technology is not new, however, hav-ing been applied to "some of our reconnaissance aircraft" — probably SR-71s and U-2s—in the early 1960s and to the Tomahawk and air-launched cruise missiles in the mid-1970s, Perry admits.

The Stealth programme is run by the Defence Advanced Research Pro-jects Agency (Darpa). The potential of reduced radar cross-section was realised in mid-1977, says Perry, and funding was increased "tenfold" and a number of "high priority" experi-mental programmes were begun. The whole effort was given "extra-ordinary" security protection, "even to the point of classifying the very existence of the programme," says Perry.

According to Perry the US has made "remarkable advances" over the last three years and is "moving with some speed" to develop prac-tical applications of the Stealth tech-niques. The technology can be ap-plied to "any military vehicle which can be attacked by radar-directed fire," says Perry, and the new US manned bomber seems a likely appli-cation : "I think any new bomber will use some elements of this tech-nology," says Harold Brown.
The Air Force must decide on a bomber design by March 15 next year and is studying derivatives of the Rockwell B-l and General Dynamics FB-111 as well as new designs. Some Stealth technology can be applied to existing aircraft, Perry says, but full protection will require an aircraft built from the ground up to defy radar detection. The cost will not be excessive, says Perry, and the cost of aircraft built using Stealth tech-nology will probably not be "substan-tially" different to that of conven-tional aircraft.

A new bomber will not appear in large numbers until 1990, based on the 1987 in-service deadline specified by Congress when it added $300 mil-lion for research and $75 million for long-lead procurement to the 1981 budget. It is possible that the first application of Stealth technology will

be a reconnaissance aircraft. Lock-heed is involved in preliminary re-search at its Skonk Works plant— birthplace of the SR-71 and U-2.
Brown stresses that the decision to accelerate Stealth studies was not a factor in President Carter's 1977 deci-sion to cancel the B-l. Efforts to re-duce aircraft radar cross-section are driven by Soviet development of high-power monopulse ground radars which are difficult to jam, says Perry, and air-to-air missiles guided by look-down radars capable of tracking air-craft in ground clutter. He adds that the Soviet Union continues to place "very heavy emphasis" on the de-velopment of air-defence missiles to offset the US air-power advantage.

Perry states that the B-l was can-celled because of its "relative in-effectiveness in penetrating Soviet air defences," a failing which also applies to the FB-111. Defence Sec-retary Brown continues to have an "open mind" on the need for a new bomber. "I am sure that we will con-tinue ... to have an air-breathing component in our deterrent force,1

'

he says.
The Department of Defence has been forced to acknowledge the exis-tence of Stealth following leaks in the US press and television. The leaks are regarded as a regrettable result of the increasing research effort. The annual funding for Stealth is now 100 times greater than in early 1977.

Perry says the US has achieved "excellent success" in the programme and that it is possible to apply the technology to a wide class of vehicles and to build aircraft which could not be successfully engaged by any exist-ing air-defence system. The pro-gramme has had its problems, and two experimental aircraft are thought to have crashed. "I think all of you who have watched more visible test programmes have seen what hap-pens," says Harold Brown,
• Besides adopting a blended design with minimal "corner reflectors," Stealth technology uses radar ablative coatings. The exact way in which they work is highly classified but an ablative "soaks up" radar energy and dissipates it as heat instead of radio frequency energy. The radar range equation shows that reducing the target's reflected energy by 12dB cuts the minimum detection range by 50 per cent; a 20dB cut reduces the detec-tion range by two-thirds and so on. In conjunction with conventional decep-tion techniques a target can "fade-
out" and replace its own, weak echo
with a stronger return in a different
position.

Boeing's concept of an advanced strategic aircraft is optimised for a low radar and infra-red signature. Yaw stability and control is provided by vanes on the lower trailing edge. Windtunnel and radar cross-section tests have been conducted on the delta design, which Boeing claims is 10 to 20 years in the future