

which turned out to have been done in the USA.

In others "we say [a UK company] got the job, but they didn't want to tell the MoD that they got it. A lot of companies in the UK have many divisions. One of the problems is to identify the division, so that when the MoD sends them a letter asking if they got the job, then the MoD knows where to send it."

He said that, where the MoD has asked for further data, some of which Boeing does not "normally capture", that would be retrieved "by hand if necessary". Where there was no record of suppliers having performed the work, "the fourth report will clear up most of the problems".

Contracts claimed to be worth \$27 million had been rejected, he said, because the contractors had turned out not to be listed under Section 10 of the Department of Trade and Industry's Register of Quality Assessed UK Companies. Under the AWACS contract terms they are barred from inclusion.

Manning said that 200 to 250 companies were being added to the Section 10 list as a result, but work they performed before their listing would not be counted. "We take the penalty for screwing up."

Direct offset

Of the \$535 million claimed so far, about 10 per cent was directly on the AWACS project. He claimed that the final figure would be 5 to 7 per cent of the whole offset deal, lower than the 10 per cent originally expected.

"This is because British industry was more competitive than we estimated", he explained, and added that they could have charged more and still got the work.

Chandler said: "I don't think work on the E-3A is absolutely vital from an economic point of view; although there may be strategic reasons".

He claimed: "We are reasonably satisfied with Boeing's programme to date. If we agree with a large part of the latest submissions, then that will take us to the first six months of 1988. From what we hear from industry, it is on target. Some of the projects downstream are potentially very valuable."

Claiming there were other benefits to UK companies from the deal, he said: "Doors are opened [in the USA] which would otherwise be slower to open."

Oblique-wing meets long-range cruise-missile needs

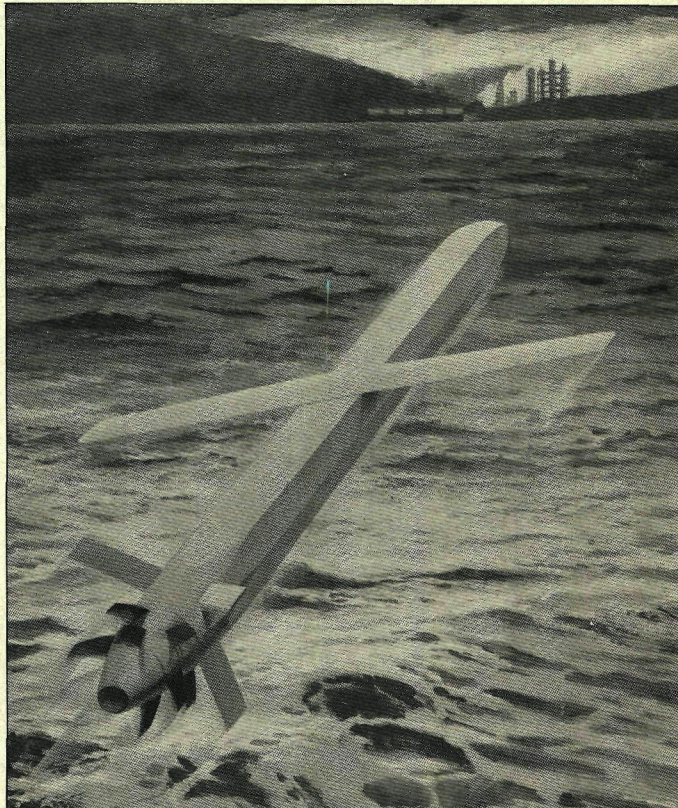
Oblique-wing configurations have been chosen by at least two companies developing long-range conventional cruise missiles for the US Navy.

At this year's Navy League show in Washington D.C., Boeing and McDonnell Douglas each revealed propfan-powered, oblique-winged, cruise-missile designs. Boeing presented its concept for three different missile types, all based on common elements.

Five companies—Boeing, McDonnell Douglas, Martin Marietta, Lockheed, and General Dynamics—are engaged in risk-reduction programmes for what the Navy calls the Long-Range Conventional Stand-off Weapon (LRCSW). The US Air Force also has a programme, called Long-Range Conventional Cruise Missile, which is similar to LRCSW. The Navy programme is expected to move into an 18-month to two-year concept definition phase this year. This would be followed by demonstration/validation and full-scale development, leading to an initial operational capability near the year 2000.

Conventional cruise missiles have found favour with Congress since the Intermediate Nuclear Forces treaty was signed in 1988. These weapons would have up to twice the 1,300-mile range of current nuclear-tipped missiles. They would be considerably more accurate, to ensure destruction of high-value military targets. There is also a requirement for significant loiter capability, to increase the number and quality of available targets.

Four engine manufacturers—Allison, Teledyne, Williams International, and Garrett—are working on propfan propulsion concepts, propfans being the



Boeing is studying a family of propfan-powered, variable-geometry oblique-wing conventional cruise missiles

only means to achieve the desired range. The designs all feature fixed-pitch, contra-rotating, folding blades. The latter feature, coupled with signature reduction, is seen as the main challenge.

Boeing's baseline design features a modular propulsion unit that can be fitted to vertical, "submarine", or air-launched missiles. The company says the oblique wing was chosen because it folds away easily, and its sweep can be varied during flight to optimise cruise performance of

the long-range missile.

"It's not necessarily our final configuration," a Boeing spokesman says, "but, given current technology, it meets a lot of the targets".

The company intends a common sensor package, avionics and guidance system, engine, and flight-control system for all of its missiles. Only the airframe and wing have to be tailored for each application, helping to reduce purchase costs by up to 35 per cent over today's cruise missiles, says Boeing.

NEWS IN BRIEF

□ Collins GPS for Cruise

Rockwell-Collins is developing a two-channel Navstar global positioning system (GPS) receiver for the US Navy's Tomahawk cruise missile. The GPS receiver is part of a Block III upgrade to the weapon to be performed by McDonnell Douglas Missile Systems, and will reduce mission planning

time, enhance navigation accuracy, and improve targeting of the conventional-warhead TLAM-C and submunitions-dispensing TLAM-D Tomahawk land-attack missile. Collins is already producing a single-channel GPS receiver for the US Navy's SLAM stand-off land-attack missile, an extended-range version of McDonnell Douglas' Harpoon anti-ship missile.

□ Ducted rocket plan

Japan is to approach the USA with a proposal for joint research into ducted rocket-ramjet propulsion for long-range supersonic missiles. Joint US-Japanese development of defence equipment was agreed in principal in January 1988, and the USA was recently briefed on the status of Japanese research into air-breathing ducted rocket ramjets.