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The Western world is now

taking the threat of intermediate range and threatre ballistic missiles seriously. SimonElliott and Ramon Lopez report. .

would be the lack of atmospheric interfer-ence on the final intercept. C3

I problems
are also likely to be eased because of the increased time available on which to make an intercept decision.

The US stance While the threat to national territory

from the south and east is only now beginning to concentrate European minds, the USA has already begun missile defence-development projects. Research, however, is focusing on protecting out-of-area forces.
The Department of Defense has made Theatre Ballistic Missile Defence (TBMD) the main priority within the Ballistic Missile Defence Organisation (BMDO). The recent report from the BMDO on the Theatre Missile Defence Initiative (TMDI) outlines the potential threat fac-ing US commanders deployed out of area. It says: "TBMs [theatre ballistic missiles] are becoming the long-range weapon of choice in regional conflicts, especially in the Middle East and South-West Asia. For future contingencies, a major implication that clearly emerged from the Gulf War is the political and military importance of possessing a defence capability to counter the threatened or actual use of ballistic missiles." In particular, commanders are worried about the vulnerability of airfields and docks which are used as points of entry for out-of-area troops.
Current US thinking divides TBMD into three phases:
• lower-tier defence, where the missiles would be engaged within the atmosphere (endo-atmospheric) during the terminal stages of flight. The lower-tier systems fall into two main categories: point defence for key assets (which include the upper tier TBMD systems) and systems to pro-tect the manoeuvre force;
• upper-tier defence, where a missile

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would be attacked midway through its trajectory, by high endo-atmospheric or low exo-atmospheric interceptions;
• destroying the missiles during the boost phase while they are still over the attacker's territory.
Lower-tier weapons under develop-ment, which could be used in the point-defence role, include Raytheon's Patriot and Loral Vought Systems' extended-range interceptor (ERINT), while the CorpsSAM (Corps surface-to-air missile) programme, which is to replace the Ray-theon Hawk air-defence system, would be used to protect the manoeuvre force. Changes to the US Navy's AEGIS system, deployed on the CG-47 cruiser and DDG-51 destroyers, are being considered for lower-tier defence.

Patriot developments include extending the current PAC-2 variant and the Patriot

PAC-3,?

'which includes the Patriot multi-
mode seeker missile.
Three multi-mode Patriot tests were conducted in 1992, including two firings with another Patriot as the target, of which one was successful. A fourth test has been delayed until later this year. The ERINT, weighing 545kg compared to the Patriot's 914kg, had two successful controlled test flights in 1992, but, on 8 June, it failed to hit its intended target, a Lance missile, during the first intercep-tion test. The 15km (8nm)-range ERINT is a hit-to-kill system with a Ka-band active-radar seeker and no warhead.

The ERINT is viewed increasingly as a competitor to the multi-mode Patriot for the lower-tier defence system. One option is expected to be selected in September. In July 1992, Hughes Aircraft, Martin Marietta, Lockheed, Raytheon, Loral-Vought and British Aerospace were awarded contracts of around $2.5 million to explore alternative concepts for the CorpsSAM programme. *
The concept-definition studies will lead to a Milestone 1 decision, which will point the programme in one of three •directions: the modification of an existing system, developing new systems using current technology, or developing new systems with far-term technology. The programme is being reviewed and is not expected to move into a demonstration and evaluation phase until at least Sep-tember, possibly later.
Development of the Navy's AEGIS, for lower-tier defence, includes the Standard SM-2 Block IVA missile and improve-ments to the SPY-1 radar and battle-

management and C3

I systems. The missile
would have a PAC-3 type capability. Upper-tier systems which are under development include theatre high-altitude area defence (THAAD) and sea-based sys-tems either using the THAAD or a light-weight exo-atmospheric projectile (LEAP)-based interceptor.

Lockheed was awarded a $689 million four-year contract to develop the THAAD in September 1992. The company will build two truck-mounted launchers, two tactical-operations-centre shelters and 20 prototype missiles for demonstration and evaluation testing at the White Sands, New Mexico, missile range, from 1995. The contract includes an $80 million option for 40 additional missiles to pro-vide a contingency capability in event of a national emergency.
A successful THAAD initial-design re-view was held in January 1993 and the programme is proceeding to the final-design review in early 1994.
For the Navy's LEAP programme, a Standard SM-2 Block II missile with the same payload dimensions as the LEAP, was fired from the cruiser USS Richmond K Turner in September 1992. Under Phase 1 of the flight-test programme, the same type of missile, fitted with a "kick-stage" rocket motor to give the system exo-atmospheric capability, will be used with the LEAP. Phase II, which is scheduled for 1995, will have the Standard SM-2 Block IV missile.

Boost-phase interception includes pos-sibilities using various airborne and sur-face-based platforms. One such study is the RAPTOR/TALON system, which mates an unmanned air vehicle with a kinetic-energy weapon.
The BMDO's TMDI report encapsulates the aims of the programme, stating: "The goal of TMDI is to develop ATBM systems to provide protection against existing and projected ballistic-missile threats to de-ployed US forces and our allies. [The] Broader objective is to develop systems that are complementary and compatible wiln allied TMD systems." D

Standard SM-2 missiles: bound for LEAP

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