

Nuclear winter

Pentagon says yes, it may happen, but "so what?"

IN its first official statement on "nuclear winter", the Department of Defense (DoD) has acknowledged the possibility of severe climatic change following a major nuclear war. But the DoD statement, which comes in the form of a report ordered by Congress*, asserts that the only policy implication is to affirm current US strategic doctrine on deterrence, arms control and Star Wars missile defence.

The DoD report echoes an earlier study issued by the National Academy of Sciences last December in its criticism of the large uncertainties in published estimates of the climatic effects of nuclear war. "At this time, for a postulated nuclear attack and for a specific point on the earth", the DoD report says, "we cannot predict quantitatively the materials that may be injected into the atmosphere, or how they will react there . . . we do not expect that reliable results will be rapidly forthcoming."

DoD specifically criticizes uncertainties in the results of the study by Turco *et al.* (*Science* 222, 1283; 1983). It says the estimate of the amount of smoke that would be produced in fires ignited by nuclear blasts was the result of combining a large number of poorly-known variables; "in actuality, the same yield weapon could produce vastly different amounts of smoke over different target areas and under different meteorological conditions", DoD says.

A preliminary DoD assessment of 3,500 "hypothetical" non-urban target locations concludes that smoke production would be 30 times less than the Turco *et al.* assumption for July and almost 300 times less for January**. The DoD report also suggests that the results may have improperly shifted the focus from dust to smoke; if smoke production has been overestimated, and if one assumes a war scenario in which, for example, ground-burst attacks on missile silos predominate, producing a lot of dust, the effects of dust may outweigh those of smoke.

The DoD report also claims that initial results of three-dimensional models constructed by DoD and National Center for Atmospheric Research scientists show that scavenging of smoke and dust from the atmosphere may be "substantial".

DoD is spending \$1.5 million on nuclear winter research this year and has requested \$2.5 million for next year. An additional \$2 million per year is coming from the

Department of Energy.

But whatever the outcome of these studies, DoD is already suggesting that they will have no effect on US strategic policy. DoD claims credit in the report for having already adopted policies designed to limit both the extent of nuclear war and its atmospheric consequences. It claims that US policy is to avoid urban population centres in its targeting plans, a policy that would also limit bomb-ignited fires.

Significantly, DoD also uses the opportunity to push President Reagan's Star Wars plans, noting that even "single-layer defense" — perhaps a reference to a terminal site defence, the one star wars component that may be possible with existing technology — "may provide a greater mitigating effect on atmospheric

consequences than could result from any level of reduction likely to be accepted by the USSR in the near term".

The report dismisses the argument that the Soviets would respond to a US anti-missile defence simply by increasing their offensive forces, claiming that since the signing of the anti-ballistic missile treaty in 1972, the Soviets have increased their forces fourfold. The report does not mention the US decision to arm its intercontinental ballistic missiles with multiple warheads during that period.

The clincher, as far as the Pentagon is concerned, is that even if the United States becomes convinced of the reality of the nuclear winter, "we cannot be confident that the Soviets would expect such effects to occur as a result of all possible Soviet attacks".

The DoD report claims that the Soviets have performed no independent calculation on climatic effects of nuclear war and in fact "show no evidence of regarding the whole matter as anything more than an opportunity for propaganda". **Stephen Budiansky**

ASATs

US Air Force slows the pace

Washington

ALTHOUGH the congressional ban on the further testing of the US anti-satellite weapon (ASAT) expired last week, new tests have been postponed at least until June. Technical problems are partly responsible for the delay, but diplomatic concern about the Geneva arms control talks, due to open next week, may also have been influential.

The Air Force officially refuses to discuss the technical problems or the testing schedule of ASAT. But administration officials last week quietly spread the word about the technical delays. And according to *Commerce Business Daily* of 21 December 1984, the Air Force has asked for bids on a contract for the redesign of the ASAT's "maneuvering propulsion package", a group of 57 miniature solid-fuel rockets that steer the 12-inch ASAT projectile into its target.

The contract announcement mentions contamination from motor exhaust as one problem to be corrected. According to John Pike, a space-weapons expert with the Federation of American Scientists, contamination of infrared sensors has been a "canonical problem" with this type of weapon, going back to prototypes developed for ballistic-missile defence two decades ago. Infrared sensors are used to pick up the heat radiated by the target satellite and so guide the projectile, technically called the "miniature homing vehicle". The projectile carries no explosives, but disables the satellite simply by colliding with it.

So far, the Air Force has tested ASAT only by shooting at a point in space. Live targets have not yet been used. (According

to some reports, for the "point in space" test last November, ASAT's infrared sensors were locked on a star or the planet Jupiter.)

Although the congressional ban on testing against live targets has now expired, the administration would still be required to send a lengthy certification to Congress before such a test could proceed. When the time comes, ASAT opponents say, the administration will have a difficult time completing that procedure with a straight face. Certification will require a finding that the test is necessary to avert "irrevocable harm" to national security, that the United States is trying to negotiate limitations of ASATs, that the test would not irreversibly harm prospects for negotiations and that it is consistent with the anti-ballistic missile treaty.

Representative George Brown (Democrat, California), one of the sponsors of the congressional restraints on ASAT testing and one of 102 congressmen who signed a letter to President Reagan last week urging a continuation of the moratorium, has suggested that the technical problems may be a convenient refuge for an administration that wants to keep up a tough image while not directly jeopardizing the Geneva talks. And Pike said, "I assume that, if they thought the safety of the republic was in jeopardy, they'd be working overtime [to correct the problems] but they've adopted a leisurely schedule".

A middle course that the Air Force may be contemplating is a second test against a point in space in June or July, which would not require the certification.

Stephen Budiansky

* *The Potential Effects of Nuclear War on the Climate*, A report to the United States Congress, Secretary of Defense, March 1985.

** *Smoke Production from Multiple Nuclear Explosions in Wildlands*, R.D. Small and B.W. Bush, Pacific Sierra Research Corp. in the press.