

proposals. They indicate the need to prohibit forward-based systems which have very short flight times to military targets including command centres. The authors of those models can rejoice at the agreement to remove Pershing IIs and SS-20s from Europe. Concerns over naval forces remain but perhaps these will be addressed in negotiations on strategic forces.

Bruce Blair, in his book *Strategic Command and Control*, puts forward a series of recommendations. The first is to build a less vulnerable command and control system for strategic nuclear arsenals.⁹ Blair's rationale is that greater confidence in the survivability of the command centres will reduce the incentives to respond rapidly to any warnings of attack, or worse, the urge to pre-empt if one side becomes convinced that an enemy attack is imminent.

Blair also argues that the current imperative to respond immediately to nuclear attack is an article of dogma that should be abandoned. His concern is that the severe time constraints and intense pressures preclude rational decision-making:

Strategic organizations actually expect to receive retaliatory authorization within minutes after initial detection of missile launches. That expectation is so deeply ingrained that the nuclear decision process has been reduced to a drill-like enactment of a prepared script, a brief emergency telecommunication conference whose purpose is to get a decision from the national command authority before incoming weapons arrive.¹⁰

Instead Blair advocates a policy of 'no immediate second use;' the US should ride out a Soviet first strike and take as much time as is necessary to consider what response is appropriate. The emphasis would be on survivability of forces and the maintenance of strict negative control over all nuclear forces deployed around the world and at sea.

Tied into the requisite for survivability is a recommendation put forward by Blair and many others — the move away from a reliance on highly vulnerable land-based ballistic missiles. In the past, the argument for land-based forces hinged on their greater accuracy, a feature which makes them more effective against small, 'hardened' military targets. This argument has lost much of its force with the deployment of D-5 missiles on Trident submarines. These missiles carry warheads with accuracies approaching that of land-based systems, and submarines are much more survivable. The difficulty is that the Soviet Union has about two-third of its strategic warheads deployed on land-based missiles and has less access to open waters than does the United States. In addition, its submarine force is less sophisticated than that of the US. For these reasons, the Soviet Union has resisted the suggestion that it shift its strategic force structure away from a

reliance on land-based systems to less vulnerable sea-based weapons.

As noted earlier, submarine launched missiles and other sea-based nuclear weapons are a worry to some analysts, partly because of the lack of restrictive controls and partly because of the stress under which the submarine crew lives. It has been recommended that permissive action links (PALs), similar to those on theatre nuclear weapons in Europe, be installed on all nuclear weapons at sea.¹¹ This would reduce the risk that naval tactical weapons or SLBMs could be launched without authorization. These restrictions do not, however, address the problems of stress which have been the subject of recent psychological studies.¹²

To reduce the danger of escalation from a conventional war in Europe, a number of suggestions have been put forward. Many of the roles assigned to tactical nuclear weapons in Europe could be covered by new conventional weapons and NATO could do away with nuclear landmines and nuclear artillery shells. There have also been calls for NATO to adopt a policy of 'no first use' or 'no early use' of nuclear weapons. These declaratory policies would of course have to be coupled with changes in force deployments and operational procedures which would reflect a reduced reliance on nuclear weapons. One manifestation of these changes would be a move away from the doctrine of pre-delegating, in times of crisis, the authority to use tactical nuclear weapons.

It has also been suggested that NATO and the Warsaw Pact pull back nuclear weapons which are deployed close to the borders in Central Europe. In 1982, the Palme Commission report proposed the creation of a corridor 300 kilometres wide overlapping the territories of West Germany, East Germany and Czechoslovakia.¹³ All nuclear weapons would be removed from this corridor. The proposal had both military and political aims. It was argued that this nuclear free zone would raise the threshold between conventional and nuclear war in Europe and, during peacetime, would serve to reduce tensions between NATO and the Warsaw Pact. To date this proposal has received no official support in Western capitals.

Because the danger of war by accident or inadvertence is greatest during a time of severe international crisis, many of the recommendations for reducing the risk of war have to do with crisis prevention or 'crisis management.' In a paper entitled, "Nuclear Alerts and Crisis Management," Scott Sagan warns against putting nuclear-equipped forces on alert as a political signal to the adversary. He recounts incidents of civilian leaders ordering an increase in the alert status of US forces without a proper understanding of the implications.¹⁴ When the adversary detects the heightened alert status, there is a danger that the crisis will escalate; one or both sides might lose control of the situation. The result could be an interlock-