

non-military representatives to observe the ceasefire between Egypt and Israel.

The practice of using nuclear alerts to send a political signal worries some researchers. What would happen if a false alarm came during the heightened tensions of a prolonged international crisis with nuclear forces on alert?

LAUNCH ON WARNING/ LAUNCH UNDER ATTACK

US government spokespersons have argued that fears of accidental nuclear war are largely unfounded because it is US policy to launch only after an attack has been confirmed. This policy is sometimes referred to as 'launch-under-attack.'

Some authors make a clear distinction between launch on warning and launch under attack. Barbara Marsh, while attending the US Naval Postgraduate School, wrote a thesis entitled *The Probability of Accidental Nuclear War* which included definitions for these two policies, gleaned from studying NORAD documents and practices:

Currently, the United States has a *launch-under-attack* policy. In this thesis, *launch-under-attack* means launching some fraction of the threatened ICBM force when the early warning system confirms a threat and that threat is assessed with *high confidence*.⁴ (Emphasis in the original.)

In this case warnings would have been received from two different families of sensors; the senior personnel involved in the 'threat assessment conference' would have decided with high confidence that the threat was real; and the president would then give the command to launch.

On the other hand, Marsh contends:

Launch-on-warning means that upon detecting the launch of an enemy's missiles and confirming the threat at the site (albeit with *low confidence*), we would launch some fraction of the threatened ICBM force before those missiles reached any of their targets.⁵ (Emphasis in the original.)

In this case the warning would have come from only one family of sensors and senior military personnel would have met and assessed the threat. Their report to the president would have noted the 'low confidence' proviso and the decision to launch would then be in the hands of the president. The advantage of a launch on warning, according to Marsh, is that it would increase the time for careful assessment, consultation and deliberation. The disadvantage is that it greatly increases the danger of accidental nuclear war.

In other literature dealing with the command and control of nuclear forces, these alternative launch policies are more closely related. Bruce Blair, author of

Strategic Command and Control and a former launch officer, uses the two terms interchangeably.

John Steinbruner, in his *Scientific American* article entitled "Launch Under Attack," also makes no distinction between the two policies:

... the US might be planning to accompany MX deployment with an increased inclination to launch its ICBMs after acquiring reliable evidence that a Russian attack was under way but before its actual effects were felt. This policy, usually labeled 'launch on warning' or 'launch under attack,' ...⁶

If there is in truth no operational distinction between the two policies, then perhaps Bruce Blair is right in arguing that the US is currently in a *de facto* launch on warning posture. In any event, this ambiguity needs to be clarified.

USING MODELS TO ASSESS THE RISK

In an attempt to estimate the risk of accidental nuclear war, some investigators have devised mathematical models for the strategic command and control system. In these models, numerical values are assigned to the following factors:

- (a) the decision time available;
- (b) the flight-time of enemy missiles;
- (c) average time required to resolve false alarms;
- (d) the frequency of false alarms;

The decision time available is dependent on the flight-time of enemy weapons. When long-range bombers were the primary threat, there was substantial decision time. With the advent of ICBMs capable of travelling between continents in about half an hour, decision time was reduced. New weapons deployed in the early 1980's have reduced decision time even further. The flight-time of a Pershing II missile launched from West Germany against the nearest military targets within the Soviet Union can be set at between 12 and 14 minutes. This is one major reason why the Soviet Union favoured the agreement which will remove these missiles from Europe. The dismantling of these forward-based, highly accurate ballistic missiles will increase warning time and therefore the time allowed for Soviet decision-making.

The average resolution time and the frequency of false alarms can be deduced from NORAD records obtained by the Center for Defense Information under the US Freedom of Information Act. The table below shows that the number of non-routine missile display conferences (MDC) has been increasing since 1977. The lower number in 1984 was the result of NORAD redefining the circumstances for calling such a conference. Note that only six of the much more serious threat assessment conferences (TAC) have been called.