ELECTROMAGNETIC PULSE (EMP)

Past issues of ITEM have nearly always contained extensive articles on EMP and nuclear effects. Many of these articles were extracted from papers prepared by the IRT Corporation. Last year's article, "Electromagnetic Response Prediction Techniques" was condensed from a paper prepared by Dr. W. W. Cooley, Dr. D. W. Mahaffey and Dr. A. Rudzitis, of the Boeing Aerospace Company. Copies of the uncondensed paper can be found in the 1977 IEEE EMC Symposium Record.

For this issue of ITEM, the IRT Corporation furnished a paper titled "Development and Production of Nuclear Hardened Weapon Systems" prepared by C. R. Hastings, E. Demaris and M. A. Rose. This paper was presented at the Fourth Vulnerability and Survivability Symposium sponsored by the American Defense Preparedness Association. We were to excerpt from this paper for the 1980 EMP article. Unfortunately, there just is not enough room in ITEM this year to do justice to this excellent paper. Thus, unless you are willing to wait for our 1981 edition, we suggest that readers request a copy of this paper from Dr. Marion A. Rose, IRT Corporation, P. O. Box 80817, San Diego, CA 92138. The following information has been excerpted from the IRT paper:

The environments resulting from the nuclear detonations portrayed in Figure 1 could pose a threat to all weapons systems including those deployed in a tactical situation. In the first instance, a threat to tactical weapon systems exists even for a high-altitude burst, where electromagnetic pulse (EMP) can impact a land area of considerable size. For a high-yield detonation at three hundred kilometers altitude, tactical electronics across a continent could be affected by EMP-generated currents on conductors. For bursts near or at the earth's surface, the large amounts of energy released in the fission or fusion processes can interact with the earth and air media to produce a variety of adverse nuclear environments, including EMP, ejecta from the crater, wind-borne debris and dust, blast, ground shock and radiation of several types. A balanced hardening against these environments is required for system survivability.

The services are coming to grips with the very real possibility of a nuclear confrontation by including nuclear hardening requirements in their new weapon specifications and by establishing nuclear survivability and hardening regulations. Both the Army and the Air Force have formalized nuclear survivability programs, with the operative organization for each being a secretariat of a survivability committee. The Air Force Nuclear Criteria Group establishes the survivability criteria and rules on changes. The Army Committee decides on proposed changes to criteria which were initially established by the Army Nuclear and Chemical Agency. Laboratories in both Services, such as Harry Diamond Laboratories (HDL) and Ballistics Research Laboratory (BRL) in the Army Materiel Development and Readiness Command (DARCOM) and the Air Force Weapons Laboratory (AFWL) in the Air Force Systems Command play major roles in maintaining nuclear hardening/survivability technology. The Navy survivability program is less structured, but the Naval Sea Systems Command has been establishing survivability criteria with the assistance of the Naval Ship Engineering Center, the Naval Surface Weapons Center, and the Naval Research Laboratory. Each of the service department-level staffs have general resposibility for their survivability programs. These policies and regulations have led to a significant increase over the past few years in the number of weapon systems that have had nuclear hardness requirements placed on them.

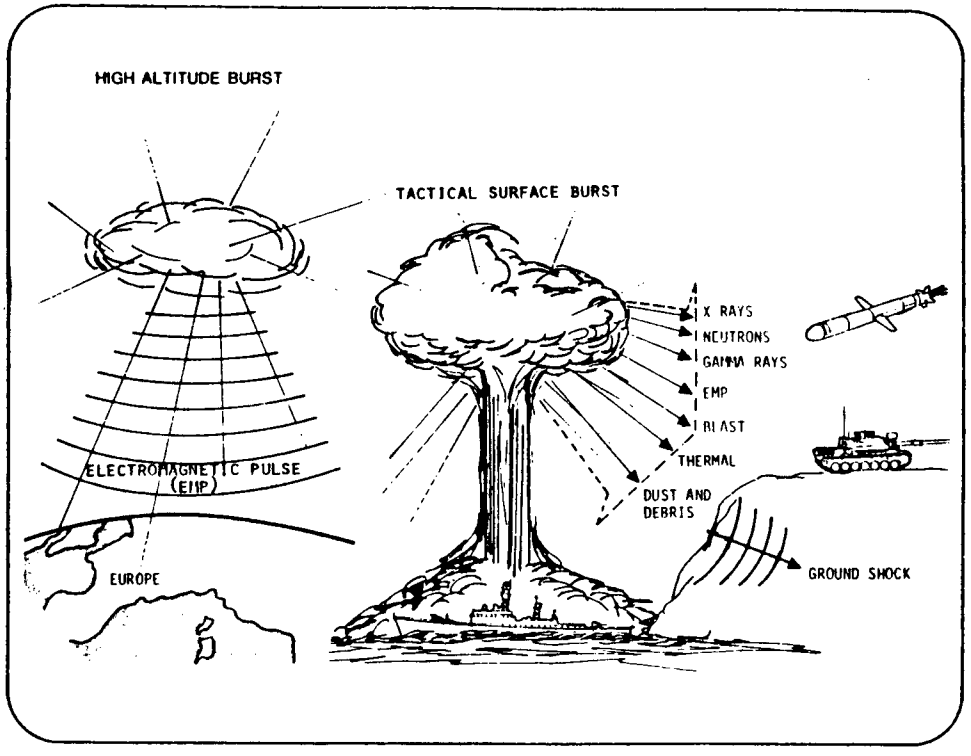

Figure 1. Nuclear Burst Environments Which Can Threaten Weapon Systems