

**SUBMITTING PROPOSALS ON DEFENSE NUCLEAR AGENCY TOPICS**

The Defense Nuclear Agency is seeking Small Business firms with a strong research and development capability and experience in nuclear weapons effects and nuclear weapons phenomenology areas. Proposals and any questions concerning the research topics should be submitted to

Defense Nuclear Agency  
DDST (EA)  
Washington, D.C. 20305  
ATTN: Maj. John Keane

The research categories proposed for study under this program are:

Nuclear Weapons Phenomenology,  
Nuclear Weapons Effects,  
Instrumentation,  
Directed Energy Effects,  
Nuclear Hardening and Survivability,  
Security of Nuclear Weapons,  
Testing and Analysis of Materials/Structures,  
Operational Planning,  
Nuclear Weapons Employment Policy Issues

These topics are further explained below.

Additional information beyond that provided herein may be obtained by request from the address given above.

**DEFENSE NUCLEAR AGENCY**  
**Research Topics**

DNA83-001      TITLE: Nuclear Weapons Phenomenology

DESCRIPTION: Nuclear weapons phenomenology includes blast, shock, thermal radiation, and nuclear radiation. A basic understanding of the phenomenology associated with nuclear weapons effects of a mechanical nature and mechanism for measuring that phenomenology under various conditions are areas of particular interest.

DNA83-002      TITLE: Nuclear Weapons Effects

DESCRIPTION: Nuclear weapons effects include: ground shock, water shock, cratering, electromagnetic pulse, radiation effects on material, electronics and personnel, and dynamic loading. Of particular interest is the response of materials, structures, and systems to these nuclear weapons effects. Materials of interest include metals, ceramics and composites. Any new material capable of being used as a structural member is of particular concern for aircraft, missiles, ships (both surface and subsurface) and military vehicles. The response of underground structures, such as missile silos, command and control facilities and communications facilities are especially important. Also of interest are permanent radiation effects on electronics and sensors.

DNA83-003      TITLE: Simulation

DESCRIPTION: Simulation of nuclear weapons effects includes: high explosive testing to simulate the mechanical effects, emp simulation, thermal radiation simulation, and nuclear radiation simulation. These simulation techniques should be as realistic as possible, relatively inexpensive to perform and comparable to actual nuclear weapons effects in a manner which can be correlated and documented. Improvements to nuclear simulations should also address their extensive program currently exists for all areas of simulation and one should become familiar with those to see how they can be improved and/or combined in order to make the total process more realistic and more representative of an actual nuclear weapons effect.

DNA83-004      TITLE: Instrumentation

DESCRIPTION: Instrumentation is for measuring nuclear weapons effects and phenomenology and the response of test items exposed to these weapons effects. The instrumentation should be capable of operating under very harsh conditions, such as might be encountered in an underground nuclear test, a high explosive test, or test involving high levels of x-ray, gamma, or neutron radiation. The instrumentation should, for the most part, be survivable and include recording data transmission and data analysis capabilities.

DNA83-005      TITLE: Directed Energy Effects

DESCRIPTION: The effects of directed energy (e.g., lasers) sources on materials, structures and systems are of interest. Of particular interest are the identification of the correlation between nuclear weapons effects and directed energy effects, the identification of materials, which are capable of withstanding both nuclear weapons effects and directed energy effects, and mechanisms by which the directed energy effects actually interact with the target materials/structures.

DNA83-006      TITLE: Nuclear Hardening and Survivability

DESCRIPTION: Techniques for nuclear hardening and survivability of systems/structures against nuclear weapons effects and, where compatible, directed energy effects are important. These techniques should be designed to protect the structure or the cases of structures or materials, and should also provide protection against electromagnetic and

radiation effects wherever any electronic capabilities are involved. In particular, the ability to harden communications facilities and surveillance sensors against electromagnetic pulses is paramount.

DNA83-007      TITLE: Security and Analysis of Materials/ Structures

DESCRIPTION: Measures to improve the security of nuclear weapons against all possible threats are of great concern. This includes the design of security features both for the actual weapons and for the facilities in which weapons are either stored or transported. These security measures should be designed to protect against all known or predicted threats and should be done in such a way as to avoid making the protected item visible as a target.

DNA83-008      TITLE: Testing and Analysis of Materials/Structures

DESCRIPTION: DNA is interested in developing techniques for testing and analysis of materials/structures by both destructive and non-destructive means, with special emphasis on non-destructive testing.

DNA83-009      TITLE: Operational Planning

DESCRIPTION: The nuclear employment planning capabilities of operational commanders in strategic and integrated warfare environments should be improved. Improvements desired include development of automated planning systems, techniques to determine target damage objective and criteria, target damage assessment capabilities, and automated nuclear weapon employment codes.

DNA83-010      TITLE: Nuclear Weapons Employment Policy Issues

DESCRIPTION: Nuclear weapons employment policy issues include the study of aspects of enduring conflict scenarios, how to enhance deterrence, and alternative employment strategies.