Nuclear Firepower

By 1961, the Army plans to achieve significantly improved warhead configurations and [redacted] that can be made available to lower echelons of command and, by 1963, for the rapid delivery of devastating fire from tanks, armored assault vehicles, drones and, by 1965, aerial assault vehicles.

The Army is actively engaged in developing a battle group atomic weapons system, called DAVY CROCKETT, in two versions: (1) a light system which can be broken into three one-man loads including the atomic projectile; (2) a Heavy Version, mountable on a 1/4-ton vehicle or comparable air or surface vehicle. [redacted] This system is scheduled to be in the hands of troops by FY 1961, and will provide an atomic capability for the Battle Group. This system will greatly enhance the fighting posture of the ground combat forces.

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Non-nuclear Firepower

Parallel with the nuclear program, the Army is continuing the development of conventional munitions. The SALVO project -- to improve small arms hit-and-kill capability -- will determine the optimum projectile caliber and type. Multiple projectiles per round have indicated promise in studies conducted thus far. When the optimum round has been determined, the optimum weapon to fire this round will be developed.

By 1963, infantry units should be provided with a materially increased antitank capability, utilizing light (250-meter), medium (500-meter) and heavy (2,000-meter) antitank weapons as follows:

a. The light antitank rocket fired from a disposable launcher-carrier will weigh approximately 4 pounds, be 24 inches long and penetrate on the order of 6 inches at 60° obliquity of armor. This weapon is designed for use at ranges up to 250 meters.

b. The medium weapon which will replace the 3.5-inch rocket launcher will be a new 90mm recoilless rifle with a penetration capability similar to the light weapon, and will range out to 450 meters.

c. Heavy antitank weapons will probably include both recoilless rifles and antitank guided missiles, and will kill any tank the enemy is capable of fielding.

Tank weapons will be significantly improved in capability to penetrate Soviet armor, using both kinetic energy and HEAT ammunition. The recently initiated Combat Vehicle Weapons System (PENTOMIC) project should be well along in development in this period. The development goal for this system is to replace tank main armament with a direct fire system utilizing a command guided missile, thus increasing accuracy at extended ranges.

Some reduction of armor protection of combat vehicles may be possible through the use of Dynamic Armor -- the DASH-DOT system. This device, currently in the research stage, consists of a series of linear shaped charges affixed to the tank hull and turret at appropriate intervals. By the use of a detection system, a computer and the charges, incoming projectiles are detected, discrimination is made of those which can damage the tank, their flight path computed, the charge fired to intercept and break up the projectile, and a new charge reloaded.

Encouraging results of efforts to increase artillery range, flexibility, lethality and rates of fire, and to reduce weight in self-propelled weapons are expected to enable improved materiel to be in production by 1963. All artillery weapons in production by the end of this period are expected to be self-propelled, with range increases of approximately 20% over the existing light and medium weapons. The development of the gun boosted rocket will continue; however, hardware resulting from the successful completion of this effort is not expected before 1966. By 1963 the 175mm gun will be operational, and the self-propelled carriage for the 8-inch howitzer will be entering the system in quantity.

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Mines

The capability of detection of mine fields will be improved through development of a universal detector, employing several different detection media such as magnetic, ultra-high frequency, X-ray, acoustic and/or nuclear. This device, which should be nearing completion by 1963, is designed to be effective in all types of soil regardless of moisture content and can be utilized with either surface or air vehicles.

Meanwhile, offensive mine capabilities are not being ignored. By 1963, mines should be under development which are adaptable to offensive use. The capability of projecting mines over considerable distances into selected areas, combined with a means to control their functioning remotely, will make the use of mines an integral part of the offensive fire support plan. The enemy's maneuverability can be suddenly restricted -- without necessarily restricting the maneuverability of friendly forces -- through such an employment of mines. This ability to control minefields remotely in order to provide temporary safe lanes for friendly troops as well as the BUFFALO BILL bulk explosive mine planter will be operational by FY 1963. In addition, reduction of the sensitivity of mines to nuclear blast pressures is expected to increase resistance to eradication by 100%.

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Chemical/Biological Warfare

In still another form of firepower, progress toward production in FY 1961 of an ultratoxic V-Agent will be accompanied by research to permit aerosol dissemination of the agent in such a manner as to endanger personnel when such agents are inhaled or placed in contact with the skin. Other chemical agents, that incapacitate without killing, are being investigated as possible alternatives to the massive exchange of thermonuclear weapons or the use of toxic agents. The study of large polar air masses, such as is being made in Operation LAC (Large Area Coverage), may lead to understanding better ways in which such air masses could be used to disseminate bacteriological warfare agents over large areas.

Surface-to-Surface Missiles

The trend in missile systems during this period will be toward:

a. More efficient warheads.

b. Lighter, simpler, more reliable, more accurate and more economical guidance systems.

c. Storable prepackaged liquid and solid propulsion systems with greatly improved performance characteristics.

d. Simple thrust termination.

e. Improved structural technique using new material for lighter, more economical systems.

In 1963, the Army will have available to support combat operations seven missile systems for employment at levels ranging from the platoon to the Army Group as follows:

a. In the Battle Group there will be an antitank missile with a shaped charge HE warhead, and the direct fire, short range, [redacted] DAVY CROCKETT system.

b. At the division level, there will be the highly reliable, presently operational HONEST JOHN free rocket with a maximum range of 25,000 meters. In addition, there will be an improved HONEST JOHN rocket with greater accuracy and a maximum range of over 40,000 meters. STRAC divisions and Air Transportable Missile Commands will be equipped with the lightweight, highly mobile LITTLE JOHN free rocket with a maximum range of 18,000 meters in lieu of HONEST JOHN. The highly accurate LACROSSE guided missile will be attached to Corps for employment in support of the division. [redacted] The LACROSSE missile will also carry a 500-pound shaped charge warhead for attacking point targets. Special warheads are under development for both the HONEST JOHN and the LITTLE JOHN to provide large area coverage with toxic chemicals. In addition, it is expected that by FY 1961 the T-238, a 115mm rocket for covering large areas with effective concentrations of toxic agents, will be available for troops. Beginning in 1964 and beyond, Missiles "A" and "B" will eventually replace HONEST JOHN, LITTLE JOHN and LACROSSE. Missile "A", mobile and light in weight, will have essentially the same maximum range as the replaced missile systems in direct support of the battle group and will have a minimum range capability of 1,000 meters. [redacted]

c. At the Corps level, the solid propellant, all inertially guided SERGEANT will replace the presently operational liquid propellant, command guided CORPORAL and will have both atomic and non-atomic warheads. [redacted]

[redacted] The SERGEANT will begin replacing the CORPORAL in 1961. Beyond the period being discussed, the SERGEANT will be replaced by a new missile system, now called Missile "C", which will have a maximum range on the order of 100 NM.

d. At the Field Army level, the Army will have operational the REDSTONE ballistic missile system, which has a maximum range of approximately 175 NM and is capable of delivering a large thermonuclear warhead. Although a fully fueled REDSTONE missile weighs about 31 tons, the unfueled missile and the system's equipment break down so they are readily air transportable. [redacted]

The PERSHING missile will be optimized for ranges between 200 - 300 NM.

Research on solid propellants will provide missile fuels with improved specific impulse. Concurrently, materials will be provided that will withstand the higher temperatures produced by the new propellants. Upper atmospheric physics research will improve the accuracy of Army missiles.

Air Defense

Turning from offensive to defensive missile systems, 1963 should be a milestone in air defense R&D; for by that time, the first NIKE-ZEUS should be operational. The NIKE-ZEUS system will be capable of destroying ballistic missiles, including the Intercontinental Ballistic Missile (ICBM). The NIKE-ZEUS system will intercept ICBM's at altitudes up to 500,000 feet and at ranges out to 75 NM from the launching site. This system will also have a tremendous capability of engaging air-supported targets out to ranges on the order of 200 NM. Recent studies indicate that the optimum family of U.S. air defense weapons will consist of the NIKE-ZEUS and a second generation HAWK. This family will provide an exceptionally successful defense against aircraft and air-supported missiles flying at ground level and at all altitudes up to about 100,000 feet. Equal in importance to any other characteristics of the NIKE-ZEUS system are its flexibility and growth potential. Recent studies indicate that the basic NIKE-ZEUS system would have some capability of attacking enemy satellites, and further studies are underway to determine and expand this capability.

It is envisioned that the present battle management systems, MISSILE MASTER and MISSILE MONITOR, will direct interim weapons systems satisfactorily but will not be capable of managing weapons systems such as the NIKE-ZEUS or the second generation HAWK. Accordingly, advanced battle management systems must be developed concurrently with the related weapon systems in order to collect and transmit data, to communicate and to evaluate continuously the air battle with reaction times compatible with the speeds of the targets anticipated in the NIKE-ZEUS era, and to compete with more sophisticated electronic countermeasures environments, decoys and multiple warheads.

For air defense of the forward elements of the Field Army, development of the crew served, highly mobile, 37mm gatling gun VIGILANTE will have been completed, but the system may be kept "on the shelf" to be produced in the event of emergency. Meanwhile, development will proceed on a follow-on guided missile system, MAULER, designed to combat a more advanced threat, and REDEYE, a shoulder fired, air defense guided missile employing an infra-red homing rocket, will have been completed. Air defense of the remainder of the Field Army area will be provided by NIKE HERCULES and HAWK when both may be supplanted by the Second Generation HAWK, now in its initial development. Only limited progress, during this time frame, is expected for PLATO, the Field Army anti-ballistic missile, due to the level of funding available for its development.

Space and Satellites

The responsibility for space and satellite activities within the Department of Defense has been assigned to the Advanced Research Projects Agency (ARPA). However, the Army has definitive military requirements that can be met only by means of satellite and space vehicles. Examples of such requirements are battlefield surveillance and target acquisition; electronic intercept; communications relay; mapping and geodesy; and meteorology. Having defined these requirements, there is also a requirement to develop, by employing satellite and space techniques, the capability of detecting, tracking, and destroying enemy satellites which pose a threat to the security of the United States. Development must be initiated for larger engines than are required for surface-to-surface or surface-to-air missiles if the United States is to surpass the USSR in this area and to insure U.S. military and technological supremacy. Many of these requirements are being approached by the Army's space program currently under the direction of ARPA.

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Air Mobility

To meet the demands for increased mobility dictated by modern weapons, the Army recognizes that major advances are urgently needed to meet rapidly expanding movement, tactical and logistical support requirements. These major advances are needed to implement certain critical tactical concepts and to provide streamlined logistical support. Therefore, Army aircraft will have to be operable in forward areas, using small, relatively unprepared landing strips; be easy to maintain; be operable just above the earth's surface; and will have to have all-weather, day-and-night capabilities comparable to ground vehicles.

From a technical standpoint, major progress is largely dependent upon the development of a superior family of modern aircraft power plants, such as gas turbine engines; major advancement in air vehicle design; the successful "combination" of the agile helicopter and the efficient, conventional fixed-wing airplane; rapid advancement in air navigation aids; improved fuels and uses of fuel; and the development of suitable weapons for delivering suppressive fires from Army air vehicles.

To improve the Army's organic air mobility, R&D projects are directed toward providing by FY 1963 the following air mobility family:

a. The IROQUOIS -- the first of a series of turbine powered helicopters designed specifically to meet Army requirements of battle area mobility, command, reconnaissance and aeromedical evacuation.

b. The CHINOOK -- a 3 to 5-ton-payload transport helicopter having all-weather flight capability and greatly improved battle area mobility for combat units, to include missiles and missile launchers, and the transport of critical supplies.

c. An Improved Utility Helicopter -- a 1 to 1 1/2-ton-payload helicopter designed specifically for small, highly mobile Air Cavalry type units.

d. The MOHAWK -- a STOL operation airplane for combat surveillance, target acquisition, airborne control of some missile weapons systems and radiological survey.

e. STOL Transport -- a 3 to 5-ton transport aircraft to provide increased Army capabilities to a radius of 250 miles for the movement of combat units and for logistic support in the battle area.

Current and future R&D projects will develop the following types of Army aircraft for the air mobility family after FY 1963:

a. An aerial jeep for reconnaissance and assault, equipped with the DAVY CROCKETT.

b. A VTOL/STOL utility aircraft to replace the H-21, H-34 and L-20.

c. A VTOL/STOL 2 to 4-ton-payload transport aircraft to replace the CHINOOK and the STOL transport.

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d. An 8 to 16-ton-payload flying crane.

A design concept of AVRO Aircraft Limited of Canada, based on the use of conventional turbo-jet engines to drive an air turbine which exhausts through periphery ducts on a circular plan form airfoil, is being investigated. Should a scientific break-through result from the investigation of this concept, it is entirely possible that a unique family of air vehicles will result. These flying discs would be capable of flying at high or low altitudes and of hovering or moving in forward flight speeds up to several hundred miles an hour. This type of vehicle may give the Army the capability for long-range movement while still retaining a high degree of tactical mobility upon arrival in the combat zone.

Surface Mobility

Mobility on the surface is typified by armor. Army doctrine includes a vital role for the tank in both the atomic and non-atomic battlefield. Between now and 1963, tank development will concentrate on a main battle tank to supersede the M-48A2 and on a light tank capable of filling the airborne role as well as that of reconnaissance. The light tank will have main armament capable of defeating enemy armor and will have an inherent swim-or-float capability for use in inland waterways. Personnel carriers, trucks and light self-propelled artillery will also possess an inherent water crossing capability. Defensively, tank vulnerability may be reduced by the successful development of anti-antitank devices that destroy incoming projectiles.

Not only tanks but all surface vehicles will benefit from the emphasis on compression-ignition type engines to increase fuel economy and reduce the heavy POL support requirements. Development effort is being directed toward attainment of a multi-fuel capability permitting engine operation using gasoline, JP-4 type fuel, or diesel fuel.

The logistical system is being reviewed constantly to reduce the number of items and lighten the supply load the Army must maintain. Means of transporting and distributing liquid fuels will be enhanced by the introduction of the ROLLING FLUID TRANSPORTER, a system for carrying fuel in oversize rubber tires. For movement of large tonnages, a large wheel, positive wagon steer, all-wheel-drive vehicle known as a GOER will be approaching completion. This concept, which is a new approach to logistical carriers for use in highly mobile Army forces, is an outgrowth of recent developments in heavy construction equipment.

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Combat Surveillance, Communications and Electronics

Airborne combat surveillance sybsystems will be available in 1963 to provide rapid, wide-area coverage of enemy terrain to the depths needed to detect targets for the employment of Army weapons, including those with the longest ranges. Sensors will continue to receive emphasis; during the time frame under discussion, radar and infra-red, coupled with spot coverage by photo systems, will provide information with sufficient accuracy for missile firing. A limited number of tactical operational centers will be available to facilitate correlation and analysis of a large mass of combat intelligence information, as well as of operational and administrative data.

By 1963, Army units will be provided tactical command net radio sets with anti-jamming features and with ranges appropriate to the greatly dispersed echelons of command in the atomic battle area. The area system itself will be designed for automatic switching and integral cryptographic facilities in all the radio relay or cable routes. Beyond 1963, the Army's objective will be to provide a field UNICOM system for converting all information, at the source, to digital form -- thereby greatly speeding up the whole communications process. Widespread use of automatic data processing systems will greatly facilitate the transfer of information.

As part of the combat surveillance effort, improved equipment will be provided by 1963 to speed up the determination of the electronic order of battle of the enemy and to facilitate effective jamming of enemy electronics. A multi-purpose jammer, covering the entire usable radio frequency spectrum, will be provided for tactical units. There will be available a limited number of special purpose jammers, such as those capable of jamming incoming missiles and VT fuses. In the field of avionics, self-contained navigators, absolute altimeters and collision-warning radars will be available in 1963 to improve the all-weather capability needed to carry out Army aviation missions.

Electronics research will insure widespread use of microminiaturization, transistors and printed circuits which will materially reduce the bulk and improve the reliability of electronic equipment -- as much as a ten-fold reduction in the size of major assemblies is in prospect.

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Nuclear Research

The development of nuclear power reactors to achieve substantial savings in logistical support is a major R&D effort which, as of today, has borne fruit in the successful design and construction of an operating prototype of a 2,000-kilowatt plant -- the Army Package Power Reactor at Fort Belvoir. The design and construction of a prototype 300-kilowatt plant -- the Argonne Low Power Reactor -- also has been successfully completed. A 5,000-kilowatt plant is programmed for 1961. By 1963, the Army plans to add a 500-kilowatt trailer-mounted plant to this family of reactors.

In the development of material and equipment with which to apply and to defend against atomic power on the battlefield, the Army is highly conscious of its unique problem. Unlike the other Services -- except, perhaps, the U. S. Marine Corps -- the Army is confronted with the problem of retaining combat mobility and striking power in the immediate vicinity of the effects of nuclear weapons and with the expectation that it can place little reliance on such passive measures as evacuation. The Army must stay and fight, and Army atomic environment research is directed to this end. Accordingly, the Army expects to achieve significant advances in the following fields:

a. An Indirect Nuclear Blast Assessment and Surveillance System (INBASS) for detection and surveillance of all yields out to ranges of 500 miles will be under development in FY 63. For the period beyond 1968, an advanced system ranging out to 1000 miles is planned.

b. Development of devices to protect eyes against flash blindness and flying fragments.

c. Biological investigations to achieve a better understanding of the mechanisms of injury to personnel.

d. Detailed investigations of the effects of atomic weapons.

e. Research involving protective agents against the biological effects induced by X and gamma radiation.