

At the December 1982 NATO ministerial meeting, US Defense Secretary Caspar Weinberger proposed that the alliance adopt a new operational concept for the next century entitled *AirLand Battle 2000*. Based on an initial document of 4 September 1981, it had already been widely promulgated on 10 August 1982 by the US Army Training and Doctrine Command

The AirLand Battle 2000 Controversy

who is being short-sighted?

by Ramon Lopez

(TRADOC), for discussion in the United States. It followed hard on the heels of the US Army's latest version of Field Manual 100-5 *Operations*, advocating the aggressive use by corps commanders of so-called Deep Strike, combined-arms formations under what is known as the AirLand Battle concept.

The new FM 100-5 itself, although formally adopted as current US Army doctrine up to the end of this century, is not without its detractors and is still the subject of heated debate. This was reflected in Col. William Hanne's article "AirLand Battle — doctrine not dogma" (*IDR* 8/1983 pp. 1035-1040). *AirLand Battle 2000*, which is projected as a logical outgrowth from FM 100-5, is even more controversial.

Although put forward as a means of exploiting one of the western world's advantages over the USSR — high technology — in order to boost NATO's conventional defense capabilities and reduce its reliance on unpopular tactical nuclear weapons, *AirLand Battle 2000* was not well received by the allied defense ministers. Both privately and publicly, a number of them criticised development of the futuristic systems it envisages as being unrealistic, far too costly, and a means of foisting "made in USA" hi-tech equipment (which may or may not work) on to unwilling European taxpayers.

Perhaps most telling of all, however, was the argument — recently re-stated with some force by German Defense Minister Dr Manfred Wörner (see box) — that if it eliminates the use of tactical nuclear weapons from the range of options available to NATO under its Flexible Response policy, then *AirLand Battle 2000* could eventually lead to the decoupling of NATO Europe from the main strategic nuclear deterrent forces of the United States. This is something which the Soviets have been seeking for decades. Since their achievement of strategic nuclear parity with the US, they are already half-way there.

The NATO allies are not the only ones to be unhappy about *AirLand Battle 2000*, however. There are rising doubts about its realism and affordability in the United States, especially now that US budget deficits have reached such high proportions. Many specialists say that, even

forces must be prepared to fight a larger force, for example as a deployment in NATO Europe, a combined force in Korea, or as a force tailored to meet a range of contingencies in the Middle East, Asia, Africa or Latin America. Introduction into an area of conflict must be rapid and with sufficient combat power to offset a concurrent buildup by threat forces. "It is important that once the political decision is made to commit forces, something be won to provide a basis for favourable political settlement. *The purpose of military operations cannot be simply to avert defeat or maintain the status quo, it must be to win*" (emphasis added).

The nature of the future battlefield and the overwhelming force potential of our enemies, say the authors of *AirLand Battle 2000*, argue for avoidance of all-out attrition warfare. In order to avoid high combat losses, they say, victory must be sought through manoeuvre, advantageous positioning of forces, use of deception, psychological efforts to erode the enemy's will, and exposure of minimum friendly forces to destructive weapons effects.

Numerous world trends indicate that prolonged war may be a thing of the past. Certainly, the lethality of future weapons, the decline in the US industrial base, and our decreasing military-age population all tend to argue against wars of a prolonged nature. The initial battles may well be so devastating that political settlement is sought early. It will be important then to be militarily ahead from the beginning, to negotiate settlement from a position of superiority.

"US forces of this period," continues the study, "must capitalize on technology to gain the combat advantage yet simultaneously retain strategic mobility. The forces called for must be easily deployable and capable of independent, widely dispersed operations by employment of small, highly mobile, firepower-intensive units that are mission-sufficient throughout the continuum of warfare."

"The decentralized, manoeuvre-oriented operational concept which is linked by a command and control philosophy based on mission-oriented tactics will require the development of a new and innovative method of developing the officer and non-commissioned officer corps", says the study in a reference to the proposed adoption of an equivalent to the British regimental system. "Collective training will be more intense. Simulation will be used to improve individual skills. Leadership and unit cohesion will be established during training and will, therefore, be in place in peacetime as well as in combat."

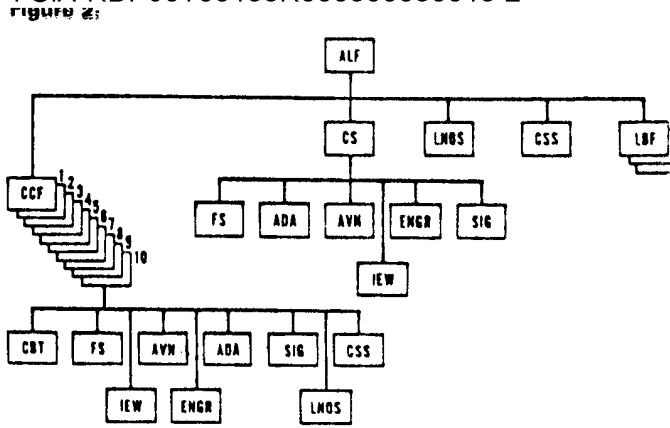
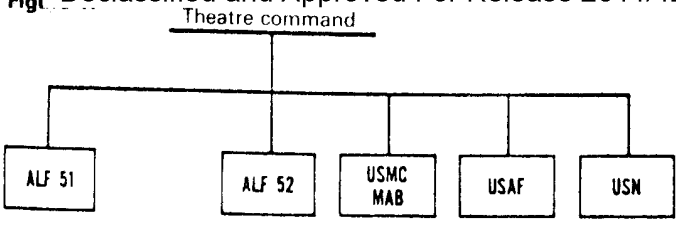
▲ Sinister-looking USAF Lockheed TR-1 aircraft, flying at high altitude, are likely to feature strongly in any future war as platforms for advanced sensors necessary to provide "deep look" targeting. Initially, they will carry Precision Location Strike Systems (PLSS) for targeting hostile ground emitters. TR-1s are also candidate platforms for the future Joint Surveillance and Target Attack Radar System (JSTARS), as are USAF C-18s and Army OV-10 *Mohawks*.

without the next generation of systems, keeping all the weapons and equipment already ordered by the Reagan administration in development, production and operation is going to make the world's richest nation bankrupt by the year 2000. Fuel is being added to this particular fire by the US Air Force, which has produced its own forward-looking study entitled *Air Force 2000: Air Power Entering the 21st Century*. Quite apart from European opposition, inter-service rivalry for funding, plus the reluctance of "white scarf" flyers to accept the force-multiplier potential of remotely piloted vehicles and "smart" missiles for traditional manned aircraft missions, may be enough to kill the *AirLand Battle 2000* proposal in its cradle.

The concept

AirLand Battle 2000 emphasizes that the world in which US military forces will be required to operate in the 21st century is likely to be one of increasing complexity and diversity of interests. "While conflict against the Warsaw Pact in Central Europe remains the most dangerous threat to US security," says the draft document, "it is not considered the most likely."

To counter the wide array of potential threats, the document continues, US



▲ A notional operational theatre with two AirLand Force (ALF) formations and other service assets, plus a US Marine Corps Amphibious Brigade (MAB).

► A generic AirLand Force with 10 Close Combat Forces (CCFs). It also has Combat Support (CS), Combat Service Support (CSS) and three Land Battle Force (LBF) command and control elements, plus representation from other services.

Key: ALF—AirLand Force; CS—Combat Support; LNOS—Liaison Officers; CSS—Combat Service Support; LBF—Land Battle Force; CCF—Close Combat Force; FS—Fire Support; ADA—Air Defense Artillery; AVN—Aviation; ENGR—Engineer Support; SIG—Signals; IEW—Intelligence & Electronic Warfare; CBT—Combat Unit

“Our methods of recruitment and providing replacements must be aligned with the overriding need to maintain cohesiveness in the units. Further, elements of the Reserve, National Guard and active force must be totally subsumed into a single conceptual direction. It is the intent of the *AirLand Battle 2000* concept and its functional area concepts to bring about these changes by laying out the next evolutionary step beyond the present doctrine contained in *AirLand Battle*” (i.e. FM 100-5). The authors add that “The guidelines in [*AirLand Battle 2000*] should be used to provide a focus for technology to allow the development of systems and organizations necessary to transition the [US] Army into the 21st century.”

Organizations

The *AirLand Battle 2000* study covers strategic, operational and tactical doc-

trine, with the emphasis on the last two, for which it says new organizations are required. At the strategic level, it advocates continued reliance on deterrence, noting that the ability to deploy large numbers of US forces to any area is itself a deterrent. In order of priority, it sets the requirements as being: deterrence of Soviet nuclear attack against the US and its allies; the defense of European and Pacific allies; and the ability to deal with lesser contingencies. It says that “psychological operations and other related actions” have the greatest impact at the strategic level. “These types of operation should commence when, through signs of mobilization or other activities, it becomes clear that the enemy is preparing to initiate hostilities. These actions concentrate on the disruption of the enemy’s warfighting potential. Actions aimed at creating disunity among nations of the Warsaw Pact and exploiting tensions between the Slavic and minority

members of the Soviet Army are examples.” The operational level, the study says “is the connecting link between strategy and tactics. [It is] the art of conducting the AirLand Battle through the application of manoeuvre.... The object of manoeuvre at the operational level is to force maximum strength against the enemy’s weakest point, thereby gaining strategic advantage. At the operational level, manoeuvre is generally characterized more by movement than by fires.” The aims are “to force an enemy to change his dispositions prior to battle to meet a threat he has not anticipated; to separate enemy forces thus allowing defeat in detail; to use advanced weapons and manoeuvre to eliminate the enemy’s operational options; and to cause indecisiveness within the enemy command structure.” At the tactical level, the US Army’s current AirLand Battle doctrine would be extended a stage further by *AirLand Battle*

JSTARS and JTACMS

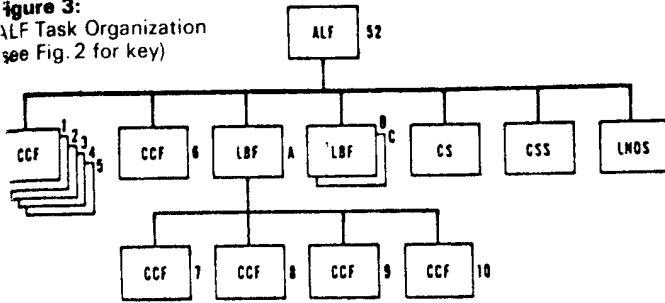
by Bill Sweetman

Two closely related joint-service programs, spawned by the recently completed DARPA *Pave Mover / Assault Breaker* technology demonstration effort, are now touted as the answer for every non-strategic target from airfields to armour and battleships. The Joint Surveillance Target Attack Radar System (JSTARS) stems from *Pave Mover* and the Army’s heli-borne Stand-Off Target Acquisition System, now cancelled. The Joint Tactical Missile System (JTACMS) will be a family of missiles, including a *Lance* replacement for the Army and an air-launched version, to be carried on aircraft ranging from the F-16 to the B-52. The Air Force is lead service on JSTARS, while the Army’s Missile Command is leading JTACMS. Ultimately, JSTARS will find and track ground targets and provide launch and mid-course guidance for JTACMS, which will deliver a payload of smart submunitions. RFPs for JSTARS and JTACMS are expected to appear around the turn of the year. New contractors have come into the competition, joining the original contenders in the *Assault Breaker* and

Pave Mover programs. Lockheed-Austin and Westinghouse have now teamed up on JSTARS, basing their approach on hardware from the Westinghouse B-1B / F-16 / DIVADS radar family and Lockheed’s experience in information-based systems such as the Precision Location Strike System (PLSS). General Electric is also bidding on JSTARS, teamed with Boeing, with its Multi-mode Surveillance Radar (MSR) against the *Pave Mover* competitors Hughes and Grumman / Norden. The MSR was flight-tested for four days at Fort Hunter-Liggett in July and is said to have proved the capability to perform Moving Target Indication (MTI) and Synthetic Aperture Radar (SAR) operations. On the missile side, Vought and Martin-Marietta have been joined in the competition by Boeing Aerospace. The key to getting both systems moving towards a reasonably early service date will be pre-planned product improvement (P³I), uncoupling the missile and radar programs while providing for complete integration a few years after service entry. The initial JTACMS would be a straightforward inertially guided weapon, carrying unguided submunitions, designed for use without the aid of the existing Precision Location and Strike System (PLSS) fitted to TR-1 aircraft, or JSTARS. It would be accurate enough to hit fixed targets such as missile sites, armed with M-74 Anti-Personnel, Anti-armour Munitions (APAMs), or airfields, in which case it could carry

an unboosted version of the Avco BLU-101 Boosted Kinetic Energy Penetrator (BKEP), the missile’s Mach 2.5 speed eliminating the need for a booster. This basic weapon could be fielded by 1988. Meanwhile, integration of the missile with JSTARS, PLSS or the satellite-based Global Positioning System (GPS) would continue as a P³I activity, along with the installation of guided submunitions, until the ultimate goal of precision strike against moving targets was attained. Members of the JTACMS missile family would vary in range, payload and size, but would have a generally greater range than was demonstrated in *Assault Breaker*. The Army weapon would weigh up to 3,000lb (1,360kg), with a 150nm range; the USAF Tactical Air Command is looking for a shorter weapon, more easily mated to an F-16, with a range closer to 100nm but a larger air-launched version would be developed for the B-52. The Vought and Martin JTACMS designs are closely similar to their *Assault Breaker* vehicles, based on the *Lance* and *Patriot* respectively; the Boeing vehicle is similar in concept but falls between the other two missiles in diameter, stemming from the company’s work on the short-lived Conventional Stand-Off Weapon. Compatibility with the B-52, and with the Common Strategic Rotary Launcher, is also part of the JTACMS study, because the new missile is part of the Conventional Stand-off Capability

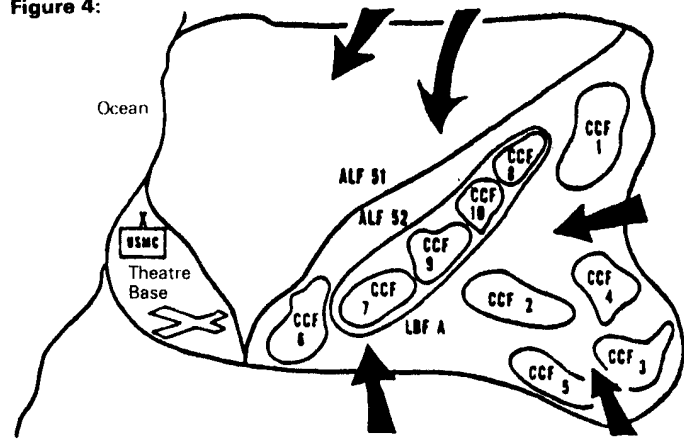
Figure 3:
ALF Task Organization
(see Fig. 2 for key)



This diagram shows in detail the 52nd ALF, part of the Theatre Command (Fig. 7), as it might be task organized. In this case, the 52nd ALF commander has employed Land Battle Force A to exercise command and control over Close Combat Forces 7, 8, 9 and 10. He has retained control over CCFs 1 through 6. He maintains LBFs B and C in readiness, if needed to reduce his span of control.

A notional theatre battlefield, with the task organization of the 52nd ALF. The 1st ALF would be similarly deployed. The USMC brigade is the theatre reserve formation and is located in the theatre base area.

Figure 4:



2000, in which "the full potential of acquisition, targeting and weapons systems is realized to attack the enemy deep in his rear.... At this level, manoeuvre contributes significantly to sustaining the initiative, to exploiting success, to preserving freedom of action, and to reducing vulnerability." It requires "decentralized execution by small, self-sufficient units; a blend of firepower and movement; continuous operations; and the need to see and strike deep." The concept envisages a number of small battles within the context of a single corps-type battle, where the full range of air and land force systems are brought to bear on the enemy formations to the full depth of the battlefield.

To implement the *AirLand Battle 2000* doctrine at operational and tactical level, new organizations are required. The study gives as an example a Theatre Command (strategic) with two AirLand Forces (ALF), a JS Marine corps amphibious brigade, plus JSAF and US Navy assets at the opera-

tional level. Each ALF would have 10 self-contained Close Combat Forces (CCFs) at the tactical level. The ALF would also have combat support, combat service support and representation from other services. To ease the ALF commander's task, he might place several CCFs under the command of an interim Land Battle Force (LBF) commander. This organization, and its outline deployment, is illustrated in Figures 1, 2, 3 and 4.

The hi-tech systems required

A series of detailed annexes to the *AirLand Battle 2000* study discusses the

▼ Artist's concept of JTACMS in action against Soviet armour. The carrier missiles are guided by JSTARS radar into a 'basket' above the target area, where they dispense their smart submunitions. The latter, using IR or millimetre-wave seekers, home on to individual tank targets, which they attack from on top where the armour is thinnest. At longer range, the enemy armour is likely to be in line of march and the submunition dispensing mechanism in JTACMS is therefore adjusted to provide linear coverage.

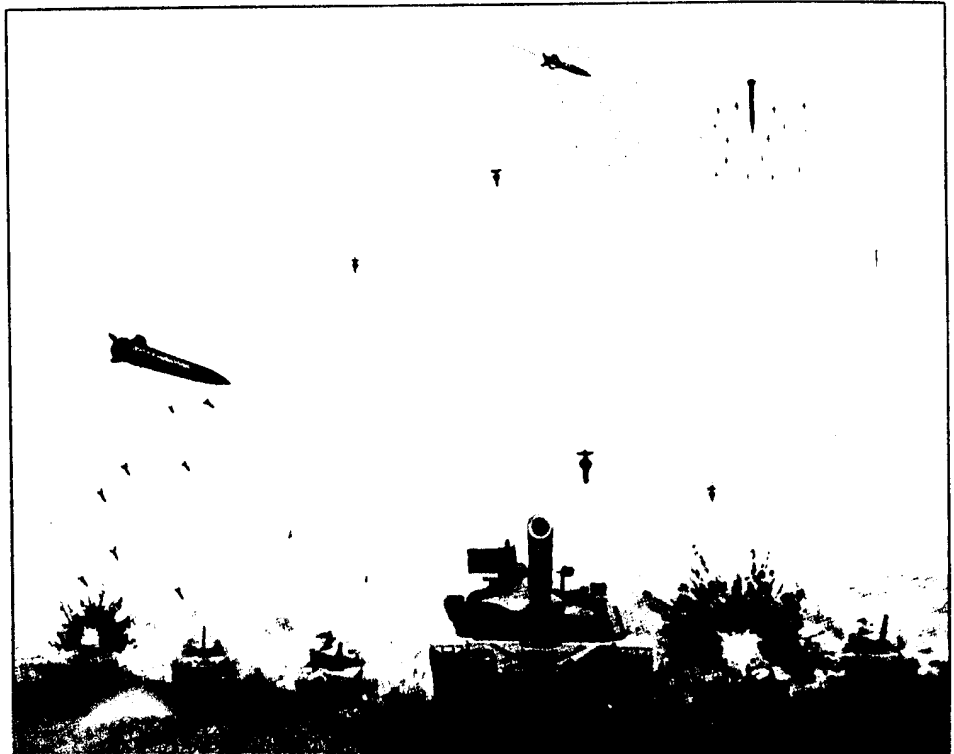
types of new equipment that are necessary for its successful implementation. First and foremost among these is the need for a Command and Control Subordinate System (CCS²). This will be essential for the control of tactical operations and covers five functional areas: manoeuvre, fire support, air defense, intelligence/electronic warfare, and combat service.

CCS² is based upon a hierarchy of component systems that have, traditionally, been tailored to meet their own separate missions. In the *AirLand Battle 2000* concept, each component system would function as an integral part of, and in support of, the overall system. CCS² in the year 2000 will require rapid information gathering, analysis, decision-making and 'shotgun' dissemination in near-real time. Targeting is seen as a critical element within CCS², since it permits the commander to fight both the close-in and the far, wide-ranging battle. New systems such as the *Aquila* remotely piloted vehicle

SC) envisaged for the B-52 in its declining years. Some contractors also suggest that ACMS could supplant *Harpoon* when, and if, B-52s are assigned to the maritime strike mission. In either case, it is possible that the B-52s would be given some form of autonomous targeting capability.

The Army wants 42 ship-sets of JSTARS, to be stalled on OV-10 *Mohawks*. The USAF has still to decide whether to combine the sensor and control station aboard a C-18 (Boeing 707) or whether to abandon autonomy for the greater range and better survivability of a TR-1 installation. The RFP for JSTARS is expected to provide for either alternative.

There seems to be a general consensus that the step-by-step approach represented by the JSTARS/JTACMS program strategy is the only practical way of getting the concepts demonstrated by *Assault Breaker* and *Pave Mover* into service. At the same time, the successful implementation of P³ calls for consistent planning and predictable spending. While the F-16C/D and F-15C/D show that it can be done, joint-service programs are always at risk when budget-cutting season comes around. All in all, designing the Dual Role Fighter around the old Mk 82 bomb seems no more than simple prudence, and the same would appear to apply to JSTARS and JTACMS, whose price tags may be as sophisticated as their technology.



The Soldier in the Year 2000

Incredible as it may seem, everything referred to here is taken from the AirLand Battle 2000 study and its annexes. —Ed.

In the scenario depicted by the *AirLand Battle 2000* study, the battlefield of the 21st century is dense with sophisticated combat systems. These include robot weapons, an electromagnetic Close Combat Force (CCF) gun system for use against ground and air targets, and an Air Land Force (ALF) particle beam weapon, whose ranges, lethality and employment capabilities surpass anything known in contemporary warfare.

The airspace above the battlefield is saturated with aerial and space surveillance, reconnaissance and target-acquisition systems, while the ether is jammed with encrypted, meteor burst communications and electronic warfare transmissions, including both non-nuclear and nuclear electro-magnetic pulses. Air defense (AD) weapons, among them an ALF AD laser system, CCF remotely piloted AD vehicle and CCF AD hovercraft, are deployed to counter the aerial platforms.

The conflict is intense and devastating with major losses on both sides. This is because both the NATO allies and the Warsaw Pact, in addition to conventional weapons, are employing tactical nuclear, chemical and biological weapons at will. In such an atmosphere of confusion, command and control is exceedingly difficult. Manoeuvre warfare — the basic premise from which all other US Army doctrine is derived — is absolutely essential for survival and winning battles against the overwhelming numbers employed by the Warsaw Pact in its offensive-oriented forces.

The basic element — the individual soldier — looks more like an *Apollo* crew member than a traditional infantryman. His rations were developed from the space program and his disposable uniform, which looks more like a lightweight space suit than traditional battledress gear, insulates him from chemical and biological warfare agents.

His basic weapon is still a lightweight automatic rifle, although a new high-velocity, high-

velocity, caseless round has replaced the traditional brass cartridge. Some soldiers are issued fire-and-forget anti-tank missiles, small directed-energy weapons, or retrievable mines. Chemicals are used to stunt hair growth and "retard bodily functions", since the requirements for mobility and continuous operations do not allow for much in the way of field services. Fatigue and combat stress are reduced by the use of specially developed "safe" drugs which do not inhibit performance. Artificial blood plasma is used for transfusions given to the wounded, and the dead are rapidly disposed of with foams and disintegrators.

During a lull in the fighting, sympathy is provided by a chaplain via a two-way video hook up, or by way of a pre-recorded video message. After the chaplain's sermon, the soldier can take his mind off the carnage around him with a portable, stress-reducing game.

Situation reporting is simplified by the use of position/location reporting systems and hand held computers and transmitters, which provide the lowest-level units with the means of forwarding strength figures, casualty data, etc. Headquarters video displays of unit strength are automatically updated as low-level units report in.

and the Joint Surveillance and Target Acquisition Radar System (JSTARS — see box) are viewed as essential to meeting this requirement for target information. JSTARS is currently intended to equip US Army OV-1 *Bronco* aircraft, plus USAF TR-1s and C-18s.

"Target selection pervades the entire force," says the study. "Targeting not only applies to artillery and close air support, but encompasses all aspects of target acquisition, analysis, and the application of the optimum system or mix of systems to attack the target."

Some new weapon systems are already entering development for *AirLand Battle 2000*, the most visible being the deep-strike Joint Tactical Missile System (JTACMS — see box) which is an outgrowth of the successful *Assault Breaker* technology demonstration program. Others are terminally guided anti-tank submunitions, fire-and-forget anti-tank missiles and robots. The *AirLand Battle 2000* study also talks of rapidly emplaced mines and sticky foam barriers, non-nuclear EMP generators, high-energy lasers, millimetre wave transmitters, and other systems which use the electromagnetic spectrum.

The type of vehicle employed is likely to be very different from today's and may well use air-cushion technology to allow passage of water barriers, minefields and areas contaminated by nuclear, biological or chemical strikes. Clifford D. Bradley, until recently Chief of the Exploratory Development Division, Tank-Automotive Concepts Laboratory, has noted that "the technology contributing to methods of killing the tank is advancing at a much faster rate than technology contributing to the survivability of the tank." He has concluded that the M1 *Abrams* "may be the end of the line." Successors are likely to be armed with a mix of fire-and-forget missiles for anti-aircraft and anti-tank missions, and possibly with dual-role, hypervelocity electro-magnetic rail guns,

now in technology development by the Defense Advanced Research Projects Agency (DARPA).

Development of the Very High Speed Integrated Circuit (VHSIC), meanwhile, is under way and promises to revolutionize certain military systems. A recently released Defense Science Board report on the Pentagon's VHSIC project said that "the VHSIC program is one of the two or three most important technology programs under way in the DoD."

According to Dr. Robert S. Cooper, DARPA's Director, the Pentagon must

now begin research and development of computer technology even more advanced than VHSIC. The Pentagon has asked for almost \$150 million over the next two fiscal years to develop a supercomputer offering computational speeds 1,000 times greater than those used in military systems today.

"As we saw recently in the South Atlantic and then again in the Middle East, the power of the silicon chip and its associate ability to rapidly and accurately process signals and data of all kinds holds the key to success in the battlefield of the future,

Air Force 2000

Like the US Army, the US Air Force has looked into the next century and seen a more complex and dangerous world in which many nations will be armed with advanced (and perhaps nuclear) weapons.

In such a world, the USAF concludes in a study called *Air Force 2000: Air Power entering the 21st Century*, the Air Force must be ready to fight "across the spectrum of conflict" from brush wars to nuclear exchanges. But because of limited funding for weaponry, the USAF will have to increase its reliance on technology and tactical surprise for survival.

The USAF study, designed to provide general guidance to planners as they address specific force development issues in the near term, was ordered by former USAF Chief-of-Staff Gen. Lew Allen in October 1981 and was completed in summer 1982. Several hundred military and civilian personnel contributed to the 450-page classified study, an extract of which was recently made available.

The study took a broad-brush view, addressing economic, demographic, environmental and technological matters to provide a comprehensive picture of the operational environment in which the Air Force of the future will carry out its missions.

According to the study, the world of 2000 will present startling contrasts to the world of today.

There will have been rapid advances in computer technology, micro-electronics, communications, composite materials and directed-energy technologies. But the world will continue to be dogged by over-population, food and energy scarcity, and inequitable wealth distribution. Such a world will be "fertile ground for future conflicts," the study said. "With the Soviet Union and some other nations attempting to undermine American influence throughout the world, the possibility of a peaceful global environment in the future seems remote," it concluded.

Deliverable nuclear weapons could be possessed by many major powers and several minor ones by the year 2000. And many third-world countries could have large quantities of sophisticated military hardware currently being produced.

Looking at potential future battlefields including Western Europe and the Persian Gulf, the study said that the emphasis for defeating Soviet theatre attacks would continue to be placed on forward-deployed aircraft and reinforcements flown in from the US. In such combat situations improved stand-off weaponry, all-weather systems, specialized munitions and real-time targeting systems would magnify the destruction that air power could cause to enemy forces. Abilities to continue operations in a chemically contaminated environment, and to retaliate in kind, must also be developed, the study added.

When a soldier is wounded, a sensor he is wearing provides location, degree of injury and degree of incapacitation. The medic (now called a Mobile Medical Trauma Technician) administers first-aid medicine. Meanwhile, a personal ID card (actually a microchip) is transmitting data from the combat unit to the receiving support unit. And an inter-connected casualty reporting system is automatically updating the soldier's status, as recorded in his unit's financial, postal and strength accounting systems.

After being shipped to a modular field hospital (a medical evacuation tilt-rotor aircraft (with weather and missile evasion capabilities) they may be transported to a larger medical recovery facility while under suspended animation.

While recuperating from his wounds, he can use a CRT to read his "mail", which is digitized, he can watch a video disc. At the hospital, he can even get a fresh supply of anti-venereal disease medicine — normal issue to the soldier of the 21st century, when, due to the reduced birth rate, commanders can no longer afford the automatic cuts in available combat manpower which were caused by the disease throughout the 19th century.

aid Cooper. "We feel that superspeed computation will play a pivotal role in the US force structure of the 1990s and, using VHIC technology as a point of departure, we intend to make the key investment now which will result in the fulfilment of the central role of supercomputation in defense capabilities for the future."

He said such supercomputers may one day simulate and predict the outcome of various courses of military action for field commanders. "This will allow the commander and his staff to focus on the larger strategic issues rather than have to

manage the enormous information flow that will characterize the battles of the future."

The head of DARPA also said that it is not far-fetched to believe that such a device will take over much of the fighter pilot's job. "Men and computers will operate as collaborators in the control of complex weapon systems," he said. "The computer could be the pilot's 'assistant' and respond to spoken commands to carry out instructions without error, drawing upon specific aircraft, sensor and tactical knowledge stored in memory, coupled

with prodigious computer power. This capability could free the pilot to concentrate on tactics. Such collaboration could change the role of the human pilot to that of aircraft commander, concentrating on the strategy for carrying out the overall mission rather than that of a button and switch technician," said Cooper.

Close combat warfare in the year 2000

The flavour of *AirLand Battle 2000* is perhaps best captured by examining the

Reflecting the Army's *AirLand Battle 2000* doctrine, the USAF study stated: "To prevail in future conflict, the AF must seize the initiative and quickly achieve both air and space superiority. Air superiority will require the capability to actively attack and neutralize enemy airfields, destroy aircraft before they can employ their weapons, and destroy surface-to-air defenses. Space superiority is required to ensure that space-based assets are available to support theatre forces. Superiority in space will require... the capability to destroy hostile space systems. The ability of the AF to interdict land and naval forces will be crucial.... To support ground forces, long range night/all-weather systems will be needed to interdict reserve forces and supplies.... These systems should have the capability to provide close air support."

Air Force aircraft, meanwhile, must be able to perform a large number of sorties and would thus require high reliability. These aircraft must also be able to operate from damaged runways and from small airfields. The planners also saw a role for long-range tactical bombing in the year 2000. The study said the extended combat range and large payload of the bomber force could be crucial in a battle.

The military aircraft of the future may reflect a departure from existing designs. For example, DARPA's X-wing aircraft has been tested in wind tunnels and will be flown in FY 1985. The X-wing operates as a rigid-rotor

helicopter that uses circulation control versus blade pitching to provide lift and control. When aloft, the X-wing aircraft converts to a fixed-wing configuration in forward flight. The rotor is stopped and the blades become fixed wings swept both forward and aft. In this configuration, the aircraft will be capable of high subsonic speeds at altitude and thus will combine the capabilities of rotary and fixed-wing aircraft. DARPA officials told *IDR*.

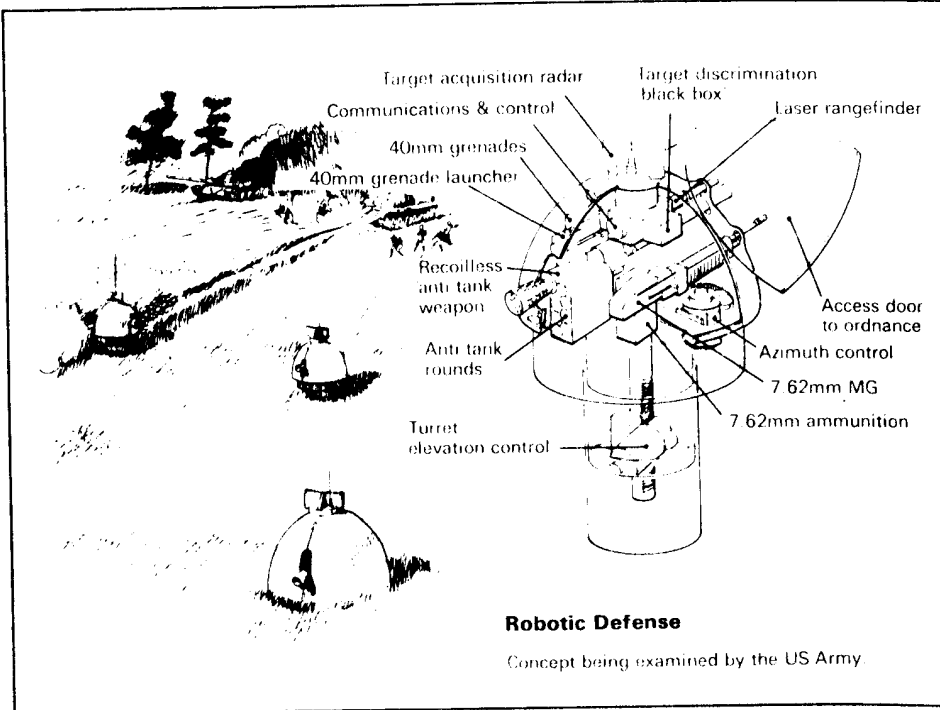
Meanwhile, DARPA will flight-test next fiscal year the Forward Swept Wing demonstrator aircraft, for which Grumman Aerospace Corp. is under contract. Grumman President Joe Gavin recently told *IDR* that he thought it was "too soon to say whether other aircraft will be built with forward swept wings." But he added that "development of the technology in DARPA's FSW program will put us in the desirable position for any future high-performance aircraft development."

Regarding the USAF's Advanced Tactical Fighter (ATF) program, Gavin said: "We think the ATF is something that anybody who wants to stay in the high-performance aircraft business must do." He said, however, that it was unclear in his mind whether there would be a follow-on to existing fighters. "You can ask yourself, is there still a role for a manned fighter in the year 2000? What is it going to do? Is there cost-effectiveness for what one could postulate for a fighter in that timeframe? Is it something that would be considered vital? I'm not so sure," he stated.

Gavin said he saw "a place for un-manned devices far beyond what we have today.... You can make a good case for what I think of as the one-way weapon. I don't expect manned missions to disappear entirely, but it's not clear to me that we will be building the same number of fighters 20 years from now as we are building today."

The USAF study concluded that "success in air warfare in the year 2000 will depend in large part on the operation of integrated command, control, communications and intelligence (C³I) systems." Such an integrated system will collect, process and transmit massive amounts of information to commanders. Improved secure communications are also needed, as are new-generation computers to help process the huge volume of data.

The study said that developments in 15 technologies would be critical for operations in the next century. These include information processing, sensors, supportable electronics, stealth and lasers. But the study warned that investment in technology development was now at less than 60 per cent of its level in the mid-1960s. In saying that the US could not "mortgage the future", the USAF planners recommended a reversal of the downward trend of the last fifteen years and appropriation of "the seed investment to ensure that the technology breakthroughs necessary to remain at the leading edge will in fact occur."



Robotic Defense

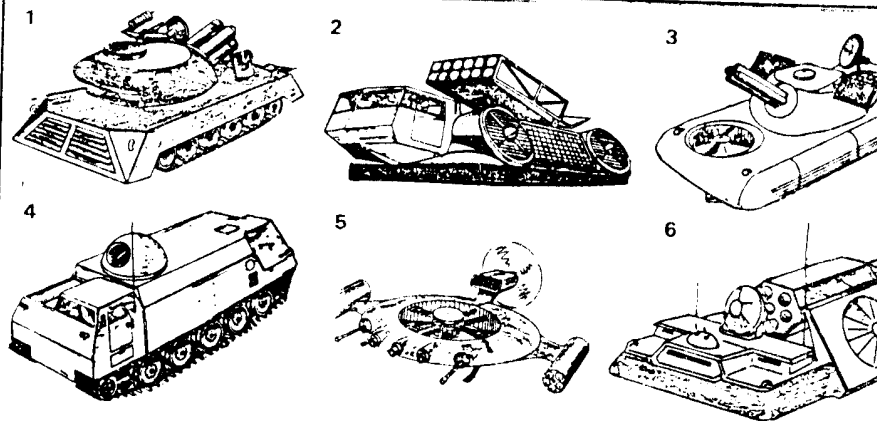
Concept being examined by the US Army

by the following extract from the section on CCF offensive operations, which form the basis of the new doctrine:

Close combat forces are oriented on defeating the enemy through physical and psychological means. To preserve favorable friendly attack ratios and to create multiple enemy weaknesses contributing to his ultimate defeat, critical enemy systems — nuclear delivery means, command and control, etc — and formations are attacked prior to their commitment. Unconventional warfare forces assist the close combat commander to see the battlefield, concentrate combat power, suppress the enemy's suppressive fires, and attack and destroy the enemy. Opportunities to attack are sought at every phase of the battle, and sufficient force and full-spectrum weapon systems are made available to attack and exploit enemy vulnerabilities.

Close combat forces attacking to exploit enemy weaknesses can rapidly change the direction of attack to defeat enemy forces on the flank or to threaten the rear areas of engaged enemy forces. Such operations lead to the *absence of a clearly defined front line*. Thus, the amoeba-like area of influence has a broken, meandering, interrupted trace, and its configuration changes very rapidly.

The rapid and frequent manoeuvring of mobile combat forces is based on information gained from appropriate intelligence, reconnaissance, surveillance and target acquisition systems committed to the area of influence. This is accomplished simultaneously with the destruction of the enemy so as not to reduce the tempo of the



Some vehicle concepts in the AirLand Battle 2000 study. Key: 1 — AirLand Force particle beam weapon; 2 — AirLand Force missile system; 3 — Close Combat Force gun system; 4 — AirLand Force air-defense laser system; 5 — Close Combat Force air-defense RPV; 6 — Close Combat Force air-defense hovercraft.

offensive. Aerially delivered combat forces acting in concert with mobile ground combat elements and fires contribute to the continuity of operations necessary for victory on the battlefield. Close combat forces delivered by organic aerial platforms and supported by assault aerial platforms, indirect fire, and tactical air elements are rapidly manoeuvred to attack enemy high-value targets throughout the depth of the battlefield.

To achieve the tactical mobility required to defeat the enemy in the area of influence, commanders integrate all available systems to support their tactical scheme of manoeuvre.

The critical massing of all combat powers at the precise time and location to achieve victory requires well led, well

trained, and multi-capable units which are trained, equipped, and supported to operate 24 hours a day in all weather and visit Operations in a combined-arms mode substitute the normal organization for combat, combat support, and combat service support elements. Close combat forces are combat organized and element is designed to permit mission accomplishment with minimal resupply or logistical phasing e.g., multi-capable weapons and non-fossil fuel dependent element.

Nuclear and chemical weapons, if available and authorized for employment, operate in support of close combat forces, fighting either dismounted or from controlled, protected environment on and ground platforms. During the conduct of nuclear or chemical operations, primary missions of close combat forces are the rapid exploitation of nuclear or chemical strikes, the completion of destruction of surviving enemy forces, the seizure of specific objectives. Under these conditions, the decisiveness and scope of the offensive are multiplied, times for the attainment of goals are reduced, and the significance of surprise is increased. If attacking forces are required to traverse contaminated terrain, they do so in protected air and mobile land carriers, thus denying the enemy any economy of force benefit from such obstacles.

Contaminated areas and water barriers are not viewed as serious obstacles to the conduct of combat operations. Combat vehicles with the means to cross water obstacles are capable of operating at full efficiency in chemical, biological and radiological environments. This is accomplished by installed radiation shielding, chemical and biological protective a decontamination systems, or by a proflaxis which protects the soldier against chemical and biological effects. Such systems permit the crossing of barriers stride without reducing the momentum of an attack. Organic close combat aviation assets and Air Force systems are fully integrated into the scheme of manoeuvre. These assets provide fires or insert dismounted forces to seize objectives on the far side of the obstacle.

German Defense Minister says "No"

The Federal Republic of Germany is the European NATO nation most immediately concerned by doctrinal changes such as those embodied in the *AirLand Battle* concept, now adopted by the US Army for the rest of the century, and the proposed follow-on *AirLand Battle 2000* concept. Both have caused renewed questioning of Germany's Forward Defense policy, which many specialists consider to be as militarily untenable as the Maginot Line. In addition, well meaning American suggestions that adoption by the Western allies of *AirLand Battle 2000* could reduce NATO's reliance on politically unpopular nuclear weapons have gone down, in the words of one observer, "like a concrete parachute" in the German Defense Ministry.

At a hearing on alternative strategies held in the Bundestag on October 24, Defense Minister Dr Manfred Wörner said that there could be no question of renouncing either the NATO policy of Flexible Response or the NATO option of launching a strategic nuclear first strike. If the first-strike option is not retained, he said, the Soviets might assume that they could attack the FRG by conventional means without risk to the USSR itself, and that they could confine the war within calculable proportions. Deterrence, said Wörner, could only be maintained if the FRG remained "coupled" to the strategic weapons of the United States. For this

reason, he said, he had refused to endorse the US concept of *AirLand Battle 2000*.

In order further to deter an attack at the conventional level, however, the German Defense Minister insisted that NATO's conventional defenses be strengthened to such an extent that the alliance have the capability to strike deep into a Soviet second echelon. This is a key element in the *AirLand Battle* doctrine, already adopted by the US Army in its new Field Manual 100-5.

In a comment that is bound to arouse controversy, Wörner also endorsed a criticism previously voiced by ex-Chancellor Schmidt, who deplored the fact that neither the United Kingdom nor the United States any longer had military conscription. The result, he said, was that the West was no longer able to mobilize sufficient reserves to avoid the rapid escalation of any conflict in Europe to the nuclear level.

On the question of Germany's Forward Defense policy, Wörner said that it was impossible to give it up. "Whoever considers abandoning this principle," he said, "should bear in mind that 30 per cent of the FRG's population and 25 per cent of its industry are concentrated in a 100km-wide strip running the length of the border with East Germany." The idea of trading space for time in an area defense concept, he said, "can only be conceived by persons failing to recognize these facts. This cannot be accepted by a German defense minister."