

The VTO transport has upward-pointed wings and propellers to produce lift for take-off.

Fantastic Features of Future Warfare

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HE atomic age is producing a curious military end-product, yet only a few persons are conscious of its birth and beginnings. This military end-product is not a by-product because it will serve not only to alter the form of any probable future conflict, but it could eliminate atomic war itself. This end-

product is a new form of lightning war: 3-Dimensional blitzkrieg.

While the world will stand in living dread of atomic warfare, and nations will continue to gird for its possibilities, this new form of blitzkrieg will quietly undergo development and progress. The fantastic proportion of future warfare is bare-

ly visible now because much public attention is focused on atomic weapons.

Since the inception of armed conflict, man has sought increased destructive effect. The peak in potential military destruction has been reached. Man now possesses more blast power than he needs. The world is on the brink of full realization that a total duel with atomic weapons is simply execution of a mutual suicide pact. The horror of this grim possibility provides the foundation upon which men will seek new approaches to a more sanitary¹ form of warfare and defense. Thus we are entering a new era, that of 3-D *blitzkrieg*, wherein multiple forms of military mobility will introduce fantastic feature into future war.

This multiple approach blitzkrieg will become the core of 3-Dimensional warfare, that form of future conflict utilizing flying tanks, leaping logistical carriers and flying pillboxes.

The Fantastic Vehicles Are Here

Since the 3-D warfare concept was published in ARMOR (November-December, 1955), the following five realities have either taken place or have recently come to public notice:

First, the Army has purchased 12 experimental models of the *Aerocycle*, a one-man flying machine designed to give the infantryman more mobility than he has ever possessed.

The second reality is the *Flying Crane*, the Air Force's XH17 helicopter that has actually lifted a 7,800 pound trailer van. The Flying Crane is now lifting a weight

one half that of the Army's new self-propelled gun, the T101. Thus, one existing helicopter is approaching the lift capacity of transporting a 90mm gun and tank-tracked carriage. In five years the marriage of tank and helicopter, even in this crude form, can be such that 15 crane-helicopters can lift a tank battalion across a river in one morning and resupply them in the afternoon. The Army's M59 armored personnel carrier for infantry is already capable of swimming rivers. Bridges are nice, but in hard combat they are bound to be eliminated for faster tactical means to the end: get across in a hurry and save lives.

Another reality in test model form is the *Aerodyne* invented by Dr. Alexander M. Lippisch. All fuselage and no wings, the Aerodyne gets its lift from a blast of air blown through its belly. Dr. Lippisch's experiment is of such significance that the Office of Naval Research is subsidizing his research. Dr. Lippisch hopes to have a piloted Aerodyne flying within this year.

The fourth reality is the *Flying Barrel* or ring-wing-type aircraft. The Navy has awarded a research contract to the Kaman Aircraft Corporation for the development of this annular wing aircraft that will combine the advantages of the airplane and helicopter for vertical and horizontal flight. The French Government has financed work on the *Co-leopter*, a flying barrel which is being developed by Dr. Helmut von Zborowski, a German engineer and aircraft power-plant specialist. The



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Coleopter (from the Greek for "sheathed-winged") has been put through laboratory and wind tunnel tests. A full sized flying barrel is expected to be evident soon in France.

In the field of larger aircraft with vertical landing potentialities there is the fifth reality: the Army's *Convertiplane*. In addition, there is under development the vertical take-off and landings airliner. (*The VTO*,

hereafter referred to as *VETOs*.) This plane itself has been successfully flown at Moffett Field, California.

Thus there is in being today an array of functional aircraft or devices which provide the very foundation for 3-Dimensional warfare and 3-D blitzkrieg. The way is clear, to wage future combat without complete reliance on roads, big airfields and bridges. Project by eight years



of mobility.

In the field of prediction, the ranges are unknown and the targets are obscure. This article is not to record a set of predictions, but to outline possibilities that lie within the grasp of the Army. These are the possibilities. They can be accepted or rejected—but they cannot be ignored.

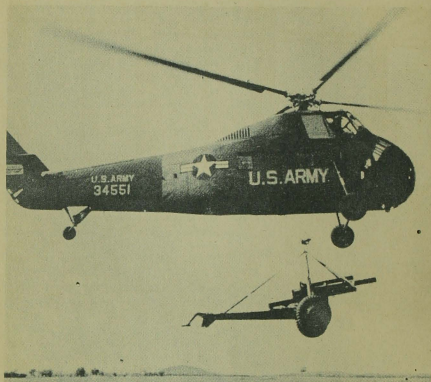
3-Dimensional Blitzkrieg

The flying tank will project armor in a new form of mobility that will give combat a fantastic final proportion. It is too early to predict the form of the flying tank. Its form was suggested in my last article. However, the more probable design will be that of the WASP, which is a flying barrel with tracks. The hull and the turret will be one unit, the barrel itself rotating on the track platform as shown.

Battalions of these barrel WASPs will constitute 3-D task force that can alight in enemy rear areas to destroy the logistical support installations of large forces. Then in turn they may take off to engage in combat in other chosen areas. By their mobility they will force such fluidity into combat that they can only be countered by tanks of similar function.

the vertical take-off ships, or VETOS, which we now have and this new form of warfare will assume such concrete shape that even the logisticians will be convinced that 3-D combat is here to stay. Actually, this revolution in tactics and techniques is going to cause a revolution in military logistics as well. The problem is to leapfrog certain logistical concepts and practices over to a new field of military art that will be in key with the future forms

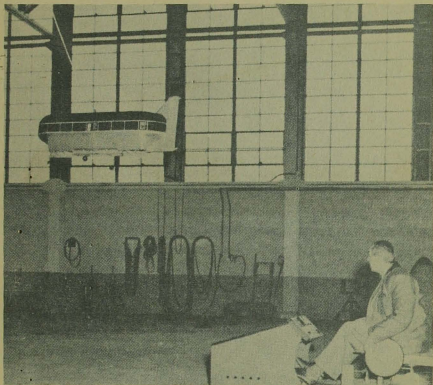
The 3-D blitzkrieg capacity of 470 flying tanks alone is such that this force, organized in seven columns, can militarily and momentarily (one to two days) dominate an area the size of Austria and wreak destructive havoc on conventional enemy forces of up to 40,000 troops. Add 10,500 VETO lifted infantry (21 battalions of 500 each) to the



The Flying Crane — XH17 helicopter has actually lifted a 7,800 lb. trailer van.

470 tanks and *this* blitzkrieg force can successfully dominate a region like Austria for one week and defeat a conventional aggressor force up to 100,000 men. These combat proportions appear fantastic on the surface until one grasps the mobility aspect of VETO tanks and infantry which can engage, disengage, disappear and reenter combat at will almost without particular reference to the limiting influences of terrain. The biggest advantage of the VETO

forces would be the surprise factor. This tactical advantage would serve to reduce ammunition consumption and thereby reduce logistical tonnages of supply and resupply. Furthermore, the capacity of VETO units to disengage in combat quickly and decisively means that they can return to several rendezvous of supply and thereby largely eliminate the present practice of showing all supply tonnages forward. To the combat unit stuck on the front, 3-D

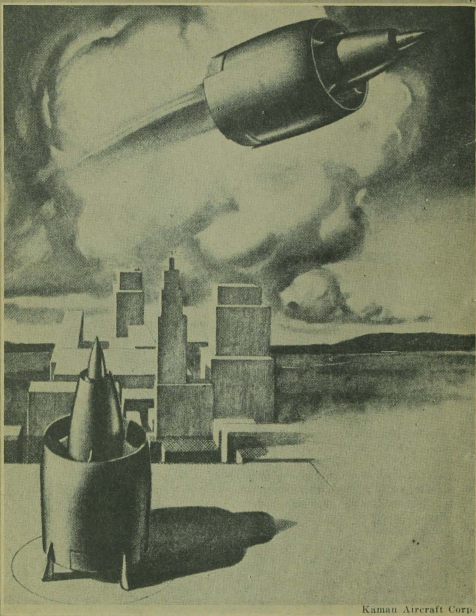


The Aerodyne, all fuselage and no wings, gets lift from blast of air through belly

will eliminate fronts entirely. There will be only points and areas of combat and conflict. These points will be multiple; they will be grim and decisive.

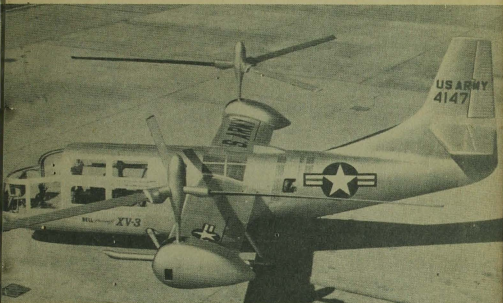
The nation first developing the capacity for effective 3-Dimensional combat will assume unusual international dominance. This dominance has two edges. In aggressive hands it can be a dire threat to small nations. In the grasp of the Free Nations it can be one of the great

est war deterrents of the atomic age. If two sides possess the same 3-Dimensional capability in conflict the question arises: Do the flying tanks start shooting down other airborne tanks and VETO personnel carriers so that the new warfare becomes air-to-air? The answer is that equality in 3-D warfare will breed a fantastic set of air-to-ground tactics in which the earth itself would assume new defensive advantage. Air-to-air combat be-



Kaman Aircraft Corp.

The Flying Barrel combines advantages of helicopter, propeller and jet planes.



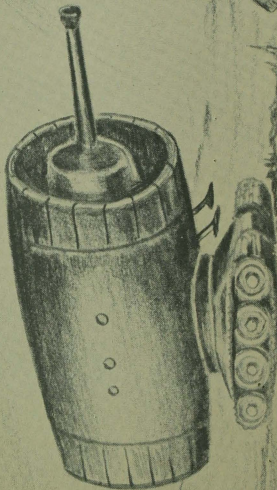
In the field of larger aircraft possessing vertical landing potentialities there is the Army's Convertiplane.

tween flying tanks and other VETOs would evolve, but it would be minor in scope because the VETOs are primarily, ground vehicles. Would new missiles eliminate flying tanks and other VETOs? Certainly missiles could shoot down individual flying tanks but armor is employed in mass formations. To successfully oppose massed tanks with missiles will require massed missiles. Then the question would be: is the mobility of missile units and installations comparable to that of the versatile armor? Probably not! As for VETO infantry, it would be capable of dispersal on ground to where it would not be profitable to employ expensive missiles against infantry.

The significant fact is that VETO Armor and Infantry can capture the enemy as well as shoot and destroy him. The guided missile or rocket can capture nothing. The former constitute the forces of 3-D blitzkrieg while missiles simply remain artillery which can be used offensively and defensively in support of mobile forces.

3-D blitzkrieg will reduce combat to its purest form that of military forces seeking to destroy opposing forces. It will feature rapid raids and destructive strikes on a principle of straight line approaches, and only when VETO forces land will terrain have influence on the conflict. The influence of terrain will be local.

The WASP, a possible form for the future flying barrel which on the ground rotates on the track platform. Elevating arms place tank upright for vertical take-off.



3-D blitzkrieg means reach, destroy and seize. 3-D strikes can be so sudden that seizure may in many instances supplant the need for destruction, because the surrender of surprised forces may be the first result of a bold strike attack.

Logics in Logistics

The slow processes of conflict cause rise in consumption of military supplies. The more rapid the striking power the more militarily effective it is. Thus blitzkrieg serves to gain more decisive effect from a given tonnage of ammunition and fuel than do the less mobile forms of combat. Furthermore, the problem is not just one of matériel consumption and weight — it is one of lives. Vertical lightning war would save lives because of its sudden decisiveness.

The logistician can argue that if new machines are created, tonnages and consumption of fuel will rise. This could be true for the period of use of the new machines. However, while the daily cost and consumption may be greater, new mobility for men and machines can serve to shorten conflicts. The result will be that the final cost in men and matériel is less.

Blitzkrieg or Atomic Conflict

The peak in potential destructive power has been readied. In place of being an intoxicant, this mutual destructive power is likely to achieve a sobering effect within aggressor circles. Stand off, or nuclear parity, has been reached. The consequence is that while large nations will retain their atomic capabilities—and while the potentialities of aggression and massive defensive retaliation will remain—the indicated result is that other forms of warfare will be sought or applied by aggressive powers.

It remains for the Free Nations to develop full capability to deter war or thwart a new type of aggression—that of 3-D blitzkrieg. This can only be done if we advance our own mobility into sophisticated forms that have certainty of deterring conflict—or winning it quickly. Any future conventional conflict, if it reaches a prolonged stage, runs into danger of precipitating more awesome and destructive war. We require a new form and a better form of combat strength to avoid this danger. Its beginnings are already to be found in the United States Army where its effect as a deterrent force will be more appreciated with the passage of time.

“ The Bataan garrison was destroyed due to its dreadful handicaps, but no army in history more thoroughly accomplished its mission. Let no man henceforth speak of it other than a magnificent victory.”

— MacArthur