

The M1A2 Abrams: The Last Main Battle Tank?

by Stanley C. Crist

With its superb integration of fire-power, mobility, and armor protection, the M1A2 Abrams is very nearly the ultimate incarnation of the main battle tank (MBT). Although more advanced design concepts have been published in recent years, it will likely prove quite difficult to produce an MBT sufficiently superior (to the M1A2) to justify the cost, so why not look for a better idea?

The Missile Option

When Egyptian Sagger surprised Israeli tankers in the 1973 Yom Kippur War, there were many who proclaimed, "The tank is dead!" A quarter-century later, tank advocates point to the continued use of the MBT as proof that the best antitank weapon is still another gun-armed tank. Yet it may be that the missile proponents were not wrong in their pronouncement — just premature.

Missiles that are guided to the target by a human operator (e.g., TOW, Dragon, Sagger) can be neutralized by distracting or killing the gunner. This would be analogous to World War II dive bombers being fired on by a battleship's antiaircraft guns; disrupt the pilot's concentration and the bomb impacts harmlessly into the sea.

But an electronic brain does not — as far as we know — feel fear or get distracted by nearby shellbursts. It also has immensely faster reaction times than a human. These factors make electronic guidance far superior to human control for guided missiles.

The self-guided missile has eclipsed the large-caliber gun in naval surface warfare. It is about to do so in the realm of land combat. The tank cannon has a maximum effective range of about 3000 meters, and precise aim is required to make a hit. The self-guided missile, however, can — like Longbow Hellfire — be effective to more than 8000 meters, and the electronic brain continually corrects the flight path as necessary.

Although Longbow Hellfire was designed for the AH-64D Apache helicopter, there is no obvious reason it couldn't be fired from an armored vehicle. Indeed, at least one nation is apparently developing a similar system. According to the August/December 1993 issue of *ASIAN MILITARY REVIEW*, India has developed the NAG, a fire-and-forget antitank missile with a range of six kilometers. It was planned that the NAG would be the armament for a tracked combat vehicle. With ground surveillance radar (GSR) incorporated into its fire control system, such a combat vehicle could engage targets through fog and smoke screens that block thermal sights. U.S. tank crewmen have never had to face a weapon system with such capabilities.

In the United States, the self-guided Javelin missile system began being issued to the troops in mid-1996. Although it was designed as a manportable, antiarmor missile for infantry use, there is a growing awareness that Javelin has enormous potential as a vehicle-mounted weapon. For example, the U.S. Marine Corps is investigating how Javelin can be incorporated into the new advanced amphibious assault vehicle (AAAV). Another idea would have single or multiple Javelin launchers installed on the M113A3 armored personnel carrier, thereby vastly increasing the combat capability of the venerable APC.

Because Javelin's 2000-meter maximum range is less than optimal for vehicle employment, the follow-on to TOW (FOTT) program is underway. FOTT will also use fire-and-forget technologies, but it will probably have a maximum range of 4000-5000 meters.

MBT or FCS?

The Army's modernization plan, as made public in September 1996, calls for continued upgrades to the Abrams fleet, while conducting research on a future combat system (FCS). The FCS

is expected to enter production around 2015, replacing the M1-series tanks. Since the next generation armored fighting vehicle is no longer referred to as an MBT, can it be inferred that the future combat system need not be a tank as we know it today?

If self-guided missiles are chosen for the primary armament of the FCS, a number of advantages present themselves. For one, it ought to be possible to eliminate the turret assembly; this would greatly simplify construction, with a corresponding decrease in production cost and vehicle weight. As currently configured, an MBT needs a turret to enable 360-degree target en-

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gagement without changing hull direction. At a traverse rate of, say, 40 degrees per second, it would take over four seconds to reverse the direction of the gun tube. For the FCS, if vertical launch is feasible, "traverse" could be done electronically and instantaneously, without any actual movement of the launch tubes; for horizontal launch, some form of physical traverse mechanism might be necessary, though.

The Abrams' maximum rate of fire is about six rounds per minute; if a single M1A2 were to engage a half dozen enemy tanks, the Abrams would be subject to return fire for nearly a full minute, since each opponent would have to be dealt with sequentially. On the other hand, a properly-designed, missile-armed FCS could lock onto all six en-

Disturbing parallels to land warfare?

emy vehicles simultaneously and salvo fire one missile at each target in perhaps less time than the M1A2 crew would take to achieve its first kill. This would give an FCS-equipped force a great advantage when fighting outnumbered.

Ideally, the FCS would use a multi-purpose missile that can be employed not only against armored vehicles, but the entire array of ground and aerial targets encountered on the battlefield. As on modern naval vessels, it would probably be wise to include a small- or medium-caliber gun for close range and low priority targets, but this would depend on the capabilities of the missile system.

Back to the Future

No doubt most MBT proponents will object to the idea that a missile-armed future combat system can make obsolete the gun-armed main battle tank. Perhaps they would find it worthwhile to ponder the words of Rear Admiral Austin M. Knight in his introduction to the 1917 book, *The United States Navy — From the Revolution to Date*:

“And through all its changes the backbone of the fleet has continued to be the fighting ship of large and steadily increasing size, with powers of offense and defense evenly balanced upon the whole — recognizing the menace of secondary enemies and guarding against them as best it may, but seeing its real opponent in the battleships and dreadnoughts of the enemy. The dreadnought of today has succeeded, through gradual, not revolutionary, development, to the line-of-battle ship of two centuries ago. It may be that this type is soon to become obsolete, but the evidence that this is so appeals far more strongly to the popular imagination than to the seasoned judgment of students of naval warfare.”

Substitute “battle tank” and “land warfare” for the terms “battleship” and “naval warfare,” and the paragraph would read almost as if it were printed in a current issue of *ARMOR*. Admiral Knight’s words should stand as a note of caution to those who think the MBT



Lethality, range, and accuracy of the Harpoon antiship missile has enabled modern cruisers and destroyers to become the Navy’s primary surface combatants, a role that used to belong to the heavily-armored, direct-fire, big-gun battleships. (Photo: U.S. Navy)



As in naval warfare, aerial combat is now dominated by guided missiles; guns have been relegated to the status of backup weapons. (Photo: U.S. Air Force)



Hellfire, seen here being fired from an M113, can hit targets as far away as 8000 meters—almost three times as far as the Abrams! If adapted to the Longbow Hellfire system, ground forces would have a heretofore unknown combat capability. (Photo: Rockwell International)



The shape of things to come? A missile-armed Future Combat System might resemble the Bradley-LOSAT prototype shown here. A very low silhouette is made possible by a turretless configuration. (Photo: Loral Vought Systems)

is here to stay. Just as the self-guided missile has displaced the gun in naval warfare, so is it sure to do in ground combat. The question is, will the Armor community follow Javelin and Longbow Hellfire on the path to the future, or will it stay on the same dead end street that doomed the battleship to oblivion?

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