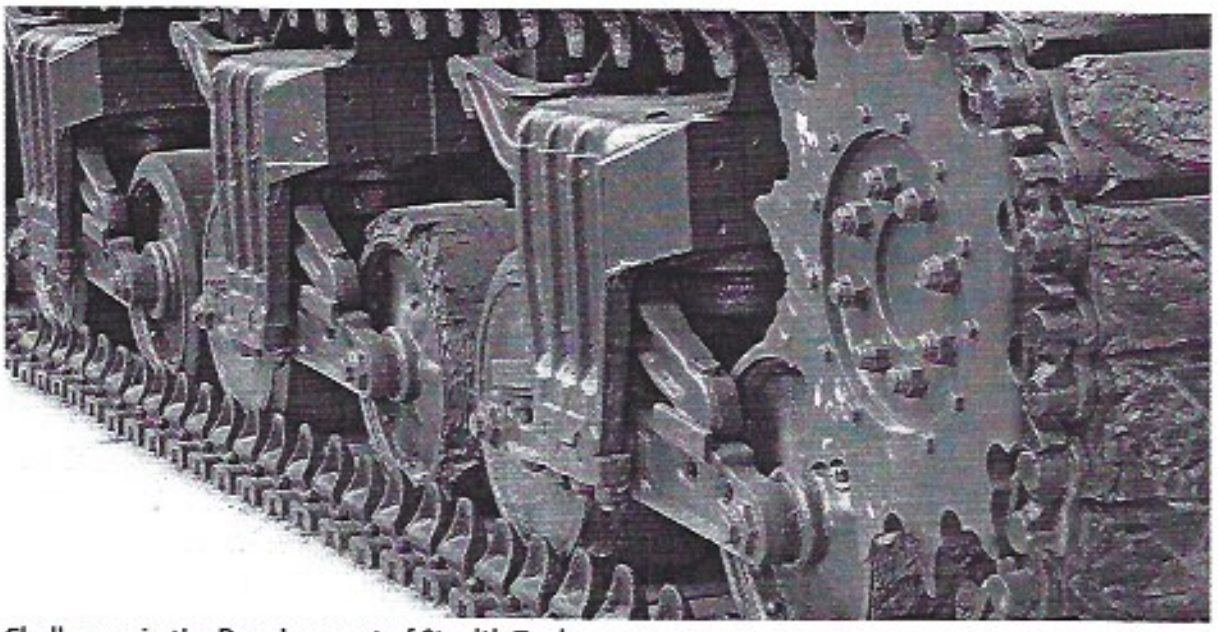


Challenges in the Development of Stealth Tanks

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Stealth technology is set to enter the world of ground combat. On the battlefield of the future, the widespread ability to kill tanks and call down tank-killing firepower makes a tank's ability to stay undetected one of the keys to survival — and to victory, says popularmechanics.com.

A cluster of technological trends may be converging to produce a potentially transformative battlefield capability: "stealth tanks." As these technologies develop they hint at possibilities that warrant serious discussion about their potential application to armored vehicles, as well as their operational and politico-strategic implications.

"Stealth" does not mean invisible. Rather, it is a collection of technologies designed to reduce an object's observable signature, thereby making detection more difficult. Even if temporary or incomplete, stealth provides a significant tactical advantage. Aircraft achieve stealth through a decreased radar cross section which incredibly complicates detection.

For a tank to be "stealthy," its key observable qualities must be masked or concealed. Specifically, tanks are loud and emit substantial heat. Therefore, constructing a "stealth tank" would necessitate the reduction of these signatures, resulting in a quieter tank with a low infrared, or IR, signature.

The greater challenge is the heat, as most targeting systems use IR. Recent research on ion-soaked graphene sheets provides an exciting possibility, according to defenseone.com. This thin and simple material can shield an object's thermal signature and even match the surrounding temperature if actively manipulated. Applied to the surface of a tank, graphene sheets could eliminate or significantly reduce a tank's IR signature.

If this concept effectively scales up, of which there is no certainty, it may be simpler and more cost-effective to implement than current options for IR camouflage.

Advancements in electric vehicles may also contribute to stealth by reducing noise and heat. Currently, a team of defense contractors, including SAIC and Lockheed Martin, is working to

construct the first U.S. electric tank prototype; two demonstration vehicles are expected to be built by 2022. Moreover, the U.S. has expressed interest in military vehicles which generate their own electricity.

There are several options for retaining the advantage of stealth also when firing. In the medium term, advanced networks and sensors, combined with emerging robotics, could create a "gun buggy" model similar to preliminary F-35 operational concepts. In this case, "stealth tanks" would refrain from firing themselves and instead direct remote autonomous platforms to deliver ordinance.

In the longer term, there is the possibility of stealthier weapons. Miniaturization and tactical application of early-stage advanced weapons, like directed energy or rail guns, have great potential if they develop sufficiently and overcome their current limitations, such as energy requirements. Directed energy would be truly stealthy in that it bears no visual or audible profile, but it is unlikely to be as destructive as rail guns.