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India's indigenously designed Arjun Mk-1A clears trials, ready to go into production

Meet Arjun 'Mk-1A' main battle tank, a 68-tonne rugged bull, waiting to join the Indian army and one of the star attractions at the 11th biennial edition of DefExpo India 2020

By SV Krishna Chaitanya

Chennai: It's the most lethal, sophisticated and all-weather battle tank that India has indigenously designed and conceptualised till date.

Meet Arjun 'Mk-1A' main battle tank, a 68-tonne rugged bull, waiting to join the Indian army and one of the star attractions at the 11th biennial edition of DefExpo India 2020 scheduled to be held in the Uttar Pradesh capital of Lucknow in February.

Armoured Corps has cleared the tank after successful completion of the final integration tests conducted earlier this year in the western sector of Rajasthan. Arjun Mk-1A is an improved variant of Arjun Mk-1, whose two regiments (124 tanks) are currently in service.

Scientists of Chennai-based Combat Vehicles Research and Development Establishment (CVRDE), a laboratory of the Defence Research and Development Organisation (DRDO), are the architects of this improved avatar of Arjun and the Heavy Vehicles Factory (HVF) in Avadi is soon expected to commence production after receiving the order.

Top DRDO officials confirmed to Express that the new variant of Arjun had passed the rigorous army evaluation.

"The tank has fulfilled all user specifications and undergone elaborate field trials. We expect the order of intent any time soon."

Officials said 72 improvements were made to Arjun MBT Mk-1A over the existing version, of which 14 were major upgrades that were specifically requested by the army.

CVRDE Director V Balamurugan told Express the fundamental parameters of a battle tank are "fire power, protection and mobility". Arjun MBT Mk-1A has been improved on all these fronts.

Under firepower segment, four upgrades have been made. An improved Gunner's Main Sight (GMS) integrated with Automatic Target Tracking (ATT) has been fitted, which helps the crew to track moving target automatically making it easy for the gunner to fire even when the tank is on the move.

The Commander's Panoramic Sight (CPS Mk II) has been integrated with Thermal Imager that enables the commander to effectively conduct surveillance both in day and night through eye-safe Laser Range Finder with an advanced Hunter Killer Capability.

Besides, additional varieties of ammunition were incorporated to enhance the lethality of the enemy battle tank.

Other than conventional Fin Stabilised Armour Piercing Discarding Sabot (FSAPDS) and High Explosive Squash Head (HESH) ammunition, Thermo Baric (TB) and Penetration Cum Blast (PCB) ammunition have been developed.

Lastly, the vehicle was upgraded with a Remote Controlled Weapon Station that provides the loader the capability of engaging ground targets and aerial targets from the protective envelop of the tank armour. It also provides an additional capability to fight in urban area called Hatch-closed firing.

Extra protection for crew

The battle tank will have a crew of four -- commander, gunner, loader and driver. Keeping them out of harm's way is paramount. For this, Arjun Mk-1A comes with a slew of new features.

Balamurugan said Track Width Mine Plough (TWMP) is a significant addition which provides capability for the battle tank to cross minefields with ease as the plough mounted to the front of the vehicle creates a mine-free path by ploughing through mines and throwing them to the sides of the tank.

The Explosive Reactive Armour (ERA) panels are provided for effective protection against the ever-evolving anti-tank threats like shoulder-fired anti-tank grenades and missiles. These panels have been mounted along the frontal arc of the hull and the turret.

Another key feature added is a Containerised Ammunition Bin with Individual Shutter (CABIS) that gives crew enhanced protection from inadvertent burning of ammunition stored in the ready round bin.

The hot gases generated due to ammunition burning is vented out by blow-off panels from the roof of the turret, thus saving the crew.

Besides, Arjun Mk-1A has protection against chemical attacks. A special chemical sensor is mounted to detect the presence of harmful toxic chemicals in the atmosphere around the tank.

"The sensor detects the harmful chemicals, triggers an alarm and the Nuclear Chemical warfare system increases the pressure in the tank compartment to a little higher than in the atmosphere thus preventing toxic air from entering the tank. The tank crew get air through a particulate filter for their survival," CVRDE official said.

The Roof Mounted Driver's Seat protects the driver from shocks and enhances driving comfort.

Other new upgrades include Laser Warning and Counter Measure System that protects the crew by creating a smokescreen between itself and the enemy and Anti Infra-Red / Anti Thermal Imaging paints that reduce the signature of the tank when viewed using an IR/TI camera or goggles making the tank difficult to be detected by enemies.

Mobility-related improvements

Officials told Express one of the challenges in making of Arjun MBT Mk-1A was the overall weight. Every improvement comes with baggage, which the user may not like as the mobility may be compromised.

To counter added weight, an Advanced Running Gear System has been developed where the hydro-pneumatic suspension system was completely redesigned to enhance agility of the Arjun MBT Mk-1A. Tweaking the final drive also ensured the required agility of the tank.

Meanwhile, an Advanced Land Navigation System is added to provide enhanced navigation capability of the tank in desert terrains during war.

It provides accurate information of where the tanks is using either Inertial Navigation or GPS or both and where the tank needs to go in the absence of any signage in the war theatre.

An uncooled Night Vision camera for driver has also been provided.

The earlier Image Intensifier (obsolete technology) for the tank driver has been replaced with a un-cooled Thermal imager with binocular sights for the driver thus providing him with a capability to travel at reasonable speeds even in pitch-dark conditions.

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