



DRDO @ Republic Day Parade 2024



Systems & Technologies developed by DRDO on display at Republic Day Parade 2024

- 1) Weapon Locating Radar (WLR) - Swathi**
- 2) Medium Range Surface-to-Air Missile (MRSAM)**
- 3) Anti Tank Guided Missile - NAG**
- 4) Multiple Launch Rocket System - Pinaka**
- 5) Sarvatra Bridging System**
- 6) Tejas LCA**
- 7) Airborne Early Warning & Control System (AEW&C)**
- 8) DRDO Tableau with theme "Women Power in Protecting the Nation by Providing the Defence Technologies and Systems in all 5 Dimensions (Land, Air, Sea, Cyber and Space)**

DRDO Developed Systems Marching at Kartavya Path as part of Armed Forces Contingent





WLR Swathi

Weapon Locating Radar (WLR) is electronically scanned phased array radar. The radar automatically locates hostile artillery, mortars and rocket launchers and tracks friendly fire to locate the impact point of friendly artillery fire to issue necessary corrections. The radar is designed to detect projectiles with small cross section across the battle space horizon, and has the capability to handle simultaneous fire from weapons deployed at multiple locations. It comes in two versions Swathi Plains and the Swathi Mountains.



MRSAM Missile

Medium Range Surface to Air Missile (MRSAM) is a high response, quick reaction, vertically launched supersonic missile, designed to neutralize enemy aerial threats – missiles, aircrafts, guided bombs and helicopters. MRSAM system provides point and area air defence for ground assets against a wide range of threats including fighter aircraft, UAVs, helicopters, guided and unguided munitions, sub-sonic & supersonic cruise missiles etc. Used by Army, Navy and Air Force as different variants.



NAG

Anti-Tank Guided Missile (NAG) has been developed to engage highly fortified enemy tanks in day and night conditions. The missile has "Fire & Forget", "Top Attack" capabilities with passive homing guidance to defeat all MBTs equipped with composite and reactive

Pinaka

Pinaka MLRS, a multi barrel rocket launching system, designed and developed by DRDO, is an all weather indirect fire, free flight, artillery weapon system capable of delivering a large volume of fire in a very short time for neutralizing critical and sensitive enemy targets. This is a flagship project of DRDO showcasing public private partnership.





Sarvatra

Sarvatra bridging system is one of the longest multi spans bridging system in the world. With individual spans of 15m each, a class 70 bridge up to a span of 75m can be constructed using 5 spans. Being class 70, the system is capable for most of service vehicles including MBT Arjun.



Tejas LCA

Light Combat Aircraft Mk-1A variant is state-of-the-art modern 4+ generation fighter aircraft. Equipped with critical operational capabilities of Active Electronically Scanned Array Radar, Beyond Visual Range Missile, Electronic Warfare Suite and air-to-air refuelling, this aircraft would be a potent platform to meet the operational requirements of the Indian Air Force



AEW&C

Airborne Early Warning and Control (AEW&C) is an airborne surveillance system mounted on Embraer-145 aircraft, designed specifically to suit the operational requirements of the Indian Air Force. The Indian AEW&C country's first ever fully active array primary radar system (PR) system is fully indigenous, in the sense that complete system including its electronics, antenna array etc. have been designed and manufactured in the country.

It is a force multiplier system of systems for detecting & tracking of enemy/hostile aircrafts/ UAVs etc. It also enables operators onboard and on ground to identify, assess the threat and take actions to guide our interceptors to those for neutralizing those threats.

The system is fully net centric, with complete command and control functions not only providing the available information to ground through its multiple data links but also can receive information from ground, integrate and fuse them onboard to provide the operators onboard a composite picture of environment.



DRDO TABLEAU-2024

**Women Power in Protecting the Nation by
Providing the Defence Technologies and
Systems in all 5 Dimensions
(Land, Air, Sea, Cyber & Space)**





DRDO TABLEAU-2024

As an enabler for progressing towards Aatmanirbharta, the valuable contribution of women scientists of DRDO in the hardcore areas of defence research has been significant. Women's involvement in Defence R&D has been showcased in DRDO Tableau 2024 with the theme 'Women power in protecting the nation by providing the Defence Technologies and Systems in all 5 dimensions (Land, Air, Sea, Cyber and Space)'.

The DRDO developed systems and subsystems being displayed on the Tableau are MPATGM, ASAT, AGNI-V, VSHORADS, NASM-SR, HELINA, QRSAM and Astra, LCA Tejas Aircraft, AESA Radar, Electronic Warfare System-Shakti, Cyber Security Systems, Command and Control Systems and Semiconductor Fabrication Facility.

Smt Sunita Devi Jena, Outstanding Scientist is the Contingent Commander of the DRDO tableau.

Cyber Security Systems, Semiconductor Fabrication Facilities and Command & Control Systems is being demonstrated by –

Smt P Lakshmi Madhavi, Scientist G

Smt J Sujana Choudary, Technical Officer C

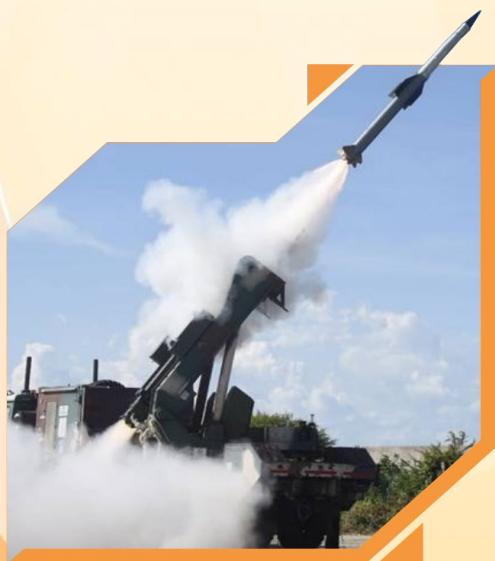
Smt Akula Bhuvaneshwari, Technical Officer A



MPATGM Missile

Man Portable Anti-Tank Guided Missile (MPATGM) is a 3rd generation Fire-and-Forget missile with Lock-On before Launch (LOBL) and autonomous homing guidance feature with 'Top Attack' capability for the infantry battalions of the Indian Army.

The missile is a low weight, Fire-and-Forget missile and is launched from a man-portable launcher, integrated with thermal sight.



QRSAM Missile

QRSAM is an advanced air defence on the move system developed by DRDO. QRSAM is an all-weather, air-defence system that provides mobile air defence cover to mechanized assets of Indian Army in the Tactical Battle Area. It constitutes Surveillance Radar, Multi-Function Radar, Command Post and Mobile Launcher capable of firing 6 canisterised missiles.



Agni-V

Agni-V is a land based nuclear capable Intercontinental Ballistic Missile ICBM developed by the Defence Research and Development Organisation (DRDO) of India.

The missile has a range of 5,000+ kilometers. It is three-stage, road-mobile, canisterised, solid-fueled Intercontinental Ballistic Missile. Agni-V incorporated advanced technologies involving ring laser and accelerometer for navigation and guidance.

HELINA Missile

HELINA is a 3rd generation Fire-and-Forget anti tank guided missile fired from the ALH helicopter. It is designed and developed by Defence Research & Development Laboratory (DRDL) for the Aviation Wing of Indian Army. It is totally Indigenous, Fire-and-Forget missile launched from the army version of indigenous Advanced Light Helicopter (ALH), also known as DHRUV, currently held by the Army Aviation Corps. The missile is guided by an Imaging Infra-Red (IIR) Seeker operating in the Lock-on-Before Launch mode. It is one of the most advanced anti-tank weapons in the world.





ASTRA Missile on LCA

Astra Mk-I is a state-of-the-art Beyond Visual Range (BVR) air-to-air missile designed and developed to engage and destroy highly maneuvering supersonic aerial targets. It has dual guidance viz. inertial guidance in the midcourse and active radar seeker-based homing guidance in terminal phase. ASTRA is designed to meet the air staff requirement issued by IAF. The missile has been successfully integrated with indigenous light combat aircraft TEJAS and successfully fired and tested.

VSHORADS Missile

Indigenous Very Short Range Air Defense System (VSHORADS) is a 4th generation Man Portable Air Defence System (MANPADS) developed by Defence Research and Development Organization (DRDO). The missile is meant for neutralising low altitude aerial threats at short ranges. The missile incorporates many novel technologies including IIR Seeker, Miniaturised Reaction Control System & Integrated Avionics.





Command and Control of Missile Systems

Command and Control centers transform a set of sensors and weapons to an integrated weapon system. Command and Control centers continuously integrate target data from various Radars & EOT sensors and present an Integrated Air & Ground situation picture to the commander.

It further classify and identify targets using various means and perform Threat Evaluation. It allocates resources (missiles, launcher, uplink and downlink channels) for target engagements. It provides automatic and semi-automatic engagement solutions to commander with manual overrides.

It controls Radars, EOTs, Launchers, Missiles, Data links for cohesive synergy. It performs kill assessment on engaged targets. Command Control centers have in built fault tolerance and can work in collaboration with other firing units, as well as with hierarchical controls (IMSAS/ACCCS/IACCS/ADC&RS).

Ground Communication Systems

Rugged ground communication system provides data & voice connectivity to all weapon system elements (Control Centers, Radars, Launchers, Debriefing Vehicles, Higher Echelons). Copper lines, fiber, RF & Satcom based systems are configured as per requirements for various SAM projects to provide static as well as on the move communication with military grade security.



Active Electronically Scanned Array (AESA) Radar

The 'Uttam' AESA Radar is a multi-mode, multi-function fire control radar for LCA Tejas fighter aircraft. The radar is realized with AESA technology offering unique advantages of graceful degradation and high beam agility. The radar has various modes of operation including Air to Air, Air Close Combat, Air to Sea, Air to Ground, Navigation, Passive and Non-cooperative target recognition with Low Probability of Intercept capability.



'Uttam' AESA Radar, with its long range capability allows the pilot to detect, track and fire at multiple threats before the adversary detects his presence. Thus it is offering a first strike, which is always the best strike for a fighter aircraft in aerial combat – "pre-empt and prevail". The auto-lock capability of Radar enables the pilot to engage with multiple threats during close-combat resulting in quick lock and shoot feature. For air-to-ground operation, 'Uttam' Radar provides high resolution imaging features and accurate ranging for targeting and delivering ammunition. For maritime operations, radar provides high resolution silhouettes of ships using Inverse Synthetic Aperture Radar (ISAR) mode for identification and classification. The Radar provides unprecedented situational awareness by interleaving multiple modes of operation.



Naval Anti-Ship Missile-Short Range (NASM-SR)

Naval Anti-ship Missile – Short Range (NASM-SR) is a helicopter launched 'Air to Surface' weapon system, which has been configured to meet the anti-ship war requirements of Indian Navy. It is the first indigenously developed air launched anti-ship cruise missile. The NASM-SR missile will be launched from SEAKING helicopter with the help of suitable launcher having adaptable Ejection Release Unit (ERU).

This missile is configured with solid rocket propulsion (booster-sustainer configuration with electable booster), Imaging Infrared Seeker, Multi-EFP Warhead, OBC-INS System, two-way Data Link, Control System, Thermal battery and Altimeter technologies to meet the IN requirements.



Semiconductor Fabrication Facility

Semiconductor devices and technologies have redefined the modern electronic warfare scenario and they are the backbone of the defence system of the nation. DRDO is working for the development of semiconductor materials, devices and technologies for defence applications in critical areas of strategic importance like radars, satellite's, missiles, night vision, avalanche detection and chemical sensing and laser detonators.



EW Shakti

Defence Electronics Research Laboratory (DLRL) of DRDO with active participation of Indian Navy has successfully designed and developed an Advanced Electronic Warfare (EW) System, Shakti for Capital warships of Indian Navy. Sea Trials of EW Shakti System on INS Satpura are completed successfully and the system is under exploitation by Indian Navy.

The EW Shakti provides an electronic layer of defence for detection and jamming of modern radars and anti ship missiles. The system has been integrated with the wideband Electronic Support Measures (ESM) and Electronic Counter Measure (ECM) for the defence of Indian Navy Ships against missile attacks. The ESM of the system helps in finding accurate direction and interception of modern radars. The system has a built-in radar fingerprinting and data recording replay feature for post-mission analysis. First Shakti System has been installed on-board INS Visakhapatnam and is being installed on-board Indigenous Aircraft Carrier, INS Vikrant.



Cyber Security

Cyber Swachhta is imperative for the health of a nation's digital infrastructure. DRDO's Cyber Warriors are at the forefront of identifying and eliminating cyber threats, including malware, viruses, and other malicious entities that could compromise the integrity of systems. Their proactive measures ensure a 'clean' and secure digital environment.

Cyber Suraksha: DRDO's Cyber Warriors, through their collaboration with other defence forces and specialised expertise in cybersecurity, encryption, and threat detection, work tirelessly to fortify the nation's digital borders. They safeguard critical infrastructure, sensitive data, and national interests from cyber-attacks, ensuring that the country's digital assets remain resilient in the face of evolving threats.

Cyber Vikaas: The role of DRDO's Cyber Warriors extends beyond defence; they actively contribute to the nation's Cyber Vikaas or digital development. By leveraging their research and development capabilities, these warriors play a pivotal role in creating innovative solutions, promoting cybersecurity awareness, and facilitating the adoption of cutting-edge technologies. Their efforts not only protect digital assets but also propel the nation forward in the global digital landscape.



ASAT Mission Shakti

Space has become an important element in a country's economy and military superiority. The capability to defend against the space based threats gives our country a decisive edge over the adversaries in times of conflict. ASAT (Anti-Satellite) weapons play a critical role in providing the necessary deterrence as well as the ability to neutralize adversaries dominance in space.



Mission Shakti, India's first Anti-satellite (ASAT) mission is a major breakthrough in demonstrating the country's advancing technological capability of engaging satellites of low earth orbit. Shakti, an Anti-Satellite Interceptor missile developed by DRDO is designated with the state of the art, indigenously developed advanced Hit-to-kill technology. It can neutralise enemy satellites travelling at nearly 8 km/s by directly colliding with them in space with pin point accuracy. The system is capable of detecting, classifying and successfully engaging LEO satellites in a matter of minutes. DRDO had designed, realized, integrated and brought the system to the flight test stage in a record time of two years.

The demonstration test was successfully conducted by DRDO on 27 March, 2019, where Shakti Missile has successfully destroyed a live orbiting satellite in the Low Earth Orbit (LEO) in the "Hit to Kill" mode possessing the Anti-satellite (ASAT) capability.



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