

DRDO: Achievements and Way Ahead

“DRDO is the heart, without it Defence is Carcass!”

DRDO, The Defence Research and Development Organisation is the agency working in the Republic of India which is responsible for Military research and development. DRDO has its headquarter in New Delhi. The organisation was formed in the year 1958 from the amalgamation of Technical Development Establishment (TDEs) of the Indian Army and the Directorate of Technical Development & Production (DTDP) with the Defence Science Organisation (DSO). DRDO was very small during its establishment and had just 10 laboratories. It had grown multi-directionally over the period of time. Today DRDO has more than 50 laboratories which are truly involved in developing defence technology. They are covering various discipline like aeronautics, armament, electronics, combat vehicle, missiles, naval system, information system and many more. There are 5,000 scientists and 25,000 other scientific, technical and supporting personnel who are working with DRDO and are a part of Defence Research and Development Services (DRDS). The organisation is working very efficiently to serve its responsibility.

"Vision without action is a daydream. Action without vision is a nightmare."

DRDO also has its own vision and mission. DRDO's vision is to Make India prosperous by establishing world class science and technology base and provide our Defence Services decisive edge by equipping them with internationally competitive systems and solutions. DRDO has three missions. Firstly, Design, develop and lead to production state-of-the-art sensors, weapon systems, platforms and allied equipment for our Defence Services. Secondly, provide technological solutions to the Services to optimise combat effectiveness and to promote well-being of the troops. Thirdly, develop infrastructure and committed quality manpower and build strong indigenous technology base. DRDO is the organisation working day and night to achieve its mission.

“We are not makers of History. We are made by history.”

DRDO is an organisation which had its own history. Defence Research and Development Organisation was established in 1958 by amalgamating Defence Science Organisation and some of the technical development establishments. In 1980, a separate department in Defence Research and Development was formed which later on administered DRDO and its laboratories. DRDO was functioning as a vendor and the various defence headquarters that is nothing but the Army headquarters, Air headquarters and Navy headquarters functioning as the customers where they place demand to the products equivalent to World Market. Soon after the establishment in 1960's DRDO started its first project on surface to air missiles (SAM) which was named Project Indigo. Project Indigo was discontinued in later years without achieving complete success. Further in 1970s, DRDO started two projects named as Project Devil and Project Valiant to develop short range surface to air missile and intercontinental ballistic missile (ICBM). Project Devil led to later development of Prithvi missile under the program Integrated Guided Missile Development Program (IGMDP) in 1980s. In the upcoming years DRDO developed many more indigenous missiles and is developing some new missiles. The year 2010 was a new determinant in the fate of DRDO, AK Antony then Defence Minister ordered reconstructing the Defence Research and Development Organisation to give major boost to defence research in the country and to ensure effective participation of the private sector in defence technology. The establishment of a Defence Technology Commission with the Defence Minister as its chairman played the key role in making DRDO functioning more effective. Defence Research and Development Organisation had achieved many successes since its establishment in developing major systems and critical technologies.

"With your entire focus on your goal, you will reach levels of achievement that you never thought possible."

Defence Research and Development Organisation has so many weapon system based on technological challenges, strategic importance, defence needs and level of completion of system. Some of the greater achievement of DRDO are AGNI-V – Intercontinental Ballistic Missile, light combat aircraft- TEJAS, INS ARIHANT- Nuclear Powered Ballistic Missile Submarine, Rustom II- Unmanned Aerial Vehicle, ARJUN-

Main Battle Tank, BRAHMOS- Super Sonic Cruise Missile, NIRBHAY- Medium Range Subsonic Cruise Missile, DHRUV- Advanced Light Helicopter, Ballistic Missile Defence System, INSAS- Indian Small Armed System. AGNI-V – Intercontinental Ballistic Missile with a range more than 5000 km. It is a part of AGNI series of missiles. It is solid fuelled and can be launched from canister Tatra Truck. It can be launched within five minutes when the threat is received. It can carry a nuclear war head of 1.5 tons. This missile is the biggest achievement of DRDO and it is very important for the nuclear deterrent and strategic posturing. Light Combat Aircraft- TEJAS is the costliest and longest going program of DRDO. It is a 4+ generation fighter plane developed by Aeronautical Development Agency. It is light weight multi-role jet fighter. It is tailless, compound delta wing design powered by a single engine. It is supersonic and highly manoeuvrable, and is the smallest and lightest in its class of contemporary combat aircraft. To keep in mind the future requirements of the country, Aeronautical Development Agency is currently working on Mark-II and Mark-III of TEJAS aircraft. These versions will have 5th generation features such as stealth, upgraded avionics, modified aerodynamic designs and AESA radar. INS ARIHANT- Nuclear Powered Ballistic Missile Submarine was built up for Indian Navy. The lead vessel was launched in 2009 and began sea trials in December 2014. Four vessels are already planned and expected to be commissioned by 2023. The Arihant class vessels are India's first indigenously designed and built Nuclear Submarine. RUSTOM-II – Unmanned aerial vehicle is a Medium Altitude Long Endurance unmanned combat air vehicle. It is developed by Aeronautical Development Establishment in Bangalore for the three services of Indian Armed forces. Rustom-II is equipped with various advanced technologies and systems which includes Digital Flight Control and Navigation System, Automatic Take-off and Landing, Digital communication technologies for revealing data links to control and operate the mission and relay UAVs. ARJUN- Main Battle Tank is a third-generation main battle tank developed by Combat Vehicles Research and Development Establishment (CVRDE), a DRDO lab in Chennai, for the Indian Army. The Arjun features a 120-mm main rifled gun with indigenously developed Armour-piercing fin-stabilized discarding-sabot ammunition, one 7.62 mm coaxial machine gun, and a 12.7 mm machine gun. It has a four-man crew. Automatic fire detection and suppression and NBC protection systems are included. Arjun Tank is equipped with high resolution day and night vision devices which is supported by laser range finder. BRAHMOS- Super Sonic Cruise Missile has been developed as a

joint venture between the Defence Research and Development Organization of India and the Federal State Unitary Enterprise of Russia under BrahMos Aerospace. The missile is named after two rivers, the Brahmaputra and the Moskva. It is the world's fastest cruise missile in operation. The missile travels at speeds of Mach 2.8 to 3.0. A hypersonic version of the missile namely BrahMos-II is also presently under development with speed of Mach 7 to boost aerial fast strike capability. NIRBHAY- Medium Range Subsonic Cruise Missile is a long range, subsonic cruise missile developed by the Defence Research and Development Organisation's premier laboratory Aeronautical Development Establishment in Bangalore. Nirbhay is an all-weather low-cost long-range cruise missile with stealth and high accuracy. The missile has a range of more than 1000 km and It can be launched from a mobile launcher. It starts flying off as a rocket and then turns into an aircraft. For that it has foldable wings. It is capable of being launched from multiple platforms on land, sea and air. It is capable of carrying nuclear warhead. It will be mounted to Su-30 MKI which makes the fighter plane more lethal. DHRUV- Advanced Light Helicopter have evolved from The Advanced Light Helicopter (ALH) program for an indigenous 5-ton multirole helicopter was initiated in May 1979 by the Indian Air Force and Indian Naval Air Arm. HAL were given a contract by the Indian government in 1984 to develop the helicopter. The Dhruv has become the first major Indian weapons system to have secured large foreign sales. It has less price compared to its rival. Ballistic Missile Defence System is an initiative to develop and deploy a multi-layered ballistic missile defence system to protect from ballistic missile attacks. It is a very ambitious and technology intensive project as this kind of capabilities are with only 2-3 countries in the world. The two-tiered Ballistic Missile Defence System consists of the Prithvi Air Defence, which will intercept missiles at exo-atmospheric altitudes of 50–80 km and the Advance Air Defence missile for interception at endo-atmospheric altitudes of up to 30 km. The deployed system would consist of many launch vehicles, radars, Launch Control Centres and the Mission Control Centre. INSAS- Indian Small Armed System is a family of infantry arms consisting of an assault rifle and a light machine gun. It is designed by Armament Research and Development Establishment (ARDE), Pune. It is manufactured by the Ordnance Factories Board at Ordnance Factory Tiruchirappalli, Small Arms Factory Kanpur and Ichapore Arsenal. Development of this rifle was a big achievement for the country as it replaced all the outdated rifles. DRDO has worked

day and night since its establishment to work for their country and is still working to help countries defence forces compete with technology in world market.