

GOVT. DEGREE COLLEGE FOR WOMEN, NALGONDA
Department of Physics

Report of Field trip on 16 -12-2021

Defense Products and Technology Exhibition Tour

Bharath Dynamics Limited, Kanchan Bagh, Hyderabad.

Bharath Dynamics Limited is a world-class enterprise producing international standard quality products for the defense industry. It manufactures aerospace & underwater sophisticated weapons to provide solutions to the security system needs of the country. BDL headquartered in Hyderabad in 16 July, 1970. BDL has been working in collaboration with DRDO & foreign Original Equipment Manufacturers (OEMs) for manufacture and supply of various missiles and allied equipment to Indian Armed Forces. Today, BDL has evolved as one among the few industries in the world having state-of-the-art facilities for manufacture and supply of Guided Missiles, Underwater Weapons, Air - borne products and allied defense equipment for the Indian Armed Forces. The Company also offers Product Life Cycle Support and Refurbishment / Life Extension of vintage Missiles.

To commemorate 75 years of India's Independence (**Azadi Ka Amrit Mahotsav**), BDL Organizing a products exhibition from 13-12-2021 to 19-12-2021, Honorable Rakshana Mantri. Sri. Rajnath Singh Inaugurated virtually at 75 locations throughout the nation, BDL is one among them. As a part of these celebrations, we have received an invitation to visit BDL exhibition about defense products and technology on 10.12.2021. We have sent a notice to all the students about the exhibition and importance of products. We have received huge response from students. Almost 70 students enrolled their names for tour. On 13-12-2-21, we have sent a mail to deputy general manager BDL regarding appointment letter to visit the exhibition along with the list of participants. We have received reply on the same day stating that our college was given slot on 16-12-2021 morning session to visit exhibition.

On 14-12-2021 we requested principal sir through a letter stating that kindly support the tour by sparing travel charges and permission to visit BDL. Honorable principal sir kindly responded and sanctioned an amount of 15,600 rupees towards the

bus fare. Same informed to students and asked to take the No Objection letter from their parents to visit this exhibition.

On 16-12-2021 morning 8.30 AM we started journey to BDL exhibition tour with 67 students and 7 faculty members (List is enclosed in next page). We reached BDL, Kanchan Bagh at 11.00 AM. BDL team first explained the work what they are doing from the beginning with the help of Power point presentation. They also explained the basics of the missiles which were kept for exhibition like surface to surface, air to surface, surface to air, air to air missiles and torpedo and anti-torpedo technology etc... After presentation, students visited the exhibition along with a guide form BDL team, they explained working principle of each missile which was kept in exhibition. Some of the defense products which we have seen in the exhibition are listed below.

ASTRA, MRSAM, INVAR, MILAN 2T, FLAME. KONVRS-M, NAG AMOGA-III TAL. GARUDA STRA. DISHOL, SFD, C-303, VLSRSAM, PRIDVI, CMDS, VARUNASTRA, AKASH etc.... The detailed information about these missiles is given in **Annexure-1** below page.

After the completion of photo session at BDL exhibition, we started to Nehru Zoological Park which located at Bahadurpura, Hyderabad. We reached Nehru zoological park at 2.30 PM. We spent almost 3 hours in zoological park. We saw almost all animals in zoo park. Around 5.30 we came out of the park and started to visit Charminar.

We visited Charminar at 6.30 pm and spent 30 minutes at Charminar for photo session. At 7.00 PM we had dinner at Dilsukhnagar and started return journey to Nalgonda. We reached the home town around 10.00 PM. All the students safely sent to their homes along with their parents who were waiting at college.

It is great experience for all who went for this tour, as they never get a chance to see the technology and products which our Armed forms using to protect our nation. We are very thankful to our principal sir for giving this opportunity to us and also for sparing bus fare charges to the students.

Annexure -1

Bharat Dynamics Limited Field Trip Report

Students saw all the missiles which are kept for exhibition. Students are explained about details of all the missiles by the staff of the Bharat Dynamics Limited, Hyderabad. Students inspired themselves towards Scientific and Technological research and got knowledge about missiles by visiting this site. Acquired knowledge about missiles is given below.

AKASH





Akash missile display during “Azadi ka Amrit Mahotsav” at BDL, Hyderabad.

Type Mobile Surface-to-air missile system

Place of origin India

Service history

In service 2009-present

Used by Indian Army
Indian Air Force

Production history

Designer Defence Research and Development Organisation

Manufacturer Bharat Dynamics Limited

Unit cost ₹2 crore

Produced 2009-present

No. built	3,000 missiles till 2011
Variants	Akash 1S, Akash Prime, Akash-NG
Specifications	
Mass	720 kg
Length	578 cm
Diameter	30 cm - 35 cm
Warhead	High-explosive, fragmentation
Warhead weight	60 kg
Detonation mechanism	Radio proximity fuse
Engine	Solid booster with air-augmented rocket and ramjet sustained motor
Propellant	Solid fuel
Operational range	35 km
Flight ceiling	20 km
Flight altitude	18 km
Maximum speed	Mach 2.5
Guidance system	Mid-course: Command guidance with datalink Terminal: Active radar homing
Launch platform	T-72 or BMP-2 chassis or Tata Motors Heavy Mobility Trucks

Transport

BEML–Tatra or Tata Motors Heavy Mobility Vehicle

2) The Milan-2T:



The Milan-2T is a Tandem Warhead ATGM with the range of 1,850 metres, produced by BDL under license from MBDA Missile Systems France. MILAN - 2T - a man portable (Infantry) second generation ATGM, to destroy Tanks fitted with Explosive Reactive Armour, moving and stationary targets. These missiles can be fired from ground as well as vehicle-based launchers and can be deployed in anti-tank role for both offensive and defensive tasks, the statement said. Induction

of these missiles will further enhance the operational preparedness of the Armed Forces. Induction is planned to be completed in three years," it said. Tandem warheads comprise a forward charge and a rear charge separated by a blast shield. The forward charge fires first and disrupts the outer Armor of the target. The rear charge fires after a short while and penetrates the remaining Armor of the target.

3) KONKURS – M:



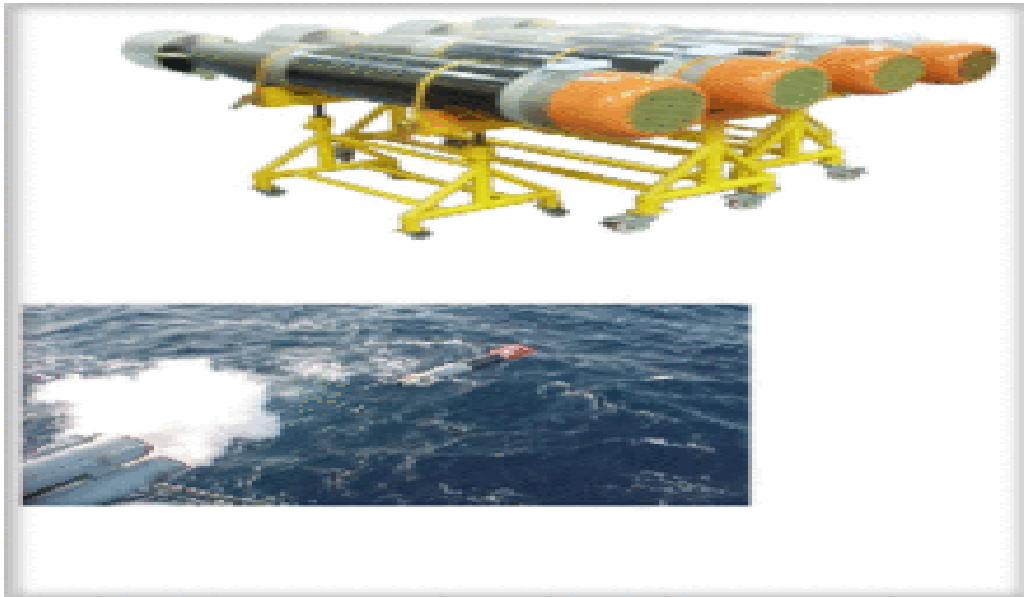
KONKURS - M – a Second Generation, mechanized infantry ATGM, to destroy armored vehicle equipped with Explosive Reactive Armour, moving and stationary targets.

Specifications	
Mass	14.6 kg (Missile weight) 22.5 kg (9P135 launching post)
Length	1,150 mm (45 in) 875 mm (34.4 in) without gas generator
Diameter	135 mm (5.3 in)
Warhead	2.7 kg (6.0 lb) 9N131 <u>HEAT</u>
Detonation mechanism	Contact

Engine	Solid-fuel rocket
Wingspan	468 mm (18.4 in)
Operational range	70 m (230 ft) to 4 km (2.5 mi)
Maximum speed	208 m/s (680 ft/s)
Guidance system	Wire-guided SACLOS (Semi-automatic command to line of sight)
Steering system	Two control surfaces
Launch platform	Individual, vehicle

4) TAL (TORPEDO ADVANCED LIGHTWEIGHT)

LIGHT WEIGHT TORPEDO (TAL) – an electrically propelled, self-homing underwater weapon. Can be launched from ship / helicopter. Seawater activated battery. The Advanced Light Torpedo (TAL) Shyena (Sanskrit: श्येन, "Falcon or Hawk") is the first indigenous advanced lightweight anti-submarine torpedo of India, developed by the Naval Science and Technological Laboratory (NSTL) of the Defence Research and Development Organisation (DRDO) for the Indian Navy. The lightweight torpedo can be launched by ships, submarines, helicopters and Ilyushin Il-38, named after the divine hawk identified with Agni.



TORPEDO ADVANCED LIGHTWEIGHT	
Type	Lightweight torpedo
Place of origin	India
Service history	
Used by	Indian Navy
Production history	
Designer	Naval Science and Technological Laboratory
Manufacturer	Bharat Dynamics Limited Larsen & Toubro Limited
Produced	March 2012 – present

Specifications	
Mass	220 kg
Length	2.75 m
Diameter	324 mm
Warhead	High explosive
Warhead weight	50 kg
Engine	Electric
Operational range	19 km
Maximum depth	540 m
Maximum speed	33 kn (61.1 km/h; 38.0 mph)
Guidance system	Acoustic homing (active/passive)
Launch platform	Ships, submarines, helicopters and Ilyushin Il-38

5) VARUNASTRA OR HEAVY WEIGHT TORPEDO

VARUNASTRA OR HEAVY WEIGHT TORPEDO - a ship launched, electrically propelled underwater weapon. Equipped with the most advanced automatic and remote-controlled guidance system. Uses its own intelligence in tracing the target.

Varunastra



Varunastra

Type Heavy torpedo

Place of origin India

Service history

In service 29 June 2016

Used by Indian Navy

Production history

Designer Naval Science and Technological Laboratory, DRDO

Manufacturer	Bharat Dynamics Limited
Unit cost	₹10 crore - ₹12 crore
No. built	150
Specifications	
Mass	1,500 kg (3,300 lb)
Length	7.78 m (25.5 ft)
Diameter	533.4 mm (21.00 in)
Warhead	High explosive
Warhead weight	250 kg
Engine	Electric Silver Oxide Zinc (AgOZn) batteries
Operational range	40 km (25 mi)
Maximum depth	600 metres (2,000 ft)
Maximum speed	40 knots (74 km/h; 46 mph)
Guidance system	Wire-guided, active-passive acoustic homing. Augmented by GPS/NavIC satellite guidance.
Launch platform	<ul style="list-style-type: none"> • Ship • Submarine

NAG:

The **Nag** missile, also called "Prospina" for the land-attack version, is an Indian third-generation, all-weather, fire-and-forget, lock-on after launch, anti-tank guided missile (ATGM) with an operational range of 500 m to 20 km. It has a single-shot hit probability of 90% and a ten-year, maintenance-free shelf life. The Nag has five variants under development: a land version, for a mast-mounted system; the helicopter-launched Nag (HELINA) also known as Dhruvastra; a "man-portable" version (MPATGM); an air-launched version which will replace the current imaging infrared (IIR) to millimetric-wave (mmW) active radar homing seeker and the Nag Missile Carrier (NAMICA) "tank buster", which is a modified BMP-2 Infantry Fighting Vehicle (IFV) produced under license in India by Ordnance Factory Medak (OFMK).

Development of the Nag is part of the Integrated Guided Missile Development Program (IGMDP), run by Defence Research and Development Organisation (DRDO). It is manufactured by Bharat Dynamics Limited (BDL). India's Ministry of Defence (MoD) announced on 19 July 2019 that the missile was ready for production. The Defence Research and Development Organization (DRDO) successfully completed the final trial of Nag anti-tank missile using a live warhead on a dud tank at Pokhran army ranges at 6.45 am on Oct 21, 2020.

Nag (Prospina)	
	
Type	Anti-tank guided missile
Place of origin	India
Service history	

Used by Indian Army
Indian Air Force

Production history

Designer Defence Research and Development Organisation

Manufacturer Bharat Dynamics Limited

Unit cost ₹1 crore

Specifications

Mass 43 kg

Length 1.85 m

Diameter 0.20 m

Warhead Tandem-charge HEAT (Penetration >900 mm in ERA + RHA)

Warhead weight 8 kg

Engine Solid-propellant rocket booster and sustained motor

Wingspan 0.4 m (16 in)

Propellant Nitramine smokeless extruded double base

Operational range

- Nag (Prospine): 500m–4km
- HELINA/Dhruvastra: 7–10km
- SANT: 15–20km

Maximum speed 230 m/s

Guidance system **Mid-course:** Charge-coupled device with area correlation and two-way datalink

Terminal:

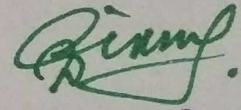
- Imaging infrared homing
- Millimetre wave active radar homing

**Launch
platform**

NAMICA

HAL Rudra

HAL Light Combat Helicopter



Head

Department of Physics
Govt. Degree College (Women)
Nalgonda - 508001, T.S.