

The Economic Times
29 Mar, 2016

DRDO eyeing defence exports in years ahead; Says international demand for BrahMos, Akash & Pinaka

Quepem: The Defence Research & Development Organisation (DRDO) is eyeing export potential and says that there is international demand for its systems like BrahMos, Akash and Pinaka.

At the Defence Expo 2016, S Christopher, Secretary, Department of Defence R&D and DG DRDO said that DRDO should definitely look at exporting its products. "I for one try to bring in the concept that we should export also."

Elaborating on this, Christopher said, "The reason is, we have been criticized many times for quality and inferior design. I don't deny that there are occasions where we might have done a design which is not good, also it is possible, that despite the best design, the product was not produced according to the need. In both the cases, it is better that we export as well. The advantage of that will be that we will get, if at all, criticism from an entirely third person, or country."

Talking about the new Defence Procurement Policy (DPP), Christopher said that a big positive that has emerged from it is that the time period it takes to first design and then develop a product will be reduced substantially. This he feels is a big boost for the DRDO, which has been hit at for the huge gestation period involved in any indigenous defence product's design and development.

Defense Update
29 Mar, 2016

DRDO Demonstrates Arjun Mk II, ICV Combat Vehicles in Action at Defexpo 2016

India's Defense Research and Development Organization (DRDO) and Indian armored vehicle manufacturers displayed today for the first time a number of combat vehicles developed in India for the Indian armed forces. Among the new vehicles were Arjun Mk II, Kestrel Wheeled Armored Platform (WhAP) and 4x4 Armored Mine Protected Vehicle (MPV) developed by Tata.

WhAP, an 8x8 armored infantry carrier developed by Tata (based on Tata's Kestrel design) was displayed by the DRDO. The vehicle uses a modular design that adapts the platform to different configurations, including infantry carrier, various specialist and support vehicles. The variant on display included a manned turret mounting a 30mm cannon and 7,62 coaxial machine-gun. APC, CBRN, command post, ambulance, 105 light tank etc.

The 25-ton vehicle is powered by a 600 hp diesel engine, that accelerates the vehicle to a maximum speed of 100 km/h, (10 km/h in water). The vehicle has two propellers for amphibious operation. The vehicle uses hydropneumatic suspension and runflat tires to soften in rough terrain and retain mobility even after tires are damaged. Among the four axles two are steerable, improving the vehicle's maneuverability in urban and rough terrain. Two years ago, at Defexpo 2014 the Kestrel was displayed with two remotely controlled weapon stations, mounting a 40mm cannon and 7.62 mm gun. For Defexpo 2016 the vehicle was fitted with a 30mm turret from the BMP-2.

Arjun Mk II is an improved version of the indigenous Arjun tank developed by the DRDO. The tank was presented on the static display at Defexpo 2014 and was shown in action, in public today at Defexpo 2016 in Goa for the first time. Arjun Mk II has a 120mm cannon that fires kinetic, high explosive rounds and LAHAT laser guided missiles.

The missile uses a tandem warhead, which is capable of defeating all types of modern armor, including add-on reactive armor. High penetration capability of the main warhead allows the missile

to penetrate the armor of major armored vehicles at high impact angles. The Arjun Mk II can carry a total of 39 rounds in special blast-proof canisters. A 7.62 mm MAG machine gun is mounted coaxially to the main armament. Mounted on the top of the turret is a Remote Controlled Weapon Station (RCWS) armed with a 12.7mm NSVT machine gun and associated optronics. An independent sight for the commander is located at the turret, left of the commander's cupola. The protection level has also been improved over Arjun Mk 1, adding reactive armor modules to the turret. The tank also has laser threat warning sensors mounted on four quadrants, along with eight launchers on each side, delivering smoke canisters deploying instantaneous smoke screen, to mask the tank from incoming missiles.

The MPV was developed by Tata Motors Defense unit, under the company's strategic expansion of its defense solutions, from logistical and utility vehicles to the design shift to broader mobility solutions for the military, providing all types of platforms, from 4×4 to 12×12, including various all-terrain weapon carriers and armored vehicles and combat vehicles. Tata is intended to participate in the Future Infantry Carrier Vehicle (FICV).

The MPV has been developed at the company in the past 5 years. A 20 ton vehicle, the MPV can transport 2 crew members and 12 troops, at high level of safety from mines and other forms of attack, at a maximum speed of 80 km/h. The vehicle is protected against explosives, mines and small arms attack up to STANAG Level 3. All passengers are provided with blast mitigating seats and 4 point harness. All tires are fitted with Run-Flat systems to retain mobility under attack.

India Today
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Exclusive: On 'overweight', next-gen Arjun tanks, DRDO chief says they 'missed the point'

Notwithstanding its first and feisty live demonstration during the opening ceremony of the 9th DefExpo being held in Goa, the Defence Research & Development Organisation (DRDO) declared its next generation Arjun MkII tank, has missed the target.

Notwithstanding its first and feisty live demonstration during the opening ceremony of the 9th DefExpo being held in Goa, the Defence Research & Development Organisation (DRDO) declared its next generation Arjun MkII tank, has missed the target. There remains at least six more months of work on it before the army can initiate its user trials.

Speaking to this correspondent, Dr S Christopher, Director General, DRDO said, "Weight is slightly on the higher side. We presumed, when informed about the additional requirement on MkI that weight will also be allowed additionally. Unfortunately, we missed the point." Elaborating further, he added, "Army says there are bridges where MkII might find it difficult (to move). This is the reason why we have developed the other bridge and made our tank go over it again and again when displayed at DefExpo. We are trying to tell the army that even if we may not be able to use it as it is everywhere, there definitely can be places where it can be used."

Defence Minister Manohar Parrikar who spoke about pushing the 'Make In India' program 'very hard' in his ministry, has asked the tank maker to reduce its weight by 1-1.5 ton. The DRDO believes in the coming six months, it will be in a position to do so.

Dr Christopher listed enhanced protection and better versatility as among the improvements in the MkII over its earlier avatar, 124 of which stand inducted in the army. "Development is about achieving targets and not really looking for maintenance related facilities and we are working on the deliverables," he said.

The history of indigenous tank building has been an acrimonious affair with the army and DRDO having bitter differences over the road ahead. While the army relies largely on the Russian-made T72 and T90 tanks, the DRDO believes it isn't being a fair opportunity to develop its product. After a protracted struggle, 124 MkI Arjun tanks were commissioned into the army.

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Defence Expo 2016: Not threatened by new DPP giving benefit to private players, says DRDO

Quepem (Goa): Clearing the air over discomfort with new DPP giving a benefit of ease of doing business to the private players, DRDO'S Director General S Christopher said, "We are not at all threatened by the private players, as the new defence policy gives DRDO a chance to collaborate with private players from day one." "We don't see private players as competition," he said.

Christopher said that DRDO has in the past been comfortable in collaborating with other public sector units, but we will look forward in collaborating with private players now. DRDO is focusing on 'Make in India' and 'Create in India', he said at Defence Expo 2016.

J Manjula, Director General said that DRDO's stronger technology base gives it an edge over the private players.

Responding to a separate query, DRDO said that we always look at possibility of utilising newer technology for improving upon the AGNI missile series. However, it refused to comment on whether there will be an addition to the AGNI missile series.

DRDO also said that the design of LCA Tejas MK II is expected to get completed by 2018. Christopher mentioned that DRDO is eyeing export potential for its products once the indigenous need is met.

oing Defence Expo at Betul-Naqueri in south Goa.

The minister told the delegates that the new DPP removes several "shackles" and frees the department from procedural tangles. "The DPP saw around 3,000-4,000 hours of work, which includes reading, rereading," said Parrikar. The Defence Minister had unveiled the new DPP on the first day of the Defence Expo yesterday and its text is now available online.

The minister said, "DPP is just a warm up, the final game is yet to begin. Through DPP 2016, we have attempted a good draft. Neither do I claim that we are experts in everything, nor is it that everything we work out is perfect." He told the industry players that their suggestions and recommendations are welcome. "May be after six months, we will see how the new DPP functions." Parrikar said, "In the absence of new DPP, whatever is in progress is generally under the old DPP.

We have tried to make mini modifications,we have tried to work out solutions to solve the bottleneck. We are for the first time analysing the status of various AONs (Acceptance of Necessity) granted."

Herald Goa
29 Mar, 2016

Parrikar to flag off bow mounted sonar dome today

Dome designed and developed by DRDO, Pune; Will then be delivered to Mazgaon docks, Mumbai

PANJIM: A huge bow mounted sonar dome, designed and developed by Research & Development Establishment (Engineers) [R&DE(E)], a Defence Research and Development Organisation (DRDO) laboratory based in Pune, will be flagged off by Defence Minister Manohar Parrikar in Goa today.

Dr S Christopher, Secretary Department of Defence (R&D) & Director General, DRDO will also be present at the ceremony that will be held on the sidelines of the Defexpo at Quito in Goa.

The sonar dome will be delivered to Mazgaon Docks, Mumbai, an official press release said.

According to the release, the sonar dome, a first of its kind in the country, has been manufactured by a composites manufacturing company in India.

"This is a huge contribution by Indian Industry to the 'Make in India' movement. Only a couple of companies worldwide have the capability of realising such structures," it said.

All anti-submarine warfare (ASW) ships have a sonar array fitted to the ship structure below the waterline. The sonar functions as the ship's underwater eyes and ears. The sonar dome is a structure fitted over the sonar array so that its electronics and sensors are not exposed to surrounding hostile environment. The sonar dome has to be structurally sound as well as acoustically transparent, it said.

The release said R&DE(E), DRDO, Pune had successfully developed process technologies to realise large composite structures that can be used in naval ships and submarines.

The laboratory has also developed technologies related to integral composite armour that can be used in combat vehicles. The laboratory is also significantly contributing in development of aerospace structures.

NPOL, a DRDO laboratory at Kochi in Kerala, played a significant role in development of the sonar dome, it said.

UCAV Ghatak project awaits PMO's nod

Bengaluru, March 29: India's plans to develop an Unmanned Combat Aerial Vehicle (UCAV) now awaits the final clearance from the Prime Minister's Office (PMO). DRDO has tentatively named the project as Ghatak, though it was known as AURA earlier. Confirming this bit to OneIndia, the Defence Research and Development Organisation (DRDO) Chief Dr S Christopher said that the high-power committee consisting of R Chidambaram and Dr V K Saraswat had submitted their report to the PMO.

While DRDO always maintained silence over this project, this is for the first time a top defence official has come on record giving some details on the programme. Bengaluru-based Aeronautical Development Agency (ADA), the designers of Tejas, have been tasked to undertake the preliminary study for the programme. Also Read: DRDO's hypersonic vehicle to have 20-second flight in Dec The ADA team had received seed-funding to undertake preliminary work on Ghatak in 2009. DRDO's Bengaluru-based Gas Turbine Research Establishment (GTRE) has already developed an engine (prototype), based on their expertise in developing Kaveri. The Ghatak engine is a dry variant of Kaveri, originally planned for Tejas.

When specifically asked about the recommendations of the committee, Dr Christopher said: "They are for it. They have recommended it." Sources told OneIndia that the Project Ghatak file is lying with the PMO for some time now, with its financial implications holding up matters. Also Read: Goa hosts India's Largest Defexpo Till-date On Nirbhay missile, the DRDO Chief said a suitable window between May-June is now being looked into for the next launch. "We will also have a launch of Nirbhay with BrahMos seeker in December," he said. DRDO is also working on an advanced version of Akash (Akash NG) which will have a maximum strike capability of up to 50 km. Scientists also confirmed that work on Anti-Radiation Missile (ARM) is progressing ahead, but didn't give any timelines of the project.

DRDO's hypersonic vehicle to have 20-second flight in Dec

Goa, March 29: The Defence Research and Development Organisation (DRDO) claimed on Tuesday that its ambitious project to develop a hypersonic vehicle would have its critical test in December 2016.

Replying to a specific query from OneIndia, DRDO Chief Dr S Christopher said the 20-22 second test of the Hypersonic Test Demonstration Vehicle (HSTDV) would be crucial for the hypersonic missile programme.

As a run-up to developing the missile, Dr Christopher said that successful trials were conducted at the Terminal Ballistics Research Laboratory of DRDO situated in Chandigarh. DRDO had formed the HSTDV Project Directorate at Dr A P J Abdul Kalam Missile Complex in Hyderabad in 2005.

Exports: DRDO is exploring the idea of exporting some of its products that did not find any takers in India. "We can always find a market for these products even if they are found not in favour of armed forces here due to some reason," says Christopher.

Arjun Mk-II: DRDO says despite the over-weight issues, the tank is best suited for Indian Army. "We have almost done all additional changes on Mk-1 as demanded by the user. We are working on all aspects of the tank so that we could reduce the weight further, including taking a relook at the engine and transmission units," says Christopher. He said similar to the trials held on Mk1, the Arjun Mk-II will have line-to-line trials with T-90 soon.

Eye-in-the-sky: The first Airborne Early Warning & Control System (AEW&C) being developed by DRDO will be handed over to Indian Air Force this year. The second platform, which has also started flight trials, would join IAF by next year. Work on Airborne Warning and Control Systems (AWACS), that offers 360-degree coverage of airspace has already begun at the Centre for Air Borne Systems (CABS) in Bengaluru. The Defence Acquisition Council had given the nod last year for home-grown AWACS programme.

Rustom-2: The Aeronautical Development Establishment is all set for the maiden flight of Rustom-2, unmanned aerial vehicle. Rustom-2 needs to be taken to a speed of 50 knots, from the current 32 knots. DRDO says the first flight (sans major systems on board) would take place in April, while the UAV would carry payloads during its flight in June.

*Shephard Media
29 Mar, 2016*

DefExpo 2016: DRDO UAVs proliferate

The smallest of ADE's UAVS the 550g Golden Hawk micro-UAV offers a 2km range and 30-minute endurance. The hand-launched vehicle was developed from 2007-10.

The Golden Hawk along with the Indian Eagle are currently being showcased at **DefExpo 2016**.

The Indian Eagle is a mini-UAV that weighs 2.9kg. Its range is listed as 10km and it can fly at a maximum altitude of 1km. Also hand-launched, the Indian Eagle is man-portable and is operated by a two-man team. The design was completed by 2012, and it has been undergoing trials by the army and internal security forces.

In addition, the ADE showed two scale models of larger UAV platforms, these being the Rustom I and Rustom II. The former is a MALE platform possessing a ten-hour endurance and 20,000ft operational altitude.

The Rustom I is essentially a testbed as the agency develops the much more capable Rustom II.

The latter is a HALE design offering a 24-hour flight endurance. It is still in the design stage but a spokesperson predicted it should fly for the first time before the end of 2016.

All three services of the Indian military intend to adopt the Rustom II, with the army first in the queue, followed by the air force and navy.

The Rustom II is destined to be armed, and each of the services expect to receive an initial three Rustom IIs each.

Each service's Rustom II would have customisations such as different payloads to suit them for their respective missions. It can accommodate a maximum 350kg payload. Operational range for its line-of-sight is listed as 250km whilst flying at a 125-175km/h cruising speed.

Interestingly, the Nishant UAV did not appear in model or physical form. Four examples in service with the Indian Army have all crashed.

A spokesperson said the ADE is modifying the design, but that the services were now more interested in the larger Rustom's capabilities.

The ADE also makes the Lakshya target drone that is used by the army and air force for training. It has been in service for a number of years.

The Netra micro-UAV is also a product of the DRDO, although it comes from the Research and Development Establishment (RDE). The updated **Netra v2** with 40-minute endurance and 4km range was completed last year. About 25 are being supplied to paramilitary units that find them especially useful for jungle operations.

Also on the DRDO's drawing board is the Autonomous Unmanned Research Aircraft (AURA), a stealthy UCAV design for the air force. However, no information was forthcoming from DRDO at DefExpo regarding this design.



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IDDM will be a game changer in defence production: Report

QUEPEM (GOA): Indian and foreign players have welcomed the creation of a new category under the Defence Procurement Procedure saying that it will be a game changer for the future, leading to real participation of domestic companies.

The Indigenously Designed Developed and Manufactured (IDDM) category is expected to bring significant investments in R&D and will ensure that the scientific talent in India is engaged in developing cutting-edge technologies in defence, a PwC-ASSOCHAM report said today.

According to the report titled 'Make in India: Achieving self-reliance in defence production', foreign OEMs (Original Equipment Manufacturers) have also welcomed the change but with some suggestions.

They feel this category will have implementation issues as OEMs have moved away from manufacturing systems and components in their factories.

OEMs rely on a global supply chain and have limited influence in mandating suppliers to localise in a given country unless economics and technical capability justify the investment.

"While the industry is upbeat about the IDDM category, some OEMs are apprehensive about achieving the indigenous content of 60 per cent," Dhiraj Mathur, Partner, Leader Aerospace and Defence, PwC India, said.

Defence Minister Manohar Parrikar has however said there should be indigenous content of 40 per cent.

According to the report released at the Defexpo here, the industry also welcomes the proposal to identify select Indian private sector defence manufacturers as strategic partners.

These companies would play central roles in developing complex and strategic systems within the country, or receive technology transferred from foreign suppliers in large defence contracts, it said.

While the government has taken several policy initiatives to lower entry barriers and improve ease of doing business, there is a need to also focus on improving infrastructure to create aerospace and defence hubs, it added.

As per the report, creating clusters is particularly relevant for MSMEs (Micro Small and Medium Enterprises), who supply components and sub-assemblies to the defence PSUs, ordnance factories, DRDO (Defence Research and Development Organisation) and private players.

The palpable change in the government's mindset regarding private players as equal partners rather than competitors to defence PSUs was also highlighted in the report.

It also laid down measures such as aligning tax policies to create synergies. Treatment of private sector as equal partners have the potential to further boost industry sentiment, it noted.

*Web India 123
29 Mar, 2016*

Parrikar flags off first indigenous composite Sonar Dome

Defence Minister Manohar Parrikar today flagged off the first indigenous composite sonar dome.

Dr S Christopher, secretary in Department of Defence (R&D) and director-general of DRDO; Vice Admiral P Murgesan, Vice Chief of Naval Staff; Dr S Guru Prasad, chief controller R&D (PC&SI) along with Rear Admiral (retired) and chairman-cum-managing director of Mazagon Dock Limited (MDL) R K Shrawat were present on the occasion.

The sonar dome has been designed by R&DE (E), a DRDO lab based in Pune, and manufactured by composites manufacturing company Kineco Ltd, Pilerne, Goa.

With this, India has joined a select group of nations which have the capability of realising large composites structure with multi-functional requirements, complex geometry and high structural rigidity with acoustic transparency.

This was possible due to the Vacuum Assisted Resin Transfer Molding (VARTM) process technology with built-in process monitoring capability, to ensure manufacture of a quality product, developed at R&DE(E), DRDO, Pune.

In this process, manufacturing technology was successfully transferred to M/s Kineco, Goa, who has now joined a select band of companies worldwide with this capability.

This launch has paved the way for realising more ambitious naval structures such as entire ship hulls as well as land-based and aerospace applications.

*PTI
29 Mar, 2016*

Parrikar flags off first indigenous Sonar Dome

Quepem (Goa), (PTI):- India's first indigenous composites sonar dome, a ship's underwater eyes and ears, was today flagged off by Defence Minister Manohar Parrikar from here to be delivered to Mazgaon docks in Mumbai.

Designed and produced by a Defence and Research Development Organisation (DRDO) lab in Pune, the sonar dome is a first of its kind in the country and has been manufactured by a composites manufacturing company.

This is a huge contribution by Indian Industry to the 'Make in India' movement, Defence Ministry officials said.

Only a couple of companies worldwide have the capability of realising such structures.

All anti-submarine warfare (ASW) ships have a sonar array fitted to the ship structure below the waterline. The sonar functions as the ship's underwater eyes and ears.

The sonar dome is a structure fitted over the sonar array so that its electronics and sensors are not exposed to surrounding hostile environment and has to be structurally sound as well as acoustically transparent.

It has been designed by Research and Development Establishment (Engineers), a DRDO laboratory based in Pune and manufactured by Goa-based composites manufacturing company Kineco.

IBN Live
29 Mar, 2016

Manohar Parrikar flags off India's first indigenously developed sonar dome at DefExpo

India reached another milestone when the first indigenous composites bow mounted sonar dome was dedicated to the nation by Defence Minister Manohar Parrikar during DefExpo 2016 on Tuesday in Goa. The sonar dome will be delivered to Mazgaon Docks, Mumbai for use in the warships of Indian Navy.

A sonar is a very critical component in a navy warship as it acts as the underwater eyes and ears. All anti-submarine warfare (ASW) ships have a sonar array below the waterline to track movement of hostile objects.

Sonar domes cover the sonar arrays and protect the electronics and sensors. The sonar dome has to be structurally sound as well as acoustically transparent.

The sonar dome has been designed by Research & Development Establishment (Engineers), a Defence Research and Development Organisation (DRDO) laboratory based in Pune and manufactured by composites manufacturing company Kineco Ltd, Pilerne, Goa.

With the indigenous sonar dome India joins a select group of nations which have the capability of realising large composites structure with multi-functional requirements, complex geometry and high structural rigidity with acoustic transparency.

This was possible due to the Vacuum Assisted Resin Transfer Molding (VARTM) process technology with built-in process monitoring capability, to ensure manufacture of a quality product, developed at R&DE(E), DRDO, Pune.

Senior DRDO officials say the success in manufacturing the sonar dome will now pave the way for realising more ambitious naval structures such as entire ship hulls as well as land based and aerospace applications.

DRDO Displays MRSAM Fire Unit at DEFEXPO

The Indian Defense Research & Development Organization (DRDO) unveiled at Defexpo2016 the fire unit of Medium Range Surface-to-Air (MRSAM) missile system, developed and manufactured for the Indian Air Force and Army. The development of this system, a land-based version of the Long-Range SAM (LRSAM) Barak-8 naval area defense system, was designed and developed by the DRDO and will be produced competitively by Larsen & Turbo and Tata Power SED, both private sector enterprises. The missiles, developed by Israel's IAI and Rafael will be produced in India by Bharat Dynamics (BDL). Three fire units will comprise a battery, self supported with target acquisition and communications. The fire unit comprises two stacks of four Barak-8 missiles, for a total of eight launch tubes. Stacks are reloaded separately, for rapid replenishment. The IAF plans to buy 60 fire units, with the Army buying additional lots to fulfill its requirement for medium range air defense. India is also interested in acquiring the Russian S400 (SA-21 Triumpf), which partly fulfills similar missions, although the operating methodology, range and capabilities of the Russian system are different from those offered by MRSAM. DRDO plans to test fire missiles from the new launcher for the first time in April, 2016.



The MRSAM fire unit holds eight ready to launch missiles in two stacks. The missiles are fired vertically from their canister-launchers. To protect the fire unit assembly DRDO developed a unique thermally protected flame deflector that directs the rocket flames away from the trailer. This heat deflector can endure at least 60 launches, without damage. Photo: Noam Eshel, Defense-Update