

DRDO's New Momentum

“Fast tracking into the Future”

In conversation with
Mr Avinash Chander



India is unique amongst countries of the world in having multi-level strategic deterrence capabilities, and its Defence Research & Development Organisation (DRDO) must certainly be given credit in large measure for this distinction. As the R&D front of the Ministry of Defence, the DRDO's mandate is to empower the nation with cutting edge Defence technologies, being responsible for design, development and leading to production of new generation weapon systems, platforms, sensors and allied equipment.

This human resource of 28,000 personnel, including distinguished scientists and highly experienced technicians, work in 52 laboratories throughout India, covering a wide spectrum of the needs of modern armed forces.

The Scientific Advisor to the Defence Minister, Secretary Department of Defence R& D and DG DRDO is Mr Avinash Chander who was appointed to this vital position on 1 June 2013. On eve of DefExpo 2014, Vayu had the privilege of an exclusive meeting and interaction with him at his office in DRDO Bhawan, New Delhi. A free wheeling account of his candid conversation is recalled, along with background notes for reference.

That unmanned aerial vehicles (UAVs) are an increasingly important factor in future air warfare is a given and Avinash Chander reinforced that by reviewing this as DRDO's thrust area for the future. Of the various programmes underway, DRDO is well ahead with its Nishant UAV developed by the ADE for the Indian Armed Forces. The Nishant is primarily tasked with intelligence gathering over enemy territory and also for reconnaissance, training, surveillance, target designation, artillery fire correction, damage assessment, ELINT

and SIGINT. This UAV has an endurance of 4 hours 30 minutes and has completed development phase and user trials.

Moving on to the Rustom I, this basic design was derived from NAL's light canard research aircraft (LCRA) but one which has been a very useful technology demonstrator, with several successful flights and attainment of a speed of 140 kmph, ceiling of 11,500 ft and endurance of just over 2 hours.

The much more contemporary and larger UAV, Rustom II is being developed by ADE as an indigenous programme and a full scale mock up was displayed at Yelahanka, during Aero India 2013. Taxi trials are to commence at Kolar at just about the time of DefExpo 2014 with first flight planned for the second half of 2014. Payloads, which include optical, electronic and SAR systems for the Rustom II will initially be imported but gradually indigenised as the programme matures.

Unmanned combat aerial vehicles (UCAVs) are also on the design board, these futuristic weapons of war being stealthy and carrying precision guided munitions: however, there is no timeline forecast for this but perhaps this would take another decade for service entry.

Mr Avinash Chander was enthusiastic about the DRDO's work on small, micro and mini UAVs to be employed for a



Mockup of DRDO's Rustom II medium altitude long endurance UAV

IAI Elta



Tejas LCA with representative underwing stores



The first AEW&C aircraft with DRDO-developed radar on Embraer EMB 145. Two such aircraft are now carrying out development test flights with a third to be delivered later this year. (photo: Angad Singh)

variety of purposes including intelligence and working in 'swarm groups' and this is an area in which many Indian academic institutions are being involved to work in conjunction with the ADE.

Last but not the least, DRDO is studying development of very long endurance, solar-energised high altitude UAVs, which would be of a totally new dimension.

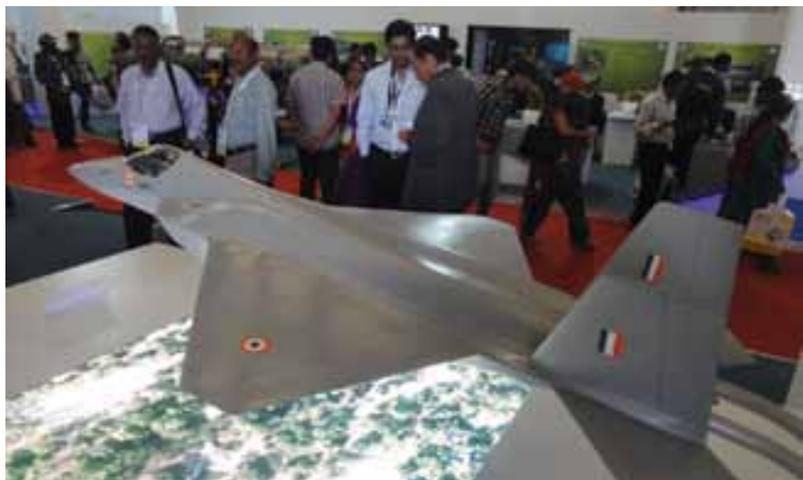
Coming to the Tejas light combat aircraft programme, subject of hyper media attention and analyses is, Avinash Chander accepted that the LCA is a great challenge for both the DRDO and HAL. The programme has certainly accelerated during the second half of 2013 and this is evidenced by numerous achievements including expansion of flight envelope, increased AOA, successful completion of

weapon trials (for IOC) and recording of 500 flights in the calendar year, culminating in award of the initial operational clearance (II) on 20 December 2013 (*see article in this issue*). Still, there is a considerable way to go before the LCA is truly 'accepted' for operational service by the Indian Air Force, but HAL are steadily moving beyond the so far 'hand crafted' prototypes and limited series production aircraft, now engaged in buildup of manufacturing facilities and honing of contemporary manufacturing techniques and formation of shop floor task teams comprising personnel from HAL, ADA and CEMILAC.

Test flights of the two-seat LCA trainer should recommence in 2014 and facilitate conversion training of IAF squadron pilots even as HAL plan to deliver the first series

production LCAs during the summer of 2014. Then, there is an entire world beyond India's shores waiting for just such an affordable multirole fighter. In fact the LCA, both the fighter and trainer variants, have an exciting export potential, being arguably the lightest fighter extant which could compete to replace many earlier generation fighters being phased out in the world.

Work on the next generation advanced medium combat aircraft (AMCA) is afoot with the Air Force and DRDO "fully committed" to this follow on programme which could certainly take advantage of the many cutting edge technologies and years of experience gained with the LCA. Presently, a suitable power plant is being identified but must be one that provides a no-risk option for this brand new airframe.



Model of the advanced medium combat aircraft (AMCA)



Mr. Avinash Chander speaks with Pushpinder Singh of Vayu, with Dr. Ravi Gupta of DRDO on his right.

Coming to land systems: the Indian Army and DRDO are working together to meet the requirement for the futuristic main battle tank (FMBT) and such an armoured fighting vehicle must be unique for operations in the varying terrain of the Indian subcontinent, including the high mountains of the north and east.

Mr Avinash Chander was characteristically candid throughout his conversation and explained the reasons for the failure of the maiden test flight of the prototype Nirbhay cruise missile. The system had actually performed "flawlessly", from take off to cruise, carrying out manoeuvres

and meeting all parameters except towards the end when a gyro malfunctioned and the missile dropped into the shallow waters off the Coast. The problem was identified after its recovery and suitable modifications made: trials are to recommence shortly.

The question on next test of the Agni IV IRBM was moot, with the test successfully



Nirbhay cruise missile at launch



K-15 Sagarika launch from underwater

conducted a few days earlier (*see this issue*)! Meanwhile, India's subsurface nuclear deterrent missile, the K-15 Sagarika will be deployed with its designated carrier, the nuclear submarine INS *Arihant* during the course of 2014 and there is great confidence in the combination soon becoming operational in Indian Navy service. After the nuclear reaction on the INS *Arihant* went critical on 10 August 2013, the submarine is to proceed on sea trials which will include underwater trials of its prime weapon, the K-15 Sagarika, earlier test launches having been very positive.

As for other DRDO missile programmes, the Nag anti-tank fire-and-forget missile has a new seeker-head and trials in the exacting desert environment are to commence soon. The Nag will be followed by the shorter range, lighter shoulder-fired version (Nagin?) which is of the same class as the Spike and Javelin. The air-launched version is the Helina whose preliminary firing trials took place at the Pokhran firing ranges in 2013.

There is positive news on the Astra beyond visual range air-to-air missile; air-launch trials of the present version, with a range of 40 km, will take place in February-March 2014, from a Sukhoi Su-30MKI in February-March 2014. After qualification, the Astra is also to be integrated with the LCA after its release to service. DRDO are very confident on the successful progress of the Astra moving to the longer range Mk.II (100 km) and beyond, the Mk.III being designed for range of 150km.

The last subject of this interaction concerned the LR-SAM programme and Mr Avinash Chander was confident of its future success. DRDO are moving ahead, with rocket motor trials taking place presently and test launches planned for mid-2014.

Beyond DRDO's impressive headquarters building in New Delhi, the peoples of India were provided a view of DRDO's wide range of products displayed during the Republic Day Parade on 26 January 2014 : while the Arjun main battle tank rolled down Rajpath on its own power, the tableaux on trailers displayed the Tejas LCA, Astra and Helina missiles, a range of UAVs including the Netra mini UAV and Nishant, the Daksh remotely operated vehicle, autonomous underwater vehicle (AUV), Muntra S tracked surveillance vehicle and other remotely operated vehicles.

Undoubtedly, the DRDO is inspired by its motto 'Balasya Mulam Vigyanam,' which translates as 'the Source of Strength is Science,' and the country has certainly reposed its faith in this as such.



Nag anti-tank guided missile trials



Astra BVRAAM displayed under LCA

