समाचार पत्रों से चयित अंश
Newspapers Clippings

दैनिक सामयिक अभिज्ञता सेवा

A daily Current Awareness Service

Vol. 43 No. 01 01 January 2018

रक्षा विज्ञान पुस्तकालय
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THE NEW INDIAN EXPRESS

Sat, 30 Dec, 2017

2017: A year when India's Defence Research and Development Organisation, armed forces gained more strength

By Hemant Kumar Rout

Bhubaneswar: It was a year of happenings for the Defence Research and Development Organisation (DRDO) and the armed forces. Apart from enhancing safety and security of the country, providing humanitarian assistance and disaster relief, modernisation of the Armed Forces, supporting indigenisation and manufacturing of defence equipment were the main features.

The country's premier agency had achieved many milestones in its strategic missile programme. Successful flight trials of indigenously developed first long range sub-sonic cruise missile Nirbhay, Quick Reaction Surface-to-Air Missile (QRSAM) and supersonic cruise missile BrahMos from fighter jet Sukhoi-30 MKI besides dedicating Naval submarine INS Kalvari to the Nation were highlights of the year.

While with the remarkable success of 1000-km range Nirbhay trial on November 7, India demonstrated its capability to develop long range cruise weapon systems, successive trials of homegrown interceptor missiles in both exo and endo atmospheric regions strengthened the Ballistic Missile Defence (BMD) shield.

Nirbhay, country's first indigenously designed and developed cruise missile, achieved grand success during fifth trial saving the project from being scrapped after three failures and one partial success.

DRDO also conducted three successful flight tests of its newly developed short range QRSAM. QRSAM is a highly mobile air defence system which can destroy multiple targets at a distance of 25 km. Though the missile is yet to get a formal name, it is expected to supplement the surface-to-air missile Akash, capable of hitting targets 30 km away.

World's fastest supersonic cruise missile BrahMos created history on **November 22** as fitted with advanced seeker software, the high speed missile was successfully flight-tested first time from frontline fighter aircraft Sukhoi-30 MKI marking a major milestone in enhancing the precision strike capability of the Indian Air Force (IAF).

Earlier on **March 11**, while maiden test of extended-range BrahMos was a copy book success, its Block-III version was successfully test fired on **May 2**. The technology upgrade came after India's full membership to the Missile Technology Control Regime (MTCR) which removed caps on the strike range of BrahMos. The range of the missile has been now enhanced from 290 km to 450 km.

Meanwhile, work has begun to integrate the BrahMos missile on 40 Sukhoi combat aircraft which is expected to fulfil critical needs of the IAF in the wake of evolving security dynamics in the region. The project is expected to be completed by 2020.

After 15 years in the making, Beyond Visual Range Air-to-Air Missile (BVRAAM), Astra completed its developmental trials this year .The indigenously built missile capable of detecting and destroying highly manoeuvrable targets, moving at a supersonic speed, will soon be inducted in the armed forces.

The third generation 'fire and forget' Anti Tank Guided Missile (ATGM) Nag has also completed developmental trials paving the way for its induction in the armed forces. The indigenously developed missile equipped with Imaging Infrared Radar (IIR) seeker was flight tested thrice from a range in Rajasthan on **June 13** and **September 8** and it successfully hit targets under different conditions. Surface-to-air missile 'Akash' was successfully test fired for the first time with a home-made radio frequency seeker against target Banshee. The missile was successfully flight tested five times between November 28 and December 5.

In **July**, the DRDO had signed a pact with the Army for developing a medium-range surface to air missile (MRSAM) which will be capable of shooting down ballistic missiles and aircraft. The missile capable of engaging multiple aerial targets at a range of more than 50 km will be produced in collaboration with the Israel Aerospace Industries (IAI).

On **March 2**, Navy successfully conducted maiden firing of an Anti-Ship missile from first of the indigenously built Kalvari class submarines in the Arabian Sea. All six Kalvari class submarines being built in India will be equipped with this anti-ship missile, which has a proven record in combat. Prime Minister Narendra Modi dedicated the naval submarine to the nation in December describing it as a prime example of 'Make-in-India'.

DRDO scientists received appreciation for the successful user trial of 4000-km range Agni-IV missile on January 2 but drew criticism for the failures of Agni-II and K-4 missiles on May 4 and December 17. This year, DRDO and Strategic Forces Command (SFC), a specially raised missile-handling unit of the Army had conducted at least 27 trials of 12 missiles - Agni-IV, Agni-II, PDV interceptor, AAD interceptor, BrahMos, Akash, Astra, Prithvi-II, QRSAM, Nag, Nirbhay and K-4.

The first ever tri-services exercise INDIRA between India and Russia was conducted in October. Another flagship event of the year was the first ever Indian circumnavigation of the globe by all-women crew on Indian Navy sailing INSV Tarini, which was flagged off on **September 10** and is expected to return to Goa in April 2018.

INS Kiltan, the third ship of Project-28 Anti Submarine Warfare (ASW) Corvette was commissioned on **October 16**. This is the first major warship with entire superstructure made of carbon fibre reinforced composite material.

The first DRDO designed and developed Airborne Early Warning & Control (AEW&C) system, aboard Embraer-145 aircraft, was inducted in the IAF in **February**. The state of the art Active Electronically Scanned Array-based radar system can detect airborne objects from far off distances and provide early warning to the Air Defence Command and Control Centres.

SPYDER Low Level Quick Reaction Missile system, equipped with Python 5 and Derby missiles, has also been inducted into the IAF. This system provides a comprehensive response to the saturation attacks with multiple target engagement, thus boosting the short range air defence capability. Among the indigenously developed air launched weapons, flight trials of 500 kg General Purpose (GP) Bomb was conducted from Su-30 MKI in May besides the thermobaric bomb from MiG-27 aircraft and captive flight trials of Stand-off Anti Tank missile from Mi-35 helicopter.

A timeline

- **December 28 and March 1** - Advanced Area Defence (AAD) interceptor test fired fromKalam Island off Odisha coast
- **June 4, July 3 and December 22** - QRSAM test fired from Integrated Test Range atChandipur
- **December 17** - Submarine-launched K-4 missile could not be launched from pontoon
- **November 29 to December 5** - Surface-to-air missile Akash test fired five times
- **November 22** - Maiden air launch of supersonic cruise missile BrahMos from Sukhoi-30MKI successful
- **November 7** - Subsonic cruise missile Nirbhay clears crucial test
- **September 11 to 15** - Air-to-air missile Astra completes developmental trial
- **September 8 and June 13** - Anti-tank missile Nag completes developmental trial at thewestern range in Rajasthan
- **June 2** - SFC conducts user trial of nuke capable Prithvi-II missile
- **May 4** - SFC carries out user trial of Agni-II missile

- **May 2** - Block-III version of BrahMos missile test fired
- **April 21** - BrahMos cruise missile test fired from warship Teg
- **March 11** - Maiden test of extended range BrahMos successful
- **March 2** - Navy conducts test of an anti-ship missile from INS Kalvari
- **February 11** - Prithvi Defence Vehicle (PDV) interceptor successfully destroysincoming missile at exo-atmospheric region
- **January 2** - User trial of 4,000 km Agni-IV achieves grand success

http://www.newindianexpress.com/nation/2017/dec/30/2017-a-year-when-indias-defence-research-and-development-organisation-armed-forces-gained-more-st-1740240.html

MAIL TODAY

Mon, 01 Jan, 2018

Fresh IAF push to stuck Jaguar upgrade project

By Ajit K Dubey

In A bid to maintain force levels and enhance firepower, the Indian Air Force (IAF) is pushing its plans to upgrade the capabilities of the Jaguar deep penetration strike aircraft by equipping them with new engines under a deal worth over Rs. 5,000 crore, which has been stuck for more than six years now. The deal would be crucial for the IAF to maintain its standards in the coming decade as the squadron strength would be going down due to indecision by the UPA from 2004-2014 in procuring any fighter plane for the service.

> **The stuck project is being revived and pushed by the Air Force. Many sticky issues with Honeywell (supplier) have been sorted out and it is expected there will be some movement forward in the deal.**
>
> **— Senior government official**

> **If upgraded and re-engined, the Jaguar can serve as a potent fighter while the govt can go on deciding on new aircraft to be procured for the Air Force.**
>
> **— Defence source**

The IAF's sanctioned strength of fighter aircraft squadrons is 42, but it has been operating at a much lower strength due to delays in acquisition of replacements for MiG 21s and delays in deciding on the new fleet of multirole combat aircraft. It has 32 squadrons at present.

₹5k cr
Total value of the deal

6 yrs
Time for which project is stuck

32
No. of squadrons of Air Force

The IAF has five squadrons of Jaguar planes, which have to be maintained by equipping them with new engines from American firm Honeywell to maintain the present force-levels. "The stuck project is being revived and pushed by the Air Force. A number of sticky issues with Honeywell have been sorted out and it is expected that there will be some movement forward in the deal in the coming times," a senior government official said. As per the programme, the Indian Air Force will re-engine around 100 of its Jaguar planes deployed in Jamnagar, Gorakhpur and Ambala with Honeywell power plants.

The Jaguars are currently powered by Rolls-Royce Adour 804/811 engines which are to be replaced with Honeywell's F125N engine. The new engines are supposed to provide almost 1.5 times the power the existing engines provide to the aircraft. On December 19, 2011, the UPA government had stated in the Parliament that the Jaguar upgrade would be completed by December 2017, but that deadline expired on Sunday and still, no decision could be taken on the issue. IAF officials said though the planes are almost three decades old, but there is still plenty of life left in

them and they will help India maintain force levels in critical times. As per IAF projections, it would have air superior Su30MKI as its main work horse in the coming years.

The Force will have 13 squadrons of these planes while it would be retiring its MiG 21s and Mig 27s in the next few years. “If upgraded and re-engined, the Jaguar can serve as a potent fighter while the government can go on deciding on new aircraft to be procured for the air force,” a source said. Recently, MoS for defence Subhash Bhamre said in the Parliament, “The IAF will have 32 fighter squadrons and 39 helicopter units by 2020.” The Air Force currently possesses 32 squadrons but, as the minister put it, “Three squadrons of MiG-21 aircraft will be phased out by 2020.”

THE HINDU

Mon, 01 Jan, 2018

NASA’s 2018 to do list includes mission to ‘touch’ Sun

NASA is turning 60 in 2018 and the agency is looking forward to launching a slew of important missions in the coming year, including one to “touch” the Sun.

NASA’s Parker Solar Probe is scheduled for launch in 2018 to explore the Sun’s outer atmosphere.

The probe will use Venus’ gravity during seven flybys over nearly seven years to gradually bring its orbit closer to the Sun, according to a NASA statement.

The spacecraft will fly through the Sun’s atmosphere as close as 6.2 million kilometres to our star’s surface, well within the orbit of Mercury and closer than any spacecraft has gone before.

The Parker Solar Probe will perform its scientific investigations in a hazardous region of intense heat and solar radiation.

The primary science goals for the mission are to trace how energy and heat move through the solar corona and to explore what accelerates the solar wind as well as solar energetic particles.

In 2018, NASA will also add to its existing robotic fleet at the Red Planet with the InSight Mars lander designed to study the interior and subsurface of the planet .

The US space agency’s first asteroid sample return mission, OSIRIS-REx, is scheduled to arrive at the near-Earth asteroid Bennu in August 2018, and will return a sample for study in 2023.

Launching no later than June 2018, the Transiting Exoplanet Survey Satellite (TESS) will search for planets outside our solar system by monitoring 200,000 bright, nearby stars.

To continue the long—term record of how Earth’s ice sheets, sea level, and underground water reserves are changing, NASA will also launch the next generation of two missions — ICESat-2 and GRACE Follow-On — in 2018.