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DefenceNews

Thu, 08 Aug 2019

India successfully develops its first beyond visual range air-to-air missile

India has successfully developed the 'Astra', its first all-weather Beyond Visual Range (BVR) Air-to-Air Missile (AAM) and leaped into a group of few nations that have a weapon system of this capability and performance. The Defence Research and Development Organisation (DRDO) initiated concept studies for developing an indigenous AAM in the 1990s. The Government of India sanctioned the Astra project in March 2004 with a budget of `995 crore. The Hyderabad-based Defence Research & Development Laboratory, a Missile System laboratory under the DRDO was designated as the design and development (D&D) agency for the Astra missile.

During its development, the design of Astra missile went through several iterative changes for improving its control, guidance and propulsion systems as also reduction in weight. Ground testing of the Astra began in December 2012 and the missile was cleared for captive flight trials on the Su-30MKI combat platform in April 2013. The first Astra missile was launched from the Su-30MKI in May 2014 and so far, 27 missiles have been test fired to ascertain and validate its performance.

The Astra is designed to carry 15 kg high explosive prefragmented warhead, which is activated by a Radio Proximity Fuse. The missile has good Electronic Counter-Countermeasure (ECCM) to enable unconstrained operation in an Electronic Countermeasure (ECM) environment. The Astra Mark 1, which successfully completed the trials recently, has a maximum head-on launch range of 100 km, a speed of 4.5 Mach and is cleared for launch up to an altitude of 20 km (66,000 ft).

The Astra could be launched either by the mother aircraft or fired in buddy mode. The extensive and rigorous trials have successfully validated the Astra missile's warhead capability, its maximum launch ranges against both, head-on and manoeuvring targets, its long-range target engagement capability, clear missile-separation at supersonic speeds, launch under high 'g' forces and multiple missile launches at multiple targets. During the trials, the Astra missiles were launched across the entire flight envelope of the Su-30MKI and all of these successfully engaged, hit and destroyed all assigned manoeuvring and non-manoeuvring aerial targets besides meeting with all mission objectives.

After launch, the Astra initially uses 'Inertial Mid-Course Guidance' through a secure data-link from the mother aircraft followed by 'Active Radar Homing' from its seeker head for terminal guidance. To absorb delays in the development process of the indigenous active radar seeker, it was decided to develop the Astra missile with Russian 'Agat 9B1103M' active radar seeker for terminal guidance. The entire D&D of Astra including the firing trials up to the year 2017, were conducted with the Russian active radar seeker. The decision to use the Russian seeker for D&D and trials phases was a very prudent one as it enabled concurrent engineering and development of both, the missile and its active radar seeker independently.

The Indian Ku-band active radar seeker was developed by DRDO and is now fully functional. This form-fit indigenous seeker has now been installed on all Astra missiles. Thus, today India has its first indigenously developed BVR AAM with indigenous active radar seeker. The Indian Air Force (IAF) being satisfied with Astra's development and performance, is in the process of placing initial order for 100 missiles in the prototype version on the manufacturer Bharat Dynamics Limited (BDL). Induction of this wapons system into the IAF will commence later this year.

Performance and kill ranges of the Astra Mark 1 is slightly better than the BVR AAM currently employed by our adversaries. The Astra is already integrated on the Su-30MKI and the IAF will certainly integrate this weapons system with the upgraded Mirage 2000, the MiG-29, light combat aircraft Tejas and may be with the Rafale jets that are expected to start arriving in September this year. The Astra is the first Beyond Visual Range, Air-to-Air Missile that is designed, developed and manufactured by the Indian aerospace industry. Its successful induction will greatly boost the BVR combat capability of the IAF.

After the successful development of the Astra Mark 1, the first BVR AAM, the IAF and DRDO have already started the process to develop Astra Mark 2, an improved version of Astra Mark 1. The Astra Mark 2 will have a head-on launch range of over 100 km along with the capability for ejector launch. It is certain that the Astra Mark 2 will be one of the best BVR AAM capable of outperforming all current BVR AAM except the European Meteor that is coming with the 36 Rafale fighters.

Successful indigenous design and development of the Astra BVR AAM coupled with Akash Mark 2 SAM, signposts the maturity of the Indian weapons industry in mastering cutting-edge missile technologies as also helping the 'Make in India' campaign and reinforcing national defence.

http://www.defencenews.in/article/India-Successfully-Develops-Its-First-Beyond-Visual-Range-Air-to-air-Missile-586336

DefenceNews

Thu, 08 Aug 2019

MoD to decide on buying two BrahMos missile coastal batteries to tackle enemy warships

In his first Defence Acquisition Council (DAC) meeting, Defence Minister Rajnath Singh will decide on acquisition of weapon systems worth around Rs 12,000 crore including the procurement of two BrahMos supersonic cruise missile batteries for the Indian Navy.

The meeting is scheduled to be held on Thursday in which the Defence Minister is also going to take a call on several acquisitions from both India and abroad.

"The two mobile missile coastal batteries have to be acquired for the Navy. The Navy would deploy the Rs 1400 crore BrahMos supersonic cruise missile batteries deployed on the Tatra trucks close to major cities from where it can destroy any incoming enemy warship in case it is posing any threat," government sources said.

The Navy wants to use the two BrahMos missile batteries to replace its existing systems which have become old and need replacement, they said.

In the DAC meeting, Singh is scheduled to take a call on the acquisition of 14 medium-lift choppers for the Indian Coast Guard which are likely to cost more than Rs 7,000 crore.

The meeting will also take a call on the deviations in the proposal for acquisition and manufacturing of AK-203 assault rifles between India and Russia.

The Defence Minister will also decide on the proposed procurement of two electronic warfare systems for deployment along the Pakistan and China borders.

Though the DAC is meeting for the first time since the new government was formed, the Narendra Modi administration has already spent around Rs 8500 crore for meeting the emergency requirement of the forces in its first 50 days.

Weapon systems such as the Spice 2000 stand off bombs and Spike anti-tank guided missiles from Israel, Strum Ataka air-launched ATGM and several other spare parts from Russia have been acquired under these powers by the Indian Air Force.

http://www.defencenews.in/article/MoD-to-decide-on-buying-two-BrahMos-Missile-Coastal-Batteries-to-tackle-Enemy-Warships-586345

Thu, 08 Aug 2019

Despite tension, India and Pakistan Army to take part in joint drill

At a time of heightened tensions between India and Pakistan, armies of both the nations will be participating in a multilateral military exercise in Russia next month.

The exercise "Ex TSENTR (Centre)" is the initiative of the Shanghai Co-operation Organisation (SCO) and will see soldiers of the member countries participating in the military drill to be held from 10 September to 21 September at Orenburg in Russia.

China too will be a part of the military exercise. Russia has also invited Iran, Mongolia, Turkmenistan and Belarus to participate in the exercise. This is the second time that India will be participating in the SCO military exercise.

India is planning to send around 140 men to take part in the exercise which will involve anti-terror war games and drill towards military security in the Central Asian Region.

The anti-terror war games will involve exercise where conventional and counter- terrorist operations would be executed against a rogue state responsible for spreading state sponsored terrorism in the region. India and Pakistan joined SCO as full members in 2017 at a summit in Astana, Kazakhstan.

The exercise will come at a time when there is an increased tension between India and Pakistan.

http://www.defencenews.in/article/Despite-tension,-India-and-Pakistan-Army-to-take-part-in-joint-drill-586347

NDTV

Thu, 08 Aug 2019

Kim Jong says latest missile launch a "warning" to US, South Korea

Pyongyang on Tuesday fired two projectiles which "are assumed to be short-range ballistic missiles" into the sea, the South's Joint Chiefs of Staff said earlier

North Korea: North Korea's leader Kim Jong Un says the country's latest missile launches were a warning to Washington and Seoul over their joint war games, state news agency KCNA reported on Wednesday, as tensions rise on the Korean peninsula.

The latest launch by the nuclear-armed North came after the South Korean and US militaries began mainly computer-simulated joint exercises on Monday to test Seoul's ability to take operational control in wartime.

Those drills are taking place despite Pyongyang's warnings that the exercises would jeopardise nuclear negotiations between the United States and North Korea.

KCNA said Kim had watched the launches early Tuesday, which verified the "war capacity" of the "new-type tactical guided missiles".

With the launches carried out satisfactorily, "Kim Jong Un noted that the said military action would be an occasion to send an adequate warning to the joint military drill now underway by the US and South Korean authorities," KCNA said.

Pyongyang on Tuesday fired two projectiles that "are assumed to be short-range ballistic missiles" into the sea, the South's Joint Chiefs of Staff said earlier.

The latest weapons tests were the fourth pair of projectiles fired in less than two weeks, and the North has threatened more.

US President Donald Trump last week downplayed the North's launches, saying Kim would not want to "disappoint" him.

Trump and Kim held a historic summit in Singapore last year, where the North made a vague pledge on denuclearisation.

A second summit in Hanoi this February broke up amid disagreements over sanctions relief and what Pyongyang might be willing to give up in return.

The two agreed to resume nuclear talks during their impromptu June meeting in the Demilitarized Zone that divides the peninsula, but working-level dialogue has yet to begin.

Analysts say the military manoeuvres on both sides could see discussions pushed back until the autumn, and Pyongyang signalled Tuesday that it was in no mood to talk.

It called the drills a "flagrant violation" of the diplomatic process between Pyongyang, Washington and Seoul.

Pyongyang has always been infuriated by military exercises between the South and US, seeing them as rehearsals for invasion, but in the past it has tended to avoid carrying out missile tests while the war games were taking place.

After the Singapore summit, Trump made a shock announcement halting joint drills, adopting Pyongyang's own description of them as "provocative".

War games known as Ulchi Freedom Guardian (UFG) scheduled for August last year were subsequently suspended and the allies' biggest annual drills, Foal Eagle and Key Resolve, were replaced with a shorter "Dong Maeng" or "Alliance" exercise in March.

US National Security Advisor John Bolton on Tuesday said the latest drills are "consistent with the partnership we have with South Korea.

"North Korea has continued its exercises unabated. So they don't really have a lot to complain about," he told the "Fox and Friends" television show.

(Except for the headline, this story has not been edited by NDTV staff and is published from a syndicated feed.)

https://www.ndtv.com/world-news/kim-jong-un-says-latest-missile-launch-a-warning-to-us-south-korea-report-2081363

Thu, 08 Aug 2019

Hordes of Earth's toughest creatures may now be living on Moon

There might be life on the Moon after all: thousands of virtually indestructible creatures that can withstand extreme radiation, sizzling heat, the coldest temperatures of the universe, and decades without food.

These terrifying-sounding beings aren't aliens but instead microscopic Earthlings known as tardigrades, who likely made it out alive following a crash landing on the lunar surface by Israel's Beresheet probe in April, the US-based organization responsible for their trip said Tuesday.

Based on an analysis of the spacecraft's trajectory and the composition of the device the micro-animals were stored in, "we believe the chances of survival for the tardigrades... are extremely high," Nova Spivack, co-founder and chairman of the Arch Mission Foundation, told AFP.

The non-profit is dedicated to spreading backups of human knowledge and Earth's biology throughout the Solar System, a quest it likens to the creation of an "Encyclopedia Galactica" first evoked by sci-fi writer Isaac Asimov.

"Tardigrades are ideal to include because they are microscopic, multicellular, and one of the most durable forms of life on planet Earth," said Spivack.

He added that the diminutive creatures, which are under a millimeter (0.04 inches) in size, had been dehydrated to place them in suspended animation, then "encased in an epoxy of Artificial Amber, and should be revivable in the future."

The tardigrades were stored inside a "Lunar Library," a nanotechnology device that resembles a DVD and contains a 30-million-page archive of human history viewable under microscopes, as well as human DNA.

Spivack is confident this too survived impact—but it doesn't represent the first genetic code or life forms to be deposited on the barren celestial body.

That distinction belongs to the DNA and microbes contained in the almost 100 bags of feces and urine left behind by American astronauts during the Apollo lunar landings from 1969-1972.

No rescue mission

Also known as water bears or moss piglets, tardigrades can live in water or on land, and are capable of surviving temperatures as high as 150 degrees Celsius (302 degrees Fahrenheit) and as low as minus 272 degrees Celsius (-458 Fahrenheit), albeit for a few minutes.

The grub-like, eight-legged animals can come back from being dried out to a lifeless husk for decades, withstand near-zero pressure in outer space and the crushing depths of the Mariana Trench.

If they did not burn up in an explosion, they could in theory survive the tiny pressure on the lunar surface, and the extremes of temperature, William Miller, a tardigrades expert at Baker University, told AFP.

"But to become active, to grow, eat, and reproduce they would need water, air and food," so it would not be possible for them to multiply and form a colony, he added.

NASA astrobiologist Cassie Conley said that their exact survival time would depend on the condition of the impact site and the temperatures to which they are exposed.

"If they don't get too hot, it's possible they could survive for quite a long time (many years)," she told AFP.

"I'd be more concerned that the animals would be affected by toxic chemicals from the epoxy or glue" used to store them, as opposed to conditions in space, she added.

Even if the creatures lived on for several years, there is no crewed mission to the Moon planned until NASA's Artemis program in 2024 at the bsouth pole—far from Beresheet's crash site on the Sea of Serenity, so they probably won't make it home.

"It is unlikely that they will be rescued in time, so my guess is that, even if they survived, they are doomed," Rafael Alves Batista, a physicist at Sao Paulo university who co-authored a 2017 paper on tardigrades' extreme resilience, told AFP.

https://phys.org/news/2019-08-hordes-earth-toughest-creatures-moon.html

THE HINDU

Thu, 08 Aug 2019

Rocket Lab working on a reusable booster

If successful, it would make it the second company after Elon Musk's SpaceX to reuse an orbital-class rocket booster

Small-satellite launch firm Rocket Lab plans to recover the core booster of its Electron rocket using a helicopter, a bold cost-saving concept that, if successful, would make it the second company after Elon Musk's SpaceX to reuse an orbital-class rocket booster.

"Electron is going reusable," Rocket Lab chief executive Peter Beck said during a presentation in Utah, showing an animation of the rocket sending a payload into a shallow orbit before speeding back through Earth's atmosphere.

The Auckland-based company is one of a growing cadre of launch companies looking to slash the cost of sending shoebox-sized satellites to low Earth orbit, building smaller rockets and reinventing traditional production lines to meet a growing payload demand.

Electron, which has flown seven missions so far, can send up to 225 kg into space for roughly $7 million. Medium-class launchers such as Los Angeles-based Relativity Space can send up to 1,000 kg into space for $10 million while Texas-based firm Firefly can do it for $15 million.

Unlike SpaceX's Falcon 9 rocket, which reignites its engines to land steadily back on Earth, Rocket Lab's Electron will deploy a series of parachutes to slow its fall through the Earth's atmosphere.

https://www.thehindu.com/sci-tech/technology/rocket-lab-working-on-a-reusable-booster/article28872508.ece