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Sky Is the Limit for Cruise Missile

By Pravin Sawhney

Given the many merits of cruise missiles, the test-firing of BrahMos-A must adhere to the timeline announced as it will open up avenues for India to acquire state-of-the-art technologies

The supersonic BrahMos cruise missile air launch version (BrahMos-A) will be test-firing by the end of this year. This was disclosed by the Air Force chief, Air Chief Marshal BS Dhanoa at the customary media interaction on October 5 to mark the Air Force Day.

With this test being successful, the air launch version would enter the Air Force, completing the trio of the anti-ship version with the Navy and the land-attack version with the Army. It is important that this test, preparations for which have been made since 2012, be held on time as it would initiate induction of technologies critical for cruise missiles, which would be the game-changers for deterrence and war-fighting.

A single BrahMos-A fired from the Su-30MKI aircraft will witness a 300kg warhead going at speed of 2.8 Mach, hitting a Naval target (an abandoned ship) at 400km range with pin-point accuracy (zero Circular Error Probability, or CEP) with the radars of the Defence Research and Development Organisation (DRDO) recording the entire event. It could be argued that what is the big deal if the Su-30MKI flying close to Mach 2 speed with a range of 3000km and payload carrying capacity of 8,000kg (eight tonne) is used to throw a single BrahMos-A missile onto the sea-target? The big deal would be that with zero accuracy error, BrahMos-A would provide excellent stand-off maritime strike capability and lethality when launched from air close to Andamans and Nicobar Islands (where India has the Andaman and Nicobar Command) to cover the Strait of Malacca, the key choke point that connects the Western Pacific with the Indian Ocean. India, thus, would have acquired the capability to both seek (through its P-8I aircraft) and kill hostile vessels entering what it considers its backyard where the Indian Navy is the net security provider.

Moreover, this would be just the beginning. The next step would be simultaneous work on three fronts: Equipping 40 Su-30MKI with this capability; miniaturisation of BrahMos-A to BrahMos-NG (Next Generation), work on which has begun with Russia and is expected to be accomplished by 2021; and indigenisation of two key technologies — propulsion and seeker — which will have a wider application in the sub-sonic Nirbhay cruise missile, which being built by the DRDO, is at present, not much of a success.

The radar, seeker and propulsion technologies of BrahMos-A come from Russia. It uses a mono-pulse X-band Imaging Synthetic Aperture Radar which is better than the Terrain Contour Matching (TERCOM) radar used in cruise missiles the world over. All cruise missiles flying at sub-sonic (less than sound) speeds are designed to be terrain-hugging since they are required to evade enemy radars by flying low over large distances. Given this, they have TERCOM, which continuously maps the terrain and matches it with its own stored data to reach the target.

Since BrahMos is the only cruise missile with super-sonic (more than sound) speed, it travels at about 16km above sea-level. It uses this special radar which gets its updates from the GPS/Russian Global Navigation Satellite System or GLONASS and flies across many way-points (where the flight changes its path instead of the traditional trajectory which can be monitored) to evade enemy radars. Because of this peculiarity, and the super-sonic speed, BrahMos is impossible to be intercepted.

The BrahMos seeker — seeker SGH — is made by the Russian company, Granite Joint Stock Company. It has the capability for accurate terminal guidance, where the seeker takes over from the GPS supported radar to hit the target. The DRDO is developing an indigenous seeker, which involves numerous domestic companies, especially Data Pattern and ECIL. Once done, the seeker will be an Indian IPR design which can

freely be used in other applications. It is for this reason that the DRDO did not take up the European MBDA company's offer for transfer of seeker technology as part of the, now abandoned, joint-development and production Maitri short-range surface to air missile programme.

The BrahMos propulsion involves two-stage motor, of which the booster is the first stage and the ramjet engine (much better than turbojet technology) being the other one. In order to reduce the weight of the BrahMos-A by 500kg as compared with the Navy and Army version of BrahMos, the booster size has been reduced with the ramjet engine remaining the same weight. This has been done since BrahMos-A fired from the Su-30MKI will already be at an altitude that does not require much boost to enter the cruise phase powered by the ramjet engine.

The challenge, however, will be in the miniaturisation of BrahMos-A so that three missiles — BrahMos NG — instead of the present single missile on the Su-30MKI can be loaded. This will require a new ramjet engine, work on which is underway with Russia. In terms of war-fighting, Su-30MKI armed with three BrahMos-NG will enhance the Air Force's mission options.

This is not all. Once India gets its propulsion and especially the seeker, it will be a big boost to the other DRDO programme — the sub-sonic Nirbhay cruise missile. This missile has had four tests, out of which three were unsuccessful and the results of the fourth were not disclosed. The Nirbhay is claimed to have 1,000km range with a turbofan engine. Turbofan engines consume much less fuel than turbojets of equivalent size; hence are more complex system and extremely expensive. Accordingly, turbofan engines are considered suitable for long-range cruise missiles with ranges between 600km to 2,000km. At present, only a few countries have mastered the turbofan propulsion technology. Interestingly, China is amongst them and Pakistan's Babur cruise missile uses Chinese technology.

In fact, the Nirbhay programme was started to meet the challenge from the sub-sonic Babur missile. A few turbo-fan engines were procured from Russia. However, when the DRDO openly boasted about Nirbhay having capability to carry nuclear warheads, Russia stopped supply of engine. This came as a blessing in disguise as the DRDO was compelled to work on an indigenous engine with Russian help. According to sources, this project is moving satisfactorily and once India develops its own seeker there will be a commonality of seeker between three missiles - BrahMos, Nirbhay and even the Russian 3M14 Club with the Indian Navy.

To place in the global perspective, cruise missiles are the weapon of choice rather than the ballistic missiles because they are less expensive; are easier to design, develop, procure, maintain and operate; have wider applications in conventional warfare, including in unmanned aerial vehicles; and have fewer technology restriction, especially so since India is a member of the Missile Technology Control Regime since 2016. Given all this, the test-firing of BrahMos-A should not be delayed since it opens up avenues for India to acquire state-of-the-art technologies.



Thu, 12 Oct, 2017

2 IAF commandos, 2 ultras killed in Kashmir gunfight

By Saleem Pandit

Indian Air Force (IAF) on Wednesday took a hit in the Kashmir valley for the first time in the last 27 years of violent insurgency, when two of its commandos were killed in a fierce gunbattle with terrorists in north Kashmir's Bandipora district. Two Lashkar-e-Taiba terrorists, one of them a Pakistani national, were also killed in the encounter.

Defence spokesman Col Rajesh Kalia said the gunbattle started after security forces cordoned off Hajin's Rakh (Paribal) area following intelligence inputs about the presence of militants there. "As the forces were

closing in, the militants fired upon them around 5 am, resulting in injuries to many army personnel. Two of them succumbed later," the Colonel said. The terrorists identified as Ali alias Abu Maaz, a Pakistani and Nasrullah Mir, a local Kashmiri, belonged to Lashkar-e-Taiba outfit, he added. DGP S P Vaid said the two Lashkar members were involved in several terror attacks. DGP Vaid complimented police personnel responsible for busting an "un holy nexus" between police and militants. "We have zero per cent tolerance for such acts and we will ensure stricter and quicker punishment for the guilty," Vaid said.

MAIL TODAY

Thu, 12 Oct, 2017

Army Wants Body Bags Lying in Warehouse

The Army has sought early handing over of 900 body bags and 150 caskets procured in 1999 lying in a warehouse for the past 17 years after allegations of kickbacks in the USD 4 lakh deal and subsequent CBI probe into it. It comes at a time when images of bodies of seven military personnel wrapped in plastic sacks and tied up in cardboard triggered outrage last week.

The military personnel were killed in an Mi- 17 helicopter crash in Tawang on Friday. Official sources said the Army has requested the CBI again to facilitate the handing over of the body bags as the probe into their procurement was over.

MAIL TODAY

Thu, 12 Oct, 2017

Nirmala may celebrate Diwali with troops

By Ajit K Dubey

Following Prime Minister Narendra Modi's decision to spend his Diwali with troops on the border, Defence minister Nirmala Sitharaman is also planning to spend the festival of lights with Army, Navy, Air Force and Coast Guard troops in Andaman and Nicobar.

"As per the plans, the defence minister is supposed to visit the Andaman and Nicobar Islands where she could spend time with troops of all the four armed forces under her in the first tri-services military command in the country," government sources said. The tri-services command has personnel from all the three forces, who are under the command of a naval officer Vice Admiral Bimal Kumar Verma and looks after the Indian maritime interests in the Indian Ocean region, where the Chinese interests have gone up significantly in the recent past.

Recently, India has been attaching greater importance to the country's strategic military base as former Navy chief Admiral DK Joshi was appointed lieutenant governor of the Andamans. In last one month, Sitharaman has visited almost all important military bases in the country.

US bombers overfly Korean peninsula in show of force

Trump meets with Secretary of Defence General James Mattis to plan best approach to Pyongyang

The US military flew two strategic bombers over the Korean Peninsula in a show of force late on Tuesday, as President Donald Trump met top defence officials to discuss how to respond to any threat from North Korea. Tensions have soared between the United States and North Korea following a series of weapons tests by Pyongyang and a string of increasingly bellicose exchanges between Trump and North Korean leader Kim Jong-un. North Korea has launched two missiles over Japan and conducted its sixth nuclear test in recent weeks as it fast advances towards its goal of developing a nuclear-tipped missile capable of hitting the US mainland. The two US Air Force B-1B bombers were joined by two F-15K fighters from the South Korean military after leaving their base in Guam, South Korea's Joint Chiefs of Staff said in a statement on Wednesday. After entering South Korean airspace, the two bombers carried out air-to-ground missile drills in waters off the east coast of South Korea, then flew over the South to waters between it and China to repeat the drill, the release said. The US military said in a separate statement it conducted drills with Japanese fighters after the exercise with South Korea, making it the first time US bombers have conducted training with fighters from both Japan and South Korea at night.

The US bombers had taken off from the Andersen Air Force Base in Guam. In August, Pyongyang threatened to fire intermediate-range missiles towards the vicinity of Guam, a US Pacific territory that is frequently subjected to sabrerattling from the North. South Korean and US government officials have been raising their guard against more North Korean provocations with the approach of the 72nd anniversary of the founding of North Korea's ruling party, which fell on Tuesday.

Trump hosted a discussion on Tuesday on options to respond to any North Korean aggression or, if necessary, to prevent Pyongyang from threatening the United States and its allies with nuclear weapons, the White House said in a statement. Trump was briefed by Secretary of Defence James Mattis and Chairman of the Joint Chiefs of Staff General Joseph Dunford at a national security team meeting, the statement said. US and South Korean wartime operational plans, including a plan to wipe out the North Korean leadership, were stolen by North Korean hackers last year, a South Korean ruling party lawmaker said on Wednesday.

Some 235 gigabytes of military documents were taken from South Korea's Defence Integrated Data Centre in September last year, Democratic Party representative Rhee Cheol-hee said in radio appearances on Wednesday, citing information from unidentified South Korean defence officials. In May, an investigative team inside the defence ministry announced the hack had been carried out by North Korea, but did not disclose what kind of information had been taken. The United Nations Security Council, which has imposed a series of ever tighter sanctions on North Korea, has banned four ships from ports globally for carrying coal from North Korea, including one vessel that also had ammunition.

The vessels are the first to be designated under steppedup sanctions imposed on North Korea by the 15-member council in August and September over two long-range ballistic missile launches and Pyongyang's sixth and largest nuclear test. China, North Korea's main ally and trading partner, has consistently argued sanctions alone will not work, urging Washington and Pyongyang to lower their rhetoric and return to the negotiating table. China's influential Global Times tabloid expressed alarm at how far the rhetoric on both sides had gone and how it had increased the risk of a "fatal misjudgment". "The international community won't accept North Korea as a nuclear power. North Korea needs time and proof to believe that abandoning its nuclear programme will contribute to its own political and economic advantage. This positive process is worth a try," the paper said in an editorial late on Tuesday. "War would be a nightmare for the Korean Peninsula and surrounding regions. We strongly urge North Korea and the US to stop their bellicose posturing and seriously think about a peaceful solution," it said.

प्लूटो के 'आइस ब्लेड्स का रहस्य सुलझा

पंकज सुमन

नई दिल्ली, (पंजाब केसरी): वैज्ञानिकों ने आखिरकार प्लूटो पर गगनचुंबी 'आइस ब्लेड्स का रहस्य सुलझा लिया है। जुलाई 2015 में प्लूटो के सतह पर इक्वेटर के नजदीक ऊंची-ऊंची आकृतियों को देखा गया था जो कई सौ फीट ऊंचे हैं। अनुसंधानकर्ताओं ने कहा कि ये ब्लेड्स पूरी तरह से मिथेन

● जिस तरह से ओस जमीन पर जम जाती है उसी तरह प्लूटो के वातावरण में मिथेन के जमने से इन आकृतियों का निर्माण हुआ

गैस से बने हैं। ये आकृतियां प्लूटो के रहस्यमय विशेषताओं में से एक हैं। प्रतीत होता है कि इन ब्लेड्स से प्लूटो के जटिल वातावरण और भूगोल को समझने में मदद मिल

सकती है। वैज्ञानिकों के अनुसार जिस तरह से ओस जमीन पर जम जाता है उसी तरह प्लूटो के वातावरण में मिथेन के जमने से इन आकृतियों का निर्माण हुआ। वैज्ञानिक ने इस प्रक्रिया को सब्लिमेशन की प्रक्रिया बताया। इसी तरह की आकृति पृथ्वी के भूमध्यरेखा के पास पाया गया है लेकिन यह प्लूटो के ब्लेड्स से अलग है। प्लूटो के इन आकृतियों से प्रतीत होता है कि यहां के वातावरण में समय के साथ काफी बदलाव आया है।

