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## The relentless pursuit of missiles

*The Agni series of ballistic missiles has matured with a few add-ons. However, since global technologies have moved strides ahead, the Agni-V no longer serves the original purpose of deterrence*

*By Pravin Sawhney*

India's 5,000-km range Agni-V surface-to-surface ballistic missile is expected to be inducted into the Strategic Force Command soon. This is the latest version of the Agni series of ballistic missiles which was launched 34 years ago as Agni technology demonstrator in 1984. The then envisaged technology, with a few add-ons, has matured.

However, since global technologies have moved strides ahead, the Agni-V — contrary to claims made by the scientists — no longer serves the original purpose of deterrence. Especially for China against whom it would be fielded. It has, thus, been reduced to an expensive showpiece.

Deterrence means that the adversary, in this case China, should be cautious if not scared of Agni-V. It should desist from military activism on the disputed border for fear of escalation which might go out of control culminating into a nuclear exchange.

Given this, it becomes evident that deterrence comes by creating strategic imbalance: By owning a weapon system which the adversary does not have and one which is capable of damaging the adversary's core military strength, or which takes the war to a higher or new level for which the adversary is not prepared.

Two examples, one each from Pakistan and China, will help clarify the essence of deterrence. Subsequent to India's 1998 nuclear tests, the United States, in order to prevent a subcontinental nuclear arms race, was keen that Pakistan should not follow suit; various inducements ranging from financial doles to F-16 aircraft to whatever else was up for discussion with Pakistan.

The Pakistani Prime Minister Nawaz Sharif was so stunned that he refused a meeting with the US interlocutors Strobe Talbott and Central Command chief, General Anthony Zinni. He simply did not know how to respond. At that point, the Pakistan Army Chief, General Jehangir Karamat met the US team; after listening to them patiently, he told them that Pakistan would do its own nuclear tests to restore the strategic balance.

Since India had demonstrated nuclear weapons capability, Pakistan would need to do the same, he added. General Karamat was proved right as within hours of India's nuclear tests, the then deputy Prime Minister LK Advani boasted that Pakistan would now have to re-think on Kashmir.

Take China's case. It cannot match the US in either conventional war-fighting platforms or in the range and variety of nuclear weapons. There is a huge gap in the finances that the two spend on developing technologies and annual defence allocations.

So, instead of attempting to match US capabilities aircraft carrier for aircraft carrier, China has focussed on developing asymmetric warfare capabilities (a) to hit and destroy US' existing state-of-art weapon platforms, like the aircraft carrier and so on, and (b) by attempting to catch up, if not outdo the US in newer domains like cyber, space, electromagnetic spectrum and psychological warfare. By doing so, China has created deterrence through strategic imbalance vis-à-vis the US, a much more powerful adversary.

China has developed rockets as anti-satellite weapons; laser pulses to disrupt satellite communication; accurate land and sea-based anti-ship cruise missiles to hit carriers and ocean-going ships; a large number of conventional and nuclear attack submarines (accounting for 45 per cent of its naval combatants); excellent cyber warfare capabilities, largest numbers of armed unmanned aerial vehicles and so on. More than anything else, the race for Artificial Intelligence (AI) in warfare has broken out between China and the US. On nuclear weapons, since China cannot match the US, it has declared a no-first-use policy. Making virtue out of necessity, China has said that it will not enter the nuclear arms race; it would only maintain limited stocks of nukes which are being upgraded and modernised. China, like other major powers, is aware that sooner rather

than later AI weapons (which are useable) would take over the role of strategic deterrence from nuclear weapons once fully autonomous weapons are introduced into inventories. An interesting book titled, *Army of None: Autonomous Weapons and the Future of War*, by Paul Scharre provide insight into where the global AI is headed.

Chinese new deterrence has rattled the US. The US President Donald Trump has recently ordered the creation of a new Space Force; the sixth joint command for the US Armed Forces. This move would militarise the space but it might ensure that Chinese capabilities to disrupt and destroy US' communications, which are the lifeline for their stand-off operations, remain mitigated.

Given all this, where does Agni-V fit into the warfare with China? Now here for one, nothing more than a limited border war between India and China is envisaged. For another, given Chinese existing conventional capabilities, it has little need to even threaten a nuclear exchange. India, which like China, has a no-first-use policy, would ensure that Agni-V in not brought into the war discourse.

Pakistan's case is different. It matches the Indian military at the decisive operational (war-fighting) level of war and it has an ambiguous nuclear weapons policy. While no military planner on either side envisages a nuclear exchange, India needs to retain land-based, in addition to the ultimate sea-based, deterrence against Pakistan. The Agni-I, with a range of 700 km, which covers Pakistan's entire elongated geography, should suffice. Thus, as far as the Agni series is concerned, except for the Agni-I, all other missiles, namely, Agni-II, Agni-III, Agni-IV, Agni-V, and even the obsolete liquid-fuelled Prithvi should be gradually eased out keeping pace with the induction of newer technologies. These comprise cruise missiles, sea-based deterrence, armed unmanned aerial vehicles, stand-off and precision weapons. Concurrently, research in space, cyber and AI weapons for the future should be redoubled.

This will not be easy for two reasons. One, there is an inherent tendency in the Defence Research and Development Organisation (DRDO) to claim technologies they have not produced as indigenous. Two points will help make this point: The carbon-to-carbon composite heat shield in all ballistic missiles (used in Agni-V which re-enters the atmosphere from space at temperature of 4,000 degree centigrade to ensure

Systems in payload remain safe), which is a critical technology, as well as the propulsion used in the Nirbhaya subsonic cruise missile are procured from a friendly country.

The other problem is the setting of unrealistic targets by the Defence Ministry. For example, the 2018 draft Defence Production Policy envisages India to become a leading world player in AI and autonomous weapon systems by 2025; seven years hence. This target seems to have been borrowed from China's Vision-2025. Surely, the Government does not believe that we are in the same league.

*(The writer is editor, FORCE newsmagazine).*

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*Thu, 05 July 2018.*

## **HAL's Sukhoi Su-30 aircraft crash to cost insurer Rs. 2.5 billion**

***The Sukhoi loss last week will result in the largest aviation payout since Chennai floods of December 2015***

***By Aneesh Phadnis & Advait Rao Palepu***

State-owned general insurer New India Assurance will have to fork out around Rs 2.5 billion in insurance claims to Hindustan Aeronautics Ltd (HAL), following the crash of its Sukhoi Su-30 fighter jet near Nashik last week. This will be the largest claim in the aviation sector for Indian insurers in the last three years, said sources. The Su-30 aircraft was on a pre-delivery test flight when it crashed last Wednesday. There were no casualties. HAL had insured the aircraft with New India Assurance for around Rs 2.5 billion. The policy covers manufacturer liability arising from accidents or incidents before it is handed over to the air force. HAL has manufactured over 4,000 aircraft for the defence forces since its inception in 1940. It manufactures Sukhoi Su-30 under a licence agreement with the Russian firm. A HAL spokesperson did not respond to an email query.

New India Assurance Chairman G Srinivasan said: “We have been informed of the Sukhoi crash and the Rs 2.5 billion claim. The survey is going on.” Over 90 per cent of the company's aviation insurance business has been reinsured with domestic and foreign reinsurers, he added.

The Sukhoi loss last week will result in the largest aviation payout since Chennai floods of December 2015. Eight jets owned by corporate houses were damaged during the floods, resulting in claims of around Rs 5 billion. The actual payout is unknown but believed to have been around Rs 4 billion, making 2015 one of the worst years for aviation insurance in India.

Last week, a King Air C-90 aircraft crashed in Mumbai. This is expected to result in a claim of Rs 70 million. Global reinsurance rates have seen some hardening since last winter as hurricanes in the United States have resulted in multi-billion dollar loss claims, thereby wiping out profits. However, the aviation insurance market in India is not expected to be affected much by the Su-30 crash. “The HAL insurance cover has been reinsured with domestic and foreign companies. We do not expect the incident to result in an immediate increase in premiums,” said Nikhil Kulabkar, lead of aviation practice at JLT Independent Insurance, a broking firm.

There have been a few large claims from airlines in the last three years, including Air India Express, Jet Airways and Spice Jet, for damage to their aircraft in air safety incidents. Air India Express claimed around \$20 million after an aircraft veered off the runway, with its wheels stuck in a drain at Kochi airport last September. The aircraft's engine, nose wheel and fuselage were damaged. It was back in service from January after an overhaul. Jet Airways said it received Rs 400 million in claims towards damage of its aircraft in the previous financial year, while Spice Jet had a large claim when its plane veered off the runway in Mumbai last September.



Thu, 05 July 2018

## ISRO to test its astronaut escape feature today

*‘Pad abort test’ involves aborting a space capsule at launch*

*By Madhumathi D.S*

Indian Space Research Organisation (ISRO) has scheduled a ‘pad abort test’ of an experimental space crew capsule on Thursday morning as an important cog of its plan to send Indians to space one day. The launch pad abort test, or PAT, involves aborting a space capsule at launch to save the inmates. It is slated for 7 a.m. at ISRO’s Sriharikota launch venue, the Satish Dhawan Space Centre (SDSC), in coastal A.P.

### **Astronauts’ safety**

A two-hour band from 6 a.m. has been slotted for the test, according to information on the website of ISRO’s Space Application Centre, Ahmedabad. SAC has provided devices that enable satellite communication and navigation of this flight. ISRO Chairman K.Sivan has been overseeing the preparations at the SDSC for the past two days. The priority of all space agencies in a human space mission is the safe return of its astronauts. With the pad abort test, ISRO aims to prove its technology that will safely parachute future astronauts down in case their space vehicle develops snags while taking off, a senior ISRO executive said.

### **First milestone**

ISRO describes PAT as the first milestone in qualifying its crew escape system in an emergency. The test is also one of the many main and supporting technologies that the space agency is developing ahead of its ambitious Human Space Flight Programme (HSP). According to information put together from multiple sources, a roughly 3,770-kg trial crew module, aided by four solid-fuelled rockets built around it, will be flown up to a distance of 2.4 km. On firing, the module will be jettisoned and demonstrate a safe descent with the help of parachutes — all this in around three minutes