



Centre for Air Power Studies

NIRBHAY: WILL THE “FEARLESS” ENTER THE FRAY

Gp Capt Ravinder Singh Chhatwal (Retd)

Senior Fellow, CAPS

Background

India recently announced that it is preparing to test its long range cruise missile “Nirbhay” (Fearless)¹. This missile was first tested in March 2013 but the test had to be aborted due to malfunction of its onboard inertial navigation system. The test was carried out at Chandipur test range off the Odisha coast. Nirbhay has been developed by Defence Research and Development Organisation’s (DRDO) Advanced Systems laboratory (ASL) at Hyderabad and has many design features derived from the Lakshya pilotless target aircraft developed by DRDO. The Nirbhay project, like most DRDO projects, has been under development since many years and plagued by delays. The second test was initially planned for February 2014 but was postponed to June 2014 and now will perhaps be held sometime in this year. Asked about the reasons for delay in the project, the Deccan Herald quoted Avinash Chander, Scientific Adviser to Defence Minister, as saying “Nirbhay is a typical model of how we should not do project R&D. Earlier it was piecemeal work, but new thrust has been provided to this project.” It remains to be seen if this “new thrust” will soon see the “Fearless” enter the combat inventory of Indian forces.

Nirbhay Project

Development work on the Nirbhay missile first came to light in 2007 but the project seems to have started in 2005. The missile was planned to enter initial operational service

in 2013/2014 but this is now likely to be delayed. DRDO officials have stated that there will be different versions of the missile starting first with a ground launched version, followed by sea and air launched versions. It has also been revealed that SU-30MKI of the IAF is being modified for air launched trials of the missile². Nirbhay is a two stage subsonic cruise missile. In the first stage it is fired with a solid propellant rocket engine, which comes off after clearing the launcher. In the second stage the turbojet engine takes over for the subsonic cruise and terminal phases. The missile has a cruise speed of about 0.8 to 0.9 mach and maximum range of 800 km to 1000 km³. The missile is said to be similar to the American Tomahawk RGM-109 which was used in the Gulf War-1991. Nirbhay is believed to be powered by a turbojet engine provided by the Russians and the engine is similar to NPO Saturn's TRDD-50. The missile can carry a payload of 450 kg which means the warhead can be conventional HE (Heavy Explosive) or sub munitions. It is also capable of carrying nuclear warhead of about 12 kT range. The guidance system is inertial navigation system with GPS updates and an active radar terminal seeker.

While India has successfully developed ballistic missiles of the Agni family, there has been little or no progress in the cruise missile field. This is surprising since the Americans have demonstrated their usefulness more than 20 years ago in the Gulf War-1991, in Kosovo and in Afghanistan. India needs to catch up in this field. Cruise missiles provide many advantages compared to ballistic missiles. Cruise missiles are low cost weapons and do not require a very extensive launch infrastructure. Cruise missiles fly at very low altitude "tree top" height which makes them difficult to detect by enemy air defence radars and airborne surveillance platforms. Their small size provides them an inherent stealth feature thus enhancing their capability to penetrate enemy defences. Ground launched cruise missiles mounted on transporter erector launcher vehicles (TEL) and with simple infrastructure can "shoot and scoot" thus enhancing survivability. Cruise missiles can be launched from multiple platforms from land, air, sea (ships and submarines) which gives them the capability to launch from long range at stand-off distances. Modern cruise missiles with accurate navigation systems updated by GPS provide a versatile long range precision strike weapon to destroy enemy targets.

India's joint venture with Russia has produced the 290 km supersonic cruise missile Brahmos which entered service with the Indian Navy in 2005 when it was installed in the INS Rajput destroyer. Brahmos missile is also fully operational with two regiments of the Indian Army, since 2007, and the government has sanctioned the induction of a third regiment in the army⁴. Brahmos has been restricted to a range of 290 km to remain within the Missile Technology Control Regime's (MTCR) limits of 300 km to which Russia is a signatory. Russia has built the critical parts like the engine and missile seeker for Brahmos, while India has made the inertial navigation system and the fire control systems. For the Nirbhay while the Russians may have provided the engine for testing of the prototype models, it is unlikely that they will provide more engines for Nirbhay since it has a range of 800 km to 1000 km and comes under MTCR restrictions. Indian sources have stated that the engine will be replaced with an indigenous turbojet or turbofan engine later⁵. Development of a suitable jet engine for Nirbhay will be critical test for DRDO since India's record in this field has not been successful. India also needs to field its own navigation satellites since availability of GPS and foreign satellite navigation systems is not guaranteed in war. Satellite navigation provides great accuracy in cruise missiles for precision strikes. The planned deployment of IRNASS (Indian Regional Navigation Satellite System) in 2015 should address these concerns.

ARTICLES BY SAME AUTHOR

PENTAGON'S NEW REPORT ON CHINESE MILITARY DEVELOPMENTS

CHINA'S NEW AWACS - KJ500

RUSSIA CLEARS S-400 LONG RANGE SAM SALE TO CHINA

BRAHMOS CRUISE MISSILE READY FOR AIR LAUNCHED TEST

AMPHIBIOUS SEAPLANE SALE COULD TRIGGER CLOSER JAPAN-INDIA DEFENCE RELATIONS

CHINA'S EAST CHINA SEA ADIZ: CONFUSION AND ALARM

CHINA'S AWACS: HISTORY AND DEVELOPMENT

SU-35 SALE TO CHINA: THE CHALLENGE FOR INDIA

Pakistan and China's Cruise Missiles

Pakistan already has a sub sonic land attack cruise missile, the "Babur" Hatf-7, which was first tested in 2005 and since then has been inducted in the army. The Babur missile has a range of 700 km and is a copy of the American Tomahawk cruise missile⁶. Babur has a turbofan engine, WS-500, which has been supplied by China⁷. The Chinese also have their own ground launched cruise missile, DH-10, which has a range of 1500 km+ and in addition have developed a 200 km range air launched cruise missile (ALCM), YJ-63, which is carried by their H-6K bombers. China is also developing two new air launched land attack cruise missiles (LACM) with 1,500 km range and 10 m accuracy.⁸

Conclusion

Cruise missiles are strategically important weapons in modern times, and not possessing them is a shortcoming which needs to be addressed on a high priority. DRDO must step up its efforts in this field and deliver results in a finite time frame. As the Prime Minister Narendra Modi, in a recent message to DRDO, quoted by the *Times of India*, urged them to "deliver cutting edge weapons to the armed forces in time to keep India ahead in the national security arena"⁹. This is a challenge which DRDO must accept and vigorously pursue development of long range cruise missiles so that when push comes to shove Nirbhay can enter the fray to counter the Chinese and Pakistani **nexus**.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

End Notes

¹ Rajat Pandit "Testing of 1,000km Cruise Missile Soon", *The Times of India* , May 15, 2014, <http://timesofindia.indiatimes.com/india/Stage-set-for-test-of-nuclear-capable-cruise-missile-Nirbhay/articleshow/35129574.cms> , accessed on August 06, 2014.

² "First Test Of Indian Cruise Missile Looms:New Delhi set to test 'secret' strategic subsonic cruise missile", *Aviation Week & Space Technology*, Jul 2, 2012, <http://aviationweek.com/awin/first-test-indian-cruise-missile-looms-0> , accessed on August 12, 2014.

³ Jane's Weapons Strategic 2013-2014, p.113.

⁴ "Brahmos Supersonic Cruise Missile" <http://www.brahmos.com/content.php?id=10&sid=10> , accessed on August 10, 2014.

⁵ N2 ibid.

⁶ “Why India needs Nirbhay? Pak has Tomahawk Clones”, <http://news.oneindia.in/2013/03/13/why-india-needs-nirbhay-pak-has-tomahawk-clones-1170505.html> , accessed on March 10, 2014.

⁷ “Being Ready for any Eventuality” <http://www.dailypioneer.com/columnists/oped/being-ready-for-any-eventuality.html> , June6, 2013, accessed on March 10, 2014.

⁸ Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan *A Low-Visibility Force Multiplier* (Washington, D.C.: NDU Press, 2014). P. 56.

⁹ Rajat Pandit “World Won’t Wait for You, Modi Tells Laggard DRDO”, *The Times Of India*, New Delhi, August 21, 2014.

