



## Akash (Sky) surface-to-air missile



(ARMY VERSION )



(AIR FORCE VERSION)

In the mid-1980s, India began indigenous development of a medium range SAM, the AKASH missile.

Planned as a replacement for the SA-6 now in service, AKASH's design is based in large part on the SA-6 configuration. Development was repeatedly delayed with flight tests finally being initiated in late 1990. Akash is a mobile area defense medium-range medium and high altitude surface-to-air missile with a range of 27 to 30 kilometers. It is said to be indigenously developed, though it has a very strong resemblance to the Russian SA-6 GAINFUL. Akash has a multi-target handling capability, and employs a command guidance system with provision for terminal guidance. Powered by a ram rocket propulsion and an air breathing engine, Akash can cut through electronic jamming with its electronic counter-

counter measure equipment.



(SA-6)

Akash has a launch weight of 720 kg, a diameter of 35 cm and a length of 5.8 meters. It can fly at supersonic speed of around 2.5 Mach and can reach an altitude of 18 kms. It has a capacity to carry 50 kg payload. The missile has a height ceiling of 18,000 meters and is capable of detecting and destroying aircraft flying at tree top height. The missile is supported by multi-target and multi-function phased array fire control radar called 'Rajendra' that has a range of about 60 km.



The missile system's fire control **radar** is a multi-target and multi-function phased array radar called '**Rajendra**' with a range of about 60-km, working in tandem. The radar and the missile can track 64 targets of which four can be engaged simultaneously. The BEL-developed "Rajendra" multi-functional radar system has been integrated with the system. The Akash self propelled launcher (ASPL) and Phased Array Radar have been developed, though it had yet to enter the production/induction phase by 2005. For training the men and officers in handling Akash, scientists developed simulator of the missile's seeker head in look down role and battery level radar under clutter and jamming environment.



(RAJENDRA RADAR OR BLR)



(3-D CAR)

A second radar called 3-D CAR is also used for Early Warning.

It is a part of the Integrated Guided Missile Development Program (IGMDP) undertaken by the Defence Research Development Organisation (DRDO) in 1983. India's IGMDP was launched in July 1983. Initially, it had a budget of around Rs 400 crore, but it has since been revised Rs 800 crore. The major programs under the IGMDP are the development of missiles including Agni, Prithvi, Akash, Trishul and the Nag. The Sagarika and the Surya had since been added to the IGMDP. The first test flight of the Akash missile was conducted in 1990, and since then many development and field trials have taken place. The system had undergone a few tests earlier to gauge proposition parameters and predicted values. By 1998 five flight trials had been conducted. As on July 31, 2007, an amount of Rs. 492.41 crore (5 billion approximately) has already been spent on development of Akash.

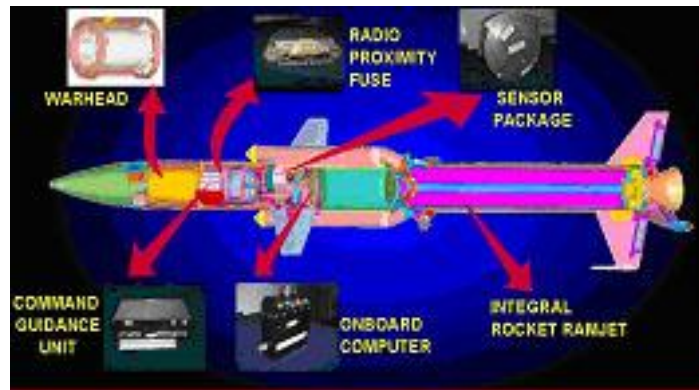
In 2003 the Government had not decided to discontinue the Akash Missile Project. The main objective was to develop medium range surface-to-air Missile with a range of 25 km. There had been some technical problems in the sub-systems which had since been rectified. In fact recent flight tests conducted were successful and user trials were planned the following year. Expenditure of Rs. 330.00 crore had been incurred so far on the project.

In a written reply on 10 May 2007, Defence Minister AK Antony told the Lok Sabha that “representatives of the Indian Air Force had participated in the development trials of the Akash Missile System, conducted by the DRDO, as observers and provided user’s inputs for improvement in the system’s performance. Some trials at the development stage had not been fully successful. User’s trials are likely to commence shortly”. Regarding the amount of money spent on the missile, he told the Lok Sabha, again in a written reply on August 29 that “as on July 31, 2007, an amount of Rs 492.41 crore” had been spent on the development of the missile.

By late 2007 forty test-fires had been done and nearly Rs 500 crore have been burnt, but the Akash missile was not yet to get the final nod for the skies. Over three days between December 13 and 15, 2007, the medium-range, surface-to-air, nuclear capable missile was test-fired as many times from the Chandipur Integrated Test Range in Orissa, after which scientists of the Defence Research and Development Organisation (DRDO) were waiting for the Indian Air Force’s nod for Akash’s induction.

In December 2007 the induction of one squadron of Akash surface-to-air missiles by the Indian Air Force came as a major relief for air defence system planners after the rupees 1800-crore deal with Israel for procuring Spyder missile system came to naught. The one squadron, numbering 18 batteries of the indigenously developed 30-km range missile, helped fill the gap due to the delay in the procurement of the Israeli missile after Indian Defence Ministry asked the Central Vigilance Commission to probe into the deal citing reported irregularities. Indian armed forces had opted for Israeli Spyder missiles, as there was delay in the Akash missile program, which was set to improve the indigenously developed Trishul missile.

On 21 December 2007, the successful conclusion of Akash missile test firing at Chandipur-on -sea gave the Air Force and the Defence Research and Development Organisation a much-needed breakthrough as the IAF had earlier expressed its reservation over the performance of Akash missile system. The missile was deemed ready for production, the Defence Ministry officials stated just after the conclusion of the tests. Although the missile was declared ready for induction after the December 2007 test, some fine-tuning was required and the project was handed over to public and private sector industries for manufacturing the required numbers in May 2008. In a boost to the country’s missile development effort, in January 2009 the Indian Air Force finally placed an order with Bharat Electronics Limited (BEL) for two squadrons of medium range, surface-to-air missile Akash. The Rs. 1,200-crore order came 14 months after field trials at Pokhran in Rajasthan. The earlier order given to DRDO of Seven Squadrons of Akash Missiles was reduced to two squadrons, after getting clearance from it, regarding NOC on IAI agreement, because DRDO was under pressure to sell Akash missile.



While public sector undertaking Bharat Dynamics Ltd (BDL) is manufacturing the missiles, the public sector Bharat Electronics Ltd (BEL) is producing the Rajendra phased array radar. Bharat Dynamics Limited is in a position to produce 100 missiles a year. It was contracted to deliver the two squadrons in 36 months. Besides BEL, BDL and Electronics Corporation of India (ECIL), the private sector Larsen and Toubro and Tata Power could be involved in its manufacture. BEL has tied up with Larsen & Toubro, Tata Power, Walchand Industries and ECIL. DRDL, besides transferring technology in the form of documents for production of Akash, will oversee the weapon system integration and provide support throughout the 20-year lifecycle of the missile. In March 2009 the Tata Group's defense arm bagged an order for supplying 16 indigenous Akash surface to air missile (SAM) launchers for the Indian Air Force. The Strategic Electronics Division received the Rs 182 crore order for the launchers.

A squadron has 18 batteries, and the IAF requirement for the Akash type of missile is estimated at five to seven squadrons. A single battery can engage four targets simultaneously. The army has also expressed willingness to accept the Akash, but some modification in the launch platform for better "mobility and gradeability" was being done to meet its requirement. The missile launcher can be ferried to operational areas by rail, road and air and made ready for use within 30 minutes of deployment.

The defense ministry allowed the Army to buy foreign missiles because DRDO's homegrown Akash missile, slated to replace the Russian SA-6 Gainful Kvadrat missile, had been delayed by more than a decade with no completion date in sight. It took more than 20 years to develop the Akash missile system against the target of 12 years, because its development had to be started from scratch. A team of more than 1,000 scientists and 300 public and private companies worked to develop state of art technologies, radars and other systems for the Akash missile. Quick Reaction Missile (QRM)

-Text from [globalsecurity.org](http://globalsecurity.org)