

Air to Air Missile: Notes for UPSC Science and Technology

Air to Air Missile (AAM) is a missile fired from an aircraft for the purpose of destroying another aircraft or any airborne object. AAM is either solid fuelled or sometimes they are liquid-fuelled. It evolved from unguided air-to-air rockets used during the first world war.

What are the components of an AAM?

The front part of an AAM consists of a conventional explosive blast warhead, fragmentation warhead, or continuous rod warhead is typically used by an AAM in the attempt to disable or destroy the target aircraft. Warheads are typically detonated by a proximity fuze or by an impact fuze if it scores a direct hit. Less commonly, nuclear warheads have been mounted on a small number of air-to-air missile types although these are not known to have ever been used in combat.

The rear part of the missile contains the propulsion system, usually a rocket of some type and the control actuation system or CAS. Dual-thrust solid-fuel rockets are common, but some longer-range missiles use liquid-fuel motors that can "throttle" to extend their range and preserve fuel for energy-intensive final maneuvering.

What are the Main Classifications of Air to Air Missile (AAM)?

AAM is broadly classified into 2 types depending on the range factor of the missile.

1. Short Range Air to Air Missile (SRAAM) or Within Visual Range Air to Air Missile (WVRAAM) - These Missiles are designed to engage aerial targets within a range of 30 km. Most of these missiles use infrared guidance and are called heat-seeking missiles. These missiles are designed for better agility, hence they are also called dogfight missiles.
2. Beyond Visual Range Air to Air Missile (BVRAAM) - These missiles can hit targets beyond the range of 37 Km. These are radar-guided missiles. They don't use infrared detectors since the infrared signatures of aerial targets would be too weak at long ranges.

Which is the Fastest Air to Air Missile in the World?

Some of the fastest AAM missiles are given below.

1. AIM-7 Sparrow (Speed is Mach 4) - This missile has been phased out with a more advanced AIM-120 missile. This missile was developed by Raytheon. It was used by the US Armed Forces.
2. AIM-120 AMRAAM (Speed is Mach 4) - It is the world's most famous AAM. This missile was developed by Raytheon for the US Armed Forces. However, this missile is used by around 33 countries across the globe.

Which is the Air to Air Missile Indigenously Developed by India?

Astra is the Beyond Visual Range Air to Air Missile (BVRAAM) developed by DRDO (Defence Research and Development Organisation). It can engage aerial targets at a range of 80 km - 110 km. It has been integrated with Sukhoi 30 Mki, Mirage 2000, LCA, MiG-29 fighter aircraft.