

Protection of Inter-Continental Ballistic Missile (ICBM) from Anti-Ballistic Missile (ABM) by using Anti-Anti-Ballistic Missile (AABM)

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Abstract: Ballistic missiles are used to deliver nuclear, chemical, biological or conventional warheads in a ballistic flight trajectory. On the other hand, an anti-ballistic missile (ABM) is generally a surface-to-air missile designed to counter ballistic missile. So, it is clear that to make the operation or mission of an inter-continental ballistic missile (ICBM) successful we have to eliminate the threat of anti-ballistic missile (ABM). This paper will discuss about the arrangement of a small tracking system and some small missiles attached with the main ballistic missile which can destroy any anti-ballistic missile (ABM) coming towards it. So, simply this small air-to-air missiles act as anti-missiles for any incoming anti-ballistic missile (ABM) which is targeting the main ballistic missile and we can simply call them anti-anti-ballistic missiles (AABM).

Keywords: AABM (anti-anti-ballistic missiles), ABM (anti-ballistic missile), ICBM (inter-continental ballistic missile).

1.Introduction:

The term “anti-ballistic missile” is a generic term conveying a system designed to intercept and destroy any type of ballistic threat, however it is commonly used for systems specifically designed to counter inter-continental ballistic missiles (ICBMs). So, it is clear that to make the operation or mission of an inter-continental ballistic missile (ICBM) successful we have to eliminate the threat of anti-ballistic missile (ABM). If we attach a small tracking system and some small missiles with the main ballistic missile and if these small missiles are capable to destroy any incoming anti-ballistic missile (ABM) towards it then we can easily protect the intercontinental ballistic missile (ICBM). So, simply this small air-to-air missiles are act as anti-missiles for any anti-ballistic missile (ABM) and we can simply call them anti-anti-ballistic missile (AABM).

2. What is inter-continental ballistic missile (ICBM)?

An intercontinental ballistic missile (ICBM) is a guided ballistic missile with a minimum range of about 5000 kilometers or more, primarily designed for nuclear weapons delivery (delivering one or more thermo-nuclear warheads). Similarly, conventional, chemical, and biological weapons can also be delivered with varying effectiveness. Most modern designs support multiple independently targetable reentry vehicles (MIRVs), allowing a single missile to carry several warheads, each of which can strike a different target. The various stages of the inter-continental ballistic missile (ICBM) launch shown below (in the Fig.1).

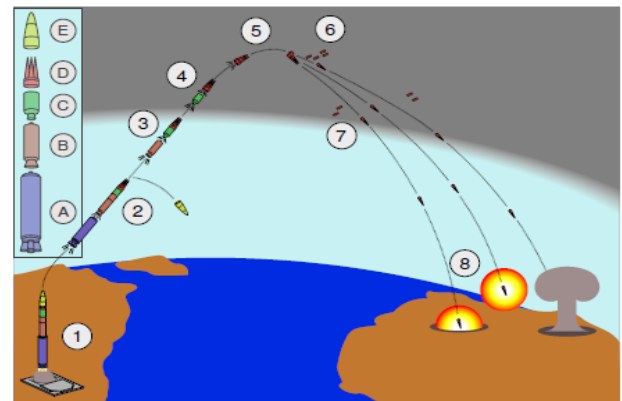


Fig.1: Various stages of ICBM launch

Ballistic missile launch stages:

1. The missile launches out of its silo by firing its 1st-stage boost motor (A).
2. About 60 seconds after launch, the 1st stage drops off and the 2nd-stage motor (B) ignites. The missile shroud (E) is ejected.
3. About 120 seconds after launch, the 3rd-stage motor (C) ignites and separates from the 2nd stage.
4. About 180 seconds after launch, 3rd-stage thrust terminates and the Post-Boost Vehicle (D) separates from the rocket.
5. The Post-Boost Vehicle maneuvers itself and prepares for reentry vehicle (RV) deployment.
6. The RVs, as well as decoys and chaff, are deployed.
7. The RVs (now armed) and chaff re-enter the atmosphere at high speeds.
8. The nuclear warheads detonate.

Early ICBMs had limited precision (circular error probable) that allowed them to be used only against the largest targets such as cities. Modern ICBMs typically carry multiple

independently targetable reentry vehicles (MIRVs) with high precision, each of which carries a separate nuclear warhead, allowing a single missile to hit multiple targets. Initially this proved superior in the field of missile technology but after successful invention and implementation of anti-ballistic missile (ABM) it no longer be the superior technology.

3. What is anti-ballistic missile (ABM)?

An anti-ballistic missile (ABM) is generally a surface-to-air missile designed to counter ballistic missiles. Let's see how an intercontinental ballistic missile (ICBM) is detected and then destroyed by an anti-ballistic missile (ABM) in the figure (Fig.2) below.

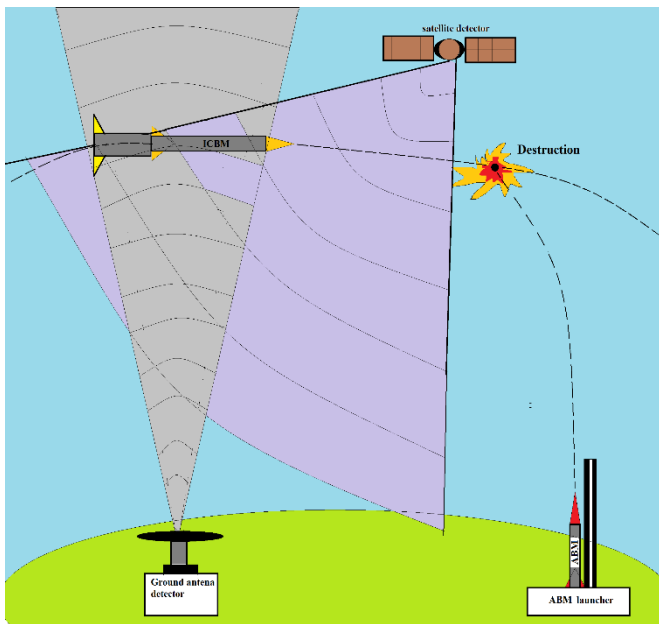


Fig.2 Destruction of intercontinental ballistic missile (ICBM) by anti-ballistic missile (ABM)

From the above figure it is clear that a ballistic missile is detected either by satellite or by ground antenna (ground detector) or both. After detecting the inter-continental ballistic missile (ICBM) the system sends signal to the anti-ballistic missile (ABM) launcher to send an anti-ballistic missile to destroy the intercontinental ballistic missile (ICBM). Then the anti-ballistic missile (ABM) launcher launches an anti-ballistic missile (ABM) and this anti-ballistic missile (ABM) destroys the incoming intercontinental ballistic missile (ICBM).

4. How we can protect an intercontinental ballistic missile (ICBM) from the threat of the anti-ballistic missile (ABM)?

In the Fig.1, from stage 1 to stage 5 (from launch to warhead separation), this period is very crucial because during this period the target is single. So, it is easy for enemy side to detect the incoming intercontinental ballistic missile (ICBM) early and then destroy it by anti-ballistic missile (ABM). Once the warheads are separated from the main

ballistic missile the targets become not a single target but more than one and make it difficult to detect and destroy all the warheads simultaneously. Our aim is to provide protection to the intercontinental ballistic missile (ICBM) during the crucial period just after its launch, i.e. from launch to warhead separation period. Here we simply attached some small missile with the main ballistic missile and the ballistic missile carry those small missile from launching to warhead separation period. There is also a detection system attached to the inter-continental ballistic missile (ICBM) to detect any incoming missile coming towards it. Once the detector detects that there is a missile coming towards it then it releases the small missile to destroy the incoming anti-ballistic missile (ABM). The destruction of an anti-ballistic missile (ABM) is shown in the figure (Fig.3) below.

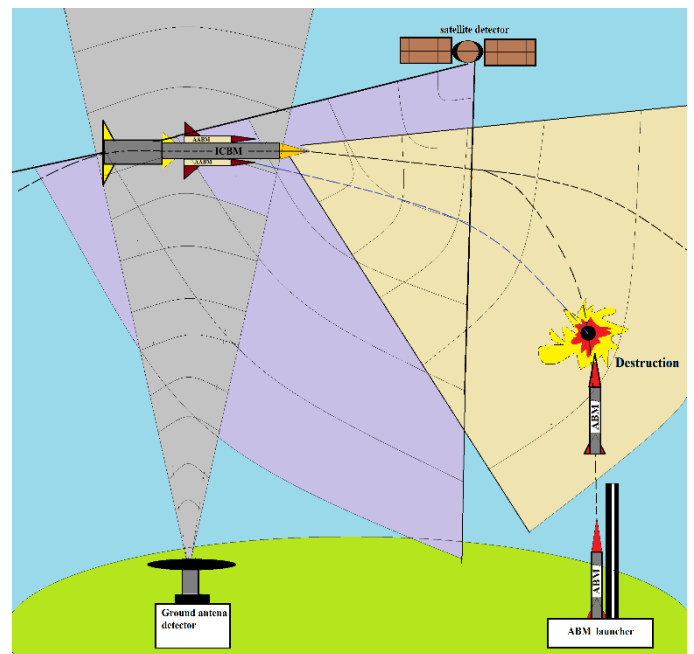


Fig.3 Destruction of an anti-ballistic missile (ABM) by anti-anti-ballistic missile (AABM)

5. Working principle:

A missile is simply a guided rocket. Guidance is that aspect of a missile system which helps it to decide the direction in which the missile should move. Generally this decision has to be taken at very short intervals of time (1/50th of a second) during the flight of the missile. For a specific mission, particular guidance technique is used. The different types of guidance are as follows:

- Command guidance,
- Homing or seeker guidance,
- Beam rider guidance,
- Inertial guidance and
- Stellar guidance.

Here, we use homing guidance technique to guide the anti-anti-ballistic missile (AABM). Homing guidance is generally used for short-range missiles. In this system the missile receives the signals reflected or emanating from the target and generates the command to direct its motion along the instantaneous link formed between the missile and the target. Fig.4 gives a schematic sketch of homing guidance system. Active, semi-active and passive homing are the main types of homing guidance systems.

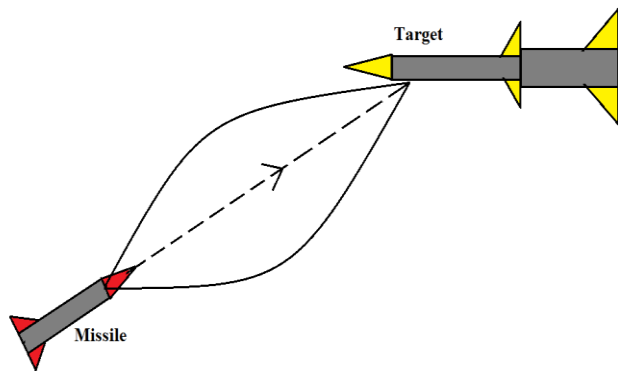


Fig.4A schematic sketch of homing guidance system

Here, we use active homing guidance system. In the active homing guidance system, the missile itself carries the transmitter and the receiver. The signal, generally electromagnetic radiation, is transmitted at the target and the reflected signal is received. In this system, the missile is not dependent on the ground launcher. Active homing can be used for guidance in all phases, from launch up to target interception. It can also be used in terminal guidance in conjunction with other modes of guidance for the initial phases. Where homing guidance is used alone, the range is limited because the system is bulky and needs a lot of force. It has instruments called homing head, also called seeker head, which are locked on to the target in tracking mode before launch. Such a system is also called the 'fire and forget' type of guidance. When used in terminal guidance, the homing head is provided with search capability to locate the target and then lock on to it till interception. Active homing is generally used for short-range missiles (with <4 km range). It is, however, extensively used as terminal guidance in long range surface-to-air, air-to-air and anti-ship missiles. In such cases, command or inertial guidance is used to bring the missile close to target, say within 15-20 km. Then the homing head is switched on and the search commences. Once it locates the target, the searcher starts tracking the target and homing guidance commences. In homing guidance, the final accuracy is superior to command guidance. In our system the inter-continental ballistic missile (ICBM) head is act as homing head. It can detect the incoming anti-ballistic missile (ABM) within range between 15-20 Km. and then continuously tracking it. When the anti-ballistic missile (ABM) come within range between 4-5 Km. then it

command anti-anti-ballistic missile (AABM) to launch and then AABM head (which is also a homing head but the tracking range is comparatively lower than main ballistic missile head) makes target the anti-ballistic missile (ABM) and finally destroys it. The whole working procedure is shown in the flow chart below (Fig.5).

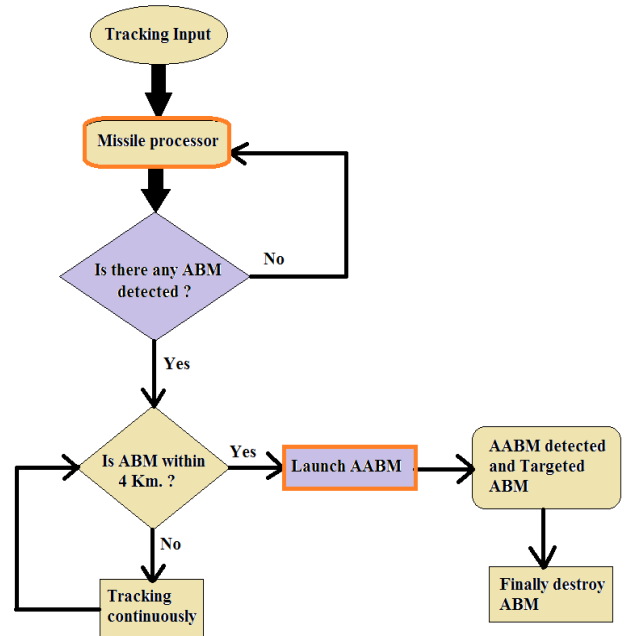


Fig.5 Flow chart of the whole working procedure of anti-anti-ballistic missile (AABM)

6. Conclusion:

So, here we develop a system which can protect the inter-continental ballistic missile (ICBM) from the threat of anti-ballistic missiles (ABMs). The advantage of this system is that the whole thing can be done with a small cost. Here we do not need to develop any external tracking system, the inter-continental ballistic missile (ICBM) itself carry the tracking system and itself able to take decision in this regard. The drawback is that the system cannot able to provide protection after the separation of warheads from the main ballistic missile. But for any inter-continental ballistic missile (ICBM) from launch to warheads separation is the very crucial period and this system is mainly design to provide protection during this crucial period.

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Author’s Biography:



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