

A-1, Ballistic and Hypersonic Missiles Interceptor

The A-1 is a ballistic, hypersonic and supersonic missiles strategic low altitude interceptor, designed to protect military and civilian high value assets.

The A-1A is deploying 10 tons of pellets, chaff and flare at altitudes up to 200m, forming a 400m diameter dome, or a high density sector of a dome, intersecting the path of the incoming missiles.



The A-1B is deploying 6 tons of pellets, chaff and flare at altitudes up to 2,000m, forming a 800m diameter cloud above the defended area.



The A-1 have the capability to engage incoming MIRVs delivered by ballistic missiles, SRBMs, hypersonic and supersonic cruise missiles with conventional and nuclear warheads designed for ground detonation or air burst.

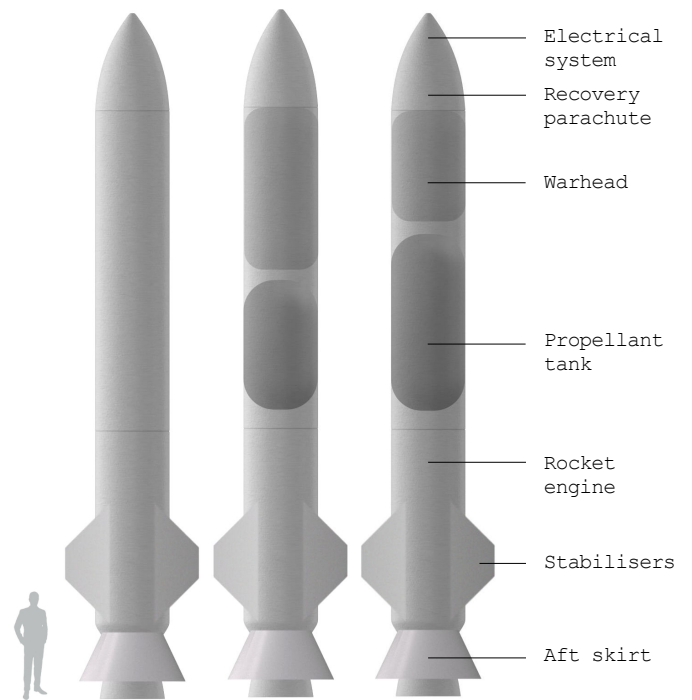
The targets are destroyed or diverted through kinetic impact, or by deceiving them through the deployed chaff and flare.

The A-1 could be fired in salvos to increase the interception probability by keeping the cloud airborne a longer time, or by increasing the pellets density, or by creating multiple layers of pellets.

A-1 interceptor

The A-1 interceptor is an unguided rocket able to launch warheads which once deployed creates domes or clouds of pellets, chaff and flare above the defended areas.

The A-1 is derived from ARCA's ecological and extremely cost effective EcoRocket which generates water vapours or water vapours and oxygen, with the engine exhaust temperature below 80°C.



Characteristics	A-1A	A-1B
Diameter (m)	1.2	1.2
Length (m)	11.4	12
Empty weight (kg)	400	450
Propellant weight (kg)	2,300	4,800
Thrust (kgf)	34,000	34,000
Engine run time (s)	3.9	8
Active altitude (m)	150	1,200
Apogee (m)	480	4,100
Max speed (Mach)	0.28	0.89
Max acceleration (g)	3.5	5.2
Warhead weight (kg)	10,000	6,000



A-1 warhead

The A-1 interceptor warheads are probably the heaviest ever mounted on an anti-missile defence system.

Opposite to the current missile defence systems, the A-1 takes a different approach. It doesn't send the interceptor to chase the target, but let the target hit a cloud of pellets, chaff and flare deployed ahead of it.

A warhead contains up to 20,000,000 pellets, chaff and flare which efficiently stay airborne up to 20 sec.

The pellets act as kinetic projectiles, while the chaff and flare are aiming to deceive the incoming missiles.

The estimated impact energy of one A-1A pellet with the incoming threat is presented below:

Incoming threat	Impact speed (m/s)	Impact energy (kJ)
Heavy ICBM	~2,300	~25-130
ICBM	~2,200	~24-120
IRBM	~2,100	~22-110
MRBM	~1,400	~10-50
SRBM	~600-900	~2-21
Hypersonic	~1,500-2,000	~12-100
Supersonic	~600-900	~2-20

In the case of a hypersonic missile or an ICBM deployed MIRV, the impact with just a single pellet at terminal altitude, the released energy is equivalent with that of a 20mm CIWS.



How does it work

While the MIRVs and hypersonic missile's strong suit is the high terminal speed which makes them difficult to intercept, the A-1 interceptor takes a completely different approach by turning the target's extremely high speed into A-1's advantage. While a conventional antiballistic systems philosophy is to hit the incoming target at high altitudes, either through the use of kinetic impact, or the use of a nuclear

warhead, the A-1 interceptor deploy a cloud of pellets released at altitudes up to 2,000m, creating a dome or cloud of pellets above the defended areas, intersecting the attacking vehicle's path, hence making the need of a guided missile redundant.

Intercepting MIRVs or hypersonic missiles through the use of guided missiles is difficult requiring state of the art technology. The A-1 removes completely this need dramatically reducing the costs.

The target will hit the pellets at high speeds which could compromise its airframe, the internal equipment or warhead, with the probability of disabling or destroying the attacking vehicle.

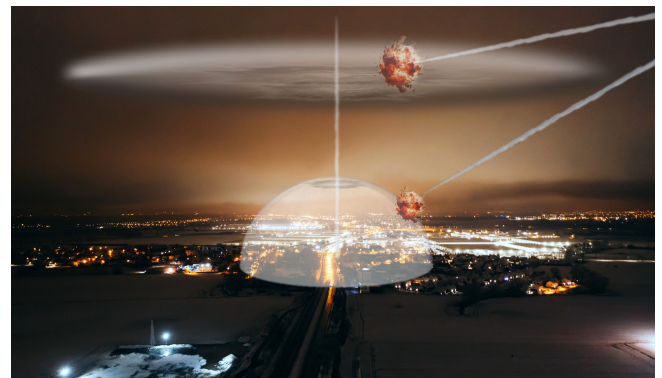
The attacking vehicle might hit the target's surroundings, or even the target itself, but the amount of damage on the target will be lower compared with a nuclear blast or a conventional detonation coming from a precise delivered warhead.

Features

- Filling the gap in the very low altitude missile defence against ICBM, IRBM, MRBM, SLBM, hypersonic and supersonic missiles;
- Able to work in conjunction with existing higher altitude missile defence systems. The A-1 engages the targets in their terminal phase, just before detonation, constituting the last layer of defence;
- Extreme cost effectiveness at €699,900/interceptor;
- Ecological.

Suitable defendable assets

- command centres;
- logistical hubs;
- ground, naval and air force bases;
- industrial facilities;
- civil engineering assets, dams, bridges;
- energy production facilities;
- small urban areas.



Contact

www.ecorocket.space