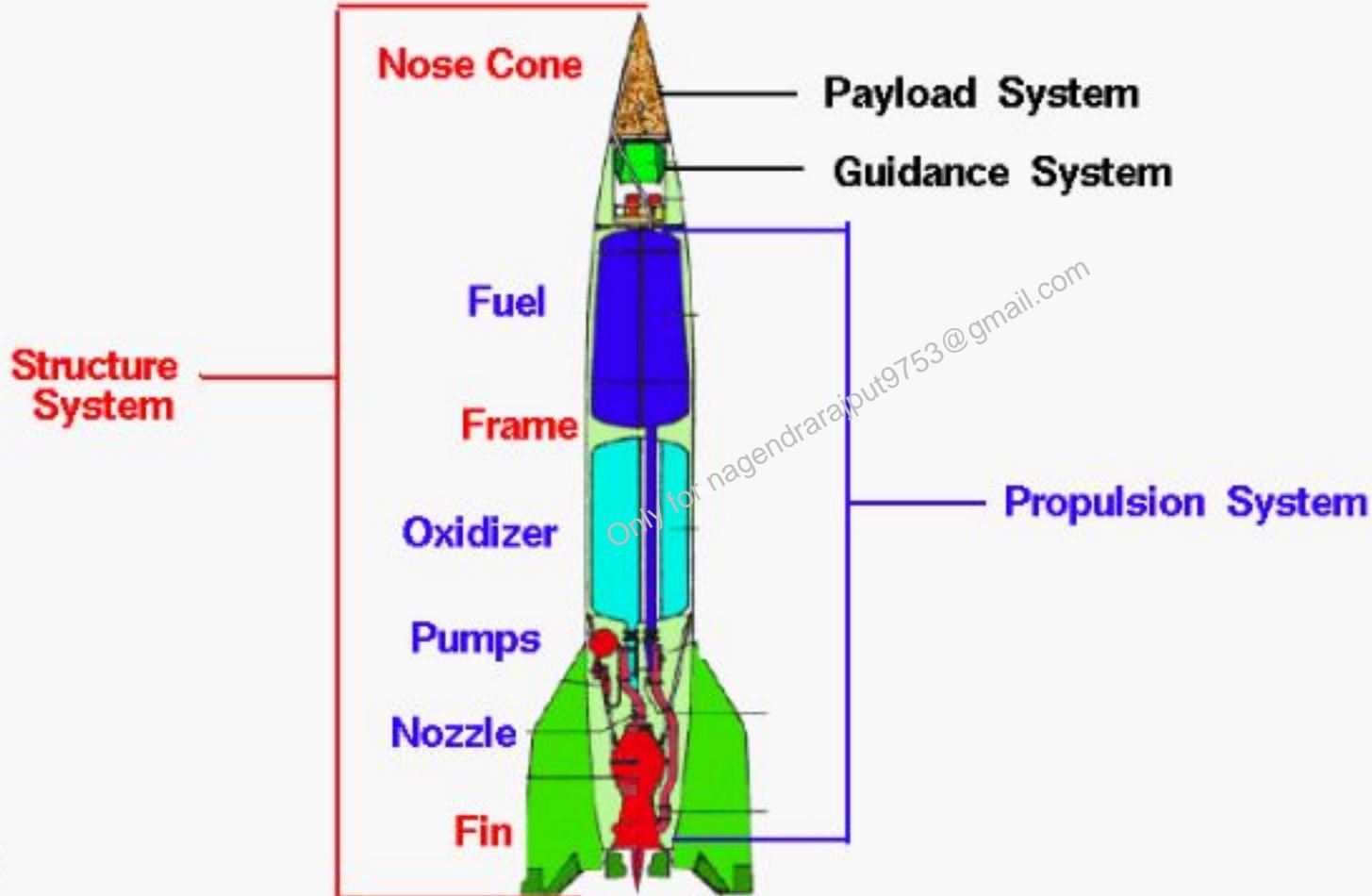


# Defence Technologies



INSPIRATION  
INNOVATION



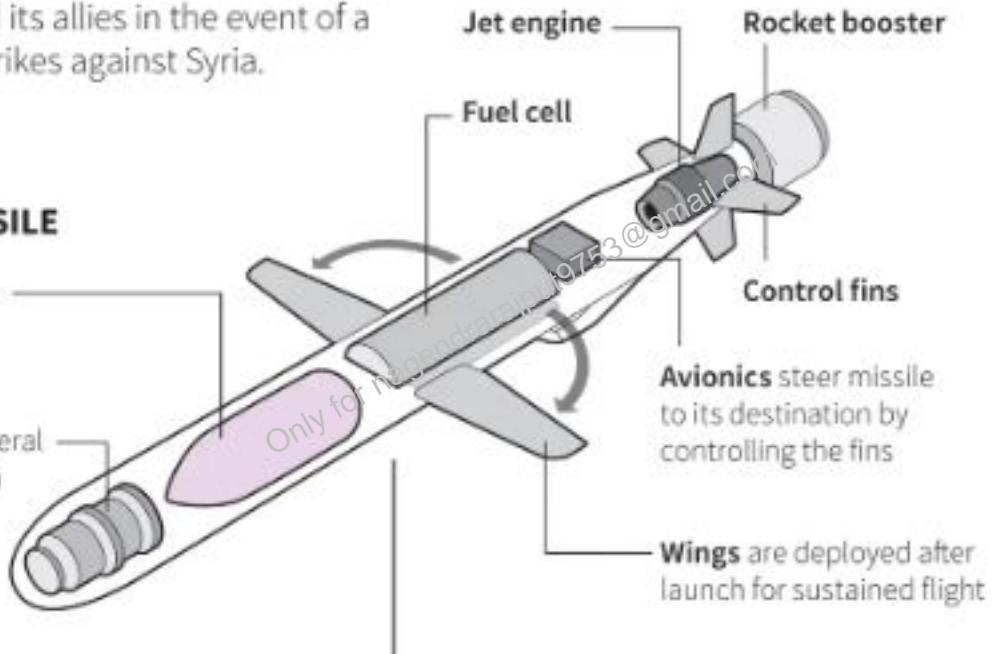
# Cruise missiles

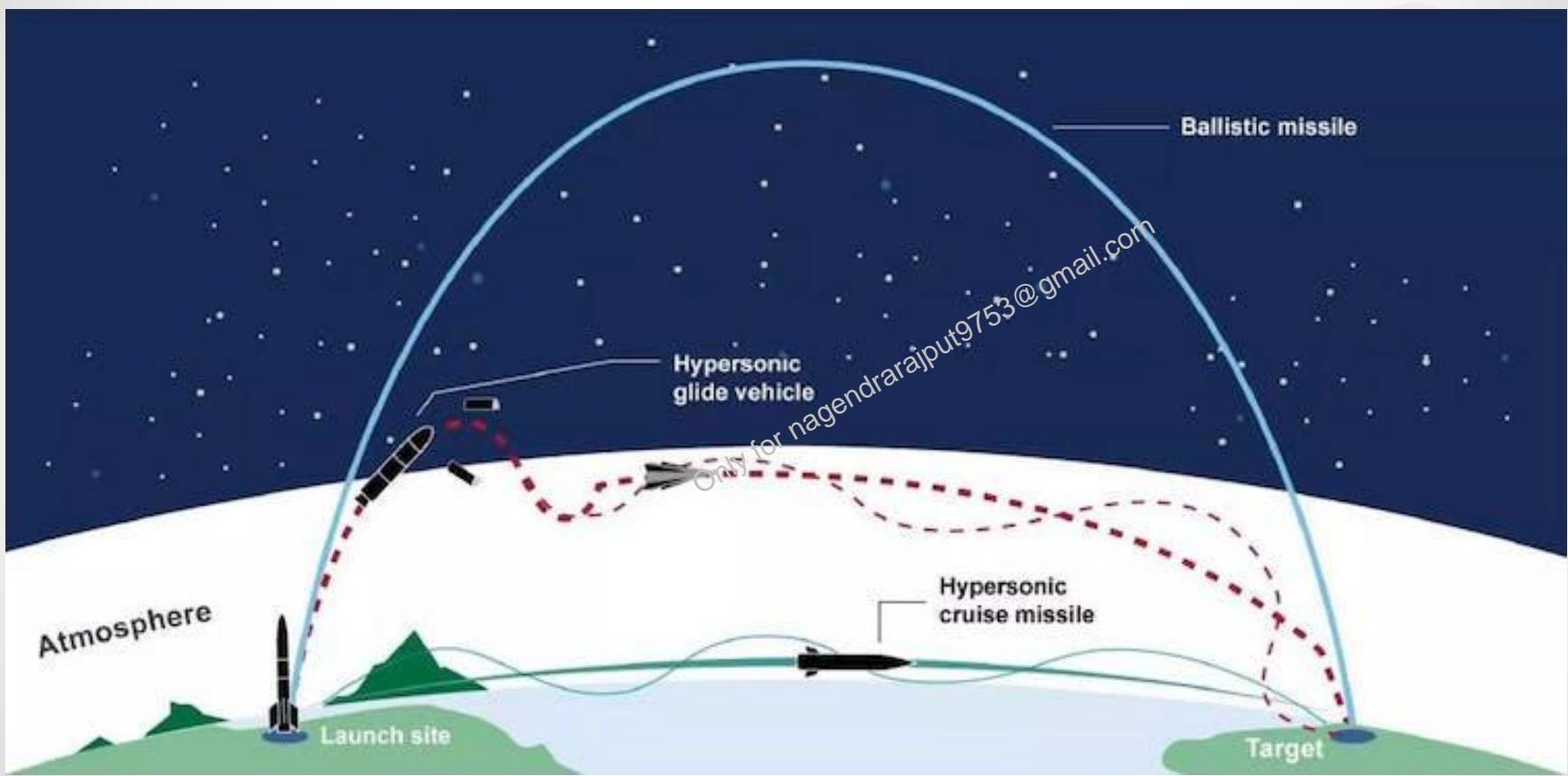
Self-guiding missiles are part of the arsenal at the disposal of the U.S. and its allies in the event of a decision to carry out strikes against Syria.

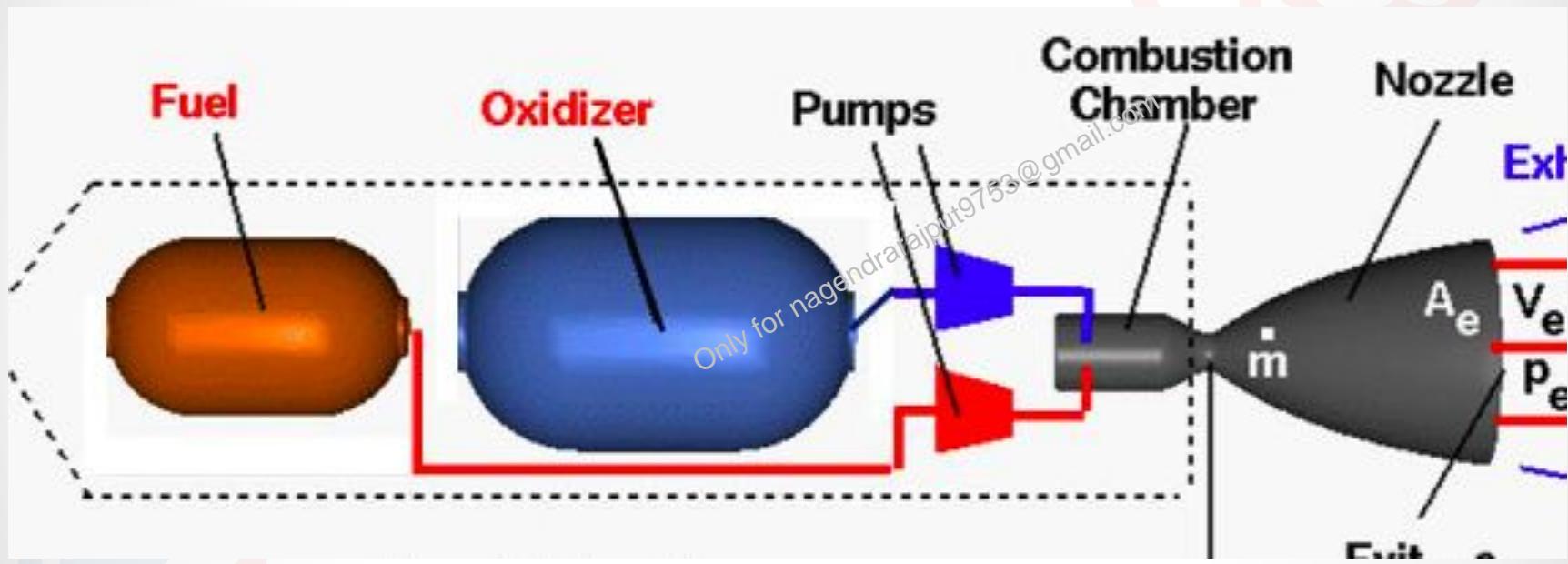
## INSIDE A CRUISE MISSILE

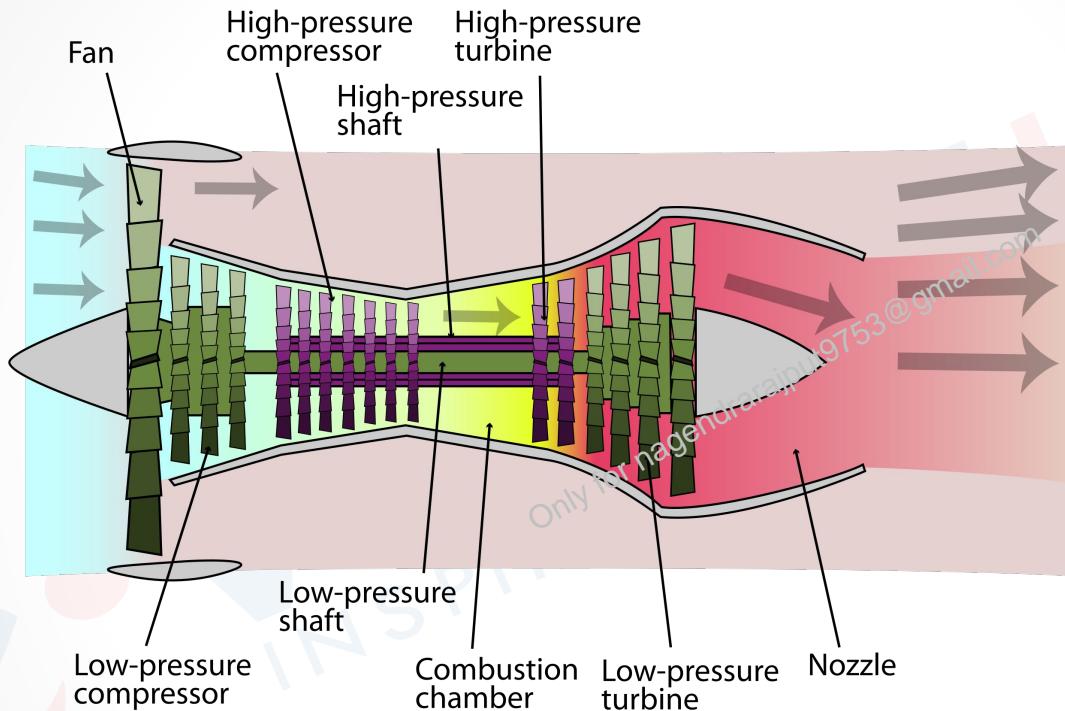
**Warhead** can be bomblets, ballistic or thermonuclear

**Navigation** is based on several systems that include terrain referencing, GPS (Global Positioning System) and time of arrival control

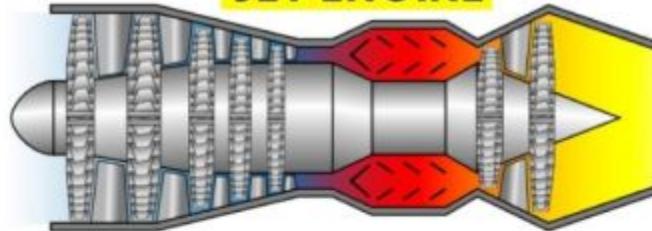




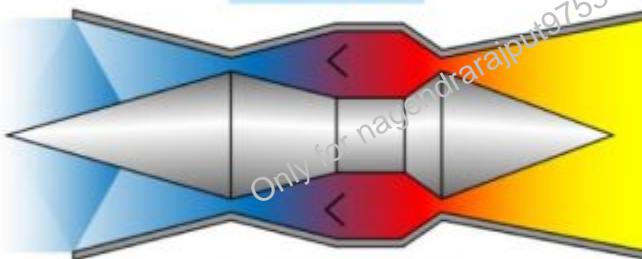




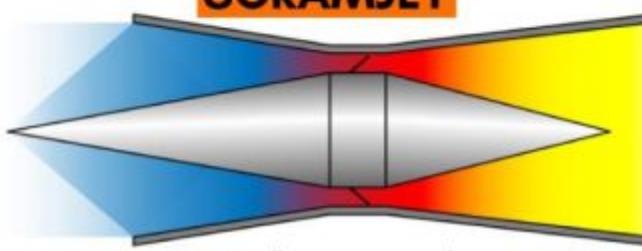
## JET ENGINE



## RAMJET



## SCRAMJET



Compression

Combustion

Expansion

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# Hypersonic weapons

Considered the next generation of arms with conventional or nuclear warheads that are hard to detect and can travel more than five times the speed of sound

## TRAJECTORY AND DETECTION

### HYPersonic GLIDE VEHICLE

Speed: at least Mach 5

Launched from a rocket. Hard to detect, track and intercept

Hypersonic cruise missiles are powered by "scramjets", maneuvered at lower altitude toward target

Detected by radar

Atmosphere (100 km)

### CONVENTIONAL BALLISTIC MISSILE

Between Mach 1 and Mach 5.

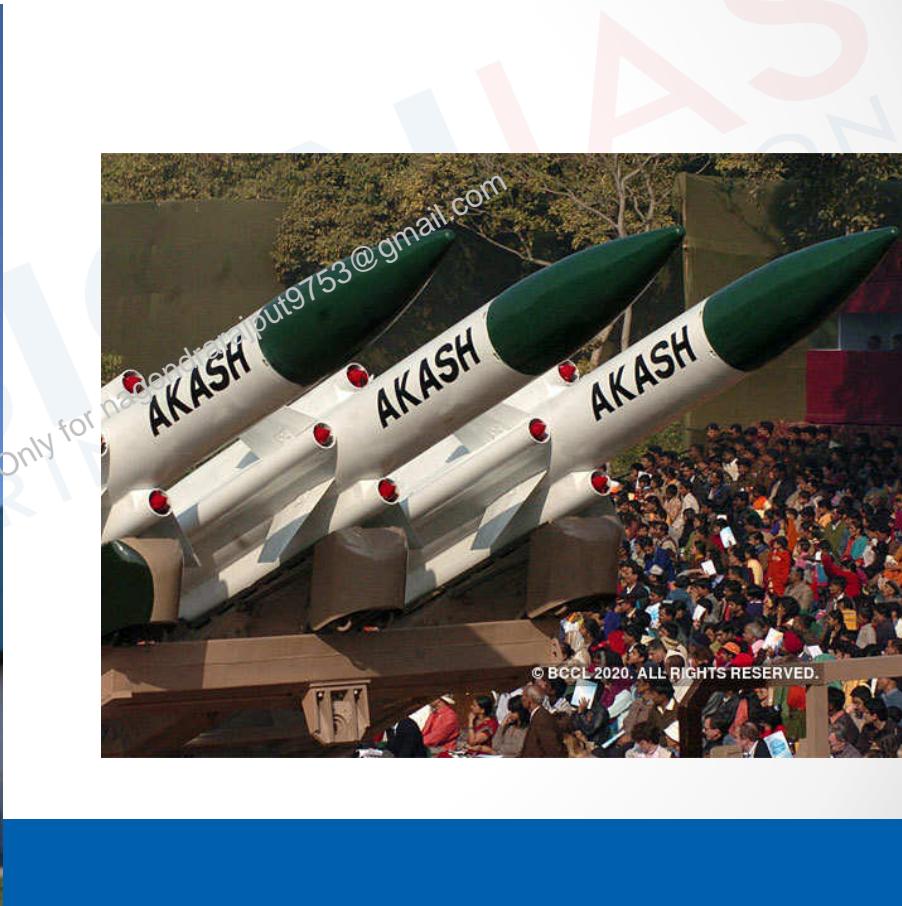
Easier to predict and intercept

Launch

Target



# Prithvi and Akash



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# Trishul and Barak

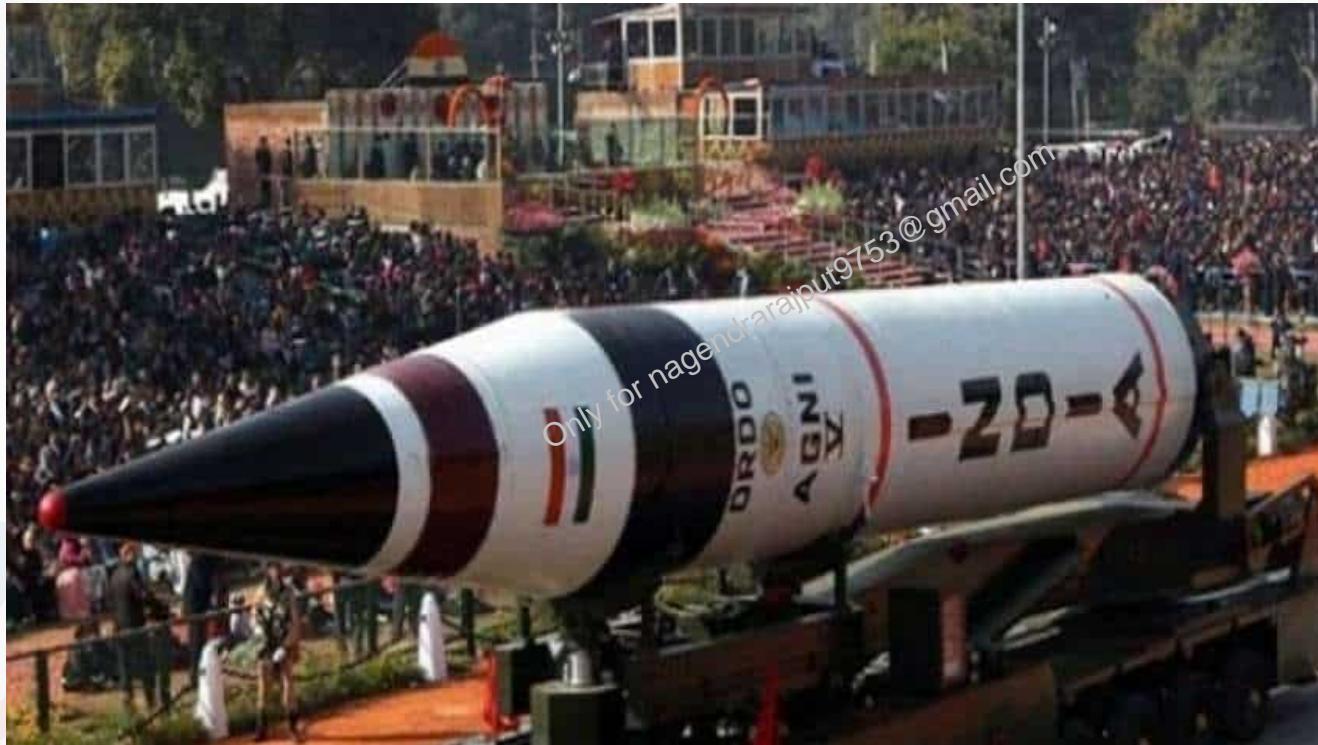


# Nag/Helina

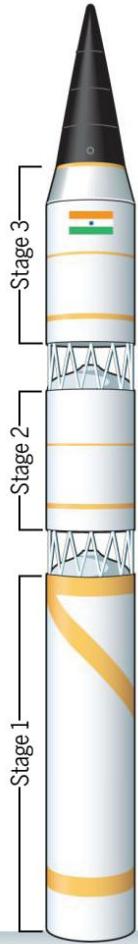


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# Agni V missile



## AGNI SERIES OF LONG RANGE BALLISTIC MISSILES



### AGNI V

- Operational range: **5,000 km**
- Payload: **1360.78 kg**
- Height **17m**
- Future development possible for variant that could be launched from a submarine

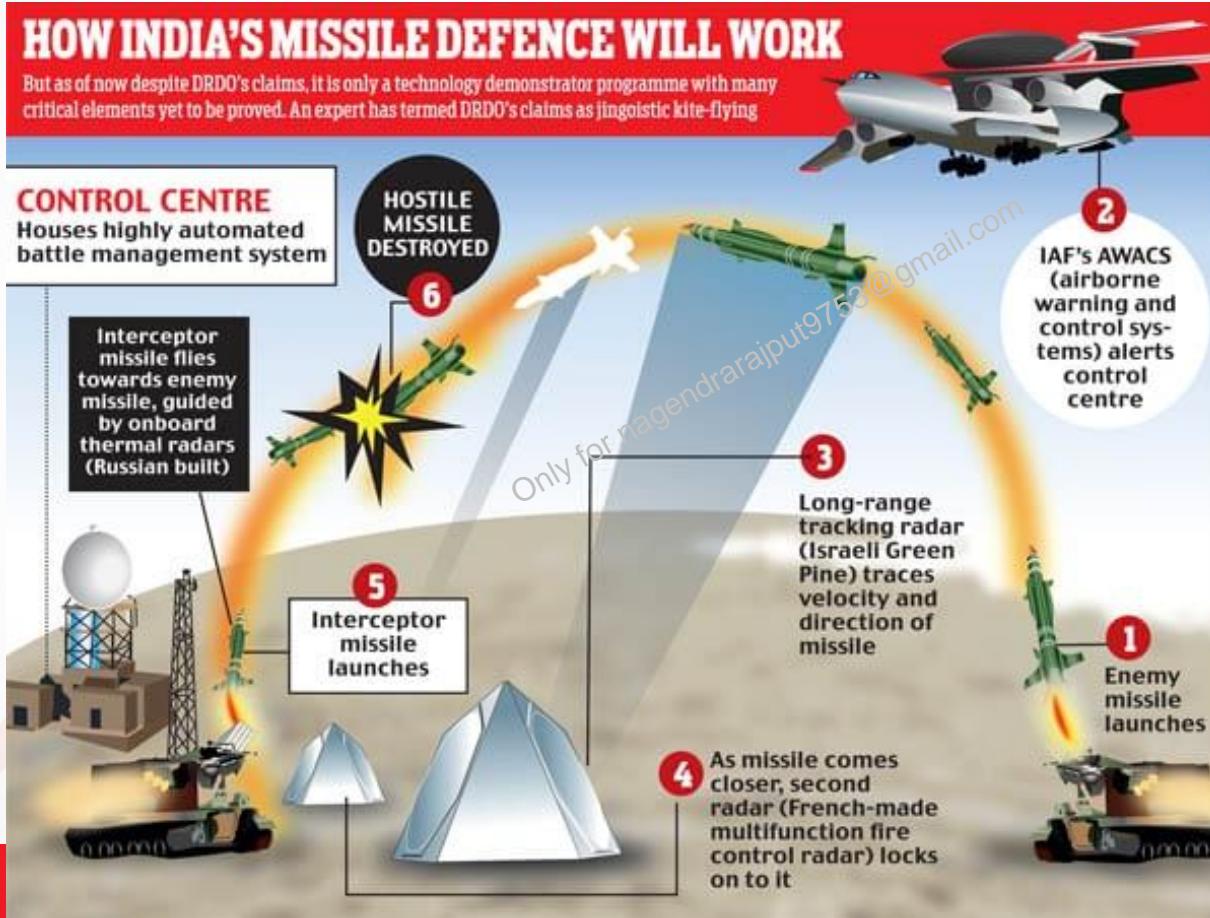


Agni Missile Series	Agni I	Agni II	Agni III	Agni IV
Range (km)	700	2,500	3,000	4,000
Payload (kg)	1,000	1,000	1,500	1,000
Height (m)	15	20	16.3	20

Source: Reuters, PTI



# Ballistic missile defence



# S400



# Iron Dome - Israel



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**58.** Consider the following statements :

1. Ballistic missiles are jet-propelled at subsonic speeds throughout their flights, while cruise missiles are rocket-powered only in the initial phase of flight.
2. Agni-V is a medium-range supersonic cruise missile, while BrahMos is a solid-fuelled intercontinental ballistic missile.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

# INS Vagsheer



# INS ARIHANT

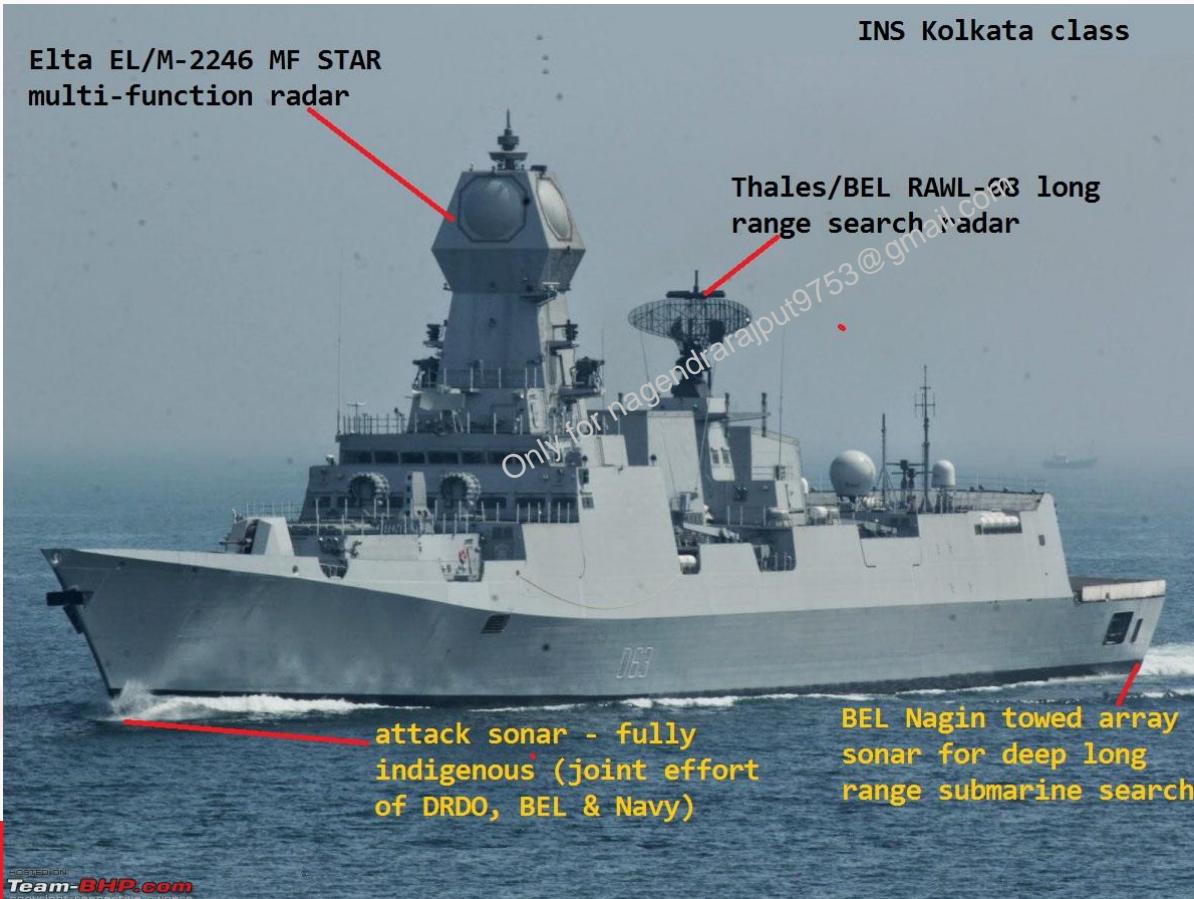


Carries K4 missile

# Varunastra Torpedo



# INS Kolkata - Destroyer



# INS Mormugao



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# Sahyadri – Frigates



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# Kamorta – Corvette



# INS Vikrant



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# Rafael and Mirage



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# Sukhoi and Tejas



# AEW&C



# Tapas 201



# Pinaka



# Directed Energy Weapons

