

OPERATION SINDOOR – SPECIAL EDITION

AI, DRONE SWARMS & SMART GUNS

THE FUTURE OF WARFARE IS HERE

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Quick Summary

Hon PM stated on 12 May 2025, – **Operation Sindoor is only 'paused'; it is not 'concluded,'** This was a 'statement of intent' which announced that India stands ready to punish any future acts of terror with conviction and resolve.

Future readiness will demand continuous capability building as threats will scale up in lethality. Moving on from Op Sindoor 1.0, this Newsletter briefly captures **Zen's efforts in capability building** to make our armed forces unbeatable in war.

A moment of just pride

The realization of the fact that our product, 'Zen Anti Drone System (ZADS)' became the 'strength' of our armed forces in taking on the drone threat during Op Sindoor was a moment of pride for us. Moving on, we committed ourselves to build capabilities that will stand by our Forces even better during Op Sindoor 2.0, 3.0 and forward.



The threat escalates

What drove our efforts to build further capabilities was the growing **threat of autonomous weapons**; a trio that includes the drones, the swarms and the loitering munitions. If Russo-Ukraine or the US-Israel-Iran war is any reference, this threat has totally changed the rules of asymmetric warfare.

Suffice to say that **we face a 'real threat' of autonomous weapons** from our potential adversaries.

Revamping the existing ZADS

While ZADS ab-initio stood out from its peers in its capability to detect and neutralize the drones that used non-commercial frequency bands, we put our system through a further cycle of revamp.

In that, from the then prevalent best surveillances range of 5-8 km for small RCS drones, we **enhanced the same to 12-15 Km** (exact figure not quoted). This was achieved by incorporation of AI tools in target detection and classification as also range revamp by our precise X band radar.

Another capability enhancer was our **Long Range Multi-sensor Optical Platform Camera 'Hawkeye'**. This AI-driven camera is capable of full dimensional target discovery and tracking of drones up to 15km. Another revamp was in the capability of ZADS to dynamically discover target frequency and auto-generate jamming signals in response. Also, in addition to jamming as a 'kill means' spoofing was also added.

Combat Proven Anti-Drone System

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Diversity driven by threat

As the threat moved North, mere soft-kill solutions started to fall short. A need was felt to **diversify the arsenal to include the hard kill (HK)** as well.

We were selected to **integrate ZADS with the L-70 gun** to realize a hybrid weapon (ZADS-HK). For this, the EO, RF and radar based surveillance and target detection capability of ZADS was seamlessly integrated with the L-70 gun without disturbing its main role. The gun fires 'smart' ammunition which when detonated in proximity of the target splits into hundreds of pieces, each capable of killing a drone thus making the weapon ideal against swarms.

Another feature of ZADS-HK is the net-based capture where an interceptor drone deploys a net capable of capturing small rouge drones headed for a kinetic strike.

Having seamlessly integrated the ZADS with the L-70 weapon system, efforts are on to achieve a similar integration using the 'ageless' ZU 23 air defence gun.



Responding to other dimensions of the threat

As threat grew, it emerged that not only the ADS systems need to respond 'instantly', they must do so when the systems are not manned, say on naval ships or unmanned stretches of the border etc. A need was thus felt to develop Remote Controlled Weapons Systems (RCWS). **Zen Vyom Kavach was born** which is an all-encompassing hybrid anti-drone solution with layered sensors and layered kill capability.

In one of the features of Vyomkavach, **ZADS was integrated with a four-barrel Rotary Machine Gun** which could remotely take on the drone threat with its devastating fire of 900-3500 rounds per minute. The RCWS capability got further enhanced to include multi-barrel rocket launcher (MBRL) with 12-36 tubes. Besides the regular MBRL, the other weapons integrated as RCWS include the HMGs, LMGs and more.

The era of killer drones

With drone swarms emerging as the next big threat, diversity took another leap as we developed the **swarm killer drones**. In this, the operator, using the radar can guide the killer drones to the **swarm target** and detonate them in proximity producing maximal effect. To enhance performance the killer drones have on-board cameras for a precise lock on and a catastrophic collision with the target.

One more enabler

A big moment came or way on 17 Apr when the **Govt granted us the arms license to produce 12.7 mm, 23mm, 30mm and 40mm cannons** for air defence and ADS role. This marks the first ever such grant to a private sector player in air defence domain.

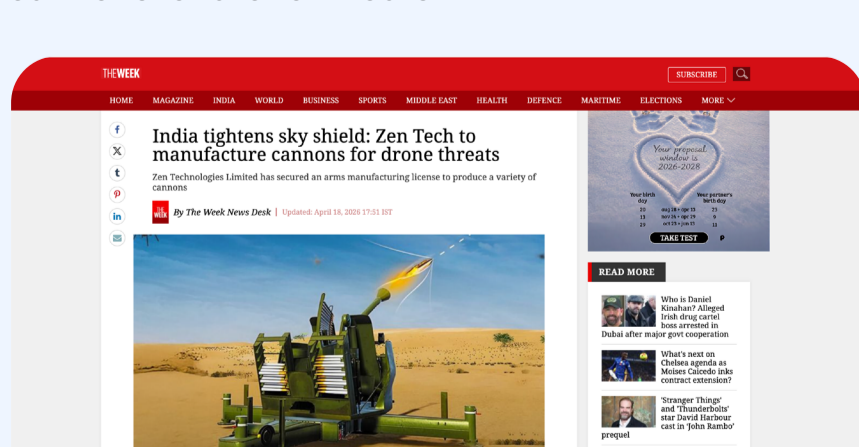
Need we say that this will further give a shot-in-the arm boost in building our capabilities to **make our armed Forces unbeatable in war.**



Zen in News

India tightens sky shield: Zen Tech to manufacture cannons for drone threats

Zen Technologies Gets License to Manufacture Ammunition For India's Defence | Ashok Atluri | ET Now



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