

STAHLKRAFT

The cheapest way to shoot down drones.



I build a cost-efficient, man-portable
robot that **detects**, **aims** and
shoots down drones.

Summary

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The Problem

04

Drones are the **#1** threat on the battlefield in Ukraine, causing **70–80%** of all deaths.

A **\$500** drone can destroy a **\$10 million** tank.

No cheap way exists to detect and stop them.

Why Now

05

Jamming used to stop drones.

Now **nothing** can jam them.

Jamming works by cutting a drone's radio link — and the newest drones don't use one:



Wire-guided

Flown on a fiber, not radio.



Satellite-guided

Steered by Starlink, not radio.



Jam-resistant

Flies itself — no link at all.

Shooting them down is all that's left — but by hand, that **almost never works**.

The Solution

A robot that **detects**, **aims**
and **shoots down** the drone.

UNIT COST	~\$30,000
PER SHOT	~\$2
WEIGHT	Under 5 kg
WEAPON	Fits any rifle
DETECTION	Audio + camera + thermal, no radar
OPERATION	Day & night
TARGETS	Group 1–2 UAS *
FIRING	You approve each shot



* Group 1–2 — small & mid-size drones (FPV, quad, Mavic-class), not Shahed-class.

How It Works

07

01

Deployment

A soldier sets it up on a tripod — or it rides on a rover or a vehicle.



Tripod



Rover

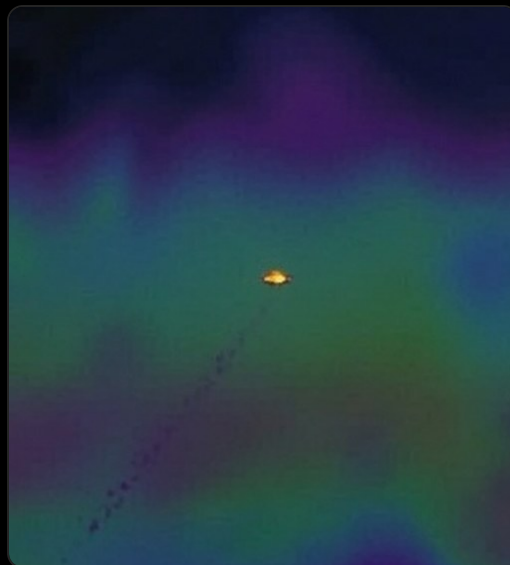


Vehicle

02

Detection

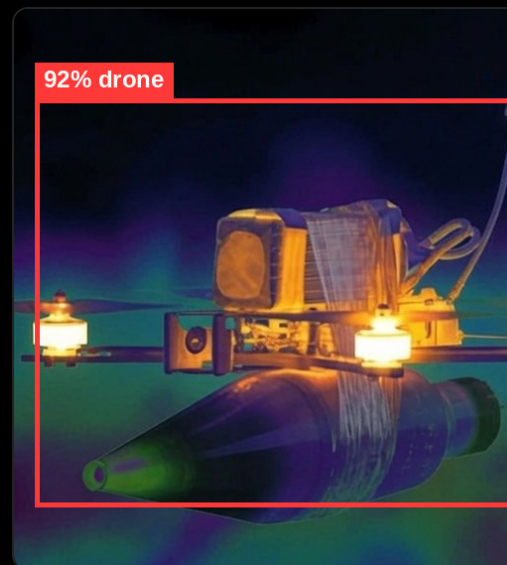
A **thermal lens** on a **step-and-stare ring** hunts for a drone's heat.



03

Confirmation & Tracking

The turret **locks on** to it and — as it gets closer — confirms if it's a **drone or a bird**.



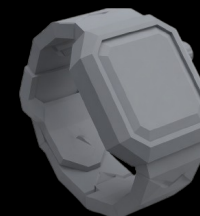
04

Engagement

Approve or cancel from a remote or wrist device — for faster access.



Remote



Wrist device

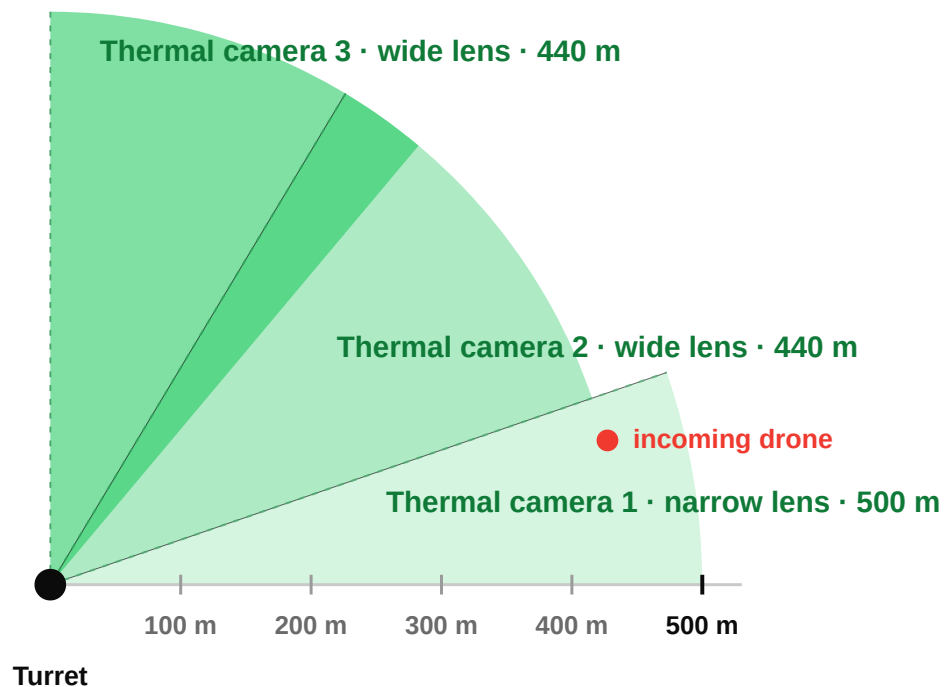
No radar. **90%** of radar performance at **10%** of the cost.

How It Works

08

No radar? Here's how.

Three rotating thermal cameras = a 360° heat dome.



1×

narrow thermal lens watches low — an FPV at 500 m. \$4K.

+2

wide thermal lenses cover up to straight overhead — no blind spot. \$8K.

~2 s

full sky re-scan — a drone is seen 4–5× before it arrives.

360°

Full heat dome for \$12K.

Prototype

09



Link alternative: youtu.be/vkviBCPKYdU

It works.

It detects and tracks drones.

It fires. Tested with a real rifle.

Built by hand in one year, while in high school.

Not yet fired at a drone. Approval for live-fire testing is in process, but complicated by German regulation.

Competition

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Other companies have realised that shooting them down is **all that's left**.

Their approach in doing so, however, is **far too expensive** for small drones.

Let me explain:

Competition

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None of them detect small drones.

For detection, they rely on third-party **\$100,000+** radars.



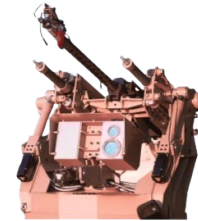
Tytan Technologies
Fixed-wing interceptor



Anduril
Reusable interceptor



P1-SUN
Interceptor drone



Sky Sentinel
Gun turret



SmartShooter Hopper
Remote weapon station

Without radar, none of the above work.

While the **price and size** of radar is justified against large threats like Shahed drones, it makes it **impossible to resolve the small-drone threat at scale**.

Competition

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Without detection, even perfect aim is useless.

Smart scopes from **SmartShooter** and **ZeroMark** make every soldier a marksman — but only **after** the drone has been found. The math shows why that's too late:

THE PRODUCT



Fire-control smart scopes
SmartShooter SMASH · ZeroMark

STEP 1 · YOU HEAR IT

~150 m

distance at which a soldier
first hears an incoming FPV

STEP 2 · IT CLOSES FAST

55 m/s

attack speed of an FPV
(~200 km/h)

STEP 3 · THE RESULT

2–3 s

from first sound
to impact

Hear → locate in the sky → shoulder → aim → fire takes **5–10 s** — the drone always wins.

Aiming was never the bottleneck — detection is.

A smart scope only works when something else finds the drone first — and today that means a \$100,000+ radar.

Competition

SYSTEM	REQUIRES RADAR	PRICE WITHOUT RADAR	PRICE WITH RADAR	COST PER ENGAGEMENT	DETECTION RANGE	MAN-PORTABLE
Stahlkraft turret	No	\$30K	N/A	\$2	500 m	Yes
Tytan METIS	Yes	~\$10–30K*	~\$150K*	~\$10–30K*	~1 km only with radar	Not man-portable with radar
Anduril Anvil	Yes	~\$50K*	~\$500K*	~\$50K*		
P1-SUN interceptor	Yes	~\$1–3K	~\$100K*	~\$1–3K		
Sky Sentinel	Yes	~\$150K	~\$300K*	~\$100*		
SmartShooter Hopper	Yes	~\$120K*	~\$300K*	~\$5*		

■ advantage ■ caveat ■ drawback · * estimate — Tytan, Anvil & Hopper prices aren't public.

We trade range for **scale**.

500 m still catches the drone in time — and only a \$30K, man-portable system is affordable enough to deploy at scale, **protecting troops everywhere they stand**.

One turret per **squad**.

Drone defence is the **fastest-growing** market in defence.

900K

soldiers in
Ukraine's army

=

90,000

squads of ten

×

\$30K

one turret each

=

\$2.7B

Ukraine alone

NATO Europe fields **2M+ troops** — and counter-drone budgets double to **\$24B** by 2030.

Every soldier on the front needs one — **no army has it yet**.

What I'd do with **\$250K**

TODAY

A working prototype.

- ✗ No full 360° detection yet
- ✗ Not rugged, not waterproof
- ✗ Built from off-the-shelf hobby parts



WITH \$250K

The production version.

- ✓ Move to America 🇺🇸
- ✓ Buy 3x FLIR Boson thermal cores
- ✓ Buy NVIDIA Jetson AGX Orin compute
- ✓ Build a military-grade, waterproof housing

The prototype proved it works — **\$250K** makes it field-ready.

Why Me

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Albert Ludemann, 17

Yale YYGS

summer program alumnus

Harvard CS50P

certified

Harvard AI50

certified

Self-taught

coding since primary school

Years of experience training image-classification AI models

Founded **jugendinvestiert.com** — a financial-education site in Germany.

A growing family of interceptors .

Pictured: the threats — each one gets its own defense layer.

TODAY



Small & mid-size drones

→ our turret, working today

FUTURE



Shahed-class attack drones

→ our next interceptor

LONG-TERM



Cruise missiles

→ our missile interceptor

One different interceptor for each — covering all threats, from FPV drone to missile.

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