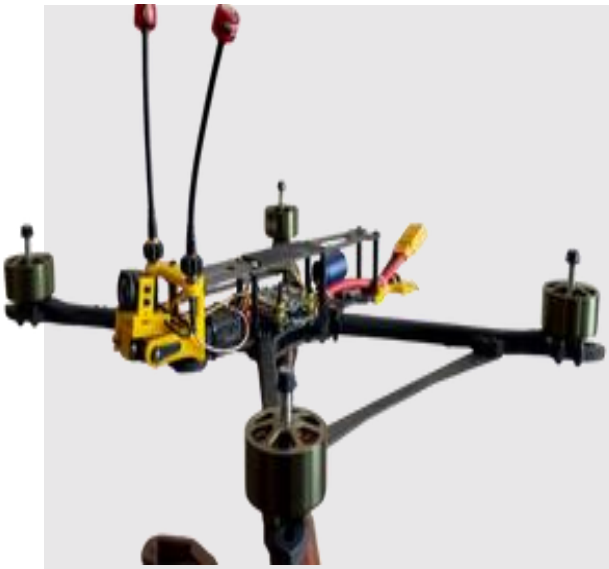
HS4-10 | Single Dropper | Tactical Air Defence | Interceptor Drone

HS4-10 Drone: Versatile Long-Range 4kg Payload Quadcopter Platform

The HS4-10 is a versatile, high-performance 10-inch class X-Quadcopter drone engineered with a lightweight carbon fibre Mark4 frame, offering a robust 4kg payload capacity and adaptability across specialised configurations such as Fiber Optics, Interceptor, or Single Dropper Frame setups.

Optimised for long-range missions and demanding applications like payload delivery or precision navigation, it integrates advanced electronics including the Pilotix F405 V3 flight controller with ICM42688 gyro and Betaflight compatibility, a 75A 4-in-1 ESC with AM32 firmware for efficient telemetry and reduced noise, powered by Partizan 3214 820KV motors tuned for 10" propellers, HQProp 10×5×3 efficiency-oriented blades, and a Matek M10Q GPS + Compass module for reliable positioning in challenging environments.

Supporting flexible power options like 6S4P 20,000 mAh Li-ion for extended endurance or 6S3P 15,000 mAh high-discharge Li-ion for the Interceptor, this platform prioritises reliability, precision, and customisation for professional-grade operations.



The HS4-10-10 Long-Range Quadcopter Platform

Build Frame

- **Model**: Mark4, 10-inch class
- **Type:** X-Quadcopter, carbon fibre construction
- **Propeller size capacity:** up to 10”

Key Options

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General Performance

Category Specification	Detail
Primary Role	Counter-UAV air defence interceptor, targeting threats like Shahed drones during cruise phase (185 km/h typical). Limited chase capability for high-speed FPV (up to 250 km/h terminal) if first strike misses.
Effective Engagement Range	2–15 km, primarily reactive to inbound threats approaching the operator.
Operational Altitude	Recommended: 200–1,000 m; Capable up to 4,100 m (performance affected by cold/icing); Engagements viable at 1,500 m under suitable conditions.
Guidance System	Operator-guided via high-quality EO/IR cameras; Not GNSS-dependent for terminal guidance (GNSS used only for launch orientation and situational awareness). Vectoring from early warning radars/observers.
Autonomy Modes	• **Automatic:** AI detects and indicates target; Operator confirms before AI takes control for homing. • **Manual:** Operator selects target via camera; AI locks and flies to intercept. Operator flies drone initially; AI handles tracking/homing post-confirmation; Operator activates detonation near target. Return-to-home (RTH) automatable but discouraged due to risks.
Target Management (Multiple Units)	Typically, one interceptor airborne at a time. For multiples, operators manually select targets (or AI proposes in automatic mode) to avoid engaging the same or friendly units.
Warhead/Ammunition	200–300 g high-explosive (e.g., C4/Semtex); Payload capacity up to 600 g. Fuze: Conventional detonator via JST connector and dedicated board. Safety: Physical pin (removed at launch), arming switch, separate detonation button.
Jamming Resilience	• **GNSS Jammed**: Not mission-critical; Visual guidance continues. • **Data Link Jammed**: Programmable responses: Stabilise/climb for reconnection, continue preplanned path, or immediate RTH.
Environmental Adaptability	Operates in confined areas (e.g., bushes/trees); Proven in dense foliage tests with control up to 3 km without line-of-sight.
Setup and Readiness	From cold start to launch-ready: ~30 seconds (plug battery, power on for live feed). Designed for 24/7 standby with instant situational awareness.
Safety Protocols	Interceptor treated as consumable (like artillery); Retrieval with live ordnance strongly discouraged due to risks. Layered safeties prevent accidental detonation.

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Frame

Model	Mark4, 10-inch class
Type	X-Quadcopter, carbon fibre construction
Propeller Size Capacity	up to 10”

Speed & Ceiling

Cruise Speed	40–45 km/h optimal for efficiency
Maximum Horizontal Speed	-70 km/h and -200+ km/h for Interceptor

Electronics Suite

Flight Controller	Pilotix F405 V3 (stack) (ICM42688 gyro, barometer, Betaflight compatible, multiple UARTs)
Payload Capacity (nominal)	Pilotix 4-in-1 75A (stack), AM32 firmware (telemetry capable, DShot, RPM filtering, dynamic PWM frequency for improved efficiency and reduced motor noise)
Motors	Partizan 3214 820KV, optimized for 10” long-range propellers
Propellers	HQProp 10×5×3 (three-blade, efficiency-oriented)
GPS + Compass (except fibre optics)	Matek M10Q — high-precision GNSS module with integrated compass for reliable navigation, accurate positioning, and stable heading reference even in challenging environments
Battery Options:	○ 6S4P 20,000 mAh Li-ion ○ 6S3P 15,000 mAh High Discharge Li-ion (for Interceptor)

General Performance

All-Up Weight (AUW)	6–6.5 kg (including 4 kg payload)
Payload Capacity (nominal)	Maximum 4 kg with 6S3P high discharge (15,000 mAh)

6S3P high-discharge (15,000 mAh) Interceptor

Hover Time	15–17 minutes (with 20% reserve)
Flight Time	17– 25 minutes
Practical Range	15 km (with reserve)
Hover Current	65–70 A

6S4P (20,000 mAh) + 4 kg payload

Hover Time	11–13 minutes (with 20% reserve)
Flight Time	15–17 minutes
Practical Range	7–8 km one-way (with reserve), total 15 km
Hover Current	70–75 A

Key Options

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Advanced Communication and Video Transmission Systems

The HS4-10 drone's Interceptor and Single Bomber variants feature advanced communication and control via the Gemini Dual-Band ELRS radio link, operating on both 2.4 GHz and 868/915 MHz frequencies to provide maximum reliability through frequency diversity.
The 868/915 MHz band ensures long-range penetration in obstructed environments, whilst the 2.4 GHz band offers additional bandwidth and redundancy in noisy RF conditions, making the dual-band system far superior to single-link setups with a practical control range of approximately 12–15 km line-of-sight. For video transmission, these variants utilise the DJI O4 Air Unit Pro system, equipped with a rotating mount for flexible payload camera positioning, supporting 1080p at 100 fps low-latency digital HD video over distances up to 15 km under FCC regulations.

Communication & Control

Radio Link	Gemini Dual-Band ELRS (2.4 GHz + 868/915 MHz)
Frequency diversity for maximum reliability	
868/915 MHz ensures long-range penetration in obstructed areas	
2.4 GHz adds bandwidth and redundancy in noisy RF conditions	
Dual-band system offers superior resilience compared to single-link setups	
Practical control range: ~12–15 km LOS	

Video Transmission

System	DJI O4 Air Unit Pro (with rotating mount for payload camera flexibility)
Supports 1080p @ 100 fps low-latency digital HD video	
Range up to 15 km (FCC)	
Integrated OSD telemetry overlay from Betaflight	
Ultra-low latency (<50 ms), stable HD feed, excellent penetration	

Interceptor / Single Bomber

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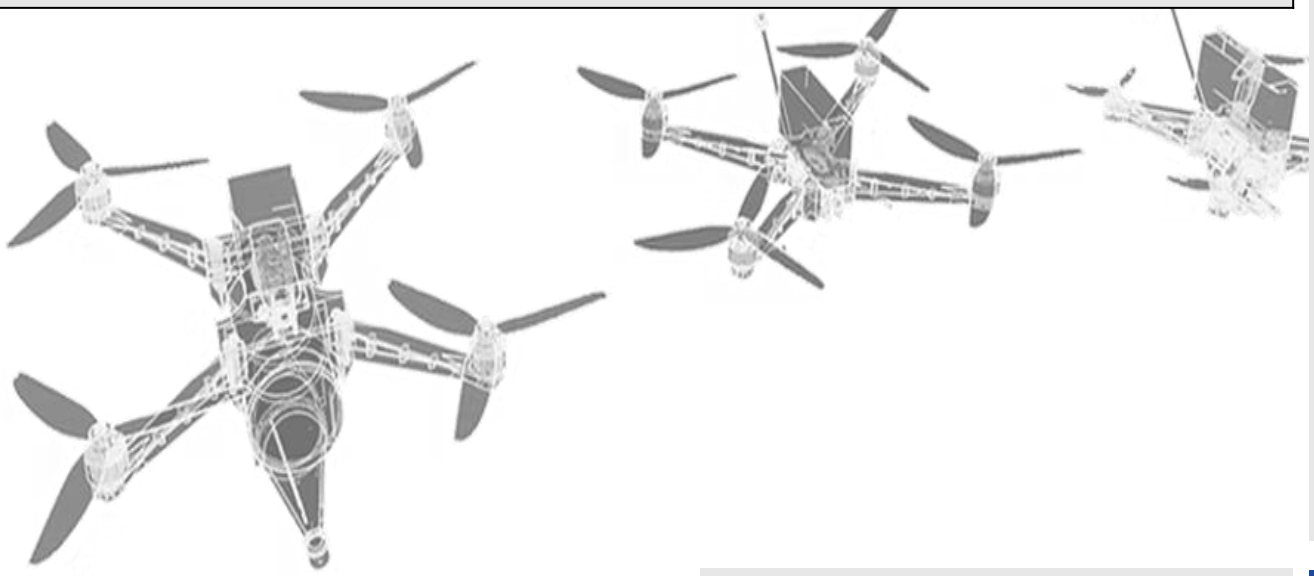
Fiber-Optical Tethered Communication System

In addition to standard long-range RF control, our platform supports a fibre-optic tethered communication system — designed for critical missions where interference-free operation and guaranteed link integrity are required.

Communication & Control

Ground Station Integration	○ Command inputs via standard radio controller. ○ A/V output to FPV goggles, external monitor, or command screen.
Onboard Fibre Transmitter	○ Mounted securely at the rear of the drone. ○ Provides direct high-bandwidth uplink/downlink through optical cable ○ **Immune to RF interference, jamming, and signal degradation**.
Operational Range (via fibre spools)	○ Available spool options: 10 km / 15 km / 20 km / 25 km. ○ Provides both **radio command link and real-time HQ video transmission with zero interference.**
Operator Advantages	○ **Absolute link security**: Fiber is not affected by radio jamming or multipath Interference. ○ **Stable real-time video**: No latency fluctuations typical of wireless links ○ **Mission flexibility**: Ideal for operations in restricted RF environment.
Note: A longer fibre spool increases operational range, but also adds additional onboard weight. As spool length increases, the maximum payload capacity of the drone decreases proportionally.	



Key Options

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Video Transmission for Fiber Optics

The HS4-10 drone boasts specialised camera options for varied missions, including the Foxeer Mini Night Cat 3 for superior low-light and night operations with its IR-sensitive 0.00001 Lux sensor; the RunCam Phoenix 2 SE V2 for reliable daytime FPV with balanced colour and wide dynamic range; the AI-assisted CaddxFPV Gazer for seamless day-to-night transitions; and custom integrations like thermal or analogue cameras for professional tasks such as search and rescue or surveillance. Complementing these are Betaflight flight modes like Altitude Hold for stable hovering, manual Angle/Horizon/Acro controls, Return-to-Launch failsafe via ELRS/GPS, and configurable waypoint loitering.

Communication & Control

Foxeer Mini Night Cat 3 (1200TVL, IR-sensitive, 0.00001 Lux) ground Station Integration	**Best for:** Night operations, security, and low-light reconnaissance. **Advantages:** Extremely sensitive sensor optimized for starlight and IR illumination. Provides clear images in environments where human vision is nearly blind.
RunCam Phoenix 2 SE V2 (1000TVL)	**Best for:** Daytime inspection, general-purpose FPV use. **Advantages:** Balanced colour reproduction, wide dynamic range, and proven reliability in harsh environments. Ideal for operators who need consistent performance without complexity.
CaddxFPV Gazer (AI-assisted, auto night/day switching)	**Best for:** Mixed-condition missions (day-to-night transitions). **Advantages:** Intelligent AI-based scene detection automatically optimizes image quality whether in full daylight or total darkness, eliminating the need for manual adjustments.
Custom Cameras (Analog, Thermal, etc.)	**Best for:** Specialised professional applications (search & rescue, industrial inspections, thermal mapping, surveillance). **Advantages:** Open integration platform — thermal imaging, high-resolution analogue, or customer-supplied cameras can be mounted and powered as needed.

Flight Modes (Betaflight)

Altitude Hold	Baro-based hover for stable stationary flight above the target.
Angle / Horizon / Acro	Manual flight modes.
Return-to-Launch (basic failsafe)	Via ELRS/GPS
Configuration	Configurable for mission hovering and waypoint loiter (with additional setup)

Key Options

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HS4-10 AI Target Detection Optics

The HS4-10 stands out as a pragmatic, operator-centric solution for countering low-to-medium altitude UAV threats in contested environments. **Its strengths lie in rapid deployment—achieving operational readiness in just 30 seconds**—and robustness against electronic warfare, as it sidesteps heavy reliance on GNSS for critical phases.

The integration of AI for target detection and homing adds a layer of semi-autonomy, allowing operators to confirm engagements before the system takes over, which reduces pilot workload while maintaining human oversight for ethical and tactical reasons. **This hybrid approach is particularly effective for head-on or rear-chase intercepts during a drone's cruise speed, where the HS4-10's design excels, boasting high hit probabilities in real-world scenarios like those in Ukraine.**

Camera Options

Type	Detail
EO (Low-Light Color)	FS – 1080p, f/2.0, ~0.01 lux sensitivity
EO (Starlight/HDR)	GZR– 2–5 MP, WDR 120 dB+, 0.001 lux
EO (Enhanced Low-Light)	R-PRO – 4–8 MP, F1.0, 0.0005 lux full-colour
IR (B/W Night Vision)	INFRA – 1080p with 850 nm LEDs, 30–80 m range, 0 lux
IR (Thermal)	TC256 (256×192, NETD ≤40 mK), TC384 (384×288), TC640 (640×512, 60 fps, FOV 48.3°×38.6°)

Video Transmission

System	D04 Air Unit Pro
Digital HD video system, integrated with D-Goggles 2 / Integra.	
Supports 1080p @ 100 fps low-latency video.	
Range up to 15 km (FCC) with strong anti-interference performance.	
Integrated OSD and telemetry overlay from AP.	
Advantages: ultra-low latency (<50 ms), crystal-clear HD feed, high penetration compared to older systems, and stable connection even in challenging RF conditions.	

Key Options

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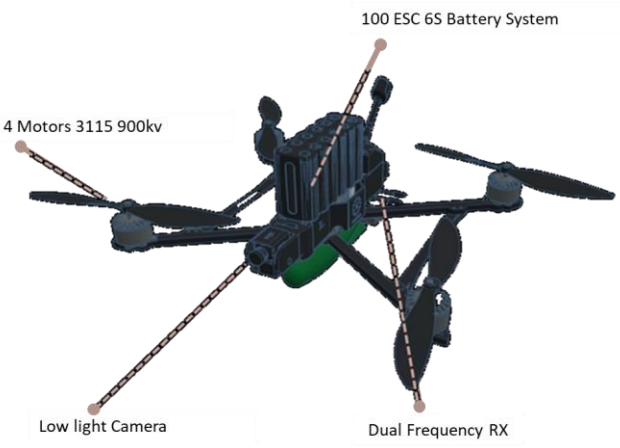
Summary

The HS4-10 platform is optimised for reliable 4 kg payload operations on a compact long-range frame, featuring the Pilotix F405 combined with an AM32 75A stack for efficient power management through dynamic PWM frequency control, which minimises heat and enhances overall flight efficiency. The Partizan 3214 820KV motors provide high thrust-to-weight performance alongside balanced endurance, whilst battery flexibility—such as 6S3P for lighter missions or 6S4P for extended endurance—enables customisation of flight times to suit specific requirements.

The Gemini ELRS dual-band link ensures robust control in interference-heavy environments, complemented by the DJI O4 HD video system for dependable long-range FPV with a crystal-clear feed. An optional Fibre-Optic Communication Module delivers unparalleled anti-jamming security and stable transmission over 10–25 km tether lengths, making it ideal for RF-restricted or interference-prone areas, though longer fibre spools may reduce payload capacity.

This 10" platform is optimized for reliable 4 kg payload operations on a compact long-range Frame:

- ✓ **The Pilotix F405 + AM32 75A stack** ensures efficient power management with dynamic PWM frequency control, reducing heat and improving overall flight efficiency.
- ✓ **Partizan 3214 820KV motors + HQ 10×5×3 props** deliver high thrust-to-weight performance with balanced endurance.
- ✓ **Battery flexibility** (6S3P for lighter missions, 6S4P for endurance) allows tailoring flight time to the mission.
- ✓ **Gemini ELRS dual-band link** provides rock-solid control even in interference-heavy environments.
- ✓ **DJI O4 HD video system** ensures reliable long-range FPV with crystal-clear feed.
- ✓ **Optional Fiber-Optic Communication Module** offers unmatched anti-jamming security and stable transmission over 10–25 km tether lengths — ideal for operations in RF-restricted or interference-prone areas (note: longer fibre spools reduce available payload capacity).



Note: HS can setup fibre-optics drones with initiating systems for ammunition "Mustache" with 3-point fuse, but for special requests only.

Key Options

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Component List

Component	Description
Frame	Mark4 10”
Flight Controller	Pilotix F405 V3
ESC	Pilotix 4-in-1 75A, AM32
Motors	Partizan 3214 820KV (×4)
Propellers	HQProp 10×5×3
Receiver	Gemini ELRS Dual Band (2.4 + 868/900 MHz)
GPS + Compass	Matek M10Q
Video System Digital	DJI O4 Air Unit Pro + Rotating Mount
Video System Analog	Client to specify analogue camera
Battery Options	6S3P High Discharge 15,000
Miscellaneous	Antennas, wiring, mounts, servo
Fiber setup	Fiber spool / ground control station / transmitter

Client Operating Set-Up

Use	3rd Party Equipment
Operating with UAV for interceptor/single bomb dropper	DJI Googles 3
	GX12 Dual-Band Gemini-X Radio Controller (M2)
Operating with UAV for fibre optics:	Monitor Hawkeye 10.2-inch Captain with DVR, HDMI
	RadioMaster Boxer

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