



Title of the Project – TRL Augmentation				
Sr. #	Item	Specification	A/U	QTY
1.	UAV/Drone (Custom Build Multi- Rotor Hexacopter)	<p>1) Performance Parameters</p> <ul style="list-style-type: none"> • Max. Range: ≤ 10 km with smooth video feed • Endurance: 30 minutes (with 5 kg payload) • Max. Operating Height: ≤ 300m AGL (Above Ground Level) • Payload Capacity: 5 kg • Flight Modes: Autonomous, Manual <p>2) Autopilot & Processing</p> <ul style="list-style-type: none"> • Autopilot System: Cube Orange+ or latest (integrated with Jetson Orin NX) • Companion Computer: NVIDIA Jetson Orin NX <ul style="list-style-type: none"> ○ Integrated control & telemetry processing ○ Autonomous mission execution capability ○ Real-time video processing support • GPS Module: High-precision GNSS with RTK support <ul style="list-style-type: none"> ○ Protocol: CAN bus ○ Positioning Accuracy: RTK-enabled (sub-meter-level precision) <p>3) Communication Systems</p> <ul style="list-style-type: none"> • Control & Telemetry Link: <ul style="list-style-type: none"> ○ Jetson-based integrated system ○ Range: ≤ 10 km reliable ○ Protocol: MAVLink compatible • Video Link 3in one: (RC + Video + Data) <ul style="list-style-type: none"> ○ Digital HD transmission ○ Minimum Range: 10 km ○ Customizable as per vendor solution <p>4) Airframe & Structure</p> <ul style="list-style-type: none"> • Frame Type: Multi-rotor Hexacopter configuration • Frame Size: 1800 – 2000 mm approx mm diagonal (carbon fiber) 	Kit.	01

- **Build Quality:**
 - Carbon fiber construction
 - Vibration-dampened mounting system
 - Reinforced payload mounting bay
 - Weather-resistant design
- **Landing Gear:** Retractable or fixed, **high ground clearance**

5) Propulsion System

- **Motors:** High-efficiency brushless DC motors
 - Suited for **5 kg payload + endurance** requirements
 - **Configuration:** 6 motors (Hexacopter)
- **Electronic Speed Controllers (ESCs):**
 - **Rating:** 60–100 A
 - **Voltage Support:** HV (6S–14S LiPo compatible)
 - **Firmware:** BLHeli_32 or similar high-performance firmware
- **Propellers:**
 - **Size:** 20–34 inch diameter
 - **Material:** Carbon fiber
 - **Type:** Folding design preferred for portability

6) Power System

- **Battery Type:** LiPo or Li-ion
- **Configuration:**
 - **Voltage:** 6S–14S
 - **Capacity:** 20,000–30,000 mAh
 - Architecture: Single, parallel, or series-connected packs
- **Battery Mount:** Secure dual-strap mounting with quick-release mechanism
- **Power Distribution:** Redundant PDB with voltage/current monitoring

7) Payload Systems

- **Parcel Drop Mechanism:**
 - **Multi-drop capability:** 4 drops per sortie (Sequence/Parallel options)

- **Actuation Options:** Servo-based, electromagnetic, or modular release system
- Controlled via autopilot integration or through companion board

8) Camera & Sensors

A) Delivered Primary Gimbal Camera (Included): SIYI ZT30 Optical Pod Gimbal Camera

High-level Specifications

- **Thermal Imaging:** 640 × 512, high-accuracy thermometric
- **Zoom:** 4K 100 × Hybrid Zoom, 20 × Optical Zoom
- **Laser Rangefinder:** 1000 m
- **Camera:** 4K Ultra HD video recording, still photo resolution up to 4K
- **Modes:** Nose Mode, Upside Down Mode
- **Compatibility:** ArduPilot & PX4 (MAV-Protocol)
- **Stabilization:** High-accuracy 3-axis (Yaw, Pitch, Roll)
- **Control:** S.Bus, UART, Ethernet UDP/TCP

Mechanical & Electrical

- **Voltage:** 11 ~ 25.2 V
- **Power Consumption:** Avg 9 W, Max 20 W
- **Waterproof Level:** IP4X
- **Operating Temperature:** -10 ~ 50 °C
- **Dimensions:** 134.5 × 140 × 201 mm
- **Weight:** 854 g (with quick-release anti-vibration claw)

Detailed Camera Specifications

- **Zoom Camera:**
 - Lens: 20 Optical (100)× Hybrid
 - Focal Length: 4.8 ~ 149 mm
 - Image Sensor: 1/2.7", 8 MP
 - Aperture: F1.3 ~ 4.8
 - FOV: 65.4° Diagonal, 58.1° Horizontal (without zoom)
 - Video: 4K (4096×2160) @ 30 fps; 2K (2560×1440) @ 30 fps; 1080p (1920×1080) @ 30 fps
 - Still Photos: 4K (4096×2160)
- **Thermal Imaging Camera:**
 - Sensor: Uncooled VOx Microbolometer
 - Resolution: 640 × 512

- Zoom: 2× Digital
- Temperature Range: -20 ~ +150 °C (High Gain), 0 ~ +550 °C (Low Gain)
- Accuracy: ±2 °C (-20 ~ +150 °C), ±3 °C (0 ~ +550 °C)
- **Wide Angle Camera:**
 - Sensor: 1/2.8", 4 MP
 - FOV: 93° Diagonal, 84.5° Horizontal
 - Resolution: 2K (2560×1440) @ 30 fps (video), 2K (still photos)
- **Laser Rangefinder:**
 - Range: 5 ~ 1000m
 - Accuracy: ±1 m
 - Laser Power: 5 mW
 - Pulse Frequency: 3 Hz

B) SIYI A8 mini 4K 8MP Ultra HD 6X Digital Zoom Gimbal Camera(Included)

- 4K Ultra HD Video & Photography
- 8MP 1/1.7-Inch Sony CMOS
- 320-Degree Yaw Axis Rotation
- 6X Digital Zoom
- Nose Mode
- Upside Down Mode
- Compatible with ArduPilot & PX4 (Mavlink)
- Ethernet, HDMI, CVBS Video Output
- High Accuracy & High Collaboration Control Algorithm

Storage & Formats

- Video Bitrate: 15 Mbps (H.265)
- File Formats: FAT32, ExFAT
- Image: JPG
- Video: MP4
- Max microSD: 256 GB (Class 10)

Control & Connectivity

- Ethernet: Video output port
- Control Ports: S.Bus, UART, Ethernet UDP/TCP
- Stabilization: High-accuracy 3-axis

C) Gimbal Mounts & Extra Mounting Provisions

- 1 × Dedicated quick-release mount/bracket for **SIYI A8 Mini** (installed)

- Mechanical design allows fast swapping between **A8 Mini** and **ZT30** without structural modification

9) Control & Software

- **Control Options:**
 - Autonomous flight with stable video feed ≤ 10 km via Jetson Orin (Through Mav-Link Protocol for controlling through AI)
 - Remote piloting capability
 - Ground Control Station: QGroundControl or Mission Planner
- **Software Compatibility:**
 - ArduPilot or PX4 firmware
 - MAVLink protocol support
 - Custom mission scripting support

10) Environmental & Operational

- **Operating Temperature:** (0) °C to +50 °C
- **Wind Resistance:** Up to (08) m/s (operational), (12) m/s (survival)
- **Environmental Rating:** Dust and light Rain Resist (better (electronics enclosures)

11) Safety Features

- **Fail-Safe Modes:** Return-to-home, auto-land, battery fail-safe
- **Redundancy:** Dual (One GPS RTK, One Standard GPS) GPS (RTK cm-level accuracy), dual compass, redundant power systems
- **Collision Avoidance:** Proximity sensors or others (upgrade)

12) Package Includes

- 1 × Complete UAV airframe (assembled & flight-tested and field-tested as per acceptance requirement)
- 1 × Cube Orange+ autopilot system
- 1 × NVIDIA Jetson Orin NX companion computer (pre-integrated, **preferably 16 GB**)

- 2 × High-precision GNSS/One RTK One Standard module
- 1 × Digital HD (3 in one RC + DATA + Video) video transmission system (pre-configured with ground station receiver)
- 1 × SIYI ZT30 Optical Pod Gimbal Camera
- 1 × SIYI A8 mini 4K Gimbal Camera
- 1 × Dedicated quick-release mount/bracket for SIYI A8 Mini (installed on UAV)
- 1 × Multi-drop parcel release mechanism.
- 2 × Battery pack pairs (6S–14S, 20,000–30,000 mAh each) 1 primary pair + 1 spare pair
- 1 × Battery charger with balancing capability (multi-port for simultaneous charging)
- 4 × Spare propeller pairs (20–34 inch carbon fiber, folding)
- 2 × Sets of spare propeller mounting hardware (nuts, bolts only)
- 1 × Ground Control Station configuration complete manual with parameters
- 1 × Transport case (ruggedized, foam-lined)
- 1 × Tool kit (hex keys, screwdrivers, etc.)
- 1 × Spare parts kit:
 - Motor screws & mounting hardware
 - ESC connectors
 - Power cables & XT90/XT60 connectors
 - Zip ties, velcro straps
 - Landing gear replacement parts
 - Vibration dampers
- 1 × Complete documentation & training materials:
 - Flight manual
 - Maintenance procedures
 - Emergency protocols
 - Pre-flight checklist
- 1 × SIYI ZT30 user manual & configuration guide
- 1 × Spare microSD cards (2 × 256 GB) for ZT30 camera
- 12 × Custom-small UAVs Propeller Pairs

13) Consumables & Spares Summary

- **Batteries:** 2 pairs (1 primary pair + 1 spare pair)
- **Propellers:** 4 pairs
- **Storage Media:** Extra microSD cards for extended mission recording

		<p>14) Warranty & Support</p> <ul style="list-style-type: none"> • Warranty Period: 12 months (hardware and software) (Additional Charges will be applicable for accident and damage) • Technical Support: Remote + on-site training included (2-week field flight training mandatory) • Maintenance: Service manual & maintenance schedule provided <p>Note (Mandatory for acceptance)</p> <ul style="list-style-type: none"> • Custom-built multirotor drone with complete flight/field testing (including integrated payload, telemetry, and video link) and a formal acceptance demonstration. • Field flight testing and training (on-site practical flight operations + safety/maintenance + mission planning via). <ul style="list-style-type: none"> ▪ Vendor must provide flight/field testing evidence/logs and complete acceptance testing prior to handover. 		
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Note: All the components installed should be compatible with the system and each other.

Please tick the relevant box

Installation Testing Commissioning Training

Warranty requirement Any other please specify