



5G



雷虎科技

THUNDER TIGER

UNMANNED VEHICLE SYSTEMS

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Mobile WORLD CONGRESS 2020





• Thunder Tiger flying mobile base station for emergency recovery CO-ENGINEERED with Chunghwa Telecom

technology, delivering precision flight performance, endurance, and optimal payload flexibility for commercial, defense, and industrial applications.

Over the years, Thunder Tiger Unmanned Systems have built reputation for winning the Taiwan Excellence Awards especially consecutively in 2017 & 2018 for its innovative values and creative designs. As the recipient of the Taiwan Excellence Awards from the Taiwan's Ministry of Economic Affairs in 2019, Thunder Tiger has been selected as a key partner by the largest telecommunications company in Taiwan, Chunghwa Telecom to provide LTE wireless coverage for emergency and disaster response operations.

Under this partnership, Thunder Tiger co-engineered the CX-180 tethered solution with Chunghwa Telecom as a key asset for temporary telecommunications, which enables the use of helicopter as telecommunications antennas. Designed to bring airborne wireless connectivity from the sky to a designated area on the ground which requires rapid response or to enhance network coverage during large events.



• Taichung Industrial Park Facility

Thunder Tiger is working on a mission to incorporate the real-time machine learning technology, 5G connectivity and unmanned system to develop our state-of-art AI-powered drones in assisting human operators generate intelligence reliably in various projects and platforms.

ABOUT THUNDER TIGER

Thunder Tiger is a company synonymous with aerodynamic 3D flight helicopters for extreme performance amongst R/C enthusiasts; Founded in 1979, the Thunder Tiger Corporation for over 40 years has been in the forefront of radio-controlled model industry.

Launched in 2015, Thunder Tiger's Unmanned Vehicle Systems division TTROBOTIX supplies its customers with proven, reliable, persistent, and surveillance capabilities vehicles spanning ground, aerial and marine categories. Thunder Tiger has grown to developing, testing and manufacturing a unique range of unmanned vehicle systems, providing access to aerial observation and communications capabilities in real-time for those who need it most.

Combining our innovative technologies and advanced level of aviation expertise, we believe the vehicles we built perform to our customers' expectations. Our entire company is committed to customer satisfaction through continuous improvement. Our dedicated team of engineers located at a cutting edge facility in Taichung Industrial Park, Taiwan constantly work on developing the Thunder Tiger CX-180 Helicopter Unmanned Air System. The CX-180 is powered by proprietary coaxial



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CX-180 ICEMAN

FLYING MOBILE BASE STATION FOR EMERGENCY RECOVERY

FEATURES AND FUNCTIONS

Thunder Tiger CX-180 ICEMAN is a collaboration project between Thunder Tiger and Chunghwa Telecom. The CX-180 helicopter is a flying 4G/5G Mobile Base Station equipped with small cells and antennas and can be easily transported, deployed and moved quickly to accommodate rapidly changing conditions in emergency situations.

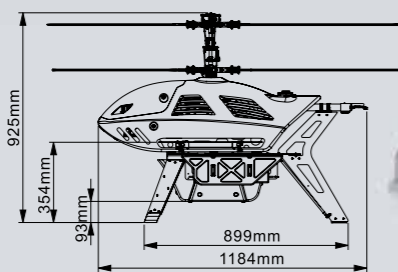
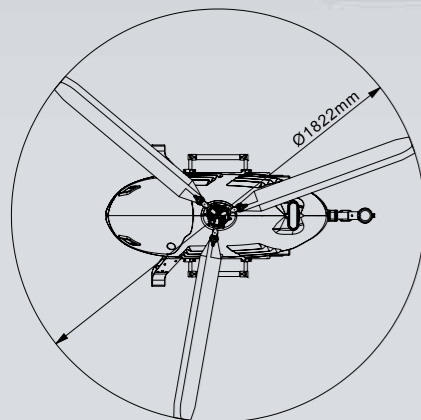


CX-180 Helicopter Unmanned Air System tethers the drone to the satellite ground vehicle with a thin fiber cable that feeds power and backhaul connectivity to the airborne drone, which then sends the signal out over the air to customers. These solutions make new possibilities available for a wide range of applications such as aerial surveillance, telecommunications, traffic monitoring and demanding industrial inspections.

- Acting as a cell tower in the sky CX-180 helicopter can fly up to 100m and provides cellular coverage up to 35 square kilometer
- Reliable and unlimited flight time for mapping, surveillance and inspection
- High efficiency coaxial pitch control structure
- All-Weather Proof Body



• Comprised of twelve 1080p cameras, with an NVIDIA Jetson Xavier AI supercomputer



T-150 MAVERICK

LTE RELAY/REPEATER HELICOPTER COMMUNICATION RELAY STATION SYSTEM

FEATURES AND FUNCTIONS

T-150 Maverick is a flying mobile relay/repeater station functions in areas where mobile phone signals do not reach, such as disaster sites, the T-150 communication relay station system enables reliable mobile phone communication as if under normal circumstances. By combining Thunder Tiger's innovative unmanned aircraft T-150 Maverick with Chunghwa Telecom's wireless communication technology, we jointly develop a LTE drone communication relay station.

Over time, communication relay station system will be more integrated with the telecommunications network so that the network determines additional capacity or coverage is needed to the specific area, drones could be deployed from cell towers to these locations to provide that temporary extra capacity.

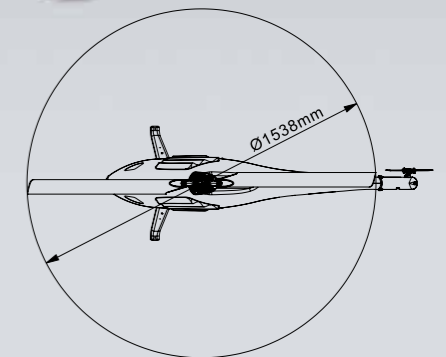
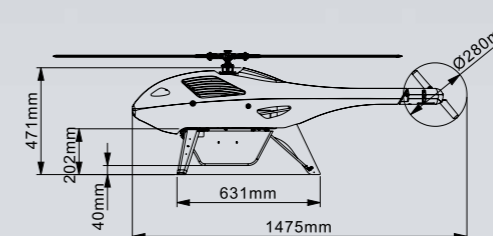
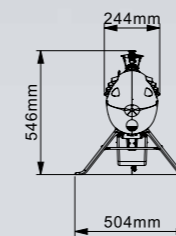
- Advanced autopilot and a variety of available sensors
- 50 minutes of flight time
- Precision flight performance
- Maximum payload flexibility
- All-Weather Proof



• Search and Rescue at fire scene



• Search and Rescue in natural disaste





X-1300 EagleEyes

TETHERED DRONE FOR MULTIPLE PURPOSES

FEATURES AND FUNCTIONS

The X-1300 EagleEyes is a fully autonomous system with tethered technology which provides continuous power and unlimited aerial coverage. It offers a portable, tethered aerial solution for unlimited streaming and data capture with endless power. Thunder Tiger designs and manufactures tether-powered aerial drones for customers who need unlimited aerial surveillance, intelligence, reconnaissance (ISR) capability. Unlike battery-powered drones that have 20-40 minute flight time, X-1300 EagleEyes with its day/night Electro-Optical Zoom camera and Infrared communications can fly for hours and days to enhance the overall public safety and security, making EagleEyes the perfect drone for extending the outer layer of security and spotting trouble well beyond the physical perimeter.



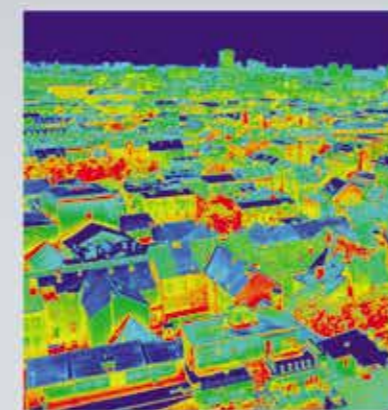
- For persistent intelligence, surveillance and reconnaissance (ISR)
- Providing all-day and all-night coverage
- Fly in GPS-denied environments
- Fully automatic flight controls



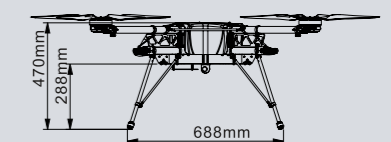
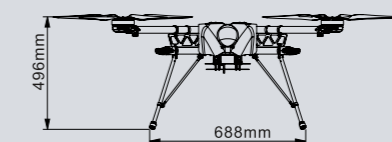
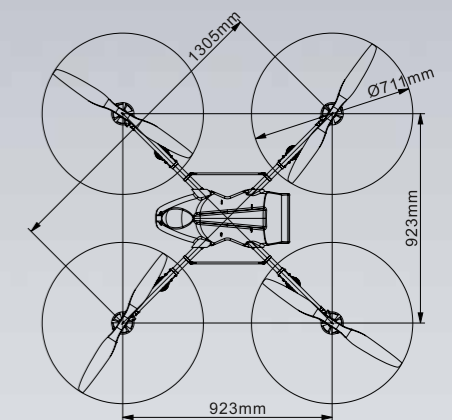
• AI flow calculation



• AI facial recognition



• Infrared thermal image



X-450 SCOUT

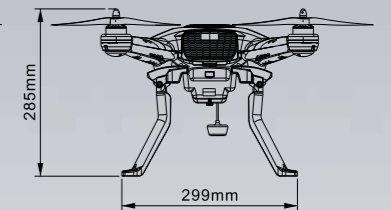
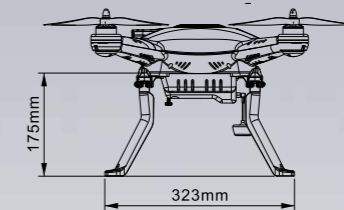
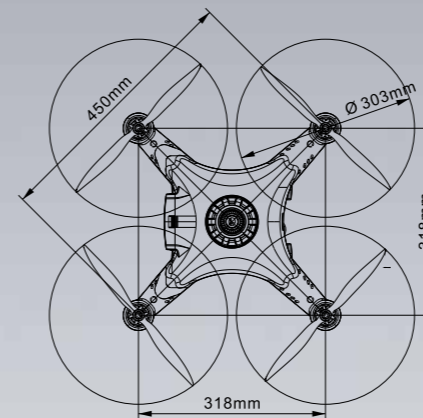
LTE SCOUT DRONE



FEATURES AND FUNCTIONS

The X450 LTE Scout is a compact multi-rotor aircraft which provides first-class image quality, outstanding reliability and automatic flight modes. The X450 LTE Scout comes equipped with an enlarged frame design and retractable landing gear. The safe and reliable quad design featuring 4 rotors remains stable in the air – even when it's windy outside. The Scout is equipped with a PX4 based flight controller and flight modes including Follow Me, Point of Interest and Curve Cable Cam. All the components of the Scout have improved protection against electrical influences and, which ensure maximum reliability. The large high-intensity directional LED lights are mounted under each motor to help with flight orientation.

- Enlarged frame space provides abundant assembly space for electronic systems
- Easy setup for various auxiliary equipment required for aerial photography
- Retractable Landing Skids provide better view of the camera lens(360 Degrees)



• Search and Rescue at car accident



• Emergency Coordination Center



• Search and Rescue in natural disaster



• Search and Rescue at fire scene



H2-X6 PHOENIX

A next generation power system of drone

HYDROGEN POWERED DRONE



PHOENIX

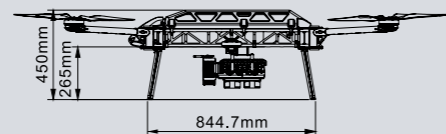
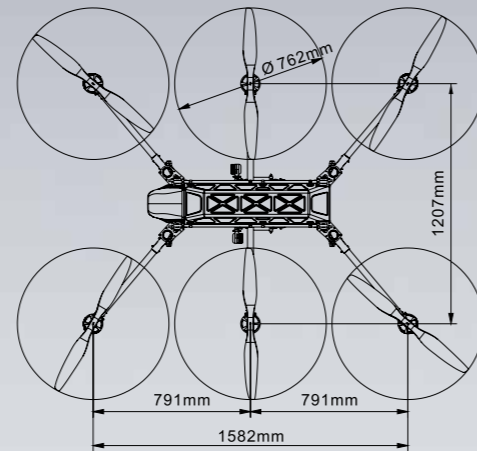
A next generation power system of drone



FEATURES AND FUNCTIONS

The Hydrogen powered system has highly energy density with great power efficiency. It is no environment pollution as well. PHOENIX as a tomorrow's drone with advancement in autonomous software, payload capabilities, data transmission and technology, PHOENIX will fly longer and further than ever before.

A longer flight time is possible with PHOENIX Hydrogen fuel cell drone since its energy density is higher than battery. Moreover its performance is optimized using ultralight stack, charging is convenient and durability is high due to long lifespan of SPECTRONIK powerpack. The world's first light weighted Hydrogen fuel cell system used on drones for commercial use.



• Bridge construction Monitoring



• Monitoring & Controlling the ships in & out the port



• High Speed Rail Intelligent Security System

- Fully electric with zero emission, no vibration and low heat and noise signature
- Up to 4x longer flight time(90 min) and 16x area coverage compared to battery drones
- User friendly Hydrogen refueling equipment for fast refilling of on-board gas cylinder
- Service subscription includes full parts warranty and firmware upgrades
- Leasing option, payload integration, operator training, data processing and analytics

Seadragon XLR

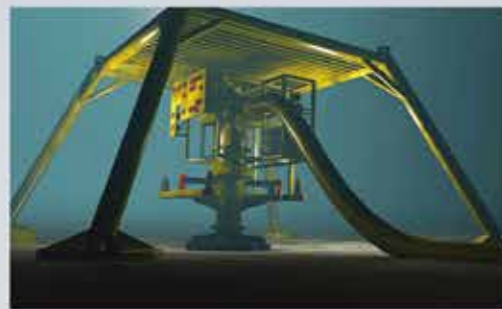
SEADRAGON UNDERWATER REMOTE OPERATION VEHICLE



FEATURES AND FUNCTIONS

Thunder Tiger expertises in the design and manufacture of ROV solutions. The Seadragon XLR configuration is designed for precise control of the ROV position and orientation, heavier payloads, and cleaning nets for offshore fish farms. With six thrusters, the Seadragon XLR is able to move in any direction, and maintain active pitch to face the vehicle in an upward or downward orientation. The Seadragon XLR can be configured according to your needs, payloads can be equipped to be enable to fit a wide range of sonar, manipulator arms and tools, and any type of sensors. The unique design allows easy acces for maintenance.

- Live Ultra-low Latency
- Live 1080P HD Video
- Highly Maneuverable Vectored Thruster Configuration
- Optimized for Inspection and Research-class Missions
- Easy to Use, Cross-platform User Interface
- Up to 300m Depth Rating
- 6xTT-100 Thrusters and High Performance ESC for the Best Thrust-to-Weight Ratio in Its Class
- Quick-Swappable Batteries for Long Missions
- Robotic Arm for Underwater Tasks
- High Payload Up to 10 Kg



• Underwater oil pipeline inspection



• Underwater Search and Rescue



OPTIONS



• Quick-Swappable Battery



• Fathom ROV Tether



• Infra-Red Camera



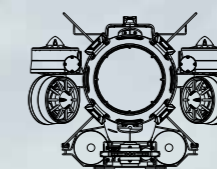
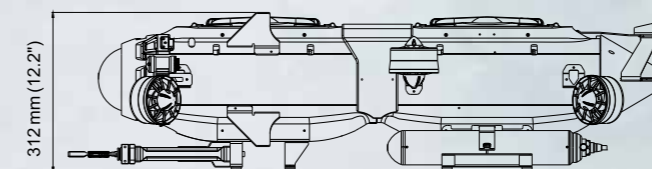
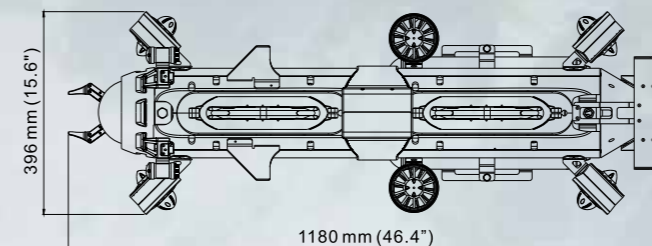
• High Intensity LED Lighting



• Manipulator



• 2D Imaging Sonar



Seadragon 8-Axis

UNDERWATER SONAR ROBOT



OPTIONS



• Quick-Swappable Battery



• Fathom ROV Tether



• Infra-Red Camera



• High Intensity LED Lighting



• Acoustic Positioning USBL Beacons

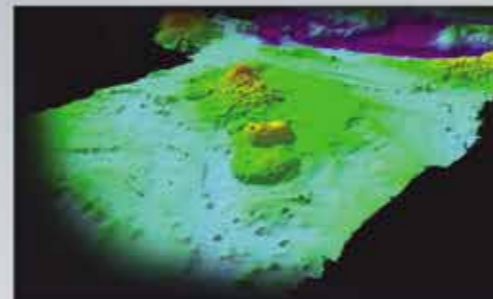


• 2D Imaging Sonar

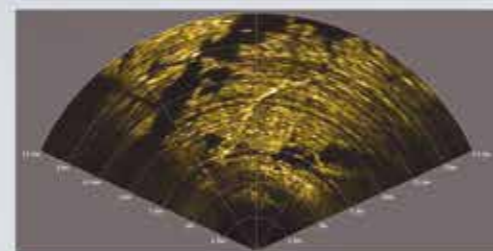
FEATURES AND FUNCTIONS

The Seadragon is a Mission-ready remotely operated vehicle that can be easily deployed and controlled by one person to conduct underwater inspections. With a new mechanical design from its predecessor, the Seadragon has flexible payload capabilities, deeper depths, and advanced 6-DOF stabilization. The Seadragon allows operators to simultaneously view the surrounding with multiple camera angles, control the manipulators, and operate the sonar while station holding in harsh environmental waters. The Seadragon is ideal for performing propeller, hull, and wharf inspections as well as underwater search and recovery missions.

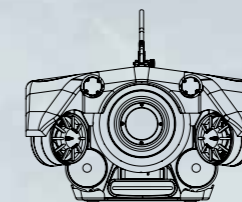
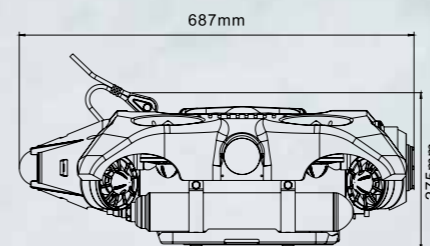
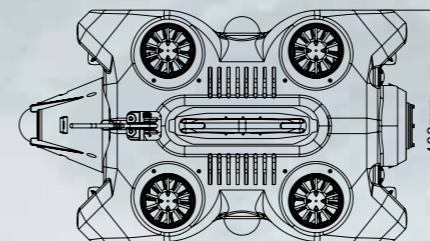
- Sonar scanning real-time image under water
- Live Ultra-low Latency
- Live 1080P HD Video
- Highly Maneuverable Vectored Thruster Configuration
- Optimized for Inspection and Research-class Missions
- Easy to Use, Cross-platform User Interface
- Up to 300m Depth Rating
- 8xTT-100 Thrusters and High Performance ESC for the Best Thrust-to-Weight Ratio in Its Class
- Quick-Swappable Batteries for Long Missions
- High Payload Up to 10 Kg



• Seabed 3D Modeling










• Sonar scanning for Search & Rescue



PRODUCTS

SPECIFICATION TABLE

PICTURE							
MODEL	CX-180 ICEMAN	T-150 MAVERICK	X-1300 EagleEyes	X-450 SCOUT	H2-X6 PHOENIX	Seadragon XLR	Seadragon 8 axis
MAX. TAKE OFF WEIGHT	35.0KGS	11.0KGS	11.0KGS	2.15KGS	21.0KGS	MAX. RATED DEPTH 300 M	MAX. RATED DEPTH 300 M
POWER	TETHERED /W GENERATOR	BATTERY	TETHERED /W GENERATOR	BATTERY	HYDROGEN FUEL CELL	BATTERY	BATTERY
PAYLOAD	8.0KGS	10KGS	2.0KGS	5KGS	1.0KG	2.0KGS	10KGS
ENDURANCE	UNLIMITED	30MINS	50MINS	UNLIMITED	40MINS	20MINS	90MINS
FEATURES	<ul style="list-style-type: none"> CX-180 can fly up to 100 m above the ground. Once airborne with communication equipments, the Dragonfly provides LTE coverage from the sky to a designated area on the ground Unlimited and reliable flight time for mapping, surveillance and inspection High efficiency coaxial pitch control structure design Dual electric brushless motor power input system Specially designed high efficiency 6 blades rotor system Foldable main rotor and no tail rotor compact design All weather proof body design 	<ul style="list-style-type: none"> High efficiency pitch control Helicopter structure design Integrated flight control systems, application specific performance metrics, data management, manufacturing, sustainment, and operating procedure User-friendly UAV operation interface and UAV education and training 	<ul style="list-style-type: none"> tethered drones for persistent intelligence, surveillance, reconnaissance (ISR) capabilities. Integrated flight control systems, application specific performance metrics, data management, manufacturing, sustainment, and operating procedure User-friendly UAV operation interface and UAV education and training 	<ul style="list-style-type: none"> Enlarged frame space provides abundant assembly space for electron systems and easier to install various auxiliary equipment required for aerial photography Intelligent power display system on the surface provides battery capacity check and antispark design Can use either proprietary battery or use standard Li-po batteries Retractable Landing Skids provide better view of the camera lens (360 Degrees) 	<ul style="list-style-type: none"> Fully electric with zero emission, no vibration and low heat and noise signature Up to 4x longer flight time and 16x area coverage compared to battery drones User friendly Hydrogen refueling equipment for fast refilling of on-board gas cylinder 	<ul style="list-style-type: none"> Live Ultra-low Latency (with standard Electronics Package) Live 1080P HD Video (with Advanced Electronics Package, 200 ms Latency) Highly Maneuverable Vectored Thruster Configuration Stable and Optimized for Inspection and Research-class Missions Easy to Use, Cross-platform User Interface Up to 300m Depth Rating 6xTT-100 Thrusters and high performance ESC for the Best Thrust-to-Weight Ratio in Its Class Battery powered With Quick-Swappable Batteries for Long Missions Robotic Arm for Underwater Tasks High Payload Up to 10 Kg 	<ul style="list-style-type: none"> Provide to the users who need sonar scanning real-time image under water Live Ultra-low Latency (with standard Electronics Package) Live 1080P HD Video (with Advanced Electronics Package, 200 ms Latency) Highly Maneuverable Vectored Thruster Configuration Stable and Optimized for Inspection and Research-class Missions Easy to Use, Cross-platform User Interface Up to 300m Depth Rating 8xTT-100 Thrusters and high performance ESC for the Best Thrust-to-Weight Ratio in Its Class Battery powered With Quick-Swappable Batteries for Long Missions High Payload Up to 10 Kg
USAGE	<ol style="list-style-type: none"> Telecommunication Aerial Mapping Real-Time Surveillance Industrial Inspection Pod Type Vital Signs Monitoring and Rescue System Super brightness LED integrates into high payload CX-180 for versatile, powerful lighting for inspection, search and rescue 	<ul style="list-style-type: none"> The T-150 provides autonomously flying, industrial unmanned helicopters for airborne aerial imagery and photogrammetry, aerial video recording, surveillance and inspection, search & rescue, aerial scientific measurements and many other applications with an remotely piloted aerial system 	<ul style="list-style-type: none"> Suited for creating temporary communication bubbles, providing mobile phone service, WiFi and data or military encrypted communication systems This extends the range of operations and areas of safety This can be used in environmental disasters where ground infrastructure is not available, or in a scenario where the situation is outside standard communication range 	<ul style="list-style-type: none"> The design is compatible with multiple camera gimbal systems 	<ul style="list-style-type: none"> The world's first light weighted Hydrogne fuel cell system used on drones for multifunctional use 	<ul style="list-style-type: none"> Seadragon XLR can be used in underwater missions: aquaculture, marine research, sample collection, underwater exploration, search and rescue 	<ul style="list-style-type: none"> Seadragon 8 axis can be used in underwater missions: aquaculture, marine research, sample collection, underwater exploration, search and rescue