Falcon-V
อากาศยานไร้นักบิน แบบยึด-ลงทางดีจ VTOL (Vertical Take Off and Landing) UAV (Unmanned Aerial Vehicle)
Top Engineering Corporation Co. Ltd. is a duly registered, Thai National company. The company was founded by a group of professionals with expertise in Unmanned Aerial Vehicles, both fixed wing as well as multi rotor drones.

Top Engineering Corporation Co. Ltd. was founded in 2013 with the sole purpose of creating the airframe of a UAV, (Unmanned Aerial Vehicle). This first airframe, with a wingspan of 8 meters, was delivered to DTI (Defence Technology Institute). After completion of this project, the company did foresee an opportunity for the development of UAV’s to be deployed in military operations, beneficial to any mission of the Thai Armed Forces and National Defence in general.

Top Engineering Corporation Co. Ltd. has successfully created UAV’s that can fulfil any mission such as Aerial Photography, Surveillance, Intelligence, Target Acquisition, Reconnaissance, Search and Rescue, Terrain Mapping and Analysis in remote, difficult to access or large areas for the armed forces, government agencies and civil use.

With the vision of combining both fixed wing and multi rotor technology, our development received support from the Royal Thai Navy and various military armed forces in response to their need of fulfilling their tasks by our UAV. These requirements are:

- Capability to take-off as well as landing in limited space, without a runway, especially to take-off or landing in jungle area or onboard a ship at sea.
- Ability to fly a long distance mission with long endurance.
- Ability to fly at high speed to reach the target area as quickly as possible
- Execute the mission autonomously or manual.

With the above vision in mind, TOP Engineering Corporation Co. Ltd. has successfully planned and developed a fixed wing UAV, capable to vertical take-off and landing (VTOL), our “Falcon-V”. We have started this development from small to large, starting at a wingspan of 1 meter, followed by 2 meters and 3 meters respectively. The end product has a wingspan of 3 meters, and can easily be extend to 4.5 meters.
Our UAV, model Falcon-V has been designed to include all requirements as needed for military unmanned aerial vehicles as mentioned before are as follows:

- **Falcon-V** can take-off and land in limited space such as in the jungle with an available area of only 10×10 meters or the deck of a ship at sea. This increases the potential of any mission in any area.

- **Falcon-V** can fully automatically take off, execute the mission autonomously and land automatically. This will enable un-experienced pilots to operate the UAV.

- **Falcon-V** can remains fully controllable up to a range of 50 Km. Beyond that range, Falcon V is capable of flying fully autonomously with a maximum travel distance of 200 Km.

- **Falcon-V** endurance is up to 2 hour (120 minutes) with the use lithium batteries, 3 - 4 hours with the use of Hydrogen Fuel Cell technology.

- **Falcon-V** has maximum speed at 130 kilometres per hour.

- **Falcon-V** has minimum speed at 45 kilometres per hour.

- **Falcon-V** has maximum altitude up to 3,000 meters.

- **Falcon-V** is suitable to execute the following tasks:
  - Aerial surveillance both day and night. The camera can be controlled real time from a ground-station.
  - Aerial photography and mapping missions. The aerial photography for an area of approximately 20 square kilometres can be finished within one single flight; it takes less than 2 hours flying at an altitude of 500 meters. The images can be processed at the computer at ground control station with the latest state of the art processing software. The output can be made visible with Google Map, Google Earth or any general image viewing software. It is possible to create 3D terrestrial of aerial imagery acquired from the same set of images to benefit tactical advantage or evaluate the geography, including calculation of the area and the number of ground objects from this aerial imagery.

However, **TOP Engineering Corporation Co., Ltd.** still requires support from the armed forces and other government agencies for testing any deficiency, additional special demands, and to achieve the development for various other applications. This also includes all future development to achieve higher performance.
FALCON-V
Fixed Wing VTOL (Vertical Take Off and Landing)
UAV (Unmanned Aerial Vehicle) Aircraft

Falcon-V Overview and Specifications

<table>
<thead>
<tr>
<th>Fixed Wing - VTOL</th>
<th>3 meter version</th>
<th>4.5 meter version</th>
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</thead>
<tbody>
<tr>
<td>Dimensions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wingspan:</td>
<td>300 cm</td>
<td>450 cm</td>
</tr>
<tr>
<td>Length:</td>
<td>195 cm</td>
<td>230 cm</td>
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<tr>
<td>Wing Area:</td>
<td>112 sq. dm.</td>
<td>154 sq. dm.</td>
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<tr>
<td>Weight &amp; Payload:</td>
<td></td>
<td></td>
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<tr>
<td>Aircraft Empty Weight:</td>
<td>6 Kg</td>
<td>6.5 Kg</td>
</tr>
<tr>
<td>Payload Capability:</td>
<td>5 Kg</td>
<td>5 Kg</td>
</tr>
<tr>
<td>Maximum Gross Take-Off Weight:</td>
<td>22 Kg</td>
<td>22 Kg</td>
</tr>
<tr>
<td>Flight Characteristics:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cruise Speed:</td>
<td>90 Kmh</td>
<td>70 Kmh</td>
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<tr>
<td>Maximum Speed:</td>
<td>130 Kmh</td>
<td>110 Kmh</td>
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<tr>
<td>Stall Speed:</td>
<td>49 Kmh</td>
<td>44 Kmh</td>
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<tr>
<td>Take off method:</td>
<td>VTOL or Runway</td>
<td>VTOL or Runway</td>
</tr>
<tr>
<td>Maximum Altitude:</td>
<td>3000 Meter</td>
<td>5000 Meter</td>
</tr>
<tr>
<td>Maximum Flight Time:</td>
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<td></td>
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<tr>
<td>Fuel cell version:</td>
<td>220 min</td>
<td>220 min</td>
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<tr>
<td>Li-Ion version:</td>
<td>120 min</td>
<td>120 min</td>
</tr>
<tr>
<td>Gasoline version:</td>
<td>300 min</td>
<td>300 min</td>
</tr>
</tbody>
</table>

Camera Options:

- 20MP (Mega-Pixel) Digital still Camera with 1080p HD Video and Remote Controlled Zoom & Shutter
- 1080p HD (High Definition) Video Camera, 36x optical zoom Low Light (0.0001 lux) Dusk/Dawn Black & White Video
- Thermal Infrared Camera
- 2- or 3 axis controllable Gimbal

RF Communications and range:

- 433 MHz Data Link, Ground to Aircraft (One-Way, Flight Controls), 20 Km
- 900 MHz Data Link, Ground to Aircraft & Aircraft to Ground (Two-Way, Autopilot & Telemetry), 80 Km 1.2 GHz Video Link, Aircraft to Ground (One-Way), 50 Km

Important: The UAV aircraft range is not limited to the above mentioned ranges. Beyond these ranges, the autopilot will fly the UAV autonomously, following the pre-programmed instructions and/or waypoints.

Standard equipment:

- High performance, 32 Bit ARM Cortex autopilot system
- Double, high performance GPS modules
- Airspeed sensor
- Compass
- 3-Way camera switch, OSD and video Transmitter
- Data transmission system
- Remote control receiver
- Li-Ion battery system for onboard electronics supply
- Multiple voltage regulator systems for redundancy

Ground control station:

- TOP Engineering Control Stations (GCS) are designed to fully control the UAV during operations. All GCS have modular design and they can be adapted to every client need.

TOP Engineering Group reserves the right to change specifications and features without prior notice.

TOP ENGINEERING CORPORATION CO., LTD.  | บิรุษณ์ กิจปุณ ถวิลเด่น นำร่อง คอร์ปอเรชัน จำกัด
233/187 Mu 5 Soi 11 Srinakarin Road, T. Bangmuang, Muang, Samutprakarn 10270 THAILAND | Tel: 662-759 8140 | Fax: 662 759 8922
URL: www.top-enggroup.com E-mail: info@top-engcorp.com