Skywalker Specification

Geo Sense Skywalker Specification (customization):

- **Body material**: Foam with Carbon Fiber Tail
- **Length**: 1,180 mm
- **Wing Span**: 1,810 mm
- **Weight With payload**: 3.3 kg
- **Autopilot type**: APM / Pixhawk
- **Motor Spec**: High torque brushless AXI2826 / 12 Gold Line
- **Battery power**: LiPo 4s 10,000 Mah
- **Propeller Spec**: APC 11” x 7”
- **Flight time**: Up to 45 min
- **UAV Altitude Capability**: 500 ft to 2500 ft (280m to 60m)
- **UAV Operational Altitude**: 1000 ft (320 m)
- **Total Per Flight Distance**: 40 km
- **Telemetry Distance**: 5 km
- **Mapping coverage area per 40 min flight mission**: 3.5 - 4 km² per flight (depending on flight plan shape)
- **Coverage mapping productivity per day**: 8 - 12 km² per day

UAV Specification
Geo Sense Unmanned Aerial Vehicle (UAV) Specification (customization):

- **Body material**: Based on Electra Pro top airframe. Epoxy Fiberglass with Gel Coat model and Carbon fiber airframe model.
- **Length**: 1,230 mm
- **Wing Span**: 2,550 mm
- **Weight Without payload**: 2.5 kg without load
- **Weight With payload**: 3.3 kg with load
- **Autopilot type**: Micropilot
- **Standard Load**: Calibrated digital camera, FPV and video camera system
- **Motor Spec**: High torque brushless AXI2820/10 Gold Line
- **Battery power**: Original 8200 Mah - Modified to 13500 Mah
- **Propeller Spec.**: Aeronaut 13"x 8" folding with 50 mm holder
- **Flight time**: Up to 45 min
- **UAV Altitude Capability**: 500 ft to 2500 ft (280m to 600m)
- **UAV Operational Altitude**: 1000 ft (320 m)
- **Total Per Flight Distance**: 40 km
- **Telemetry Distance**: 5 km
- **Micropilot Telemetry Signal**: 2.4 GHz
Unmanned Aerial Mapping Services

<table>
<thead>
<tr>
<th>RC radio signal</th>
<th>35 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPF signal</td>
<td>1.3 GHz</td>
</tr>
</tbody>
</table>

Mapping coverage area per 40 min flight mission (depending on flight plan shape)

Coverage mapping productivity per day

Coverage mapping for line area such as piping and electrical transmission distance per day

**Benefits of Using Geo Sense Glider Based UAV**

- Highest resolution – depending on the height, images taken from UAV are at 10 cm to 15 cm per pixel compared to 20 cm to 50 cm from conventional aerial photography and 50 cm to 200 cm from satellite. This is due to UAV able to fly lower to the ground and able to avoid cloud covers. Following is comparison of 3 different images from satellite, conventional aircraft/helicopter and UAV.

<table>
<thead>
<tr>
<th>Satellite imaging</th>
<th>Manned Aircraft</th>
<th>UAV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical Coverage Per Day</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 km²</td>
<td>8 - 10 km²</td>
<td></td>
</tr>
</tbody>
</table>

**New Acquisition to Delivery**

- Depending on cloud - New tasking for Malaysia 1 - 4 months
- 2 weeks to 2 months (for 30 km²)
- Less than 2 weeks (for 30 km²)

<table>
<thead>
<tr>
<th>Altitude</th>
<th>300 km - 500 km (Space) 2000 - 10,000 ft</th>
<th>500 ft to 2000 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject to strict flying regulation</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Image resolution pixel per cm</td>
<td>60 cm - 200 cm</td>
<td>20 cm - 60 cm</td>
</tr>
<tr>
<td>8 cm - 15 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues</td>
<td>Cloud cover</td>
<td>Cloud and weather</td>
</tr>
<tr>
<td>Original Format</td>
<td>GeoTIFF, Ortho, TMS, RAW, multiple inc. Hyper/MultiSpec, LIDAR etc.</td>
<td>GeoTIFF, RAW, RGB image</td>
</tr>
<tr>
<td>Acquiring Cost</td>
<td>RM150 to 600 per km² min. 10 km². Sample SPOT pricing.</td>
<td>RM2000 km² for typical 30 km² coverage - including image processing and georeference. The cost can reduce to RM1600 per km² for larger coverage.</td>
</tr>
<tr>
<td>Sample Image</td>
<td>Clouds issues - sample image res.as typical google earth image.</td>
<td></td>
</tr>
</tbody>
</table>
Cloud Free Imagery – one of the problems in relying on satellite images in Malaysia and other tropical countries is cloud cover as satellite imagery cannot penetrate areas with cloud cover. UAVs are able to fly below the cloud, capturing better resolution and faster delivery.
Unmanned Aerial Mapping Services

- Faster Delivery – comparing to ordering new satellite imagery which average take 4 months, UAV can deliver within days or weeks.
- Easy setup – Geo Sense UAV can be setup within 30 min to fly and highly mobilize. Thus, should client want to retake certain area with able to respond faster than conventional aircraft.
- Battery operated – the propeller and engine do not produce high noise that possibly disturb existing habitant. Enable discreet operation for various surveillance purposes.
- Computerized Geo Coordinated Log Flight Plan – enable customer to assign periodic or interval flight using as the same log flight to take the same exact area over a period of time for progress monitoring, auditing etc.
- Aerial Video Recorder – able to view live or recorded aerial video of the coverage areas for further monitoring.
- Experience Team – Geo Sense is among pioneer company in Malaysia and South East Asia that been developing and perfecting the UAV system for mapping purposes and also in high resolution aerial photography. Thus we able to ensure the technology reliability and requirement delivery.
- Cost versus benefits – for limited area coverage, UAV provides cheaper cost compare to conventional aircraft equipped with aerial camera. Eg. Average deploying aircraft with airborne camera is approximately RM80,000.00. Average chartering helicopter is from RM8,000.00 per day to RM25,000 this is without proper aerial camera. While UAV stable position camera system is computerized, thus producing high accuracy angles for mapping and planning purposes.

Limitation
- Coverage – mini UAV is battery operated and can only cover 2 sq km in 30 min flight, which require to land and change battery for subsequent flights. Thus we can only cover approx. 4-5 sq km per day and the best time to take aerial images is from 9 am to 12 pm. The optimum coverage for fast respond is 10 sq km. compare to more than 100 sq km using conventional aircraft and approx. 3000 sq km of one single satellite images (slate).
- Geo Sense UAV is only equipped with normal compact RGB camera that is connected to autopilot system. Thus with limited band colour, advance analysis for remote sensing purposes are also limited. There is also option to equip with Near Infrared especially for agricultural monitoring etc.
- Strong wind condition – our glider based UAV can resist up to 30 km per hour wind to maintain stable and quality images. Thus operation can be disturbed in condition when there is stronger wind.

Add Value Services
- Using latest remote sensing software, the images can be processed for orthophoto thus enable users to make advance analysis such as estimation of land mass, elevation model etc.
- Special sensor can also be mount on the UAV for various colour bands reflectance analysis, for quality land analysis, vegetation analysis etc.
- Value added services may require an upgrade to our existing UAV platform.