Version 1.0

PilotGaea

PilotGaea
Enterprise Brochure

Pioneer of Spatial Technology

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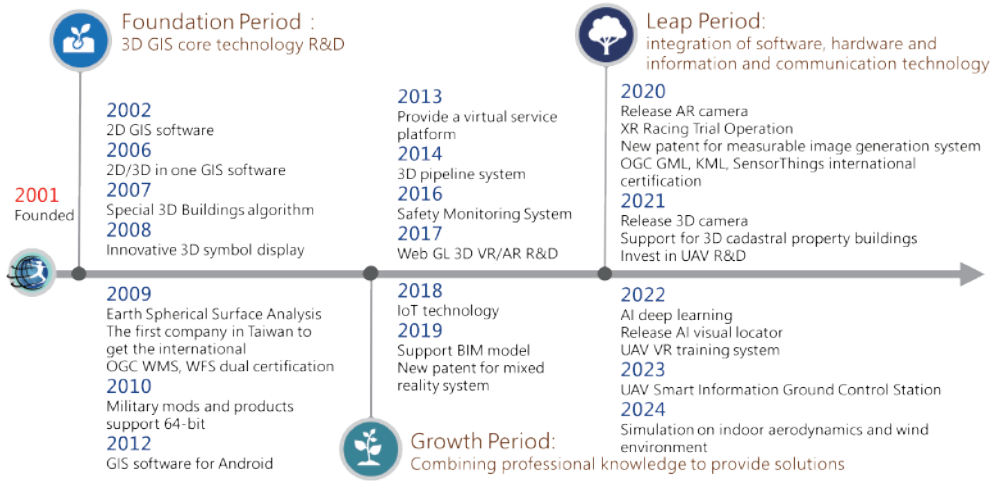
CATALOG

Company Overview

Innovation is our only way !

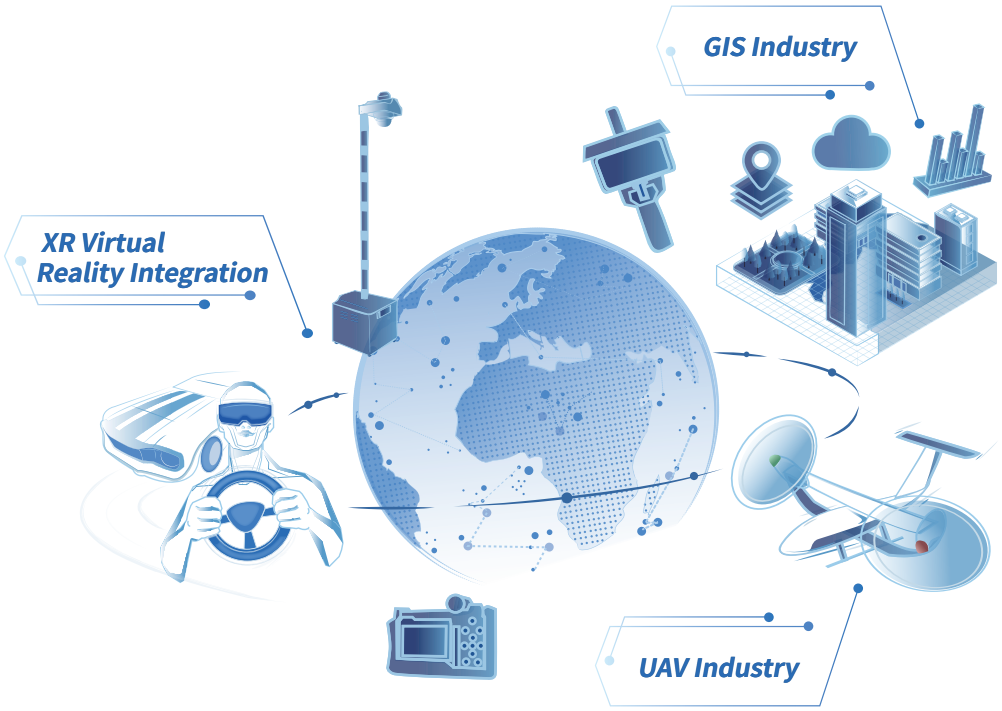
Established in 2001, PilotGaea dedicates to geometric computing, 2D/3D computer graphics, and spatial analysis, etc. In 2004, we developed the world's first generation of 3D GIS System, which made us become the pioneer of Spatial technology. Since its inception, we have assisted numerous domestic and international enterprises and government agencies in building various GIS applications, while also securing an OGC international certification and numerous prestigious awards in the information field.



With the wave of Smart City, governments are focusing on the developments and applications of Digital Twins, combined with 2D/3D maps and Internet of Things (IoT), etc. Pilotgaea has independently developed GIS core technology for years, and recently integrates those technology into some devices.
With the experience and innovative ideas, we develop professional and high-performance equipment, and be ready to meet global market demands.

In recent years, with the outbreak of the war in Ukraine, people realize the importance of independence of national defense. Based on the unique GIS core technology and combined with AI visual identity, virtual and real integration and automatic control technologies, Pilotgaea develops Taiwan's unique twin-axis tilt-rotor UAV, coupled with self-designed tilt rotors and variable pitch mechanism. Not only combined with airplane and helicopter, it also features with visual assisted landing, smart route planning, energy saving and high wind resistance, etc.

In the future, we will provide several different types of UAVs with different payload characteristics, which will be equipped with ground control systems to comply with engineering requirements. It meets the needs of application fields such as inspection, logistics and transportation, disaster prevention and relief, safety monitoring, and smart national defense, etc.

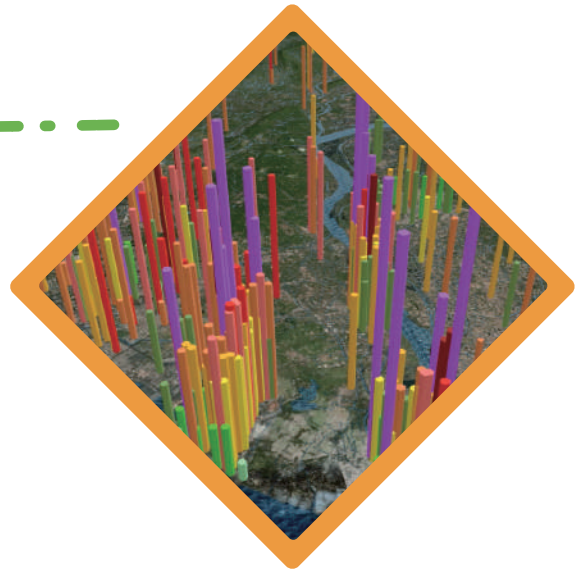


Spatial Utilization of Geographical Information

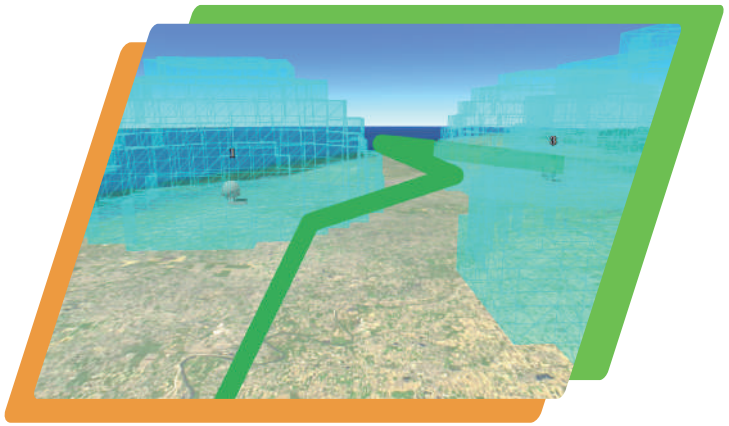
O'View MapServer

- Map servers used in professional fields.
- Locate, query, measure, calculate, analyze and visualize geographic data.
- Display huge amounts of data simultaneously.
- Support BIM building information model.
- Accept requirements to develop customized functions.
- Has variety of functions, including pipelines, virtual reality integration, augmented reality, Internet of Things, military use.
- Support PC applications, mobile device applications, web applications.

- Pass OGC international standard certification, SensorThings, WMTS, KML, WMS.
- Support dual international 3D transmission service standards.
- Integrate government data. Various map data are integrated and stored to achieve cross-departmental and historical preservation purposes.
- Apply to urban planning, disaster prevention and response, project management, cultural guide in the government.
- Manage multi-site construction, industrial areas, and port areas, and assist enterprises to strengthen management efficiency.



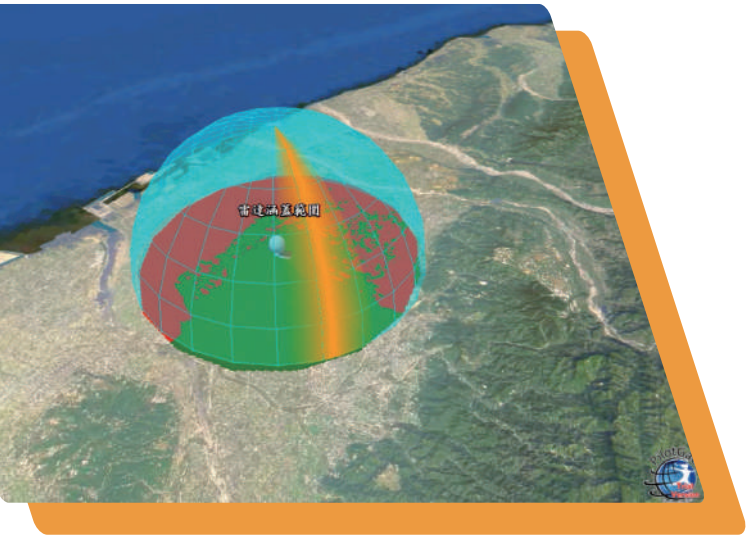
Aerial Path Planning



- Use exclusive algorithm to plan the best aerial path.
- Consider terrain relief, earth curvature, obstacles, radar position, radar range, aircraft performance, and visual range analysis.
- Calculate the shortest path, the most energy-saving, and the most time-saving solutions.
- Present aerial path planning in 3D simulation, providing the most intuitive visual information.

Radar Simulation

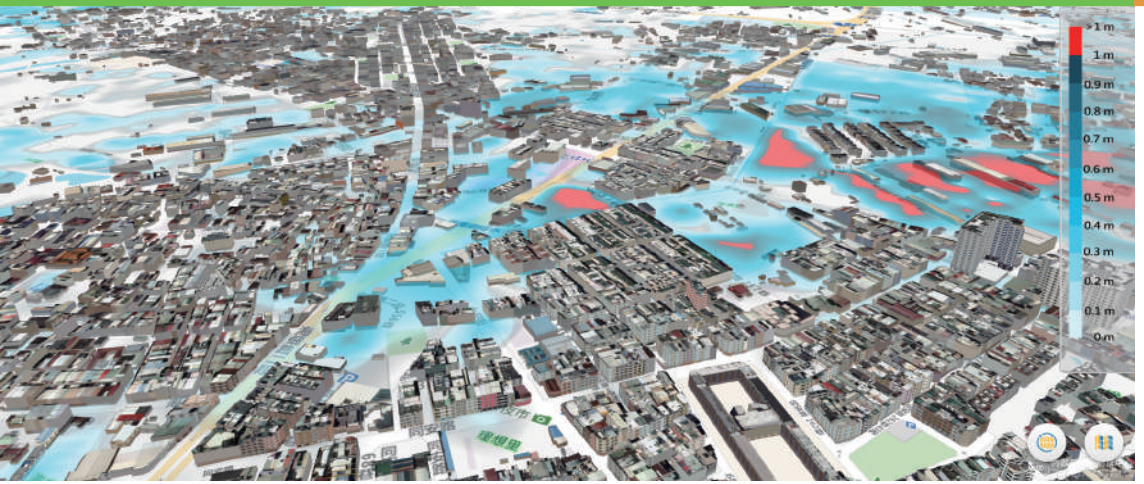
- Cooperate with the radar specification and use 3D GIS technology to simulate the radar detection range.
- Simulate radar detection scan speed according to radar performance specifications.
- Simulate radar detection range based on actual terrain and elevation information.



Land Administration and Map Management

- Integrate and display various GIS map data to improve the efficiency of land management operations.
- Analyze and display the 3D analysis results, then open the information to the public.
- Conforms to the international image data transmission standard and exerts the benefits of data sharing.
- Integrate topography, aerial photos, cadastral maps, and 3D cadastral models to assist the government in intelligently managing land use, ownership space, and asset management.

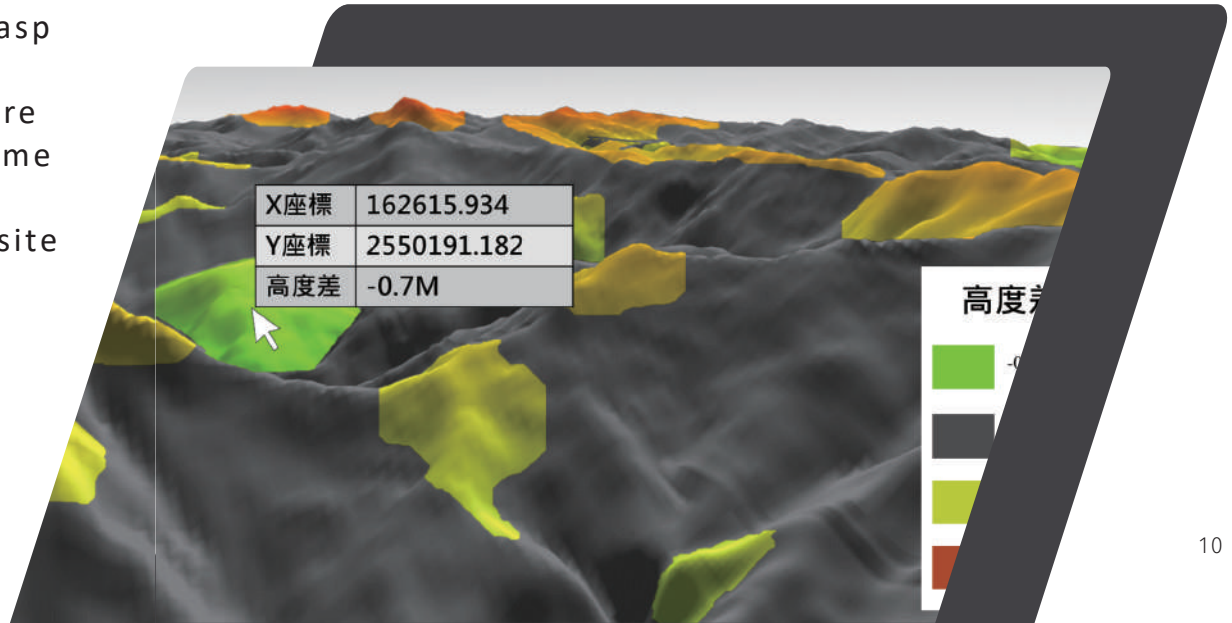
Disaster Prevention



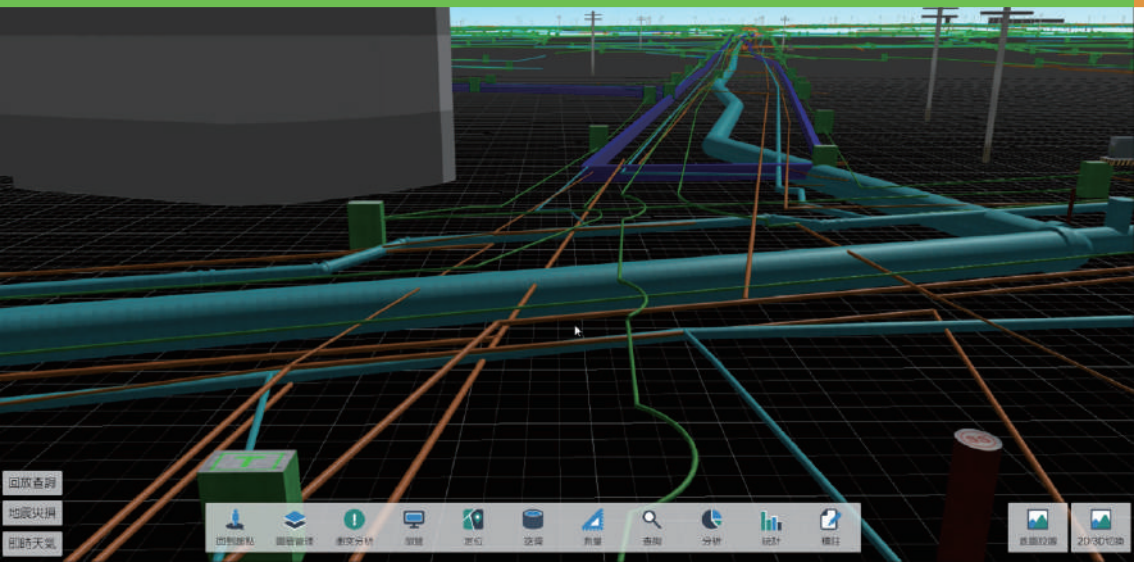
- Integrate various spatial information, including aerial photos, electronic maps, buildings, road networks, regional drainage, pipelines, and grasp the current situation in one stop.
- Use IoT real-time sensing information and future weather forecasts to simulate future rainfall time and range with 3D visualization technology.
- Organize historical data and combine with on-site observation data to predict high-risk areas.
- Plan evacuation and refuge maps to reduce losses.
- Integrate CCTV real-time images, watch live images immediately.

Terrain Analysis

- Check the rationality of the existing urban planning.
- Use multi-windows to compare and change images.
- Support 3D simulation check.
- Support earthwork calculation.
- Support 3D seabed terrain change.



Underground Pipelines

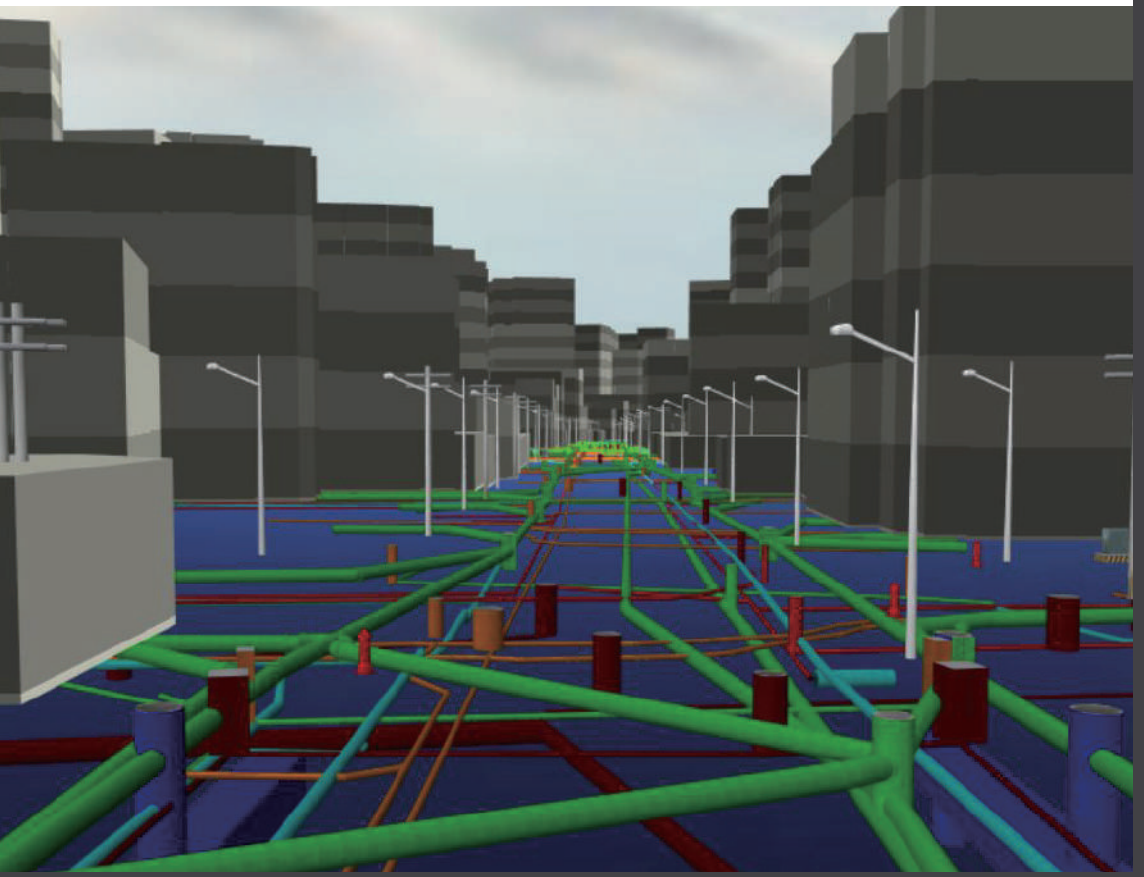


- Present 3D visualization of underground pipeline distribution, in line with national policies and regulations.
- Create many 3D models automatically based on the database data. Achieve the goal of automatic update, time saving and cost saving.
- Provide intelligent conflict analysis and hot area analysis tools to assist the government in supplementing and correcting maps and data.
- Management of underground pipelines can be applied in cities, airports, port areas, science parks and industrial areas, etc.

Virtual and Real Integrated Park Management

- Use oblique photography technology and 3D GIS technology to quickly build 3D models of the park.
- Query and view the status of buildings and equipment by combining the building information model.
- Stack various maps and data for land planning and management.
- Analyze the impact of pipelines and skylines, which is conducive to park management planning.
- Integrate IoT to help managers control park environment data in real time.

- Integrate CCTVs, with image recognition and artificial intelligence, to assist in the management and monitoring of park security.



Smart Device

AR Space-Planner

- Record positioning data, recording speed is fast and position is accurate.
- Achieve low error, measurement accuracy error ± 1%
- Support multiple people, collaborative mark fast return.
- Inspect construction sites and conduct fieldwork.
- Support Android mobile devices.

AR Geo-Camera

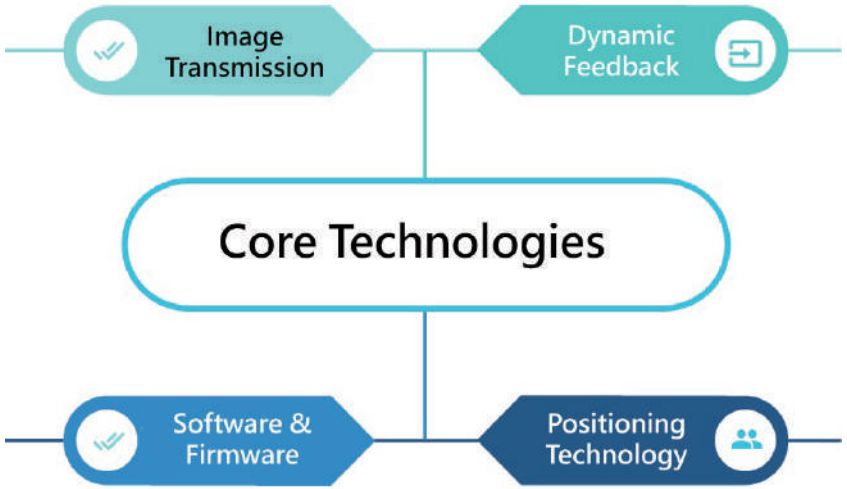
- Integrate spatial information and actual camera images, and to provide visual information integrating virtual and real using Augmented Reality (AR).
- Mount various sensors to monitor the on-site environment.
- Manage construction sites, parks, and road safety by integrating multiple camera images on the monitoring screen.

Eye Cam

- The usage is the same as that of a general camera.
- The photos can measure the distance and area of the specified location to improve work efficiency.
- Record engineering geographic coordinates.
- Upload photos to the cloud and access them at any time.

XR Entertainment – Racing

Pilotgaea always lead in high quality image integration and algorithm technology innovation. In order to enter the market of entertainment industry, we have developed XR racing, which set up the latest somatosensory chairs, best processors and fast network speeds. We also used physics engines, image algorithm, positioning technology to make it like real drive.



In 2020, we hosted the show, from 1st Dec to 28th Feb, 2021, and built a racing track model at the Pier-2 Art Center in Kaohsiung, as real simulation. When you put VR helmet on, you could see the real scene on the screen synchronized with camera on the car. Also, a virtual driving dashboard been created to show current speed, position, gear and more. With sound of engine, brake and selected music, it brought you impressive experience coming with your shaking body by somatorysensory chair at

XR Entertainment -
Ecological Adventure Chronicles

President Ren was inspired from Jurassic Park, and dreamed about that user could observe and interact with animals as closer as movie.
To achieve this dream, **PilotGaea** based on our leading image integration technology and the finest XR interactive technology, we believe **PilotGaea** will bring people a novel experience never been.

Under water

On land

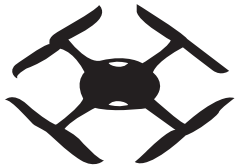
Origin

Capture fisheries are often paired with helicopters, help to comfirm the location of fish schools.
However, it is difficult to train and find a helicopter pilot who is willing to stay on boat for a half year or longer.

- Cost $500,000~600,000 per year to hire the helicopter.
- Need the operate radius up to 50km.
- Overcome the severe sea condition: strong gust, billow, return positioning, etc.

In order to lower the risk and cost,and overcome the hard flight condition, we choose the concept of Bell Boeing V-22 Osprey, start to develop the NEW Generation AI Twin-Axis Tilt Rotor UAV.

MV-22 MAGTF demo Miramar air station 2014
(By FOX 52 - Own work, CC BY-SA 4.0,
https://commons.wikimedia.org/w/index.php?curid=35908368)



Multicopter

Fixed-Wing

Compound Aircraft

Advantage

- High maneuverabilit
- VTOL

- High cruise speed
- High endurance

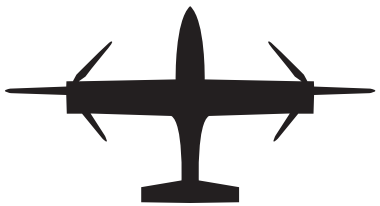
- VTOL
- Easy to design

Disadvanta

- Low speed
- Bad endurance

- Poor maneuverability
- Runway needed

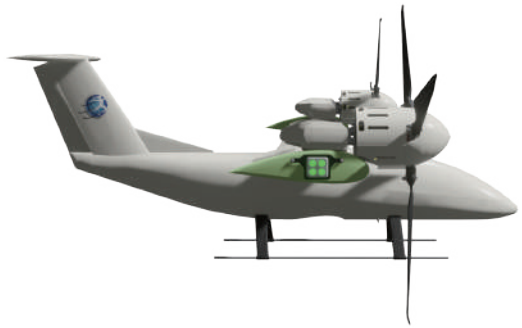
- Poor wind resistant
- Inefficient structure



Tilt Rotor UAV

- Hoverable
- Automatic VTOL on moving vehicle
- High flight efficiency
- Different from the compound aircraft on the market
- Self-balanced in strong wind

Features



There are three danger stages during flight:Take off, Transition, and Landing.
To against the billow while take off and landing, the existance of tilt rotor is very important. As shown on the picture below, two tilt rotors can provide the enough force to against side wind; The larger the wing-propeller ratio is, the better wind resistance it has.

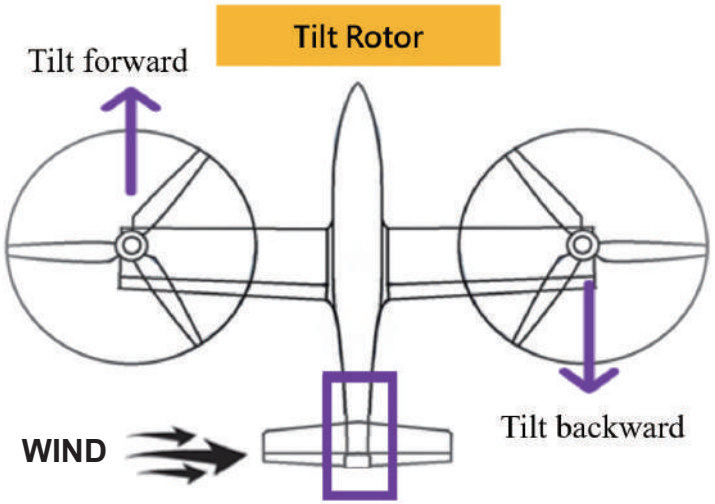
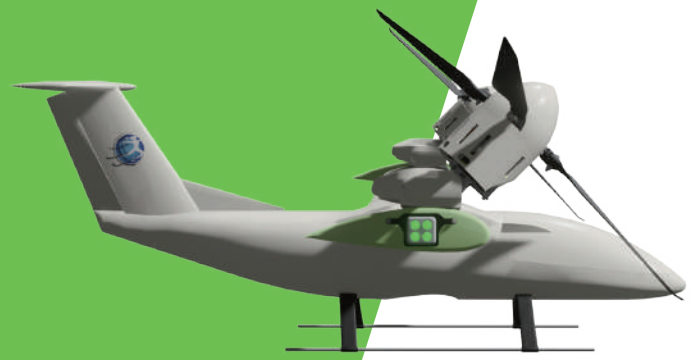


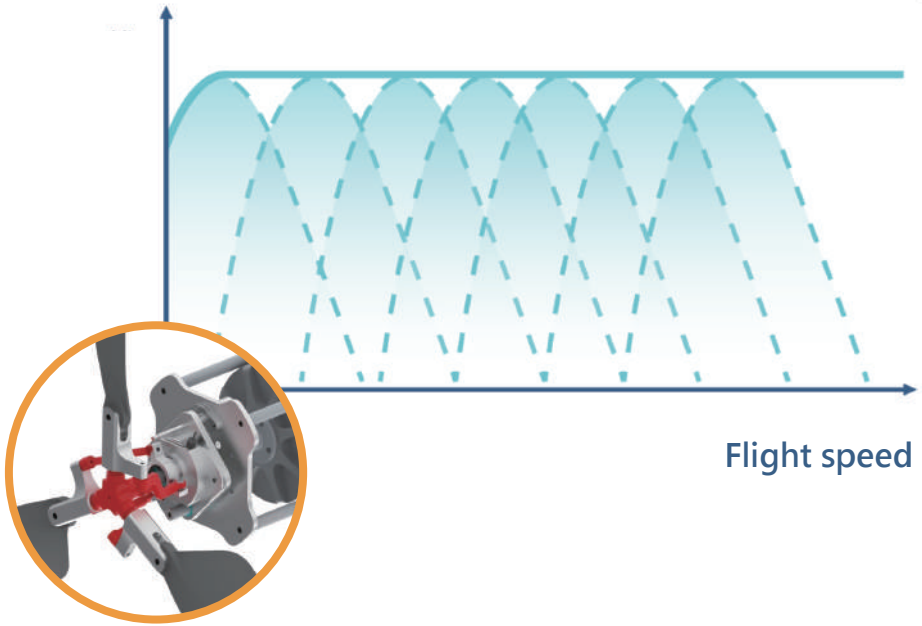
Fig. How tilt rotor against the side wind

The stage of transition is that the UAV fly from copter mode to plane mode. During this stage, the lift force will provide from propeller to wing.
In order to transform smoothly, a proper control program is needed: When can the transform start? How to transform? How fast should it transform? There are a lot of details influence flight.



The use of varible pitch is very helpful to increase the flight efficiency, and lower the consumption of energy.
Also, it provides extra control power, which is very helpful to fly in a hard condition, such as severe sea condition.

Boost efficiency



The most important thing is how UAVs locate between itself and the moving vehicle on the sea.

- GPS trace from far place
- Approach a moving target by the automatic tracking algorithm
- Visual recognize for Auto-landing from near

Our UAV can trace the vehicle from far place by GPS, and auto land on the platform by visual identity technology.

To simplify the control method, lower the difficulty of flight control of the owner, not only provide the automatic TOL and tracking, we also provide the control method refer to the operation method of video games.

Happy training, easy learning!

DragonFly

Specifications

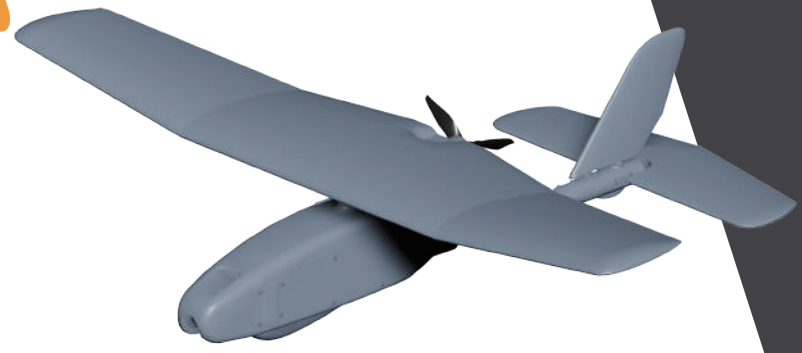
Length / Wing Span (m)	1.2/1.6
Maximum Takeoff Weight (kg)	14
Range (km)	150
Cruise/ Maximum Speed (km/hr)	80/140
Service Celling (m)	1,500
Operate Radius (km)	50
Endurance (hr)	1.8
Head/Side Wind Resistance Performance (Beaufort scale)	8/6
Power by electric	

Black Kite

Specifications

Length / Wing Span (m)	1.6/2.5
Maximum Takeoff Weight (kg)	40
Range (km)	1,000
Cruise/ Maximum Speed (km/hr)	110/160
Service Celling (m)	1,500
Operate Radius (km)	50
Endurance (hr)	9.4
Head/Side Wind Resistance Performance (Beaufort scale)	8/6
Power by electric and fuel	

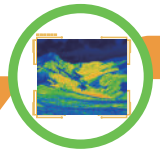
Hand-launched Reconnaissance Drone



High Endurance

Easy to carry

Quick to assemble



EO/IR Dual Camera

Features

Low RCS value, Long-time ISR, AI Video Image Detection(VID)

Unique Landing Pattern

Smart flight controller and unique structure design, minimize the impact from touch down.

Modular Design

Easy to carry, Quick to assemble, and hand-launched takeoff, Change/Upgrade payload according to mission requirement.

Specifications

Length / Wing Span (m)	1.04/1.2
Maximum Takeoff Weight (kg)	2.5
Cruise/ Maximum Speed (km/hr)	40/110
Operate Radius (km)	RF:20km / Satellite Communication
Endurance (hr)	1.5
Lens	EO/IR Dual Camera
Power by electric	

Flight Simulator

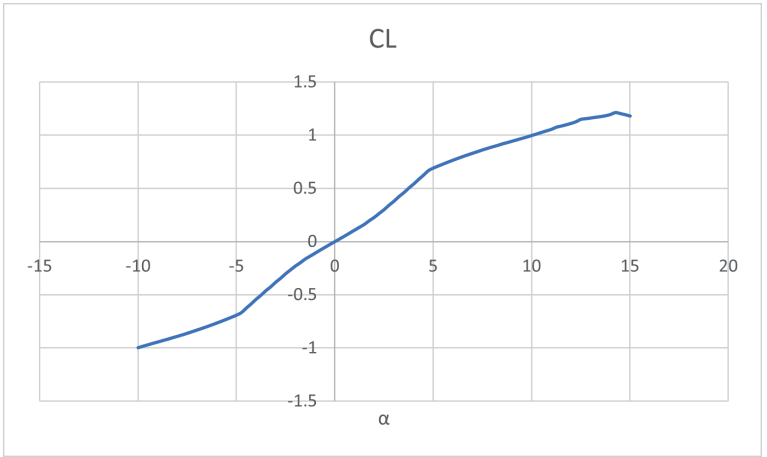
- Real-liked physics model
- Virtual flight controller
- VR device

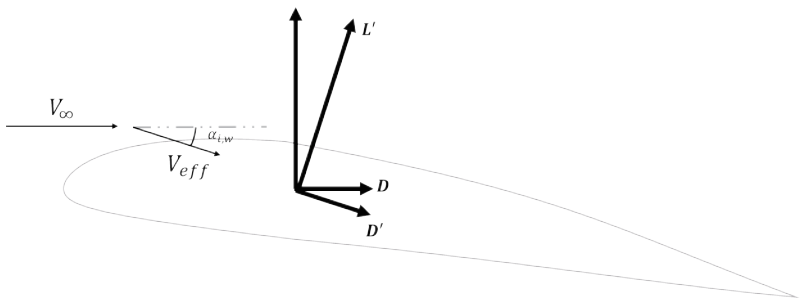
We build a flight simulator which includes real-liked physics model and the aerodynamic model of our UAVs.

- Test control programs and algorithms
- Train UAV operators

In order to build a real-liked simulator, we consider the aerodynamic:

- Air density
- Airfoil
- Airspeed
- Angle of attack
- UAV attitude
- Wet area
- Wing geometry
- …etc.





This simulator provides an excellent training condition for user to learn the method of UAV's position and movement control.

Flight Simulator

- Build your own UAV
- Fly as real vehicle
- Set envirment condition
- Start with simple Python command

Ground Task Assistant System (GTAS)

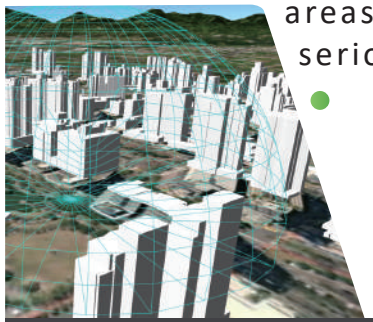
Integration of drones and geographic information systems

UAV collect Geomatics.

- Rapidly scan the target zone to efficiently improve information collection.
- Specifically collect special information (multispectral and agricultural analysis, electromagnetic induction, and radar detection)
- Immediately provide critical information for decision-making (disaster response)
- Save costs due to inconvenient terrain (Mountains, Seas, Forests, High Buildings)

Geomatics boost UAV

- Accurately provide flight paths (precision agriculture, land monitoring)
- Carefully provide hazard information to flying vehicles for safe path planning (no-flight areas, areas with serious interference, areas with serious control signal shadowing)
- Greatly enhance the applications of GIS information supply (Agricultural application, Coastline monitoring, Resource detection)



The advantage of PilotGaea Ground Task Assistant System(GTAS)

SUPPORT for more layer formats and types

PLAN better routes and waypoint tasks

ANALYZE more detailed flight logs

MONITOR real-time flight status

(combined with real-time images)

ASSIST in navigating with aerial or satellite photos

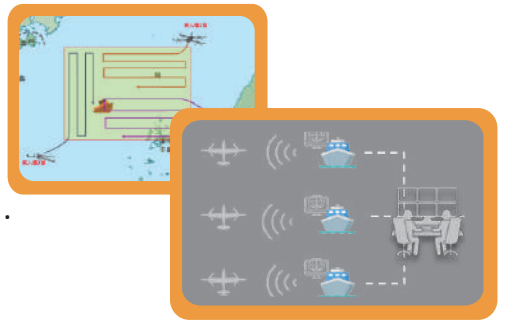
ACCURATE landing through AI vision tracking

ACHIEVE multi-UAVs joint operation by back-end map servers

Function and Technical Description

Mission Planning

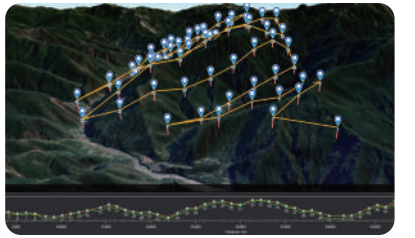
The GTAS facilitates safe UAV flights in mountainous areas and high-density urban zones.



Path Planning – Algorithms

Integrating the information of buildings and terrain, and UAV specifications, path planning is no longer the boring point-to-point, but the agilely flying through the urban jungle.

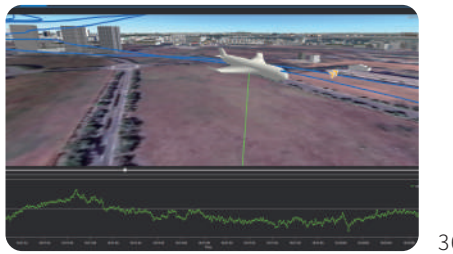
Circuit Cruise Planning

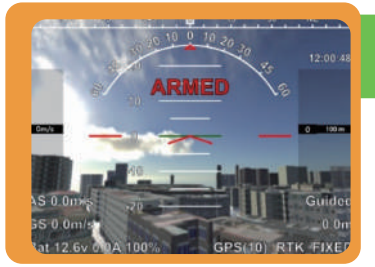


By utilizing the terrain data from the 3D map platform, routes can be planned to reduce the climbing and then lower the energy consumption.

Flight Log Review

Through 3D image demonstrations, users can visually analyze the flight attitude of the drone and interpret the flight results effectively.



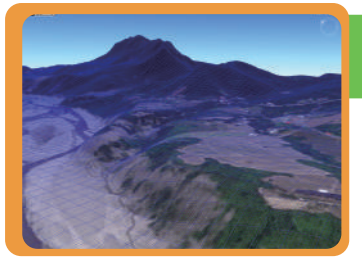


Realtime Image Overlay

Combine the real-time images and the flight data of the UAV, make flight much more vivid.

Realistic Map Scene

Users can gain a more accurate understanding of the actual situation through the simulation screen.



Various Display Type

Users can choose between satellite photos, frames, frame lines, or slope coloring types of images as the background.

Image-aid Navigation Landing

UAVs can navigate using image-based methods, which is particularly valuable in the logistics industry for object delivery. Advanced landing capabilities utilizing AI technology for precise and reliable landing operations.

Multi-UAVs Joint Operation

Back-end server integration and data sharing enable coordinated operations among multiple UAVs, incorporating radar or Internet of Things technologies.

In summary, the PilotGaea Ground Task Assistant System offers a comprehensive range of functions and technical features that enhance the capabilities and performance of UAVs in geomatics applications. With mission planning, path algorithms, circuit cruise planning, flight log analysis, augmented reality, 3D route navigation, realistic map scenes, various display options, image navigation, AI vision landing, and multi-UAV joint operations, PilotGaea empowers users with powerful tools for efficient and effective UAV operations.

Geomatics (GIS) enhances the capabilities of UAVs. It enables accurate flight path planning for applications like precision agriculture and land monitoring. Geomatics also helps in providing hazard information to ensure safe path planning for flying vehicles, considering no-flight areas, areas with serious interference, and areas with significant control signal shadowing. Additionally, it greatly enhances the applications of GIS information supply in various areas such as agricultural applications, coastline monitoring, and resource detection.