Pipistrel Special Operations Program

SURVEYOR

Available in four configurations:

Surveyor VIDEO

for *day and night video monitoring* and *recording*

Surveyor ULTRA-HIGH RES PHOTO

for *automatic 3D terrain mapping, aerial cartography* and *aerial photography*

Surveyor LDC

Look down camera for cartography

Surveyor CUSTOM

start with a *basic aircraft* and *modify to suit your mission*

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The Pipistrel SURVEYOR Airborne Surveillance program features a special aircraft that is customized with different advanced sensory packages and control systems using the Pipistrel Virus SW 100 as a base airframe with either 35-foot or 50-foot wingspan and then fully customized for your mission requirements.

The Pipistrel Virus SW 100 is the winner of two NASA competitions for excellence in aircraft technology, the PAV 2007 and the GAT 2008 challenges. The Surveyor 35 is known for extremely fast cruise speeds and being stable throughout the camera operating speed range.
If longer flights are required the Surveyor 50 is known for its super-efficient operation, extremely low noise footprint and being able to stay airborne for more than 24 hours.

Using advanced composite technologies, the airframe guarantees corrosion-free construction and extreme durability even under the harshest conditions. More than 600 aircraft from these models fly worldwide over deserts, artic ice and tropical regions. The Pipistrel Surveyors' are truly versatile aircraft with excellent handling characteristics, low purchase and operating costs and high capability sensors.

The Surveyor 35 and Surveyor 50 are available through the Pipistrel Special Operations Program with three payload configurations or the aircraft can be fully customized and built to suit your specific requirements:

• Surveyor VIDEO Platform - perfect for day and night video recording. The system is equipped with a HD camera with digital zoom and an infrared camera both mounted on a gyro-stabilized gimbal

• Surveyor ULTRA HIGH RES PHOTO Platform – superb for 3D terrain mapping and aerial photography. The system is equipped with an ultra-high resolution (36 MP) photographic camera on a gyro-stabilized gimbal

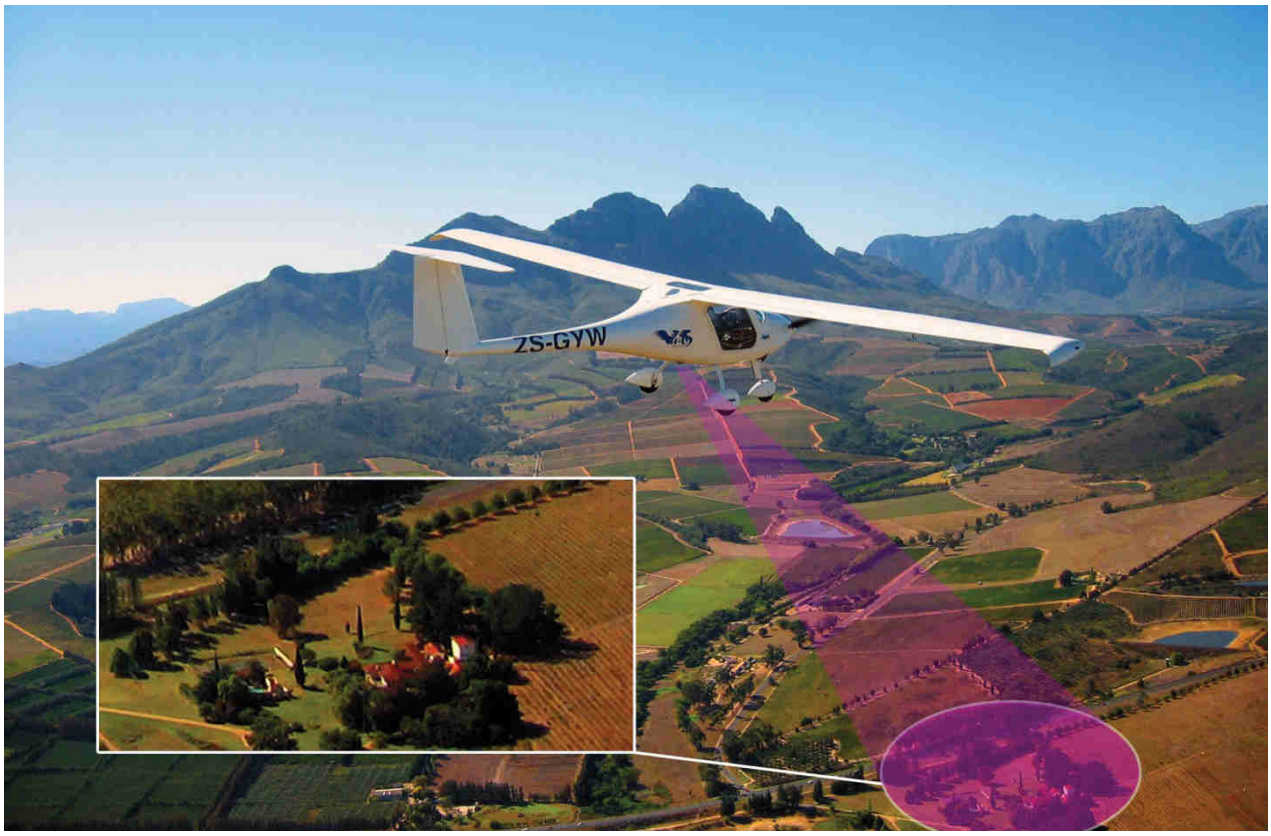
• Surveyor LDC - Look down camera for cartography using an automated image tracking and alignment gimble

• Surveyor Custom – start with our basic airframe and modify to suit your particular requirement and payloads.

Surveyor VIDEO Platform

Equipped with a High-Definition camera with 28x digital zoom for day surveillance and a 640 x 480 infrared camera, the VIDEO platform is the perfect solution for video surveillance and video recording. Typical missions include:

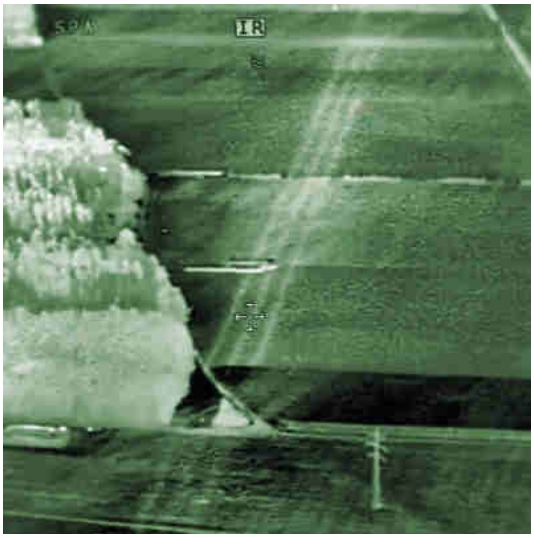
- Day and Night operations
- Border Surveillance and Control
- Homeland Security
- Traffic Observation
- Special Events Security
- Surveillance
- Moving target detection and tracking
- Convoy protection
- Fire/ Disaster Management
- Airborne Data Acquisition
- Pollution Control
- Crime prevention
- Wildlife Management
- Forest Management
- Disaster support
- Seaport monitoring
- SAR operation and victim localization
- Maritime/Costal Patrol
- Power/Oil/Pipeline Monitoring



Surveyor VIDEO Platform Sensory Package

Suitable for day and night video recording

HD camera (1280 x 720) with integrated zoom (28x) high sensitive sensor
Gyro-stabilized gimbal with vibration damping mount
FLIR sensor 640 x 480
Video digitalization module
Rugged computer with 13' touch screen interface, joystick and Windows OS
1 TB solid state HD for long endurance video recording – specifically designed for high operating altitudes
Vision Software
Stationary target tracking software
Moving target tracking software (OPTION – not included in basic configuration)



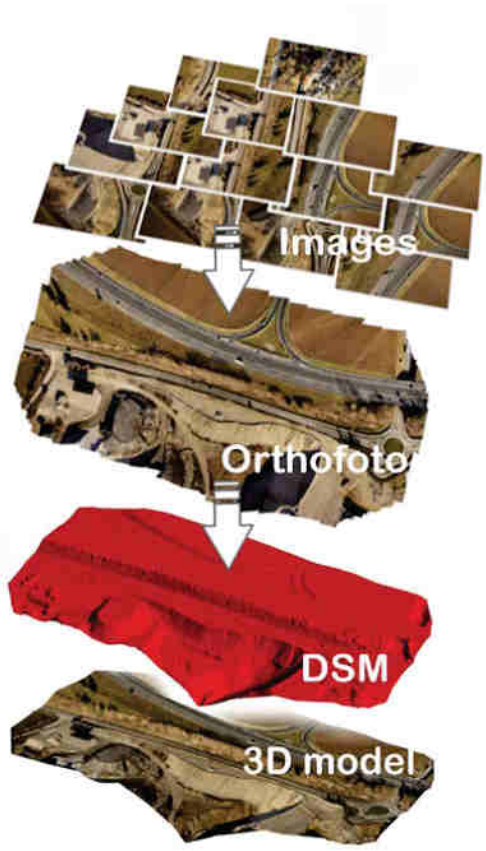
Underground Pipeline Infrared Signature

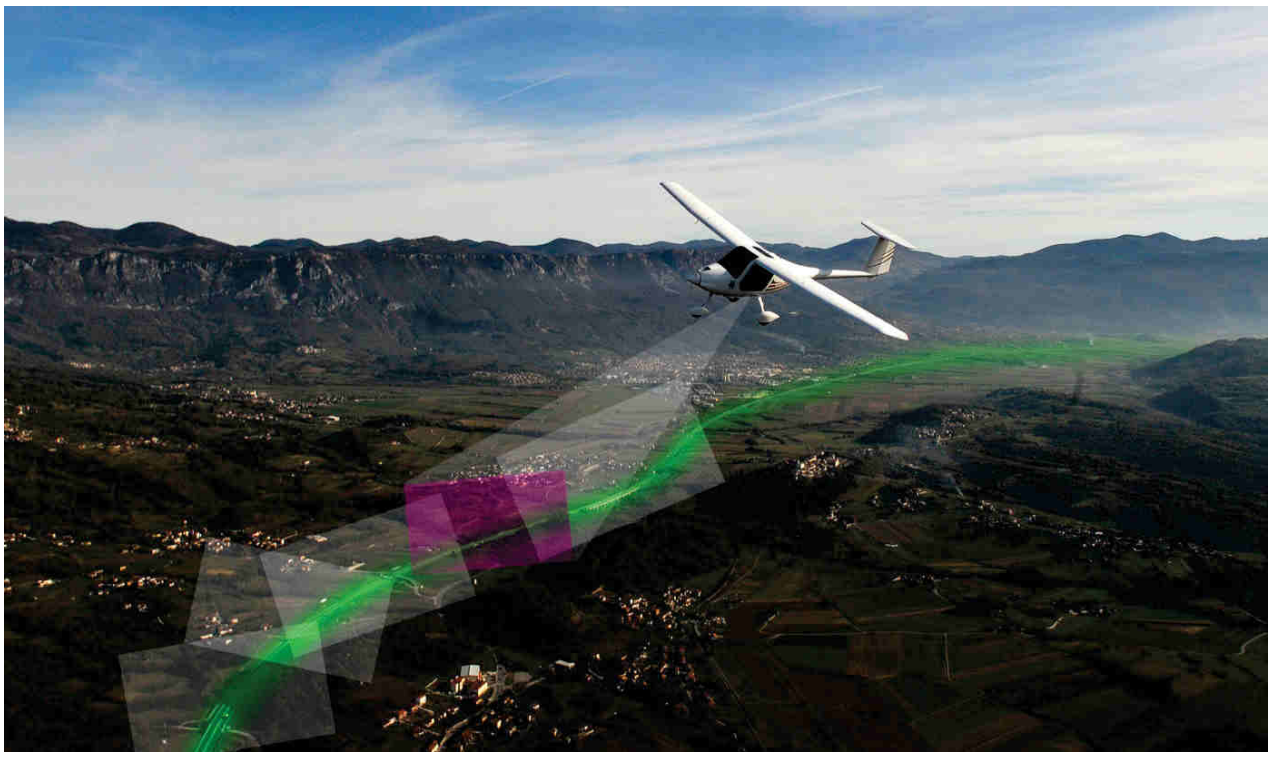
Property Surveillance

Surveyor ULTRA HIGH RES PHOTO Platform

Equipped with a 36 mega pixel camera and high vibration damping gimbal, the ultra-high resolution pictures are perfect to accomplish the following missions

- Excavation volume measurements
- Real estate mapping for property management
- Forest Management
- Infrastructure Planning
- Post-natural disaster damage assessment
- Automatic 3D map generation
- Power/Oil/Pipeline Mapping
- Infrastructure planning
- Aerial photography
- Advertisement



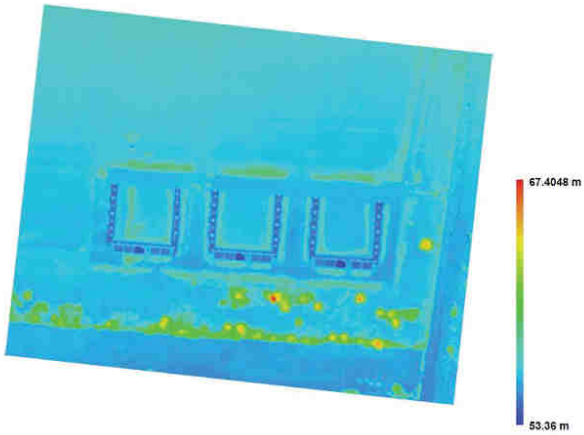


Surveyor ULTRA HIGH RES PHOTO Platform

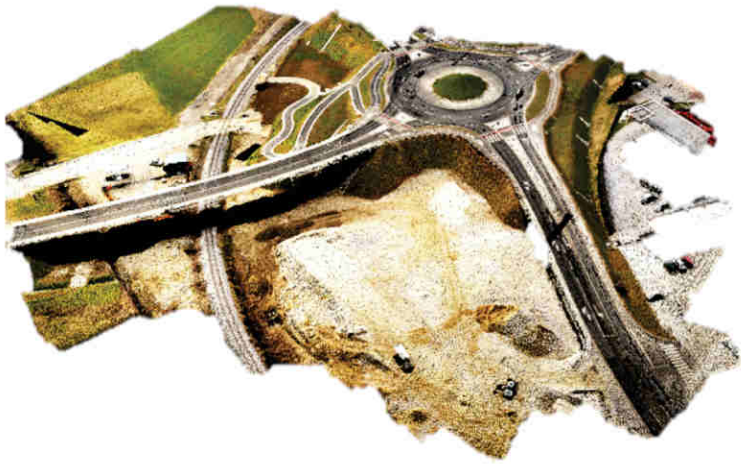
Suitable for terrain mapping and aerial photography

Ultra-high resolution camera with 36 MP pixel low noise sensor
Extra bright lens F2.8 70 mm
Image acquisition module
Gyro-stabilized gimbal with vibration damping mount
Rugged computer with 13' touch screen interface, joystick and Windows OS
Optional second display
1 TB solid state HD designed for high operating altitude
Vision Software
Stationary target tracking software
Automatic 3D Terrain Map Creation software (OPTION – not included in basic configuration)

Ultra High Resolution Photos



Terrain elevation measurements



Automatic 3D Terrain Mapping

Surveyor LDC (Look down camera)

FEATURES

- extremely light - 3kg without camera
- works with Nikon, Cannon, Hasselblad cameras (small and medium format cameras)
- tested on Pipistrel Surveyor 35 and Surveyor 50
- home pre-planning of aerial survey routes
- easy transferring navigation data into LDC via SD or USB
- automatic camera triggering above pre-planned spots
- screen confirmation of exposed pictures
- GNSS navigation
- electronic compensation of the camera direction for wind (crab angle)

Very fast development of digital high resolution sensors for small and medium format cameras brought a whole new era into vertical aero photography. Using the Surveyor means ECO attitude - professional results with low noise and gas pollution.
New GNSS and INS navigation systems enable to register precise location of each photograph what make postprocessing faster and more accurate.

Our fragile ecosystem is changing fast due to aggressive urbane development and due to natural disasters like forest fires, earthquakes, land and snowslides, floods, hurricane winds. For planning and rebuilding purposes we must do aerial monitoring, documenting changes in natural and urban environment. The LDC is well suited for small and medium areas of aerial survey and for low budget monitoring projects. Perfect for digital orthophoto map production, suited also for photogrametric measurements.

HIGH QUALITY

• precision vertical aero photography
• 24–60 MP digital camera sensors
• metric calibrated lenses and cameras
• resolution from 0.03 m.

LOW COST

The LDC system consists of on-board navigation computer, camera gimble and software for aerial survey.

Supported functions are:

• planning of aerial survey routes and exposition points
• GNSS navigation
• pilot guiding during aerial survey flight
• triggering of the camera
• correcting the camera orientation

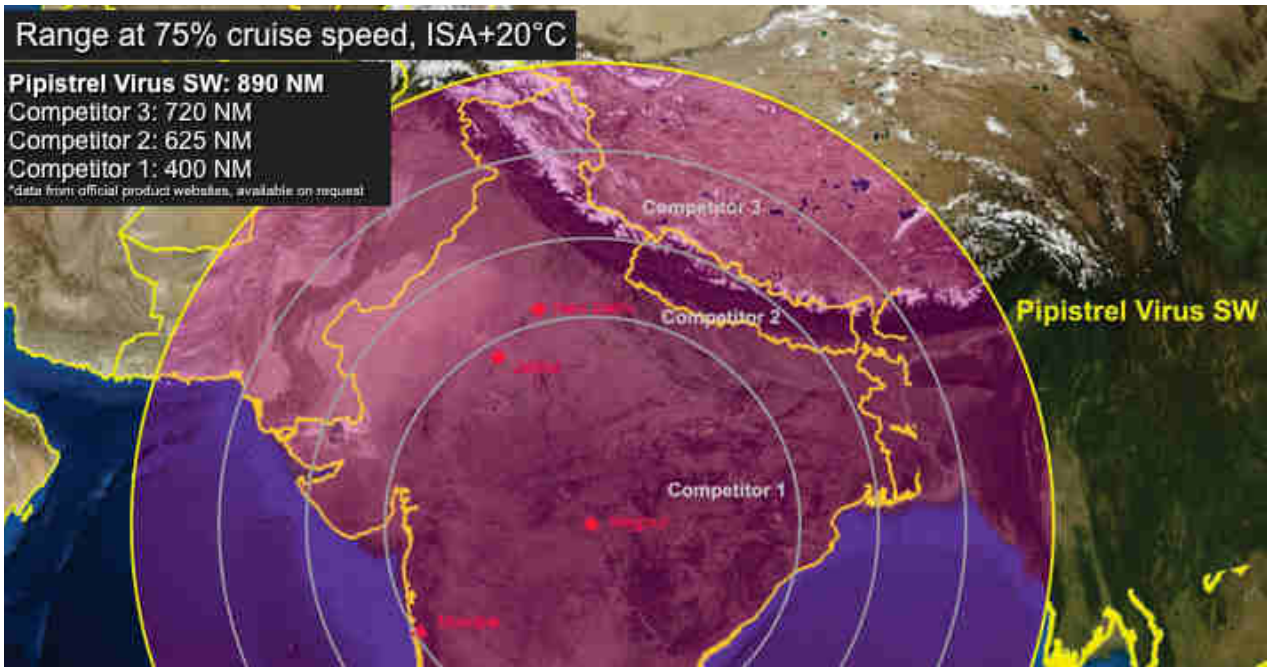
Why is the SURVEYOR the perfect choice?

Because the Pipistrel VIRUS SW 100 aircraft combines all these features in one airplane:

- class-leading high cruise speed (264 km/h) to reach the work area in short time
- over 1400 km of range at high cruising speed
- over 7 hours of endurance in loitering/observation mode
- class-leading low fuel consumption (18 liters/hour in high speed operation and 10 liters/hour in loitering operation)
- superior payload and flexibility - even with full fuel tank, two pilots can fly, carry out missions
- or train, thanks to dual cockpit controls
- extra-low operating costs combined with high dispatch rate
- extra-low maintenance costs with maintenance packs included in purchase price
- strong undercarriage suitable to operate from unpaved runway
- full aircraft parachute – in case of emergency deployment protects crew and equipment from impact
- fuselage mount for camera or wing pod mount for advanced sensor packs

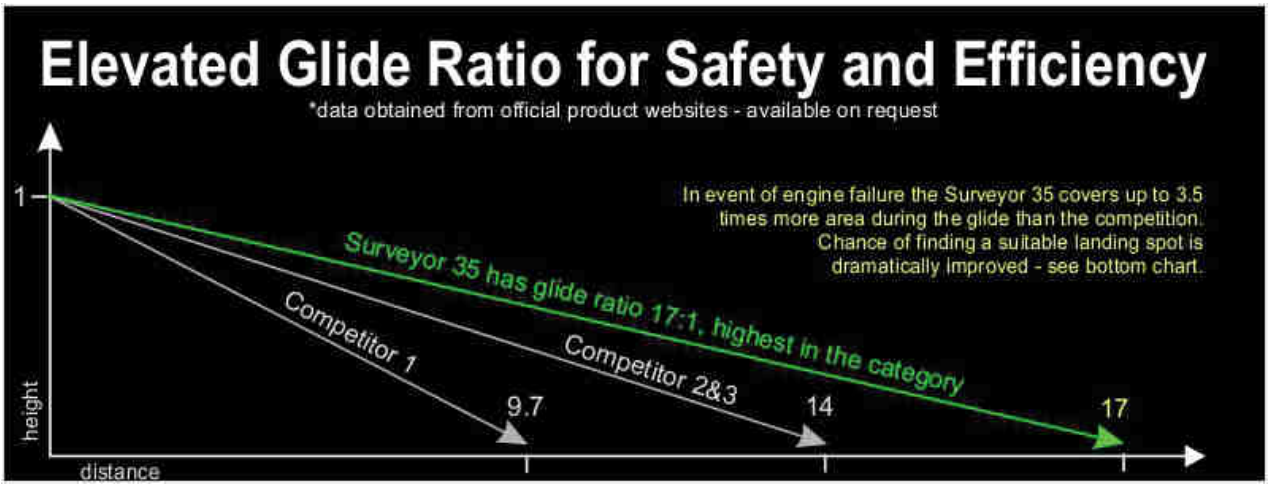
The SURVEYOR can do what others can't:

- climb higher than competitors to avoid aircraft spotting from ground observers or to cross mountains (maximum operating altitude of 5800 meters)
- ultra-long range - get there, work on the mission then return home without refueling
- observe targets at a very low orbiting speed (only 90 km/h), can replace helicopters
- endurance in loitering mode of more than 7 hours!
- high carrying capacity: with full fuel, the payload is 1 crew and 1 pilot, with a sensory pack of up to 150 kg
- take-off and landing on very short (230 meter) runways, also unprepared runways
- available for operation from rough runways using Tundra wheels (available only for tail-wheel configuration)
- high glide ratio allows to fly safely the aircraft even in case of engine failure
- aircraft disassembles for road transportation in trailer or truck
- 7-minutes deployment time from trailer to take-off using the special trailer
- special airbrakes allow a fast on-target descent
- wide temperature operating envelope (- 40C to + 55C)
- airframe floats on water surface in case of ditching during maritime surveillance mission
- *multi-fuel compatibility*, including automotive fuel with up to 10% of ethanol or AVGAS, special fuel is NOT required.



Technical data - SURVEYOR 35 aircraft

Description	SURVEYOR (Virus SW 100)
ENGINE	ROTAX 912 ULS or fuel injected 912 iS
max power	100 hp at 5800 RPM
fuel type	Automotive fuel and AVGAS, octanes between 91 and 130, up to 10% ethanol
SIZES	
wing span	10.71 m
length	6.5 m
height	1.85
wing area	9.51 m2
WEIGHTS	
max take-off weight (MTOW)	600 kg up to 750 kg
fuel tanks capacity	100 l up to 200 l
PERFORMANCES	
min mission speed for camera work	90 km/h
max mission speed for camera work	250 km/h
cruising speed (75% power)	264 km/h
max. horizontal speed	275 km/h
turbulence penetration speed Vb	250 km/h
max climb rate	6.6 m/sec
take off run	140 m
take off over 15 m obstacle	230 m
max altitude	5800 m
fuel consumption at cruise speed	18.0 l/hour
endurance at cruise speed (100 l)	5.3 h
max operating temperature	55 ° C
range distance	1415 km (with 100 l of fuel, cruise speed)
Pipistrel reserves the right to revise the listed data whenever occasioned by product improvement, government/authority regulations or any other cause.	



Technical data - SURVEYOR 50 aircraft

Description	SURVEYOR 50
ENGINE	ROTAX 912 80 or 100 hp engines or fuel injected 912 iS
max power	80/100 hp at 5800 RPM
fuel type	Automotive fuel and AVGAS, octanes between 91 and 130, up to 10% ethanol
SIZES	
wing span	14.97 m
length	6.5 m
height	1.82
wing area	12.26 m2
WEIGHTS	
max take-off weight (MTOW)	600 kg up to 750 kg
fuel tanks capacity	100 l up to 200 l
PERFORMANCES	
min mission speed for camera work	90 km/h
max mission speed for camera work	200 km/h
cruising speed (75% power)	205 km/h
max. horizontal speed	222 km/h
turbulence penetration speed Vb	126 km/h
max climb rate	6.6 m/sec
take off run	140 m
take off over 15 m obstacle	230 m
max altitude	5800 m
fuel consumption at cruise speed	13.5 l/hour
endurance at cruise speed (100 l)	7.4 h
max operating temperature	55 ° C
range distance	1518 km (with 100 l of fuel, cruise speed)
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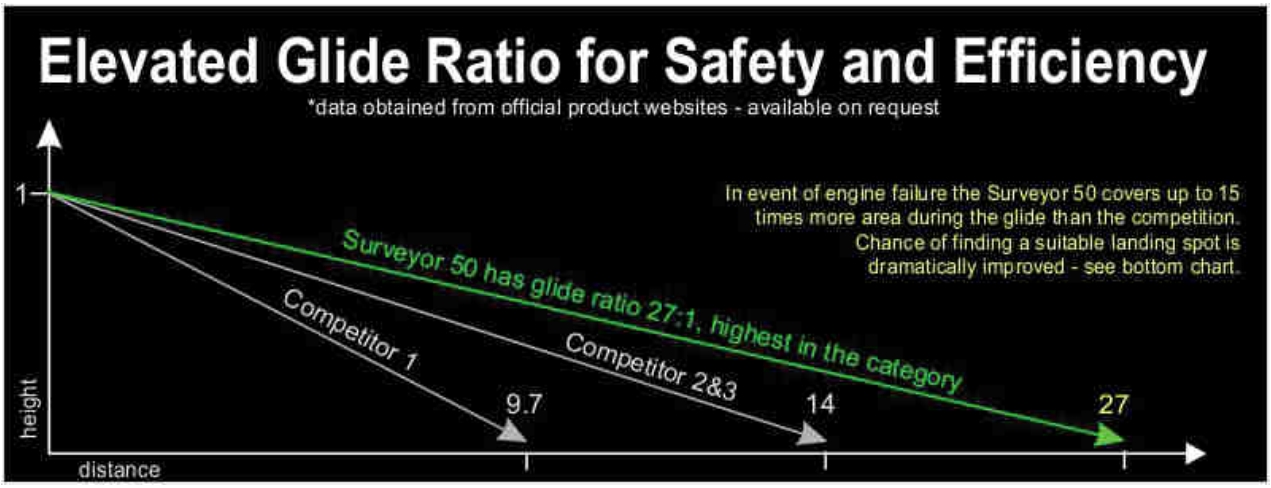

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CUSTOMIZATION & OPTIONS

PIPISTREL SPECIAL OPERATIONS PROGRAM

Surveyor VIDEO platform

Suitable for day and night video surveillance and recording

1. Aircraft Surveyor 35 & 50 customized for surveillance operations
Nose-wheel configuration OR tail-wheel with Tundra wheels
Advanced avionics with GPS, moving maps and 2 LCD displays
Auto-pilot with programmable way-points
Two-seats with ergonomic interior for long-range missions
Superior ventilation for tropical and desert conditions
Aircraft Navigation and Strobe LED lights and landing light
Scratch resistance low-reflection paint
Noise reducing firewall for quite cockpit
UV protected, tinted, scratch resistant Lexan windshield
Easy connection of wing and tail mechanical controls for easy deployment from trailer
Hydraulic disk brakes on the main wheels
Advanced dual electrical system
Integrated fuel tanks, 2 x 50 liters in the wings with filler neck
Spare parts for ordinary maintenance covering 1000 hours of operation
Full aircraft ballistic parachute rescue system
Airbrakes for fast descent on target
Integration of sensors pack and sensors control systems
2. Sensory package
HD camera (1280 x 720) with integrated zoom (28x) high sensitive sensor
FLIR sensor 640 x 480
(See detailed specification under VIDEO Platform Sensory Package for all material)
3. Maintenance pack covering 1000 hours
Spare parts package for regular maintenance covering 1000 hours of operation
4. Full Operating Team Training at Pipistrel HQ
Maintenance training delivered at Pipistrel HQ for 2 person per aircraft
Camera and sensors operation training at PIPISTREL HQ for 2 persons per aircraft
Type conversion training delivered at Pipistrel HQ for 2 pilot per aircraft
5 year telephone and e-mail remote support
TOTAL COST (EX-WORKS)
option MOVING TARGET TRACKING SOFTWARE

Surveyor ULTRA HIGH RES PHOTO Platform

Suitable for 3D terrain mapping and aerial photography

1. Aircraft Surveyor 35 & 50 customized for surveillance operations
Nose-wheel configuration OR tail-wheel with Tundra wheels
Advanced avionics with GPS, moving maps and 2 LCD displays
Auto-pilot with programmable way-points
Two-seats with ergonomic interior for long-range missions
Superior ventilation for tropical and desert conditions
Aircraft Navigation and Strobe LED lights and landing light
Scratch resistance low-reflection paint
Noise reducing firewall for quite cockpit
UV protected, tinted, scratch resistant Lexan windshield
Easy connection of wing and tail mechanical controls for easy deployment from trailer
Hydraulic disk brakes on the main wheels
Advanced dual electrical system
Integrated fuel tanks, 2 x 50 liters in the wings with filler neck
Spare parts for ordinary maintenance covering 1000 hours of operation
Full aircraft ballistic parachute rescue system
Airbrakes for fast descent on target
Integration of sensors pack and sensors control systems
2. Sensory package
Ultra-high resolution camera with 36 mega pixels and low noise sensor
(See detailed specification under ULTRA HIGH RES PHOTOS Platform Sensory Package for all material)
3. Maintenance pack covering 1000 hours
Spare parts package for regular maintenance covering 1000 hours of operation
4. Full Operating Team Training at Pipistrel HQ
Maintenance training delivered at Pipistrel HQ for 2 person per aircraft
Camera and sensors operation training at PIPISTREL HQ for 2 persons per aircraft
Type conversion training delivered at Pipistrel HQ for 2 pilot per aircraft
5 year telephone and e-mail remote support
TOTAL COST (EX-WORKS)
option 3D Terrain Map Creation software
option MOVING TARGET TRACKING SOFTWARE

Detailed SENSOR Information for the Surveyor Video Only

The current surveyor is equipped with a gyro stabilized 2-camera gimbal with:

- geo-lock capability
- directional-lock capability
- recording video from either source
- recording still images from either source

The most basic sensors used are FLIR TAU640 for the IR spectrum (640 x 480) and Sony FCB-EX980SP PAL (video) and 800,000 pix (still) resolution with 26 x optical zoom.
There are many options to how the gimbal can be configured, with much better and more capable sensors (choose any two sensors):

Sensor #1A - Daylight Camera with Zoom Lens
Model: FCB-EX980S or FCB-EX980SP
Effective Picture Elements: 0.74 Megapixels
Field of View (deg): 1.6 (Tele) - 42.0 (Wide)
Zoom Range: 26 x Optical Zoom (3.5 - 91 mm); F1.6 - F3.8

Sensor #1B - HD Daylight Camera with Zoom Lens
Model: FCB-H11
Effective Picture Elements: Approx 2.0 Megapixels
Field of View (deg): 5.4 (Tele) - 50.0 (Wide)
Zoom Range: 10 x Optical Zoom (5.1 - 51 mm); F1.8 - F2.1

Sensor #2A (1) - 320 Uncooled IR Sensor Digital Zoom
Model: FLIR Tau 320
Field of View (deg): 18 x 14
Resolution: 324 x 256 FPS: 9 or 25 Hz

Sensor #2A (2) - 320 Uncooled IR Sensor Digital Zoom
Model: Thermoteknix Miricle 110K Xti
Field of View (deg): 15.6 x 11.7
Resolution: 384 x 288 FPS: 9 or 25 Hz

Sensor #2B - 640 Uncooled IR Sensor Digital Zoom
Model: FLIR Tau 640
Field of View (deg): 18 x 14 OR 25 x 20
Resolution: 640 x 480 FPS: 9 or 25 Hz

Sensor #2C - GigE Daylight Sensor, Up to 16 MP Model: Procillica GC / GE Zoom Range: 35 - 50 mm Fixed Zoom Resolution: 0.5 - 16 Megapixels
Sensor #2D - USB Sensor Any USB sensor within size limitation of the gimbal
Sensor #3 - Eyesafe Laser Range Finder (LRF) Laser Type: Nd : YAG / OPO Wavelength: 1,565 - 1,575 Pulse Rate: 12 ppm Range: 6,500 m Resolution: +/- 2m

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