



Technical Proposal

STROMKIND GMBH

www.stromkind.com



SUMMARY

Stromkind designs and manufactures unmanned systems for air, land and sea operations, bringing these areas together to increase the level of automation, lower the cost of personnel and reduce potential risks in operations.

The aerial drone market is already a billion-dollar market with strong growth and a wide range of applications and business cases. The maritime drone market is underserved and has an even higher growth rate.

With our experience and background in drone manufacturing and operations, we have developed modular, scalable systems that are easy to use and allow us to produce faster and deliver sooner than the competition - at a fraction of the cost.



INTRODUCTION

PRODUCT AND STATUS

Stromkind develops modular, scalable unmanned systems and components for air, land and sea applications. In addition, we seek to increase the level of automation by combining these elements.

The UAVs can take off and land automatically from a landing platform mounted on the rover and are pre-programmed with a specific mission. The UAV can also be equipped with multiple sensors or floats for water landings. Several air, land and sea systems have been delivered to customers for a variety of applications.

CUSTOMER NEEDS

By using our drones, expensive manned applications can be carried out much more cheaply, safely and efficiently. Instead of a manned helicopter equipped with an EO/IR camera for nighttime surveillance missions, for example, our drone can carry the same sensor without the need for a VFR-equipped twin-turbine helicopter for populated areas, increasing the cost per hour of operation by 50 to 100 times, with further constraints on equipment availability, pilots, and insurance. In addition, the noise level of the drone is much lower than that of the manned helicopter and therefore the acceptance of its use is often much better.

USP

Stromkind's Flettner approach is the most efficient flight platform besides a coaxial helicopter.

Compared to the mechanical complex coaxial system with hollow shaft and two swashplates, the Flettner design consists of two identical (except for the direction of rotation) rotor heads which are inclined by 10-15% and whose rotor blades are offset by 90 degrees in order to be able to mesh and be driven by one motor.

Compared to many other designs, this concept is more scalable and allows rapid adaptation to alternative propulsion systems, payloads and sensors. The mechanical structure can be scaled up and down with appropriate actuators for the swashplate, while the overall control loop and avionics remain the same. This means that a small training helicopter can be flown with the same ground control station as a large cargo drone. In addition, the drone's floats (which are electrically powered and controlled by the same GCS) allow for silent relocation on the water and takeoff and landing in safe, non-populated areas.



STR-35



STR-35 System

UAV

STR-35 is an energy efficient intermeshing helicopter design capable to lift up 35kg of load and can reach up to 120km/h of speed. Its open architecture allows to integrate several sensors and use IP Datalinks on different frequencies. The system is equipped with radar altimeter for automatics autorotation capability. Range can be extended by additional fuel tanks.

GCS

Th 19" inch rack based modular ground control station that can be powered either by wide range power supply or buffered by UPS or Battery Pack for save and silent operation. There are different Data Link System form short range to long range application and Sat link available.

PAYLOADS

Stromkind produces and assembles the systems but can also adapt to customers needs and integrate payloads provided by customer or on customer request.

INTEGRATION

Stromkind also provides integration of entire drone system, either stationary or mobile. We have integration Kits for conventional transporter such as Ford, Iveco, Mercedes Sprinter but also have done integration in armored vehicles and on ships for shipboard operation.

ADD ON

Stromkind provides all the necessary tools and spares to operate the system. "Out of the Box". Different Packages of Toolkit and Spares are available.

TRAINING

Stromkind provided in-house maintenance and operational training in different levels up to "Train the Trainer". The real operation can be pre simulated within the HIL environment and uploaded to UAV for real automated mission.



UAV

STR-35



USP

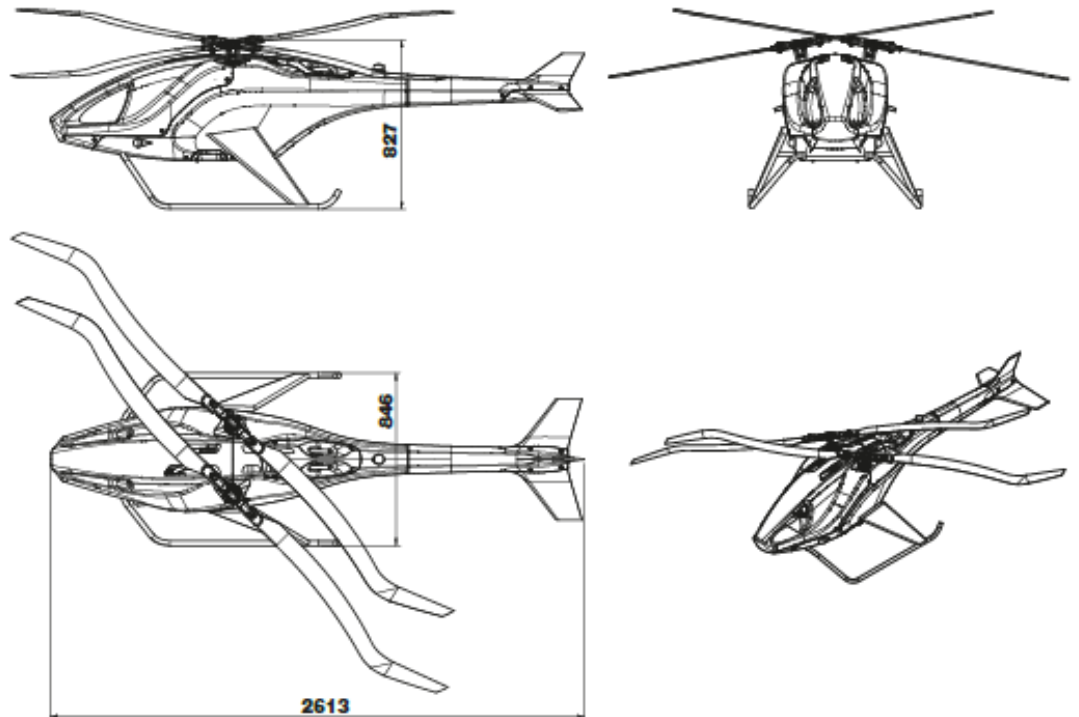
- Efficient Flettner Design
- Modular Design
- High payload capability
- ADSB / Mode S
- Radar Altimeter
- Collision Avoidance optional
- Different Datalinks available
- Redundant Actuator Configuration



STR-35 Front

Data	Value	Comments
MTOW	100kg	
EW	58kg	65kg in max. config
Payload	35kg	Incl. 9l fuel
Boxer Engine (Double Piston)	170cc	Automatic Decompression
Ignition	Dual Electronical	
Electrical Starter	1kW	
Starter Battery	LiFe /80Ah	
Avionics Box	150W	
Servos	HV 7,4V buffered	Redundant configuration on Swash plate
Generic IOs	12	
Generic Serial Interface	1	4 Upon request
Can Bus	1	2 Upon request
Ethernet	2	Up 8 on request

Data	Value	Comments
Max endurance internal	1,5h	Internal 9l
Max endurance external	4h / 6h	with external fuel tank 10 / 15l
Max Speed	36m/s	
Max.Auto Takeoff Wind	10m/s	
Max.Land Takeoff Wind	10m/s	
Max. Wind	30m/s	
Max Altitude	8000ft	with high altitude blades 12000ft
Action Radius	Up to 200km *	(with 100km Datalink)
Action Radius	Up to 750km*	(with Satlink Datalink)
Temperature Range	-30** /+55	**Preheated Starter Battery
Weather Condition	IP 65 / Rain Weather	With NLE Blades





STR-35 Parts

Part	Configuration	Qty
STR-AIR-U35		1
	Mechanical Kit	1
	Boxer Engine with E-Starter / Generator with muffler and cooling.	1
	Landing Skit	1
	Hull / Grey Ground / Nav Lights /R/G/W	1
	Custom Paint and Design	Upon request
	Extended Fuel Tanks on Skit	1
	Avionics E Box	1
	Radar Altimeter	1
	Transponder with Antenna	1
	Data Link Modem	1
	DL Antennas	2
	Payload Bay	1
	Rotor Blades	4 / (2L / 2 R)

STR-35 UAV Options

Options	Modules
STR-AIR-PCM	Pilot Cam Module (Front Pilot Cam)
STR-AIR-DCM	Cam Module (Down looking Pilot Cam)
STR-AIR-LSM	Loudspeaker Module
STR-AIR-LLM	Landing Light Module
STR-AIR-SLM	Search Light Module
STR-AIR-SDM	Second Data Link Module
STR-AIR-SLC	Sat link Modem (Certus)
STR-AIR-SLS	Sat link Modem (Starklink)
STR-AIR-CA3	Collision Avoidance System (3 Cam)
STR-AIR-CA5	Collision Avoidance System (5Cam)

GCS

The GCS is 19" inch industrial Standard Rack Based System. All connectors are military grade 38999 Series 3 connectors. The Datalink System is embedded in RF transparent nano particle coated Radom enclosure that can be preheated for harsh environmental conditions upon request. Within the Radom several antennas for different frequencies ad radiation pattern are installed.



GCS with Data Link System

Part	Configuration	Qty
STAR-AIR-GCS		1
	Rack Based GCS	1
	GCS SW incl Dongle	1
	Cable Kit	1
	Monitors / Keyboards/ Mouse / Controller	4/2/1
	Data Link System	1
	Data Link Cable 25m	1
	Tripod	1
	Transport Bag for Tripod	1

The GCS modular design allows to connect a wide variation of sensors. Therefore we made a generic Interface that allows to interact and connect to the UAV in transparent, semi transparent or isolated mode. The Interfaces are standardized on ground and in air.

Connector Data	Type	Qty
Data 1 (Ethernet and Serial and Power) (connected to Flight Controller)	Mil 38999 Series 3 22Pin	1
Data 2 (Ethernet Serial and Power)(Independent from flight Controller)	Mil 38999 Series 3 22Pin	1
Power 1	Mil 38999 Series 3 4 Pin	1
Power 2	Mil 38999 Series 3 4Pin	1
SMA 1 (GPS Position GCS)	SMA Female	1

Technical Data

Data	Type	Comments
Frequency Range	2,4GHz / 5,4 GHz	optional other Frequencies available
Antenna Gain	11-17 dBi	
Patter AZ	360 Degree	Omni Directional can be reduced / Sectors of 120
Patter EL	20 Degree	Adjustable on Operation
Range	5-50km	depending Antenna position
Data Rate	54Mbit/s Max. Typical 5Mbits/s (50km range)	FBR or VBR
Power Consumption	230V	>500W
Dimensions Rack (L/W/H)	6HE (310/ 484mm/3*890)	There needs to be 10 cm spacing behind the GCS for Connecting



PAYLOADS

The STR 35 modular design allows to carry a wide variation of sensors. The Sensors or typically mounted on the landing skit. That allows fast interchangeable setup without long installation time of payloads onto the airframe. Further more the Sensors can be exchanged and stored while remaining on the landing skits to ensure save transportation of expensive sensors.

We have integrated

- Octopus Cameras 140/175/180/95
- Overwatch PT8D
- IMSI Catcher
- Riegl Laser
- DSLR / Nikkon / Sony Cameras
- Phase One Camera Array
- Vleipsis System

The Boxer Engine is equipped with 1kW Starter / Generator and DC /DC converter to provide 14V/ 48 V DC or any other Voltage between 1,2V to 4(upon request.

Default there is the Payload Interface on the UAV with 6 connectors with dual GPS Signal (upon request with DC Power over Bias TEE)

Connector Data	Type	Qty
Data 1 (Ethernet and Serial and Power) (connected to Flight Controller)	Mil 38999 Series 3 22Pin	1
Data 2 (Ethernet Serial and Power(Independent from flight Controller)	Mil 38999 Series 3 22Pin	1
Power 1	Mil 38999 Series 3 4 Pin	1
Power 2	Mil 38999 Series 3 4Pin	1
SMA 1 (Front)	SMA Female	1
SMA2 (Rear)	SMA Female	1



INTEGRATION

The transportation of up to two UAVs and the operational Installation of Ground Control Station can be done in one conventional transport vehicle.



STR-35 / STR-50 / GROUND CONTROL STATION



Mercedes Sprinter Integration



ADD ONS

Part	Configuration	Qty
STR-AIR-RBC	Case for Rotor Blades	1
STR-AIR-FST	Fueling Station (manual)	1
STR-AIR-PFK	Preflight Tool Kit	1
STR-AIR-TPG	Transport Gig	1
STR-AIR-TCD	Transport Case DL	1
STR-AIR-RMG	Rack 6HE	1

Training Add Ons / Flight (optional)

Part	Configuration	Qty
STR-AIR-HIL	Hardware in the Loop Simulator	1
STR-AIR-SWS	Simulation SW	1
STR-AIR-SWD	Software Dongle SW	1
STR-AIR-M27	Monitor 27"	1
STR-AIR-SUP (1Year)	Access to Updated on DB	1

Training Add Ons / Maintenance (optional)

Part	Configuration	Qty
STR-AIR-MTA	Maintenance Tools (Level A)	1
STR-AIR-MTB	Maintenance Tool B (Level B)	1
STR-AIR-SWD	Software Dongle SW	1
STR-AIR-SUP (1Year)	Access to Updated on DB	1
STR-AIR-IPC	Printed IPC	1

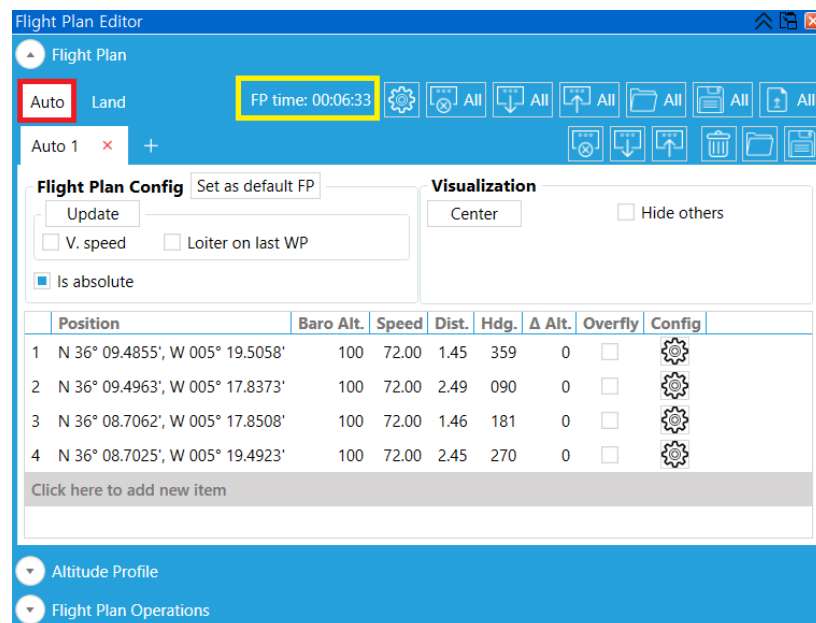
TRAINING

The ground control station SW is running on the GCS Flight Computer. It allows to program missions by waypoints planning, automatic waypoint generator or over Google Earth and KLM import.



GCS GUI / PFD / TELEMETRY ENGINE / MAP

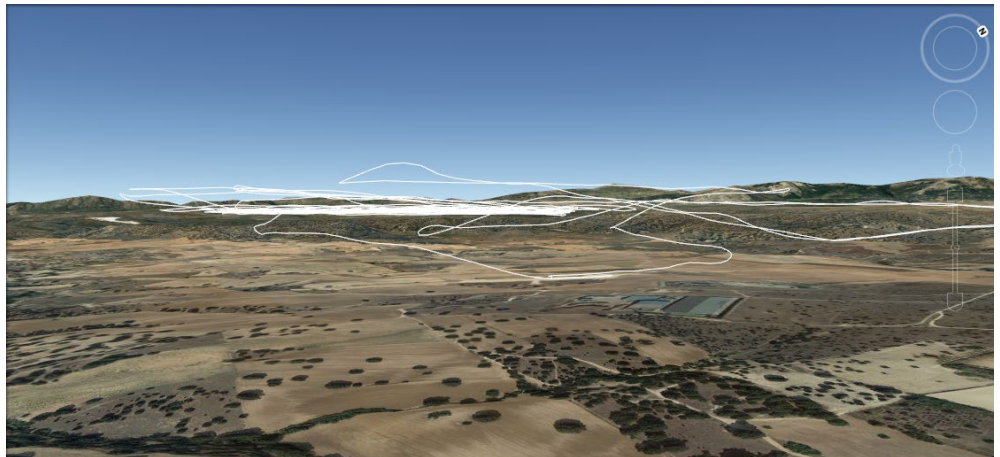
The GCS SW can be depicted on several screens (Object Oriented) for modifications. and customer requirements SKD are available. The Maps can be loaded out of open maps / google maps or any Map Material which is referenced ins several formats. The terrain models can be installed from any DEM source.



Waypoint Programming

Several Flight Plans can be preprogrammed and also several landing plans can be stored and conditional jumps can be activated.

The entire mission can be simulated (with generic >200kg UAV model) and programmed within the system and parameter variation can be set during flight. (With the Train the trainer SW Dongle and Lic).



<i>Part</i>	<i>Configuration</i>	<i>Qty</i>
<i>STR-AIR-FTO</i>	<i>Flight Training Operator</i>	<i>1</i>
<i>STR-AIR-FTT</i>	<i>Flight Training Trainer</i>	<i>optional</i>

Maintenanc Training

Stromkind provides in house maintenance training and maintenance of Delivered systems on system and module level. The delivery of the systems include. Special tools that are needed to maintain the system. Generic Tool shop equipment can be provided as well.

<i>Part</i>	<i>Configuration</i>	<i>Qty</i>
<i>STR-AIR-MTA</i>	<i>Maintenance Training (Level A)</i>	<i>1</i>
<i>STR-AIR-MTT</i>	<i>Maintenance Training Trainer (Level A)</i>	<i>optional</i>



PO Number	Description	Qty	Price	Total
UAV				
STR-AIR-U35	UAV STR 35- Complete	1		
STR-AIR-PCM	UAV- Pilot Cam Module	1		
GCS				
STAR-AIR-GCS	UAV GCS Complete	1		
ADD ONS				
STR-AIR-RBC	Case for Rotor Blades	1		
STR-AIR-FST	Fueling Station (manual)	1		
STR-AIR-PFK	Preflight Tool Kit	1		
STR-AIR-TPG	Transport Gig	1		
STR-AIR-TCD	Transport Case DL	1		
STR-AIR-RM6	Rack 6HE	1		
STR-AIR-HIL	Hardware in the Loop Simulator	1		
STR-AIR-SWS	Simulation SW	1		
STR-AIR-SWD	Software Dongle SW	1		
STR-AIR-IPC	Printed IPC	1		
STR-AIR-FTO	Flight Training OPS	1		
STR-AIR-MTA	Maintenance Training (Level A)	1		
			TOTAL	

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