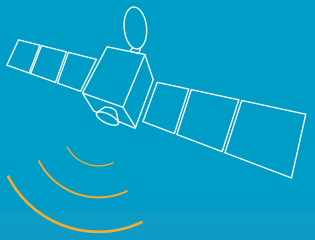
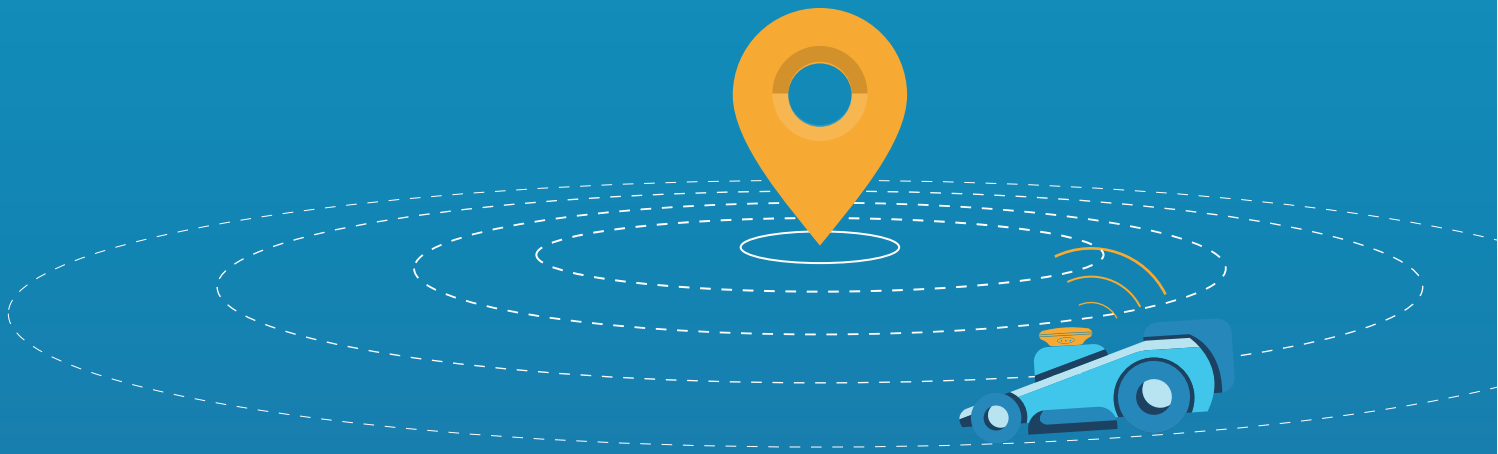
SinoGNSS®
By ComNav Technology Ltd.



HIGH PRECISION GNSS SOLUTION

FOR ROBOTIC MOWERS

- Cost-Effective
- Maximum Flexibility
- Reliable Accuracy
- Improved Efficiency



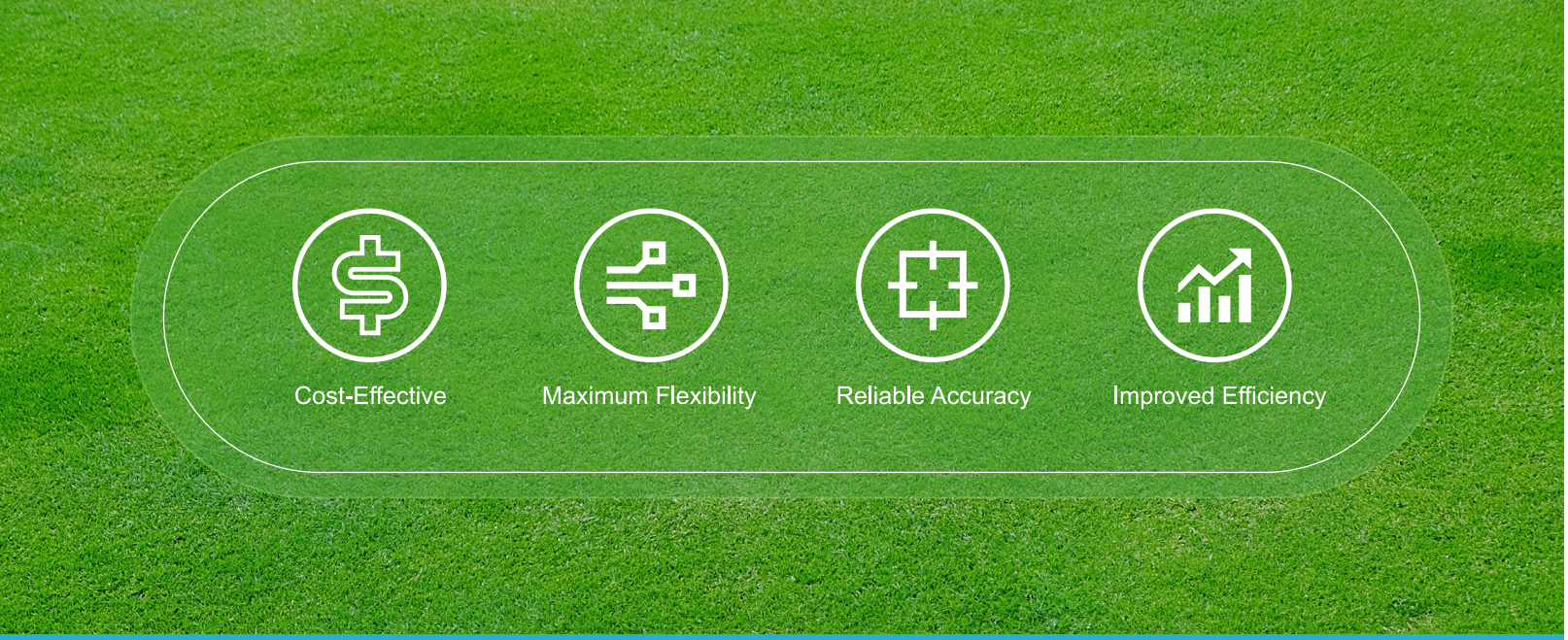
COMNAV PROVIDE COST-EFFECTIVE AND HIGHLY FLEXIBLE GNSS SOLUTION FOR ROBOTIC MOWERS

The utility of GNSS technology in robotic mowers has emerged as a way to optimize mowing efficiency and accuracy. Historically, robotic mowers operated autonomously by using the local CORS or self built CORS is of high cost and continuous maintenance input. With ComNav Technology's current robotic mower solution, it is accessible to benefit from reliable high precision service easily and cost-saving with zero operational input and highly integrated design. ComNav has cooperated with OEMs to apply this solution in internal production of the robotic lawn mowers.

CHALLENGES

STRICTLY REGULATED RADIO FREQUENCIES ACROSS REGIONS

There is also challenge with regulatory compliance. Some areas are strict regulations around the use of radio frequencies and power. Lawmakers are concerned about potential interference with other communication systems.



LESS ACCURACY AND RELIABILITY IN CHALLENGING CONDITIONS

One of the greatest challenge is accuracy and signal reliability, particularly in areas with poor satellite coverage or dense tree cover. These issues can impact the ability of GNSS technology to accurately guide the lawn mower and may require additional technology to be incorporated into the system to compensate for these challenges.

HIGH OPERATIONAL AND MAINTENANCE COST

Another key challenge is the cost of implementing GNSS technology into lawn mowers. Even though the cost of hardware has decreased significantly in recent years, the operational input like subscription fees to CORS network definitely increase the overall cost of the robotic mower, making it less accessible to consumers.

SOLUTION

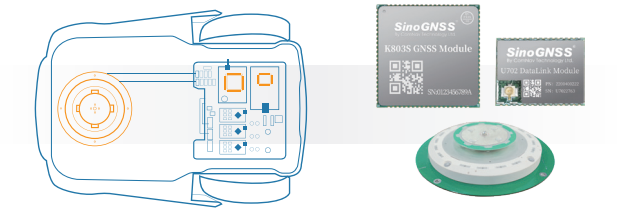
The main hardware of a robotic mower solution consist of U702 datalink module, 803S GNSS module and LoRa GNSS combination antenna, involving the whole process from satellite signal reception, differential data broadcasting and reception and RTK positioning data output. There are alternative options fit your needs, providing easy-of-use solution for system integrators and users.

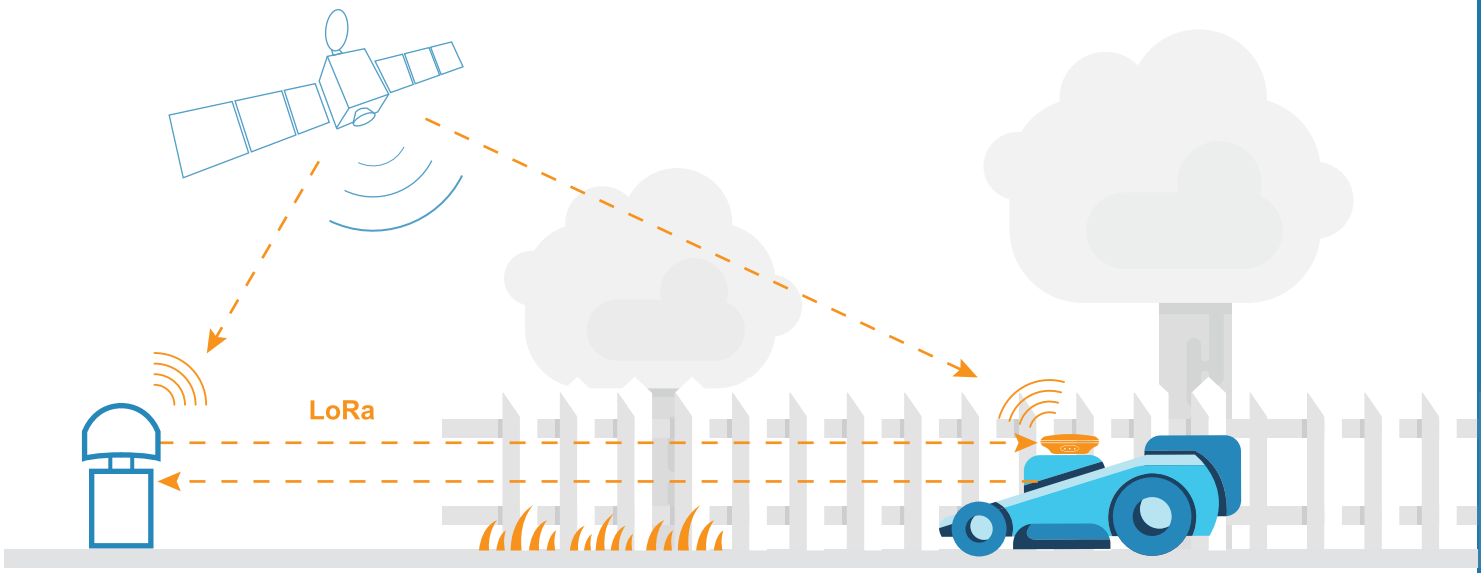
INTELLIGENT GNSS ANTENNA

This is a ready-to-use solution, which can be directly used after being integrated into the lawn mower robot without any further configuration.

OEM SOLUTION

This is a ready-to-integrate solution, consisting of a main board and a GNSS and Lora combination antenna, which is easily adaptable to specific needs, allowing add customized features and integrate with existing software and hardware.

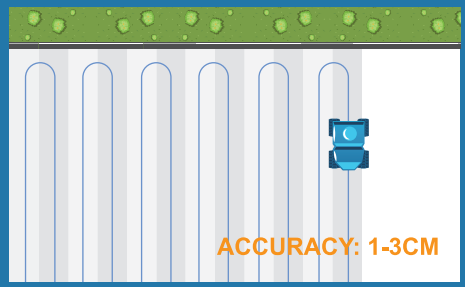




ADVANTAGES

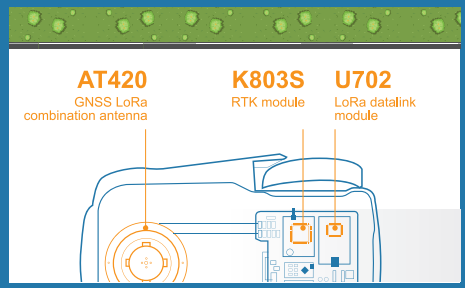
RELIABLE ACCURACY

Robotic mowers often operate in areas with poor GNSS signal coverage, such as regions with significant tree cover or corners. To ensure reliable accuracy in these situations, we employ the U702 LoRa data link module to receive correction data. This can reduce or delay the reception of RTK correction data, resulting in more stable RTK solutions. Furthermore, the U702 provides a more reliable connection to the RTK correction data source, reducing the risk of data dropouts or interruptions. As a result, this solution ensures centimeter-level accuracy in all conditions.



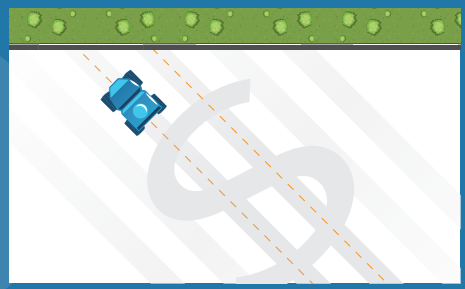
MAXIMUM FLEXIBILITY

So far, there are still barriers in using different types of RTK data across regions. The U702 data link module ensures flexibility in terms of the type of RTK correction data that can be received. Therefore, this solution can be easily integrated into existing systems or added to current devices without any physical changes, making it ideal for users and working consistently across manufacturers of mowers in different regions.



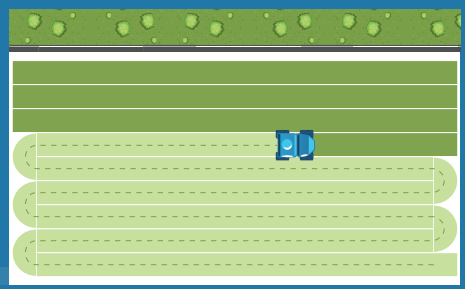
COST EFFECTIVE

Historically, cost has been one of the key issues when using GNSS technology in robotic mowers. Backed up by years of GNSS technology experience, ComNav has successfully made it more affordable. Firstly, the hardware price is cheaper than traditional solutions. Secondly, by using the data link module as the correction data receiver instead of CORS, integrators can save costs in system updating and maintenance.



IMPROVED EFFICIENCY

Combining with controller, this high precision solution makes it possible to eliminate the cumbersome installation of boundary wires and random movements. It allows for the generation of a virtual lawn line, route planning, and obstacle avoidance, enabling small lawn mowers to be used for cutting large areas.



K803S

GNSS Receiver Module

Size (L x W x H): 30 mm × 30 mm × 3.2 mm
Weight:8 g

The K803S is a full-constellation triple-frequency GNSS OEM board with IMU module featuring robust performance and compact design.

- ★ Support L-Band and PPP
- ★ Support GNSS+INS navigation
- ★ Surface-mounted design and small size to integrate
- ★ High-performance floating-point arithmetic
- ★ Low power consumption

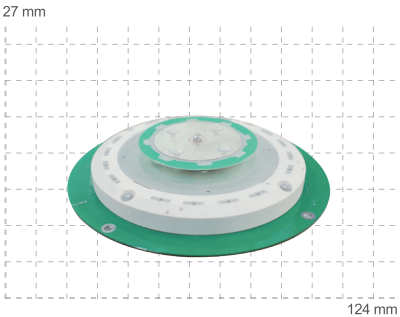
Performance	
Channels:	965
Satellites tracking:	GPS: L1C/A, L2P,L2C, L5 BeiDou: B1I, B2I, B3I, B1C, B2a, B2b GLONASS: L1, L2 Galileo: E1, E5b, E5a QZSS, IRNSS SBAS: WAAS, EGNOS, MSAS, GAGAN, SDCM L- Band
Post Processing:	Horizontal: 2.5 mm + 1 ppm Vertical: 5 mm + 1 ppm
Single Baseline RTK:	Horizontal: 8 mm+1 ppm Vertical: 15 mm+ 1 ppm
Initialization time:	<10 s

Physical	
Hardware interface:	LGA 82 pin
Power consumption:	1.0 W
Input voltage:	+3.3 V ± 5% DC
Operating temperature:	-40 °C to + 85 °C
Storage temperature:	-55 °C to + 95 °C
LNA Power:	External: +3.3V ~ +5V ± 5%VDC @ 0-100mA
LNA Gain:	20 ~ 40dB (suggested)
Impedance Match:	Wiring 50 Ω impedance matching

Communication	
LVTTL ports:	4
SPI:	1
Event Markers input:	2
PPS:	1
Indicator :	3
Correction data I/O:	RTCM 2.X, 3.X, CMR, CMR+
Position data output:	NMEA-0183, ComNav Binary, BINEX

AT420

GNSS LoRa Combination Antenna



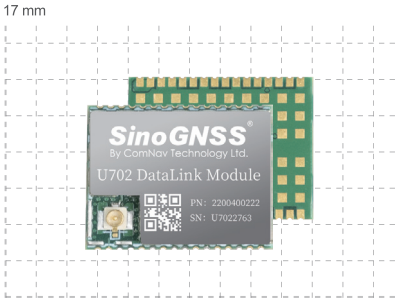
Dimension: Φ124×27mm

AT420 is our custom designed antenna combining the GNSS and LoRa technology. It is specifically designed to simplify the development of positioning-related applications for integrators.

- ★ Innovative combination of GNSS and LoRa technology
- ★ Lighter and thinner design, space saving, particularly beneficial for small devices
- ★ Maximal capability of receiving radio signal
- ★ Support upgrade to GNSS, Bluetooth, Wi-Fi, 4G and LoRa five-in-one antenna

U702

LoRa Data Link



Size (L x W x H): 17mm×22mm×3mm
Weight: 5g

The U702 datalink module is a RX/TX data link module that incorporates advanced CSS digital modulation technology, making it ideal for RTK real-time data transmission.

- ★ Support LoRa for long work range & low power consumption
- ★ Work as TX/RX mode
- ★ Working range 0.8km-1.5km
- ★ Optional frequency , 410-470 MHz/863-870/902-928MHz
- ★ Surface-mounted design and small size
- ★ Certified by both CE and FCC

General	
Frequency Range	410-470 MHz/863-870 MHz
Work Mode	Half-duplex
Frequency Stability	1.5ppm
Modulation System	CSS
Air Baud Rate	500bps/11000bps/12500bps/15500bps/18000bps
Protocol Type	LoRa

Physical	
Power Supply	+3.3V ~ +3.6V DC
Emission Current	< 0.2A
Received current	50 mA
Transmit Power	0.025W/0.05W/0.1W
Size (with connector)	17mm×22mm×3mm
Weight	5g

Communications	
I/O Interface	LGA 2×16 pin, pin pitch 1.27mm
DTE-DCE Interface	2 × LVCMOS 3.3V
Antenna Interface	IPEX female connector

APPLICATION