

RU-10-E

ALL-IN-ONE UAV HYPERSPECTRAL SYSTEM

INTELLIGENT ALL-IN-ONE UAV HYPERSPECTRAL IMAGING SYSTEM

Hyperspectral camera, HD visible camera, GPS/INS, onboard computer, ambient light detection, automated airfield, and cloud-based data visualization



INTEGRATED MULTI-SENSOR PAYLOAD

400-1000

HYPERSPSPECTRAL

920 channels, <3.5nm resolution, 128 fps, 12-bit CMOS

15 MP

HD VISIBLE

Dual-mode imaging, better than 2.8nm spectral resolution

<10cm

GPS + COMPUTING

RTK accuracy. i7 CPU, 16GB RAM, 2TB storage

24/7

AUTO AIRFIELD

Auto takeoff/land/charge. 15km range, 0.3s latency

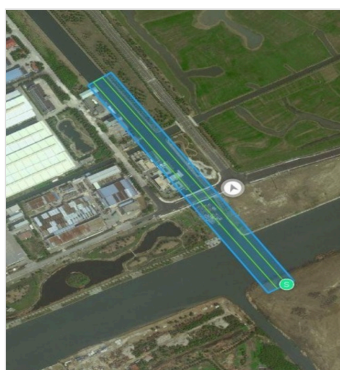
4-STEP WATER QUALITY MONITORING



01

MISSION CONTROL

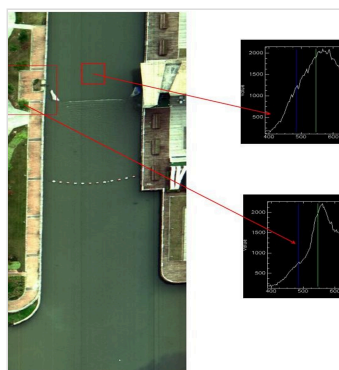
Operator sets parameters. One-click cloud deployment.



02

ROUTE PLANNING

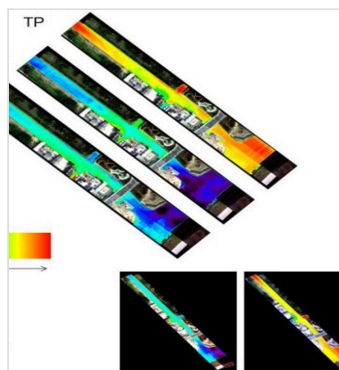
Intelligent path with obstacle avoidance on maps.



03

SPECTRAL ANALYSIS

Onboard processing with light correction.



04

VISUALIZED RESULTS

7-parameter maps. Accuracy exceeds 80%.

ACCURACY VALIDATION

Parameter	Ground Truth	Hyperspectral	Error
CODmn (mg/L)	5.30	5.33	0.6%
Total Nitrogen (mg/L)	2.04	2.02	1.0%
Dissolved Oxygen (mg/L)	7.20	9.41	30.7%
Total Phosphorus (mg/L)	0.07	0.10	38.7%
Ammonia Nitrogen (mg/L)	0.06	0.39	exc.

>80%

Calibrated Water Quality Monitoring Accuracy

TN: 1.0% error | CODmn: 0.6% error | 7 parameters retrieved

400-1000nm
SPECTRAL RANGE

<3.5nm
RESOLUTION

128 fps
FRAME RATE

24/7
AUTO OPERATION

15km
MAX RANGE

KEY ADVANTAGES

>80%

Calibrated Accuracy

7 Params

Simultaneous Retrieval

Seconds

Data Delivery Speed

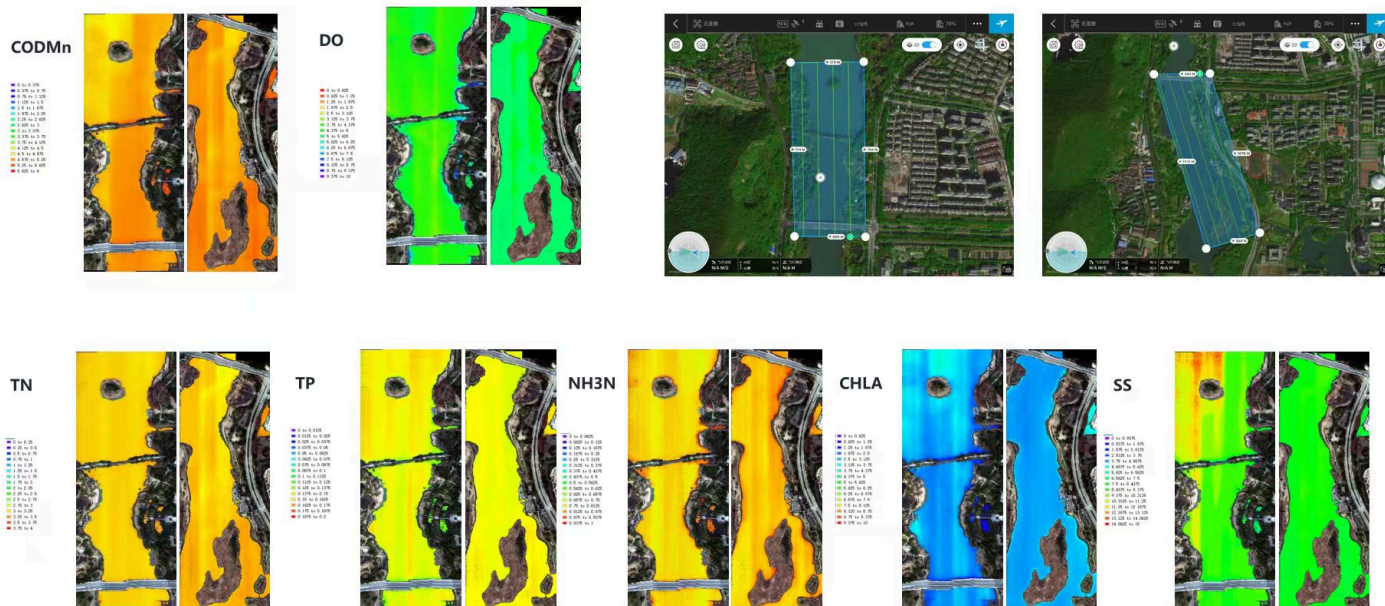
Reagent-Free

Eco-Friendly Operation

Self-Learning

Improves Over Time

7-PARAMETER CONCENTRATION DISTRIBUTION MAPS



>80%

Calibrated accuracy for all 7 water quality parameters after local model adaptation

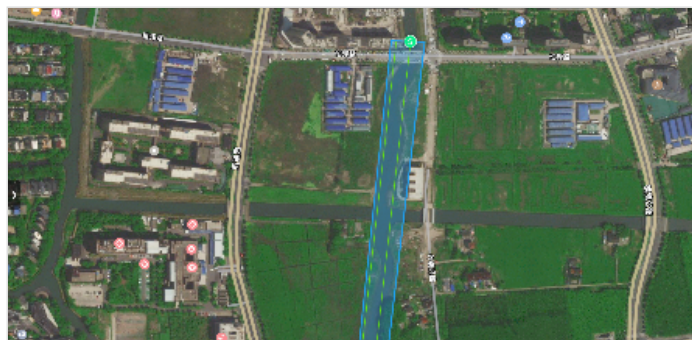
TN and CODMn demonstrate <1% error | Self-learning AI progressively improves with each flight mission

CLOUD-BASED MISSION CONTROL & DATA VISUALIZATION



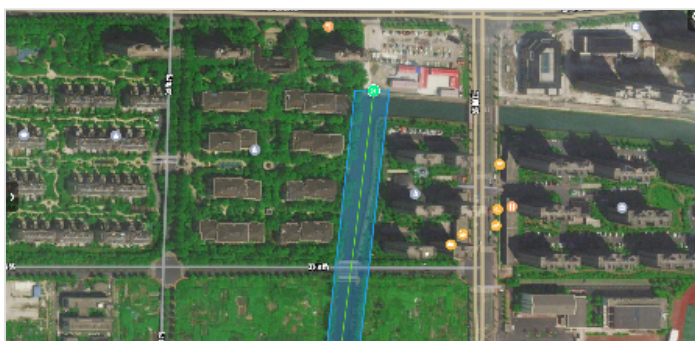
Flight Route Planning

Intelligent path planning with satellite map overlay.



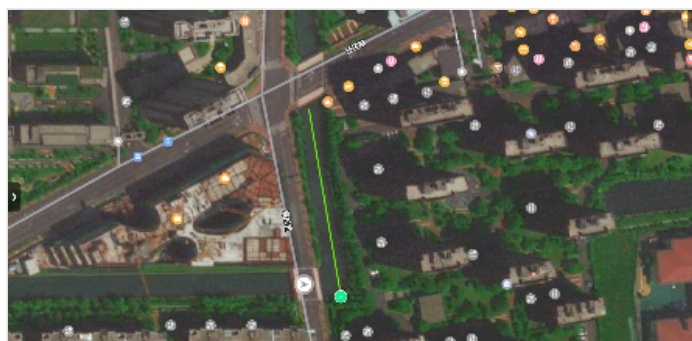
Multi-Route Management

Plan and save multiple flight routes for recurring missions.



Real-Time Monitoring

Live UAV tracking with telemetry and spectral data.



Automated Execution

One-click deployment with auto takeoff, route, landing.

WHOLE INTELLIGENT MONITORING SYSTEM

The RU-10-E represents a complete end-to-end intelligent water quality monitoring ecosystem. From automated mission deployment to AI-powered data analysis, every component is designed for autonomous, continuous environmental surveillance.

01

AUTO AIRFIELD

24/7 autonomous takeoff, landing, and charging cycle. Zero human intervention required.

02

MULTI-SENSOR

Hyperspectral, HD visible, GPS/INS, and ambient light sensor integration.

03

ONBOARD AI

i7 CPU with 16GB RAM processes spectral data in real-time during flight.

04

CLOUD PLATFORM

Remote mission control, real-time data sync, and result visualization dashboard.

05

SELF-LEARNING

Deep learning models improve water quality accuracy with each flight mission.

06

7-PARAMETER WQ

Simultaneous retrieval of CODmn, DO, TN, TP, NH3-N, CHLA, and TSS.

UAV + MULTISENSOR PAYLOAD

Spectral Range	400 - 1000 nm
Spectral Resolution	< 3.5 nm
Spatial Resolution	0.37 mrad @ f=16mm
Field of View	29° @ f=16mm
Spatial Channels	1450
Spectral Channels	920
Max Frame Rate	128 fps
HD RGB Camera	15 MP
Ambient Light Module	< 2 nm resolution
Control Module	i7 CPU, 2 TB storage
GPS Accuracy	< 10 cm (RTK)

AUTOMATED UAV AIRFIELD

Size	≤ 1.4 m³
Max Range	15 km (NCC/FCC)
Video Latency	0.3 s
Charge Time (20-90%)	~30 min
Monitoring	24/7, including night

HIGHLIGHTS

400-1000

Spectral Range (nm)

<3.5 nm

Spectral Resolution

128 fps

Max Frame Rate

920

Spectral Channels

15 km

Max Range

>80%

Water Quality Accuracy

SOFTWARE & CONTROL

Preprocessing	Automated hyperspectral
Correction	Ambient light correction
Inversion	Multi-parameter WQ
AI Models	Built-in deep learning
Deployment	One-click task
Navigation	Point-to-point on map
Hops	Unlimited between airfields
Weather	Local forecast integration