Intelligent Cleaning Drone VA-D15R

Multifunctional Cleaning Drone

Aerial high-efficiency cleaning
Safe Unmanned Operations at Height
Applicable to multiple scenarios

VastArrive

VastArrive VA-D15R

Current State and Challenges in the Solar Panel and Curtain Wall Cleaning Industry

Currently, manual cleaning (using “spidermen” or suspended platforms) remains the primary cleaning method. Cleaning companies in the industry are characterized by being small, numerous, and diverse, resulting in a chaotic market with varying levels of quality. There are instances where companies share “exterior wall cleaning certifications” and “spidermen” with one another, presenting numerous challenges.

Safety Risks

In traditional manual high-altitude cleaning operations, workers must use scaffolding or suspended platforms, which poses significant safety risks，especially in adverse weather conditions.

Poor Flexibility

Fixed-track systems and certain automated equipment can only cover specific areas, difficult to adapt to various complex building facade structures, lack of flexibility.

Inefficient Cleaning

Manual cleaning is slow and difficult to complete large-scale exterior wall cleaning in a short time, which affects overall work efficiency; manual cleaning also involves high-risk work for cleaners and has historically failed to achieve sufficient cleaning results.

High Cost

High-altitude cleaning costs significant manpower and time, automated cleaning equipment involves high purchase and maintenance costs, and its installation and operation are complex, leading to overall high costs.

VA-D15R

High-efficiency – 1,000 m²/h high-pressure rapid cleaning; supports continuous water supply operations

VA-D15R cleaning drone features a modular design with two different cleaning attachments, including adjustable-angle and oscillating nozzles. With four nozzle designs offering different angles for wide range of cleaning needs, providing a convenient, efficient, and versatile aerial high-pressure cleaning solution for multi-scenarios. It is widely applicable for high-altitude cleaning tasks such as building facades, solar panels, and tall towers.

Mooring Water Supply Operation

Unrestricted by tank capacity, enabling long periods of uninterrupted operation.

Maximun Pressure 20MPa

Quickly and effectively removes stubborn stains.

Maximum 1000m2/h

Enables quick cleaning while hovering, covering 1,000 square meters in 1 hour.

Quick Installation and Setup

Foldable design for easy transport and storage; quick-release mechanism allows for setup in just one minute.

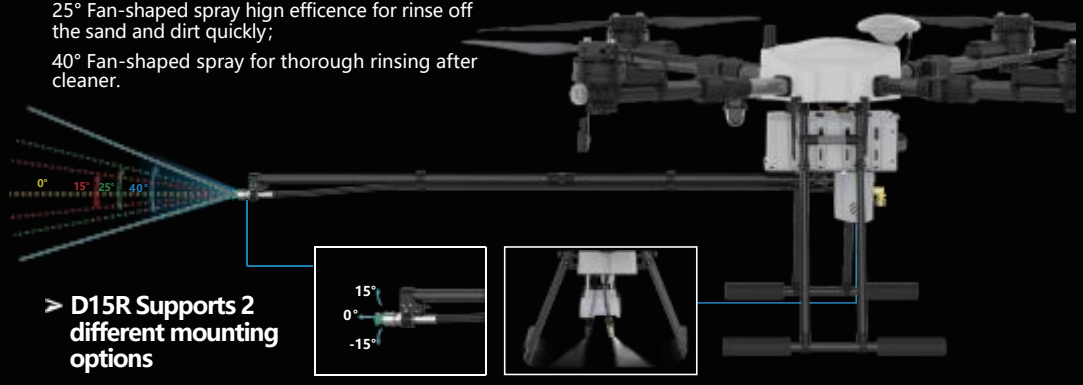
Standard with 4 nozzles in different functions

0° High pressure spray for cleaning crevices, stubborn stains, etc.;

15° Fan-shaped spray for quick stain removal;

25° Fan-shaped spray hign efficence for rinse off the sand and dirt quickly;

40° Fan-shaped spray for thorough rinsing after cleaner.



D15R Supports 2 different mounting options

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High-efficiency – 1,000 m²/h high-pressure rapid cleaning; supports continuous water supply operations

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Multi Scenario - Stable operation at height, support various nozzles,cover different angles

Modular Design

Support the optimal mounting and nozzle for each specific task to meet cleaning requirements in various complex high-altitude environments.

Stable Operation at Height

Through a closed-loop "sensing-decision-execution" systemto achive stable control and adapt to cleaning requirements at various heights.

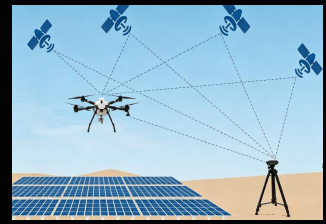
Automatic Cleaning of Elevation Lines

Enables autonomous operation, allowing for the configuration of route, tailored to different cleaning scenarios to enhance the applicability across multi-scenarios.

Multi-angle Covering Top and Bottom

Supports various optional configurations to clean complex surfaces such as top and bottom easily.

Safe - approve unmanned operation,Dual RTK, Wall-Simulation Radar



Raplacing Manual Operation at Height

Remote control enables the completion of various complex high-altitude cleaning tasks, eliminating the risks associated with working at heights.

Built-in Dual-redundant RTK Module

Built-in dual RTK modules enhance positioning accuracy and enable fault-tolerant switching, ensuring reliable façade and photovoltaic cleaning operations.

Intelligent Obstacle Awareness

Front-mounted wall-like radar an instantly detect the distance information ahead, maintaining a safe distance and ensuring a more secure flight.

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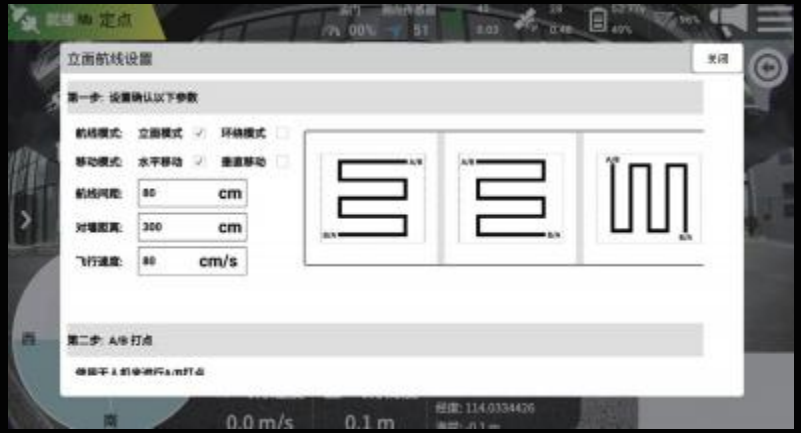
Intelligentized - Intelligent Route Planning

Newly upgraded version VA-D15R 5.3 version，enhanced the intelligent route planning，achieved autonomous operations,allowed for the configuration of route, tailored to different cleaning scenarios to enhance the applicability across multi-scenarios ,improved the efficiency and flexibility.



High Degree of Automation: Route can be planned in advance through ground control station, allowing the drone to fly automatically along the pre-set route without the need for real-time control, reduced the time and effort required for manual operation and improves work efficiency.

Comprehensive Coverage with No Blind Spots: It can precisely cover the entire facade along a pre-ste route and height, eliminating the omissions and blind spots that may occur during manual inspections or standard flights, and ensuring a thorough cleaning of the target facade.

High Accuracy: By combining advanced positioning technologies, such as RTK positioning, or high-precision chips with advanced algorithms, drones can maintain a stable flight attitude and accurate route while executing elevation survey routes.

Remote Operation: Operators can control and monitor the drone from a ground control station located in a safe position away from hazardous surfaces. Even in an emergency, they can take immediate action, further enhancing operational safety.

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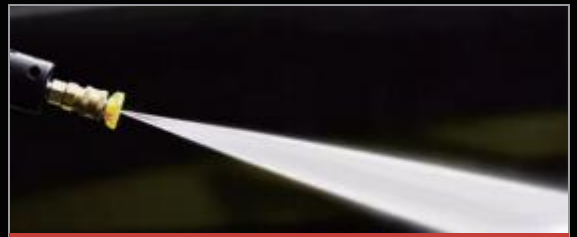
Multi-Scenario - Compatible with a Variety of Nozzles

The modular nozzle design fit customers' various cleaning needs, delivering optimal cleaning results tailored to specific tasks,handling a wide range of complex high-altitude work scenarios, and enhancing the equipment's applicability. Standard with four nozzle heads, all feature tool-free quick-release installation. A single hose supports multiple spray patterns ranging from 0 to 40 , allowing for seamless switching to efficiently clean different types of stains.



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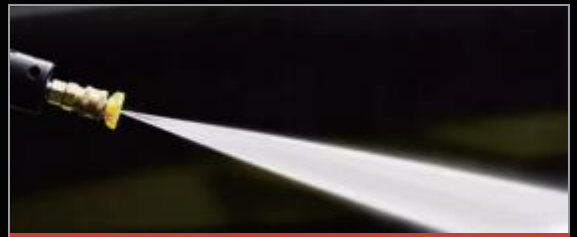

15° Fan-shaped spray for quick stain removal.

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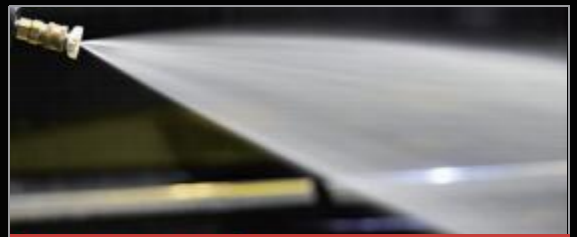

40° Fan-shaped spray for thorough rinsing after cleaner.

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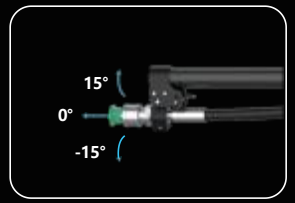
Multi-Scenario - Modular design, support different mounts

VA-D15R cleaning drone features a modular design compatible with two different cleaning attachments, including adjustable-angle and oscillating nozzles. With four nozzle designs offering different angles, serve for different cleaning needs, providing the industry with a convenient, efficient, and versatile aerial high-pressure cleaning solution suitable for various scenarios. Widely applicable for high-altitude cleaning tasks such as building facades, solar panels, and tall towers.

Adjustable-angle Nozzle

1500mm spray nozzle allows the unit to be away from the wall, ensuring safe and reliable operation.

The spray nozzle can be adjusted to three angles: -15°, 0°, and 15°.



Oscillating Nozzle

The nozzle swings through a 45° range. Significantly improved cleaning efficiency and effectiveness, and the swinging speed can be adjusted via the remote control to suit the varying levels of dirt on the surface being cleaned.

VA-D15R

Comparison of Drone with Traditional Manual Spider

Based on VastArrive Drone solution of High-altitude cleaning system,compared witn traditional manual operation,owns significant advantages in terms of safety, efficiency, and cost:

Target	VastArrive D15R Drone Aerial Cleaning System	Traditional Manual Operation
Security	Unmanned operation, lower risks	Risk of security such as falls from heights
Efficiency	17m2/min, quickly cleaning with high pressure, supports continuous operation	Slower cleaning speed,inefficiency
Cost	One-time capital investment with low long-term operating costs	High labor and time cost
Performance	20MPa high pressure, with proffesional cleaner, remove stubborn stains and mold spots thoroughly	Harder to cleaning thoroughly, influence the looking and life of buildings and materials
Set Time	Quick installation, deploy in one minute	Takes longger time, build scaffolding or hanging baskets
Flexibility	2 choosen of mounts, 4 choosen of nozzles for multi-scenario	Poor flexibility, harder to cover all cleaning surface

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Case 1

Maintenance of the Building Exterior Walls in Longgang District, Shenzhen

Industrial Park in Longgang district, Shenzhen, the cleanliness of the building's exterior directly affects its aesthetic appeal and the company's image. Because of a string of rainy in Guangdong, the exterior walls appeard the dirt and mold which influenced the outlooking of bulidings. It’ s hard for spider man to clean the surface efficiently with the complex high bulding structures, and risk of security. To maintain a high-end image and ensure tenant satisfaction, he management office has decided to seek an efficient and safe exterior wall cleaning solution.

Challenges and Pain Points

High Safty Risks

Traditional operation works suspended, high safety risks

Cleaning Difficulty

Complex facade of buildings, hard to clean in traditional operation.

High Manual Cost

10+ person per group, one cost 300-500 yuan per person one day working.

Weather Conditions

Rainy day lead to frequent mold and dirt buildup, long time needed hard to set up quickly.

01 **High-Altitude Drone cleaning:** Unmanned operation, reduce safty risks.

02 **Cost Saving:** Lower labor costs and equipment maintenance cost in long-term savings.

03 **Stable Safe Cleaning:** Dual RTK configuration, real-time centimeter-level positioning dating for safe and stable cleaning.

04 **Higher Cleaning Efficiency:** 1000㎡/hour efficient cleaning capability, shorten time cost and increase efficiency.

05 **Quick and Efficient Cleaning:** High-pressure cleaning, supporting various cleaner, achieves immediate cleaning results.

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Case 2

Solar Panel Cleaning in Huizhou, Guangdong

Under high-temperature and humid conditions, algae and biological growth accumulate on the surfaces of photovoltaic panels. Since these panels are installed above bodies of water such as fish ponds, manual cleaning requires working on the water, a complex environment that poses a drowning risk.

The drone cleaning solution for floating photovoltaic panels offers significant advantages: leveraging the efficiency and flexibility of drones, it can rapidly cover large areas of photovoltaic panels without the need for manual work on the water, thereby reducing safety risks. Precise cleaning ensures the power generation efficiency of the solar panels and reduces labor costs. This solution provides an innovative, efficient, and safe approach to cleaning floating solar panels.

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Case 3

Building Exterior Wall Maintenance in Shenzhe

Due to the high concentration of industrial parks in a certain district of Shenzhen, the building exterior walls were frequently covered in dust, which detracted from its appearance. To maintain a high-end image and ensure tenant satisfaction, the property management decided to seek an efficient and safe solution for cleaning the building’ s exterior. In 2024, the VastArrive D15R cleaning drone was selected as the building’ s curtain wall maintenance solution, enabling safe, efficient, and cost-effective cleaning and offering a new approach to building exterior maintenance.

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Case 4
Building Exterior Wall Maintenance in Shenzhen

A high-end complex in Shenzhen over 10 meters tall, because of a string of rainy in Guangdong, the mold and grime have appeared on the metal exterior walls of the buildings. The cleanliness of the building's exterior directly affects its aesthetic appeal and the company's image.

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Application Solutions

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Important Parameters

Dimension	1905 mm *1720 mm *815 mm (Wings extended, propellers folded) 635 mm *1340mm *815 mm (all folded)
Maximum Flow Rate	15L / minute
Water Hose Length	100m
Flight Time	45 min (curtain wall cleaning) 55 min (photovoltaic panel cleaning) 30 min (fan-assisted cleaning)
Nozzle to Surface Distance	2–3 m (adjustable according to operating conditions)
Battery	14S 41000mAh
Spray Boom Length	1500mm
Maximum Horizontal Flight Speed	15m/s
Operating Temperature	-10℃ - 40℃
Operating Humidity	0-90%
Maximum Wind Resistance	12m/s
Rated Water Pressure	10MPa
Maximum Water Pressure	20MPa (instantaneous)
Shallow Cleaning Efficiency	1000㎡/h
Deep Cleaning Efficiency	500㎡/h
Charging Time	40 min
Maximum Supported Takeoff Weight	≤24.9 kg

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