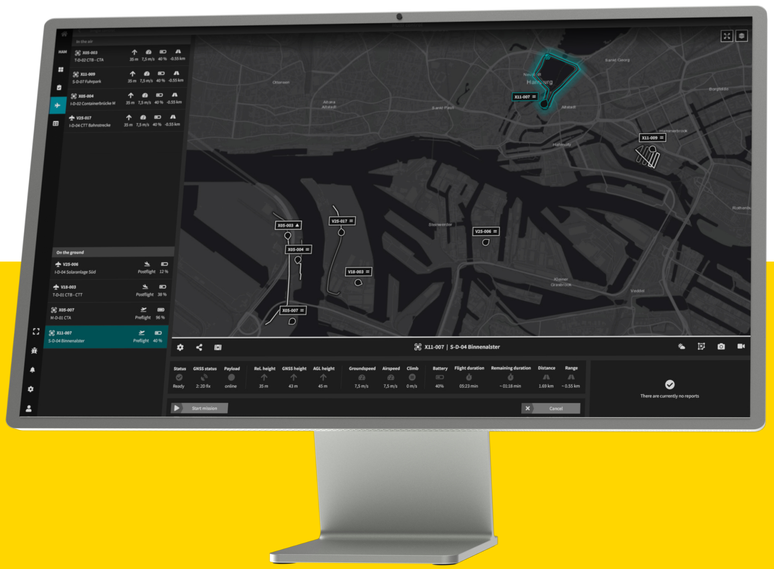
HHLA Sky



Mobile Robot Management

Automate and digitize manual operations today.
And scale. Globally.

Smart Logistics

Automated transport

Ready at a moment's notice. Easy to use. Efficient.

Use Case

As industries increasingly rely on just-in-time workflows, there is a growing demand for fast, autonomous logistics solutions that can operate independently from existing road infrastructure. Especially in dynamic industrial and port environments, internal logistics — such as the transport of documents, spare parts, or tools — can slow down operations and lead to delays. Additionally, reliable fast deliveries are a need specifically for time critical cargo in cases like medical samples or emergencies when every second counts.

Solution

HHLA Sky's drone fleet, managed via the ICC, offers automated, on-demand delivery services. Drones like the X25 octocopter can carry payloads up to 10 kg and tackle distances up to 25 km while operating BVLOS (beyond visual line of sight), ensuring swift and reliable transport. The system seamlessly integrates with existing ERP systems, enabling streamlined logistics operations – from onsite transports to long-range delivery services. Deliveries can be scheduled or be deployed spontaneously while more than a hundred missions can be managed simultaneously through the ICC, supervised by remote operators.

Benefits

- Reduced delivery times and operational costs
- Minimized reliance on ground transportation, alleviating traffic congestion
- Enhanced supply chain efficiency through real-time tracking and integration
- Improved responsiveness to urgent delivery needs
- Scalabe delivery scheduling and operation

Automated Inspections

Intelligent supervision

Fast and safe. Easily integrated. Supported through AI.

Use Case

Regular inspections of industrial assets like cranes, pipelines, tanks, wind turbines, or port infrastructure are critical to ensure operational safety and regulatory compliance. As industries grow more complex and asset networks expand, there is an increasing need for scalable, efficient, and safe inspection methods that minimize downtime and provide high-resolution, actionable data.

Solution

HHLA Sky's end-to-end inspection solutions enable automated drone operations, allowing for the simultaneous control of over 100 drones. Equipped with high-resolution cameras, these drones can capture detailed imagery from safe distances, in fast and efficient ways. The Integrated Control Center (ICC) also integrates data management and AI-based data pre-processing, facilitating rapid analysis and decision-making. Through open APIs, the system seamlesly integrates into assett management tools.

Benefits

- Enhanced safety by minimizing human exposure to hazardous environments
- Increased efficiency through simultaneous, automated inspections and minimization of operational downtime during inspections
- High-precision data collection for accurate assessments
- AI-supported, rapid data processing and analysis leading to quicker maintenance decisions

Integrated Surveillance

Smart security and overview

Flexible monitoring. Multimodal missions. Quick deployment.

Use Case

Large industrial facilities, ports, and infrastructure corridors face growing security and safety challenges, from perimeter breaches and unauthorized access to fire detection or hazardous incidents. Traditional security measures — such as fixed cameras or foot patrols — often provide limited coverage and delayed response. There is a rising need for mobile, real-time monitoring systems that can flexibly cover large or remote areas and support human operators with situational awareness and rapid deployment capabilities.

Solution

HHLA Sky's automated solution offers flexible and multimodal monitoring allowing for faster situational awareness and thus taking measures against security incidents. Managed through the ICC, this enables 24/7 BVLOS operations, providing real-time awareness. The light-weight and robust X4 drone is easy to deploy and operates day and night thanks to its thermal sensor. The system supports automated patrols and can be integrated with ground-based robots like the Capra Hircus for comprehensive security coverage.

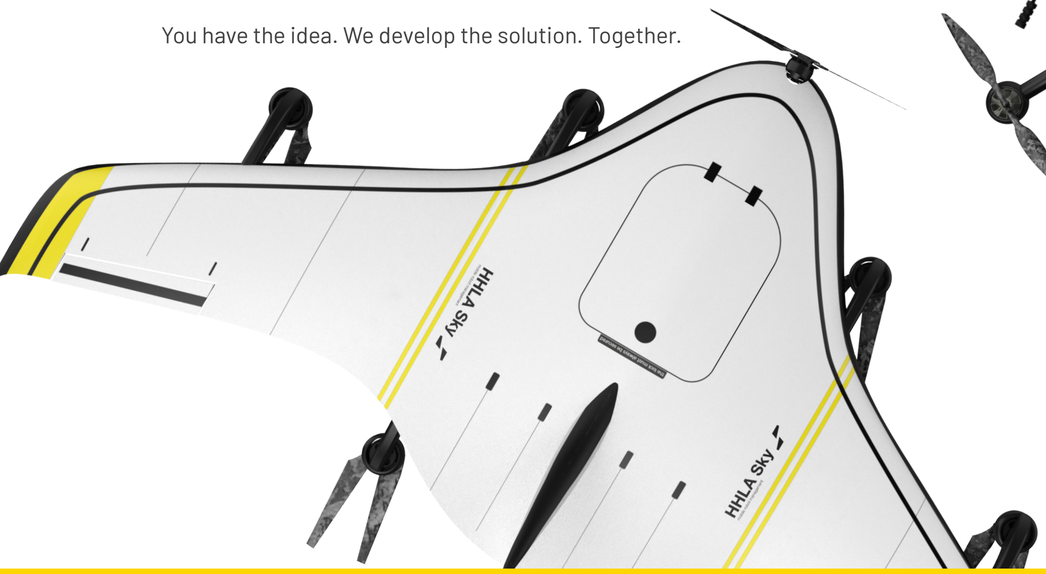
Benefits

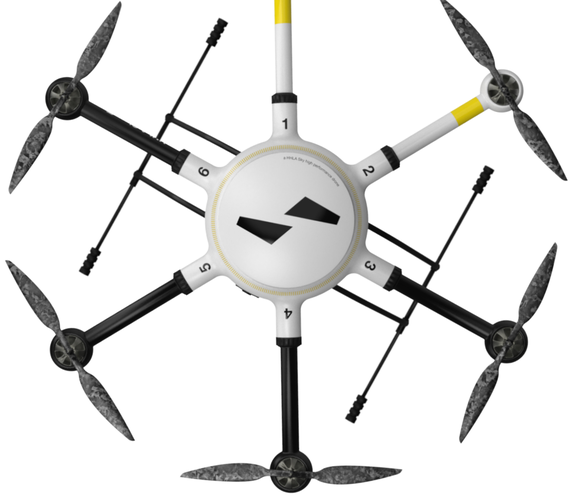
- Continuous, automated surveillance reducing the need for manual patrols
- Rapid detection and response to security incidents, creating fast situational awareness
- Comprehensive coverage of large or hard-to-reach areas.
- Enhanced safety and security for personnel and assets

Custom Solutions

Tailor made end to end solutions

You have the idea. We develop the solution. Together.





Use Case

Every industry faces unique operational challenges—from complex environmental monitoring in remote regions to integrating robotics into existing automation workflows. Off-the-shelf solutions often fall short when it comes to interoperability, scalability, or regulatory alignment. Whether it's real-time data transmission, autonomous data collection with specialized sensors or integration with proprietary software ecosystems, companies increasingly require tailored robotics solutions that fit their specific technical and business environments and unlock new workflows and innovations.

Solution

HHLA Sky offers customizable solutions, leveraging its ICC to manage both aerial and ground-based robots. The robotic systems are modular designed, allowing for integration with various sensors, payloads, and third-party applications, ensuring adaptability to specific operational needs. Whether it's environmental monitoring, emergency response, or specialized logistics, HHLA Sky provides end-to-end support from design to deployment.

Benefits

- Tailored solutions addressing specific operational requirements
- Seamless integration with existing IT and operational systems
- Scalable and flexible deployments adaptable to changing needs
- Comprehensive support ensuring successful implementation and operation through excessive experience and expert knowledge in hardware, software, legal and compliance matters

Der Deutsche Innovationspreis
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DESIGN AWARD 2023

UX DESIGN AWARDS
product 2023

GERMAN INNOVATION AWARD '22 WINNER

HHLA Sky

ICC

Integrated Control Center

100+ simultaneous BVLOS operations. Safe & secure.

- Mobile Robot Management system (ROS2)
- End-to-end developed modular IoT-platform consisting of process management and control center software, and integrated hardware
- Simultaneous, active control and monitoring of more than 100 automated drones and autonomous mobile robots (AMR) and their tasks at different locations
- Operations beyond the pilot's/operator's visual line of sight (BVLOS)
- One central control center – globally scalable
- Cybersecurity-certified
- Integrates with existing IT systems & business processes
- Open standard

Planning

- Complex mission planning for multi-modal mobile robots
- 2D and 3D planning modes
- Automated grid planning

Piloting

- Supervision of fully automated missions
- Direct manual control over robots
- Low latency first person view video stream
- Integrated pre- and post-checks for technical compliance
- Automated, audit-proof mission documentation, in device and in the backend

Security

- Role-based user management
- Cybersecurity-certified in Germany in accordance to IEC 62443
- Secure hosting, optionally on premises

Scheduling

- Efficient, time-based scheduling
- Management of hundreds of operations per day

Management

- Fully integrated mission data management
- Data lake for collected images, videos and other payload data
- Fleet and infrastructure management

Scalability

- More than 100 simultaneous operations
- Fully cloud based backend, accessible through browser
- Efficient vertical and horizontal scaling
- API integration with third party software

HHLA Sky

UTM

UTM Control Center

Automated uncrewed traffic management. Cybersecurity approved.

- Safe drone operations - fully compliant to UTM/U-space regulation
- API access for drone operators - scalable solution that guarantees seamless integrations
- Digital integration with ATM, CIS and authority systems - UTM platform ready for global deployment
- Industry-leading cybersecurity built in - ensures trusted airspace management

Compliance

- Standard (ASTM, EUROCAE) conformance to ensure interoperability
- Meets BVLOS regulatory compliance

Safety

- Enhanced safety through full integration in UAS operator tools
- Automated monitoring and alerting
- Reduction of Air Risk Class in SORA

Security

- Cybersecurity approved
- Role-based user management
- Traceability through logging

Efficiency

- Optimization of usage of assets & ressources
- Optimization of personnel usage

Management

- Fair airspace access to all UAS operators
- Human intervention possible through exceptions

Scalability

- Modular platform with microservices architecture
- Cloud-based deployment for performance scaling for increase in demand

HHLA Sky

X 4

First Responder Drone

Silent Person Detection. Track and Trace. Remotely.

- German engineering - made in the EU
- Industry grade quadcopter
- Easy to carry & use
- Low-noise operations
- 5G fully encrypted data link for command, control and live video
- Direct remote control for manual missions
- Infrared position light
- Optimal smart functions: object detection, object follow, etc.
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 10 to +40° C / 14 to 104° F
- **Propulsion system:** 12 x 5 inch carbon propellers (x4)
- **Environmental protection:** rain and dust proof IP54
- **Flight time (with payload):** up to 30 min
- **Wind stability (max.):** up to 15 m/s / 33.6 mph
- **Range (max.):** 27 km / 16,77 mi
- **Speed (max.):** 15 m/s / 33.6 mph

Dimensions

- **Excluding propellers:** 49,5 x 46 x 19 cm / 19.5 x 18.1 x 7.5 in
- **Including propellers:** 74,5 x 78 x 19 cm / 29.3 x 30.7 x 7.5 in
- **Folded:** 44,5 x 25 x19 cm / 17.5 x 9.8 x 7.5 in
- **Transport case:** 56 x 46 x 27 cm / 22 x 18 x 10.6 in
- **Maximum take-off mass:** < 4 kg / < 8.8 lbs

Command and Control

- **Radio link telemetry RC:** 2,4 Ghz encrypted data link
- **Radio link ICC:** 4G/5G IoT link with diversity antenna

Power Management

- **Flight battery:** 6S (22.2V) Lithium Polymer
- **Capacity / nominal energy:** 12,000 mAh / 226.40 Wh
- **Redundancy:** Double battery, short circuit protected

Safety

- **Fully automated parachute system**
- **Integrated condition monitoring system**
- **Fully redundant flight termination system**

Payload

- **Thermal:** FLIR Hadron 640 R dual sensor
- **IR sensor:** 640 x 512 radiometric thermal IR
- **RGB sensor:** 64 MP RGB sensor

HHLA Sky

X 11

Multi-purpose Drone

Cyber security-certified. Multi-purpose.

- German engineering - made in the EU
- Industry grade hexacopter
- Multi-purpose drone
- IEC 62443 cyber security-certified
- Multi-processor architecture on the drone
- Dedicated AI accelerator hardware
- Fully integrated ROS2 architecture for advanced robotics
- 4G fully encrypted data link for command, control and live video
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 10 to +40° C / 14 to 104° F
- **Propulsion system:** 17 x 5.5 in carbon propellers (x6)
- **Flight time (with payload):** up to 20 min
- **Wind stability (max.):** up to 15 m/s / up tp 33.6 mph
- **Range (max.):** 18 km / 11.18 mi
- **Speed (max.):** 15 m/s / 33.6 mph

Dimensions

- **Excluding propellers:** 100 x 100 x 53 cm / 39.4 x 39.4 x 20.9 in
- **Including propellers:** 143 x 143 x 53 cm / 56.3 x 56.3 x 20.9 in
- **Transport case:** 80 x 58 x 48 cm / 31.5 x 22.8 x 18.9 in
- **Accessories case:** 56 x 46 x 27 cm / 22 x 18.1 x 10.6 in
- **Maximum take-off mass:** < 11 kg / < 24.3 lbs

Command and Control

- **Radio link telemetry / RC:** 868 MHz / 2.4 GHz (3 times redundant)
- **Radio link mobile radio:** 4G IoT link with diversity antenna (5G Opt.)

Power Management

- **Flight battery:** 2x 6S (22.2V) Lithium Polymer
- **Capacity / nominal energy:** 2x 12,000 mAh / 226.40 Wh
- **Redundancy:** Double battery, short circuit protected

Safety

- **Fully automated parachute system**
- **Integrated condition monitoring system**
- **Fully redundant flight termination system**
- **Engine redundancy**

Payload

- **IR sensor:** variable
- **EO sensor:** variable
- **Cargo:** variable (up to 3 kg / 6.6 lbs)

HHLA Sky

X25

Cargo Drone

Last mile delivery. Heavy lifter. Ideal for BVLOS operations.

- German engineering - made in the EU
- Industry grade octocopter
- Payload up to 10 kg (22 lbs)
- Up to 27 km range (16.77 miles)
- Up to 30 minutes air time (with max. payload)
- 5G fully encrypted data link for command and control
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 10 to +40° C / 14 to 104° F
- **Propulsion system:** 28 x 9.2 in foldable carbon propellers (x8)
- **Flight time (with max. payload):** up to 30 min
- **Environmental protection:** rain and dust proof IP54
- **Wind stability (max.):** up to 18 m/s / up tp 40 mph
- **Range (max.):** 27 km / 16.77 mi
- **Speed (max.):** 15 m/s / 33.6mph

Dimensions

- **Excluding propellers:** 92 x 125 x 57 cm / 36.2 x 49.2 x 22.6 in
- **Including propellers:** 154 x 187 x 57 cm / 60.8 x 73.8 x 22.6 in
- **Transport case:** 100 x 70 x 40 cm / 39.4 x 27.6 x 15.7 in
- **Maximum take-off mass:** < 25 kg / < 55 lbs

Command and Control

- **Radio link telemetry / RC:** 2.4 GHz link
- **Radio link mobile radio:** 4G IoT link with diversity antenna (5G Opt.)

Power Management

- **Flight battery:** 4x 6S (22.2V) Lithium Polymer
- **Capacity / nominal energy:** 4x 21,000 mAh / 466.20 Wh
- **Redundancy:** Four batteries, short circuit protected

Safety

- **Fully automated parachute system**
- **Fntegrated condition monitoring system**
- **Fully redundant flight termination system**
- **Engine redundancy**

Payload

- **Cargo:** variable (up to 10kg /22lbs)

HHLA Sky

V 25

VTOL

Long-distance transport, survey & inspection. Rapid home security support.

- German engineering - made in the EU
- Industry grade VTOL drone
- 4G fully encrypted data link for command, control and live video
- 27 m/s maximum speed (62 mph)
- 190 km range (118 miles)
- Up to 3 hours air time
- Different power configurations for extended flight times optional
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 10 to +40° C / 14 to 104° F
- **Flight time (with payload):** up to 3 hours
- **Wind stability (max.):** up to 11,1 m/s / up tp 24.8 mph
- **Range (max.):** 190km / 118 mi
- **Speed (max.):** 27 m/s / 62.14 mph

Dimensions

- **Full dimensions:** 299 x 159 x 47cm / 117.71 x 62.6 x 18.5 in
- **Transport case:** 152 x 84 x 52cm / 59.8 x 33.1 x 20.5 in
- **Maximum take-off mass:** < 25 kg / < 55 lbs

Command and Control

- **Radio link telemetry/video:** 2.4 GHz link
- **Radio link telemetry/payload:** 4G IoT link with diversity antenna (5G Opt.)

Power Management

- **Flight battery:** 4x 6S (22.2V) Lithium Polymer
- **Capacity / nominal energy:** 4x 21,000 mAh / 466.20 Wh
- **Redundancy:** Four batteries, short circuit protected

Safety

- **Fully automated parachute system**
- **HHLA Sky certified companion computer**
- **Automatic stall recovery**

Payload

- **IR sensor:** variable
- **EO sensor:** variable
- **Cargo:** variable

HHLA Sky

Capra Hircus

Multi-purpose Mobile Robot

Inspection. Surveillance. Indoor & outdoor logistics.

- Made in Denmark by Capra Robotics
- Multi-purpose mobile robot
- Seamless ROS2 and MQTT integration
- Autonomous operation
- Safety solutions according to ISO 13849-1
- Ground-breaking new safety-concept of intuitively recognizable intention markers
- Caprine Agility: unique wheel frame allowing for 360°-turning on the spot, drives on slopes with 50% rise and 14 cm curb climb
- Long operating time: 10+ hours
- Long range: 31 mi (50 km)
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 20 to +40° C / -4 to 122° F
- **Maximal speed:** 6 km / 3.7 mph
- **Maximal incline:** 50%
- **Motor type:** 4pcs, hub motor of 250W each
- **Operating time (max.):** 10h
- **Range (max.):** 50 km / 31 mi
- **Speed (max.):** 6 km/h / 3.73 mph

Dimensions

- **Full dimensions:** 110 x 60 x 37 cm / 43.5 x 23.6 x 14.7 in
- **Clearance height:** 12,6 cm / 4.96 in
- **Weight (with 2 batteries):** 50 kg / 110.2 lbs

Command and Control

- **External communication:** 4G router with Dual-band Wi-Fi (G/N/B) and Dual Sim
- **Manual Steering:** Remote Control

Power Management

- **Battery:** Li-NMC
- **Capacity / nominal energy:** up to 4 units 25.9V, 20 Ah each

Safety

- **Safety functions according to ISO 13849-1**
- **Brake validation**
- **Bumper bars**
- **Detection of manually triggered brake**
- **Emergency stop**

Payload

- **IR sensor:** variable
- **EO sensor:** variable
- **Cargo:** variable (up to 50kg / 110.2lbs)

HHLA Sky

All Sky

Automated Drone Base Station

Fully Automated Robotic Operations in Harsh Environments.

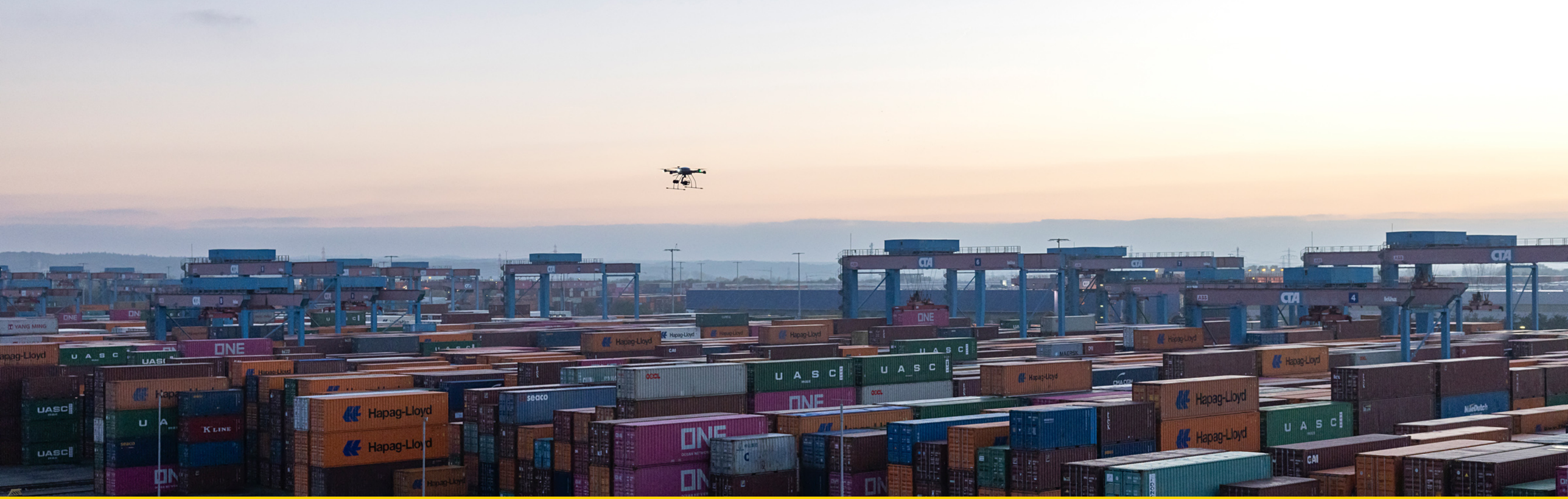
- Automated drone base station for remote take-off, landing, charging and weather protection
- Enables automated 24/7 BVLOS drone operations, even at large-scale
- Integrated video and weather broadcasting
- < 60 seconds from command to take-off
- LTE / Ethernet / WIFI / 5G COM / optional: Edge computing capability
- Emergency power supply to close or open roof in case of power loss
- Full integration into HHLA Sky's ICC

Performance

- **Operating temperatures:** - 70 to +55° C / -94 to 131° F
- **Wind resistance:** up to 33,3 m/s / up tp 124 mph

Dimensions

- **Height:** 280 cm / 9.2 ft
- **Weight:** <1.000 kg / <2.205 lbs
- **Max. diameter:** 230 cm / 7.5 ft
- **Max. drone diameter:** 160 cm / 5.2 ft



High-tech.

Made in Germany.

HHLA Sky is a Hamburg based mobile robot management pioneer. We pave the way for a global Industry 4.0. For pros who are leading the digital revolution. To transform their industry - straight ahead into the industrial metaverse.

We would like to invite you: Take a closer look at HHLA Sky. Learn more about the breakthrough potential these hardware and software solutions offer you.

Let’s get in touch.

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