



essentialaero

FOD-BOT

Autonomous FOD Collection System



FORCE MULTIPLIER

- 24/7/365 day and night
- Unattended operation
- Multi-mission chassis

SYSTEMATIC & SAFE

- Obstacle detect & avoid
- Preplanned routes
- NDAA compliant hardware

ANYTIME & ANYWHERE

- All weather and waterproof
- Operable in extreme temperatures
- Can be palletized to ship

MANAGEMENT | NOTIFICATIONS | DATA ANALYTICS

TECHNICAL INFORMATION

FOD Collection Size	0.02" to 8"
Maximum Speed	5.6 mph (2.5 m/s)
Maximum Incline	Up to 26.5° (50% grade)
Operating Time	Up to 6 hrs on a single charge
Charging Time	2.0 hours (30 min from 30-80%)
Operational Temperature	-4° F To 104° F (-20° C To 40° C)
Collision Avoidance	Ultrasound and LiDAR sensors



Technical Specifications

Software

ONBOARD SYSTEMS (EDGE)

Essential Core

Autonomy stack running directly on the FOD-BOT, enabling full mission independence without network reliance. Fuses LiDAR, GPS, and vision data for perception, navigation, and adaptive path planning.

- Real-time perception and object classification
- GNSS/RTK and LiDAR navigation and dynamic replanning
- Full autonomy cycle: deploy → sweep → return → self-charge → self-dispose
- Redundant safety and override systems

Safety & Compliance

Built-in multi-layer safety architecture meeting FAA and airside standards.

Onboard systems maintain situational awareness and safe behavior.

- 360° LiDAR obstacle detection
- Dual E-Stop and remote override protocols
- Geofencing and virtual safety zones

Onboard Operator Interface

Touchscreen control for single-robot missions, diagnostics, and overrides.

- Local start/stop and manual control
- Live system health display

CLOUD & FLEET SYSTEMS

Essential Ops Supervisor

Fleet-management layer hosted in the Essential Aero cloud ecosystem. Provides real-time mission visibility, scheduling, and analytics for all connected robots across multiple sites.

- Live mission tracking and remote dispatch
- Multi-robot coordination and zone scheduling
- Automated uptime, mission, and FOD collection reports
- Remote alerts, overrides, and maintenance notifications
- Cloud-linked data storage for analytics and ROI evaluation

Essential Commander

Browser-based control hub (desktop and mobile) unifying all connected FOD-BOTs and site infrastructure. Provides intuitive mission planning, data visualization, and remote supervision.

- Point-and-click mission setup and map editing
- Real-time telemetry and system health monitoring
- Fleet dashboards for analytics and compliance review
- Intuitive user interface optimized for airside operations

Hardware

Accessories and Attachments

Autonomy Wireless charger
Disposal station

Surface Cleaning FOD-MAT
Track-Sweep

Attachment Interface 2" Ball hitch

Dimensions and Weight

External Dimensions 3.6 × 2 × 2.6 ft (L x W x H)

Wheel Diameter 1 ft

Weight 150 lbs

Speed and Performance

Maximum Speed 5.6 mph (2.5 m/s)

Maximum Incline
(Without Payload) 50%

Chassis 4-wheel robot frame

Motor Type 4 hub motors (500W each)

Power

Battery Type Lithium Iron Phosphate (LFP)

Operating Time Up to 6 hours

Charging Time 2.0 hours at 220V

Safety Features

Collision Avoidance

E-Stop

Bumper Bar

Immediately stop droid in place

Environment

Operational Temperature -4° F to 104° F
-20° C to 40° C

Interface and Communication

External Communication Redundant 5G router with
Dual-band WiFi, UHF

I/O RJ45 Ethernet, USB-A

Sensors

GPS Differential GPS with RTK

LiDAR 360 degrees 3D LiDAR

