
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

HYB205

AWS Snow Family: Bringing AWS to the rugged, mobile, and disconnected edge

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Agenda

Continuum of AWS services from cloud to edge

AWS Snow Family: Edge compute at the rugged or disconnected edge

Snow capabilities to enable edge compute

Guest speaker: Using AWS Snowball Edge for Robotic Combat Vehicles

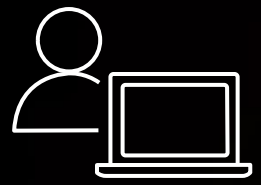
Deploying a scalable cluster for compute, storage, and networking

Q&A

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Learning from our customers



Extend the cloud

Bring infrastructure, services, tools, and experiences wherever customers need it — in the cloud, on premises, and at the edge



Use cases

Low latency applications, migrate and modernize, local data processing, and data residency



Challenges with solutions today

Complexity, cost, and maintenance of on-premises solutions and at the edge

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AWS cloud-to-edge continuum

DELIVERING AWS WHERE YOU NEED IT

Regions



For most use cases

Metro areas and telco networks



On premises



For low latency, Data residency

Remote and limited connectivity locations



Smart devices



For local compute, rugged, DDIL* edge

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* Denied, disrupted, intermittent, limited

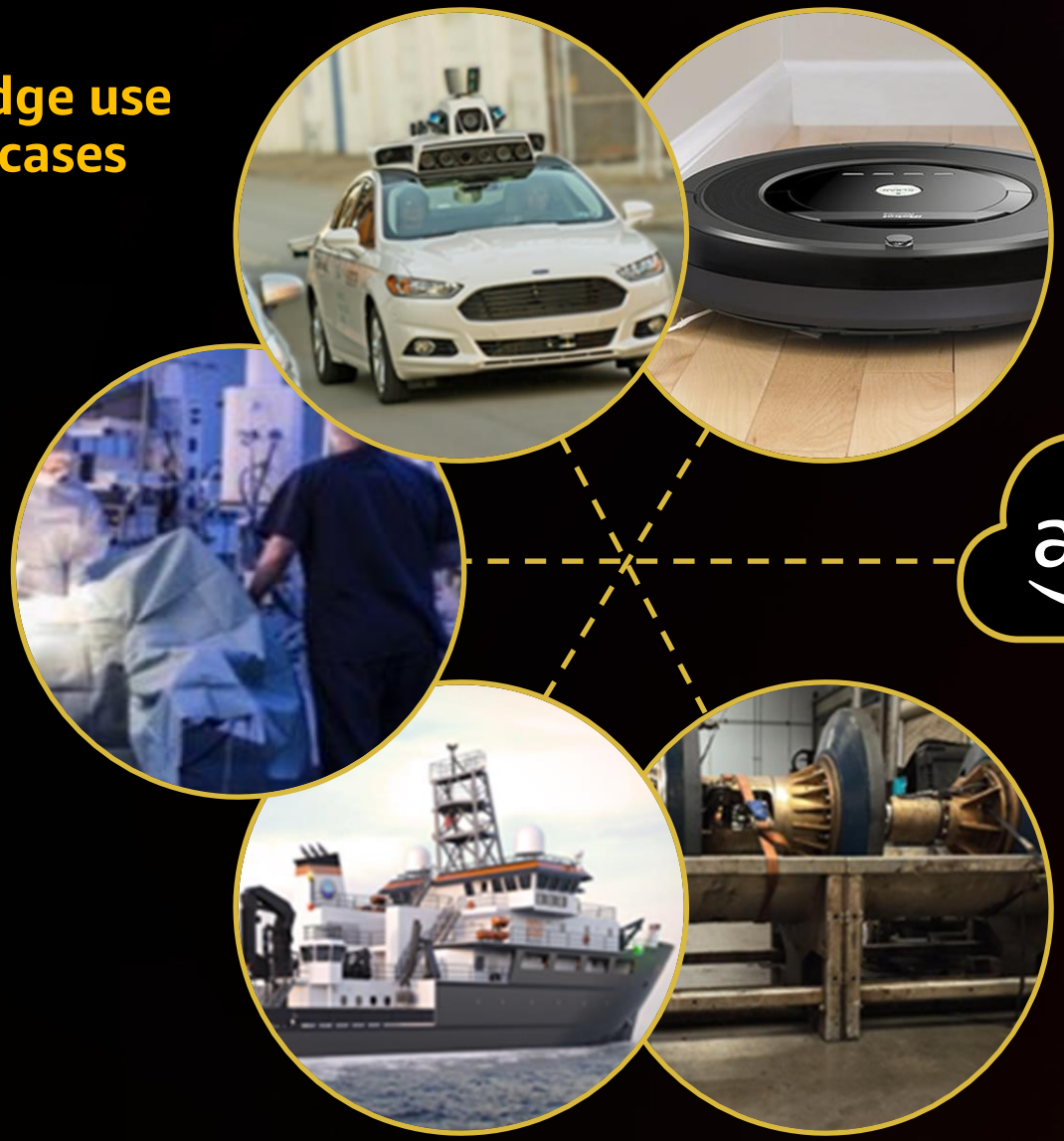
AWS Snow Family: Edge compute at the rugged or DDIL* environments

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* Denied, disrupted, intermittent, limited

Rugged edge or DDIL* environments

Edge use cases



Why is it important for customers?



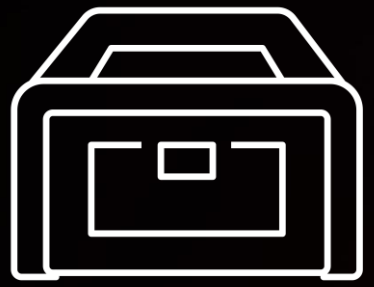
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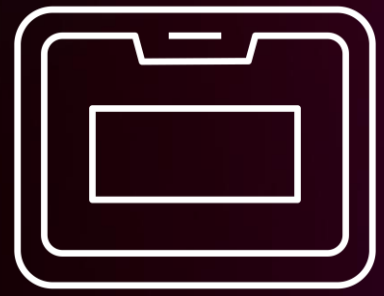
AWS Snow Family

PHYSICAL DEVICES TO AGGREGATE AND PROCESS DATA IN RUGGED EDGE LOCATIONS



AWS Snowcone

Compact and portable device,
purpose-built for use outside
of a traditional data center



AWS Snowball

Compute-optimized or
storage-optimized device
for use outside a traditional data center

Available for clustering, scaling, and connectivity

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AWS Snowball Edge for rugged and tactical edge

BRINGS AWS TO DDIL RUGGED EDGE AND LOCATIONS WITH NO OR LIMITED NETWORK CONNECTIVTY

Edge compute and edge storage use cases:
32 - 104 vCPU, 208 - 416 GB RAM
28 - 210 TB NVMe storage
Up to 100G Networking



Tamper-resistant
Tamper-evident

- Handles up to 200G impact
- Airdrop-able
- MIL-S-901D
- Meets FISMA High, FedRAMP ITAR, CJIS, and DoD SRG Impact Level 6 requirements

Operates on unconditioned power and in non-datacenter environments (0° to 45°C)

Data secured with 256-bit encryption

Designed to be operated by non-technical personnel

Weighs 49 pounds; can be handled by a single person

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AWS Snowball Edge Compute Optimized: 2x compute refresh



Denser Snowball Edge – Compute optimized

Device Specs	**CPU**	104 vCPUs available for customer use (2X improvement)
	Memory	416 GB available for customer use (2x improvement)
	Storage	28 TB All NVMe
	New Amazon EC2 instance type	sbe-c.16xlarge 64 vCPUs sbe-c.24xlarge 96 vCPUs
Pricing	• Monthly and 1-Year Pricing Option (New)	
	• 32, 52, 104 vCPU usage tiers (New)	
	• Volume discount (PARC Pricing) Available (New)	

Suitable Customer Use cases

- Telco workloads, such as Private 5G deployment
- Dense compute workloads in factory floor, healthcare, disaster recovery
- Defense use cases for tactical edge deployments
- Deployment on moving platforms and high-vibration environments
- Deployment in trucks, planes, and ships

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AWS Snowcone for mobile workloads

SMALL, ULTRA-PORTABLE, RUGGED, AND SECURE DDIL EDGE COMPUTING AND DATA TRANSFER DEVICE

Capabilities:
2 vCPU, 4 GB RAM
8 TB HDD or 14 TB SSD
1 or 10G Networking

Tamper-resistant
Tamper-evident

Handles vibration
up to 50G RMS



Operates on unconditioned power and in non-datacenter environments (0° to 45°C)

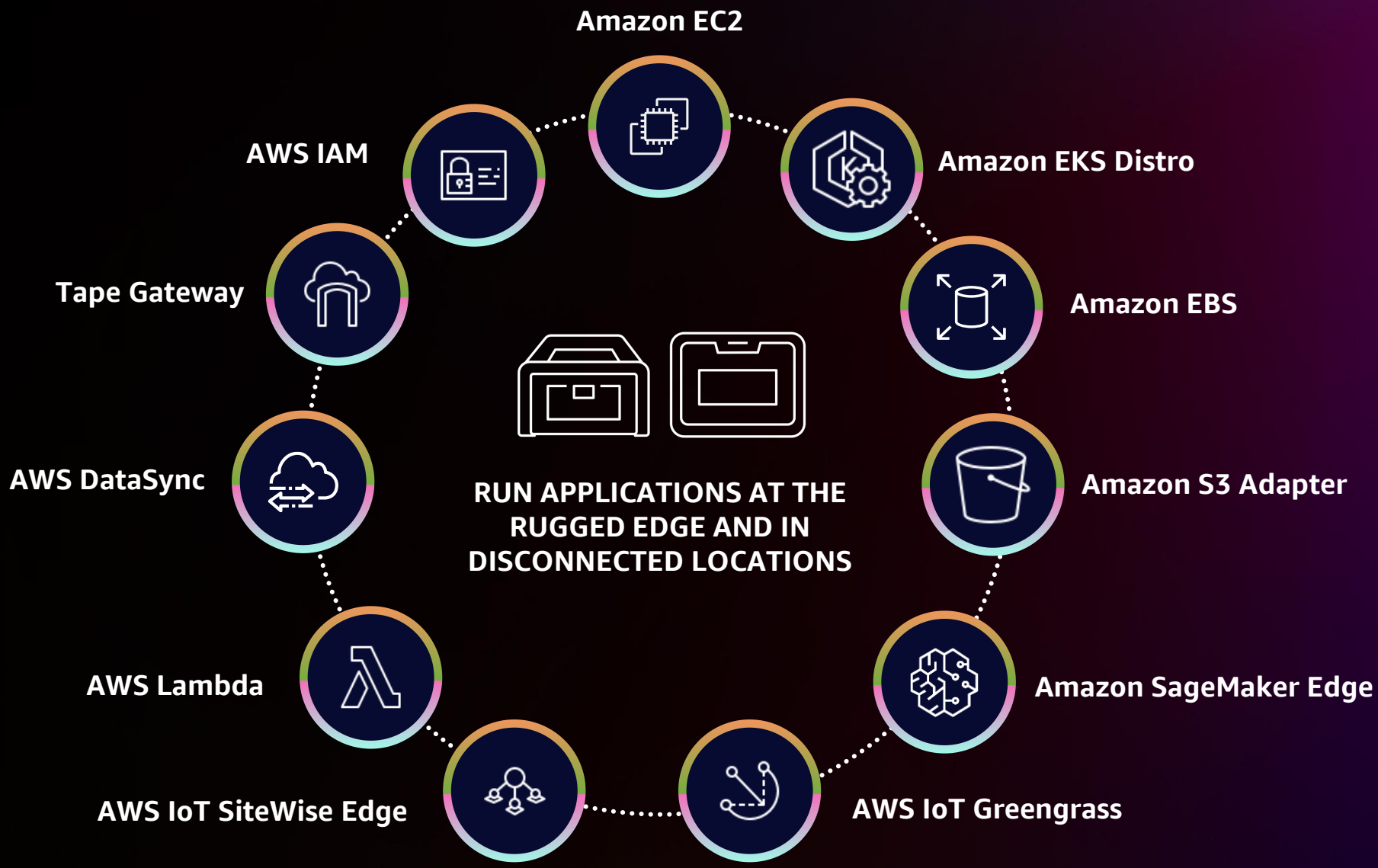
Data secured with 256-bit encryption

Designed to be operated by non-technical personnel

Weighs 4 pounds and
can be carried in a backpack

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AWS services available on Snow Family devices



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Snow Family capabilities to enable edge compute

Danny Wei

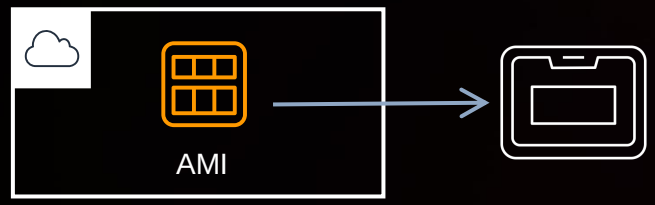
Principal Engineer, AWS Snow Family

Amazon

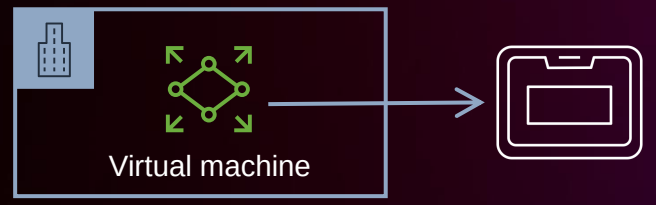
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Enabling compute with AMIs on Snow Family

RUN COMPUTE WORKLOADS USING ON SNOW FAMILY DEVICES USING AMIS



Export an AMI from an AWS Region



Import a VM image at the edge

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Exporting an AMI from Amazon EC2 in Region

- Launch an instance from a supported AMI from the AWS Marketplace
- Customize your instance
- Create an AMI from that instance
- Provision your Snow job with that AMI

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Importing VM images at the edge

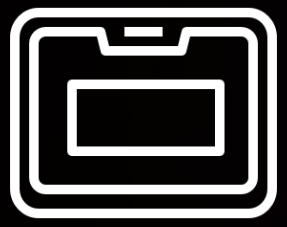
- Import a RAW image of your VM as a snapshot on your Snowball Edge device
- Register that snapshot as an AMI

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CURRENTLY IN PRIVATE BETA ON AWS:

Amazon EKS Anywhere on Snow

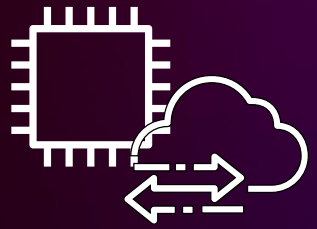
RUN AMAZON EKS ANYWHERE ON AWS SNOW FAMILY DEVICES FOR RUGGED, DISCONNECTED CONTAINER WORKLOADS AT THE EDGE



Provides an installable software package for creating and operating Kubernetes clusters



Deploys containerized applications to Snow Family devices in a fault tolerant and highly available fashion



Enables automation for cluster management, reduced support costs, and elimination of redundant efforts of using multiple tools for operating Kubernetes clusters

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Direct Network Interface on Snow Family

Direct Network Interfaces (DNI)



- Multicast streams
- Multiple DNIs per VM
- VLAN tags
- Use multiple network ports
- Configure route tables
- Routing

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AWS Snow Family: For data transfer use cases



Amazon S3 API compatible buckets locally on Snowball Edge devices



Online data transfer using AWS DataSync



Offline data transfer by shipping back to AWS

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Edge operator experience: Management capabilities

COMPREHENSIVE MONITORING AND MANAGEMENT FEATURES FOR OPERATING SNOW AT RUGGED EDGE

Features

- Customers can remotely unlock, reboot, monitor device status, and build automation
- All Snowball Edge and Snowcone devices have support for remote edge management

Customer benefit

- Customers now have flexibility in managing their devices on the rugged, disconnected edge
  - When disconnected, customers can use AWS OpsHub or CLI for local edge management
  - When connected, customers can use remote edge management on AWS OpsHub

Using edge management

- Customers can order Snow devices with Remote Edge Management at the time of job ordering or can enable it once the device is in their possession
- Customers can then use OpsHub to manage one or more Snow Family devices at the edge

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Use case – Optimizing delivery routes

- Distribution centers with limited bandwidth
- Fleet of delivery vehicles with sensors and cameras
  - Collect data and traffic conditions on route
- Optimize path/route planning
  - Route around/avoid construction
  - Avoid areas of high congestion

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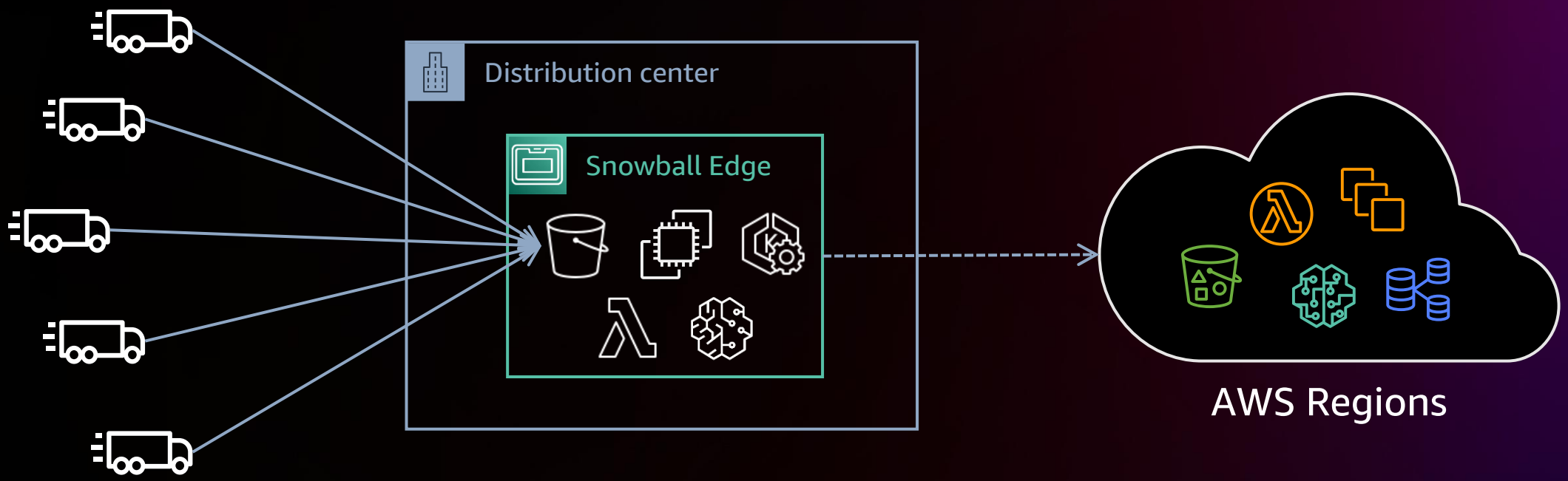
Use case – Optimizing delivery routes

- Snowball Edge devices located at the distribution center
- Gather data from the vehicles as they return
- Filter and process that data for timely local decisions
- Periodically send Snowball Edge devices to AWS to import full data set for further analytics in the cloud

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Use case – Optimizing delivery routes

PHYSICAL DEVICES TO AGGREGATE AND PROCESS DATA IN RUGGED EDGE LOCATIONS, THEN TRANSFER TO AWS



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Hypergiant: Robotic Combat Vehicle Sustainment

Michael Roberts
CTO
Hypergiant

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US ARMY ROBOTIC COMBAT VEHICLE SUSTAINMENT

HYPERGIANT



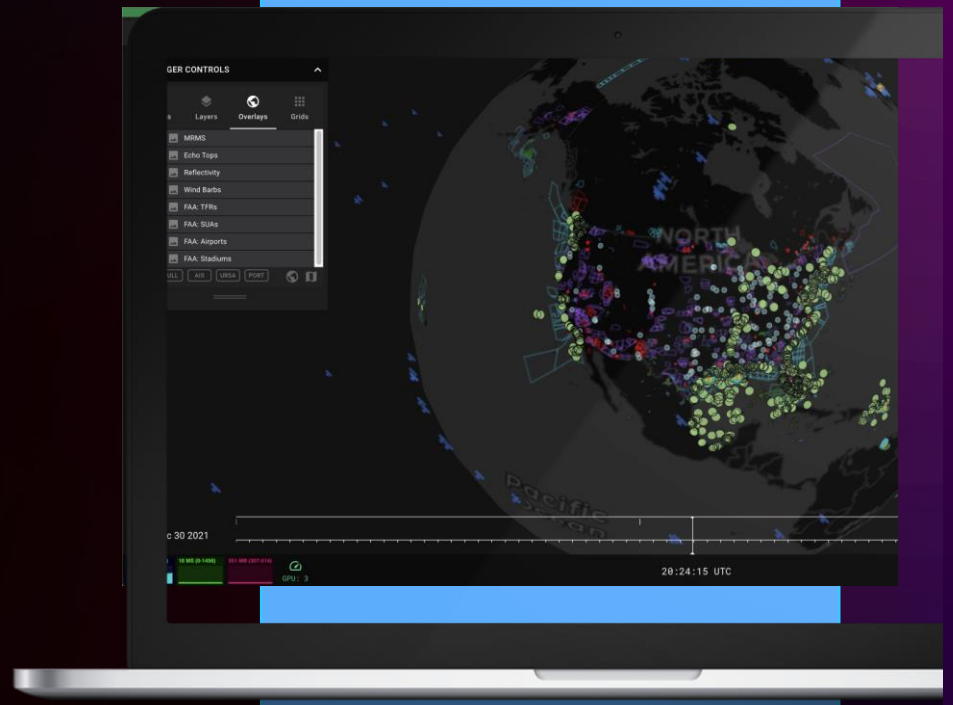


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CommandCenter

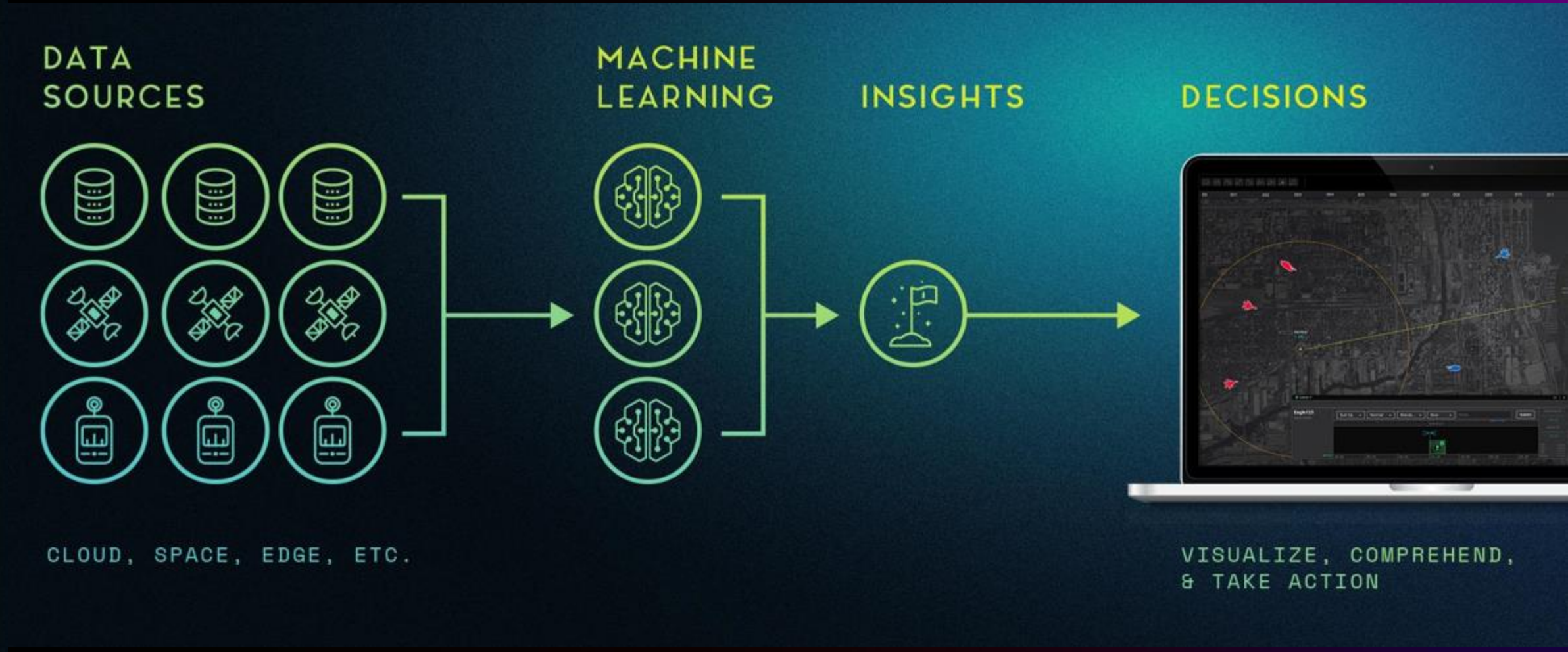
Intelligent Insights & Actions Platform

CommandCenter is a real-time, highly performant **Intelligent Insights & Actions Platform designed for AI**. CommandCenter supports multiple data formats and **courses of action** for a variety of specific use cases customized to your operational needs.



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From data to decision



HYPERGIANT

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Supporting components

Hyperdrive: Machine learning software development kit and command line interface enabling data scientists to independently complete end-to-end model development and deployment (ML OS as a single image)

Hyper Learning Studio: A no-code interface for human in-the-loop data labeling and Machine Learning training, reducing roughly 70% of the time spent labeling, deploying, and retraining models

AutoML: A low-code automated tool enabling model selection and development for reduced time in Machine Learning discovery

AutoDC: A low-code automated tool enabling data outlier detection, label correction, and dataset augmentation; this tool takes a data-centric approach to improving ML performance by focusing on the dataset itself

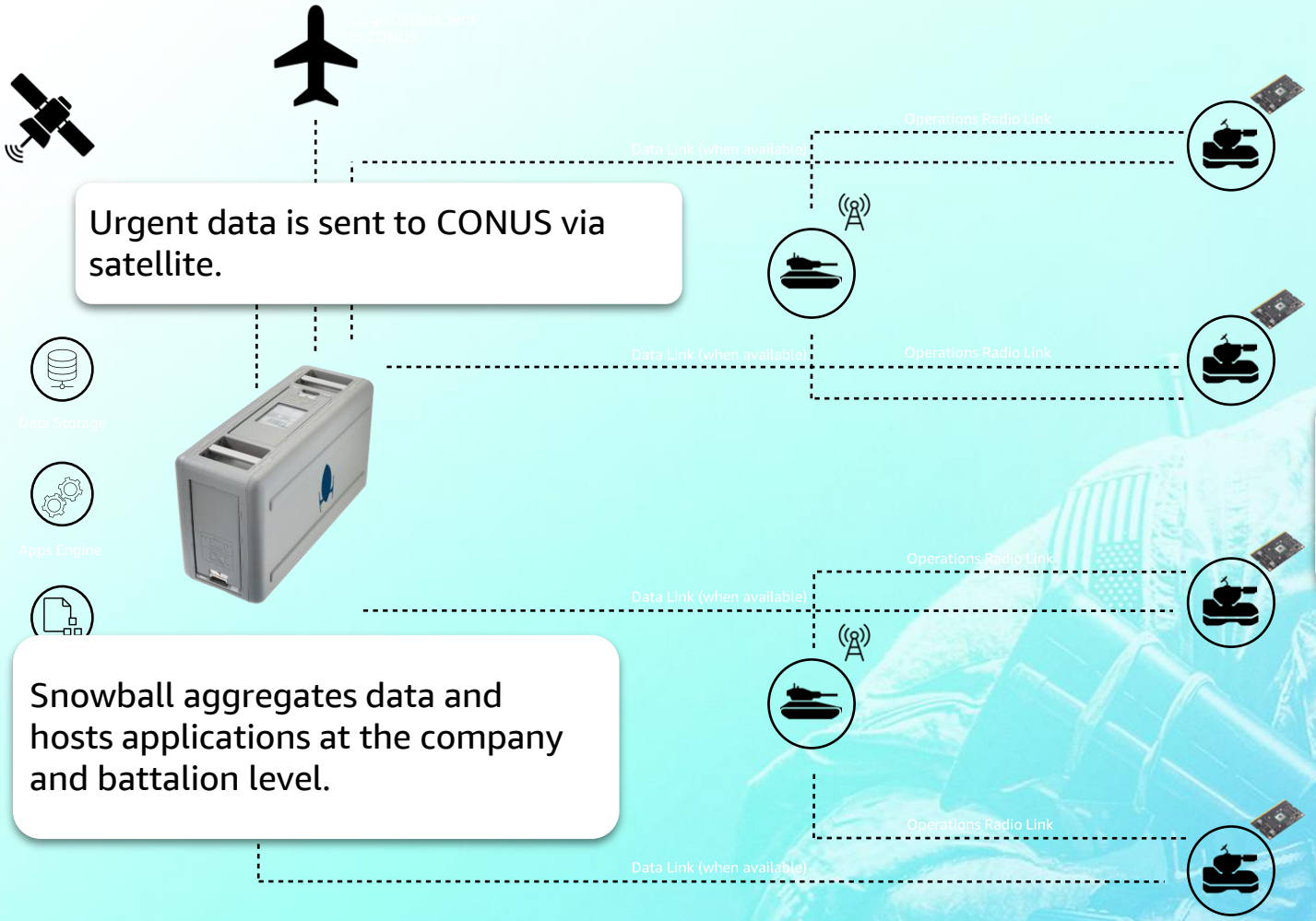
Hyper Secure Data Sharing: A data versioning, sharing protocol, and tool suite for processing, storing, and sharing data across applications and secure environments enabling quicker access to data for AI development

Firefly: GovCloud IDE/EC2 manager for ML projects (provisioning secure access to Hyperdrive 2.0 core compute)

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RCV, CommandCenter, and Snowball in the field



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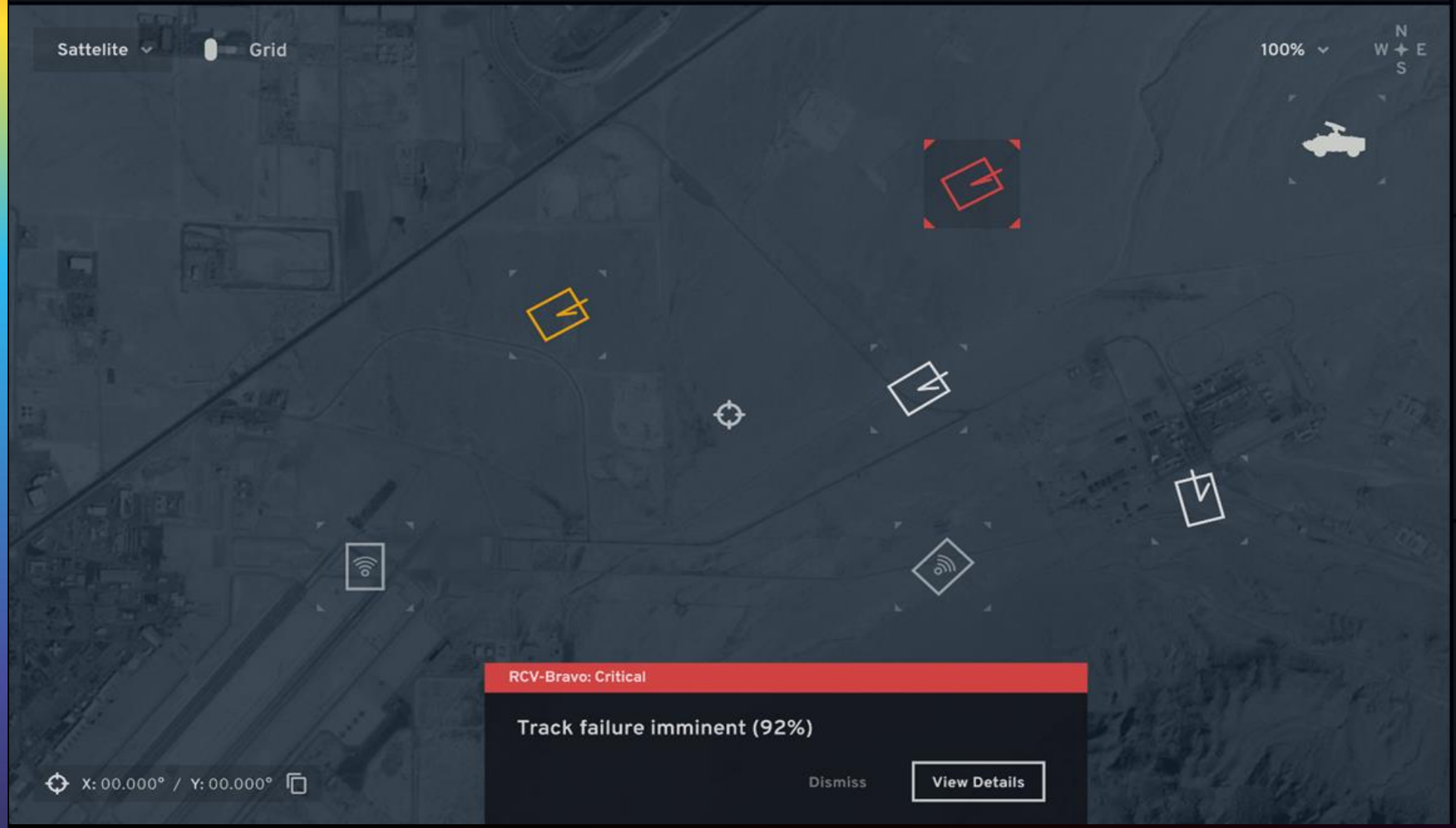
Tactical Dashboard

3/4
Battle ready

654/800
Ammo level

11/15
Fuel gallons

22/24
Battery hours



1
Critical
Critical attention required

1
Affected
Attention required

4
Operational
Systems ready

Predictions

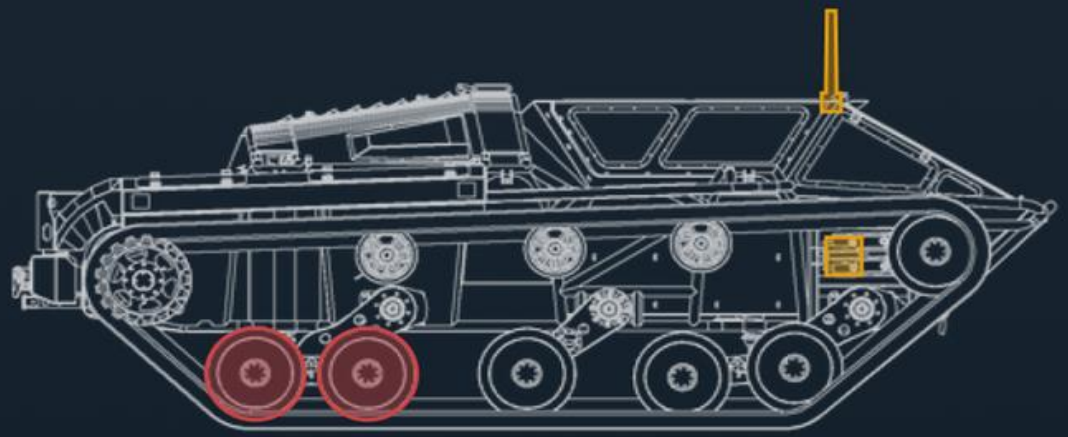
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RCV-Bravo Diagnostics

1/4	0°	11/15	22/24
Battle ready	Turret pos.	Fuel gallons	Battery hours

Left side

100%



Return to Maintenance Waypoint →

Move
Critical attention required
1

Communicate
Attention required
1

Shoot
Systems ready

Misc.
Attention required
1

Sytem Health

Rear Axle Gasket
TLR232011



X-Line	MFT3417 - ML v2.1	92%
Status	Reporter	Probability

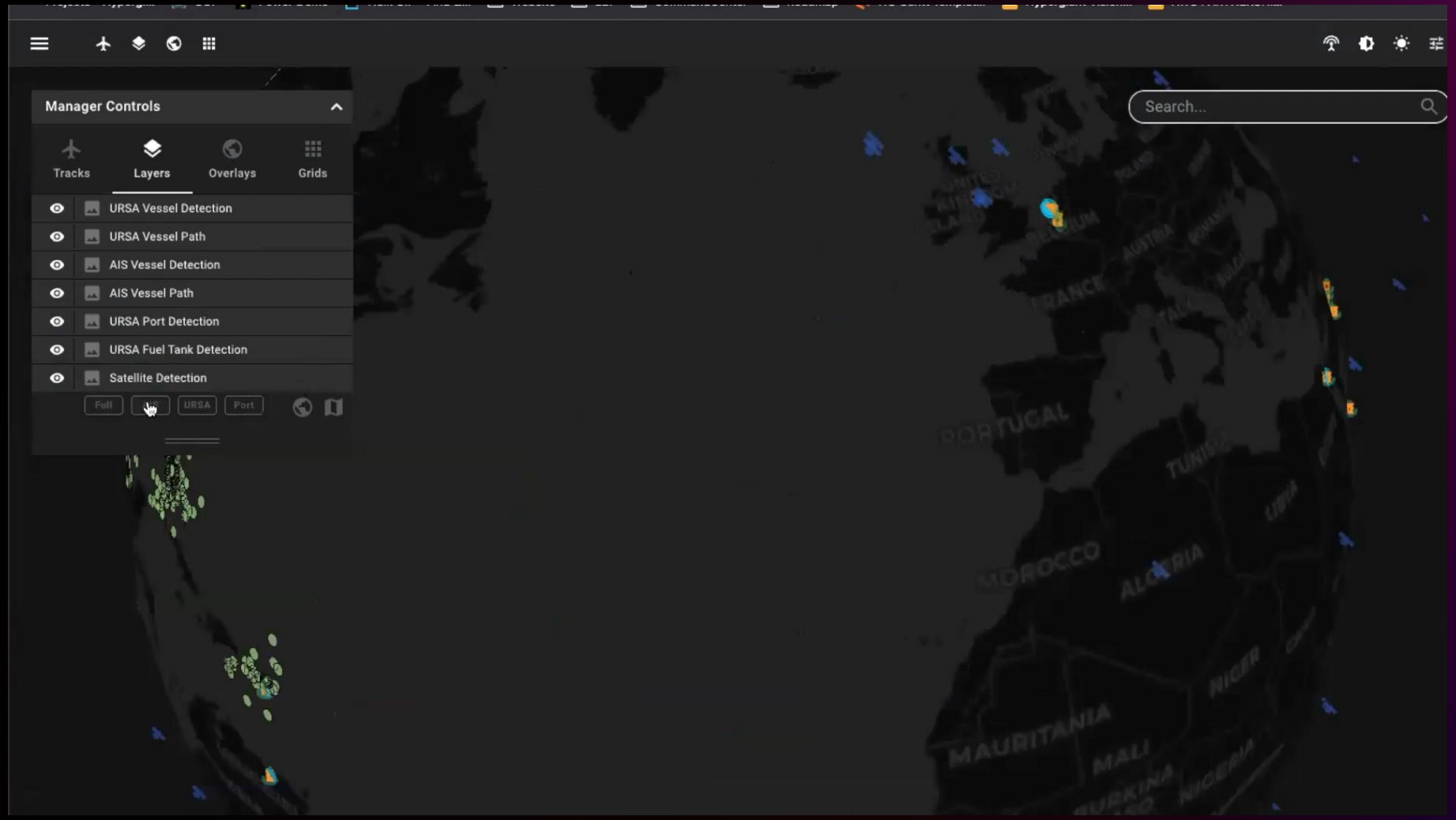
Sep 19	Oct 22	Oct 25
Ordered	Est. arrival	Est. repair date

Solutions Manual Tracking Info

Faults Logs Search... + Add Log Entry

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CommandCenter video



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Ready for service



- Currently deployed on IL4 and IL6
- PlatformONE Certificate to Field







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→ Deployable across DoD





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AWS Snow Family: Deploying a scalable cluster for compute, storage, and networking

Ramesh Kumar

Head of Product and Solutions, AWS Snow Family

Amazon

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Scalable Snow cluster for compute, storage, and networking at the DDIL* edge

- 6 Snowball Edge devices in a 42U server rack
- 64 port, 100G L3 switch, power distribution unit
- Scalable compute and networking
  - Multi-node container management with EKS-Anywhere
  - Amazon EC2 instance monitoring and auto-recovery
  - Cluster repair service
- Scalable storage
  - 5 to 15 Snowball Edge nodes/ devices
  - Add, remove, and replace nodes



Redundant ToR switch

Switch manager

6 AWS Snowball Edge devices

Power modules

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Thank you!

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