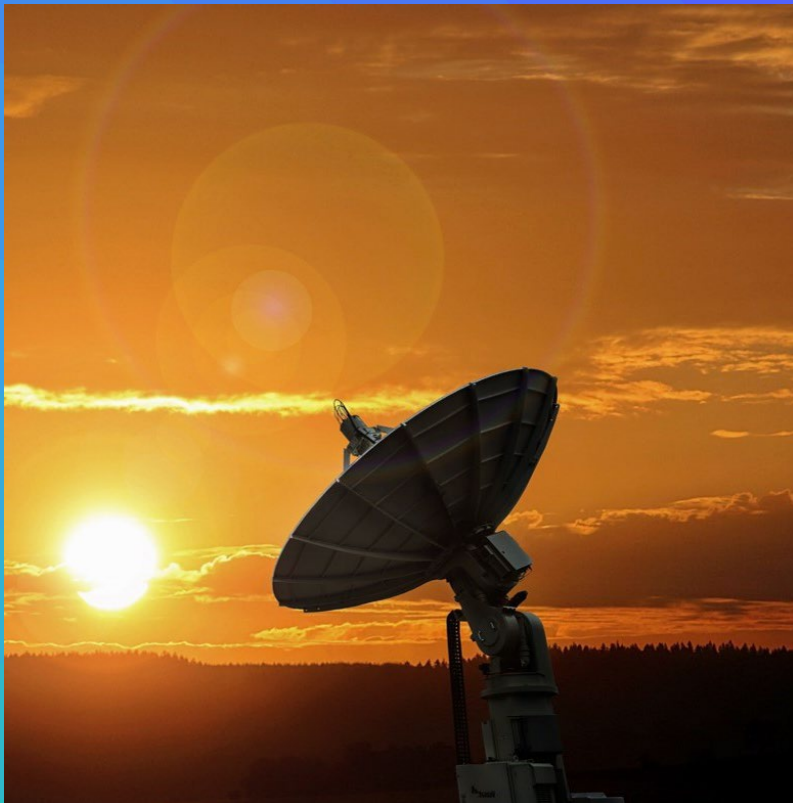# Space, Spatial and Satellite Solutions in the Cloud

Mani Thiru
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The world is entering an exciting new space age

The space industry is rapidly growing and transforming

A new era of human spaceflight is dawning

Satellites launched into orbit will quintuple over the next decade

AWS for Aerospace and Satellite (A&S) Solutions

AWS A&S provides secure, flexible, scalable, and cost-efficient cloud solutions to help commercial and government customers build satellites, conduct space operations, launch missions, and reimagine space exploration.
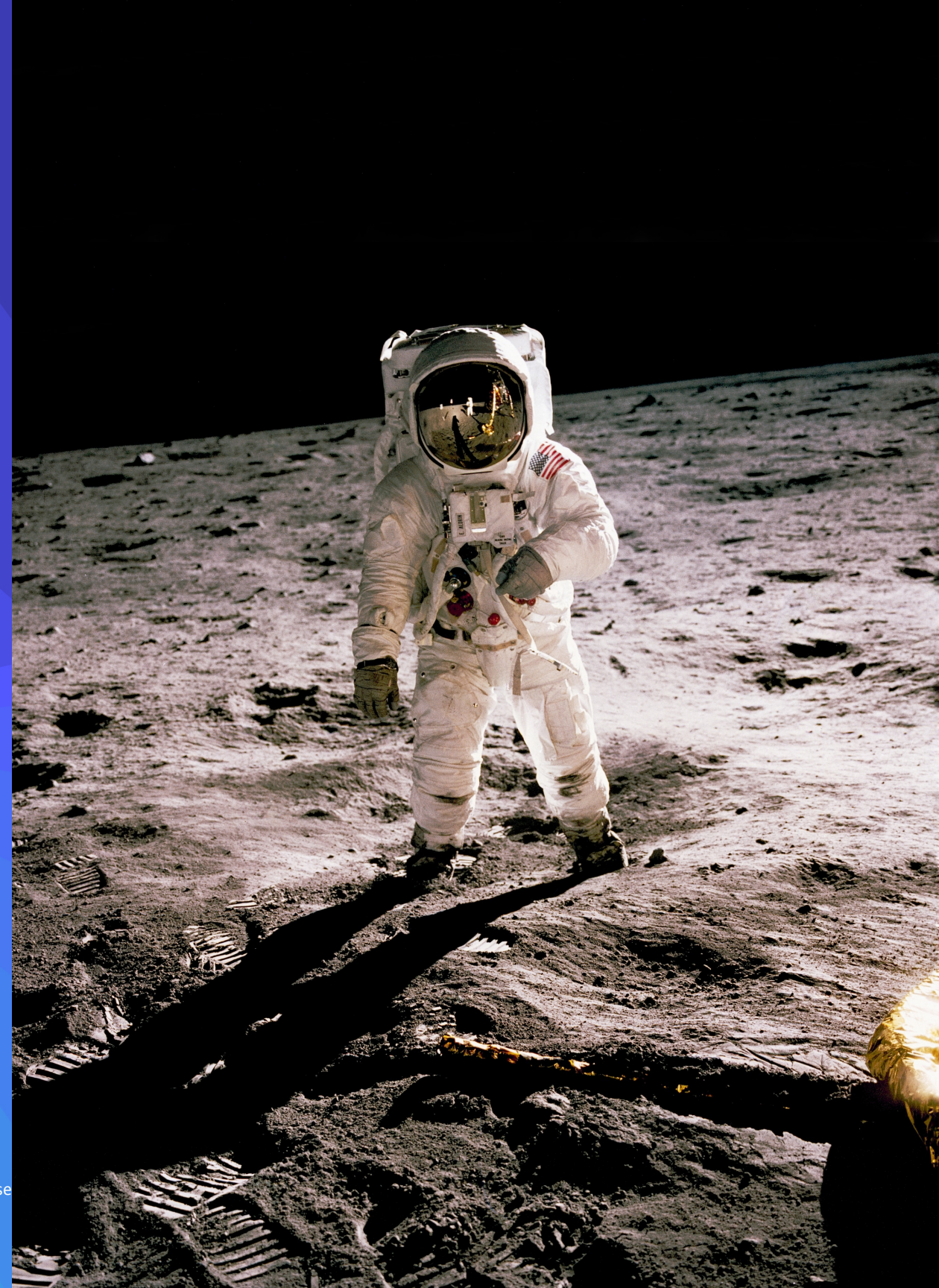
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AWS's approach to space

Space exploration

- Human spaceflight
- Lift support systems
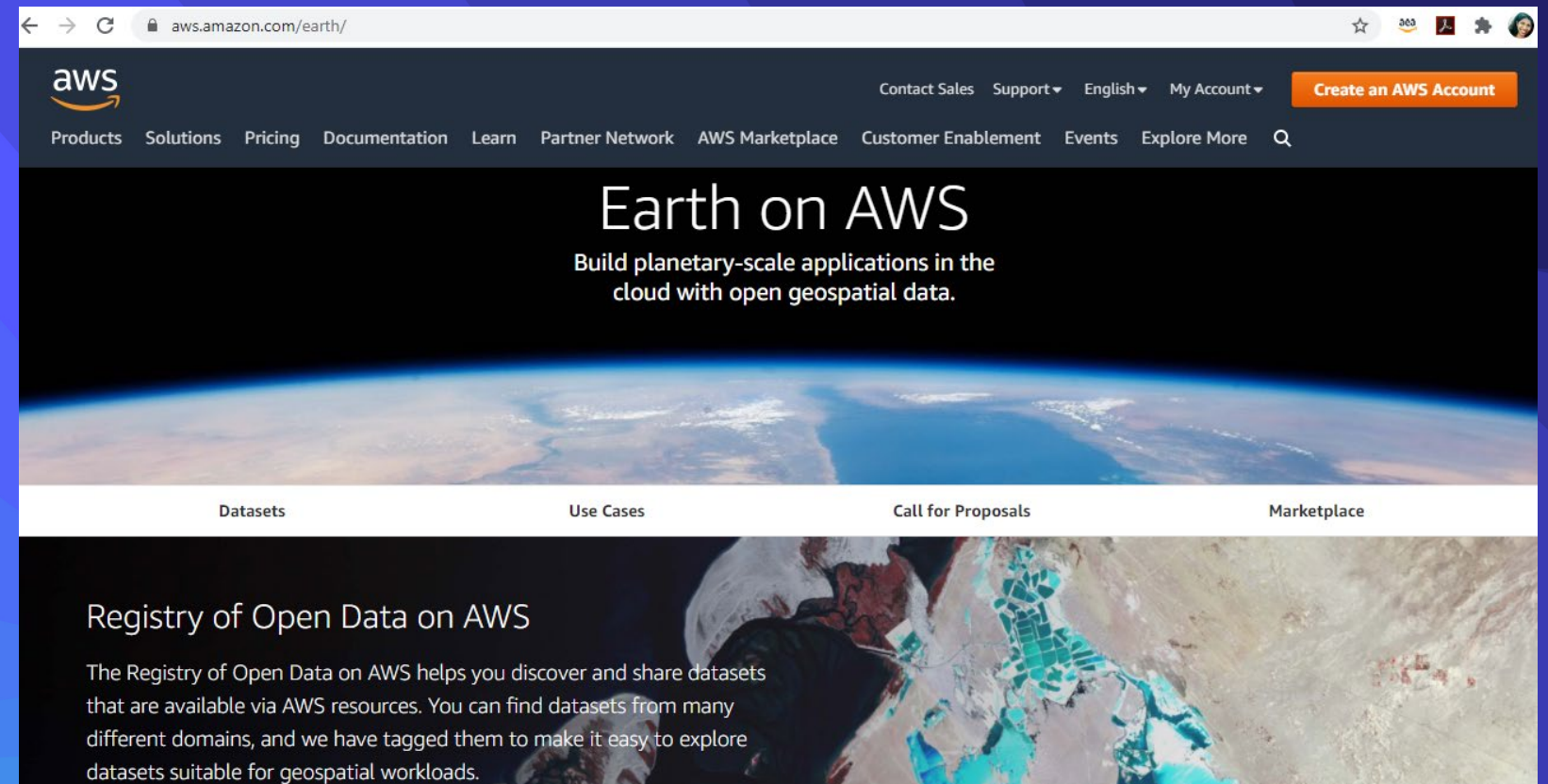- Mission control center operations
- Robotic/autonomous systems

AWS's approach to space

Satellite solutions

- Earth observation
- Situational awareness
- Internet of Things (IoT)
- Disaster assistance
- Defense/intelligence

Most robust, fully-featured technology infrastructure platform

HYBRID ARCHITECTURE

- Integrated Networking
- AWS Direct Connect
- Identity Federation
- Integrated App Deployments
- Data Backups
- Integrated Resource Management

MARKETPLACE

- Business Apps
- Business Intelligence
- DevOps Tools
- Security
- Networking
- Databases
- Storage

TECHNICAL & BUSINESS SUPPORT

- Support
- Professional Services
- Partner Ecosystem
- Training and Certification
- Solutions Architects
- Account Management
- Security and Billing Reports

ANALYTICS

- Data Warehousing
- Business Intelligence
- Hadoop/Spark
- Streaming Data Analysis
- Streaming Data Collection
- Machine Learning
- Elastic Search

APP SERVICES

- Queuing and Notifications
- Workflow
- Search
- Email
- Transcoding

MOBILE SERVICES

- Amazon API Gateway
- Single Integrated Console
- Identity
- Sync
- Mobile Analytics
- Mobile App Testing
- Push Notifications

DEVELOPMENT & OPERATIONS

- One-click App Deployment
- DevOps Resource Management
- Application Lifecycle Management
- Containers
- Triggers
- Resource Templates

IoT

- Rules Engine
- Device Shadows
- Device SDKs
- Device Gateway
- Registry

ENTERPRISE APPS

- Virtual Desktops
- Sharing and Collaboration
- Corporate Email
- Backup

GAMING

- 3D Game Engine
- Character Designer
- Multiplayer Service
- Cloud Integration
- Twitch Integration

SECURITY & COMPLIANCE

- Identity Management
- Access Control
- AWS Key Management Storage (AWS KMS)
- Monitoring and Logs
- Configuration Compliance
- Web Application Firewall
- Assessment and Reporting
- Resource and Usage Auditing

CORE SERVICES

- Compute — VMs, Auto-scaling, Load Balancing, Containers, Cloud Functions
- Storage — Object, Blocks, File, Archivals, Import/Export
- CDN
- Databases — Relational, NoSQL, Caching, Migration
- Networking — Amazon VPC, DX, DNS

INFRASTRUCTURE

- Regions
- Availability Zones
- Points of Presence

AWS Ground Station

- Managed ground stations
- No long-term commitments required
- Simple, pay-as-you-go pricing – pay by the minute
- Self-service scheduling
- Close proximity to AWS Regions
- First-come, first-served scheduling
- 12 AWS Ground Station locations planned in 2019
- Two or more antenna systems per location

AWS AI and Machine Learning

AWS offers the broadest and deepest set of machine learning services and supporting cloud infrastructure, putting machine learning in the hands of every developer, data scientist and expert practitioner.

ML Services
Build, train and deploy machine learning models fast

AI Services
Easily add intelligence to your applications
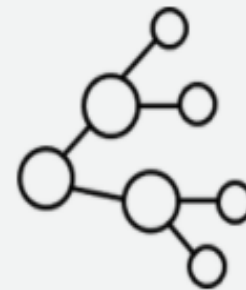
Deep Learning Frameworks
Choice and flexibility with broadest framework support

Learning Tools
Get hands-on with machine learning

Getting Started
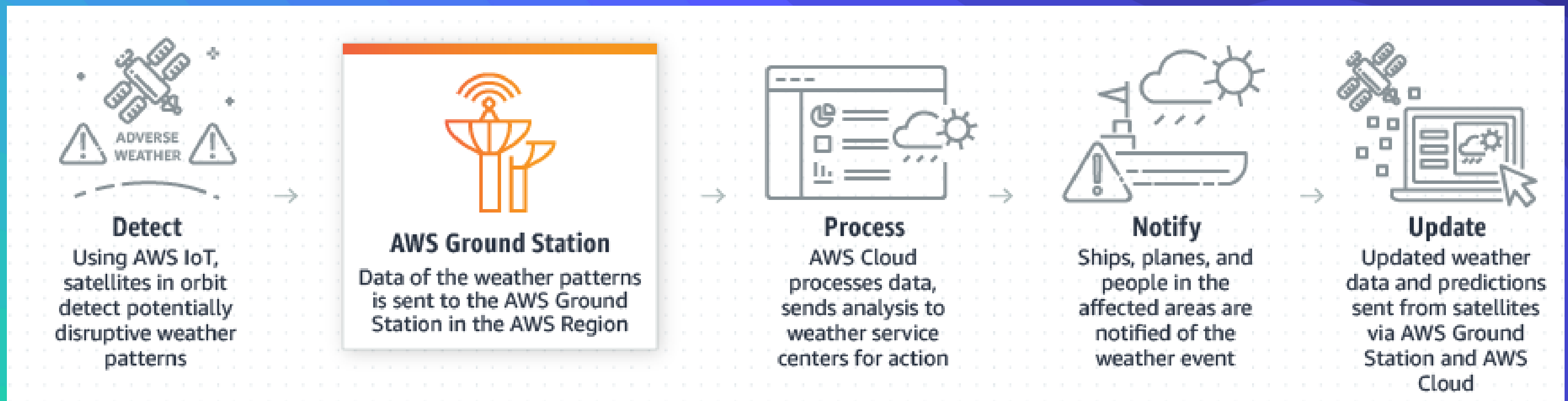Start your machine learning journey

AWS RoboMaker

Cloud robotics service that makes it easy to build, deploy, and manage smart robots at scale.
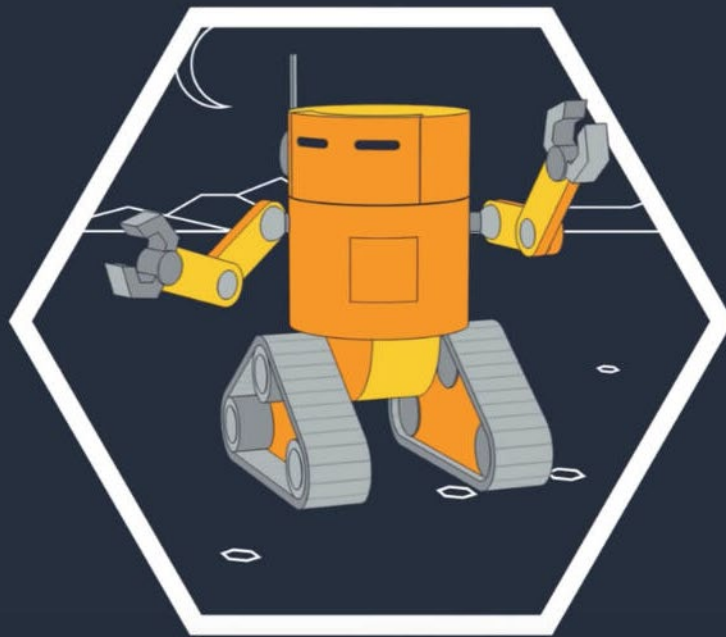
- Provides a fully-managed, scalable infrastructure for simulation that customers use for multi-robot simulation and CI/CD integration with regression testing in simulation.

- Provides an IDE, fleet management capabilities, ROS extensions, and seamless integration with various Amazon and AWS services (Polly, Lex, Kinesis) to empower customers to innovate and provide best-of-class robotic solutions.

Sample Use Case: Accurate Weather Prediction

You can use the AWS Cloud to analyze downlinked weather data from all over the world to more accurately predict weather patterns. This can be used to help ships, airplanes, trucks and people increase their awareness of inclement weather in their area and then safely and efficiently avoid dangerous situations.

Detect
Using AWS IoT, satellites in orbit detect potentially disruptive weather patterns

AWS Ground Station
Data of the weather patterns is sent to the AWS Ground Station in the AWS Region

Process
AWS Cloud processes data, sends analysis to weather service centers for action

Notify
Ships, planes, and people in the affected areas are notified of the weather event

Update
Updated weather data and predictions sent from satellites via AWS Ground Station and AWS Cloud

Building Industry through AWS Partner Network (APN)

- **Startups** — Source of new technology, niche solutions, and disruptive business models

- **Incubators/ accelerators** — Strong network aggregator for sourcing new technology, commercialization efforts, investors, and universities

- **Universities/ R&D** — Advanced research, intellectual property, and expertise for new technology development

- **Government agencies & Enterprises** — Dedicated initiatives to support, and access commercially-available technology

- **System integrators** — Client relationships, domain expertise, design thinking led and unique problem-solving

- **Defence primes** — Technical infrastructure, products, partners, and go-to-market programs/channels

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Thank you!

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