INTUITION
GROUND SYSTEM

Intuition revolutionizes satellite networking with an advanced, secure ground system designed to deliver unmatched market agility. Built on a cloud-native, multi-orbit architecture, it leverages automation and the latest standards-based technologies while unifying iDirect's industry-best technologies. This innovative system empowers operators with the flexibility and insights needed to stay ahead in a rapidly evolving market, delivering new services and maximizing the revenue potential of next-generation satellites.

Intuition's innovative architecture supports a range of cutting-edge technology applications and capabilities designed to enhance the performance, reliability, and scalability of satellite network operations. From enabling seamless multi-orbit connectivity, to virtualization and leveraging AI-driven automation, these technologies and capabilities empower operators to tackle complex challenges and unlock new possibilities.

CORE CAPABILITIES

- **Virtualization**
- **Intelligent Multi-Orbit**
- **Automation and Orchestration**
- **Market Agility**
- **Standards-based**
- **Security**

iDirect

INTUITION

VIRTUALIZATION

Virtualization has transformed IT and telecommunications, and now it's redefining satellite networks. By decoupling software from hardware and introducing cloud-native designs paired with high-density configurations, cloud-native architectures ensure unparalleled flexibility, scalability, and efficiency.

MULTI-ORBIT

The future of satellite connectivity lies in multi-orbit networks. Intuition enables service providers to unify diverse constellations into one seamlessly integrated infrastructure and will deliver uninterrupted service, simplified operations, and quality-focused service delivery.

AUTOMATION & ORCHESTRATION

Intuition's dynamic automation streamlines satellite operations, optimizing resource orchestration, global bandwidth management, and service delivery. AI-driven insights will boost efficiency, enhance QoS, and maximize profitability.

MARKET AGILITY

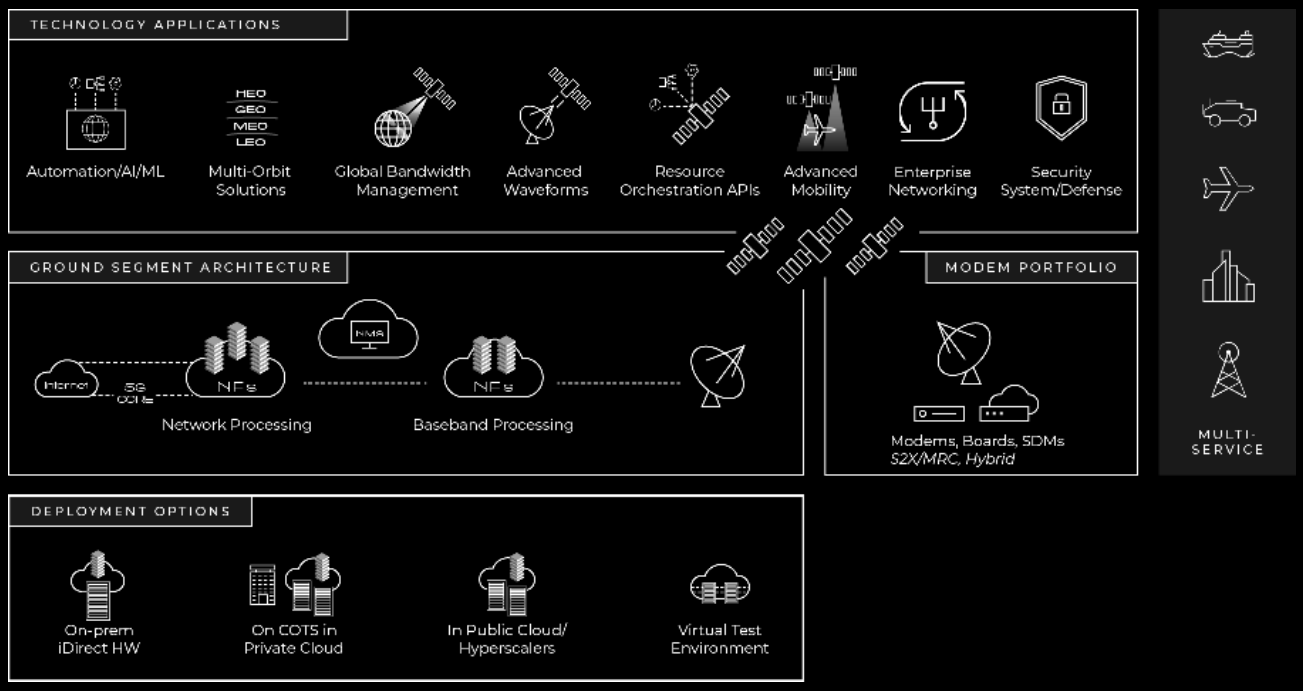
Intuition empowers satellite operators to unlock new revenue streams with adaptable solutions like managed services and virtual network operator setups. Its unified platform supports multiple markets while streamlining operations for optimal efficiency.

STANDARDS

Intuition integrates 5G NTN to unify satellite and terrestrial networks, enabling seamless global roaming and hybrid connectivity. With a scalable, standardized foundation, it unlocks opportunities for operators to deliver uniform services and optimized performance.

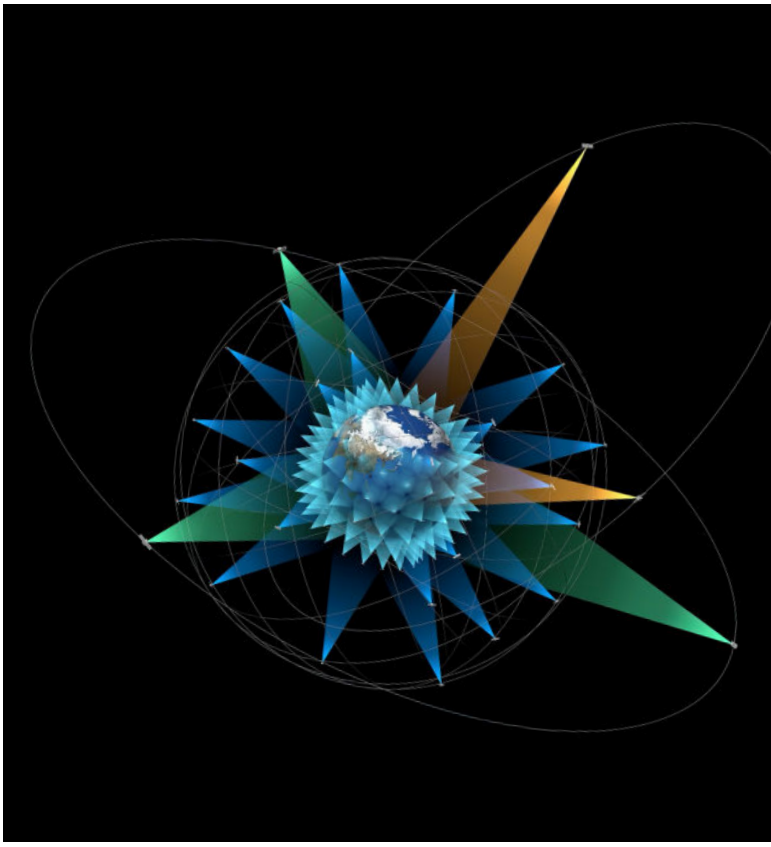
SECURITY

Intuition embeds robust, end-to-end protection to safeguard data and ensure operational continuity. With advanced encryption, vulnerability mitigation, and compliance assurance, providing confident operation in today's interconnected world.



MULTI-ORBIT SOLUTIONS

Intuition transforms multi-orbit connectivity with advanced capabilities that enable optimal performance, reliability, and adaptability across GEO and NGSO constellations. By combining bandwidth across networks, it delivers superior service diversity and reliability while avoiding interference, ensuring redundancy, and seamlessly offloading traffic from saturated links. Its intelligent satellite switching, will power real-time, multi-orbit, dynamic beam scheduling with orbit-independent tracking using a single modem, and is designed to evolve with seamless handovers and advanced mobility support.



Traffic Optimization and Routing

- Intelligent steering tools dynamically assign resources to high-priority applications, switching between HEO, GEO, LEO, and MEO for optimal performance

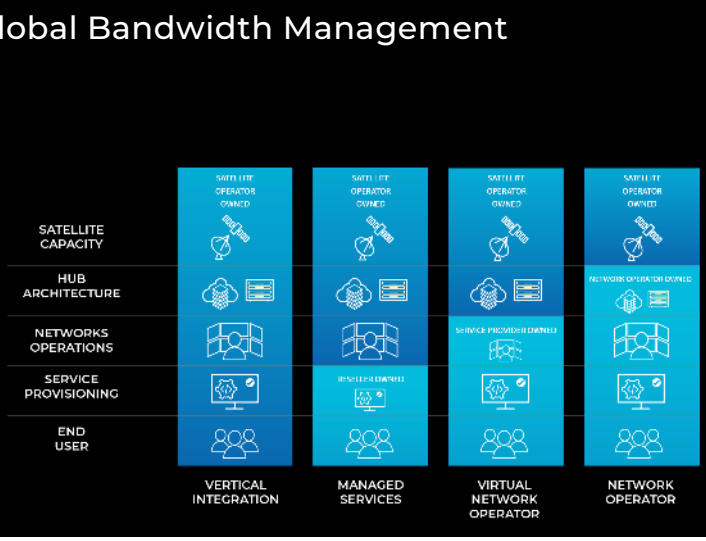
Global Bandwidth Management

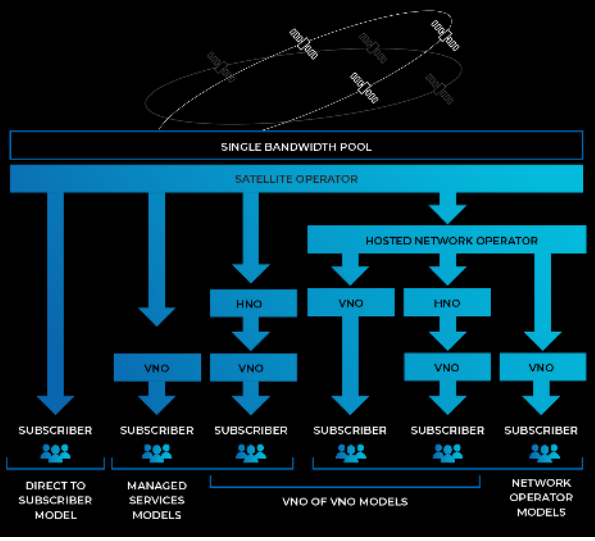
- Pools resources regionally or globally, streamlining SLA optimization and eliminating per-carrier QoS setups

Real-Time Resource Orchestration

- Automation and open APIs enable dynamic allocation, reducing manual intervention and enhancing 5G service readiness

Global Bandwidth Management





ADVANCED MOBILTY

Intuition enables service providers to scale mobility networks with exceptional performance. By bridging transparent and regenerative satellites, Intuition supports uninterrupted operations across multi-orbit networks in dynamic environments. It guarantees flawless connectivity and compliance when integrating hybrid capacity or managing migrations. Additionally, its domain-based beam switching allows networks to adapt to geographic and regulatory demands without service disruption.

Beam Switching Technologies

- Automatic and Fast Beam Switching, Satellite Switching, and Batched Beam Switch APIs

Terminal Enhancements

- Skew Mitigation, Antenna Diversity, and OpenAMIP for reliable performance in challenging conditions

Bandwidth and QoS

- Scalable beam support and GBWM maintain superior speed, quality, and flexibility

NGSO Operations

- Multi-orbit tracking algorithm, dynamic beam mapping, and enhanced handovers

Satellite Resource Orchestration APIs

- Real-time interfaces support instant adaptation and optimized performance across ground networks

Intuition's advanced mobility solutions address real-world challenges with innovations for SDS and NGSO support, regulatory compliance tools, and open protocols like OpenAMIP. These features ensure service providers stay ahead of evolving user demands while maximizing efficiency, flexibility, and user experience.

GLOBAL BANDWIDTH MANAGEMENT

Global Bandwidth Management (GBWM) redefines how satellite networks allocate and optimize bandwidth, ensuring unmatched efficiency and adaptability across multi-orbit environments. GBWM dynamically allocates bandwidth based on real-time demand, treating the network as a single, customizable resource pool. It ensures critical applications receive the necessary resources to meet stringent SLAs while delivering flexibility for fixed or mobility use case in highly dynamic satellite environments.

Go-to Market Model Flexibility

- Multi-tenant/level architecture supports diverse SLA needs, from best-effort to CIR-based services

Universal Design

- Combines multiple satellite resources into regional or global bandwidth pools, removing the need for per-carrier QoS adjustments

System-Wide Allocation

- Automatically distributes resources based on real-time demand to optimize MIR/CIR commitments

Continuous Optimization

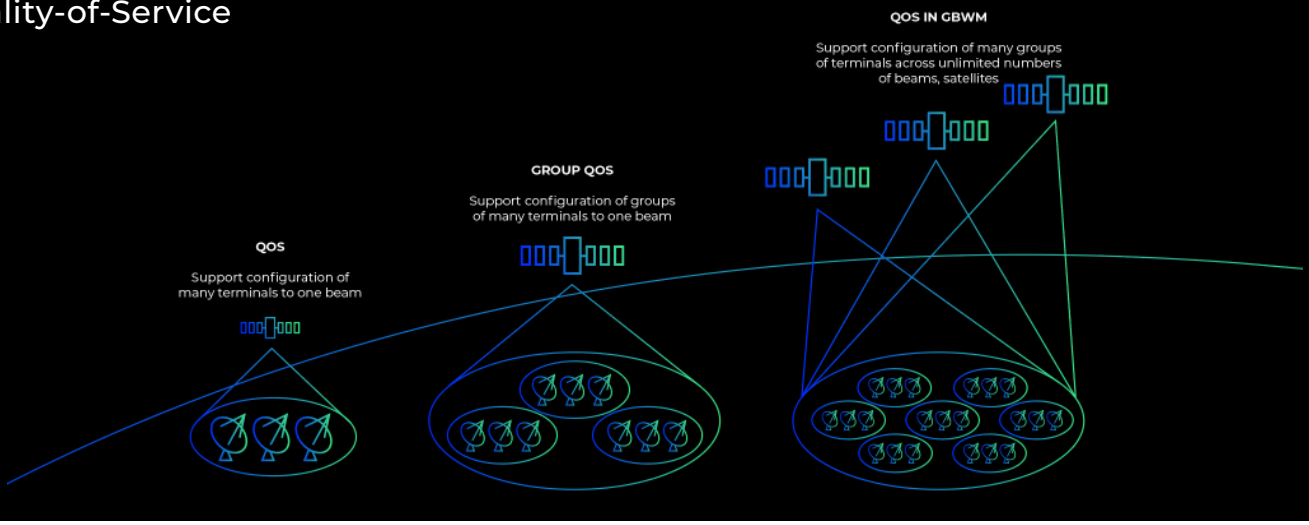
- Maximizes resource efficiency and ensures consistent SLA fulfillment while reducing manual intervention and supporting more terminals

Enhanced Service Management

- Provides global QoS enforcement and granular service control eliminating beam-based silos with features like service area shaping

GBWM enables simplified resource management, reliable service delivery, and adapts to evolving market demands without compromising efficiency or performance.

Quality-of-Service



ENTERPRISE NETWORKING

Intuition delivers tailored, scalable, and high-performance networking solutions by combining Layer 2 and Layer 3 configurations with advanced IP routing, traffic management, and Layer 2 bridging. This functionality ensures seamless integration with terrestrial systems while providing the flexibility to adapt to diverse operational requirements. Layer 2 over Satellite (L2oS) introduces carrier-grade Ethernet for converged services and allows for dynamic Layer 3 modifications post-deployment, empowering operators to accommodate evolving network architectures efficiently.

Layer 2 over Satellite

- Provides support for Carrier Ethernet services by enabling transparent Layer 2 transport over satellite to support use cases such as mobile backhaul, enterprise WAN extensions, and oil & gas and government networks to remote sites

Traffic Optimization

- Enhances user experience and satellite efficiency through data compression for enterprise, application, and Internet traffic

Advanced Features

- Reduced IP assignments, advanced header compression, and virtual networking streamline management, improving service delivery, and enhancing overall control

With these capabilities, Intuition equips operators with the tools to deliver reliable, secure, and future-ready networking solutions that support seamless connectivity and superior performance.

QUALITY-OF-SERVICE

Efficient, reliable network performance begins with robust Quality of Service (QoS). By offering precise control over bandwidth, traffic prioritization, and service levels, QoS ensures network operators can meet the demands of diverse users and applications. Paired with Intuition's Global Bandwidth Management, QoS enhances scalability and flexibility, delivering seamless performance even across complex, multi-terminal environments. Operators gain unparalleled capabilities to optimize traffic, maintain SLA adherence, and provide exceptional service in the most demanding situations.

QoS

- Configure multiple terminals on a single beam with custom traffic profiles, filtering and prioritizing packets while monitoring key network metrics.

Group QoS

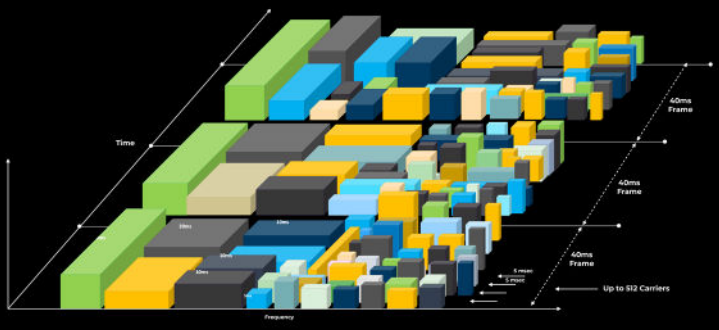
- Arrange terminal groups on a single beam, partitioning bandwidth and assigning resources by group, application, or traffic needs to support diverse operations

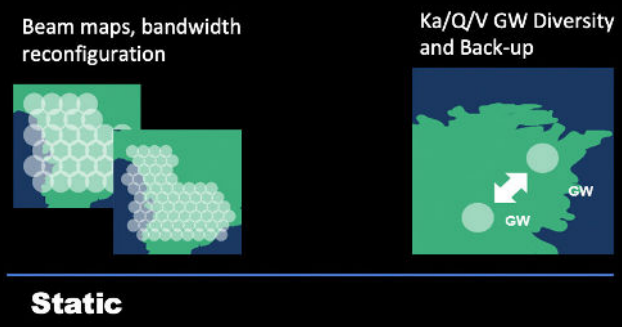
QoS in GBWM

- Manage terminals across unlimited beams and satellites, scaling with tiered service levels, global allocation, congestion managment, and geoscoped service areas, while ensuring SLA compliance

By combining precise control, scalability, and operational flexibility, QoS transforms network performance, equipping operators to deliver high-quality connectivity tailored to evolving market needs.

Satellite Network Resources Allocation Use Case





WAVEFORMS

Mx-DMA MRC delivers the highest level of intelligent, real-time bandwidth allocation up to 100 Msps with SCPC-like efficiency. It offers a simpler way to manage complex traffic demands with service agility that provides the highest Quality of Experience on a multi-service platform. The scalability of Mx-DMA MRC allows a single network to support thousands of terminals for the widest mix of applications and network requirements and its performance reaches data rates of 100 Msps, resulting in up to 300 Mbps of throughput on the return channel.

Dynamic Bandwidth Allocation
- Redistributes resources 25x per second for optimal efficiency and low latency

Adaptive Payload Length
- Matches payloads to application demands for efficiency

Unsolicited Logon
- Dynamically activates modems to avoid idle capacity use

Self-Organizing Link
- Ensures Real-time bandwidth allocation eliminates preset carrier planning

MODCOD Efficiency
- Operates with 34 MODCODs up to 64APSK and 5% roll-off

Intuition also supports the DVB-S2X waveform, pushing the boundaries of satellite efficiency by boosting throughput by up to 51%.

SATELLITE NETWORK RESOURCE ORCHESTRATION APIS

Satellite Network Resource Orchestration API ensure seamless integration across multi-tenant payloads and diverse infrastructures, supporting vendor diversity and minimizing complexity. The API enables network operators unite Software-Defined Satellites (SDS), NGSOs, multi-orbit networks, and ground systems with real-time synchronization and optimization, including:

Dynamic Control
- Dynamically control resources and service allocation to meet customer demands wirh differentiated end-user services

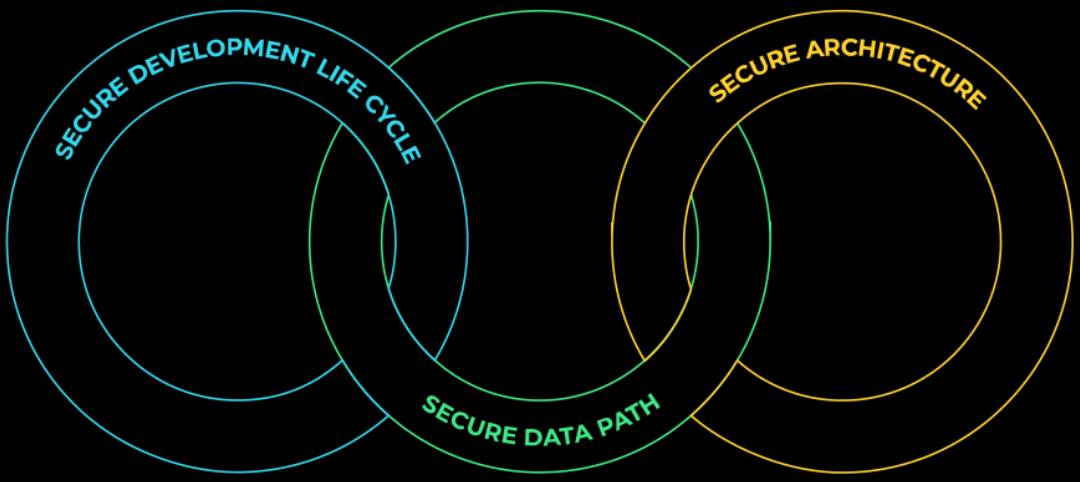
Simplify Network Configuration
- Adapt Simplified network configuration and enhance network resilience and reliability

Mazimize Sellable Capacity
- Maximize sellable capacity to derive maximum revenue and profitability

The API can optimize static operations such as supporting gateway diversity for reliable gateway switching and secure backup solutions. The API will adapt to emerging demands with scalability and flexibility in resource adjustments, keeps pace with the evolving satellite landscape.

As standardized APIs, integrated with Intuition's NMS, streamlined management will support decision-making in multi-vendor environments, reduce costs, and increase value. Satellite Network Resource Orchestration equips operators to meet today's challenges while preparing for the opportunities of tomorrow.

Secure-by-Design



ORCHESTRATION/AUTOMATION

The move to cloud-native, software-defined architectures, and multi-orbit constellations makes orchestration / automation essential for modern satellite communications. It provides real-time flexibility for dynamic netowrk operations with minimal effort. Automation helps operators scale, maximize uptime, and deliver superior user experiences, driving efficiency and profitability through optimized services.

Resource Orchestration for Software-Defined Capacity

- Standardized APIs to sync ground and space systems for scalable integration, optimizing resource allocation to improve flexibility and capacity

Cloud-Based NMS Control

- Streamline operations and drive service differnetiation with open-source API integrations and custom managment tools

SLA Assurance and Revenue Optimization

- Manage bandwidth and congestion, and increase efficiency by using shared resource pools

Self-Organizing Waveform Innovations

- Simplify return links and eliminate complex carrier management with real-time Mx-DMA MRC technology for superior performance

Automation helps satellite operators evolve networks, optimize performance, and meet demands of a fast-changing communications environment.

SECURITY

Safeguarding networks and operations from end-to-end, Intuition delivers multi-layered security solutions designed to protect devices, data transmissions, and critical systems against a wide range of evolving threats. Leveraging advanced encryption, access controls, and platform hardening, Intuition ensures operational resilience and system integrity. Operators can rely on comprehensive protection to prevent unauthorized access, defend sensitive data, and mitigate vulnerabilities, enabling secure and confident operations in any threat environment.

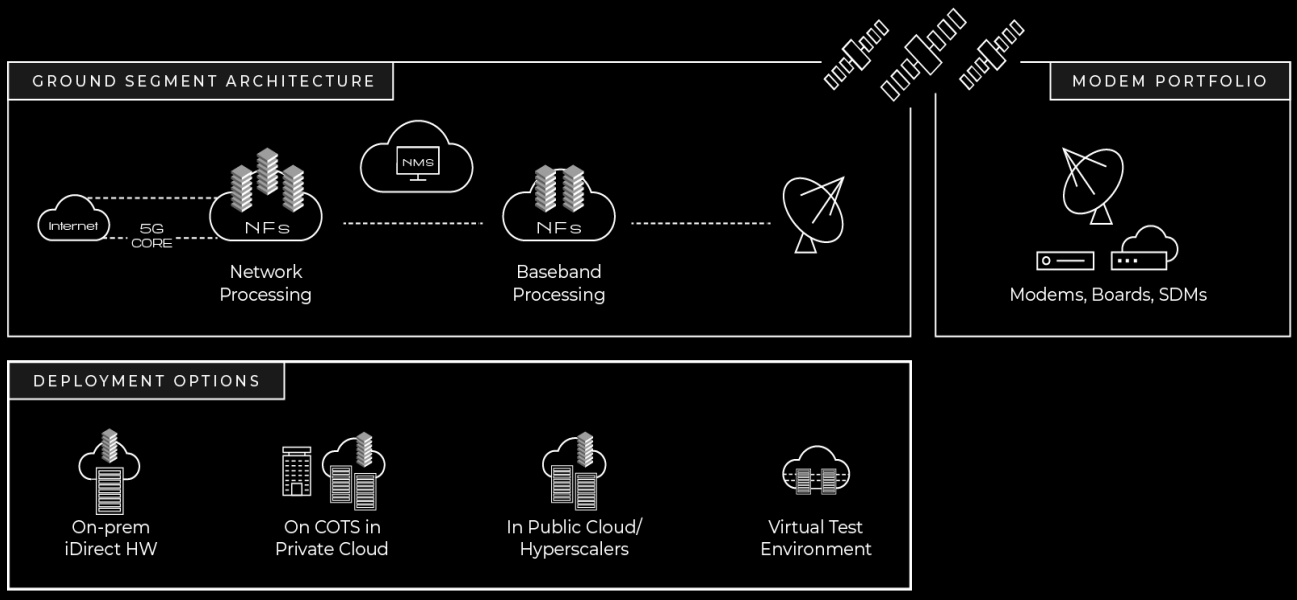
Advanced Data Protection

- AES-256 encryption secures all communications and data transmissions
- X.509 implementation provides robust system-wide authentication
- Hardware-based security and Platform Hardening (CIS standards) reduce vulnerabilities and enhance defenses

Operational Integrity

- Software signing prevents unauthorized code execution, ensuring system integrity
- Comprehensive audit logging tracks detailed action trails for effective analysis

With its powerful combination of robust security measures and critical safeguards, Intuition will equip users to stay resilient, even the most demanding environments.



CLOUD-NATIVE ARCHITECTURE

The Intuition ground system is designed with a cloud-native architecture to deliver unmatched scalability, efficiency, and reliability. By utilizing containerization and Kubernetes for orchestration, Intuition ensures dynamic scalability, allowing resources like compute power, memory, and storage to be allocated in real-time. This efficient design adapts to changes in demand while maintaining reliable performance, even in the event of node failures.

Built on the Kubernetes-based OpenShift platform, Intuition provides embedded security, user-friendly management, and seamless support for diverse environments, from on-premises to cloud. Its intelligent resource orchestration optimizes usage, reduces over-provisioning, and ensures cost-effective operations.

- **Scalability:** Intuition's cloud-native architecture offers unparalleled scalability. Dynamically adjusting resources in real-time to meet fluctuating demands, ensuring networks handle increasing workloads efficiently without over-provisioning.

- **Resilience:** Built with resilience in mind, Intuition ensures uninterrupted service even during node failures. The system includes detection and optimization mechanisms, driven by AI/ML automation, which can identify issues dynamically. This guarantees operational continuity, even under challenging conditions.

- **Operational Efficiency:** The modular design of the Intuition system streamlines software upgrades, testing, and deployment, minimizing risks and reducing operational complexity. High-density baseband processing further enhances efficiency by enabling centralized management of multiple networks and carriers within a single system.

- **Robust Security:** Security is embedded at the core of Intuition, aligning with the principles of cloud-native architecture. Advanced, proactive security measures safeguard critical satellite operations against vulnerabilities and emerging threats.

- **Future-Readiness:** Intuition positions operators for the next generation of satellite networks, including software-defined systems and 5G NTN. By adopting a cloud-native infrastructure, operators can rapidly respond to market changes, adapt to evolving architectures, and lower the total cost of ownership while preparing for long-term competitiveness.

With its cloud-native architure, Intuition unlocks the agility and efficiency operators need to stay ahead in an ever-evolving technology landscape.

INTUITION NMS

Optimize network operations with Intuition NMS, purpose-built for smart, scalable management of advanced satellite communications. Whether overseeing a localized network or managing a global operation, Intuition NMS delivers unmatched monitoring, control, and insights that empower operators to provide reliable, secure, and cost-effective services. Designed with a cloud-based microservices architecture, it simplifies network management while driving operational efficiency and enhancing the customer experience.

Intuition NMS transforms network management through end-to-end orchestration, enabling operators to allocate resources efficiently, achieve seamless global coverage, and automate critical workflows. With its comprehensive open and standards-based API suite, the system integrates effortlessly with OSS/BSS solutions and broader ecosystems, ensuring operators can adapt dynamically to evolving operational demands.

Cloud-Based Architecture
- Ensures unmatched flexibility, scalability, and resilience
- Enhances productivity with a robust, future-proof design

Comprehensive Management Tools
- Centralized monitoring for streamlined troubleshooting and efficient network oversight
- Simplifies service provisioning, reducing time to market and cutting costs

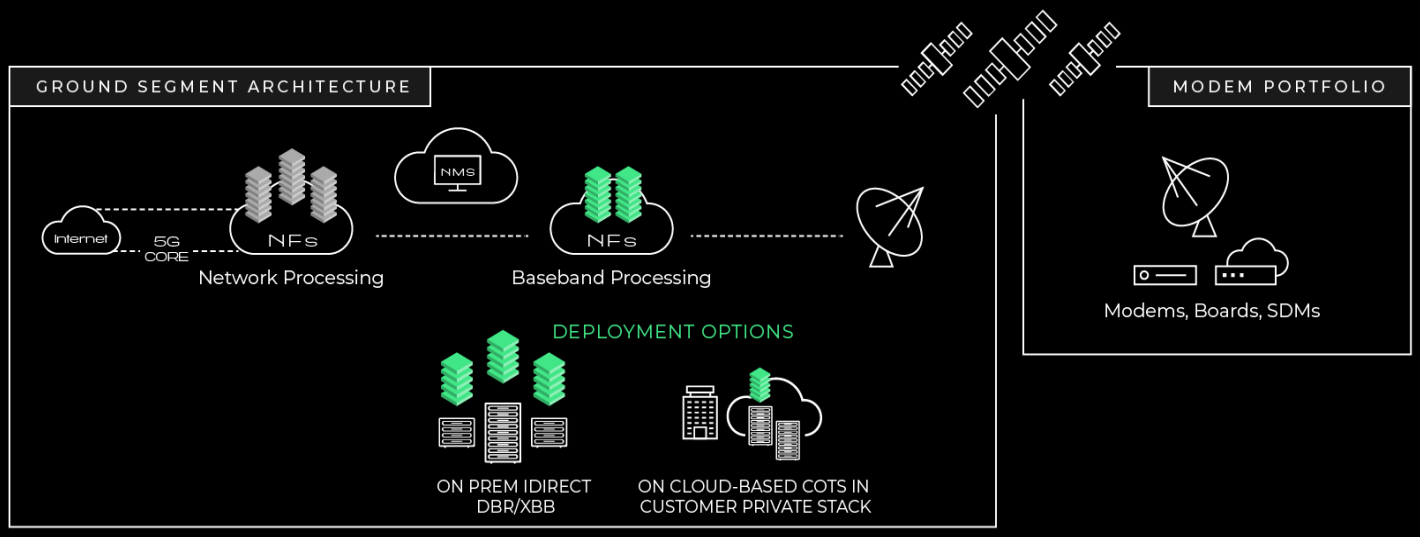
End-to-End Orchestration
- Lays the foundation for automated workflows, ensuring optimal global coverage and resource allocation
- Offers full visibility and seamless control over network operations

Robust Security
- Alignment with NIST and OWASP security frameworks

Seamless Integration
- Open and standards-based API suite connects effortlessly with OSS/BSS systems and Mplify LSO orchestration
- Adheres to trusted GraphQL and REST protocols to enable fast, efficient rollouts and ongoing adaptability
- Enables seamless data export to Kafka for real-time streaming of statistics, events, and notifications

Scalability for Any Network
- Dynamically scales to handle networks of all sizes, growing in tandem with operational needs
- Provides flexible deployment options to align with unique business objectives

Intuition NMS equips users to optimize performance, ensure reliability, and scale confidently for the future of connectivity.



BASEBAND PROCESSING

iDirect Baseband Processing is a vital component of the ground system, delivering all baseband signal and waveform functionalities within the Intuition datapath. These include modulation, demodulation, error correction, and signal processing for advanced waveforms like DVB-S2X and Mx-DMA MRC. Systems can be distributed across multiple locations, each powered by a Baseband Processing Cluster to ensure robust and efficient operations tailored to satellite communication demands.

EFFICIENT WAVEFORMS

iDirect's innovative MX-DMA MRC self-organizing waveform delivers SCPC-like efficiency with real-time bandwidth allocation up to 100 Msps, achieving up to 300 Mbps.

- Support for thousands of sites
- Superior quality of experience (QoE) for end-users
- Dynamic adaptation to traffic demands
- Optimized satellite and ground resources for maximum system efficiency, even under conditions such as rain fade

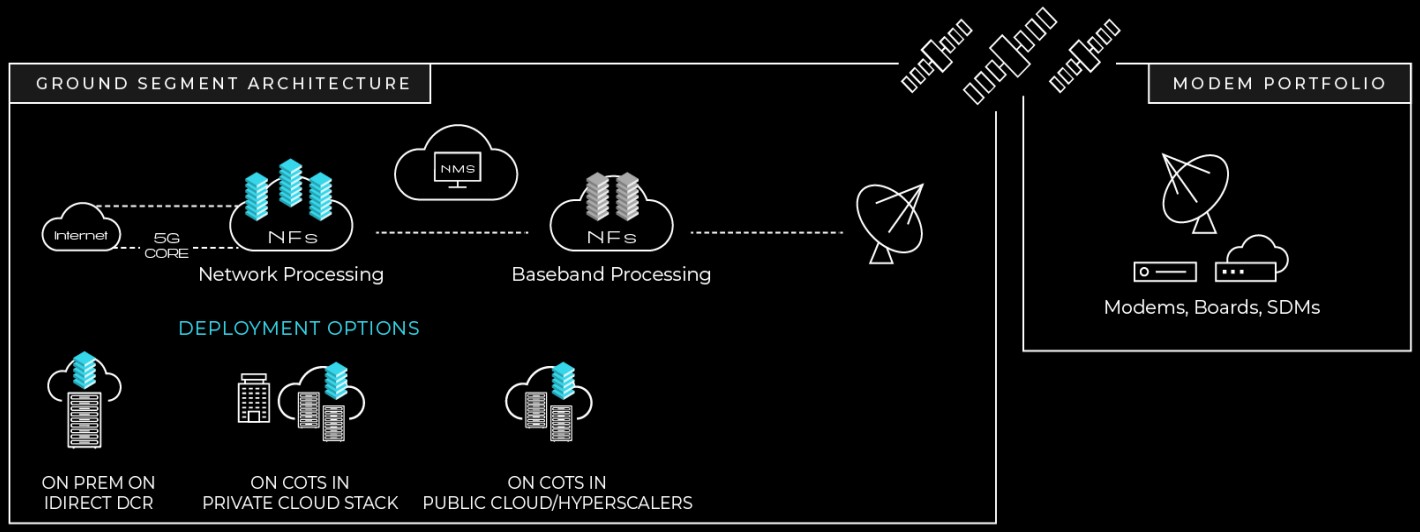
HIGH-DENSITY INFRASTRUCTURE

Designed to address the demands of high-capacity satellites, iDirect's high-density Baseband Processing solution ensures enhanced throughput across industries. XBB, iDirect's on-prem, universal baseband system, delivers unmatched flexibility and efficiency with features such as:

- DVB-S2X support up to 1.5 Gsps across 32 carriers
- Housing two hot-swappable iDirect Mod/Demod Modules (DXM)
- Versatility in DXM support, including 500 Msps DVB-S2X, and 100 Msps Mx-DMA MRC
- DIFI readiness for interoperability
- The XBB compact, 1RU module can be deployed in the iDirect Baseband Rack (DBR 2100)

FLEXIBLE DEPLOYMENT

The Baseband Processing Functions are tailored to adapt to diverse customer needs. iDirect's flexible DIFI-compliant architecture (XBB standalone or within a DBR rack) ensures ease of deployment for large or distributed, small scale solutions. Beyond ON-Prem deployments, Baseband Processing functions can expand to COTS in Private or Public Cloud in the future.



NETWORK PROCESSING

Powering advanced connectivity, the Network Processing System leverages modern cloud-native architectures to handle a wide range of critical networking tasks. Its centralized design, with built-in redundancy, ensures telco-grade availability while simplifying management and driving operational efficiency. Equipped with the latest tools, it empowers satellite operators to optimize performance, reliability, and scale to meet the demands of modern satellite networks.

Key functions

- **Networking and Routing:** Manages IP traffic with advanced L2/L3 architecture for flexible configurations
- **Traffic Management / QoS:** Prioritizes voice, video, and data to meet SLAs and enhance user experience
- **Mobility and Physical Layer Control:** Ensures seamless and optimizes physical layer performance
- **Signal and Data Processing:** Reduces latency and maximizes througput with efficient signal handling
- **Security and Access Control:** Strengthens security and data integrity with advanced protols
- **Network Operations and Monitoring:** Centralized control and real-time insights for proactive management
- **Global Bandwidth Management:** Allocates bandwidth globally to meet SLAs and manage congestion
- **Optimization:** Enhances QoE with TCP/UDP acceleration, compression, and reduced overhead

Flexible On-Premises Deployment

Network Processing Functions leverage the Kubernetes-based CIDI orchestration infrastructure for flexibility

- **On-Premises**: Runs on iDirect hardware (DCR2000) for optimal performance, and security.

Future Deployment Options

- **Private Cloud:** Uses COTS hardware in secure private clouds for control and customization.
- **Public Cloud:** Scalable, cloud-native deployments in public cloud regions for scalable operations

MODEMS

The satellite modem portfolio delivers versatile solutions for industries like broadband, enterprise, banking, cellular backhaul, maritime, aero, trunking, and government & defense. Operating on a unified platform, these modems optimize bandwidth with shared forward carriers, while a single NMS streamlines service activation and performance monitoring to meet diverse business demands.

iDirect is driving innovation with next-generation modems designed for multi-access and virtualized edge solutions. With a full range of DVB-S2X-enabled modems—from cost-efficient entry-level options to advanced, high-speed models—we offer customized performance to match every customer's unique needs.

INT Series

As a first in a series of next-gen modems, iDirect's INT2000 is equipped with the latest standards and high-performance features to support a broad array of Enterprise, Mobility, and Cellular Backhauling capabilities.

MDM Series

The MDM Series modems deliver cutting-edge satellite communication solutions tailored for a variety of market applications, ranging from enterprise connectivity to government, defense, and mobility use cases. Featuring exceptional flexibility across multiple networks, the MDM Series is designed to provide high performance, efficiency, and scalability.

iQ Series

The iQ Series modems are a proven solution for modern satellite communication needs, featuring advanced technologies like DVB-S2X and Adaptive Coding and Modulation (ACM) for exceptional performance. Prioritizing efficiency and reliability, they set the standard for industries demanding robust connectivity, such as maritime, aero, and land mobility.

INTUITION UNBOUND

Intuition Unbound offers several service options through a usage-based pricing structure that allows satellite operators and service providers to unleash the power of the Intuition Ground System in a new way.

Leveraged in this way, Intuition Unbound helps overcome barriers to technology adoption and prioritize Satellite Operators and Service Providers' core business goals.

Intuition Unbound introduces two core services: **Unbound Operations** and **Unbound Capabilities.**

Unbound Operations takes the operational complexity out of managing ground networks, allowing satellite operators and service providers to focus on growing the business. This subscription-based service offers comprehensive operational management delivered by industry-certified ground network specialists. From network configuration to end-to-end monitoring and optimization, Unbound Operations ensures peak performance with reduced operational risk. Three tiers of service are available, which scale up with the size, complexity, and level of service included.

All service plans include the following features

24/7 OPERATIONAL MANAGEMENT

Complete oversight and optimization of ST Engineering iDirect platforms and solutions.

CONFIGURATION MANAGEMENT

Establish and control network configurations and alarms to maintain service availability.

EVENT MANAGEMENT

Monitor, manage, and respond to network alarms to ensure reliability.

REPORTING & ANALYTICS

Access detailed, data-driven insights through a customer portal offering visibility into performance metrics.

CUSTOMER EXPERIENCE MANAGER

A dedicated point of contact for end-to-end service delivery and engagement.

Unbound Capabilities is a consumption-based deployment of ST Engineering iDirect's ground segment solution that provides access to the latest technology without significant capital investments or lengthy deployment times. Unbound Capabilities empowers satellite operators and service providers to adapt to swiftly changing market demands, capture new opportunities without complex infrastructure upgrades, unlock access to new capabilities as their network needs evolve, and grow at the speed of innovation.

Choose from flexible service plans designed to deliver core functionality, technology, and market applications.

INFRASTRUCTURE OWNERSHIP

iDirect owns the ground system equipment, which means we take responsibility for all aspects of hardware and software maintenance.

IMPLEMENTATION INSTALLATION & DEPLOYMENT

Our expertise in setting up and configuring the network infrastructure ensures your specific operational needs are met.

LIFECYCLE MANAGEMENT

As the architects of the ground system, we are aware of each component's lifecycle, allowing us to optimize service availability.

NETWORK AUTONOMY

Flexibility to establish service plans, service levels, QoS, and more while utilizing all the best technology applications.

Intuition represents a bold step forward in satellite networking, combining advanced cloud-native architecture, unparalleled automation, multi-orbit integration, and robust security to redefine what's possible. Its comprehensive feature set provides operators with the tools to unlock new revenues, scale seamlessly, and ensure reliability across diverse deployments. Designed to future-proof operations, Intuition paves the way for the adoption of next-generation technologies like 5G NTN.

Intuition is future-ready, delivering immediate innovative capabilities while aligning with evolving market needs and business goals. These advancements position operators to not only excel today, but also seamlessly adapt to future innovations and opportunities. Whether it's integrating hybrid networks, automating operations with AI-driven insights, or leveraging innovative waveforms, Intuition is setting the stage for a new era of satellite communications. Experience the power of Intuition and shape the future of connectivity with confidence.