



Brief

ASTRO Site Satellite Resiliency

Providing space-based backhaul connectivity for ASTRO sites



MOTOROLA SOLUTIONS

In today's digital world, LMR networks are more interconnected and complex than ever. A robust backhaul solution with multiple communication technologies can help your system stay up and available.

Motorola Solutions is uniquely positioned to help you deploy and maintain your system's mission critical backhaul. With decades of experience in mission-critical network deployments around the globe, we understand the complexities of network connectivity. We help you to manage complicated technology and management protocols, so that your teams can focus on the work of public safety. To make the process as simple as possible, we offer regulated telecom services that include wireline, wireless and satellite networks, integrated seamlessly into your ASTRO® Connectivity Services (ACS).

Satellite resiliency has become an integral part of our ASTRO Connectivity Service offer. Far too often, weather events or excavation work results in a loss of site backhaul for extended periods, which can be detrimental to your first responders in the field. Our solutions integrate with your Motorola service package to provide additional connection flexibility to your ASTRO remote radio frequency (RF) sites, prime sites and the ASTRO core. Whether as a primary or backup connection, satellite adds an important layer of resiliency to your system, so you can be sure that your communication technology is available for the people who rely on it.

ASTRO Site Satellite Resiliency (ASSR) has been designed by Motorola Solutions to provide field-tested, highly available LTE and satellite-based backhaul services. Because we manage and optimize this as an end-to-end connectivity solution, we can confidently recommend ASSR for ASTRO system deployments at underserved sites or where additional site backhaul resiliency is needed.



ASTRO Site Satellite Resiliency (ASSR)

Most public safety radio networks rely solely on ground-based infrastructure to provide wide area connectivity. Typically consisting of Microwave, T1 or MPLS, this infrastructure is reliable – but not for every scenario. In times of emergency, for example, ground-based solutions may be prone to a host of outage scenarios that can result in a loss of communications. The distance from your tower site to the ASTRO core, ground line routing and many other factors play a part in determining the reliability of your network.

ASSR can help to mitigate these network vulnerabilities and increase your site's availability by providing backhaul connectivity using satellite solutions explicitly tailored for your ASTRO network. As a ubiquitous, cost-effective and easy-to-deploy solution, ASSR offers a number of significant benefits to your mission-critical communication solution:

- High-reliability communication link
- Independent of localized infrastructure outages
- Automatic switchover to the satellite connection
- Low maintenance with minimal service needs
- Secure connection

ASSR can be installed as a standalone connection or as a backup or redundant connectivity option for any ASTRO site, including those already connected with wireline or microwave. It is a beneficial option for sites where conventional connections such as wireline or microwave are cost prohibitive. It can also be quickly deployed in advance as a primary connection, and then used as backup once the wireline or microwave is installed.

This fully managed and supported service option includes a Software-Defined Wide-Area Networking (SD-WAN) self-healing, blended connectivity solution that leverages numerous technologies, including the added satellite and cellular connections. Information is routed from our fully geo-redundant teleports back to your ASTRO Core or Motorola cloud application via the ASTRO Connectivity Services secure private IP MPLS network.



ASSR Service Level Objectives At-a-Glance

→ Coverage

Nearly ubiquitous coverage means trouble-free deployment of ASSR to remote areas with poor access.

→ Availability

Improves system availability when used as a backup resiliency connection.

→ Security

All wireless satellite paths are encrypted, and IP networks are private, providing robust network security.

→ Cost

ASSR can provide a cost-effective solution for primary or backup connectivity and backhaul management.

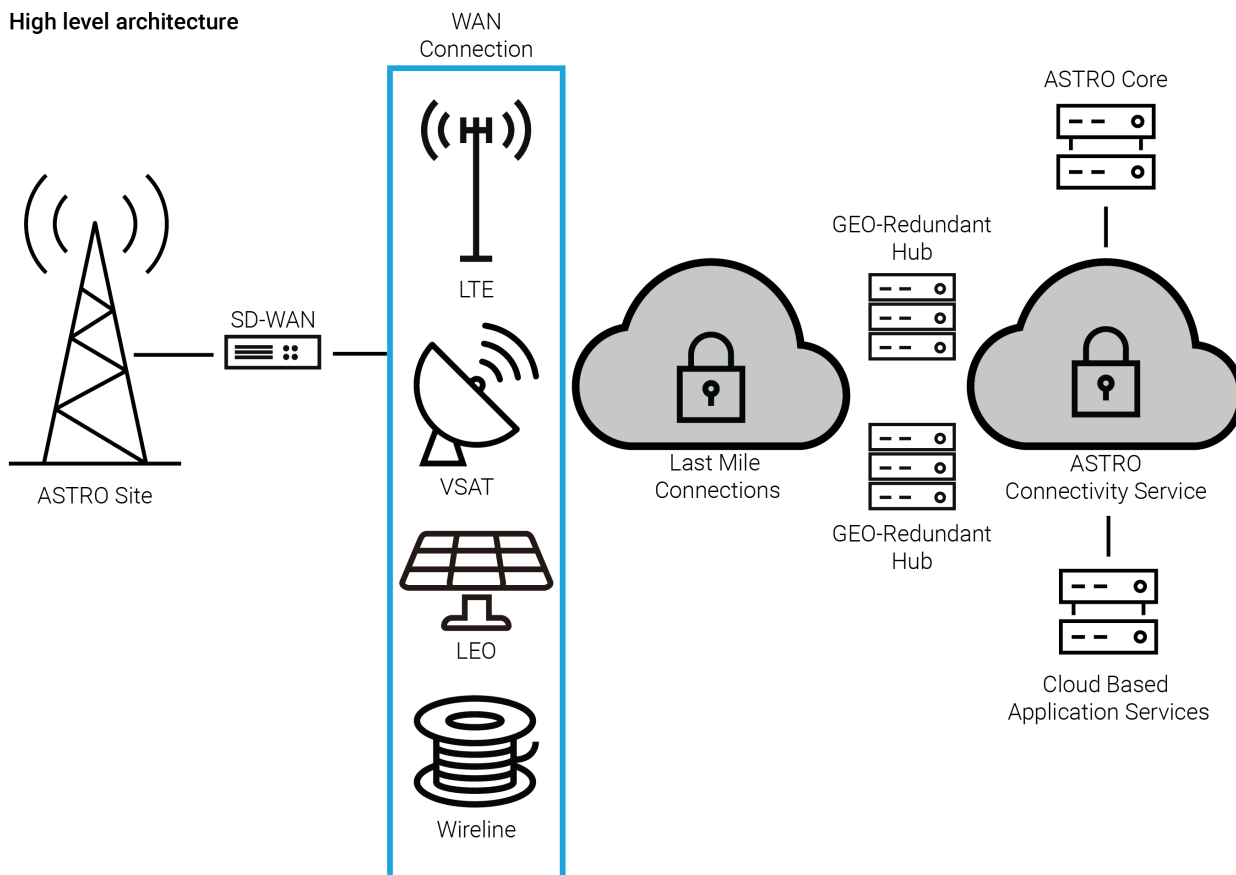
→ Connectivity

Optionally provides seamless integration of multiple backhaul solutions for failover, management and monitoring.

→ Services

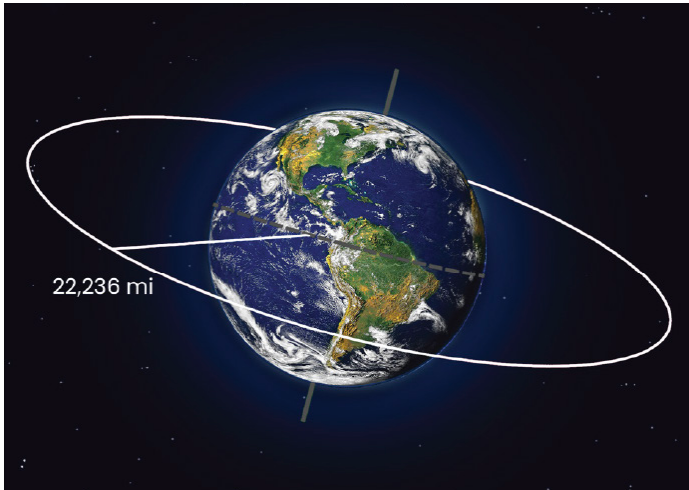
Motorola Solutions provides on-site installation and maintenance services. Engineering and service support is included and the solution is integrated with the ASTRO support services and roadmaps.

High level architecture



ASSR in-depth

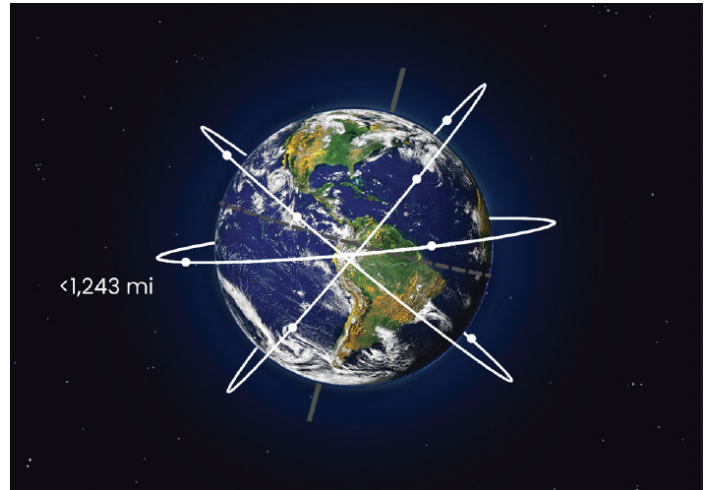
Primarily used satellite orbit altitudes



Geostationary orbit (GEO)

These satellites orbit the Earth at the same speed as the Earth's rotation. This allows ground-based antennas to be fixed to a specific point in the sky. This distance from the Earth creates large service footprints for each satellite, allowing for near ubiquitous coverage and service levels.

The large path length of GEO satellites (over 22,000 miles) introduces a moderate amount of latency to the link. In many cases, the use of GEO satellite has historically been dismissed for audio based application, such as ASTRO backhaul. However, in extensive testing and real-world deployments, ASSR's GEO satellite offering has proven to provide acceptable service levels for most ASTRO applications.



Low Earth Orbit (LEO)

LEO satellites operate very close to Earth. This proximity to Earth means that LEO networks must include thousands of satellites and operate similar to a cellular network. The antennas are complex and must be able to track the satellites as they are not fixed in the sky.

LEO satellite is a groundbreaking new technology that provides some significant advantages and disadvantages when compared to GEO satellite. LEO is an optional offering on ASSR to provide low latency, high performance, best effort connectivity as an optional path to the ASSR SD-WAN managed backhaul solution.



The Financial Sense of a Managed Solution

A comparison of the costs involved with building and operating your own backhaul network versus having a trusted partner host a backhaul service reveals significant savings in a number of areas. When evaluating costs, it's critical to consider both initial costs and evolutionary costs, and evaluate them over a five- or ten-year period. It's also important to keep in mind that government grants are usually reserved for capital equipment expenses and not available for the operational expenses associated with operating a core network.

A managed backhaul solution provides a stable, predictable annual expense. Savings areas include:

→ Equipment

With a managed backhaul network, significantly lower up-front capital expenses can enable agencies to migrate sooner rather than later. Just as important, there will be no additional investment required for backhaul technology refresh and equipment upgrades. There is also no need for acquiring, inventorying and storing spare or replacement backhaul equipment.

→ Maintenance

Network maintenance costs are controlled. Since all software updates, certification and troubleshooting are handled by Motorola as your network management partner, there are no additional maintenance expenses. Similarly, there are no additional costs for service, and you eliminate or greatly reduce costs for security, network facilities and associated engineering resources.

→ Personnel

Fewer personnel are needed for maintaining, managing and monitoring the ASTRO backhaul network, giving you the flexibility to deploy personnel resources in more effective and productive ways.

→ Budget Management

In today's volatile economy, you gain by having predictable operating expenses in the form of consistent annual fees over the life of the system.

Beyond Savings

In the long run, your public safety network is about protecting your communities and the people you serve. As an industry leader in public safety technology, Motorola Solutions has the knowledge and expertise to deliver a managed backhaul service that your teams can rely on. We look forward to talking with you about a solution that best fits your needs.





To learn more, visit:
www.motorolasolutions.com/astro-services



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Available in North America

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