

# Fortress FastPath Mesh™

*Mobile Networks for Tactical Applications*



Architected for tactical networks

Seamless mobility of nodes

Reliable, high availability network connectivity

Performance solution delivers range,  
throughput and capability

Accredited end-to-end security

## Overview

The mobile nature of tactical operations demands an adaptable and scalable network solution that can dynamically adjust to the situation. General Dynamics Fortress FastPath Mesh is an advanced solution for secure tactical networks optimized for mobile network applications. FastPath Mesh is a self organizing, self-healing, path-optimizing network solution that provides a network ideally suited for deployed operations, mobile communications or temporary networks in applications like:

- Operations center networks
- Long-range network extensions
- Convoy or motorcade networks
- Dismounted warfighter networks
- Temporary operations centers
- Event management networks
- Manned or unmanned vehicles
- Platform and sensor communications
- Perimeter relay networks
- Industrial plant or outdoor warehouse networks

Mesh networks are distinguished by the ability of all nodes to link in a flexible lattice nature to provide coverage where no wired infrastructure exists. Fortress FastPath Mesh solution interconnects nodes in a fluid manner, extending the mesh capability to ideally suit a tactical mobile network typical in the defense, first responder, and industrial sectors. Fortress FastPath Mesh dynamically adapts the network as needed to ensure reliable, lowest cost path data connectivity as the network grows or shrinks in austere operating conditions.

# Fortress FastPath Mesh™

## Technology

FastPath Mesh™ is a layer-2 mesh technology that delivers mobile ad-hoc networking without the complexity of layer-3 routing algorithms. By focusing on the unique needs of tactical wireless networking General Dynamics has developed a mesh solution for ubiquitous secure access in dynamic conditions. With industry leading throughput and multi-hop agility, FastPath Mesh delivers spontaneous network formations that extends the range of end-to-end connectivity and enables units to join and exit the network seamlessly and securely.

## Performance

FastPath Mesh provides fast link setup, low latency and broadband throughput regardless of the size of the mesh network. With specific multicast optimizations that prevent network flooding, FastPath Mesh is ideally suited to critical high-bandwidth applications such as streaming video and VoIP.

## Scalability

FastPath Mesh routing protocol requires only a small percentage (less than 5%) of network bandwidth and is independent of the size of the network. As a result, a Fortress enabled mesh network is more scalable than those using traditional routing protocols where control traffic grows significantly with network size.

## Mobility

FastPath Mesh allows nodes to move within the network as well as to leave and rejoin the network without user intervention. This is achieved through a combination of proactive and reactive routing protocols that automatically allow for continuous route refinement and provide faster failover.

## Distributed Architecture

FastPath Mesh dynamically builds the network and adapts to change with no single point of failure; the distributed architecture has no central controller, with fully distributed control, far surpassing the reliability and availability of central controller-based networks

## Security

General Dynamics was the first vendor to be awarded FIPS 140-2 validation for a wireless solution and today is at the forefront of implementing NSA Suite B cryptographic algorithms. General Dynamics' Fortress wireless mesh products implement FIPS validated end-to-end encryption.

## Media Independence

In addition to supporting the internal radios in each Mesh Point, FastPath Mesh™ also integrates with external networks including 802.16 (WiMAX), military RF, free space optics (FSO), standard Ethernet or a heterogeneous mix of technologies. FastPath Mesh will network over non-Fortress links and ensure that the network is optimized and connected from end-to-end.

**Establish a scalable network  
where no infrastructure exists**

**Enable bandwidth intensive voice,  
data, and video applications  
Protect data integrity using  
state-of-the-industry encryption**

**Extend connectivity into the  
harshest environments in minutes**

## GENERAL DYNAMICS

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# Fortress Tactical Mesh Network Use Cases

## Deployable Operations Center Network

The Rapid deployment and changing nature of forward operating bases and tactical command centers in military engagements or training exercises demands a flexible and robust infrastructure network. Fortress Mesh enables fast setup of the operational headquarters and supports extending the secure network to link multiple assets in the base or area.

## Temporary Network Extensions

Defense and first responder operations are often required to respond and immediately adapt to new ground situations. Fortress Mesh architecture supports rapid setup of logistics bases, medical facilities, maintenance depots, docking capabilities and other resources that require the network to quickly and seamlessly expand to accommodate new users, extend to remote sites and more capacity.

## Vehicle Networks

Vehicles and convoys carry advanced information technology and require flexible communications capabilities to stay connected through voice, video, and data. Fortress Mesh network self-organizing capabilities enable communications that move with the convoy and keep mobile assets connected to each other and to their command posts while extending connectivity to each individual and device in the mobile units. Vehicular networks enable command and control (C2), vehicle health management, situational awareness, voice communications, asset tracking and more.

## Dismounted Warfighter

Groups of soldiers in theater maintain communications with each other and carry state-of-the-art intelligence, surveillance and reconnaissance (ISR) and situational awareness (SA) equipment. When enabled with Fortress tactical mesh points, they can establish a mobile mesh network for continuous connectivity to each other, to their vehicle and to a command post or backhaul link. Dynamic mesh network technology enables the most advanced man-portable technology to be fully online in the most austere conditions.

## Incident Response

Military and civilian first responders require quick access to the services and information databases at a moment's notice when responding to natural disasters and emergency situations. Fortress Mesh network automatic self configuration capabilities will allow units from different agencies to rapidly and securely establish the most reliable communications possible for ad-hoc networks in all conditions.

## Perimeter/Border Security

The enormous distances and remote conditions of international borders and base perimeters present unique challenges in maintaining connectivity to surveillance and monitoring devices like cameras, motion sensors or access card systems. Wireless relay networks using mesh architecture will allow units from different agencies to rapidly and securely establish reliable communications using an ad-hoc network in all conditions.



*Convoy communications are a good example of the benefits of Fortress Tactical Mesh Networks delivered by FastPath Mesh. Constant voice, data and video communications between vehicles increases situational awareness and extends ISR information from SATCOM to the entire mobile force. When the convoy reaches a base, the mobile network will automatically join the base network.*

# Fortress FastPath Mesh™

## Overview

Fortress FastPath Mesh™ will automatically self-form, self-heal, and self-optimize each path within the network and ensure end-to-end security. The highly-scalable solution extends network coverage by routing data through multiple mesh points to achieve robust non-line-of-sight communications where no existing infrastructure exists.

## Fortress Mesh Points

The Fortress family of tactical mesh points all offer advanced capabilities including:

- Multiple radios for mesh infrastructure and wired or wireless local access enabling client devices like PCs and smartphones
- FastPath Mesh self-forming and self-healing mesh capability automatically adapts to the addition and removal of nodes to/from the network infrastructure
- Decentralized operation - No single point of failure
- Native IPv6 support "out-of-the-box"
- Distributed DNS, DHCP and ARP proxy at each mesh point eliminates overhead and congestion of broadcast traffic
- End-to-end security maintains data integrity at each hop
- Internal RADIUS server supports certificate-based authentication
- FIPS 140-2 Level 2 validated security on all mesh and Wi-Fi links
- NSA Suite B crypto algorithms Optional for up to SECRET communications with NSA approval
- Rugged construction for outdoor operation
- Fortress Mesh networks can be established or extended quickly and easily without running cables, reducing deployment cost and setup time
- Fortress Mesh provides fault-tolerance by making use of multiple paths between mesh points. If one path is no longer available or a more optimal path is identified, the alternate path is used automatically
- Fortress Mesh points can extend communications between both fixed and mobile infrastructures, supporting dynamic network environments like vehicular comms-on-the-move and dismounted communications, where mesh points may regularly join or leave the network
- Fortress Mesh networks are ideal for applications such as unattended sensors, unmanned devices and dismounted operations where range and mobility are critical and running cable is impractical
- Multicast optimization improves performance by not relaying multicast traffic to areas of the network where there are no listeners
- Quality of Service (QoS) prioritizes network traffic based on layer 2 or layer 3 tags



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