



MOTOTRBO™ Control Station

Capability Guide

Introduction

For interoperability with MOTOTRBO™ radio systems when wireline connectivity is not possible or simply to have a wireless control station in place as a backup, Scout supports a wireless control station interface to access these wireline systems.

The Scout console system, which interfaces to the MOTOTRBO™ XPR Control Station radio using the Avtec Outpost Plus, allows connectivity to the following:

- MOTOTRBO™ IP Site Connect
- MOTOTRBO™ Multi-Site Capacity Plus
- MOTOTRBO™ Connect Plus
- MOTOTRBO™ Capacity Max

Capabilities-at-a-Glance

In addition to standard console features, Scout supports the following for MOTOTRBO™ control station endpoints:

Capability	IP Site Connect	Single-Site Capacity Plus & Multi-Site Capacity Plus	Connect Plus	Capacity Max	Description
Interface Method	✓	✓	✓	✓	Scout interfaces with MOTOTRBO™ XPR control station radios using an Avtec Outpost Plus Radio Gateway connection to VPGate to provide remote access to the control station.
Group Calls	✓	✓	✓	✓	Allows a dispatcher to establish voice communication with a group of subscriber radios or consoles. All members of the group hear the conversation.

Capability	IP Site Connect	Single-Site Capacity Plus & Multi-Site Capacity Plus	Connect Plus	Capacity Max	Description
Announcement Calls (Broadcast Calls) (Multi-Group Calls)			✓		Allows a dispatcher to establish voice communication with multiple groups of subscriber radios. In MOTOTRBO™ systems, allows a dispatcher to call a pre-configured group of groups.
Multi-Site Group Calls (Wide Area Group Calls)	✓	✓			Allows a dispatcher to establish voice communication on a talkgroup across multiple sites. In Capacity Plus applications, Wide Area Groups are predefined multi-site talkgroups that are configured in the radio infrastructure. To minimize the risk of failed calls, dispatchers should not Simul-Select or patch more than four Wide Area Groups.
Site All Calls			✓	✓	Allows a dispatcher to call all subscribers in a MOTOTRBO™ site.
Multi-Site All Calls				✓	Allows a dispatcher to call all subscribers in multiple MOTOTRBO™ sites.
System All Calls	✓	✓		✓	Allows a dispatcher to establish voice communication with all subscriber units in a radio system.

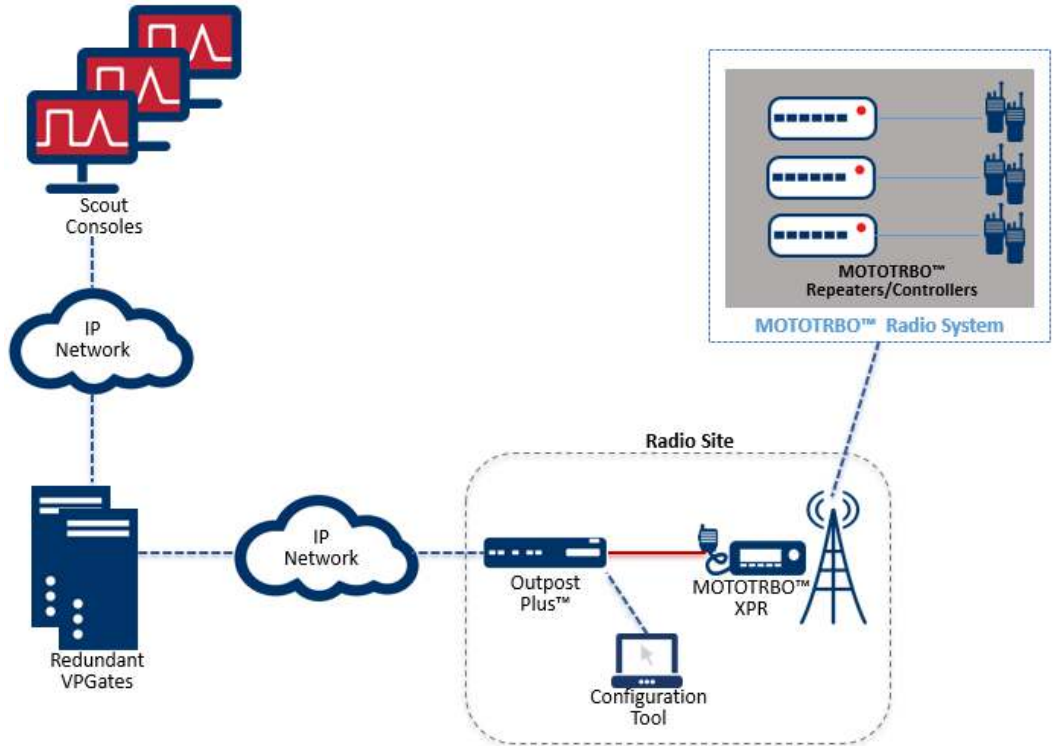
Capability	IP Site Connect	Single-Site Capacity Plus & Multi-Site Capacity Plus	Connect Plus	Capacity Max	Description
<p>Console-over-Subscriber Transmit Interrupt</p> <p>NOTE: The radio system maintainer determines the control station's priority level.</p>	✓	✓		✓	<p>Allows a dispatcher to take over a transmission from a subscriber on the same talkgroup. In Capacity Plus applications, allows a dispatcher with a higher priority level to take over a transmission from a subscriber on the same talkgroup. The Scout System Administrator can select either Impolite or Dynamic Interrupt as the type of interruption the endpoint uses when a dispatcher interrupts a transmission.</p> <p>Impolite Interrupt: The dispatcher takes over the transmission without notifying the subscriber who was transmitting.</p> <p>Dynamic Interrupt: When the transmission is interruptible, the dispatcher takes over the transmission using Transmit Interrupt, which allows the dispatcher to politely interrupt an ongoing voice transmission on the same talkgroup. When the transmission is uninterruptible, the dispatcher takes over the transmission using Impolite Interrupt.</p>
Channel/Frequency Change	✓	✓	✓	✓	<p>Allows a dispatcher to change the channels or frequencies of the connected device. The interface supports up to X channels or frequencies, depending on the characteristics of the radio system.</p> <p>The MOTOTRBO™ Control Station supports up to 99 channels or frequencies.</p>

Capability	IP Site Connect	Single-Site Capacity Plus & Multi-Site Capacity Plus	Connect Plus	Capacity Max	Description
PTT-ID/ANI Alias	✓	✓	✓	✓	Gives a dispatcher a visual indication of the identity associated with the last voice transmission. An identity can represent the raw subscriber unit ID (PTT-ID) or an alphanumeric string representation of it (ANI Alias). The identity can display in the Activity History and on the associated endpoint pad using the ANI pad extender. For example, a PTT ID of 2527 can be aliased to "Fire 1."
Tone Generation	✓	✓	✓	✓	Allows a dispatcher to send tones or to send tone specifications when WAV files cannot produce the desired output. For example, a dispatcher could send an alert tone to announce bad weather or other alarm conditions. These tones include: <ul style="list-style-type: none"> • Alert Tones • Paging Tones • Channel Marker Tones • Keying Tones • Guard Tones • Function Tones • DTMF Tones

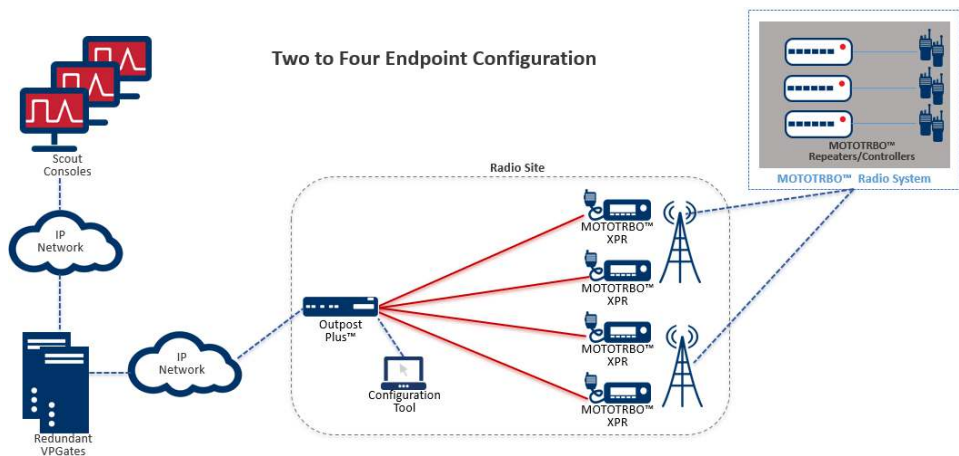
Capability	IP Site Connect	Single-Site Capacity Plus & Multi-Site Capacity Plus	Connect Plus	Capacity Max	Description
Emergency Calls/State	✓	✓	✓	✓	Notifies a dispatcher of an emergency situation in the field using a unique ring and visual indication. When a subscriber presses the emergency button or dials the emergency DTMF string, the endpoint generates an emergency call and activates the emergency state. Until the emergency state is cleared by the dispatcher, no further emergency calls from that subscriber can generate an Emergency Call.

Connections

Avtec's VPGate connects to MOTOTRBO™ XPR control station radios using Avtec's Outpost Plus Radio Gateway.



The diagram above shows the setup of the MOTOTRBO™ Control Station interface with the Scout console system via the Outpost Plus Radio Gateway providing connectivity to a MOTOTRBO™ radio system.



Each control station radio can share one Outpost Plus. The Outpost Plus supports up to four MOTOTRBO™ XPR control station connections.

Licensing

VPGate drivers are licensed by specific categories. The MOTOTRBO™ Control Station driver is a Category A license allocated on a per endpoint basis.

The base VPGate license size represents the maximum number of endpoints that can be active at any one time on a single VPGate. The base license is available in several sizes: 24, 40, 80, or 160 endpoints. To use more endpoints, you need additional VPGate licenses.

VPGate License Model Number	Total Category A&B Endpoints	Maximum SIP Endpoints (Category B)	Redundant
SFW-VPG-L0-NR SFW-VPG-L0-NR-SK	24	12	No
SFW-VPG-L0 SFW-VPG-L0-SK	24	12	Yes
SFW-VPG-L1 SFW-VPG-L1-SK	40	20	Yes
SFW-VPG-L2 SFW-VPG-L2-SK	80	40	Yes
SFW-VPG-L3 SFW-VPG-L3-SK	160	100	Yes

The MOTOTRBO™ Control Station driver must include an Outpost Plus driver in its driver chain. For every MOTOTRBO™ Control Station driver used, an Outpost Plus driver must also be used.

For example, if you purchase a Level 1 license (40 endpoints) and are using 10 MOTOTRBO™ Control Station endpoints, you are using 10 A licenses for the MOTOTRBO™ Control Station endpoint drivers and 10 A licenses for the Outpost Plus drivers. This configuration uses 20 A licenses from your total of 40 Level 1 licenses.

NOTES

- Each MOTOTRBO™ control station radio requires an Outpost Plus (OUTPOSTPLUS-2R or OUTPOSTPLUS-4R) and an XPR Kit (OUTPOSTPLUS-XPR).
- If your requirements include two to four MOTOTRBO™ control station radios at a single physical location, the radios can share one Avtec Outpost Plus Radio Gateway.

Network Requirements

Each Scout console requires a minimum of either one or two Ethernet connections. If using the Hardware Media Workstation, two Ethernet connections are required, one for the console PC and one for the media workstation. If using the Software Media Workstation, only one for the console PC is required. More are required when implementing redundant networks. Each VPGate requires one Ethernet port. Outpost Plus requires only one Ethernet port even though it supports four connections.

Bandwidth

Avtec recommends that Scout be installed on a 100 Base-T (or faster) network infrastructure.

The commonly used G.711 codec uses approximately 84 kbps for each active conversation.

A typical Outpost Plus to VPGate network connection for one radio operates at 30 kbps to 86 kbps for audio transmission during activity when the radio is squelched. This endpoint traffic is unicast to reduce multicast traffic on a WAN. Control and keepalive messages add only about 1% – 3% additional overhead.

For efficiency on a LAN, VPGate forwards the unicast packets from Outpost Plus using multicast to the Scout consoles. Audio is automatically forwarded whenever an endpoint is active and transmitting to VPGate, whether 1 or 50 consoles have that endpoint selected or monitored.

Jitter and Latency

For WAN configurations, the delay should be less than 100 ms. Scout Outpost Plus and Media Workstation typically use 20 ms packets and allow jitter ranging from 60 ms to 2.5 seconds. Both Outpost Plus and Media Workstation let you adjust their jitter buffer to optimize performance.

Network latency can affect the flow of conversation by introducing longer than expected delays between talkers. Ideally, overall latency should be less than 150 ms to prevent unwanted delays during conversations. For half-duplex radios, under 300 ms is generally acceptable.

Quality of Service

VPGate supports separate Differentiated Services (DiffServ) values for audio and control packets from VPGate to the endpoint. This allows VPGate to set a higher priority for VoIP packets over control packets to ensure that the audio is transmitted through the network without unwanted delays.

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