October 2018
Release 4.7

Icom IDAS™ Multi-Site Trunking System *Capability Guide*

Introduction

Avtec's Scout VoIP Console system uses a direct IP connection to interface with Icom IDAS™ Type-D trunked radios. In addition to best-in-class console features for which Scout is known, Scout's interface with IDAS brings the unique features of an IDAS digital radio system to the dispatcher's console.

The Icom Digital Advanced System (IDAS™) is Icom's implementation of the NXDN™ protocol for digital two-way radio systems. NXDN is an industry designation that stands for *Next Generation Digital Network* and is both a modulation method and an over-the-air API. IDAS uses frequency division multiple access (FDMA) modulation and 6.25 kHz narrowband channels.

Avtec is a member of the NXDN Forum that promotes NXDN technology for land mobile radio in North America.

> **NOTE**
> NXDN is the designated interoperability standard for North American railroad land mobile communication.

Capabilities-at-a-Glance

In addition to standard console features, Scout supports the following for IDAS Multi-Site Trunking endpoints:

> **NOTE**
> The capabilities outlined in this document are available with Scout 4.5 and later.

Capability	Description
Interface Method	Communicates with subscriber units using VPGate and a direct IP wireline connection to IDAS endpoints.
Unit Calls (Individual Calls)	Allows a unit to send and receive a direct voice call to and from a single unit. Units can be either dispatchers or subscribers in the system.
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.
Announcement Calls (All Group Calls)	Allows a dispatcher to establish voice communication with multiple groups of subscriber radios.
Selectable Talkgroup	Allows a dispatcher to change which talkgroup is currently being used for voice communication. This is accomplished using the frequency/channel selector tool. Selectable talkgroup endpoints can be used by dispatchers to communicate on talkgroups that are not needed frequently. Talkgroups that are needed frequently or are used for emergency calls should be assigned to stationary talkgroup endpoints.
PTT-ID/ANI Alias (Unit ID)	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 be displayed 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.”
Over the Air Alias	Gives the dispatcher a visual indication of the identity associated with the last voice transmission without requiring use of an ANI alias table.
Console-Controlled Encryption	Allows a dispatcher to enable encryption to prevent unauthorized listening to outbound voice communication. The interface supports AES encryption. The dispatcher can dynamically change encryption keys and methods. Key management is handled using the Avtec Encryption Key Manager.
Transmit Encryption Mode	Allows a Scout System Administrator to set a transmit encryption mode. Encrypted Only sets the endpoint to transmit encrypted audio at all times. Clear Only sets the endpoint to transmit unencrypted audio at all times. Dynamic allows a dispatcher to toggle between the two. Received audio is not affected by this feature.
Auto Transmit Encryption Key	Allows a dispatcher, upon PTT, to automatically apply a transmit encryption key, matching the received key of the last incoming encrypted audio.
Encryption Key Manager	Allows a Scout System Administrator to load multiple encryption key sets for use by VPGate endpoints.
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.

Capability	Description
Paging Tones	Allows a dispatcher to send paging tones or to send tone specifications when WAV files cannot produce the desired output. For example, a dispatcher could send a page to a specific subscriber via tones.
Channel Marker Tones	Allows a dispatcher to send channel marker tones or to send tone specifications when WAV files cannot produce the desired output. For example, a dispatcher could send a channel marker tone to indicate the channel is in priority status and should not be used for routine transmissions.
DTMF Decoding	Notifies a dispatcher with either a call or an ANI when inbound DTMF signaling is decoded.
Unit Alert (Call Alert)	Allows a unit to send or receive a request for another unit to call them back. Units can be either dispatchers or subscribers in the system. Functionality is similar to a page.
Unit Check (Radio Check)	Allows a dispatcher to verify operational status of a subscriber.
Unit Monitor (Remote Monitor)	Allows a dispatcher to hear any audio picked up by a designated subscriber's microphone. Depending on the system, there might be no indication to the subscriber that a Unit Monitor is in progress.
Stun/Revive (Disable/Enable)	Allows a dispatcher to temporarily stun a radio so that it cannot transmit, receive, or power on and off. Reviving a stunned radio returns it to an operational state.
Lone Worker	Notifies a dispatcher by automatically sending an emergency call/state when a Lone Worker-enabled subscriber is not used within a preset time.
Emergency Call/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.
AMBE Vocoder	Applies a high-quality voice compression codec primarily used in digital mobile radio applications.
Late Entry	Allows a dispatcher to join an ongoing conversation without having to wait for the next transmission or call when an endpoint registers or changes a channel.

Scalability

The basic design for a Scout–IDAS Multi-Site Trunking system is determined by the number of endpoints required and the number of consoles that require access to those endpoints. On the console, an IDAS Multi-Site Trunking endpoint (talkpath) can represent both a group and a unit—console connections are treated much the same as subscriber unit connections. The group associated with an endpoint can be either static or selectable.

When designing a system, the number of desired endpoints and geographical locations for consoles determine the number and type of licenses needed. Review the following to understand how components in a Scout–IDAS Multi-Site Trunking system can be scaled.

- One VPGate license can control 24, 40, 80, or 160 total endpoints, depending upon the VPGate license level purchased. Of the total endpoints in the VPGate license, up to 16, 30, 60 or 100 endpoints can be IDAS Multi-Site Trunking endpoints, depending on the supplemental NXDN license purchased.
- Clients migrating to an IDAS Multi-Site Trunking system from an IDAS conventional system must purchase a supplemental NXDN trunking license to enable each IDAS talkgroup or individual call endpoint.
- Clients covered by ScoutCare at the time of Scout version 4.5 release are entitled to receive the 4.5 software update at no additional charge. On-site assistance provided by Avtec to execute the upgrade would incur an additional charge.
- An Icom IDAS Multi-Site Trunking system can support a maximum of 48 sites, each containing up to 30 repeaters. Repeaters and sites can be interconnected using an IP network.

In a Scout–IDAS Multi-Site Trunking system, VPGate connects to a master repeater at each site. The number of connections per site is limited to 8. The total number of connections that can be made, and simultaneous groups monitored, is therefore limited by the quantity of available sites.

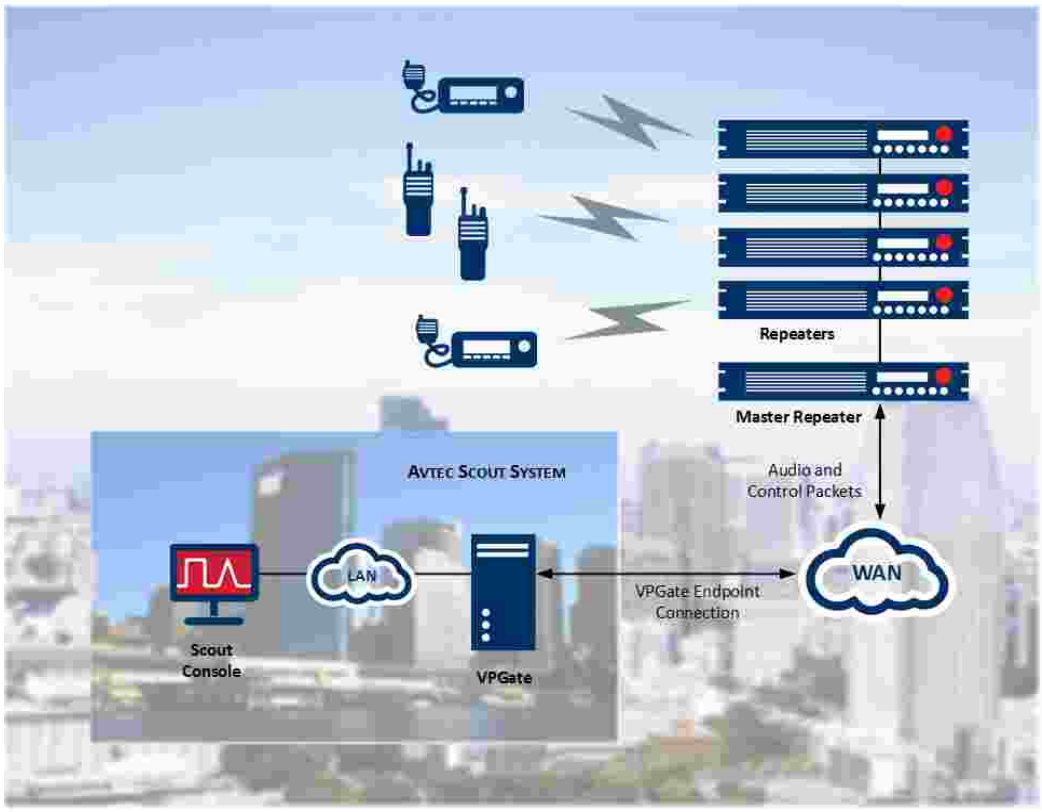
Scout can interface with more than one IDAS Multi-Site Trunking system, and multiple VPGates can be used for redundancy. In any multi-system environment, Scout unifies a command center by connecting simultaneously to multiple radio systems for different reasons. For example, different systems could represent different agencies or locations for an agency.

Connections

Scout provides access to a variety of IDAS Multi-Site Trunking communication system configurations consisting of handheld radios, mobile units, and repeaters.

Single-Site Trunked

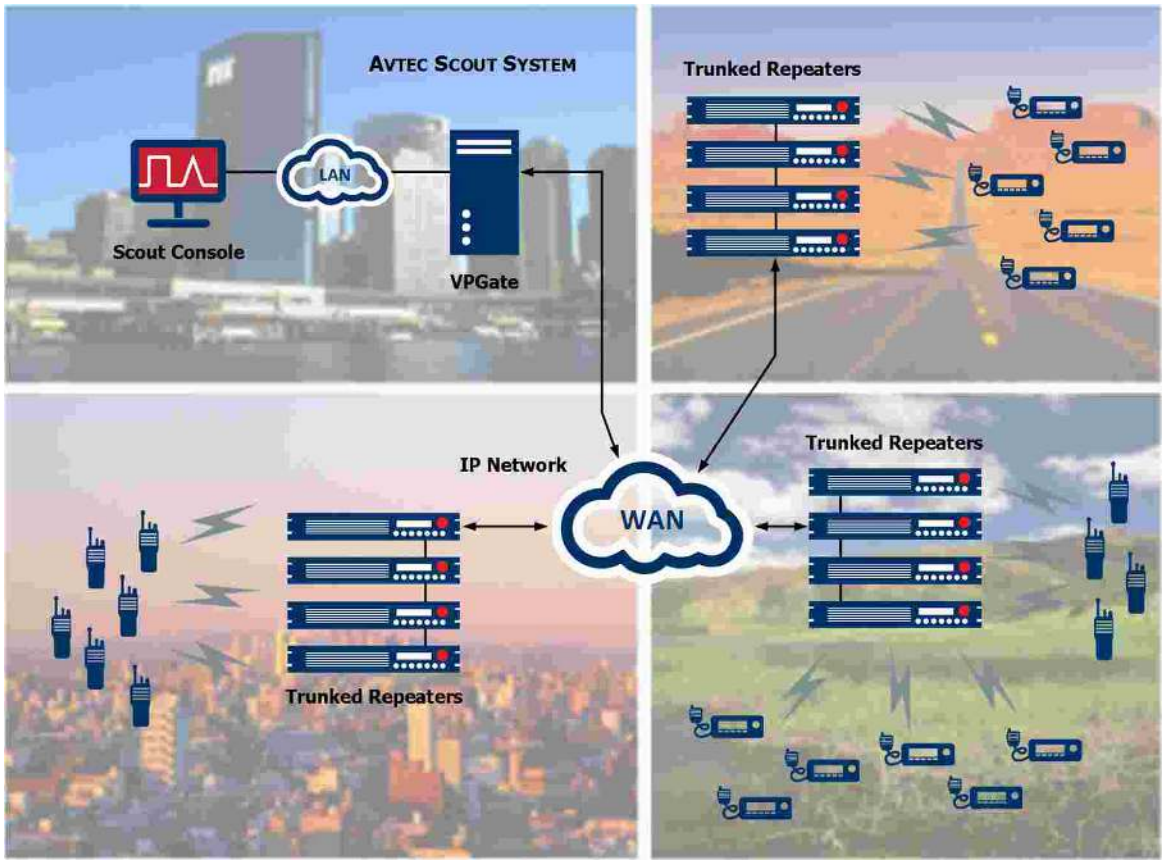
The following diagram shows a single site trunked setup for a Scout Console System with endpoints providing connectivity to IDAS radios.



The Scout Console connects through VPGate, which communicates with an IDAS trunking site over a network that VPGate can access. One repeater functions as the master when communicating with the Scout system. VPGate communicates with the master and is not aware of the other repeaters.

Multi-Site Trunked

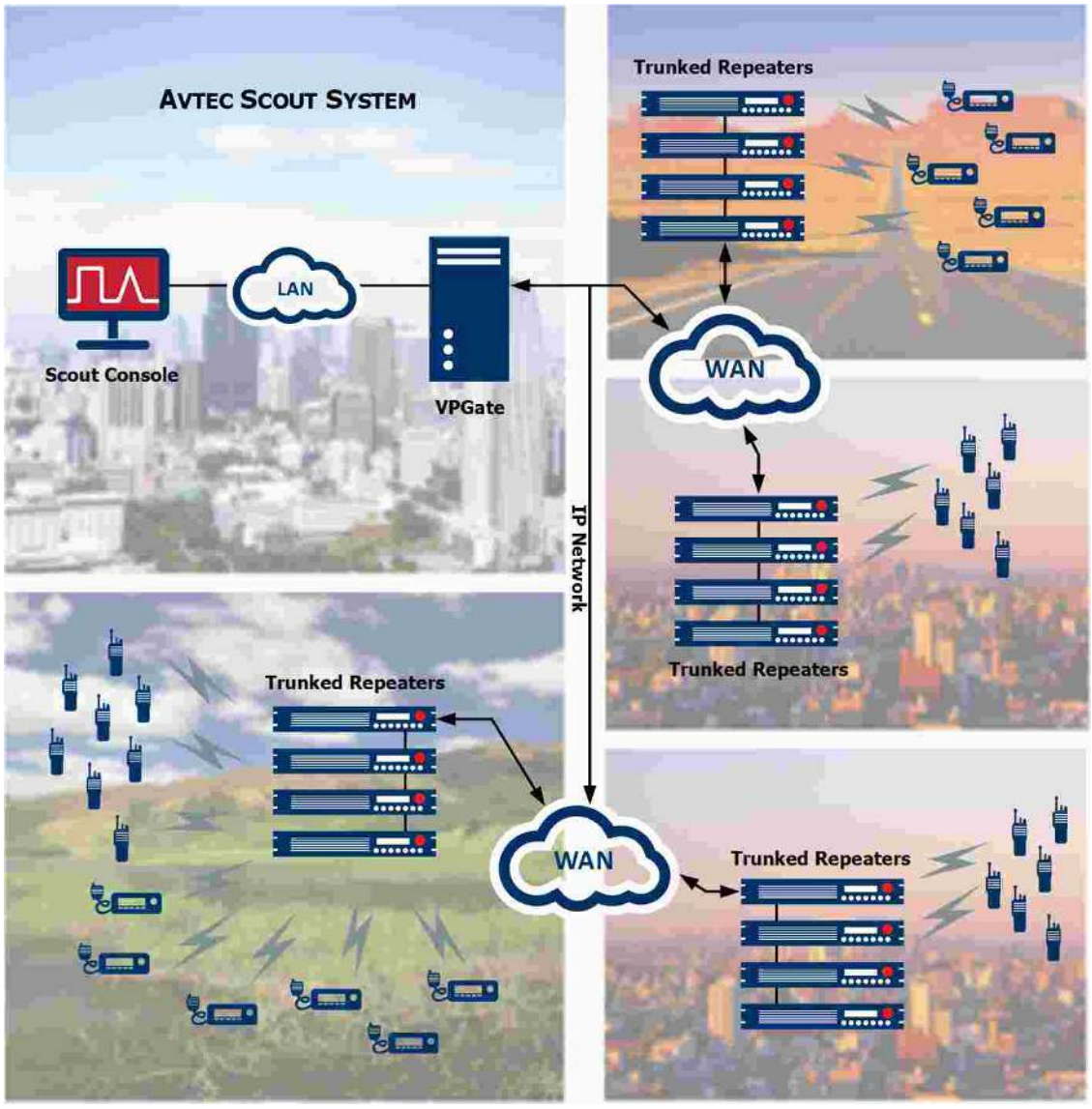
Scout supports trunked IDAS Multi-Site Trunking radio systems across multiple sites. The following diagram shows a typical multi-site trunked setup for a Scout Console System with endpoints providing connectivity to IDAS radios.



The Scout Console connects through VPGate, which connects to multiple IDAS trunking sites over a network that VPGate can access. When endpoints are registered through VPGate, the audio can also be forwarded to an IP-capable logging recorder. This applies to endpoints used for group calls as well as endpoints used for private calls to individual subscribers through the console.

Intersystem Trunked

To enable regional communication, Scout supports the linking of multiple IDAS Multi-Site Trunking systems over wide geographic areas.



Each trunked system is linked to the others through IP-interconnected WANs.

Licensing

The direct IP interface between the Scout VoIP Console system and an IDAS™ Multi-Site Trunking system is controlled by software licensing in the Scout system. Review the following information to learn more about the type and quantity of licenses required in the Scout VoIP Console System for an IDAS trunked interface.

NOTE
Although not controlled by Avtec, FCC licensing for the IDAS trunked radio system frequencies is required in addition to the VPGate endpoint licensing for the Scout system.

A Scout–IDAS Multi-Site Trunking system requires a VPGate license and a separate supplemental license for IDAS trunked endpoints. The following tables list the VPGate and IDAS Multi-Site Trunking endpoint license options and the maximum number of endpoints allowed with each type of license.

- **Base VPGate License** — 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

- **Supplemental License** — A Scout interface to an IDAS radio system requires an additional license for each IDAS Multi-Site Trunking endpoint. A VPGate IDAS trunked endpoint uses one VPGate Type A license and one supplemental License. Supplemental licenses are available in the following quantities:

NXDN License Model Number	Maximum IDAS Endpoints
SFW-VPG-NXDN-TRNK-16 SFW-VPG-NXDN-TRNK-16-SK SFW-VPG-NXDN-TRNK-16-NR SFW-VPG-NXDN-TRNK-16-NR-SK	16
SFW-VPG-NXDN-TRNK-30 SFW-VPG-NXDN-TRNK-30-SK	30
SFW-VPG-NXDN-TRNK-60 SFW-VPG-NXDN-TRNK-60-SK	60

NXDN License Model Number	Maximum IDAS Endpoints
SFW-VPG-NXDN-TRNK-100 SFW-VPG-NXDN-TRNK-100-SK	100

VPGate Category A, Level 3 is the maximum number of endpoints that one VPGate can support. Any number of endpoints over the maximum requires additional VPGates and licenses. For detailed licensing information, contact your Avtec sales representative.

Network Requirements

To configure the network requirements for a Scout System with IDAS Multi-Site Trunking endpoints, consider the following:

- UC-FR5000 network link.

  One ongoing call requires 13 – 17 kilobits per second (kbps).

- IDAS allows a maximum jitter of 180 milliseconds (ms).

  If a delay of more than 180 ms occurs, audio begins to sound choppy. Scout allows jitter ranging from 60 ms to 2.5 seconds.

- QoS (Quality of Service).

  VPGate supports Differentiated Services (DiffServ) values for IDAS audio and control packets, which are transmitted between VPGate and the IDAS endpoint using a single UDP connection. This allows VPGate to set a higher priority for VoIP packets to ensure audio is transmitted through the network without unnecessary delays.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