



# P25 Privileged *Capability Guide*

## *Scout's Wireline Interface for Airbus P25 Privileged Trunking Systems*

### *Introduction*

Scout's support for Project 25 trunking underscores Avtec's commitment to public safety and government agency communications.

Project 25 standards meet current and future communication needs by establishing mutually agreeable migration paths for multi-vendor, interoperable communication systems. The Scout true VoIP console system supports P25 standards to provide connectivity with Phase 1 (12.5 kHz FDMA) and Phase 2 (6.25 kHz TDMA) trunked radio systems operating in Airbus Privileged mode.

### *Capabilities-at-a-Glance*

Refer to the *Avtec Scout Consoles Capability Guide* for information on capabilities common to the Scout system. For information on capabilities requiring unit calling, refer to the *P25 CSSI Capability Guide*.

| Capability   | Description   |
|--|---|
| Interface Method   | Scout supports a VoIP connection between the Scout IP console subsystem and the P25 radio subsystem infrastructure.                                 |
| Interface Method<br>P25 Phase 1 (Full-Rate 12.5 kHz)           | Scout supports Phase 1 radio systems operating at 12.5 kHz using FDMA.  |
| Interface Method<br>P25 Phase 2 (Half-Rate 6.25 kHz)           | Scout supports Phase 2 radio systems operating at 6.25 kHz using two-slot TDMA or at 12.5 kHz using FDMA.   |
| 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<br>(Broadcast Calls)<br>(Multi-Group Calls) | Allows a dispatcher to establish voice communication with multiple groups of subscriber radios.   |
| System All Calls   | Allows a dispatcher to establish voice communication with all subscriber units in a radio system.   |
| Console-over-Console Transmit Interrupt                        | Allows a dispatcher with a higher priority level to take over a transmission from another console subsystem on the same talkgroup.                  |

| Capability                                 | Description   |
|--|---|
| Console-over-Subscriber Transmit Interrupt | <p>Allows a dispatcher 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> |
| Supergroups                                | <p>Allows a dispatcher to use supergroups (P25 merged talkgroups) to communicate with multiple radio units in the field.</p> <p>When operating in Privileged mode, dispatchers can merge/regroup talkgroups, <u>using an Airbus application</u>, into a supergroup consisting of two or more talkgroups. When a supergroup is activated, all merged talkgroups act as a single talkgroup.</p>   |
| PTT-ID/ANI Alias                           | <p>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."</p>   |
| Console-Controlled Encryption              | <p>Allows a dispatcher to enable encryption to prevent unauthorized listening to outbound voice communication.</p> <p>The interface supports AES and DES encryption. Encryption key management is handled using the Avtec Encryption Key Manager. The dispatcher can dynamically change encryption methods and keys.</p>  |
| Encryption Key Manager                     | <p>Allows a Scout System Administrator to load multiple encryption key sets for use by VPGate endpoints.</p> <p>The Scout System Administrator can manually enter encryption keys for multiple encryption methods, and can also load encryption keys into the Avtec Encryption Key Manager using supported Key Fill Devices.</p>  |

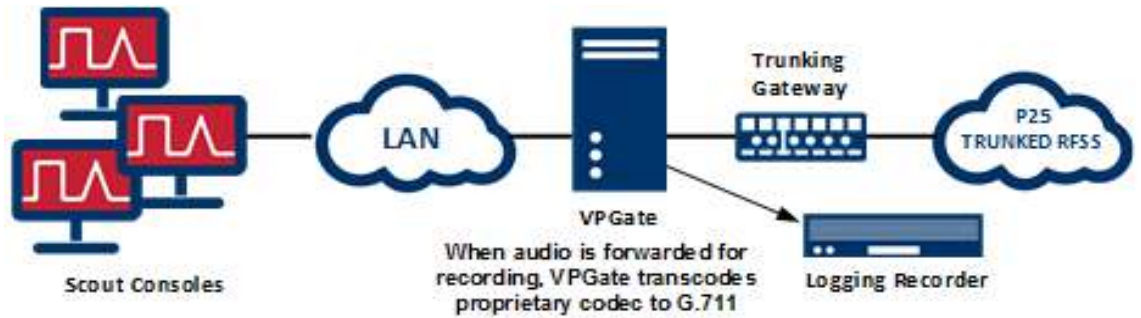
| Capability            | Description  |
|-----------------------|--|
| Low Speed Data        | Allows a third-party application to accept Low Speed Data from the radio infrastructure using the Data Forwarding Driver. For example, when a public safety official transmits, the subscriber could send low-speed data to relay its GPS location to a mapping system.  |
| P25 Failsoft          | In P25 trunking applications, P25 Failsoft allows a dispatcher to continue voice communication during degraded P25 system operation. When a site fails, designated repeaters enter the Failsoft state which allows the console and affected radios to continue communicating using Failsoft channels in conventional mode. Failsoft operation supports Conventional Group Calls, PTT ID/ANI Alias, Emergency Calls/State, Late Entry, Call Alert, and Console-Controlled Encryption. Endpoints can be configured to generate a call using a distinctive ringtone to announce Failsoft operation, and an ANI text string can also be configured to provide a customized visual notification. Endpoints can also be configured to generate an alarm to DMS when they enter the Failsoft state. |
| 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.   |
| 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.  |

*Connections*

Setting up the connection between the Scout console system and the P25 trunked radio frequency subsystem (RFSS) includes configuring the P25 CSSI driver and the Scout Trunking Gateway. The P25 CSSI driver, which is included in VPGate, connects to the Scout Trunking Gateway. The P25 CSSI driver and Scout Trunking Gateway provide the connection to a P25 Phase 1 or Phase 2 trunked radio system. Phase 1 systems operate at 12.5 kHz using FDMA. Phase 2 systems operate at 6.25 kHz using two-slot TDMA or at 12.5 kHz using FDMA. Scout supports Phase 1 and Phase 2 Airbus Privileged communications.

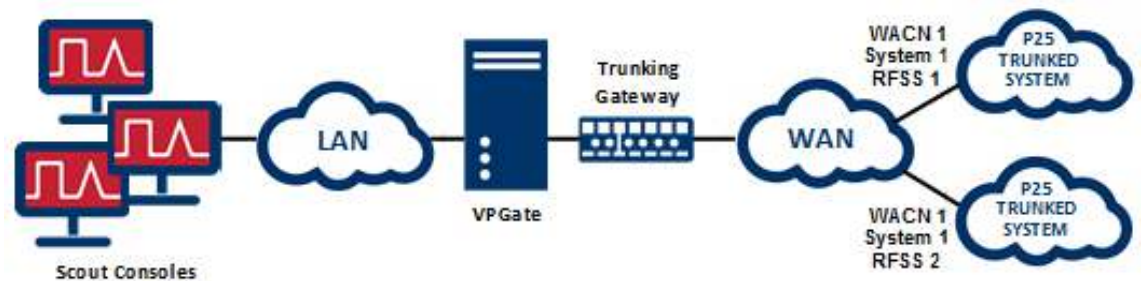
The P25 CSSI driver and Scout Trunking Gateway provide a VoIP connection between Scout consoles and the trunked radio system. The connection from VPGate to the P25 RFSS uses a standard IP transport requiring no external controllers or vocoders. Scout uses the latest AMBE+2 vocoder with improved forward error correction (FEC) and noise reduction for excellent audio quality.

*Basic System Setup*



*This diagram shows the basic setup between a Scout console subsystem and a P25 trunked radio subsystem. Scout's VPGate software and Trunking Gateway software run with redundancy to ensure connectivity. The P25 Trunked RFSS represents the entire trunked radio system including the trunking radio controller, base radios, and subscriber units.*

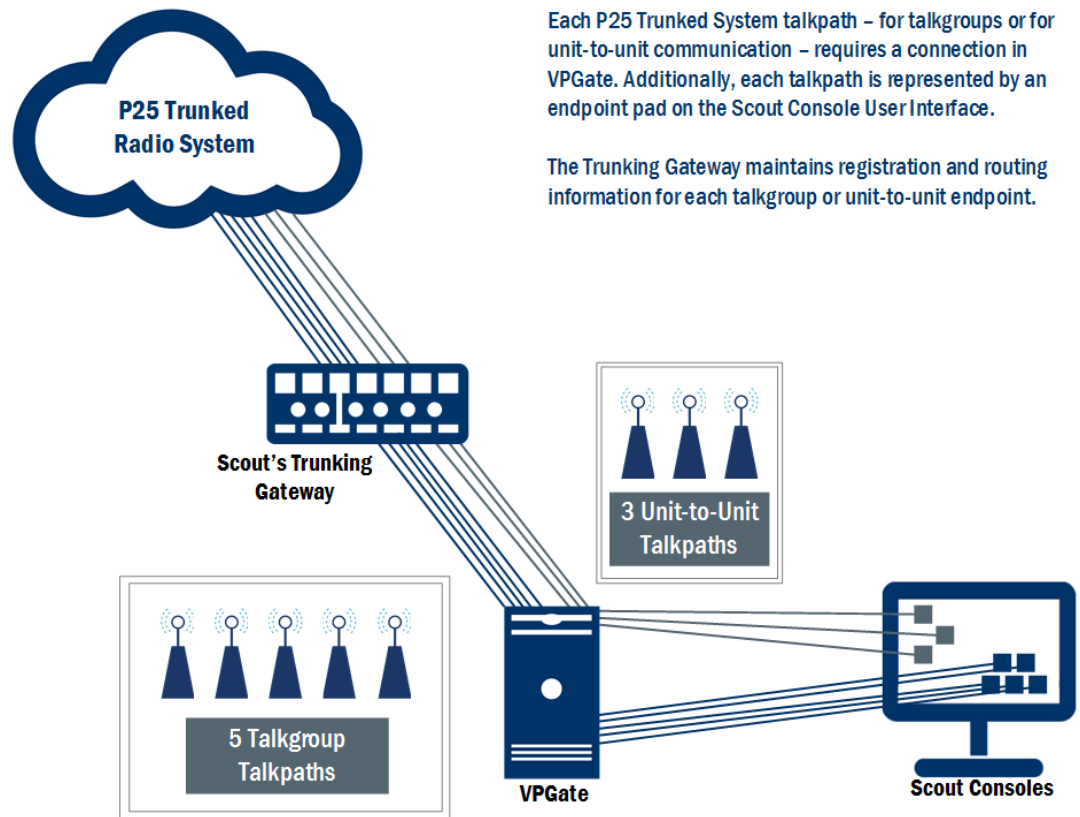
*Multiple RFSS Setup*



*This diagram shows a Scout console subsystem connecting to a P25 Wide Area Communication Network (WACN) system including two separate radio frequency subsystems, RFSS1 and RFSS2.*

## Licensing

The direct IP interface between a Scout VoIP console subsystem and a P25 trunked radio system is controlled by Avtec software licensing. Each P25 endpoint requires a separate licensed connection between the P25 trunked radio system and Scout. Each endpoint, whether a talkgroup or unit-to-unit, is represented by an endpoint icon on the Scout console user interface. Each Scout console that holds a seat license for P25 can be configured to access any or all P25 endpoints. Review the following information to learn more about required licenses.



*This diagram shows the number of licensed connections required from a P25 trunked radio system to VPGate and Scout consoles to support five talkgroup endpoints and three unit-to-unit endpoints. With respect to the Scout console subsystem, an endpoint is a licensed connection that can be used by the console positions to establish voice communication with P25 subscriber units through the P25 infrastructure.*

To interface with a P25 trunked radio system, Avtec requires three licenses:

- Base VPGate License
- VPGate P25 Supplemental License
- P25 Seat License

The **Base VPGate License** size represents the maximum number of endpoints that can be active at any one time on a single VPGate. Each P25 endpoint, whether a talkgroup or unit-to-unit, uses one Type A license. As shown in the following table, the base license is available for 24, 40, 80, or 160 endpoints. Additional VPGate licenses would be required to use more endpoints.

| VPGate License                    | Total Category A&B Endpoints | Maximum Category B SIP Endpoints | Redundant |
|-----------------------------------|------------------------------|----------------------------------|-----------|
| SFW-VPG-L0-NR<br>SFW-VPG-L0-NR-SK | 24                           | 12                               | No        |
| SFW-VPG-L0<br>SFW-VPG-L0-SK       | 24                           | 12                               | Yes       |
| SFW-VPG-L1<br>SFW-VPG-L1-SK       | 40                           | 20                               | Yes       |
| SFW-VPG-L2<br>SFW-VPG-L2-SK       | 80                           | 40                               | Yes       |
| SFW-VPG-L3<br>SFW-VPG-L3-SK       | 160                          | 100                              | Yes       |

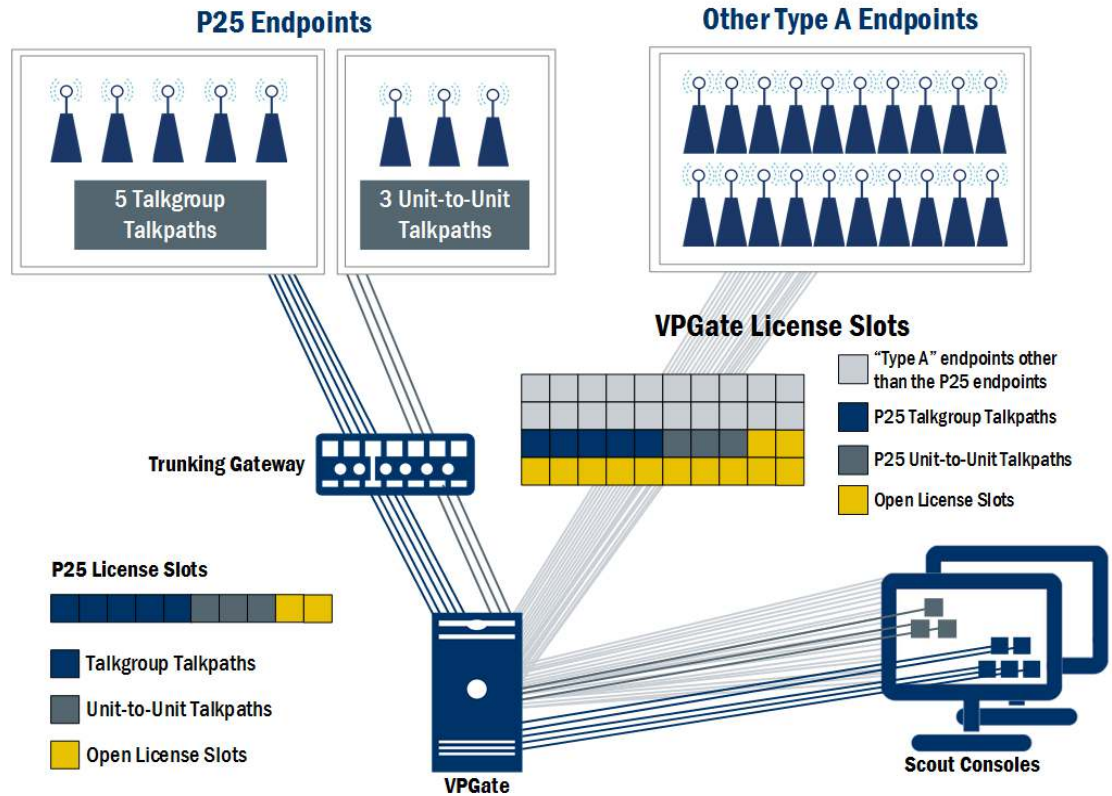
Each P25 endpoint requires one **VPGate P25 Supplemental License**. Every endpoint available on the console must be configured as a dedicated endpoint license. As shown in the following table, supplemental licenses are available for 10, 30, 60, or 100 endpoints.

| VPGate P25 Supplemental License       | Maximum P25 Endpoints |
|---------------------------------------|-----------------------|
| SFW-VPG-P25-10<br>SFW-VPG-P25-10-SK   | 10                    |
| SFW-VPG-P25-30<br>SFW-VPG-P25-30-SK   | 30                    |
| SFW-VPG-P25-60<br>SFW-VPG-P25-60-SK   | 60                    |
| SFW-VPG-P25-100<br>SFW-VPG-P25-100-SK | 100                   |

Each console position must hold a **P25 Seat License** as shown in the following table.

| P25 Seat License | Maximum Licenses per System |
|------------------|-----------------------------|
| SFW-SCOUT-P25    | 100                         |

Licensing Example



*This diagram shows example licensing for a company that uses P25 endpoints in addition to other endpoints. A P25 endpoint uses one Type A license slot from the Base VPGate license as well as one license slot from the VPGate P25 Supplemental license.*

The example depicts a company with eight P25 endpoints and 20 other Type A endpoints that do not require supplemental licenses, for a total of 28 endpoints.

- A 40-endpoint base VPGate license (SFW-VPG-L1 or SFW-VPG-L1-SK) provides enough licensing for all 28 endpoints, which includes the eight P25 endpoints and the 20 other Type A endpoints
- A 10-endpoint VPGate P25 Supplemental license (SFW-VPG-P25-10 or SFW-VPG-P25-10-SK) provides coverage for the eight P25 endpoints
  - Five license slots cover the talkgroup talkpaths
  - Three license slots cover the unit-to-unit talkpaths
  - Two license slots remain open for additional P25 endpoints

- The Base VPGate license has 12 unallocated endpoints. The customer in this example would be able to add up to two more P25 endpoints. The VPGate P25 Supplemental License includes 10 endpoints, eight of which are used.
- The company would also require a P25 Seat License for every Scout console that accesses P25 endpoints.

### Network Requirements

To configure the network requirements for a Scout system with P25 endpoints, consider the following:

- P25 Endpoint—Calls between a Scout console and a P25 radio subsystem (talkgroup or unit) require a 44 kbs bandwidth. Calls from a P25 radio subsystem to a Scout console require a 35 kbs bandwidth.
- Jitter—Scout allows jitter ranging from 60 milliseconds to 2.5 seconds.
- QoS—Scout supports separate Differentiated Services (DiffServ) values for audio and control packets between the console subsystem and the radio subsystem. This allows the network administrator to provision the Ethernet network that ties the console subsystem to the radio subsystem to give priority to the voice communication packets to reduce latency and provide an excellent Quality of Service.
- Scout software does not natively handle SIP messaging across NAT environments. Special equipment and expertise are required to implement. A network administrator should be consulted before delivering SIP signaling over NATs.

For more information, refer to the *Architecture and Networking Design Considerations* reference guide, available on Avtec Connect.

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