Automatic Roaming in a Project 25 Radio System

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What is "automatic roaming"?

This term is sometimes misunderstood. There are two methods of roaming that are often discussed in P25 and informally referred to as "automatic" and "manual'. Both roaming methods have unique aspects that mainly affect two areas – user experience, and identity management.

User Experience

From the perspective of the user, "automatic roaming" refers to the radio's ability to move from the coverage of one RF site to another without user intervention (or often even user knowledge). The user's radio automatically knows when coverage is degrading, it automatically searches for better coverage, and then automatically switches and registers with the new RF site's control channel.

Automatic roaming from this perspective usually requires cooperation between the two sites including broadcasting a standardized set of information about nearby sites to the radios to facilitate the roaming. The two sites can either be part of a larger system, where the user is already "homed", or they can be part of two separate systems, perhaps connected via ISSI. In the case of two separate systems connected via ISSI the new system (that the radio roams to) cooperatively allows the radio to register on its system, sometimes exchanging information with the old system via ISSI to validate the user.

Alternatively, "manual roaming" from the user's perspective requires the user to physically select the new site, or system using radio control methods (i.e. menu, selector, etc). The radio then tunes to the newly selected site frequency and attempts to register on the new RF site's control channel. This manual selection can also include some identity changes as described below.

Identity Management

From the perspective of a radio user, the term "automatic roaming" refers to the ability of a radio to move from the operational area of one system to the operational area of another system without changing the operating identities (individual and/or group) of the radio.

Based on the contents of the published P25 standards, when registering on a visited trunking system (identified by a unique WACN/System ID combination) using "automatic roaming" methods the radio always uses the full individual identity assigned by the individual radio's home system (WACN ID, System ID, and Unit ID). The term "automatic roaming" also allows a radio to affiliate to a talkgroup that is homed to a system other than the system of current operation.

The P25 standards do not require an ISSI connection for the operation of "automatic roaming".

When roaming to another system connected via ISSI, the ISSI will enable information exchange between the system of operation and the home system of the individual identity or the talkgroup.

In "manual roaming", the radio operator manually changes the parameters that the radio uses to try and locate and register on a new site (frequencies, site identifiers etc.), and may also change the operating identity (individual unit ID) of the radio itself in order to operate on one system or another. "Manual roaming" can include moving to a site connected via ISSI to the old site, or not. Validation of the radio's individual identity works exactly the same as with "automatic roaming" – the new site can validate the identity itself, or can use the ISSI for assistance. The difference with "manual roaming" is that in addition to changing the RF parameters, the manual selection could also include changing the radio identity/address (WACN ID, System ID, and Unit ID). Changing the individual unit ID can facilitate operation on foreign/visited systems that are not connected to the radio's home system via ISSI. In addition to changing the radio identity, the manual selection could also include changes to the currently selected group as well as the group set(s) available to the user.

Manual selection of the radio's unit ID is not standardized, but is a common feature available in most P25 radios. The manual method of roaming pre-dates the automatic method of roaming and so, older radios (and/or older infrastructures) may only support the manual method. In addition, although these descriptions are for P25 trunked operation, P25 conventional only supports the manual roaming method.