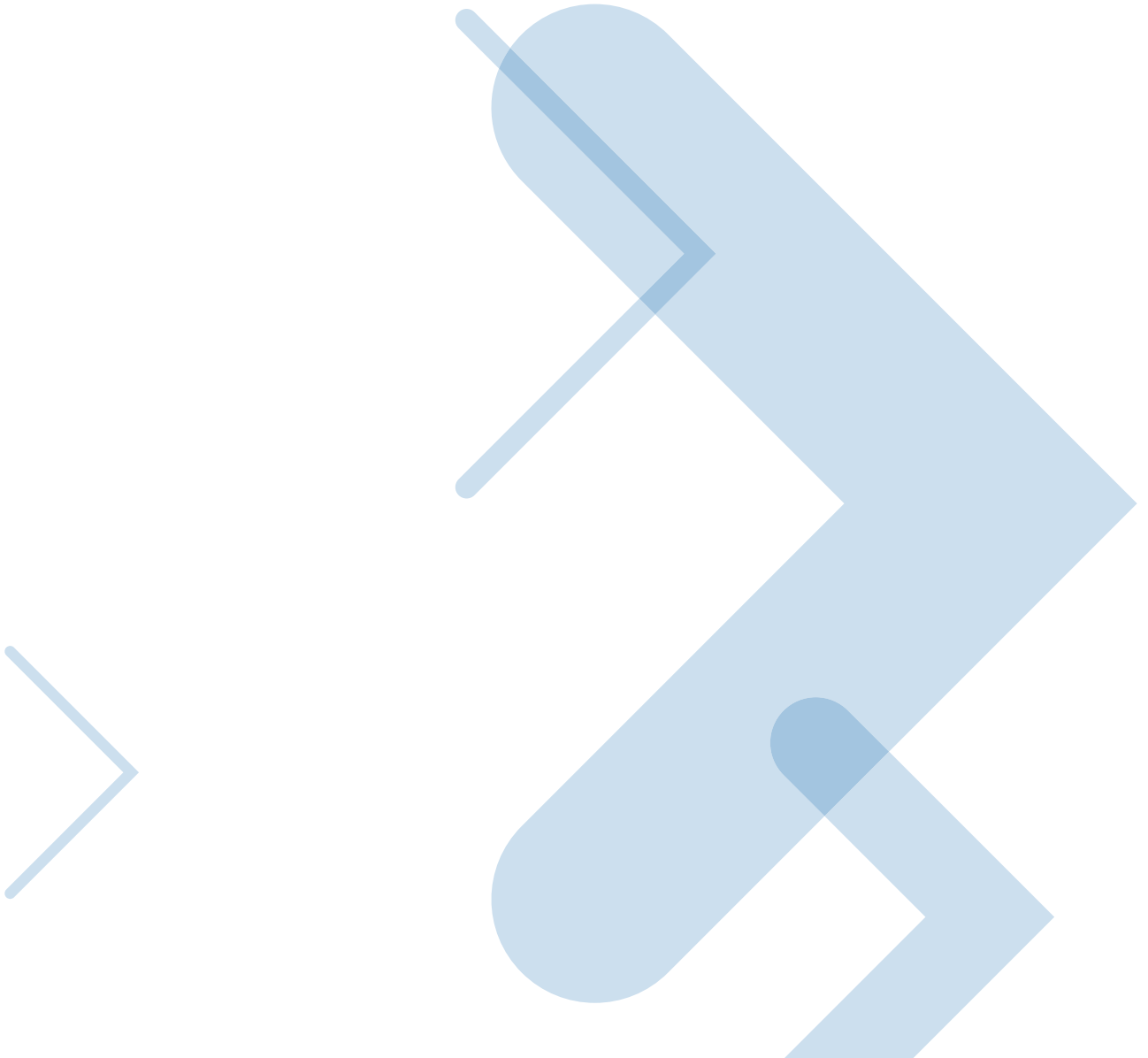


Migration Roadmap: DataTAC™ to ASTRO®25 HPD

Upgrade your dedicated data system... and begin
the transition to ASTRO 25 voice and data



Mobile data is playing a more critical role in public safety with each passing year. To keep up with growing user demand and new applications, agencies are looking to upgrade their data networks for higher speed and capacity.

If your department is using a DataTAC™ system, the question is how to upgrade while preserving the same degree of control, reliability and availability for mission critical operations and do it without breaking the bank. Like many organizations, you may also have a legacy analog voice network that needs upgrading to Project 25 (P25) interoperability.

Motorola offers a strategy that solves both dilemmas at once. Migrating to HPD modernizes your mobile data while simultaneously building the core of an ASTRO®25 voice network. With an upgrade to ASTRO 25 HPD, you can begin investing today in a dedicated data network while moving to a P25 standards based network while continuing to maximize the useful remaining life of your existing systems .



ASTRO 25 HPD is the Next Step for DataTAC Users

Agencies that operate a DataTAC system already know the importance of owning their own data networks for mission critical performance. They also know that DataTAC technology is aging. Parts availability is becoming an issue and the systems will not last forever. Opportunities to add newer applications and additional users are limited because of DataTAC's relatively slow speeds. However, the applications that are running over DataTAC are still important operational tools and users depend on them. When looking for a solution, agencies need to consider:

- *What applications do we need today and in the foreseeable future?*
- *How much will it cost to deploy over our entire geographic service area?*
- *Do we control an adequate number of channels to deploy the system?*
- *Can we manage the changeover so it is transparent to end users?*
- *Can we find a solution that does not leave us dependent on commercial carriers whose networks are not disaster hardened?*

ASTRO 25 HPD answers the challenges with a mission critical wide-area data network that is cost effective to deploy across an entire city, county, or state.

ASTRO 25 HPD offers important improvements over DataTAC including:

- Support for a wide variety of applications that empower personnel to work safely and effectively in the field.
- Greater flexibility and capacity to support more users or more applications with data throughput rates up to four times greater than those of DataTAC.
- Increased the coverage area of the data system. An HPD site covers a roughly 30% larger area than a DataTAC site so agencies can upgrade data over their existing coverage footprint without acquiring additional sites. At the same time coverage can be extended to more locations potentially filling coverage holes in the existing system.
- P25 interoperability migration using the ASTRO 25 Integrated Voice and data allowing you to share information with other agencies and complying with Federal and local mandates for standards compliance.

ASTRO 25 HPD gives you complete control over system operation including equipment, spectrum, deployment, access, scheduling, and security. HPD is the fastest wide-area private data system that operates in standard 700/800 MHz channels and provides the degree of control needed to provide mission critical communications to the community.

Information where and when they need it

HPD provides the bandwidth to deliver potentially lifesaving data into the hands of first responders in the field:

Photo IDs
Fingerprints
Maps and GPS locations
Medical info
Law enforcement records
Routine paperwork
...and more

Gradual and Transparent Migration

Instead of requiring a sudden cutover, ASTRO 25 HPD and DataTAC can interoperate smoothly for a gradual migration on your timetable. Radio IP middleware allows agencies to run the same applications while enabling users to roam freely between HPD and DataTAC systems. This gives you a choice of migration strategies:

- Gradually deploy ASTRO 25 HPD by geographic area, one site at a time, while DataTAC sites continue serving other locations.
- Migrate some user groups to HPD while others continue using DataTAC, migrating one channel at a time.
- Deploy new applications on HPD while DataTAC continues running existing applications.

Motorola's established migration path allows HPD to leverage some of the existing DataTAC site facilities to reduce deployment costs. HPD can cover a greater area than the DataTAC network with the same number of remote sites, so agencies avoid the costs and delays of acquiring new sites.

HPD Application Support

The value of a data network is the applications it supports. Supporting greater bandwidth than DataTAC, ASTRO 25 HPD allows you to deploy more applications for more users. Graphics capable applications, for example, can act as force multipliers that empower first responders to make well-informed decisions on the spot.

Applications supported include:

Computer Aided Dispatch (CAD) – Improve situational intelligence and real-time decision making by providing information such as alerts, photos, and files to personnel in the field.

Messaging – Send and receive text messages or email to convey complex information silently and accurately.

Mobile Identification – Gather data such as photos, fingerprints, vehicle and license plate records, warrants and other information to swiftly ID potential suspects and control access to restricted areas.

Browser Access and Database Lookups – Access intranet records and databases, putting maps, building plans, medical data, arrest records, wants and warrants, hazardous materials references, and more at the fingertips of personnel both en route and at the scene.

Field Reporting – Complete routine paperwork from any location via the vehicle's computer, so responders can file reports faster while spending less time at the station house and more time on the job.

Location Tracking – Empower co-workers, dispatchers, and commanders to track the GPS locations of vehicles and personnel, allowing them to dispatch the nearest unit for a quick response – and to find and assist units in trouble.

Data Architecture	Channel Size	Frequency Bands	Applications
ASTRO 25 Integrated Voice & Data	12.5 kHz	VHF UHF 700/800 MHz	<ul style="list-style-type: none"> • Text Messaging • Location Tracking & Motorola MARVLIS™ Resource Analysis • Fire Station Alerting • POP25 Over-the-Air Radio Programming • Encryption & Over-the-Air Rekeying (OTAR) • Third-party Application Program Interface (API)
ASTRO 25 HPD	25 kHz	700/800 MHz	<ul style="list-style-type: none"> • PremierOne™ Mobile Applications • PremierOne CAD • Messaging • Location Tracking • Third-party applications integrated via Application Program Interface (API): <ul style="list-style-type: none"> - Web-based browsing – internet/extranet - Photos, maps, still images - Fingerprints & mug shots - Field reporting, vehicle location, CAD dispatch - Filing administrative reports from the field

Architecture: HPD Builds on the Proven ASTRO 25 Platform

The ASTRO 25 platform has a proven track record for public safety mission critical communications. The ASTRO 25 core is hardened with layers of redundancy and failure management techniques and protected against today's threats from virus and intrusion. An HPD network with Radio IP's Virtual Private Network provides information assurance with high-level encryption and security layers to protect the network and message contents from unauthorized access.

Infrastructure

An ASTRO 25 HPD system replacing DataTAC consists of the ASTRO 25 core and the HPD network components. If an ASTRO 25 voice system is already deployed, then only the HPD network components are required:

- HPD Packet Data gateway provides data traffic routing and wireless subscriber tracking and control functions.
- ASTRO 25 GGSN and Border Router complete the connection to your back end computer networks. A second GGSN and Border Router are not required if these components are already deployed for an ASTRO 25 IV&D system.
- G series RF site equipment configured for HPD operation.

Mobile Data Devices

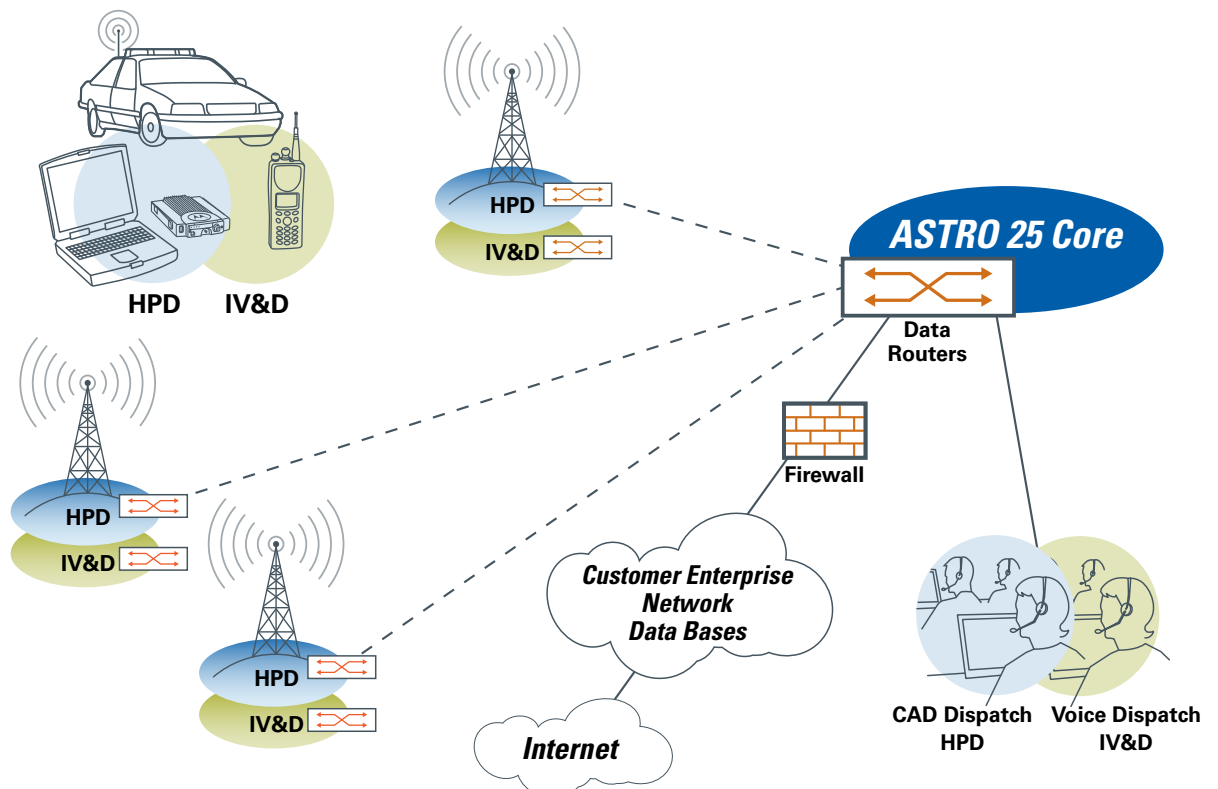
The HPD Modem and a Mobile Data Terminal (MDT) running Windows® XP equips a vehicle for HPD operation.

- DataTAC modem may remain in the vehicle, connected to the vehicle's MDT to operate where DataTAC is still operational.
- The optional GPS receiver in the HPD modem may be enabled initially, or it may be enabled later to provide GPS-derived location coordinates to the user in the vehicle, as well as to the dispatcher.

Command and Control / Dispatch Center Solutions

Computer Aided Dispatch (CAD) applications enable dispatchers to identify situations as they develop, speed emergency response, deploy resources effectively, and provide potentially lifesaving support to personnel in the field.

Command and control software provides the analytical power to recognize trends, maximize effective deployment, and anticipate problems before they strike. Motorola offers a suite of dispatch and command and control applications including mapping, records management, and dispatch or mobile CAD.



ASTRO 25 – A FLEXIBLE SOLUTION

The ASTRO 25 core supports several voice and data networks including HPD-dedicated data, P25 Phase 1 voice and data and Phase 2 TDMA voice, plus legacy SMARTNET® and SmartZone™ RF sites.

Start moving to an integrated solution beginning with an HPD dedicated data network or a P25 integrated voice and data solution. Easily add additional radio access protocols HPD, IV&D, TDMA as your needs change.

Radio IP for Seamless Roaming and Gradual Migration

Radio IP is a recommended middleware application available from Motorola. It enables seamless roaming across multiple data networks: DataTAC, HPD, MOTOMESH, public cellular, Wi-Fi and Wi-MAX, satellite, and other networks. It also supports DataTAC applications on newer IP networks like HPD. During the migration period, Radio IP allows you to keep running the same applications, supporting users as they roam between different networks. Radio IP also creates a Virtual Private Network (VPN) between the vehicle's mobile data terminal and the agency's back-end computer network for enhanced security and privacy. Radio IP provides:

- Network performance enhancement tools to enable faster transmissions and more traffic per channel.
- Optimized performance by automatically connecting users to the best service available in a given location.

After migrating from DataTAC to HPD, Radio IP is still valuable, giving you the freedom to deploy different services in different locations. For example, an agency might choose to deploy MOTOMESH for broadband coverage in a high-density district, but rely on HPD in suburban neighborhoods and wide-area regions. Radio IP manages the handoffs between networks so it's completely transparent to field personnel as they roam across networks. They remain connected even as they drive across network sites, with no interruption and no need for user intervention.

ASTRO 25 with SmartX Solution Eases the Migration to P25 Voice

HPD can be the first step in building out a complete ASTRO 25 network including P25 voice and integrated data. With the foundation systems already installed as part of your HPD deployment, migrating your voice radio to ASTRO 25 becomes easy and cost effective.

Motorola provides a solution for easy migration from a SMARTNET/SmartZone system. SmartX allows you to continue using most of your remote site equipment and establishes seamless interoperability between new ASTRO 25 sites and legacy sites for a smooth transition. By moving all of your voice and data onto a single platform, you gain important benefits:

- Having one network to build, maintain, and administer reduces your costs while allowing investment dollars to do double duty.
- Simultaneously support a wide range of services to meet your needs today and adapt in the future. These include HPD, IV&D, conventional and trunked voice, multiplexed voice, SMARTNET/SmartZone voice, analog mutual aid channels, and other services.
- Compliance with open standards protects the ASTRO 25 platform against obsolescence. P25 IV&D brings all of your communications into compliance with interoperability mandates, an important factor in grant requests.

Boosting Officer Efficiency in York County, South Carolina

The York County Sheriff's Office uses an HPD network integrated into the county's ASTRO® 25 communications system. The county has also deployed localized Wi-Fi hot spots for high-speed software and anti-virus updates. For the 145 vehicles equipped with Motorola work stations, roaming between Wi-Fi and HPD is seamless.

"Previously we were writing reports by hand. HPD allows us to merge wireless data into our records management system. The deputies have noticed that field reporting gives them a 20 to 25% savings of their time so they can get back on the road."

– Captain Allen Brandon

WHY HPD IS A BETTER ALTERNATIVE THAN PUBLIC CELLULAR

If a data application is important during normal operations, how much more critical does it become during an emergency? Some agencies have experimented with using public cellular networks for some or all of their data needs. However, all too often those networks fail at the exact moment when first responders need them most. When you're serious about using data for public safety, you need a network you can rely on under adverse conditions. Unlike a commercial network, your ASTRO 25 HPD network is designed for:

- *Disaster survivability, with rugged and resilient components to keep working under extreme conditions even when parts of the network are damaged*
- *Geographic coverage designed according to your specifications (not the profitability of commercial carriers)*
- *Economies of scale as your department continues adding users and applications in the years to come*
- *Network security that meets the requirements of critical public safety databases like NCIC, without which they will not allow you to gain access*

Radio Spectrum Considerations

Spectrum efficiency is of critical importance to agencies operating in locations where it is difficult to license additional radio channels. ASTRO 25 HPD carries more data per channel, requiring about half the DataTAC capacity for the same number of users running the same applications. HPD can transparently and dynamically switch between 700 MHz and 800 MHz channels, making the best use of available frequencies at multiple sites given current demand from users. HPD uses existing standard 25 kHz channels in the 800 MHz public safety band (non-NPSPAC) and in the existing 700 MHz public safety narrowband spectrum.

HPD requires at least one dedicated 25 kHz channel per site and adjacent sites cannot use the same channel frequencies (this requirement ensures that HPD delivers maximum bandwidth and eliminates problems with interference in areas where site boundaries overlap). If your DataTAC sites use Single Frequency Reuse (SFR) you may not be able to directly substitute a DataTAC channel for an HPD channel at every site. Motorola system engineers will help with RF planning to ensure that there are enough channels for all of your voice and data needs.

Suggested options include:

- Work with the local Regional Planning Committee to have 700 MHz channels assigned to your agency. This is the most straightforward approach, and has been often overlooked as a means for acquiring channels.
- Invite other local agencies to share the system and pool available channels.
- Negotiate with the State for access to state owned 700 MHz channels.

Ready for the Next Step Forward

ASTRO 25 HPD is the next logical step for agencies now using DataTAC. It offers easy migration, cost-effective wide-area data coverage, and support for the applications first responders need most. It provides an adaptable, growable, updatable platform for modernizing the organization's data networks. And the investment in HPD can do double duty by laying the groundwork for an ASTRO 25 integrated voice and data network.

Technology that's Second Nature™ From a vendor who understands public safety

MOTOA⁴™

Providing a migration path from DataTAC to ASTRO 25 HPD is just one of the ways that Motorola assists public safety organizations in moving their communications forward. An ASTRO 25 voice and data or HPD system are key components in our MOTOA4 portfolio of mission critical technologies. Agencies can start with any solution and gradually build upon it to introduce new capabilities to reflect their evolving needs and resources. Motorola helps agencies move with confidence beyond the basics to achieve the most reliable and innovative wireless solutions that help to save lives and protect communities. These technologies are delivered seamlessly into the hands of first responders: simply, reliably, and without distracting them from their work. This is technology that's second nature.



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