

City of Milwaukee - Radio System Replacement

MYTH: The "system" itself does not need to be replaced, however, the P25 over the air protocol needs to be installed in the field.

FACT: This is a bit of an understatement. **If Milwaukee deploys the same number of channels they have today, they would need to deploy 308 trunked repeaters over 14 sites.** In addition to the many trunked repeaters, many sites will require upgrades to or new equipment shelters and towers. Replacing the "P25 over the air protocol" is the most expensive part of a Land Mobile Radio (LMR) system

MYTH: L3Harris provides unique features in addition to the APCO P25 standard

- In-band GPS (does not utilize extra talkpaths to provide GPS)
- Enhanced Dynamic Dual Mode Operation allows the system to operate at Phase I (slightly better voice quality) unless the system is busy, which will then dynamically switch to Phase II when needed (doubling system capacity at no extra cost) .
- Only L3Harris can provide radios that utilize BeOn, which the City of Milwaukee has already purchased.

FACT: **None of the features above are unique to a L3Harris System**

- Other providers also can provide "In-band" GPS. The term "in-band" is a little misleading because the entire system is in one frequency band, so there would be no "in" or "out" of band signaling. This unique feature, which was developed by a vendor other than L3Harris, uses unused digital words on the voice transmission to send location instead of requiring a separate dedicated data or "location" channel. This feature is NOT unique to L3Harris. **The perception that L3Harris is the only provider of efficient GPS is erroneous.**
- Likewise another vendor developed this feature and calls it Dynamic Dual Mode and it is available on the OASIS network, L3Harris adopted this feature and added the word "Enhanced" even though it does nothing extra or different.
 - Also noteworthy is other vendors have no difference in audio quality between Phase I operation and Phase II operation. That vendor is consistently ranked as the best and loudest audio quality in the industry
- The OASIS network has a feature that is identical to BeOn and is operational today, it too has already been purchased.

MYTH: L3Harris radios can provide over-the-air updates to subscriber unit text aliases

- MFD currently relies on text aliases to determine who is speaking (E_38_CO, etc...)
- Non-L3Harris P25 systems only utilize a radio ID (1234567) when in use
- Non-L3Harris radios can be programmed with a limited subscriber list, however if any change is made in the system, all of those radios need to be recalled and reprogrammed (weeks/months of work)

FACT: **Another vendor can also provide over-the-air update to subscriber unit text aliases**

- **Other vendors have radios that can also display text aliases instead of Radio ID's**
- Another Vendor also has the ability to update subscriber unit text aliases over the air. This can be done in two ways:
 - Subscriber unit text aliases can be updated over the air on the system
 - Subscriber unit text aliases can be updated over the LTE or WiFi. This minimizes the use of voice channels that could be needed for voice calls. It also reduces the time to update from hours to minutes/seconds.
- These feature can be enabled on the OASIS network

MYTH: L3Harris infrastructure allows for "Dynamic Channel Allocation", allowing for Phase I only subscribers (I.e. OASIS) to roam onto the system without degrading the system as a whole. Other vendor's infrastructure does not support this.

FACT: **Another vendor introduced this feature to the marketplace. It can be enabled on the OASIS network.**

MYTH: L3Harris has no subscriber fees!

FACT: **Subscription fees on the OASIS system are simply the cost of the maintenance of the system.** The ongoing costs to operate and maintain the OASIS network are paid by all users, and each user is billed by the number of radios that agency has operating on the system. **If L3Harris has not included maintenance in their offer they are either leaving Milwaukee vulnerable to failure and cybersecurity threats, or they plan to introduce multi million dollar change orders after contract signing.** By joining OASIS, the City of Milwaukee benefits from other users on OASIS hence LOWERING the City's system maintenance costs.

MYTH: Why don't we join OASIS - Not enough sites

- Per Motorola, OASIS has two sites in the City of Milwaukee (Aug 15, 2022)
- This is not enough coverage for a densely packed urban area
- Currently the City of Milwaukee has 20 sites .
- Future sites have been reduced to 14 linear simulcast sites to provide the appropriate amount of coverage in the city of Milwaukee, and the surrounding area for Fire Shared Services.
- P25 Linear Simulcast requires less sites than Opensky

FACT: **The OASIS system provides the required level of coverage.**

- On Aug 15 Motorola informed the city that two additional sites were added free of charge to the Milwaukee portion of the OASIS system.
- **There are 20 sites in the OASIS network. These 20 sites provide better than 95% portable in- building (20dB) coverage in the entire Milwaukee and Waukesha Counties. So all communities in Milwaukee County including the city of Milwaukee will have better than 95% in-building coverage**
- L3Harris has a long history of over-promising on their coverage predictions. **City of Las Vegas canceled their upgrade from Opensky to P25 because the dense urban coverage could not be met**

- **In Dane County and Washington County both have had to add additional sites to meet their coverage needs. Harris has placed both customers in the uncomfortable position of going back to the board for additional funding.**
- With the OASIS network you can gain confidence before deciding with the unique ability to test the coverage before you decide. Milwaukee is in an extremely unique position to “try before you buy”. And of course, proving the level of coverage exists today means a faster path to beneficial use.

MYTH: Subscriber Fees

- Per the OASIS IGA, all subscribers currently pay \$19/month, forever.
- Currently, the City of Milwaukee has approximately 7,000 subscriber radios or \$1,596,000 in annual subscriber fees.

FACT: This perception is erroneous. **The calculations being made do not consider the value that would be brought to the city via a shared services agreement.**

- Minimal This fee would be recalculated based on the increase in the number of users
- It would be expected that the City of Milwaukee, after joining the OASIS network, would be the largest single user on the network., They would likely be considered a “primary” partner with autonomous access and control of their portion of the system. Milwaukee would negotiate a sharing of the maintenance and software/hardware upgrade contract to significantly reduce costs.
- Joining OASIS will be significantly less expensive than building a new P25 system. **The OASIS network could be made ready for the City of Milwaukee to join for as little as \$8M or up to \$20M for all features outlined in this document. Even the highest estimate is less than half of the city’s budgeted \$45 million, saving over \$10 million in interest payments alone over the next decade. That is money that can be reallocated for public safety, libraries or other city priorities.** In addition, the city would only be responsible for approximately 1/3 of the ongoing maintenance and operational costs of the system.

MYTH: Radios would still need to be replaced

- All City of Milwaukee radios are currently End-Of-Life (EOL) / End-Of-Manufacture (EOM) .
- New radios would need to be purchased, in addition to the monthly subscriber fees.
- The replacement radios would not come at the steep discount proposed due to the bulk buy.
- Consoles would potentially need to be replaced

FACT: The statements above needs to be discussed with other vendors

- Technically all of the existing City of Milwaukee radios could be re-programmed to operate on the OASIS P25 radio system, but knowing they are in an EOL state, it is recommended that they be replaced

- As previously discussed, the monthly subscriber fee covers the maintenance of the shared system. If more users join the system it will drive down monthly fees . Again **it would be recommended that the City of Milwaukee negotiate to a separate MOU with other users as the largest user on OASIS**
- Another vendor is the P25 pioneer and definitive leader in this space for a reason. That vendor can offer a best value procurement package that, feature for feature, is untouchable by any other vendor.
- The existing Symphony Consoles support the P25 CSSI interface, as does the OASIS P25 network. Replacing the consoles is not required and would be at the discretion of the City of Milwaukee.

MYTH: OASIS is not a P25 Phase II system

FACT: Because OASIS is running currently supported software P25 Phase II can be enabled with a simple software upgrade. The \$8 to \$20 million estimate includes that upgrade.

MYTH: OASIS does not have the capacity to absorb the City of Milwaukee

FACT: OASIS actually supports all of the City of Milwaukee Fire Department traffic today with extra capacity available on OASIS. OASIS owners group has not over-built the system to support the capacity for the city. At such time as the city indicates they wish to join OASIS, the system will enable that capacity.

MYTH: A multi-million dollar project would need to be approved by Milwaukee and Waukesha County, upgrading all of their radio system infrastructure.

FACT: The OASIS network is designed such that if the City wishes to join OASIS using TDMA channels can be added with no impact to any Waukesha or Milwaukee County users. **Multiple vendors can provide dynamic channels that can switch between Phase 1 and Phase 2 on a call by call basis**

MYTH: All Milwaukee County (and potentially Waukesha County) radios would need to be upgraded to support Phase II, or new radios purchased. Smaller departments will not have the budget to accomplish this, especially for no added benefit to them.

FACT: As previously stated **there would be no requirement for any of the Waukesha or Milwaukee county radios to be upgraded if the City of Milwaukee joins the system and wishes to operate in the Phase II mode.**

MYTH: During a migration from Opensky to OASIS, the interconnection between the two systems would have to be via ISSI. Due to ISSI limitations, this would immediately prevent all the City of Milwaukee talkgroups from being patched. This would be detrimental to functionality and is unacceptable.

FACT: It should be noted that another vendor has migrated more L3Harris Opensky customers to P25 than L3Harris themselves. The most recent customer making this migration is Oakland County MI. The ISSI limitations must be a limitation on the L3Harris core

that supports the OpenSky network. In all of the Opensky to P25 migrations this has never been a problem

MYTH: OASIS has known issues of their own; voice traffic interfering with police/fire operations.

- It has also been noticed by the public:
<https://forums.radioreference.com/threads/oasis-bleedover.440546/>
- This is due to software issues with the Motorola core, or improper system design.
- Random conversations in the middle of a police or fire transmission are unacceptable.

FACT: **The City of Milwaukee should consider hiring an independent consultant to perform an evaluation of the Open Sky and OASIS systems. The evaluation will clearly show the OpenSky implementation was fraught with challenges both technically and from a cost overrun standpoint. While OASIS came in on time and under budget.**

- The quoted source is a public website where some scanner junkies think they heard RF interference, not software or design issues. In fact this could be someone from the City of Milwaukee Radio shop or from L3Harris who wanted to create the image that the OASIS network is experiencing issues. There are no open cases referencing this event or any other interference problems over the operational period of the OASIS network
- This is OBVIOUSLY an RF Interference problem NOT a Software issue or improper system design. Anyone who can not immediately identify this as an RF interference problem does not even have a rudimentary understanding of the LMR environment

MYTH: OASIS does not have Over-The-Air-Rekeying (OTAR). This limits the security of the system.

- If a security key is somehow compromised, or the fleet needs to be rekeyed (keys added or modified), it could take weeks (if not months) to manually recall every radio and re-key it.
- OTAR securely reprograms encryption keys over the air as soon as the radio affiliates to the radio system.

FACT: **OASIS network is capable of OTAR.** The owners group has not decided to purchase this option. **OTAR can be deployed for the City of Milwaukee if that is an option of their choosing. The inclusion of OTAR is included in the previously mentioned \$8 to \$20 million dollar estimate that is less than half the budgeted amount.** Deploying OTAR for the City of Milwaukee would have no impact on any other user on OASIS. This is nothing more than a personal choice by the OASIS Owners, not technical limitation on OASIS

MYTH: OASIS does not have any backup infrastructure in case of a systemic failure This also means OASIS has no native nationwide analog interoperability assets. In the event of a disaster, or large planned event, the City of Milwaukee's interoperable analog network would be a key asset.

FACT: This is an agency choice. It is assumed if the City of Milwaukee is going to maintain a back-up infrastructure if they migrate to L3Harris P25, they would make the same choice if they migrate to OASIS. This is good civic minded planning but a choice by the City of Milwaukee. OASIS, the citizens of the City of Milwaukee. All should hope that the city of Milwaukee continue this tradition regardless of their choice for a next generation LMR network

MYTH: OASIS does not have redundant core infrastructure

- OASIS has one (and only one) centralized core in Waukesha WI. If something happens to the centralized core, the radio system could fail
- The City of Milwaukee has two redundant cores, in two physically different locations, with two separate internet service providers (ISP) .
- As of Summer 2022, the City of Milwaukee radio network was moved to the self-healing 4Gb City Fiber ring.
- This provides increased resilience to combat network issues, or fiber cuts

FACT: OASIS is designed with redundancy in mind. The facts as described here are not a reflection of reality. A look into the OASIS architecture will bring to light these misperceptions. The OASIS core is completely redundant.

- **OASIS does have a redundant core.** It is true that the OASIS Owners group has not elected to implement a geo redundant core, this is a customer choice. If the City of Milwaukee wishes a geo redundant core, there are actually three options available;
 - a traditional geo redundant core,
 - a geo redundant core in the cloud solution
 - a geo redundant solution called edge availability which establishes a virtual core for fall back operation at any or all RF sites.
 - **These options are included in the \$8 to \$20 million estimate previously quoted.**
- OASIS is also deployed on a ring architecture; it also has self healing capabilities and has at least two microwave links to every RF site.

MYTH: OASIS by design is not able to provide In-Band GPS for subscriber radios, This is a feature only provided by L3Harris infrastructure and radios. This allows the GPS coordinates to be relayed from a radio while they PTT or when they declare an emergency. This would be a huge benefit to employee safety.

FACT: **Another vendor was the first company to provide Location on Emergency and Location on PTT.** Most recently this vendor also announced Location on Receive, so whenever a radio is in a talkgroup call, the radio's location is displayed/sent to the system. **OASIS "by design" was the first system in Milwaukee to have this capability.**

MYTH: OASIS by design is not able to provide real-time updates to text aliases for radios. The P25 standard shows unit ID numbers while transmitting, not text. The Milwaukee Fire Department currently relies on text information for radio traffic (as does the PD to some extent).

- On Non-Harris P25 system, Alias Lists can be programmed into the radio, but if a single radio changes its alias (it happens daily), the entire fleet would need to be recalled for reprogramming (weeks to months of work) .

FACT: This statement is simply false. The OASIS network is capable of this exact feature as part of the Group Services Suite of features. It is true that the OASIS group has not elected to deploy this feature but that is a customer choice. If the City of Milwaukee requires this feature it can be deployed on the OASIS network for City of Milwaukee users. Joining OASIS could be 50% less expensive than building a new P25 system

MYTH: The City of Milwaukee has invested 'in BeOn, allowing radios, phones, tablets, and computers to operate natively on our radio system. This feature would go away if moving to OASIS.

- BeOn will also have the ability to extend the range of the public safety radio system by using LTE (FirstNet or Verizon) or WiFi (Cradlepoint, etc...).

FACT: OASIS has implemented Critical Connect. Critical Connect is a simple to use Broadband interface. It already supports LTE (FirstNet or Verizon) and WiFi. In addition to enabling smartphones and tablets, it also enables SmartConnect on equipped radios. Motorola Solutions SmartConnect is the only solution that allows equipped radios to roam to and from broadband networks with NO intervention from the radio's user. The City of Milwaukee should take another look at BeOn vs critical connect. **Milwaukee's neighbors can explain that critical connect is the only technically feasible way to roam without user intervention.** This perception is not based on fact.

MYTH: We have explored in detail the possibility of moving onto the County P25 Phase I OASIS radio system. It does not make sense financially or operationally to do so: :

- The City would
 - Incur a significant annual user fee (forever) to move to a now antiquated technology,
 - Still have to purchase new radios (and potentially dispatch consoles),
 - Have to operate on a radio network designed for outdoor coverage across a wide area (as opposed to indoor coverage in a densely packed urban-area .
- The Milwaukee Police Radio Shop would continue to function if the City moved to OASIS, therefore it has no vested interest in any specific paths forward.

FACT: Every point above is a misconception;

- **The data presented to the city to come to this conclusion is false. The city needs to pause and reexamine the extraordinary value Oasis would offer technically, fiscally and from a user standpoint.**
- P25 Phase I is certainly not antiquated, it is part of the currently accepted standard. OASIS can support Phase II today, the customer has not elected to implement that option. If the City of Milwaukee wants to join OASIS and use P25 Phase II, OASIS can accommodate that with no impact to any current users. That upgrade is reflected in the previously mentioned \$8 to \$20 million cost estimate that is half the city's budgeted amount developed with L3Harris in mind.

MYTH: L3Harris P25 Phase II is Milwaukee's only path forward:

- 14 Linear Simulcast Sites with public safety grade microwave / fiber backhaul
 - No roaming between sites, always on n L3Harris Radios
 - MFD – XL-400p, NFPA 1802 radios n MPD / DPW –XL-95p
- All vehicles –XL-200M multiband radios
- All radios can support up to 255 separate systems (Can be on bAKE, OASIS, WISCC)M, etc...)
- in-Band GPS for enhanced member safety and situational awareness
- Native system roaming with ISSI (OASIS, WISCOM) .
- Not "rigged" to work like today, actual roaming between systems.

FACT: All of these capabilities are available on OASIS for approximately half the cost as L3Harris. The exception being the city does not have to deploy 14 Linear Simulcast Sites. OASIS already meets the coverage requirements and can save the city and it's taxpayers 50% or more.

NOTE: Harris was reprimanded by the National Fire Protection Agency for calling the XL400P NFPA certified, misleading fire departments across the country. Furthermore, the XL400P fails in EVERY head to head battle with another vendor's radio built specifically for the fire service. The city should consider a head to head test to let the facts come to light

MYTH: System frequencies will move to 700 MHz

- Better in building penetration
- Longer range
- Less noise from surrounding agencies
- Nearest 700 MHz users are Washington County

FACT: It is unclear why the City of Milwaukee is migrating to 700 MHz unless there is an issue with the L3Harris equipment. Both the 700 and 800 MHz bands are structured and managed the same way by the FCC. They are both set up with guard bands to prevent interference between transmit and receive. They both require contour studies to be completed to guarantee no co-channel interference. The only difference between the two bands is the 700 MHz band has more restrictive (less power than 800 MHz) effective radiated power restrictions.

MYTH: Coverage Requirements

- L3Harris was held to the highest level of requirements
- 90% (or more) of the coverage requirements were driven solely from the Milwaukee Fire Department.
 - Fire Shared Services has the potential to respond anywhere in Milwaukee County
 - Police / DPW do not typically respond outside the City of Milwaukee
- Radio Coverage Requirements were defined as follows:
 - Portable indoor Talkback with 20db penetration loss
 - Typical P25 systems are spec'd to 12db penetration loss

- Every 3db is either double or half the amount of power. 3db +3db ; doubling power
- Portable Indoor Talkback was chosen because if the radio system can't hear the end user, it doesn't matter how far the system can cover.
- Many coverage maps show system talkout (how far it can reach), this is deceiving and in practice is not useful information.

FACT: The truth on coverage:

- **Coverage predictions and designs should be designed to the TSB88 standards. The city needs to investigate this point further - Harris has a history of straying from TSB 88 resulting in millions of dollars in change orders to meet the desired coverage.**
- Other Vendors use a preferred methodology that shows worst case coverage prediction maps. There are rare instances where a portable can talk into a system (talkback) but the dispatch cannot talk out. It is also critical that simulcast interference be taken into consideration in coverage prediction, these areas should be shown as non-coverage areas. This is standard practice on coverage design by this vendor.

MYTH: Coverage Requirements, designed for:

- Critical Buildings
- Fire Houses
- Hospitals (in and out of Milwaukee)
- Police Districts
- DPW Locations

FACT: OASIS has been designed to work and tested to work in all of these critical locations as well as many areas below ground, such as:

- Subterranean Parking Garages
- Basement of City Hall, specifically in the lower restaurant
- Lower levels of the Fiserv
- Lower levels of many of the city's hotels
- Schools and Colleges

MYTH: Milwaukee Fire Department Radios

- L3Harris XL-400p
 - Designed to NFPA 1 802 Standard
 - A real firefighting radio
- L3Harris sent the engineer who personally designed the XL40C)p to the
- Milwaukee Fire academy twice for testing and improvements.

FACT: Another Vendor is on their 4th generation of radio designed SPECIFICALLY for the Fire service. **And yet in head-to-head testing customers are choosing this other vendors radio over the L3Harris Radio designed to meet the NFPA 1802 Standard**

NOTE: The NFPA 1802 Standard only requires Intrinsically Safe Division 2 certification Despite that the other vendor has radios that meet both Division 1 (1 Model) and Division 2 (4 models) including one radio currently in testing to receive NFPA 1802 certification

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MYTH: Milwaukee Fire Department Radios

- Loud and clear audio with industry leading noise cancellation
- Redesigned rugged remote speaker mic
- Eliminates water-logging issues notoriously with XG model radio mics.
- Glove-friendly operation and large emergency button
- Expanded top display with unique Visual Zone Indication

FACT: In head to head testing customers continue to prefer another vendor's radio which has superior audio noise cancellation.. This other vendor was the first to bring all of the features above and more to the fire industry and is on their 4th generation radio specifically designed for the Fire Market.

MYTH: XL-200M Multiband Radio

- L3Harris flagship model
- Multiband
- Supports LTE / Wifi
- Integrated Speaker in Control Head
- Custom designed interface with
- Pyramid Vehicular Repeater (VR)
 - Provides Scene Of Incident (SOI) coverage, integrated into the P25 Trunked Radio System
 - FD currently uses V-TACs, V-TACs do not exist in P25.
 - VR will provide the same coverage and potentially more functionality.

FACT: Another Vendors DVRS solution far outperforms L3H's solution with Pyramid.

L3H has backed out of (or protested) numerous opportunities where there was a DVRS emphasis stating that it favored the other vendors superior technology. Virginia State Police was just faced with a similar choice - Milwaukee can call them. The other vendors DVRS was found to be far superior than Harris and Pyramid. That vendor offers two vehicular repeater options, one simplex and one full duplex. Both units offer:

- Scanning while in VR mode
- Pass through of all trunking function from the portable to the system and system to portable these include
 - PTT ID
 - EMERGENCY
 - Call Alert
 - Private Call
 - And many more