

**P25
BEST PRACTICE**

FIRST STEPS TO YOUR P25 SYSTEM

tait
communications



Who should read these guides?

If you are a Public Safety official who is responsible for, or involved in, procuring a new communication system, this guide (and the others in the series) is written for you. You may be new to the position, or focused on other disciplines, such as IT. Or you may be new to P25. We assume that you have an understanding of Land Mobile Radio, but not necessarily in-depth knowledge.

We also assume that your interest is pragmatic; you want to make sure you procure and/or manage your radio system to meet the needs of your first responders and public service providers in a fiscally-responsible way. Becoming an expert on all related topics is not your objective.

We hope these guides will benefit you and your wider Public Safety Communications community by presenting you with a range of P25 topics so you can more effectively engage in the process.

The decision to adopt the digital open standards-based P25 platform offers Public Safety agencies many benefits, but it also raises a lot of questions. There are many common questions - and there a lot of agencies who have already tackled them, who are happy to share their experiences.

Tait is sponsoring an on-going project, to discuss these topics and put forward some answers.

Over a series of intensive round-table sessions, our participants discussed their own experiences and challenges, generously sharing their frustrations and triumphs. Together with Tait expert advice, these guides include their many valuable insights, based on their hands-on experience working through typical P25 project challenges.

Learn more and subscribe to future guides at
www.p25bestpractice.com

FIRST STEPS TO YOUR P25 SYSTEM

- Where can you turn for expert advice?
- How do you decide whether to upgrade or replace?
- Who are your stakeholders?
- How do you conduct a needs analysis?
- Where can you go to seek funding?

In most cases, the decision to undertake a project will be forced on you by external circumstances. For example, receiving an End of Life letter from your vendor means you cannot maintain the status quo for an extended period of time, even if your current system is performing to everyone's satisfaction. Administrative changes – the need to expand/improve coverage or increase system capacity – may also force you to consider replacing or upgrading your system.

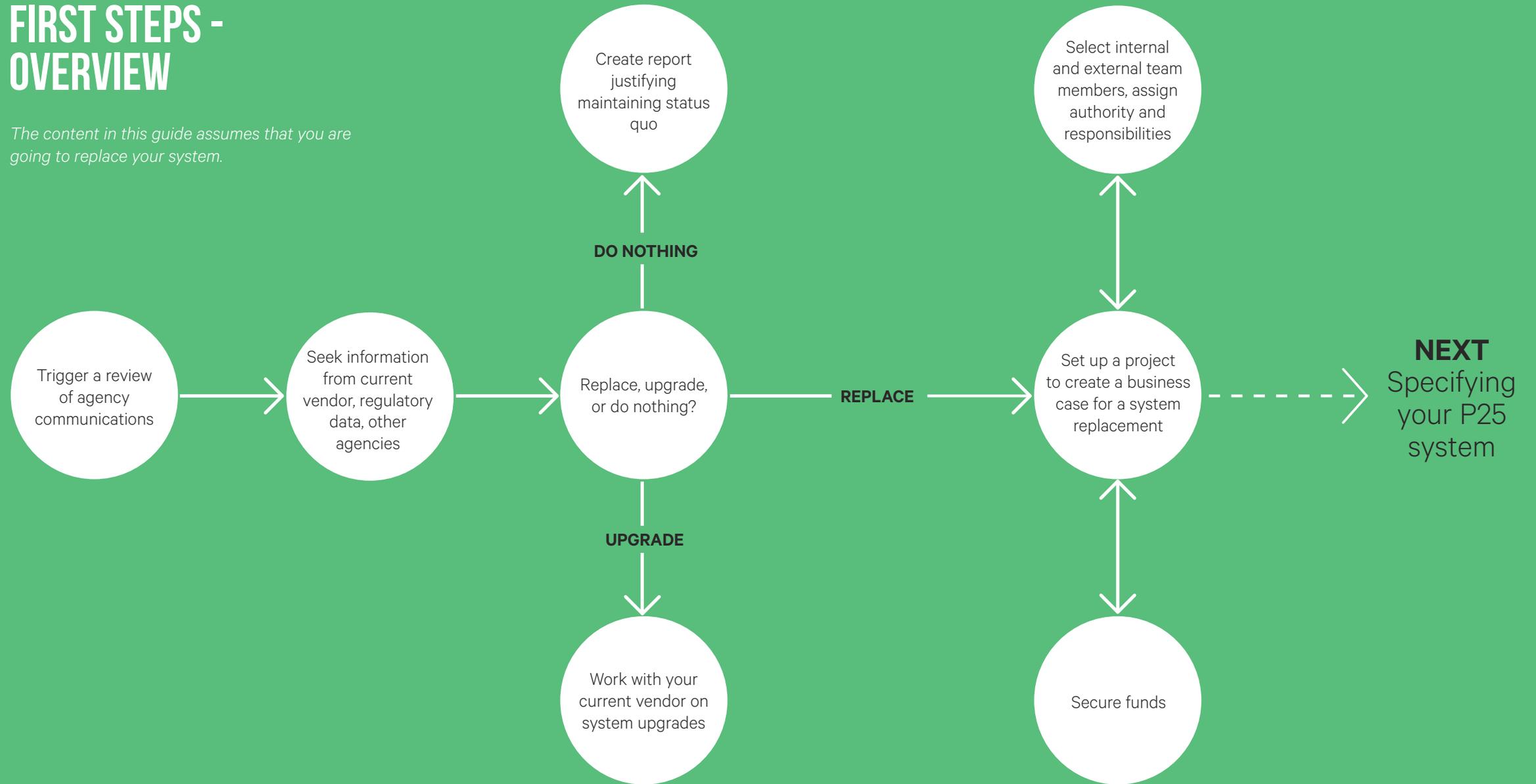
Which way to go? This guide outlines some vital steps you can take right now, that will help you make the myriad decisions that lie ahead, and ensure your project runs smoother. Arm yourself with the right information and the right people from the beginning...

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FIRST STEPS - OVERVIEW

The content in this guide assumes that you are going to replace your system.

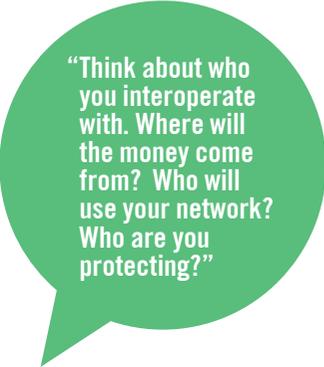


IDENTIFY YOUR PROJECT STAKEHOLDERS

Identifying and involving all your stakeholders early is critical to your project success. Their opinions must be represented so that the future system meets their needs. They need to be consulted and informed throughout the project so that they can properly prepare for the change, and embrace it.

Here is a typical list of stakeholders for a Public Safety Land Mobile Radio project:

- ✓ Radio users (first responders, public services and other group representatives)
- ✓ Dispatchers
- ✓ System administrators
- ✓ Technical personnel (internal employees, dealers, manufacturers)
- ✓ User agency leadership
- ✓ Local politicians/administration
- ✓ Representatives of external agencies with interoperability or mutual aid agreements
- ✓ In some cases, the local media



DEFINE YOUR PROJECT SCOPE

Decisions used to be easy in the world of analog conventional systems – just add channels/base stations when and where needed, at the existing or new radio sites, maybe re-program some radios, and you were done.

With the advent of digital networks and wide area trunking technology, the answer is no longer so clear. Ever-increasing technical complexity and continuous competition make the situation even more challenging. Even ball-park estimates for your options may be very difficult to obtain.

Replace or upgrade?

At first sight an upgrade (incremental changes in hardware, software and licensing) sounds easier and cheaper, but a closer look may reveal that first impression to be false.

- Your incumbent vendor is unlikely to offer you best pricing unless competitively challenged.
- In some cases, the quantity of hardware and software upgrades needed to bring your system to the next platform may be so significant that the cost may be higher than starting anew.
- Be wary of requirements for dual mode (old proprietary and new open standard) subscriber radios – that requirement alone may be more costly than a complete new network and new subscriber units.

- Some proposed upgrades and migration plans may be an attempt to replace your system – forklift style – while avoiding the competitive process. This is especially true where older proprietary systems are concerned.

It is tempting to simply let your incumbent vendor upgrade your existing system. However, upgrading via non-competitive purchase is only recommended under very specific circumstances, such as:

- your current system is performing very well,
- current running costs are acceptable,
- you have a good relationship with your vendor and local service provider,
- you do not require significant capacity expansion or improvement, or
- you need only small incremental changes (such as adding a site, a channel, a software feature).

If all of the above conditions are true for you, you may be better off talking directly to your current vendor, manufacturer, dealer or system integrator. Otherwise you should prepare for an open procurement process.

But more often, replacing your system will lead to better technology, which is also more cost-effective in the long run.

Join an existing large system?

As a stand-alone system owner, you may be under pressure to join larger, typically state-wide, systems. Should you?

In some cases the answer is simple. Larger systems operators are aware of the financial uncertainty these arrangements can bring, and can sometimes offer irresistible incentives, such as:

- excellent system performance and functionality,
- low maintenance cost,
- excellent technical and logistical support,
- low initial investment,
- sophisticated interoperability options,
- even generous financial credits that enable you to use the system subscription-free for several years.

Unfortunately, not all large systems are equally well run and well financed. You risk relinquishing local control over your own system while submitting yourself to inferior services, obsolete technology and the potential for unpredictable cost increases.

The most important considerations are governance and financing. Is the system operated and financed in a way that gives you a high level of confidence in its ability to

provide reliable performance to your first responders, at a reasonable and predictable cost?

No Public Safety official can vouch for elected officials and future decisions, including those impacting system performance and costs. But a system that is performing well and financed well is your best indicator of its future performance. Such a system is unlikely - though it cannot be guaranteed - to experience disruptive changes or pose insurmountable budgetary challenges.

Ultimately, as a decision maker you must satisfy yourself that you are thoroughly informed so that you can weigh up the benefits and risks of any agreement you enter into.

“A combined system provides increased resources as backup.”



“ISSUES AROUND COOPERATION INCLUDE LOSS OF AUTONOMY AND CONTROL. YOU NEED TO COMPENSATE WITH GREAT REPORTS, ALARMS, RESPONSES AND REDUNDANCY.”

Do nothing?

Doing nothing is rarely an option. However, occasionally such a decision can be justified. For example, the call for change may be prompted by an extraordinary failure of a system that otherwise is performing to the satisfaction of the users. If the reasons for failure are fully understood and easily remedied, maintaining the status quo is fully justified.

Perhaps an antenna system failed during a major storm as a result of lightning damage. While the public, the media and politicians might call for drastic change, no technology can provide 100% immunity against to the forces of nature and all technologies are vulnerable to some external factors. In this case you should write a report explaining what has happened and justify your course of action – immediate remedies and long term options.

Another hypothetical situation may be the desire of local leaders to load your system with hundreds of additional non-first responders. You are running a proprietary technology system with expensive subscriber units and all subscriber needs are met. Expanding your system to accommodate additional users is likely to be much more expensive and disruptive than building a separate, low-cost network for them. Write a simple report explaining your recommendation providing some budgetary comparison.

SET UP THE PROJECT

Once you have investigated the positive and negative aspects of upgrading or replacing your system, and the decision to replace your system has been made, the corresponding project management process basics must be addressed. This should cover all aspects of generic project management practices.

- ✓ Identify team members – you need representation of your local Public Safety leadership, purse holders, system users and technical experts.
- ✓ Define the project objectives (results, timeline, budgetary assumptions).
- ✓ Allocate responsibilities and authority.
- ✓ Establish clear guidelines on the basics of your project communications (who, what, when and how often).

You should consider using well-established Project Management concepts, such as those developed by Project Management Institute (PMI), right from the beginning of your project. These processes and guidelines will provide you with valuable checklists to ensure that you do not overlook any important aspects.

WHY USE CONSULTANTS?

A critical decision to make up front is whether to use external consultants. A good consultant will save you time and money, as a value-add member of your team.

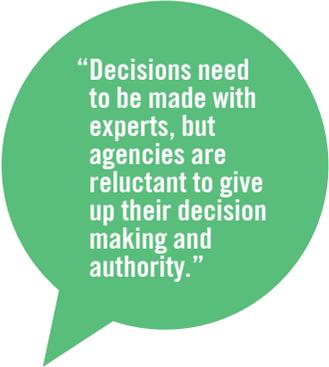
Having gone through several similar projects a good consultant can help you avoid costly and troublesome mistakes in every aspect of the project, from basic logistics to important technical details. They can:

- provide a broad technology perspective,
- identify future technology trends,
- bring in more competing vendors, thus lowering the cost of the project,
- cut through internal political tensions and provide objective views and recommendations,
- add credibility to your project,
- help in vendor negotiations.

For example, even in the early stages of your project, a consultant will have enough experience and current market data to easily and quickly help you with the replace/ upgrade/do nothing/join a larger system question.

So unless the scope of your project is very limited, or your internal resources include someone with recent and broad system replacement experience, the strong recommendation is to use a consultant.

However, consultants are not cheap. It takes some time, money and effort to find the appropriate expert for your needs and then to set him/her up in the most effective way.



“Decisions need to be made with experts, but agencies are reluctant to give up their decision making and authority.”



**“USING A CONSULTANT
DEMONSTRATES
TO YOUR
STAKEHOLDERS
YOUR DUE DILIGENCE
WITH PUBLIC
MONEY.”**

HOW TO CHOOSE A GOOD CONSULTANT

There are dozens of consulting companies active in the Public Safety Land Mobile Radio market. Many enjoy a very good reputation, so finding a good consultant should not be difficult.

With the help of your internal procurement or purchasing experts, write and publish a simple RFP describing the scope of the project and listing the areas where you feel you will need help. Do not worry about being 100% accurate - one of the marks of a good consultant is the ability to independently evaluate your true needs and identify where their assistance is needed. The responses you receive should clearly separate the qualified experts from their weaker competitors. Pay close attention to the content related to your specific project, as the majority of typical bid responses provided by consulting companies are templates. An impressive generic template does not guarantee that the appropriate experts will be assigned to your project.

Once you produce a short list of potential consultants, make sure to check their references. Talk to the people you know first, but do not hesitate to call on strangers as well. You will be able to learn a lot about the consultants, who may prove to be the most significant resource on your project.

It is customary for consulting companies to present specific people for your project and you should demand specific names. Make sure that the people you evaluate in the proposals will actually be working on your project. While “bait and switch” practices are not common, consulting

companies constantly juggle their people and projects and you need to make sure that you get the expertise you need, instead of just a headcount.

Last, but not least, make sure your preferred consultant has a history of awarding projects to a diverse range of vendors. Distribution of awards reflects the reality of the market which is dominated by one vendor; that is to be expected.

However, selecting a consultant who consistently awards projects to one company may be worse than bypassing the competitive procurement process and working directly with that vendor. Why? Even before the “competitive” process begins, you may end up paying for the consultant’s services, while signalling to the preferred vendors that they are in the driver seat.



“Develop a relationship with your consultant – it is important to talk through your concerns as peers.”

SECURING FUNDS

Buying a new system is likely to be a significant investment in time and money. So it is important to identify - and preferably secure - the necessary funding early.

- ✓ Early project cost estimates can be based on similar projects or be provided by consultants.
- ✓ The estimates should include towers and antenna systems, switching equipment, backhaul, dispatch, base stations, shelters, all related services, internal or external.
- ✓ Find out about grants from vendors, state agencies, consultants.
- ✓ For multi-agency and multi-jurisdiction projects decide early the rules for dividing the upfront and on-going costs. Per user or per use fees are considered the fairest approaches, but none are perfect, which is why it is important to discuss and settle the cost sharing issues early.
- ✓ Keep accurate track of how you spent grant money. The documentation will be required to close the project.

“Hiring a grant writer should pay for itself within a year.”



STATUS QUO ANALYSIS

Before you can decide where you want to go with your communications, you need a clear understanding of where you are now. A good description of your current system will serve multiple purposes.

- ✓ It will help prospective vendors understand the gap between where you are and what you need.
- ✓ It will identify elements of the system that can be re-used in the future network, thus lowering your cost.
- ✓ It will provide good input for cutover/migration planning.

Unfortunately, most Public Safety organizations have only limited records of their current systems, and these are rarely available in one document. As you enter the upgrade/replacement process, gather together everything you can, and start a self-documented system audit as the basis of your RFP.

Here are the basic types of system information your potential vendors need to see:

- FCC and other applicable licensing documentation,
- models of RF base stations (repeaters),
- locations of existing and potentially-available radio sites,
- tower heights and locations,

- antenna types and locations,
- backhaul (fiber, microwave, other) and capacity/performance characteristics (include type/model number, configuration, for microwave),
- number and types of subscriber radios (mobiles, portables and stationary units) and which are P25-capable,
- dispatch center description,
- dispatch center equipment (consoles, instant recall recorders, logging recorders, CAD, phone system),
- power (main and back-up) at RF, administrative and dispatch sites,
- space availability at site shelters and other equipment locations,
- current alarm and monitoring systems.

Don't overlook information sources that may have been prepared for other purposes. For example, most systems have undergone narrow-banding (in UHF and VHF) or re-banding (in 700 and 800 MHz bands) efforts. The documentation that supported these processes may include information your vendors will be interested in.

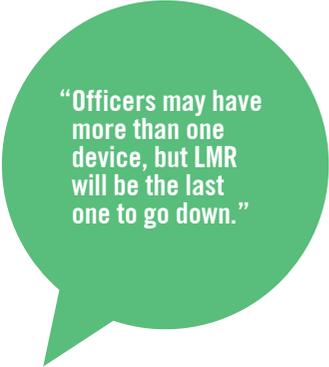
TICPs (Tactical Interoperability Communications Plans) have been developed for every county in the United States in recent years. Similar documents should

have been prepared at state level, and usually contain significant detailed information.

Gathering together as much information as possible will improve the quality of the proposal responses. Once the bid is published, site visits give the vendors the opportunity to evaluate your sites, locate additional information to assist their response and request any information they do not have. These visits are also your opportunity for you to place the responsibility for accurate design on the vendors.

Subscriber and system information should be - but is generally not - well maintained. Supplement your existing documents with these additional system audit activities.

- ✓ Conduct interviews with team leaders to provide indicative fleet counts.
- ✓ Download 365 days of system activity for a guide to your current use and requirements.
- ✓ If you have no activity data, start monitoring your current use today.
- ✓ Create coverage maps showing problem areas.



“Officers may have more than one device, but LMR will be the last one to go down.”

System Operational Description

It will also be helpful to prepare your system operational description – how it is actually used. This will include:

- ✓ individuals and groups who must interoperate,
- ✓ dispatch operations, process and applications,
- ✓ data technologies and applications (integrated voice and data, stand-alone narrowband data, broadband data cards; GPS/AVL, SMS, database searches)
- ✓ security (encryption, asset management, call logging)
- ✓ call prioritization protocol,
- ✓ interoperation procedures and agreements with outside agencies and organizations,
- ✓ emergency procedures,
- ✓ paging operations,
- ✓ alarm reporting procedures.

What else?

For your own benefit you should also gather and document some additional information about your organization and current situation, especially your resources and constraints. These may include:

- internal and external costs of running your current system,
- any revenues - for example leasing part of your backhaul to other entities,
- budget information – available and potentially available funds,
- human resources and assets involved in managing and maintaining your current and future system (vehicles, computers, test equipment, spares),
- all agencies using the system,
- non-technical licenses and permits; relevant environmental studies,
- resource sharing agreements,
- interoperability and mutual aid agreements.



NEEDS ANALYSIS

A very important stage of the project brings together the needs of current and future users. This stage is often ignored because the core team assumes to have a very good understanding of how the system is used and what the shortcomings are.

This, however, is often not the case; the understanding is often overestimated. Your users may believe that what they need is not available and your core team may believe that what is available is not needed.

Here are some common factors that limit understanding:

- ✓ Your users do not know what the radios and the network are capable of, and get by without the available functions.
- ✓ The core team may not be aware of the currently available functions.
- ✓ Users may accept some interference, coverage weak spots or routine capacity limitations without complaining about them.
- ✓ The core team is unlikely to be fully aware of all operational details in all involved departments.

Ideally, an experienced consultant will gather and analyze the opinions of all relevant stakeholders. Gathering inputs can be achieved by informal discussions, formal interviews, group workshops, and written questionnaires. Whatever method you choose, your questions should be open, consistent and simple, to avoid any confusion. For example:

- What are the current system/equipment shortcomings?
- What are the problems that you most often experience?
- What would help you do your job better/faster/easier?

The needs analysis should not, however, be limited to the system users. It is very important to identify all current and future stakeholders early in the project and make sure all of them have a sufficient opportunity to have valid input into the process.



“Consider timing, interoperability, decision making and operational responsibilities, shared resources and funding.”



“KEEP AN OPEN
MIND TO FUTURE
TRENDS 10 - 20
YEARS OUT.”

ACQUIRING ADDITIONAL SPECTRUM

Unfortunately spectrum is finite and additional radio spectrum in desirable frequencies can be hard to acquire. If you suspect you need additional channels, securing more operating frequencies is an important part of preparations.

- ✓ Find out what is available/usable in your region. The best place to start is your state's APCO frequency coordinator.
- ✓ Consider 700 and 800 MHz if you are frequency-constrained - it is open and widely-available in many locations.
- ✓ UHF and VHF bands are less straightforward. The licensing processes and frequency coordination for trunking in particular, require significant effort and can be very time-consuming.
- ✓ Partners bring more frequencies! Good planning and system sharing brings more spectrum for all.

“Helping First Responders to communicate is the sole reason we are here.”

“When you have to purchase your spares on EBay, you know it is time to upgrade.”

“Involve I.T. as consultants, not stakeholders.”

“Keep an open mind to future trends 10-20 years out.”

“Choose your stakeholders carefully and keep them close throughout the process.”

“Involve dispatchers in the selection – they want certain things which vendors need to consider.”

“It can be tempting to go for fancy technologies and protocols, but often simple solutions are better.”

“While high spec power tools are great to have, if you only have to saw some wood or drill a hole occasionally, hand tools will do the job just fine.”

“Involve your finance people early – they need to support your decisions with CAPEX and OPEX.”

“Question your vendor’s independence!”

“Who are the neighbours? What are they using?”

INSIGHTS

All quote bubbles are direct insights from the industry participants at the Tait P25 round table discussions. To find out who the participants were, visit www.p25bestpractice.com

Once you know what you want to accomplish with your project and have a reasonable idea how the related processes will work, it is time to gather the fundamental information that will allow you to prepare system specifications and project requirements.

For information and best-practice advice about the specification phase of your project, see “Specifying your P25 System” available now at...

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