



MOTOROLA POSITION PAPER
APX 7000XE DESIGN



WHEN IT COMES TO YOUR SAFETY, WE GO TO THE EXTREME.



IT'S NOT JUST A LINE OF COMMUNICATION. IT'S YOUR LIFELINE.

We understand you need a mission critical radio that performs in the most extreme environments. Whether you're reporting from a smoke-filled structure or listening to instructions over the ambient noise of equipment or apparatus, we know fire doubles in size every 60 seconds and one second can make all the difference.

How do we develop a new generation of mission critical technology that is more intuitive and glove-friendly, significantly louder and clearer? So that every time you turn a knob or talk to incident command – particularly under stress – communicating becomes second nature.

Motorola designed the APX™ 7000XE two-way radio to meet the specific needs of firefighters. We created a tough as nails portable that is safe, easy and efficient to use.

DESIGNED TO HELP YOU DEAL WITH THE ROUTINE AND THE EXTREME.

No one knows the challenges of communicating better than those working a fire. That's why firefighters' needs drive our design process. A two-way radio that is difficult or distracting to operate can cause you to take your mind off the mission.



Under calm conditions, a radio might be easy to operate, but in a high-stress situation, performing anything complex can be almost impossible. In a room of intense heat and heavy smoke, there isn't time to search for the push-to-talk (PTT) button or risk a burn to remove a glove to select a channel. What's more, high stress can "situationally disable" even the most experienced responder.¹

Our challenge at Motorola is to create solutions that help you succeed in both high and low stress situations and survive the harshest environments. Looking at how firefighters use radios under stress is a science we pioneered, and this science of high velocity human factors plays a pivotal role in helping us develop the APX portables.

¹ Recent studies show that due to their demanding and high stress work environment, firefighters can temporarily experience functional limitations. These limitations or situational disabilities can have a detrimental effect on their ability to communicate to each other and to incident command.

WE WALK IN YOUR BOOTS TO UNDERSTAND YOUR EXPERIENCE.

IMMERSION

We undertake an unusual approach to designing safe and best-in-class ergonomic products that shape the market and lead the industry. More than sketches in a studio, Motorola designers, researchers and engineers ride the apparatus, wear the gear, carry the equipment and go into the smoke-filled environments of live-fire training. This full immersion in understanding typical fire response behavior helps us model how firefighters throughout the world use their radios.

OBSERVATION

Then we dig deeper and study how firefighters actually act and react during varying extremes and how this differs from their daily routine. Our team utilizes a multi-disciplinary approach to create products based on this behavior – integrating concepts from industrial design, ergonomics, cognitive psychology, physical and cultural anthropology and clinical psychology.

EXPLORATION

During our interactive design process, firefighters engage in participatory sessions, off site, at their workplace and in the Motorola Design Lab. A variety of exercises, like hands-on 3D modeling, lets them define the radio features and physical characteristics they consider most important, such as glove-friendly controls and the location of displays.

PROTOTYPE

This exploration in 3D modeling results in many choices for the radio's final design. We produce a number of prototypes and ask firefighters to use them in simulation. This is an important learning stage where key observations are made and turned into workable ideas and potential solutions.

EVALUATION

Finally, we test, refine and retest to make sure we've addressed firefighters' requests – from better tactility with heavy gloves to stiffer knobs that prevent accidental activation. Audio, voice and usability tests are just the beginning of refinements we make before you ever hold an APX radio in your hand.

TEAMWORK THAT WORKS TO CREATE A NEW GENERATION OF RADIOS.

We asked firefighters from Miami to Malaysia what they wanted in a mission critical radio specifically for their environment. Here's what they said mattered most:

- A louder radio for clear communications in high-noise situations.
- A larger display that can be viewed looking down or at an angle.
- The ability to be clearly understood while talking from and in extreme noise environments.
- Glove-friendly controls that are big, recognizable and easy to use.
- A smaller size multiband radio that is the smallest and lightest in the industry.

- No compromises on the quality, durability and reliability they expect from Motorola.

When firefighters said they wanted a larger display and exaggerated controls but in a smaller radio that sounded contradictory – we viewed it as the ideal challenge. The APX 7000XE brings together their priorities with our eighty years of experience in ergonomics, design and technology for public safety. It is the culmination of cross-disciplines and user input.

Working together with firefighters around the world, we have designed and delivered the first mission critical two-way radio specifically designed for personnel safety in extreme environments.

APX 7000XE: EVERYTHING FIREFIGHTERS ASKED FOR.

At first glance, the APX 7000XE is unquestionably a rugged, mission-ready radio. Yet some of its most remarkable aspects come from questioning traditional thinking. That is why every feature and function of the APX 7000XE has been designed with your safety in mind; from best-in-class audio, to industry leading ergonomics, and advance features such as intelligent lighting and voice announcement. All innovative features that make the APX 7000XE an ideal fit for the fire service.



EXAGGERATED CONTROL TOP

Firefighters told us it was difficult to access one knob without accidentally adjusting the other. Drawing on the innovative T-grip design of the APX 7000, the APX 7000XE has a significantly larger and wider control top designed specifically for gloved hands. We designed larger knobs for volume and channel selection, with more room between them to prevent inadvertent activations.

GREATER DEXTERITY WITH GLOVES

Firefighters often operate their radios by touch alone, mentally counting “clicks” while changing channels. We’ve distinguished the APX 7000XE knobs by tactility or touch. Not only is the volume knob angled, it now has a continuous high-resistance “feel” that is different than the feel of the channel knob.

50% LOUDER AND CLEARER

Volume is the most frequently-used control on any radio and the APX 7000XE honors this fact. It's 50% louder than traditional two-way radios without distorting or degrading communication. Now firefighters can hear clean, clear sound from virtually any angle. With a powerful 1 watt speaker, the APX 7000XE won't wash out from background noise, like the high-pitched alarm on an SCBA or the whine of power saws on the fireground.

EXTREME ENVIRONMENT AUDIO PROFILE

Reducing background noise is essential for communications and the APX 7000XE has the latest Noise Reduction software especially for loud environments. With the ability to use dual microphones for noise cancelation and the latest audio signal processor our Extreme Audio Profile makes sure firefighters can transmit clearly and effectively – whether standing at a pump panel, wearing an SCBA or speaking while a PASS alarm is sounding.

ENLARGED TOP DISPLAY

We placed this display on top, angled it for easier viewing and made it much larger. Now firefighters can see the radio status and channel/zone information at a glance, without removing the radio from their turnout gear. The top display is so large, it's double the size of the APX 7000 display.

SHIELDED PUSH-TO-TALK (PTT) BUTTON

Using a thumb, multiple fingers or gloved hand, the exaggerated PTT button makes communicating even easier. Ramps on either side help firefighters locate the PTT button by "feel" alone, while a green ring around it provides an extra visual cue, especially in low light. And if the radio is dropped, the ramps help prevent accidental activation.

X-LARGE EMERGENCY BUTTON

We pioneered the emergency button at the base of the antenna so firefighters could quickly locate it.

Now we've improved our innovation, making this lifesaving button the largest and most accessible on the market.

BETTER, SURER GRIP

Minimizing distractions and maximizing control is critical in response. So when firefighters asked us for a better, firmer grip of the device, we added rubber nibs on the back to secure it from slipping. The "grip zone" on the radio's body improves coordination and control.

MULTI-BAND INTEROPERABILITY

Meeting public safety specifications for multi-agency collaboration is key to a timely response. The APX 7000XE operates in any two bands seamlessly so firefighters can reduce the equipment they carry and be confident their communications are truly interoperable when they need it most.

YOU DESERVE THE RADIO THAT IS DESIGNED TO KEEP YOU SAFE.

You told us what you needed and we listened. A rugged, designed-for-how-you-do-business, two-way radio that stands up in the most extreme situations – as fire burns, smoke pours and multiple PASS alerts scream. The APX 7000XE is about using our knowledge, design leadership and technological innovations to collaborate and create a solution so firefighter-focused, it's unlike any radio you've ever

used. Yet so intuitive, it's everything you expect a radio to be.

By listening, observing and inventing solutions like the APX 7000XE, you can focus on the task instead of the technology – and focus your time on fighting fires rather than fighting with the radio. Together we are creating the radios that are second nature to use – with reliability that is second to none.

TECHNOLOGY THAT'S SECOND NATURE™

The APX P25 Multi-Band Radios are part of the Next Generation Public Safety Mission Critical Portfolio of products that offer seamless connectivity between first responders. Motorola puts real-time information in the hands of fire and emergency service personnel to provide better information that enables better decisions for better outcomes. It's Technology That's Second Nature.

APX P25 MULTI-BAND RADIOS

Additional information and resource such as product information, 360-degree product tours, brochures and white papers are available on the APX product website at motorola.com/apx.

www.motorola.com/apx



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