AGENDA

- Westchester System Migration
- Firefighter Solutions
  - New Radio System Technology
  - Capabilities for Fire & EMS
- Firefighter Mobile and Portable radios
SYSTEM MIGRATION

SMARTZONE LIFE CYCLE
• Smart Zone started shipping in early ‘90s. Last shipped system: 2005
• Most Radio Infrastructure Will Reach End of Life DEC 2018
• Motorola Actively Pursuing Spare Parts for Westchester Support

SMOOTH TRANSITION TO PROJECT 25 SYSTEM (ASTRO 25)
• Use of Motorola SmartX Migration Tool to allow:
  – Reuse of existing UHF site equipment to new master core
  – Continue to use Existing Fleetmap and Talkgroups
  – Mix Smart Zone and new ASTRO subscribers in same talkgroups

FREQUENCY CONSIDERATIONS
• New ASTRO 25 Master Core Supports:
  – VHF Conventional
  – Both UHF and 700 MHz Trunking
18 Motorola P25 7.0 Trunked Systems

15 Motorola SmartZone & Conventional Systems
MOTOROLA P25 TRUNKING SYSTEMS (US)

- 600+ ASTRO 25 TRUNKED SYSTEMS
- 700+ LEGACY RADIO SYSTEMS
### FIRE DEPARTMENTS ARE FACING CHALLENGES

| **BUDGETS AND STAFF REDUCTIONS** | Smaller workforce must be used more efficiently for acceptable results
|                                 | Firefighters may need to take on further responsibility such as EMS training to manage reduced headcount |
| **FIREFIGHTER SAFETY**           | Safety in transport to and from incident must be priority |
|                                 | Less resources means increased firefighter responsibility and hence more stress and exertion |
| **INADEQUATE EQUIPMENT**         | 65% Of firefighter radios lack water resistance |
|                                 | 39% Of fire departments lack enough PASS devices to equip all personnel on shift |

*Sources: NFPA Needs Assessment Survey 2010*
MISSION CRITICAL FIRE & EMS COMMUNICATIONS

COMMUNICATIONS FOR A CHANGING PUBLIC SAFETY LANDSCAPE

ANALOG TO DIGITAL MIGRATION
INCREASE COVERAGE AND IMPROVE AUDIO WHILE ENSURING THE HIGHEST LEVELS OF SECURITY, DATA ACCESSIBILITY AND INTEROPERABILITY

PURPOSE BUILT DEVICES
DEVICES ABLE TO WITHSTAND THE PUBLIC SAFETY ENVIRONMENT FROM THE FIELD TO THE OFFICE HAVE BECOME CRITICAL TO SUCCESS IN THE FIELD

INTEROPERABILITY
ENABLING A COLLABORATIVE ENVIRONMENT THROUGH VOICE AND DATA COMMUNICATION OVER MULTIPLE NETWORKS AND BETWEEN MULTIPLE AGENCIES ENSURES SUCCESSFUL INCIDENT RESPONSE
IMPROVED AUDIO QUALITY

- Digital Audio Quality
  - Strong Signal Strength: Good Audio Quality
  - Weak Signal Strength: Poor Audio Quality

- Analog Audio Quality
  - Strong Signal Strength: Good Audio Quality
  - Weak Signal Strength: Poor Audio Quality
IMPROVED COVERAGE

Radio Coverage comparison for analog vs. digital
MISSION CRITICAL FIRE & EMS COMMUNICATIONS

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ASTRO® 25 SYSTEMS
INTEROPERABILITY

BUILT ON THE P25 STANDARD, CONNECTING ACROSS TECHNOLOGIES

CERTIFIED P25 COMPLIANT
• Compatible with other P25 equipment from other manufacturers
• Roam between systems with continuous mission critical voice and data communication

MUTUAL AID
• Mutual Aid designed to accommodate digital trunking to analog conventional channel types

BROADBAND INTEROPERABILITY
• Integrated with WAVE offers secure PTT connectivity with many more people
• Connect across town, across the country or anywhere broadband service is available

INTELLIGENT MIDDLEWARE
• Share more information across more applications to ensure everyone has a common operating view
WAVE ENABLES UNIFIED WORK
GROUP COMMUNICATIONS

- Purpose-built Radio on Public Safety and Government Service Radio System
- Specialized Smartphone on Optimized Broadband Network
- Consumer-grade Broadband Device on Broadband Carrier

CRITICAL COMMUNICATIONS ACROSS ANY NETWORK ON ANY DEVICE

- Land Mobile Radio
- Public Safety LTE
- Broadband Carrier/WiFi
ASTRO DATA SOLUTIONS

Integrated GPS

- GPS receiver integrated into the radio package.

HAZMAT/CAD

- Immediately access critical information in the field
- Information at your fingertips: Messaging, CAD Dispatch notifications, MSDS info

OVER THE AIR PROGRAMMING

- Program radios without having to go out and touch radio fleet.
- Re-assign Talkgroups and make radio template changes on the fly.
- Radio users remain on-line during radio programming

ENHANCED DATA CAPABLE – MORE GPS POWER

1. Distance based
2. Time based
3. Emergency
4. Dispatch polling
AN INDUSTRY BEST SOLUTION

BEST IN CLASS TEXT-TO-SPEECH
- Utilizes award winning text-to-speech engine
- Transmit CAD information over fire station PA system as well as to subscribers
- Manual text-to-speech voice announcements capable from dispatch position

ACCOUNTING FOR YOUR ENTIRE OPERATION
- Report generation of MACH Alert events
- Alarm, alert, response action and event logging

STATION AUTOMATION AND MONITORING
- Alert Tones
- Apparatus Doors
- Appliances
- Station Lighting
- Station Security
- Day/Night Operation
- Apparatus Exhaust Blower
- Local Pull Box Alarm
- And more…
DISPATCH SOLUTIONS

OPERATIONAL COMMAND AND CONTROL FROM MULTIPLE POINTS, AT MULTIPLE LEVELS

MCC 7100 AND 7500
- Fully featured IP Dispatch Console solutions
- Access from tablet and laptop (MCC 7100)
- Integrate with CAD and other mission critical solutions
- Interoperable across conventional and trunked systems, analog and digital

MCD 5000
- Optimal for providing channel/incident monitoring by upper level staff in station or command center
- Connect to radios through the MCD 5000 Radio gateway unit – supporting 4 radios per unit and providing access to a single channel at a time

MCC 7100

MCC 7500

MCD 5000
Enhanced Data
- Higher efficiency narrowband data service on ASTRO 25 that enables 10-12X improvement in GPS location reporting

Mission Critical Enhanced Geo-Fence
- Ability to quickly connect and trigger actions for an incident scene Geo-Fence

Personnel Accountability
- Rapid identification of First Responders at an incident
- Evacuation commands

Location on PTT
- Emergency communications enhancement gives location with emergency call

Over-the-Air Firmware to APX
- Change APX Firmware & Codeplug over ASTRO Talkgroup

Talkgroup Text Messaging
- All first responders in a talk group receive incident specific text messages

Alias Download & Alias User Log in
- Over the air alias updates to subscribers in an ASTRO talkgroup
- Alias update upon radio user login

Advanced Messaging/Text Messaging
- Dispatch to radio, radio to dispatch and radio to radio TMS on ASTRO 25

The Power of Motorola ASTRO 25 Systems and Motorola Radios
BROADCAST MESSAGING

- Command and Control
- Everyone receives the message simultaneously

**CORE**

- AMS Server
- Talkgroup Text
- Text & Query

**Connections**

- Radio Console
- AMS Smart Client, CAD or Mobile
- Talkgroup Text
- Talkgroup 1

**Examples**

- From: 6th Divi
  Traffic Accident: Tractor-trailer into center guardrail
  Hwy 101 milepost 15.

- From: 6th Divi
  Weather Alert: High winds for Franklin Cnty until 8:15 PM EDT.
ALIAS USE IMPROVES SAFETY AND OPERATIONS
ALIAS BROADCASTS

- Radio manager updates radio PTT ID aliases in Provisioning Manager (PM)
- On the next PTT, the new PTT ID alias is broadcasted and updated in all radios in the talkgroup
ENHANCED GEO SELECT

ENABLE IMMEDIATE RESPONSE TO A GEOFENCE CROSSING
ENHANCED GEO SELECT
FEATURE DESCRIPTION

OVERVIEW

GEOFENCE
• Virtual perimeter
• Trigger a response
• Visual indications

GEO SELECT
• Triggers a radio channel/talkgroup change
• Automates radio actions
• Improves communication
• Improves personnel safety
LOCATION ON PTT

FEATURE DESCRIPTION

OVERVIEW: ENHANCED COMMAND VISIBILITY

SITUATIONAL TRIGGERS:

LOCATION ON EMERGENCY
Location transmitted automatically with EMERGENCY alarm and with each PTT during EMERGENCY Call (A7.17)

LOCATION ON DEMAND
Dispatch to user command to send an immediate location report

TIME OR DISTANCE BASED REPORTING INTERVALS
Change reporting criteria as needed

LOCATION ON PTT (A7.17)
Location transmitted with each group call PTT

Configurable icons for simple and meaningful map viewing

Robust incident and unit management

Name
Incident type
Last Report Time
Status Duration

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Project 25 Phase 2 TDMA

Divides Channel Into 2 Talkpaths
Mandate is 6.25kHz efficiency (6.25e)

TDMA gives you more capacity without adding channels
P25 TDMA BENEFITS:

• Standards-Based Solution for *Increasing Capacity*

USE CASE: INCREASE VOICE CAPACITY WITH P25 TDMA

**P25 FDMA SYSTEM: 7 CHANNEL TRUNKED SYSTEM WITH UP TO 6 VOICE CALLS**

<table>
<thead>
<tr>
<th>FDMA Control Channel</th>
<th>FDMA VOICE</th>
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**P25 TMDA SYSTEM: DOUBLE VOICE CAPACITY WITH UP TO 12 VOICE CALLS**

<table>
<thead>
<tr>
<th>Advanced FDMA Control Channel</th>
<th>TDMA VOICE</th>
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ISSI 8000 SOLUTION

• Built to P25 ISSI Standards

• Enables P25 networks to connect

• P25 TDMA Support

• Maintain system security using Radio Authentication across systems

• Services Supported
  – Group Call
  – Emergency Call
  – Emergency Alarm
  – Clear or Encrypted Audio
  – Unit & Group Registration
  – PTT ID, Seamless Automatic Roaming
  – 3rd party console support over the CSSI Interface

• Capacity Specifications
  – Max. number of connected systems: 24
  – Max. number of simultaneous calls: 100+
ISSI 8000 ASTRO 25 to ASTRO 25

Motorola ISSI 8000 Example

Motorola ASTRO 25 System A

- Standards Based Features

Motorola ISSI 8000 Gateway

ISSI Link

Motorola ISSI 8000 Gateway

ROCKLAND COUNTY System B

- Group calls
- P25 Unit ID
- AES encrypted calls
- Emergency calls

Motorola Differentiated Features

- Alias Display
- Fast, Auto Roaming
- Busy Queuing & Callback
- FastStart / AllStart
ACCOUNTING FOR SAFETY AND EFFICIENCY

PROTECTING YOUR PEOPLE AND YOUR COMMUNITY IS YOUR NUMBER ONE PRIORITY
LACK OF PERSONNEL ACCOUNTABILITY IS STILL A MAJOR CONTRIBUTING FACTOR TO FIREGROUND FIREFIGHTER LINE OF DUTY DEATHS

ACCOUNTABILITY SOLUTIONS MUST...

- QUICKLY ACCOUNT FOR THOSE ON THE FIREGROUND WITH RELEVANT STATUS INFORMATION
- FIT SEAMLESSLY INTO FIREGROUND SOPs
- PROVIDE MINIMAL FIREFIGHTER INTERRUPTION
- WORK IN ALL SITUATIONS, INTEGRATED INTO EVERY RESPONSE
APX PERSONNEL ACCOUNTABILITY

ONE SOLUTION TO DELIVER IT ALL

TACTICAL ALERTS
Immediate audio notifications sent for firefighter evacuation, situational updates and other uses.

MAY-DAY ASSISTANCE
Situational awareness-based notification when:
- Emergency alarm is activated
- Man-down is triggered

ROLL CALL APPLICATION
Easy accountability via a simple PTT

REMOTE INCIDENT COMMANDER
Monitor firefighter safety on site or anywhere you have an ASTRO 25 or broadband connection
NEXT....

SUBSCRIBER RADIOS

JEFF ASHTON
SUBSCRIBER SALES SPECIALIST
SERVING THE NEEDS
OF FIREFIGHTERS

JEFF ASHTON TECHNICAL RADIO SPECIALIST

SAFER CITIES. THRIVING COMMUNITIES.
APX Durability
RUGGED FROM THE INSIDE OUT

Rugged Inside-Out Endoskeleton

- High strength aluminum alloy chassis
- High impact resistant polycarbonate outer housing

Robust Specifications

- IP 67 standard 1m /1 hr
- Optional 2m /2 hr (Delta “T”)
- TEMPERED GLASS
  - Scratching, Impact
Public Safety users face tough environmental conditions every day.

Public Safety radios must be designed and tested to survive these environments.
Environmental Tests

Typical environmental tests
- Temperature Shock
- Temperature Cycling
- Drop
- Vibration
- Blowing Rain
- Dust
- Salt Fog
- UV Exposure
- Electro-Static Discharge (ESD)

Testing Standards Used
- Military Specification 810
- European “IP” specs
- Motorola Internal 12M spec

Functional and parametric testing is also performed to verify functionality after exposure to the environments.
XE Portable Series
Designed for the Fire Market

Exaggerated Knobs and Controls
PTT / Side Button design changes for Improved Gloved Operation
  Larger Ridge / Increased Texture
  Larger programmable side buttons
Rubber over mold for improved grip
Redesigned speaker grill for improved water porting
Larger emergency button
Taller top display for larger fonts
APX XE PORTABLES

ULTIMATE MOBILITY
EXTREME PERFORMANCE

APX 8000XE
- All Band
- Adaptive Audio Engine
- Secure WiFi

APX 7000XE
- Multiband
- Exceptional Audio
- Advanced Ergonomics

APX 6000XE
- Single Band
- Exceptional Audio
- Advanced Ergonomics

TESTED TO IP68 STANDARDS FOR ZERO DUST PENETRATION AND SUBMERSIBLE UP TO TWO METER FOR UP TO FOUR HOURS

ERGONOMIC DESIGN AND EXAGGERATED CONTROL KNOBS FOR EASY GLOVE USE

3 WATT AUDIO POWER IN THE APX 8000XE & APX6000 XE SPEAKER TO PROVIDE BEST IN CLASS AUDIO

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APX XE500 RSM

**ULTIMATE USABILITY**

- **ADAPTIVE AUDIO ENGINE**
  Hear and be heard

- **EXTREME PERFORMANCE**
  Rugged, robust, reliable

- **FLEXIBLE WEARING**
  Wear it anyway you want

- **ENHANCED CONTROLS**
  Designed for the mission

**EXTREME Water Porting Grill**
Enhanced grill for improved water porting.

**Light Control Button**
Requires long press of 1 second to turn light on/off flashlight function.

**EXTREME Temperature Housing & Cable**
Enhanced to withstand 500°F for 5 minutes.
Man Down Feature

Man Down

- Accelerometer Based
  - Both Position and Movement
  - Integrated with Emergency Activation
  - Integrated with APX Accountability

- Not a PASS Replacement

- Meant to Improve Alerting / Accountability
APX MOBILES
RUGGED 02 CONTROL HEAD

INTUITIVE OPERATION
EXTREME PERFORMANCE

TESTED TO IP56 STANDARDS FOR ZERO DUST PENETRATION

FIPS AES ENCRYPTION PROVIDES TAMPERPROOF SOLUTION

INTEGRATED GPS OUTDOOR LOCATION FOR PERSONNEL SAFETY
As Incident Commander you can Stay connected to your mobile radio up to 100 meters line-of-sight away from your vehicle.

Plug and play - Just attach the mobile gateway microphone to your mobile radio, align the BT RSM where indicated by the blue dot and you are ready to go.

Compatible with APX mobile radios
COMMUNICATE LIKE NEVER BEFORE

<table>
<thead>
<tr>
<th>FRONT VIEW</th>
<th>SIDE VIEW</th>
<th>TOP VIEW</th>
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<tbody>
<tr>
<td>INTERNAL ANTENNA</td>
<td>POWER BUTTON</td>
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<tr>
<td>LARGE, YET PROTECTED PTT</td>
<td>VOLUME TOGGLE SWITCH</td>
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<td>AUDIO JACK</td>
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<td>MIC PORT</td>
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<td>LOUD SPEAKER</td>
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<td>TASK LIGHT</td>
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<td>BLUE DOT SECURE PAIRING</td>
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IN MASK AUDIO SOLUTION
SCOTTS & MSA SCBA BT SOLUTION

INTERFACE DIAGRAM
High Audio Output with Clarity

At the heart of APX audio is a high-output speaker driven by a powerful Class D amplifier...

Max loudness - APX is 106db vs. XTS5000 @ 98.5db

Main speaker - custom 3W 45mm Dual Magnet Speaker *Competitors typically use a 500mW speaker

Main Amplifier - Class D Amplifier with 3 Watt Rated, 5 Watt Max and 14 Watt Peak Output

Class D gives the best balance between High Power Output and Current draw rate, yields ultra-high power efficiency

For comparison the XTS 5000 uses a Class AB amplifier with 1/2 Watt Rated and 1 Watt Maximum Output

This all results in a portable radio which has the highest audio output and clarity ever developed by Motorola...
DUAL MIC ADAPTIVE BEAM NOISE CANCELING TECHNOLOGY
Improved digital communications in high noise.

K-960 Saw

ANALOG vs DIGITAL

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THANK YOU