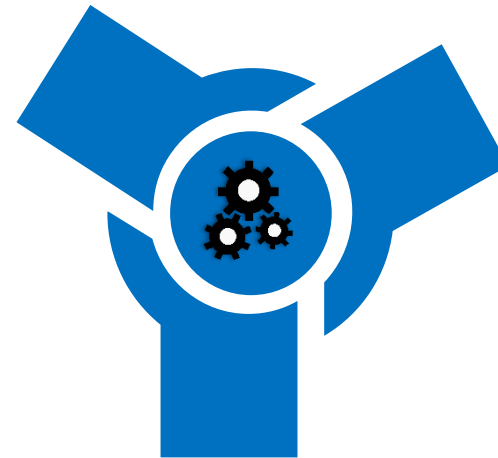# WHAT'S CHANGING
BROADBAND

BROADBAND UBIQUITOUS AND INEXPENSIVE
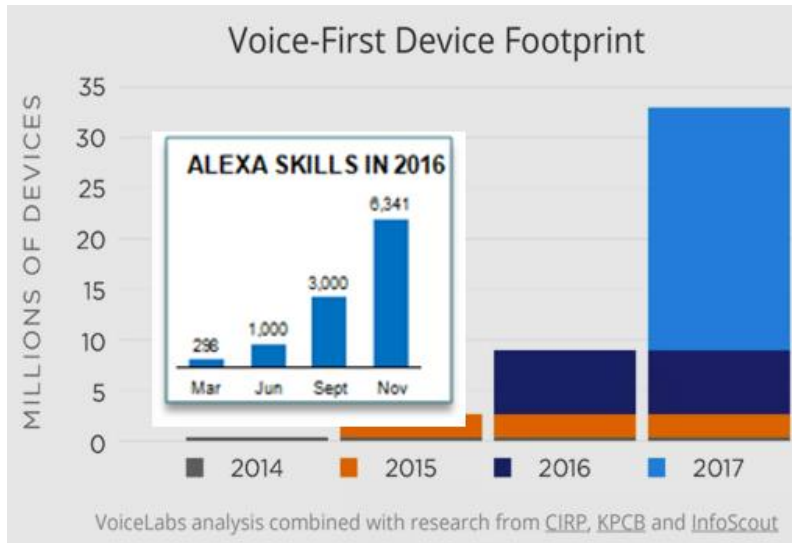
MULTIMEDIA MESSAGING

NEW TECHNOLOGIES AND STANDARDS (LTE-U, CBRS, ETC)

WHAT'S CHANGING
TOUCH INTERFACES
VOICE INTERFACES
APPS, APPS, APPS

DATABASE QUERIES
ACCESS TO SERVICES
CONTEXT AWARE QUERIES
(SENSORS, MEDIA)

SPEED
EFFICIENCY
EASE OF USE
DURABILITY
ACCESSIBILITY
ENGAGING AND INTERACTIVE
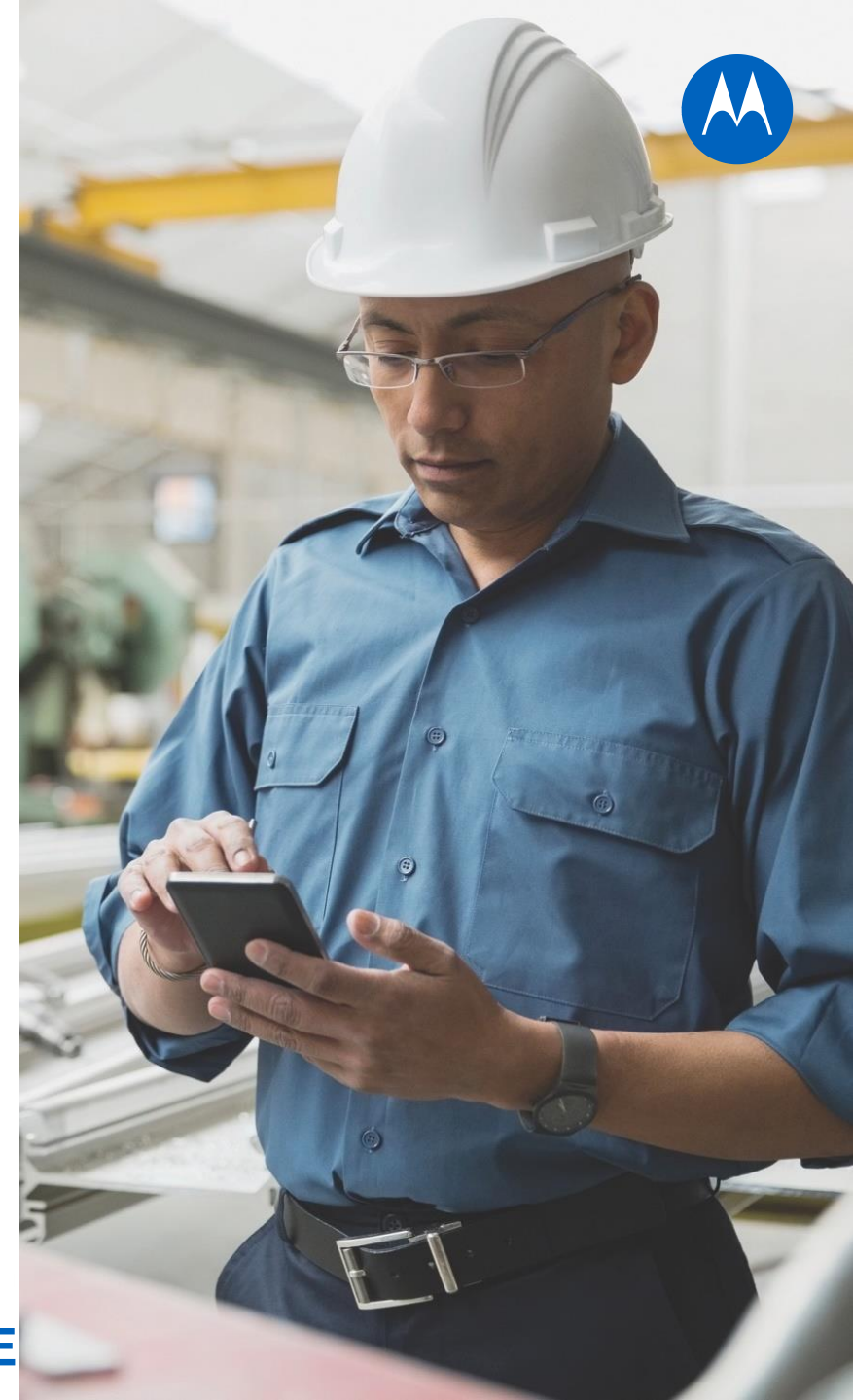
Voice-First Device Footprint

MILLIONS OF DEVICES

35
30
25
20
15
10
5
0

ALEXA SKILLS IN 2016
6,341
3,000
1,000
298
Mar   Jun   Sept   Nov

2014   2015   2016   2017

VoiceLabs analysis combined with research from CIRP, KPCB and InfoScout

BLACK COFFEE
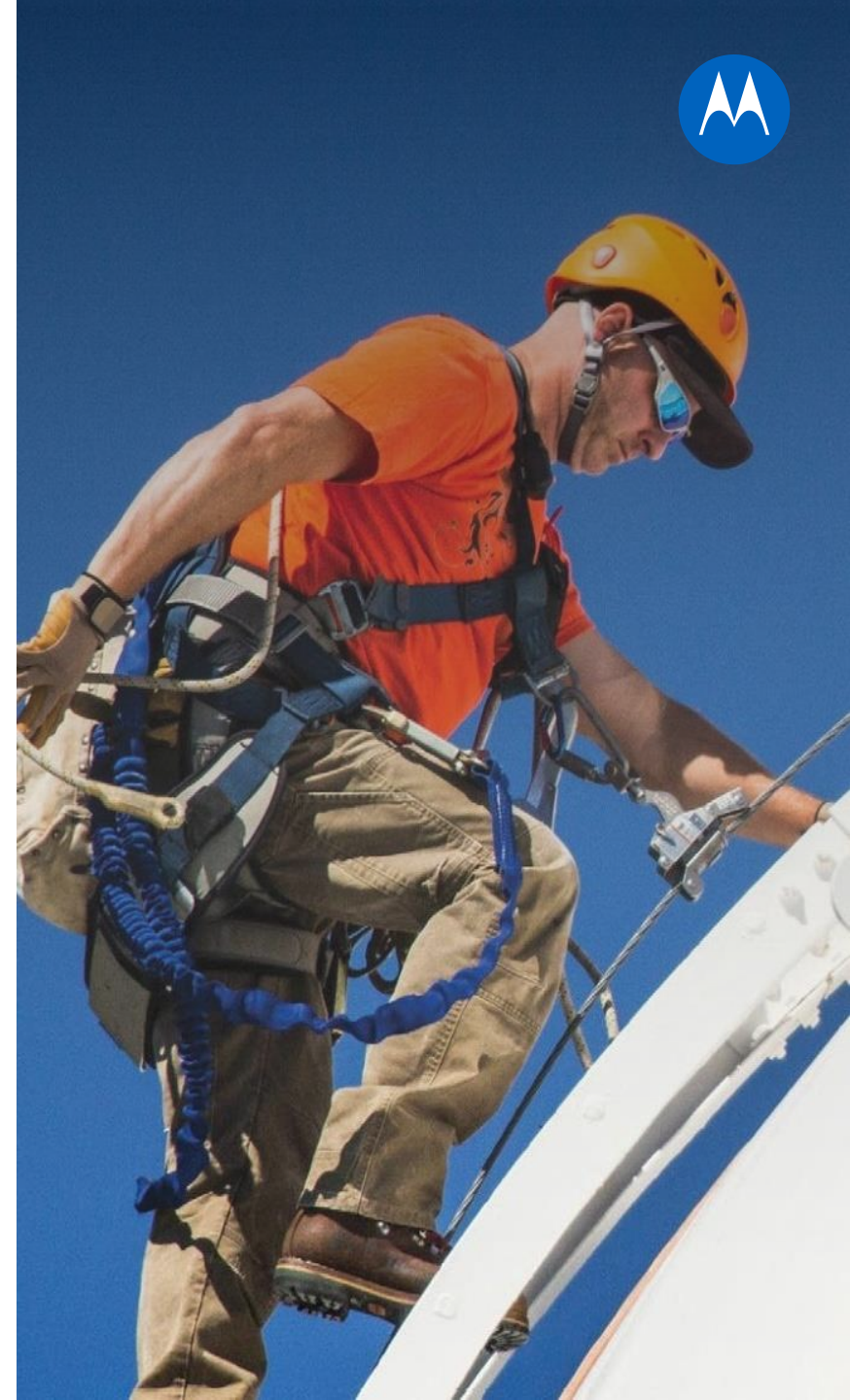
WHAT PURPOSE BUILT OF THE FUTURE LOOKS LIKE

DISAGGREGATED AND COHESIVE

BIOMETRIC SENSORS

COMMUNICATIONS HUBS

WIRELESS RSM

INDOOR LOCATION

LTE 4G SMARTPHONE
Voice & Data

Si700
RSM, BWV, Display,
Data /4G LTE

PS LTE WORLDWIDE DEPLOYMENT MODELS

PRIVATE PS LTE NETWORK	HYBRID PUBLIC-PRIVATE	CARRIER LEVERAGED
Dedicated Spectrum	Dedicated/Shared Spectrum	Shared Spectrum
Dedicated Network	Shared Network	Shared Network
Utilized only by PS agencies	PS-LTE network shared with other entities (e.g., utilities, carriers, military)	Network shared with consumers, businesses, and PS agencies
Sold directly to PS agency, usually as a CAPEX model	Requires unique governance and operating model to accommodate PS demands and reduce costs	Select enhancements and hardening to meet PS agency needs

LOWER LEVELS OF PS CONTROL, FUNCTIONALITY, RELIABILITY

LOWER COST PER USER

MORE LIKELY AN 'AaS' DEPLOYMENT

HIGHER LEVELS OF PS CONTROL, FUNCTIONALITY, RELIABILITY

HIGHER COST PER USER

MORE LIKELY A CAPEX-BASED DEPLOYMENT
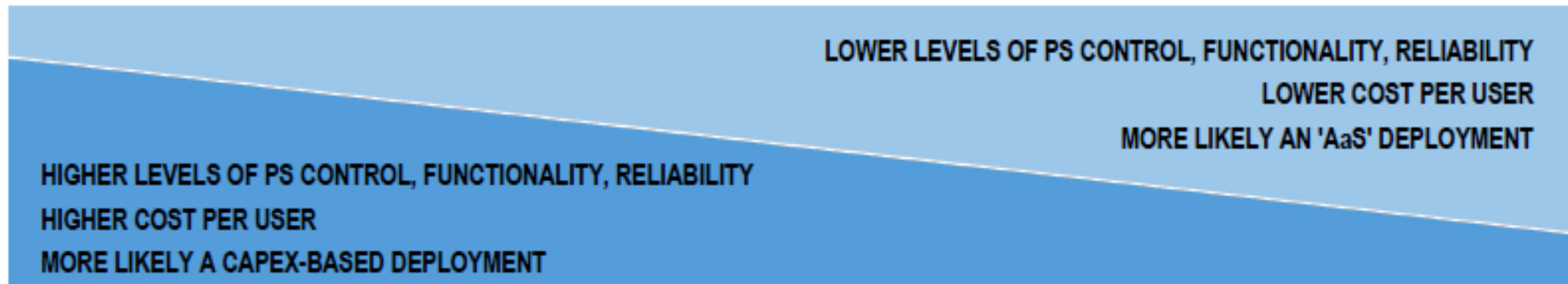
PUBLIC SAFETY vs CARRIER NETWORK

	CARRIER MODEL	PUBLIC SAFETY MODEL
BUSINESS OBJECTIVE	**Revenue growth**	**Protect life and property**
CAPACITY DESIGN	**For "typical day"** (PREDICTABLE)	**For "worst day"** (UNPREDICTABLE)
COVERAGE DESIGN	**Based on population density** (PREDICTABLE)	**Based on life and property that need protection** (UNPREDICTABLE)
COMMUNICATIONS DESIGN	**One-to-one communications**	**One-to-many communications**
BROADBAND DATA NEED	**Internet access to centralized internet connections** (HEAVY DOWNLOAD)	**Traffic to agency enterprise network…not thru Internet** (HEAVY UPLOAD & DOWNLOAD APPS)
SUBSCRIBER DATA	**Owned by Carrier**	**Owned by Agencies**
SERVICE PRIORITY DIFFERENTIATION	**Minimal differentiation - Subscription and application level**	**Significant differentiation - Role and incident level** (VERY DYNAMIC)

BUILT FOR PUBLIC SAFETY

PUBLIC SAFETY NEEDS MORE THAN STANDARDS

QoS & Prioritization	Prioritized services for the most critical incidents	Dynamically prioritized data flows and communications
Security	Enhanced security and data integrity	Mobile VPN security
Applications	Control room applications designed for LTE	CAD, voice and bandwidth optimized real-time video
LMR Interop	P25 and Tetra two-way radio interactions	Push-to-talk coordination across LTE, P25 and Tetra
Devices	Public safety designed user devices	Hardened and ruggedized user devices

Tetra and LMR Trends

Tetra (LMR) continues to be dominant:

- South Korea – commitment to Tetra renewed
- UK – Tetra to run longer
- Austria – Tetra to operate to 2039
- Netherlands – KPN Tetra and offering Broadband PTT
- USA – P25 running in parallel to LTE
- Spain – renewal of Tetra & new Tetra business
- Germany – refresh of Tetra
- Norway – experimenting with Broadband – minimum 2026 Tetra
- Sweden – debate on spectrum, experimenting with Broadband
- France – plan for Tetra to continue 5-7 years
- MiddleEast#2 – New national Tetra contact 2018
- Others -