

# Ligado Networks Overview

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March 25, 2016



# Ligado Networks Company Overview

## New Ownership and Board of Directors

- Company restructuring plan and FCC Change of Control Order approved in 2015
- Focus of new board and management team on fully resolving spectrum compatibility issues and working with stakeholders
- Working to deploy network providing next generation connectivity

## Spectrum Holdings

- Spectrum licenses in the 1.5 GHz to 1.6 GHz band that include:
  - Ancillary terrestrial authority for L-Band spectrum
  - 5MHz terrestrially authorized in the 1670-1675 MHz Band
  - Dedicated satellite spectrum

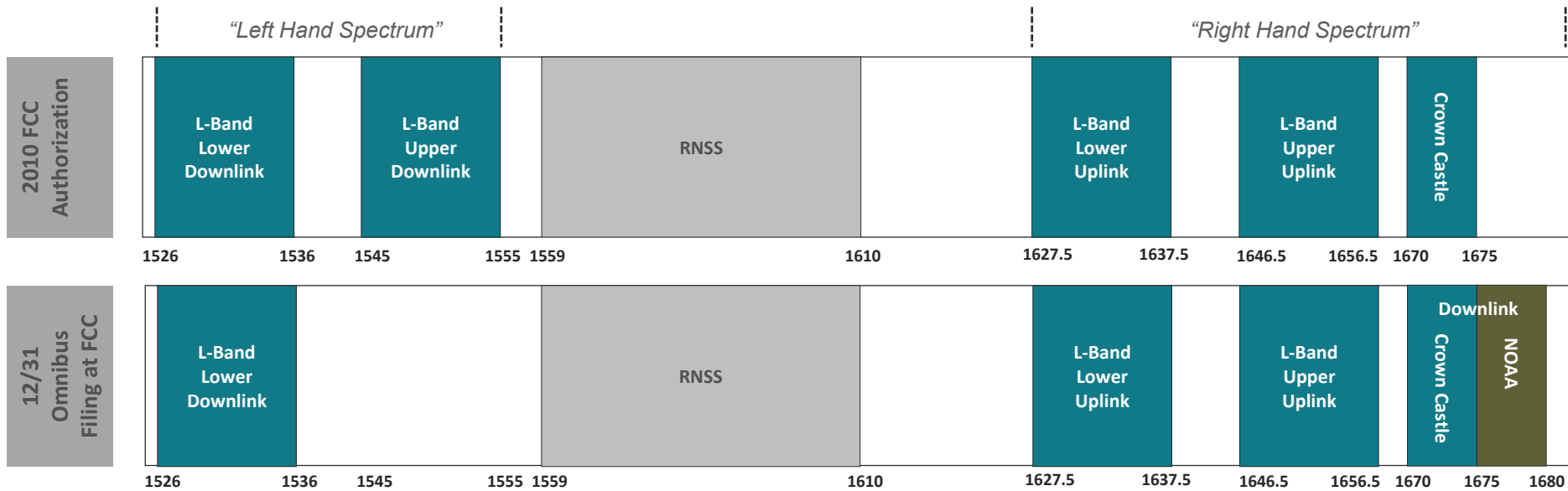
## Network Operator

- Mobile Satellite Service (MSS) operations in North America since launch of MSAT-2 in 1995 and MSAT-1 in 1996
- Next-generation satellite, Sky Terra 1, launched in 2010 provides North American coverage for voice and data services

## Company Products and Background

- Provider of MSAT Push-To-Talk and Voice, M2M, Broadcast Data, and GPS augmentation solutions
- Offices in Reston, Virginia and Ottawa, Canada

# GPS and Mobile Broadband Coexistence



- Terrestrial authority for 1545-1555 MHz relinquished creating 10MHz guard band for GPS
- Reduced power levels and stronger OOB limits
- No remaining issues with “Right Hand Spectrum” for broadband use
- Technical issues on “Left Hand Spectrum” limited to certified aviation and MSS augmentation
- Placement of Ligado’s license modification request on public notice by FCC will allow for the identification of any unresolved issues

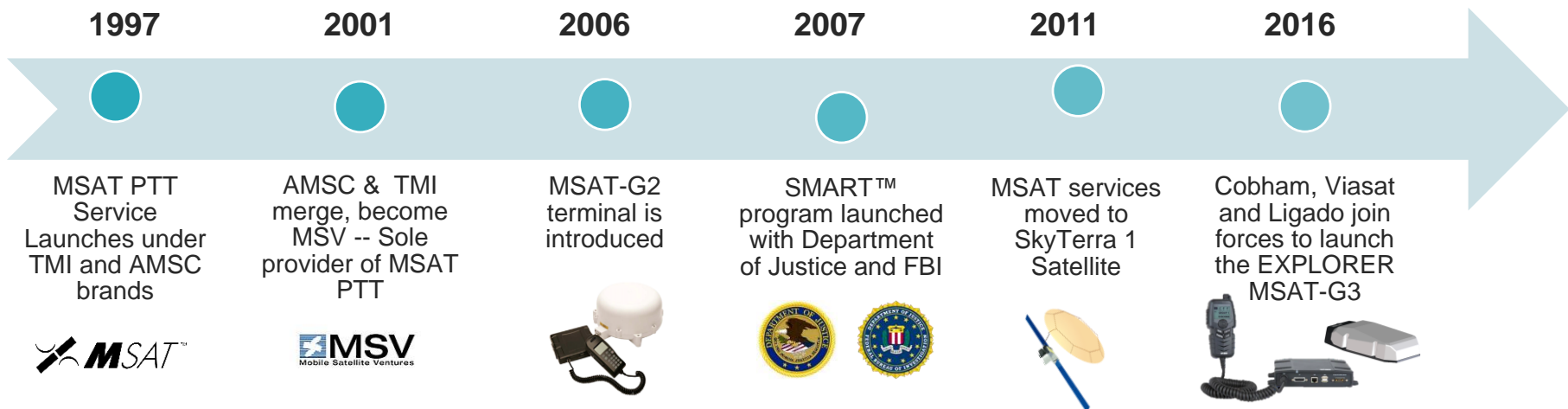
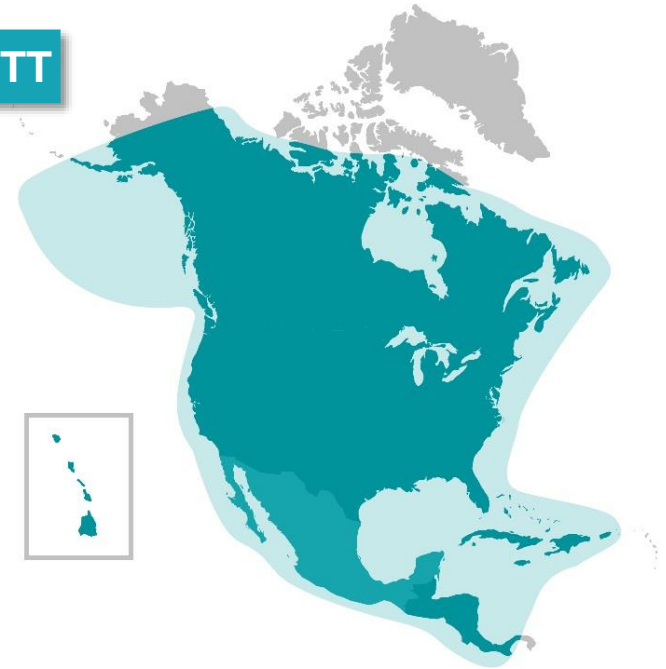
# Ligado's Service Offerings

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# Ligado Legacy of Push-To-Talk Connectivity

For 20+ years, Ligado has set the standard for Satellite PTT

- MSAT PTT is the solution of choice for First Responders and Enterprise users in emergency situations and for remote operations
- SMART™ Program:** Nationwide interoperable public safety talkgroups



# Talk Groups: Interoperability

## Interoperability can be achieved by configuring and sharing talk groups

- Shared local and state talk groups already exist throughout North America
- Agencies and organizations are free to manage their talk groups
- Mutual aid talk groups have been established at the Local, Regional and National level



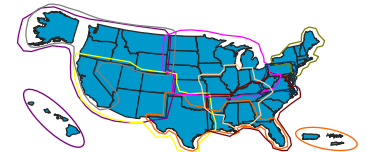
TWO WAY RADIO CONFIGURATION			
TAG	TG NAME	TG ID	M/C
1	CDC Atlanta	328230	High(3)
2	OPEO - Command	15138958	Med(1)
3	NPHST-1	328011	High(3)
4	NPHST-2	393547	High(3)
5	OPEO - Teams	852111	Med(1)
6	SESMART	852299	Low(0)
7	G-SMART	131403	Low(0)
8	SWSMART	917835	Low(0)
9	W-SMART	983371	Low(0)
11	E-SMART (EMS)	2556235	Low(0)
12	F-SMART (Fire)	2490699	Low(0)
13	L-SMART (Law Enf)	2621771	Low(0)
15	J-SMART	65867	Low(0)

Local

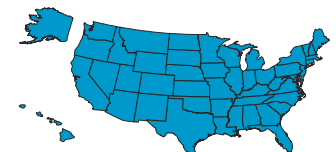
Agency Interoperability



Regional Interoperability

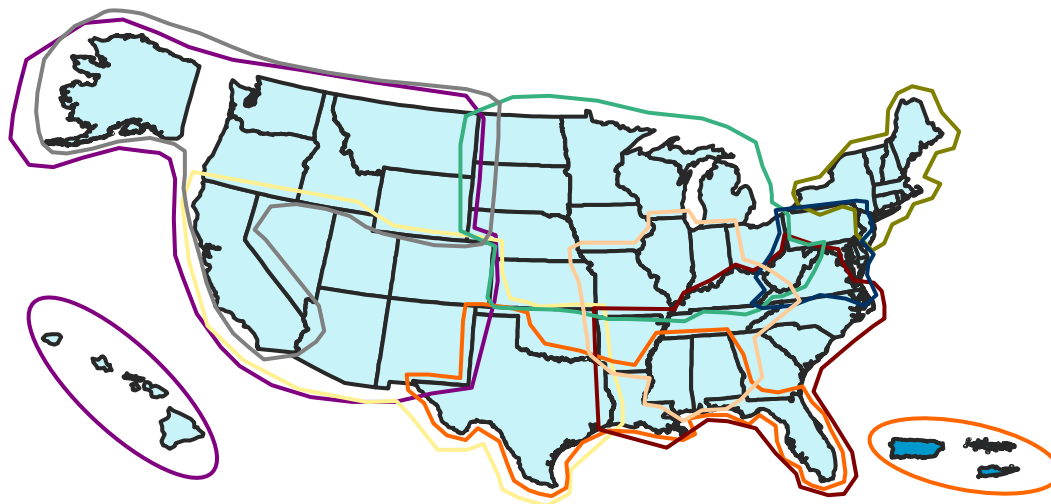


National Interoperability



Nationwide

# Regional SMART™ Talkgroups



NESMART - CT, DE, MA, ME, NH, NY, NJ, PA, RI, and VT  
 Manager: Connecticut State Police



MWSMART - IA, IL, IN, KS, KY, MI, MN, MO, OH, ND, NE, SD, WI, and WV  
 Manager: IN Department of Homeland Security



M-SMART - DC, DE, MD, PA, VA, and WV  
 Manager: Allegany County (MD) Dept. of Public Safety and Homeland Security



SWSMART - AZ, CA, CO, NV, NM, OK, TX, and UT  
 Manager: Contra Costa County Fire Protection District



SESMART - AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV  
 Manager: Fairfax County (VA) OEM/Public Safety Comm.



W-SMART - AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, and WY  
 Manager: California Emergency Management Agency



G-SMART - AL, FL, LA, MS, TX, PR, and VI  
 Manager: LA Governor's Office of Homeland Security and Emergency Preparedness



NWSMART - AK, CA, ID, MT, OR, WA, and WY  
 Manager: WA State Emergency Management Division



CUSEC-1 - AL, AR, IL, IN, KY, MS, MO, and TN  
 Manager: Central United States Earthquake Consortium

# National SMART™ Talkgroups



**J-SMART & SMART-T – Public Safety**  
Manager: FBI Operational Technology Division



**F-SMART - Fire Service**  
Manager: Seattle Fire Department



**NPHST-1 / NPHST-2 – Public Health**  
Manager: KY Department for Public Health



**I-SMART – Critical Infrastructure**  
Manager: Seattle Public Utilities



**E-SMART – EMS**  
Manager: KY Dept. for Public Health



**L-SMART - Law Enforcement**  
Manager: U.S. Marshals Service



**U-SMART – Urban Search & Rescue**  
Manager: Montgomery County (MD) Fire & Rescue Service



# MSAT Evolved – EXPLORER MSAT-G3 Push-to-Talk

Ligado Networks, Cobham SATCOM and Viasat have joined forces to bring to market EXPLORER MSAT-G3 PTT



## Groundbreaking SkyTerra-1 satellite based network:

- Ubiquitous coverage throughout North America
- Dynamic satellite beam formation and system resource allocation
- 22 meter reflector enables use of smaller device form factors at higher data throughputs



## Service Provider

### All-IP Based Mobile Satellite Services Platform

- Multicast network
- Low Latency
- Embedded AES256 Encryption



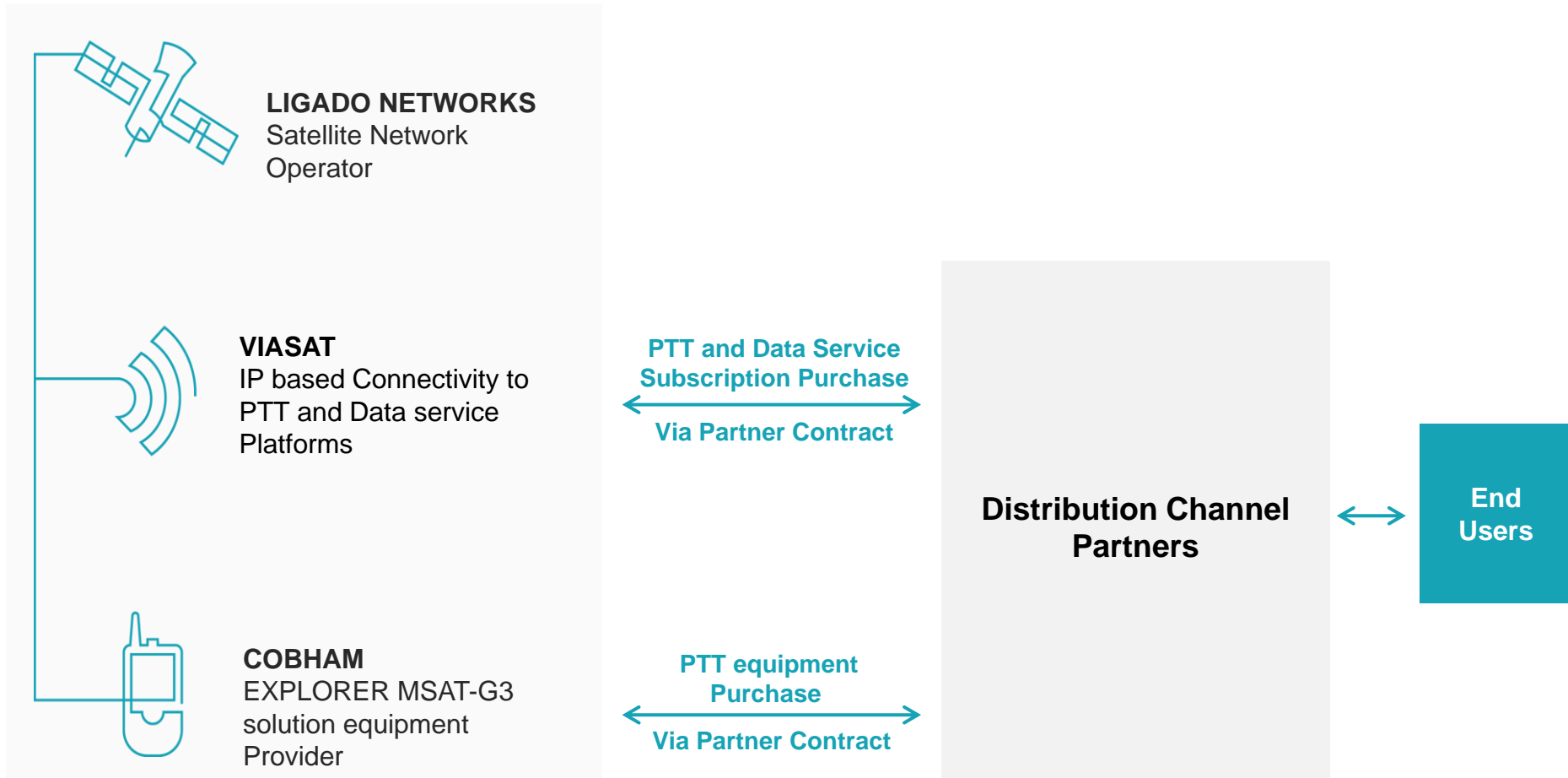
## Equipment/Hardware Provider

### EXPLORER MSAT-G3 Radio

- EXPLORER 122 IP Data Terminal
- EXPLORER PTT
- PTT Server Infrastructure



# EXPLORER MSAT-G3 Distribution Overview



# Next Generation IP Data Products – ViaSat and Ligado Partnership



**Fixed / Portable**  
**AT 2225**



**Mobile**  
**AT 2220**



**MT 2220**



**Hot Spot**  
**M2M/IoT**



**Embedded**  
**Module**  
**Chipset Module**

## Fixed and Mobile (Land, Air, Maritime) Designs

- Smaller form factors, lower cost
- Embedded GPS
- WiFi, Bluetooth, Ethernet, and USB
- Single and dual channel models
- Land mobile and maritime enclosures being developed
- NextGen voice and PTT Platform

## Bring your Own Device (BYOD) Enablement

- Battery powered
- Embedded connectivity
- WiFi, Bluetooth, Ethernet, and USB interfaces
- Cellular augmentation
- Personal (consumer/prosumer)
- Low cost device
- M2M IoT modules

**ViaSat IP Product Introduction will Enable the Transition of Legacy Customers to NextGen L-Band Platform**

# Conclusion

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- Ligado has a track record of fostering integration and interoperability among various teams and workgroups at a local, regional, national and even international level
- We are committed to drive innovation in satellite, terrestrial and integrated networks
- New era of collaboration being driven by new ownership and leadership
- We especially look forward to continuing to demonstrate our commitment to public safety communications at all levels