HF-NVIS as our Nation's Base Layer Fallback Mode

NVIS Communications LLC

HF-NVIS Service Providers

Review: Fallback as opposed to Failover

Primary Operational Mode

Failover Modes

Fallback Modes

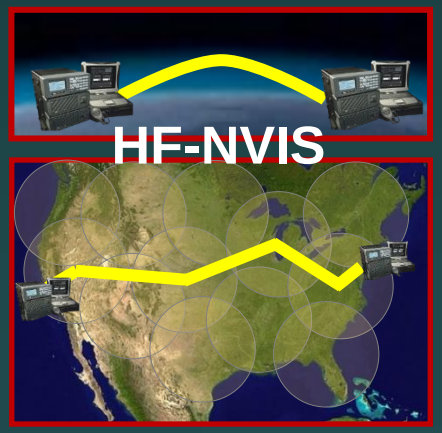
- **Failover** preserves the ***primary*** operational mode using alternate resources.
- **Fallback** ***replaces*** the primary mode with simpler modes when the primary mode is not available.
- **Base Layer Fallback** is your lowest layer of prepared fallback for when everything else has failed. *It should **not** have components in common with the primary mode*.

Fallback for regional and wide-area communications

Primary systems:
- FirstNet, LTE
- Satellite
- Trunking systems
- …

Failover Measures → Many layers of alternate resources to keep the systems operational – This is critical! ***However…***

Base Layer Fallback is critically needed



- Please do not conclude that these primary systems are immune to failure or that simple fallback modes are not needed.

- Modern, automated HF-NVIS networks are being implemented now as the Base Layer Fallback Mode for federal, state, and local government and for critical infrastructures.

LMR Direct is the base layer fallback for ***local*** communications.

HF-NVIS is the base layer fallback for regional and wide areas

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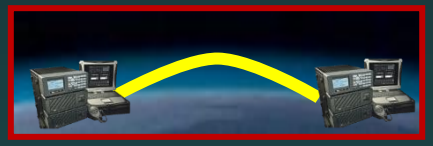
Local

LMR Direct
(or FirstNet devices off network)

Primarily **voice** for on-scene tactical communications

Regional

HF-NVIS Direct



Voice, **chat, email, file transfer** for regional command and control

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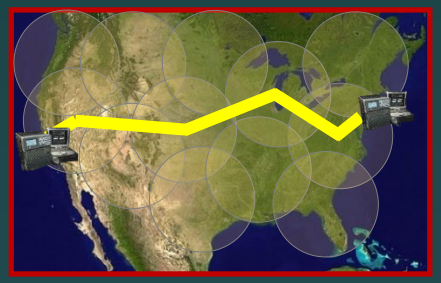
Wide-Area

Wide-area HF-NVIS Fallback Networks
(Patent Pending NVIS Communications)



Primarily **email** (with attachments) for national strategic management

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Renewed government interest in the ionosphere

- Multiple government-sponsored research studies
  - Numerous government-funded research listings on fbo.gov
- To map the ionosphere in more granular detail than ever before
  - Modern, high-volume, data collection and statistical analysis
  - Analogy to modern GPS topo mapping versus old topo maps
- To develop new uses for the ionosphere as a reflective and refractive medium
  - Radio Direction Finding using the volumes of data available

Organizations across many lines of business are building their HF-NVIS networks

Governmental Agencies

- **Fed**
- **Sta**
- **Loc**

Critical Infrastructures

Update: The Veterans' Administration just awarded $15m for an HF voice, data, and telephone interconnect system to connect every VA hospital across the nation.

And not just for fallback: They are using HF-NVIS for ***primary*** communications in areas that do not have communications infrastructure

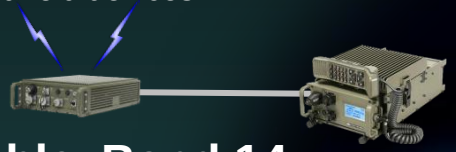
They want to provide their *own* communications pathways, ***"off the grid"*** from public communications infrastructure

This is similar to them going off the electrical grid because they know it is not reliable

Remember the terrorist attack in Morgan Hill, CA that left thousands without cell phone or landline service

They want emerging advances in gateways to FirstNet and other infrastructure

Apps on Band 14 handheld devices



Portable, Band 14 LTE networks

Voice, data, SMS to ALE-AMD conversion

ACU routing through dispatch consoles

HF-NVIS Cloud

--- hundreds of miles ---

Automated reach-forward, reach-back, and backh**aul**

SMTP/POP gateways to Internet Email

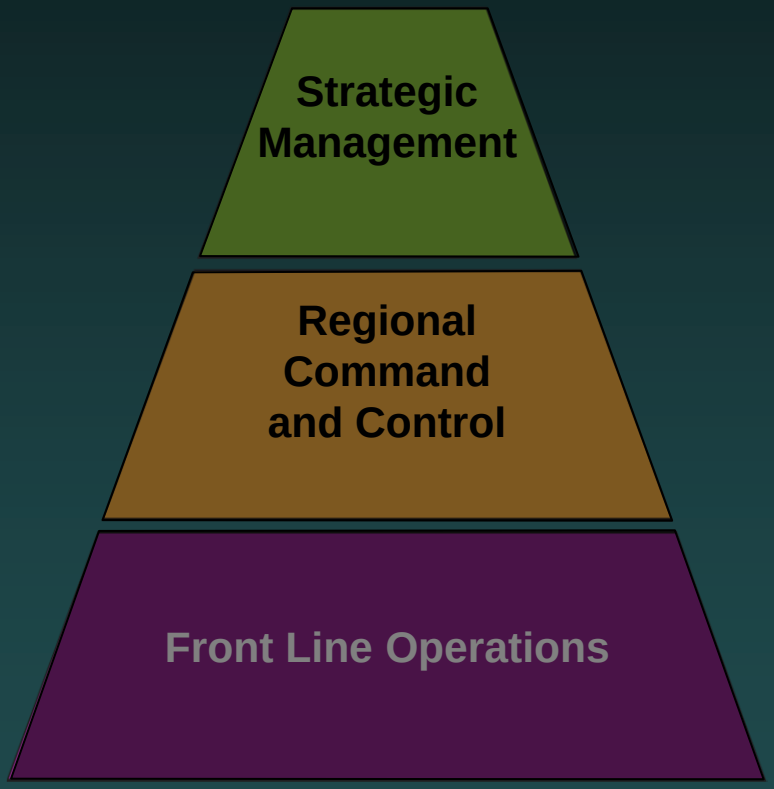
Automated PSTN interconnects for dial-out and dial-in

VHF/UHF devices

Automatic interconnect with LMR networks

Emerging gateways to public cellular services

The migration of HF services downward through the NIMS/ICS hierarchy



Earlier: Very few stations, available only at headquarters locations because of the expense

More Recently: Stations available at selected regional locations and for special field ops, due to reductions of cost and size

Emerging: Services available to everyone in the field for reach-forward, reach-back, and backhaul to other services. This is through device apps automatic interconnects, and gateways.

How manufacturers should prepare for the revitalization of HF

- Build smaller (LMR sized) base and mobile equipment
- Enhance ALE scalability to large, heavy traffic networks
- Improve antennas for base, mobile, and portable
- Bring prices down to LMR range for public safety
- Align with HF network integrators
- Become involved in large network planning

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