

NXDN

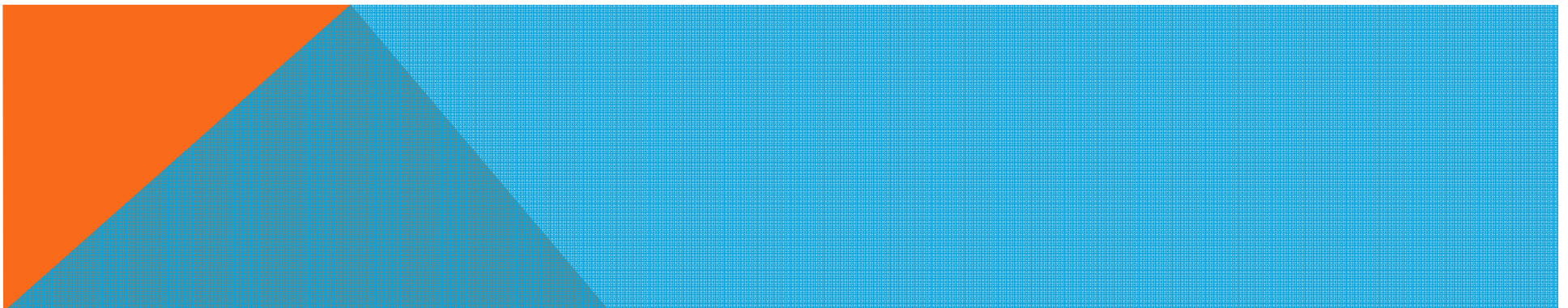
AMATEUR RADIO USAGE IN CENTRAL FLORIDA

ORANGE COUNTY COMMUNICATIONS AUXILIARY
NOVEMBER 2012

WHAT IS NXDN?

- NXDN is a “Narrowband” protocol developed jointly by Icom and Kenwood. This CAN include support for 12.5Khz and 6.25Khz channel spaced Digital Voice, as well as Analog mixed mode support in repeaters as part of the standard.
- Digital mode emission type is C4FM, Frequency-Division Multiple-Access (FDMA), with Forward Error Correction (FEC).
- Uses the DVS1 AMBE+2 Vocoder for Digital Voice.
2450 bps speech + 1150 bps FEC + 1200bps signaling info
= data rate of 4.8Kbps
- Support for Conventional and Trunked system configurations.

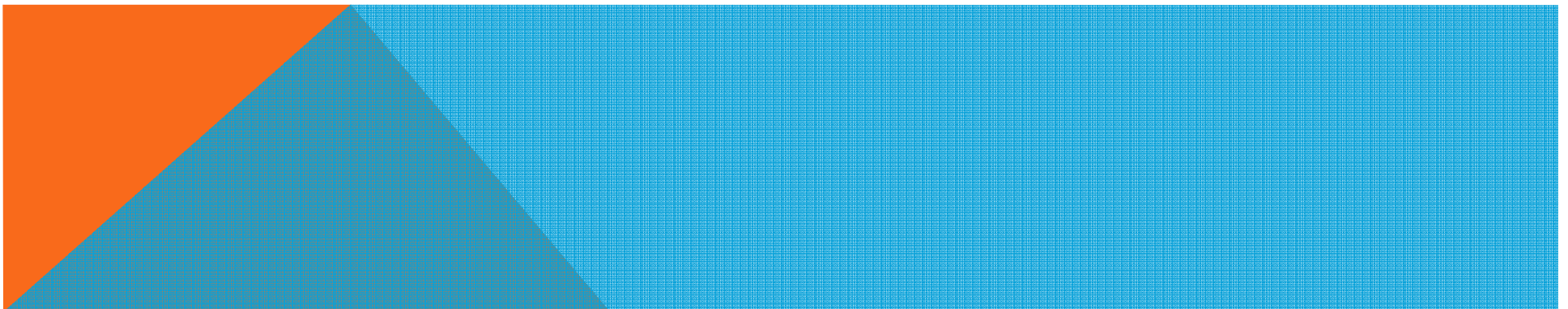
www.nxdn-forum.com



WHAT IS NXDN?

- Radio Access Number (RAN)
Similar in concept to CTCSS or DCS / DPL. The RAN is a two digit number (1 – 63), that is required for the data packets (Digital Voice) to be accepted for processing in NXDN Digital equipment.
- Equipment is interoperable in conventional (non-trunked) modes, but vendors can implement proprietary enhancements in trunked configurations. TCP/IP networking is included, but can be vendor specific.
- Additional Digital capabilities include Selective Call and paging, GPS / location integration, Encryption, Over the Air Programming (OTAP), and text messaging.
- NXDN Forum has an Informal agreement for development and collaboration with European Digital Private Mobile Radio (dPMR) Association.

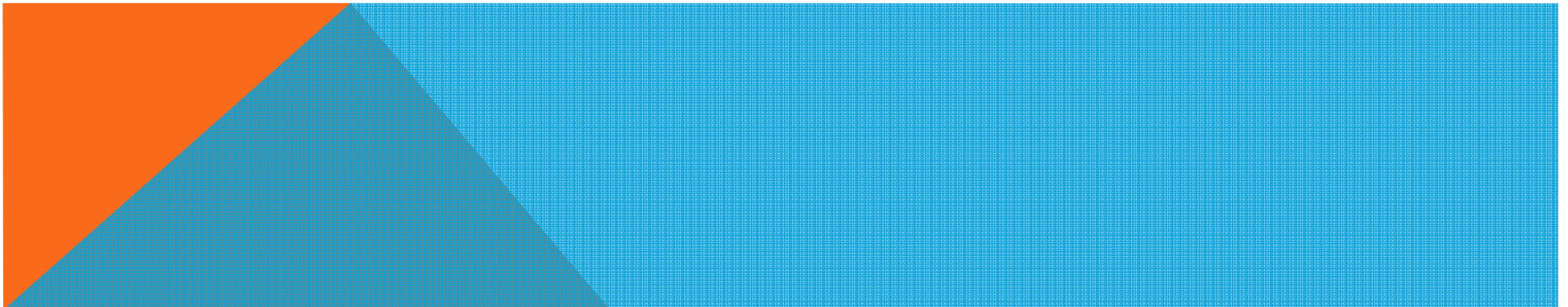
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BRIEF HISTORY

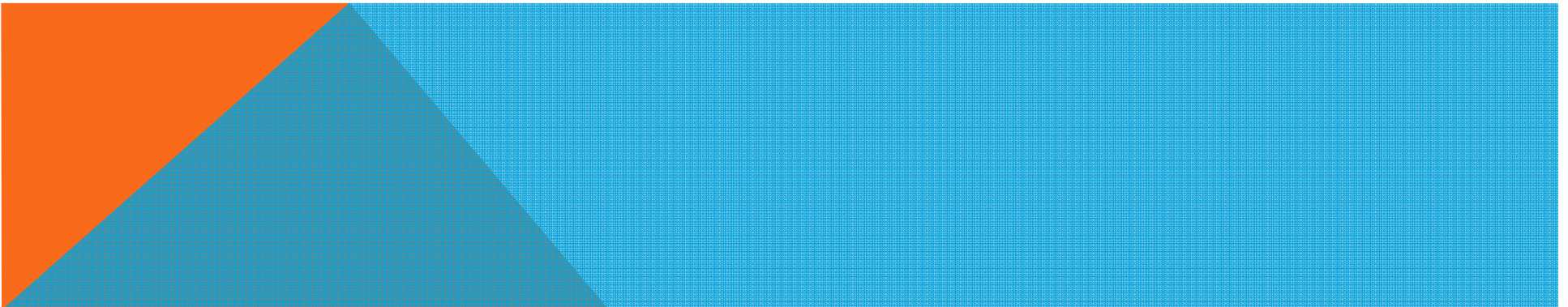
- Joint development started in 2003 with Icom and Kenwood. The first radios and repeaters were on the market in 2006.
- Currently there are thirty communications companies that are members of the “NXDN Forum”, including Icom, Kenwood, Hytera, Daniels, Ritron, Zetron, Trident Micro, Raven, Catalyst Communications, and many others.
- Marketed primarily to Commercial and Utility companies, as well as smaller government and Public Safety markets, who are less likely to depend on DHS grants, which then often require APCO Project 25 compliance and therefore have higher purchase prices.
- Railroad companies have been aggressively adopting NXDN technologies.
- NXDN protocol Standards and Technical Specifications made available for free to the general public in 2012.

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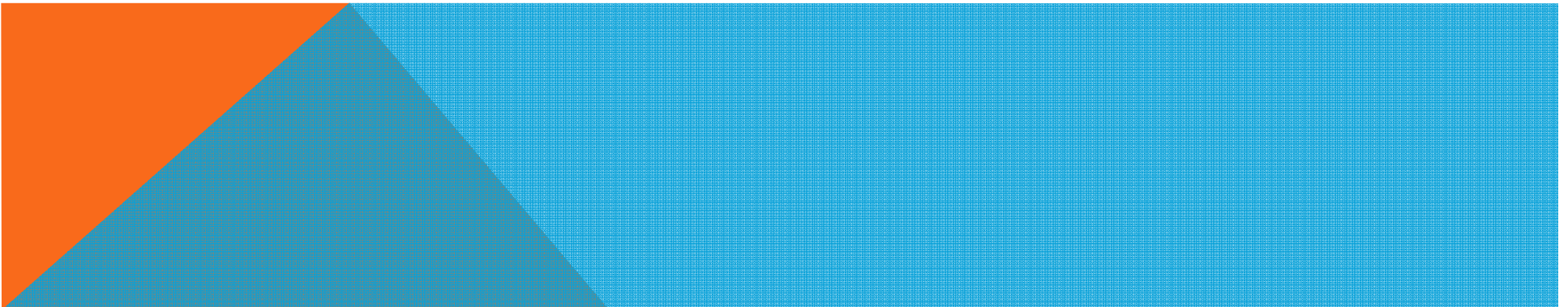
EQUIPMENT

- Repeaters can be run in Mixed Mode.
- End user equipment primarily from Icom and Kenwood.
- Icom markets their NXDN products as the IDAS series.
- Kenwood markets their NXDN products as the Nexedge series.
- Mobile and portable radios currently are single band.
- New cost for radios ranges between \$400.00 and \$700.00, depending on features.
- Occasionally used radios show up on auction and sale forums.



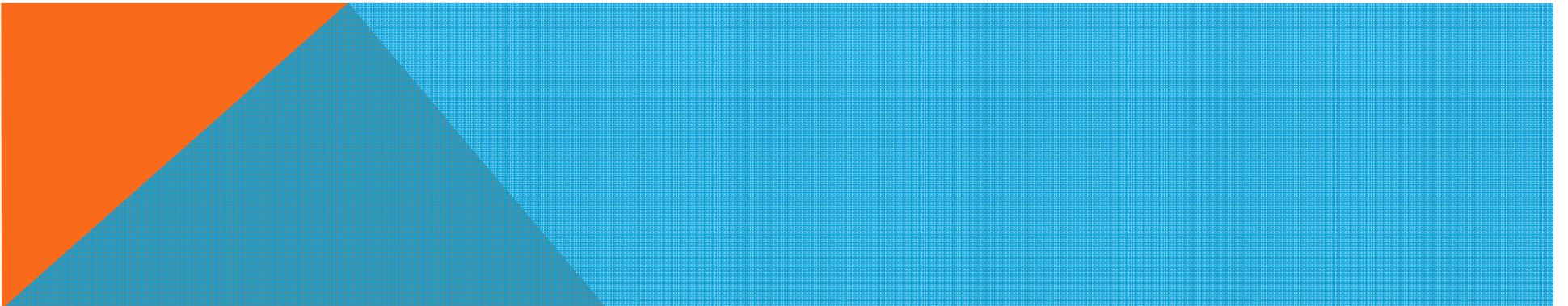
EQUIPMENT

- Some of the NXDN radio models require an option board to enable digital capabilities, and some of the radios have the digital capabilities included by default.
- When purchasing new or used NXDN radios, it is important to determine whether the radio requires a digital option board and whether it is included, if needed.
- Currently there is not any Commercially manufactured Amateur Radio equipment that will work with the NXDN digital modes.



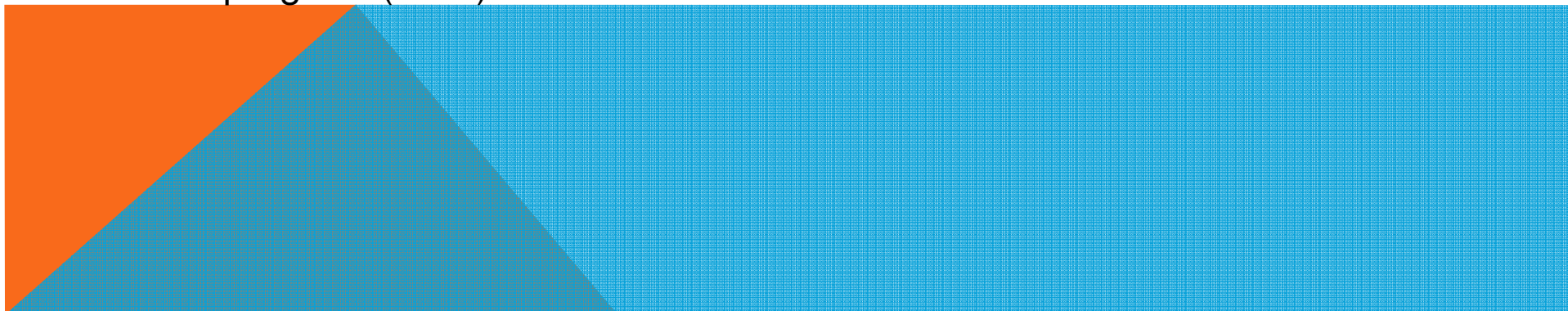
RADIO PROGRAMMING

- Programming software for both Icom and Kenwood NXDN radios is available for under \$100.00
- Programming cables are also needed. These can sometimes be purchased as a bundle with the software.



INTEROPERABILITY

- As mentioned in the beginning of this presentation, the NXDN specifications call for analog support in both repeaters and user radios. The repeaters can run in automatic Mixed Mode. In digital mode, Icom and Kenwood repeaters and radios can talk to each other in 6.25Khz channel mode.
- Repeaters include TCP/IP networking capability. However they are not required to have interoperability between vendors.
- Recently HAMs have developed network interoperability between Icom and Kenwood networking protocols and have linked IDAS and Nexedge networks.
- There are some NXDN repeaters and networks connected to VoIP systems, including EchoLink, IRLP, and AllStar.
- NXDN Digital can be monitored on air with at least one computer program (DSD) with certain models of radios / receivers.

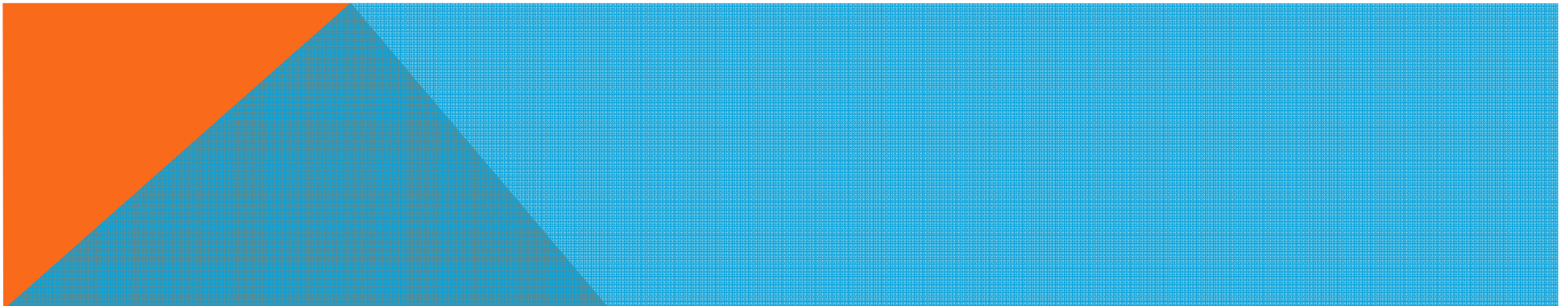


LOCAL RESOURCES

- Most of the NXDN repeaters in the central part of the Florida Peninsula are in the West Central area.

Location	Output Freq.	Analog / Digital	Networked
BITHLO	442.625	WBFM	NO
HOLIDAY	443.450	WBFM - NXDN	NO
LAKELAND	442.275	WBFM - NXDN	3 QTR 2012
LAKELAND	146.655	WBFM - NXDN	YES
LARGO	442.783	WBFM - NXDN	NO
NEW PORT RICHEY	442.763	WBFM - NXDN	YES
RIVERVIEW	444.425	NXDN ONLY	NO
STUART	146.985	WBFM - NXDN	?
VERNA	145.430	WBFM - NXDN	NO
VERNA	442.950	WBFM - NXDN	NO

<http://tinyurl.com/nxdn-rptr>

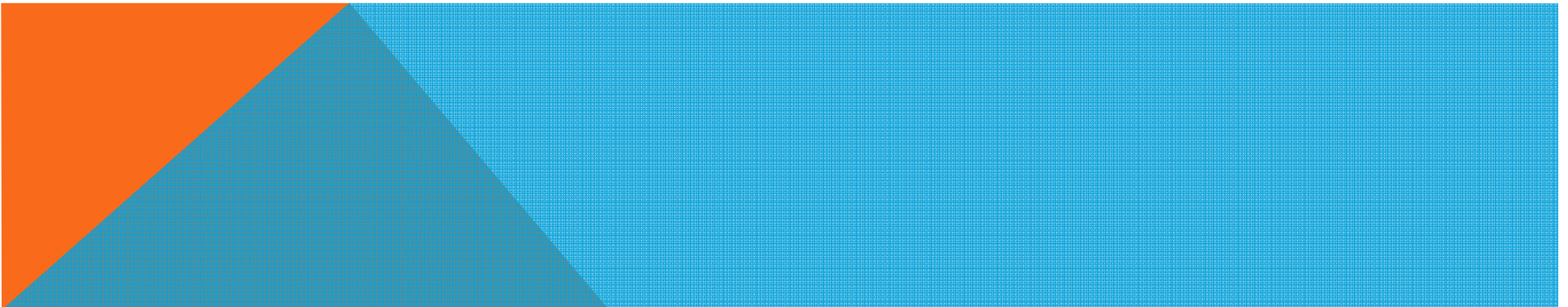


LOCAL RESOURCES

- The West Central Florida Group, is planning to convert all of the repeaters in their NI4CE repeater system to NXDN repeaters. This is partially done now, with some repeaters in Mixed Mode, and one repeater in digital only mode.

<http://www.ni4ce.org/>

- Currently there are separate IDAS and Nexedge networks, mostly in North America. They can be connected together if desired and when the required hardware and software are implemented. That is up to the network owners / operators.



LOCAL RESOURCES

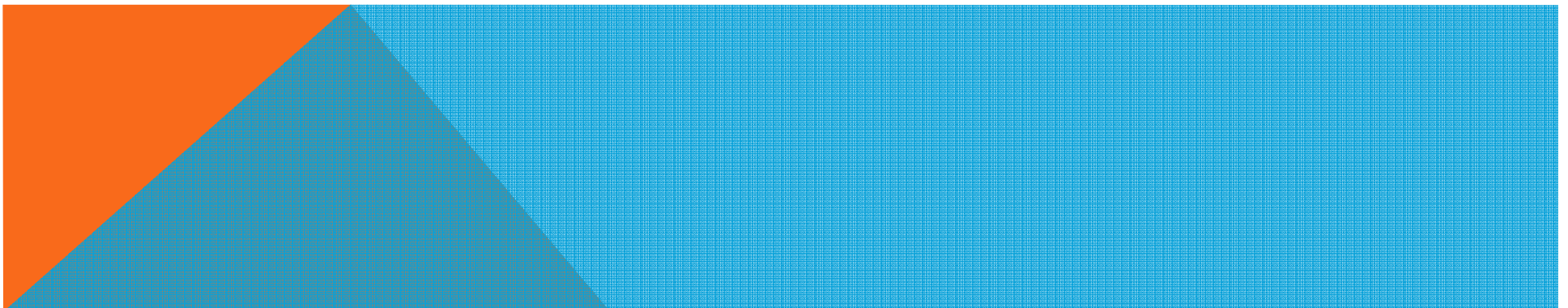
- NXDN WW Kenwood Talk Group List

NXDN

General 1 | General 2 | Trunking | Conventional | Unit ID List | **Group ID List** | Status List | Status | GPS

Total 11/250

No.	ID	ID Name	Transmit Inhibit	Alert Tone	
1	1200	FLA WIDE TG	No	2	
2	1201	NFL TG 1201	No	Common	
3	1202	SFL TG 1202	No	Common	
4	1203	WCF TG 1203	No	Common	
5	65000	NXDN WIDE CALL	No	Common	
6	65001	ITU REGION 1	No	Common	
7	65002	ITU REGION 2	No	Common	
8	65003	ITU REGION 3	No	Common	
9	1	TG 1 OLD	No	Common	
10	ALL	ALL CALL	No	1	
11	12345	DATA TG	No	Common	
12					
13					
14					



DEMO ?

Maybe

