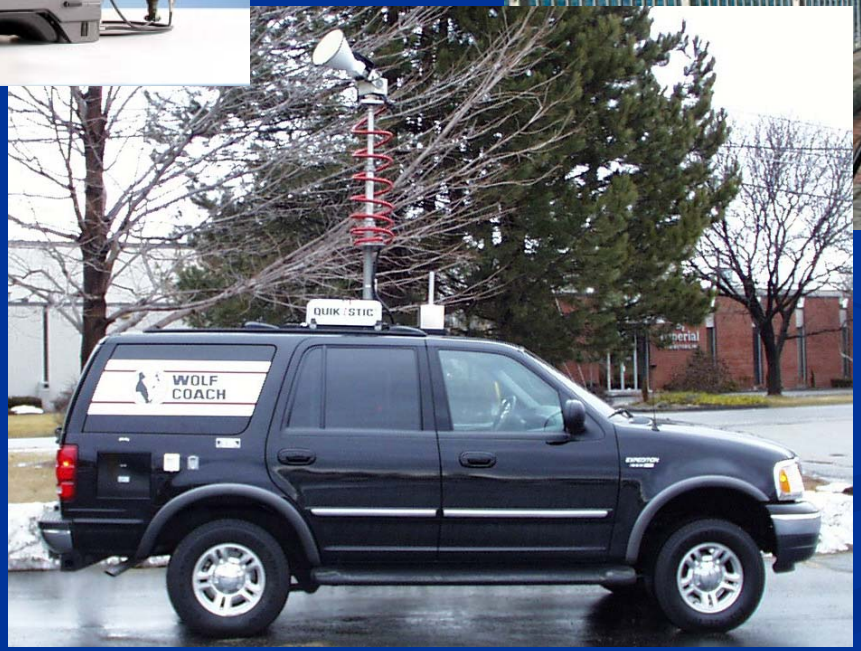
7 GHz ENG Solutions

ENG today



Why 7 GHz?

- More channels to use.
- More bandwidth – 20 MHz
- Allows migration to HD
- Multiple transmissions per channel.
- Less interference.

7 GHz realities

- Propagation – increase free space attenuation.
- More attenuation per reflection.
- Doppler effect.
- Directional antenna alignment.

7 GHz Solution

- High gain antenna.
- LDPC Error correction.
- Maximum Ratio Combining diversity.
- Linear amplification, cleaner RF chain.

7 GHz solutions (con't)

- Wider carrier spacing.
- Deep Interleaving.
- Multi-site diversity.
- More antennas per site.

LMS-T

- COFDM, 512 carriers.
  - LDPC enhanced FEC (same as DVB-S2)
  - QPSK ½ FEC (DVB-T) equals QPSK 2/3 FEC (LMS_T)
- 10 MHz channel, more data per channel.
- Optimized for HD .
- Enabler for 7 GHz.

LMS-T vs DVB-T

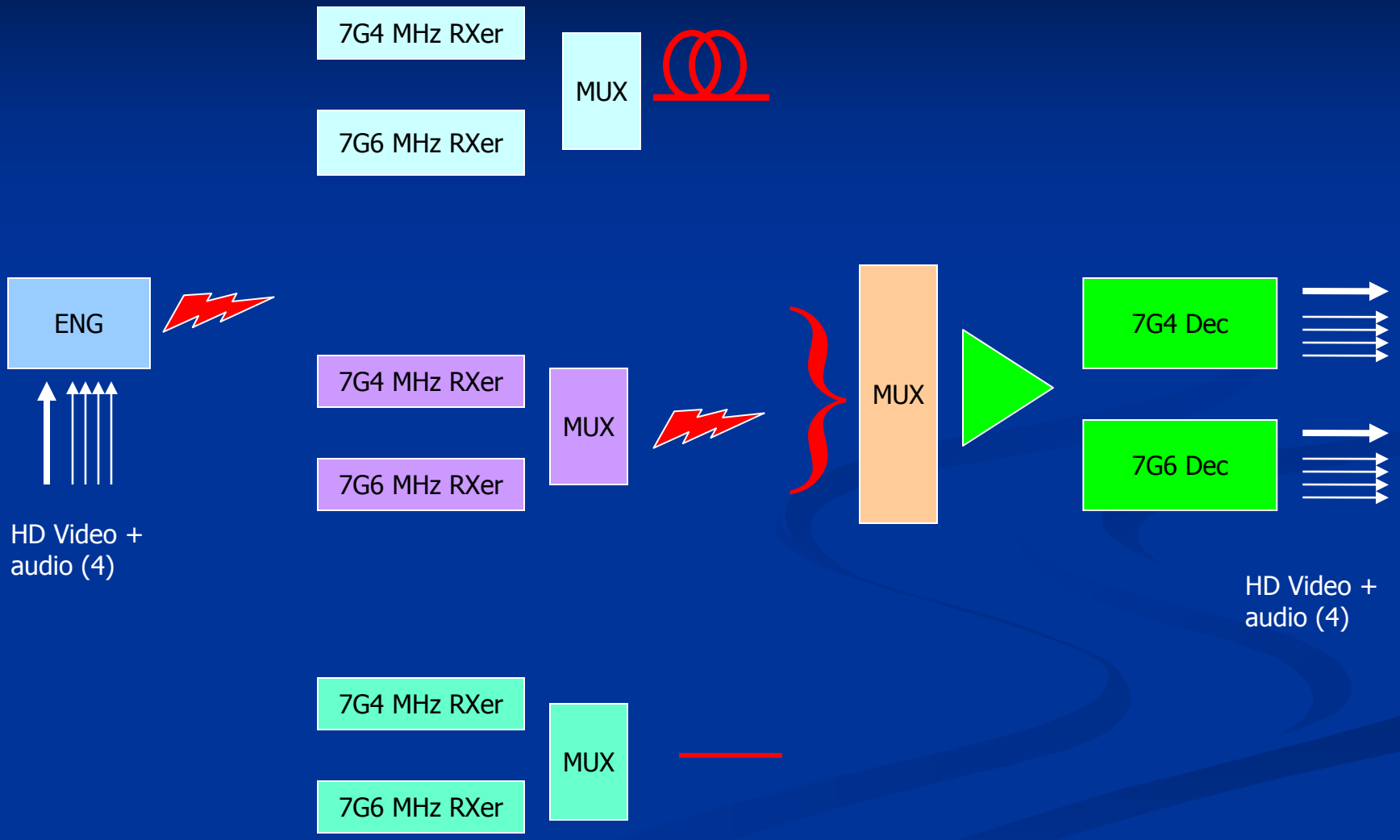
- 5.5Mbps equivalent to 9.7 Mbps, 33% increase bandwidth.

COFDM Technique	Modulation	Forward Error Correction	Data thru put	Diversity Improvement	Threshold	System Gain
DVB-T	QPSK	2/3	7.37Mbps	5 db	-92 dbm	133db
DVB-T	16QAM	2/3	14.75Mbps	5 db	-86 dbm	127db
DVB-T	64QAM	2/3	22.12Mbps	5 db	-80 dbm	119db
LMS-T	QPSK	2/3	9.7Mbps	5 db	-94 dbm	135db
LMS-T	16QAM	2/3	19.5Mbps	5 db	-88 dbm	129db
LMS-T	64QAM	2/3	29.1Mbps	5 db	-83 dbm	122db

Deep Interleaving

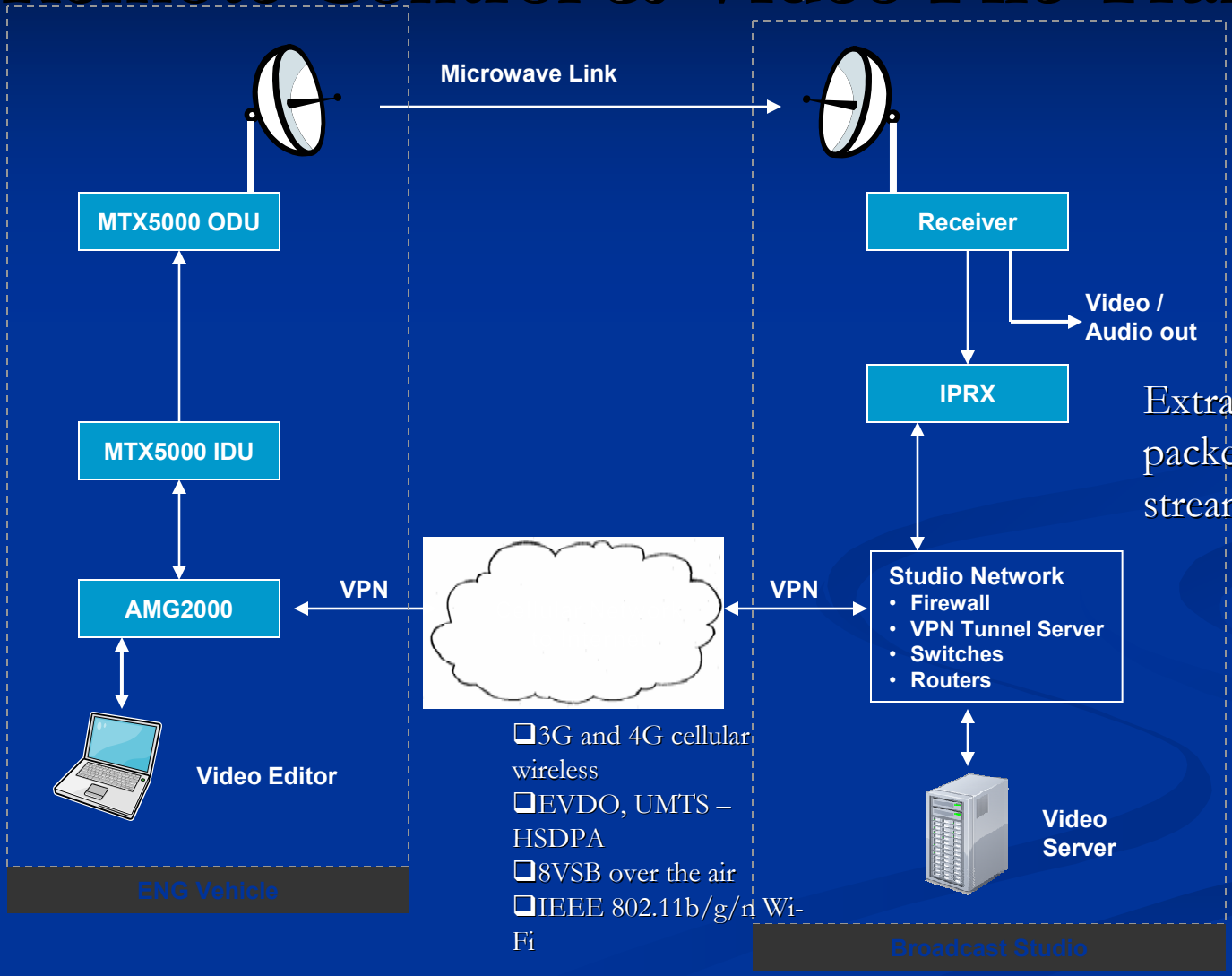
- Eliminates picture loss caused by RF signal drop outs.
- Compensates for RF loss of up to 4 seconds.
- Instantaneous relocking.

Receive Architecture



ENG Automation

Remote Control & Video File Transfer



Extracts MPE IP packets from ASI stream

Conclusion

7 GHz Digital ENG is happening.

- More channels.
- More bandwidth.
- More HD.
- More flexibility.