Applying Codec2 To Amateur Satellite Operations

Bruce Robertson, VE9QRP

Amsat Symposium, 2012

QSO with ZL3IN in Early 2011

About 45 min. conversation

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The complete recording of both sides of the conversation could fit on a 1.4MB floppy disk

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- Encouraged David Rowe, VK5DGR, to repurpose the work in his Ph.D. thesis to this end
  - Built community and code base
  - Won ARRL technical innovation award in 2012

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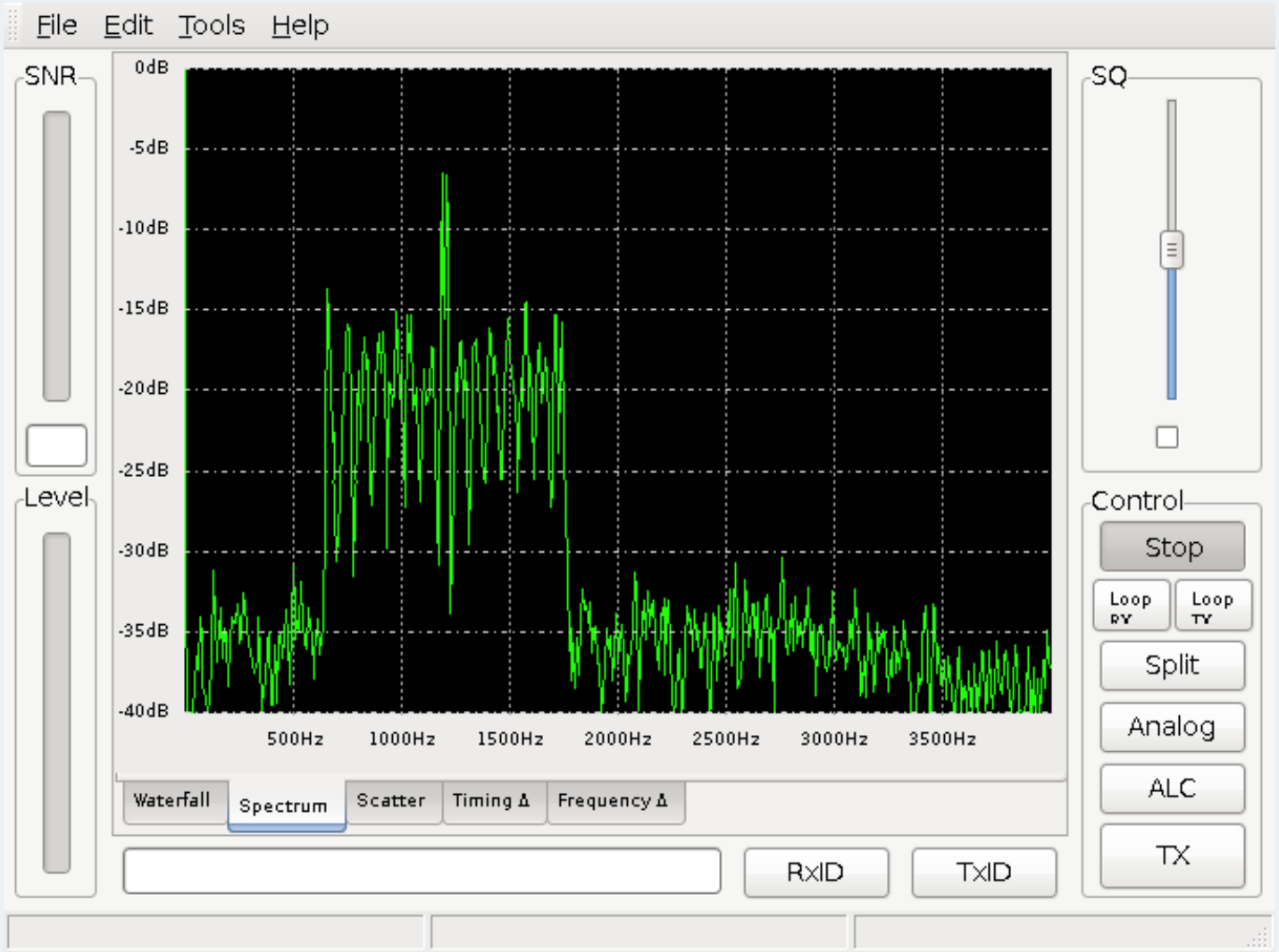
- Modems:
  - 1400 bit/s FDMDV
  - 4800 and 2400 (early) GMSK

FDMDV2 Teaser



Hardware

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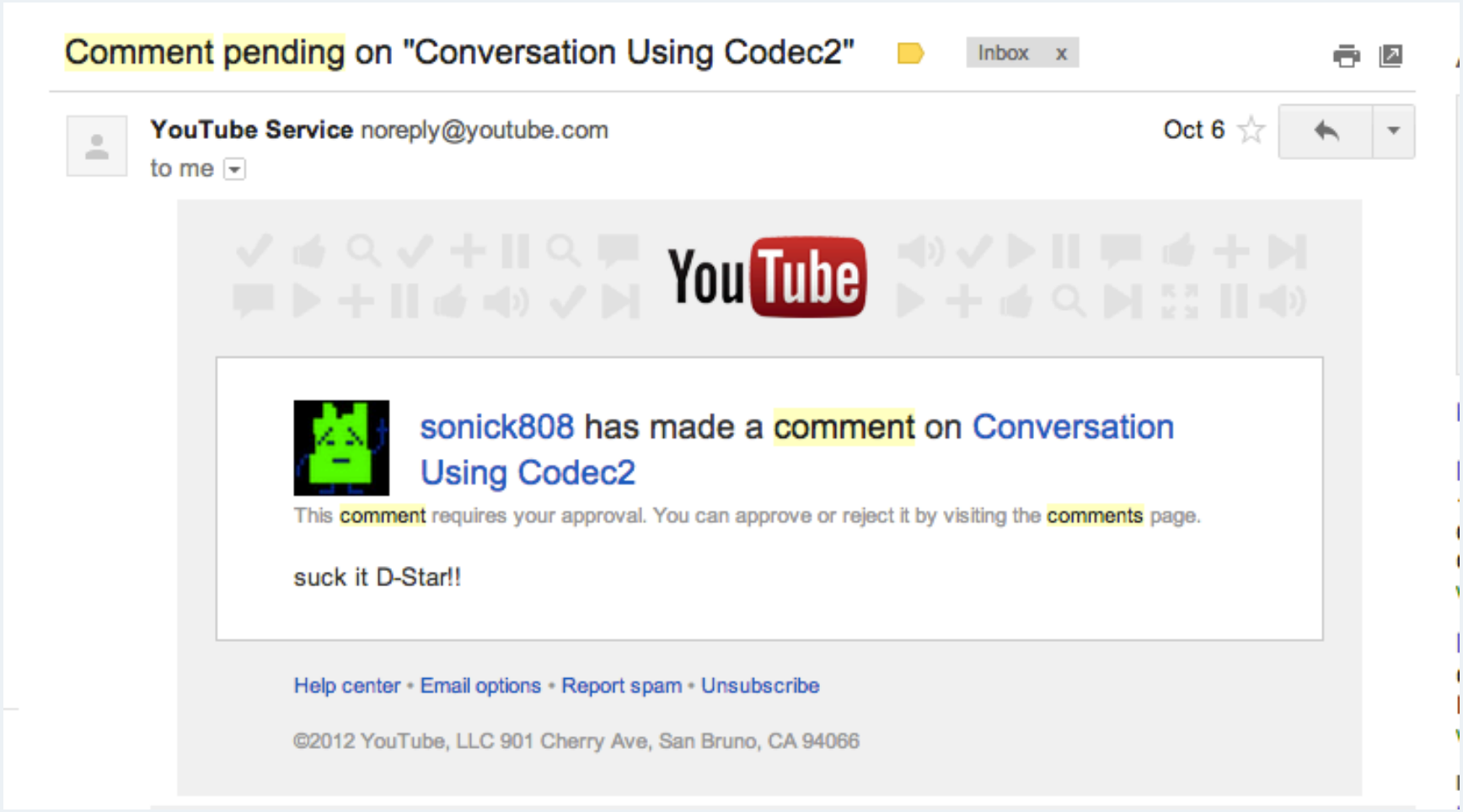
- But many satellite stations have a computer attached

Philosophy


Comment pending on "Conversation Using Codec2"
Inbox x
YouTube Service noreply@youtube.com
to me
Oct 6
YouTube
sonick808 has made a comment on Conversation Using Codec2
This comment requires your approval. You can approve or reject it by visiting the comments page.
suck it D-Star!!
Help center • Email options • Report spam • Unsubscribe
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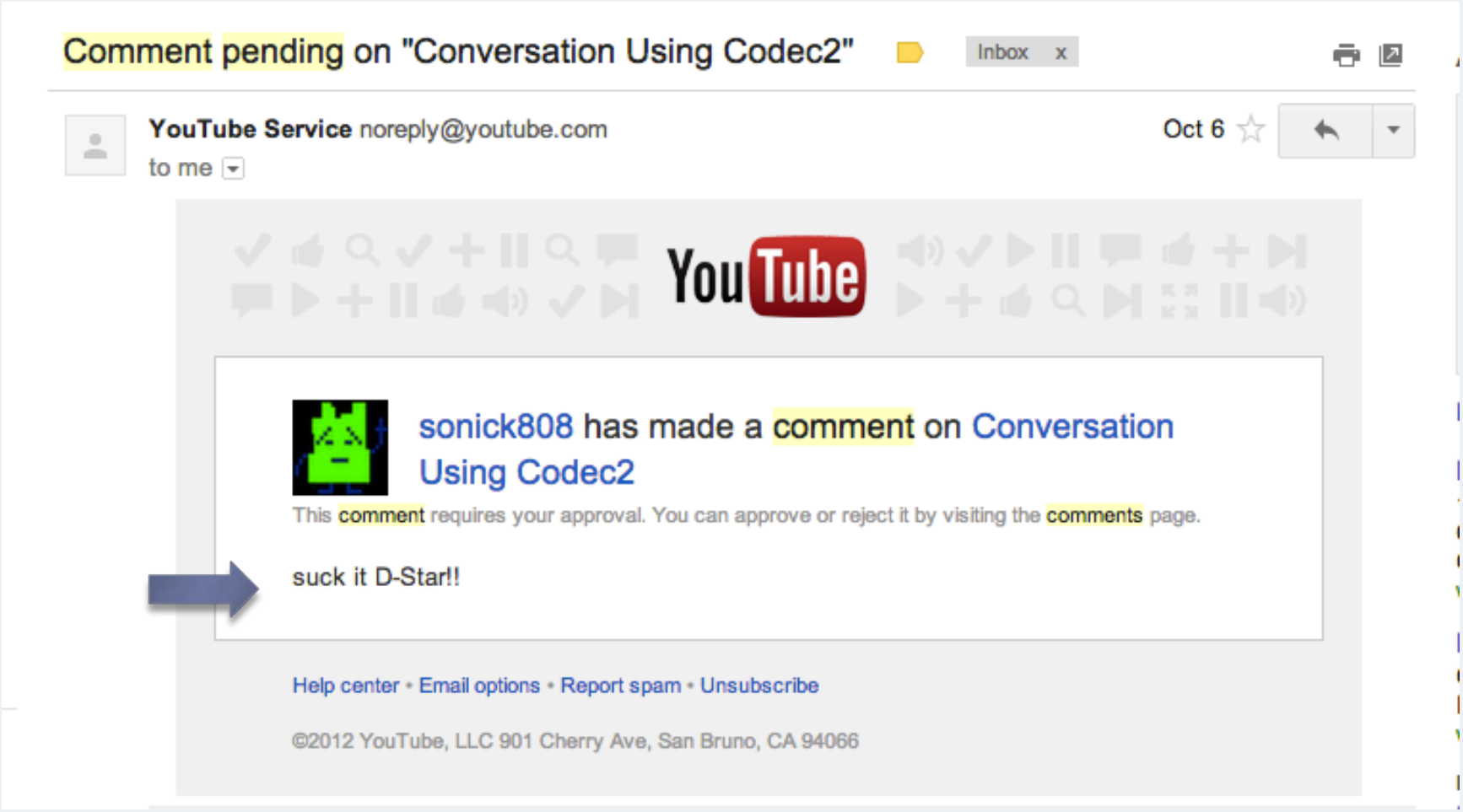
Philosophy


Comment pending on "Conversation Using Codec2"
Inbox x
YouTube Service noreply@youtube.com
to me
Oct 6
YouTube
sonick808 has made a comment on Conversation Using Codec2
This comment requires your approval. You can approve or reject it by visiting the comments page.
suck it D-Star!!
Help center • Email options • Report spam • Unsubscribe
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  - Hijacking D-Star

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  - Hijacking D-Star
- Current emphasis on HF voice

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For example?

I. Experiment With Today's Satellites

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- TWO FDMDV channels (x 1050 Hz) through one FM bird
  - Who's going to call that an Easy-Sat? ☺
- FDMDV signal acquisition and doppler correction

2. A Codec2 Demo. Mode

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- Codec2 can bridge the voice / digital gulf
  - Allows a functionally digital mission
    - To assist in improving voice communications
    - To provide voice communications
  - No more ‘beep boxes’
- Digital comms. should be arranged with this possibility in mind
  - 1200 AFSK won’t cut it
  - 2000-2400 BPSK/QPSK?

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  - E.g., what sort of modulation technique and how much error correction would be helpful in LEO?

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- Challenge:
  - Including efficient codec2 modulation code in on-board computing system

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  - (Twit's live stream to shoutcast)
    - ```
      gst-launch souphttpsrc location=http://twit.am:80/listen ! Mad ! Audioconvert ! Audioresample ! Audio/x-raw-int, rate=8000, depth=16, signed=true ! Fdsink fd=1 | c2enc 1200 - - | src/c2dec 1200 - - | gst-launch fdsrc fd=1 ! Audioconvert ! Vorbisenc ! Oggmux ! Shout2send mount=/stream.ogg port=8000 password=password ip=localhost
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- Introduce random errors into FEC-encoded Codec2 to evaluate interleaving approaches
  - Extra points: make a website that crowd-sources the scoring of various approaches


      ```

Last Word to the Codec

- 2.1 kB message at 1200 bits/s
- Come see me for a record/playback session with my laptop