

Maximum SDR Operation

Demonstration of Anan-100D and Thetis

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The fun part is the demo!

But I need to tell you
what you're looking at...

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Topics

- ▶ How I got here - my history with this radio
- ▶ What is Thetis software - runs in the PC, it's the entire user interface
- ▶ What is Apache Labs - company in India produces only hardware
- ▶ What is Anan 100D - black box radio
- ▶ Demo

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How I Got Here

I wanted to:

- ▶ Analyze 6m signal polarization
- ▶ Minimize local noise
- ▶ Avoid Flex Radio systems
- ▶ Tinker with diversity receiver

Apache Labs Anan-100D released in 2013

I purchased in 2014 for about \$3K

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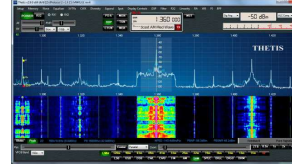
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What is Thetis Software

Thetis is an open-source
Swiss Army knife with
high-performance DSP

- Written and supported by amateurs
- Started with HPSDR by TAPR
 - TAPR is Tucson Amateur Packet Radio, founded in 1981
 - HPSDR forked to OpenHPSDR
 - Which was then forked to PowerSDR
 - In turn, forked to SmartSDR by FlexRadio
 - And also forked to Thetis
 - and then ridiculously improved beyond Flex Radio
- Maintains 10–100 Mbps datastream to radio
 - Demodulation is all in PC



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What is Apache Labs

- ▶ Manufacturer in India
- ▶ Headquarters in California
- ▶ The hardware arm of TAPR & PowerSDR
- ▶ They don't write or support software
- ▶ "Anan" product line is named after the owner's daughter

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What is Anan 100D

- ▶ Blank box
 - Antenna, mic, key goes in
 - Network cable, speaker comes out
- ▶ NOT a big-knob-and-dial radio
- ▶ Directly samples antenna
- ▶ Intended for experimenters
 - Software has matured
- ▶ Two ADC for dual synchronous receivers
 - Aka “dual channel coherent SDR”



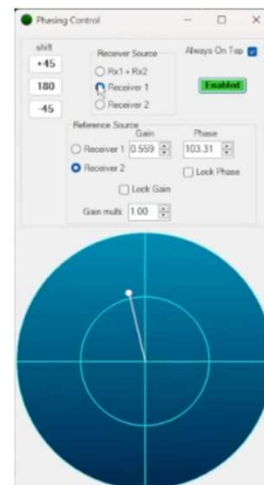
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Diversity Reception

- ▶ Combine signals from two antennas
 - Datastream has two I/Q channels
 - Enhance signal up to 3 dB
- ▶ Antenna config depends on goal
 - Spaced apart for directivity, “beam forming”
 - Antenna polarization combats fading
 - Noise antenna can null local interference



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Radios with Diversity Reception

- ▶ Radios with diversity reception
 - Anan 100D, 200D \$3K 16-bit ADC
 - Anan 7000DLE, G2 \$4K "
 - Icom IC-7610 \$3K "
 - SDRPlay RSPduo \$0.3K 14-bit ADC

- ▶ Radios with dual synchronous receivers
 - Flex Radio 8600 \$5K software "in the next release"
 - Elecraft K4D \$6K one antenna in each ear

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Demo – The Visuals

- ▶ What's around the borders
- ▶ Panadapter, waterfall, scope
- ▶ Collapse, Expand
- ▶ Changing bands
- ▶ Tuning
 - Panning and Zooming
- ▶ WWV, SSB, CW
- ▶ Calibrated S-meter

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Demo – The Basics

- ▶ Audio filters
 - Brick wall skirts
 - No ringing
- ▶ Digging out weak ones
 - Noise reduction, 4 types
 - Noise blanker, 2 types
 - Notch filter, manual and automatic
 - AGC
 - Binaural output

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Demo – Advanced Operation

Two receivers on different bands
Diversity reception
Pure Signal
Record/playback voices
Add meters to UI
Tx equalizer

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