REMOTE CONTESTING WITH FLEX-6000 SERIES RADIOS

TAKING A MAINSTREAM RADIO PLATFORM AND MAKING IT CONTEST READY

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WHAT WE WILL COVER TODAY

✈ A brief history of how we got here

✓ What we need to contest with flex, and a brief architecture overview

🖥 Looking at the transceiver or server and station

🏠 Interfacing our logger to the remote setup

▯ Making a few q's .. Supporting the team – quick remote solution – mobile – from the office

A bit more interesting.. Using separate devices for pan adapters etc

FOR THE WIN – a competitive setup that allows for the most demanding contester

A LITTLE RECAP OF REMOTE OPERATION

- Early remotes used a "clooge" of different technologies. (K6LRG ~2010). I suppose we could call it Home brew remote!
  - Skype or IP sound for audio
  - VNC for remote desktop
  - Various computer applications, some off the shelf some custom to track VFO/Band etc.
  - Not super efficient to contest with.. Maybe dx or make a contact or 2
  - Quality not that great.. But the future was cemented. It WAS possible.
  - (DX entity counts start racking up from LRG)

A LITTLE HISTORY CONTINUED…

- Different hands off problems being resolved..

- VFO control

- Rotator control

- Inter station interference

- Still rather complicated
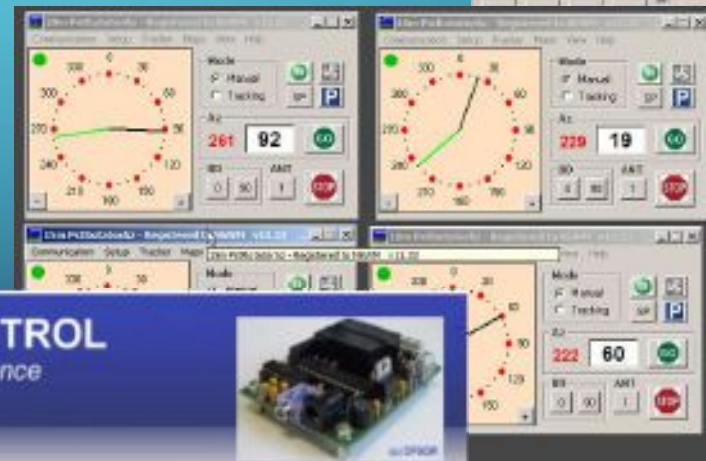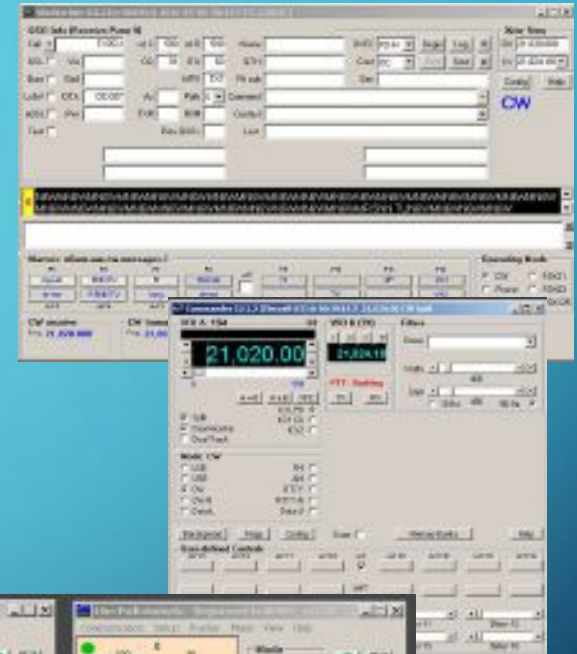
EASY-ROTOR-CONTROL
Rotators driven by intelligence

E R C

MORE REMOTE EVOLUTION HISTORY - DISRUPTIVE TECHNOLOGY

- Remote Rig system and like clones appear

- Still enabling non remote technology for remote

- Contest experimentation begins in earnest.

- Remote businesses start showing up on the landscape.. RHR, ETC.

WHAT WE NEED TO CONTEST REMOTELY WITH FLEX

- A Flex Radio transceiver used as a server activated with SmartLink system

- Station automation necessary to switch antennas, amplifiers etc.

- Your choice of control interface

- A Windows based PC locally(N1MM), and Optionally one at the remote site, with RDP, Flex CAT/DAX software installed – logged into SmartLink

- Internet connection with adequate bandwidth

- Optional enhancements for top competitive level.

# BUILT FROM GROUND UP AS CLIENT SERVER ARCHITECTURE

- Original implementation was lan based, but allowed us to innovate , use vpn etc. to start remoting

- Later implementations introduced LAN remote

- LAN remote evolved into SmartLink broker system allowing efficient and easy remote control
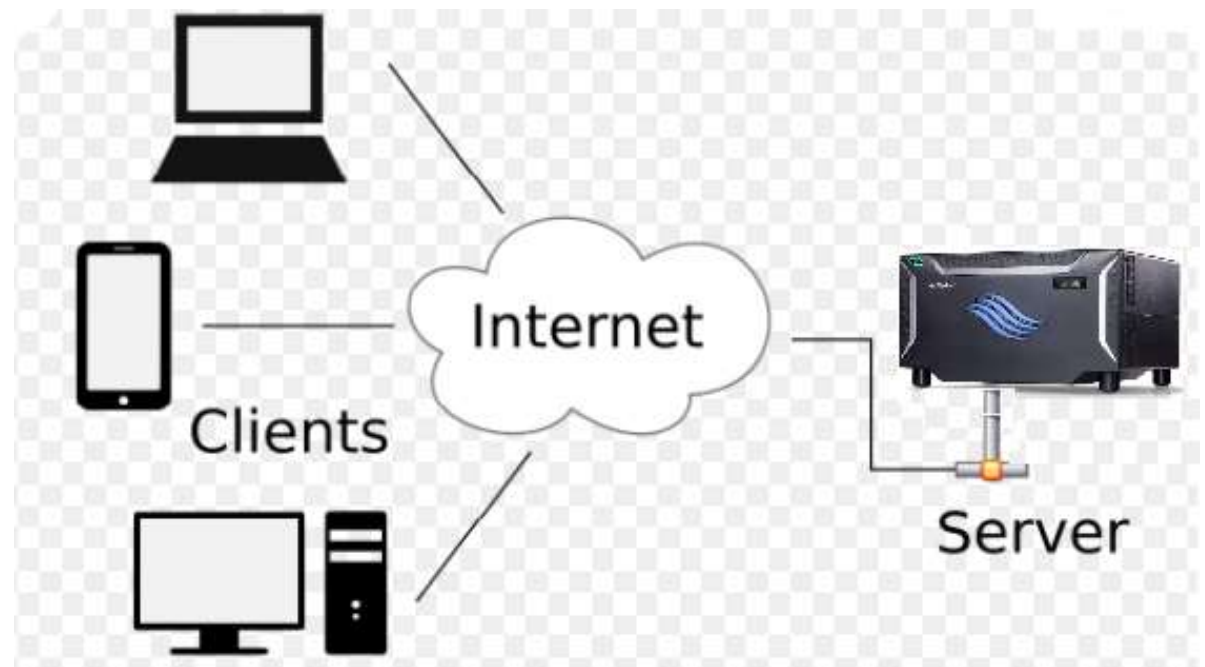
LETS JUMP RIGHT IN – CONTROL INTERFACES, AND CLIENT SERVER ARCHITECTURE = LOTS OF CHOICES

Maestro - Client
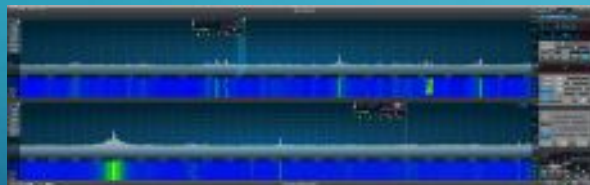
Smart SDR for Windows – Client (can be on same pc as logger or not.. Your choice.)

FLEX-6600

Transceiver /Server

SmartSDR Mac - Client

SmartSDR iOS - Client

LETS LOOK AT THE SERVER AND STATION
FLEX 6000 SYSTEM (6600 6700 SO2R READY, 6300 6400 SAME BAND SO2R READY - NOT FULL DUPLEX)

FLEX-6600

- Needs to be LAN and Internet connected

- Automation, antenna switches, amp control all need to be functional and remoteable

- Flex has a FTDI based usb interface that can support RS-232, BCD, various relay boards to drive peripherals

- PGXL is a fully integrated solution with flex clients

- Honestly – most of the work needed will be here

100W SETUP CAN BE A FLEX TRANSCEIVER AND AN ANTENNA, LAN AND INTERNET

- 100w and an antenna represents the bare minimum.

FLEX-6600

But we are contesters right??

LAN BASED PERIPHERALS

- Easiest to integrate

- PGXL control integrated into SSDR – is keyed over LAN

- 4o3a perepherals often support flex native

LEGACY AND OTHER NON-NATIVE PERIPHERALS

- USB interface offers support for quite a few FTDI options

- SteppIR control, relay support by band etc.

- Broad set of non-flex and legacy equipment can be automated
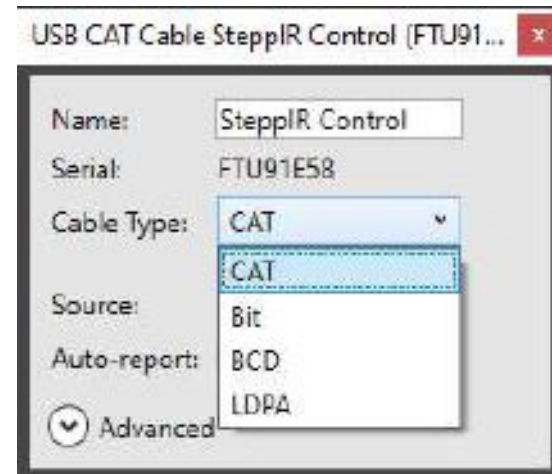
6600 REAR PANEL

- Up to 3 tx relays can be implemented

- Multiple USB devices as shown previously

- REM on is equivalent of a button push with a relay

REMOTE POWER CONTROL IS ALSO VERY USEFUL

- Allows you to turn things on and off remotely

- This can also include relays that can be actuated by 110v voltage

- Can cycle a misbehaving PC, etc.

A PC AT THE REMOTE SITE CAN GIVE ADDITIONAL CONTROL

- Doesn't need to necessarily big power for basic functions

- Small form factor etc.

OFFERS CONTROLS FOR VARIOUS OTHER COMPONENTS YOU MAY PUT YOUR HANDS ON WHEN IN THE SHACK

- Rotor Control

- Automated tuners

- watt/swr meter

- Control of other things not directly connected to the radio server
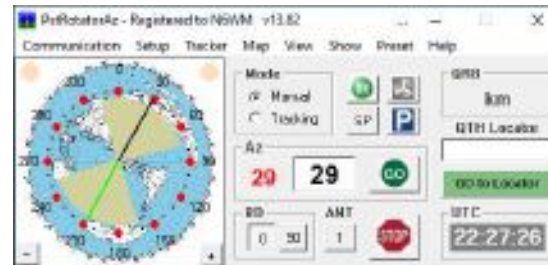
AND IN ANOTHER POSSIBLE SCENARIO MORE COMPREHENSIVE CONTROL, LOGGER AT REMOTE SITE, ETC. WE WILL COME BACK TO THIS LATER
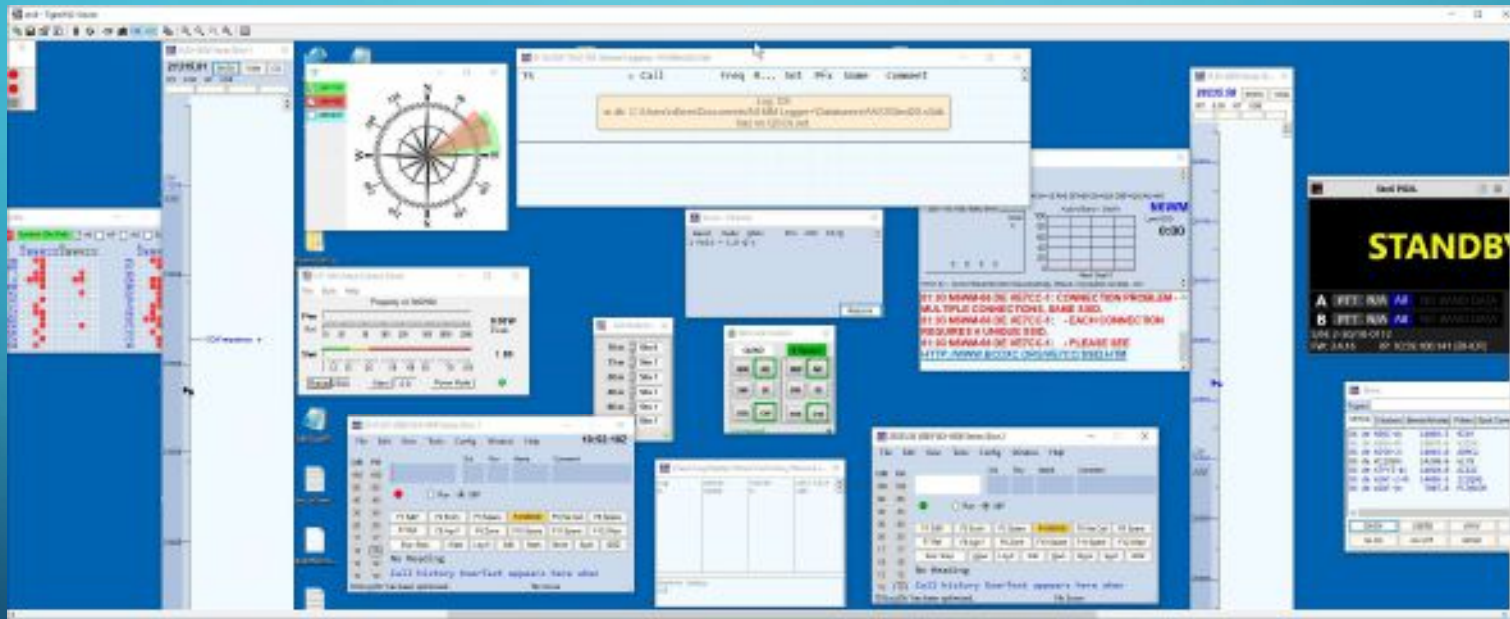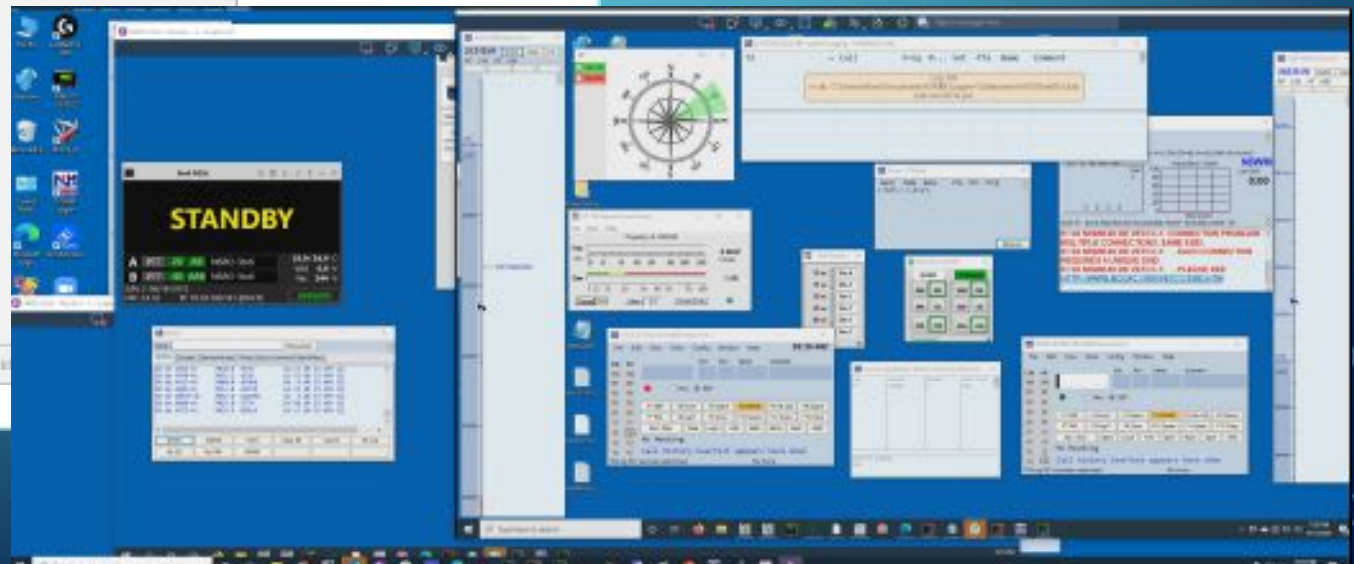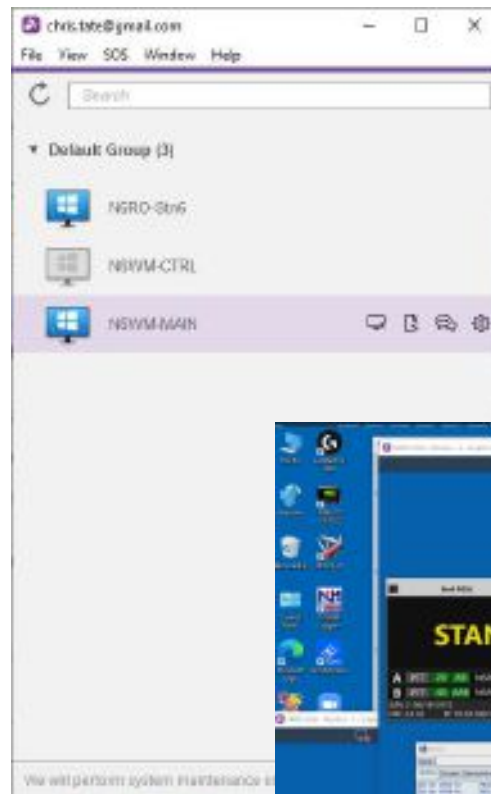
A BIT ON REMOTE DESTKOPS - VNC

- VNC variants are free

- Allow for lowering resolution improving bandwidth

- You need to handle port throughs and access

- Screens can be a bit difficult to make comfortable

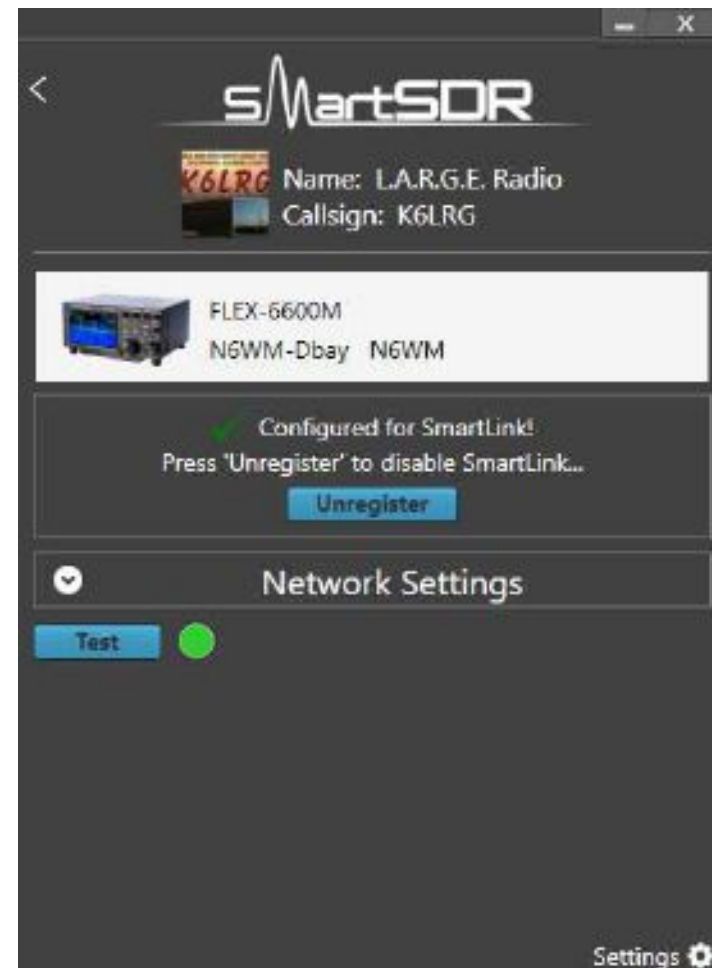- Multiple monitors are represented as a contiguous window
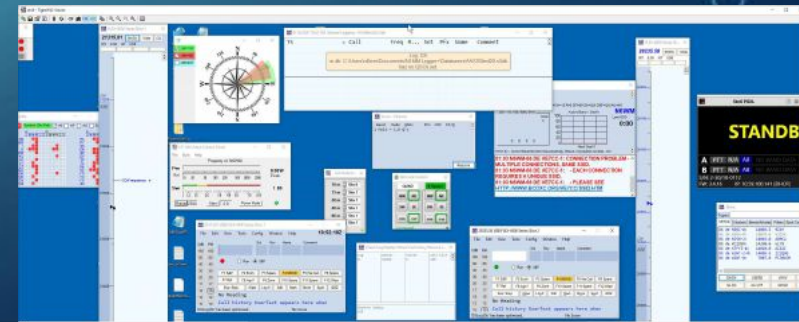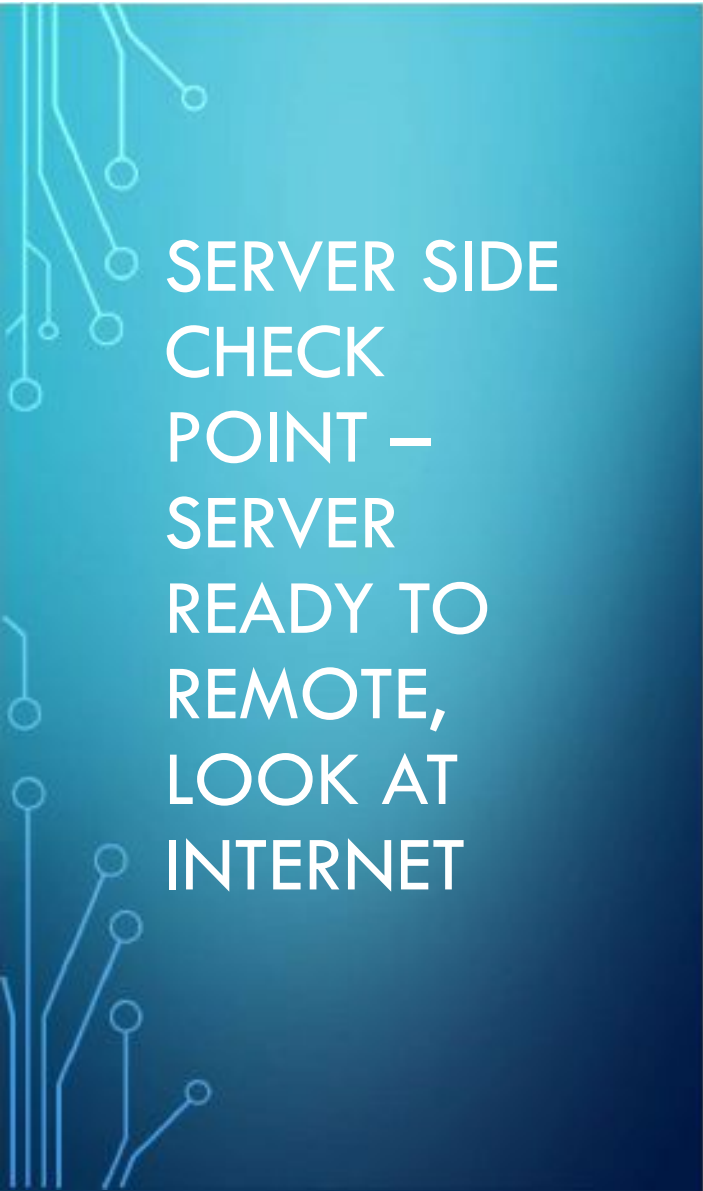
PAY SOLUTIONS – LIKE SPLASHTOP

- Inexpensive
- Allow individual windows per monitor – more flexible

AFTER YOU HAVE IT ALL DIALED IN

- Register radio with SmartLink servers

- Just do this 1 time on the transceiver MUST BE ABLE TO ASSERT LOCAL PTT TO ACTIVATE

- Clients log in separately

SERVER SIDE CHECK POINT – SERVER READY TO REMOTE, LOOK AT INTERNET

Can be a simple setup, transceiver, antenna, LAN and Internet connection – this can get you on the air, and making QSO's

More complex stations will require additional prep work to make sure everything works – AUTOMATION

Work out the usual issues for SO2R, antenna separation, isolation, harmonic suppression, RFI

Server setup and tested OK for SmartLink

Optional in shack PC is setup, and remoteable via Remote desktop

Adeqauate remote power solution is in place

INTERNET CONNECTION IS IMPORTANT ON BOTH SIDES OF THE CIRCUIT WE ARE GOING TO NEED A GOOD CONNECTION

For remote of systems, UPSTREAM SPEED IS EXTREMELY IMPORTANT

If you have 500Mbit downstream and 1mbit upsteam for instance, you will have issues even though the internet is perceptibly screaming fast when at the site

Avoid high latency connections, for instance, Hughes satellite services have upwards of 800ms of latency. Not useable

Cable services provide some better upstream capabilities

Some DSL services also, but is dependant on distance from CO, etc. And can be problematic

NOW THAT WE HAVE WORKED THAT OUT – LETS GO TO OUR REMOTE SHACK AND SETUP FOR A CONTEST

We will use SmartLink to make our client connection to the radio server

Our connection options and complexity for the logger depend on what our contest intentions are

| If we want to just make a few qso's keep it simple | If we are going to try and be competitive, we will require more tools | We will cover some of these scenarios |

SMARTLINK – ENABLING EASY CLIENT SERVER ACCESS

- Flex V2 and later

- Broker system for easy flex radio client server connections

- One time setup and activation of server

- Can log in from various clients easily

- Compression makes bandwidth usage much more efficient

- Does add latency as compared to direct connect solutions (VPN).

INTERFACING WITH YOUR RIG– SMART CAT AND SMART DAX ARE ALSO SMARTLINK ENABLED

SMART CAT – VIRTUAL COM ON STEROIDS

- Ports can be added and removed as needed

- Just need to take note of ports for setup of your logger environment

- All work over SmartLink remote environment

HOW THIS IS IMPLEMENTED ON YOUR LOGGER

DAX GIVES US REMOTE AUDIO "CABLES" AS WELL

HOW AUDIO DEVICES APPEAR IN CONTEST LOGGER

- Audio devices can now be selected in N1MM to setup voice recordings and tx audio from logger

- Digital applications and receive and send audio streams to server
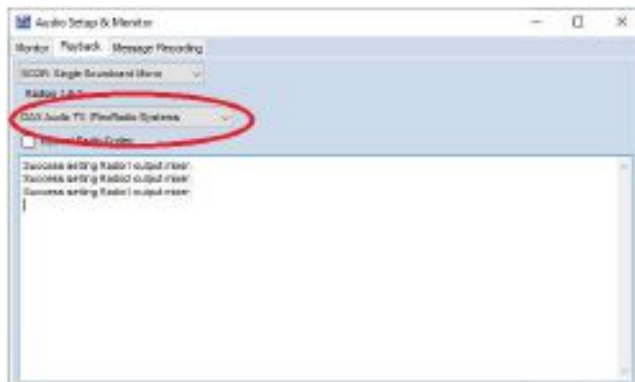
THESE TOOLS ALLOW FOR REMOTE CAT INTERFACE, AS WELL AS AUDIO INTERFACES FOR RTTY, DIGITAL.

A QUICK SLIDE ON MIC/HEADSET OPTIONS

A FEW REMOTE FLEX SCENARIOS

- Lets go through some of the many scenarios available to us for flex remote

- This can be very simple, get on the air, to competitive level

- Lots of different options once you have your server environment dialed in the way you want it

FLEX REMOTE – MOST BASIC SMART LINK SETUP

- Easy and quick setup

- Can fully utilize any SO2R setup you have enabled on the server side

- Gets you on the air quick

- If a PC is needed for rotor control or anything else, VNC is optional

AN EXAMPLE OF A QUICK SETUP SO2R FROM THE OFFICE

- Here is a contest setup at an office setting

- Usb based monitor for expanded screen real estate

- This example has SSDR win client, and logger on same pc. Lots of possibilities here.

A BIT MORE INTERESTING – ADD A SEPARATE CONTROL INTERFACE (ALSO SMARTLINK CONNECTED)

- Can use any available client.. Ipads are useful with SSDR for iOS

- Of course maestro would give you full tactile control

- If you used SSDR same as most simple scenario, could use maestro for SmartControl, but your gonna need screen real estate

A QUICK LOOK AT THE DEDICATED LOGGER + SEPARATE CONTROL INTERFACE VIA SMARTLINK

REMOTE DESKTOP TO A COMPUTER AT THE REMOTE SITE

OR

HERE ARE THOSE SOLUTIONS IN ACTION

REMOTE OPTIONS CHECK POINT

We use SmartLink feature to get a low bandwidth pan adapter experience

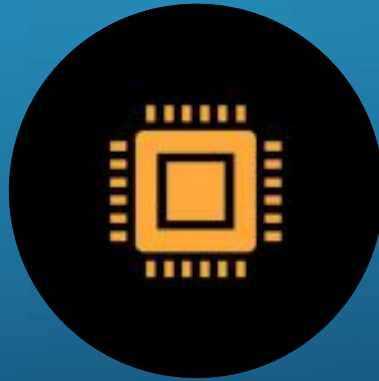We know that CAT and DAX can be used remotely over smartlink, facilitating logger interface

We can setup remote with just a computer, and we can simultaneously connect an external panadapter solution or both

We can have a local pan adapter and logger can be in remote location

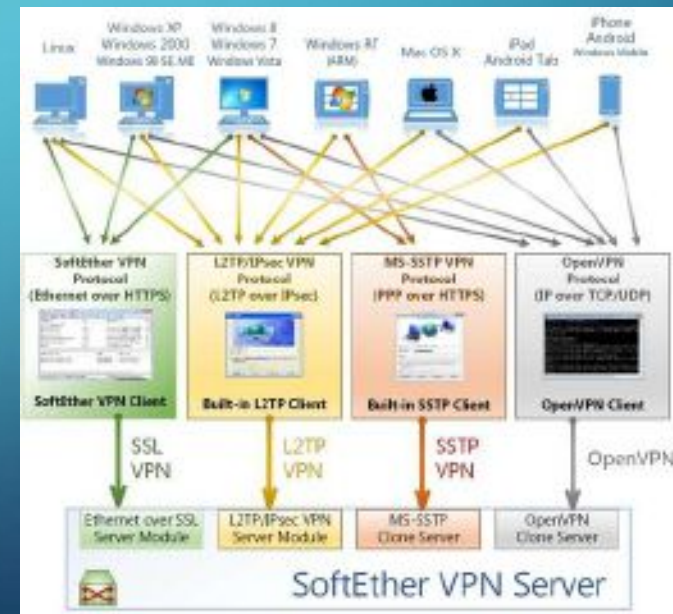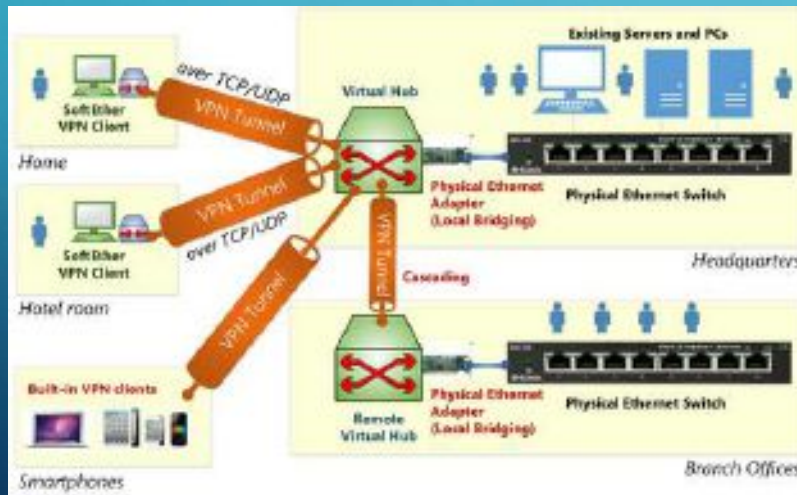# COMPETITIVE LEVEL REMOTE – SOLVING THE LITTLE THINGS

SMARTLINK, ALTHOUGH BANDWIDTH EFFICIENT, AND FUNCTIONAL ADDS SIGNIFICANT LATENCY WITH ITS NATIVE AUDIO. 300-400% HIGHER LATENCY.

FLEX HAS NOT PROVIDED A WAY TO PRODUCE SIDE TONE AND MONITOR OF LOGGER GENERATED SIGNALS OVER ANY REMOTE SOLUTION

WE COULD USE VPN AND NOT USE SMARTLINK – RIGHT?

VPN SOLVES LATENCY SOMEWHAT - BUT

✓ We now have to contend with significantly higher bandwidth usage

We still are unable to listen to sidetone/monitor of computer generated signals.. Big issues with cw.

WE HAVE NOW COME FULL CIRCLE.

- I told you we would talk about remote rig again..

- Solves most if not all of the latency and side tone issues, and remains bandwidth efficient

- A competitive remote flex scenario should include a remote rig 1258mkII solution.

- Used in combination with SmartLink, is a comprehensive solution

THE COMPETITIVE LEVEL FLEX REMOTE

- Many years of trial and error to find best solution

- Leverages a combination of low bandwidth flex smart link for Pan Adapter of your choice, as well as Remote Rig for audio, paddle based cw and foot switch

- Logger is on PC at remote site and remote desktop is leveraged. Also gives full station control experience

COMPETITIVE SCENARIO LAYOUT
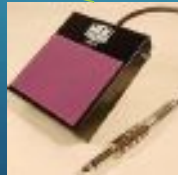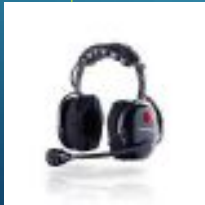
AS APPLIED – SERVER SIDE

AS APPLIED

Remote side

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QUESTIONS?
COMMENTS?

- Open discussion

DEMONSTRATION

- Depending on bandwidth attempt an SO2R demo