A Flexible Low Cost EMWIN-HRIT Receiver for the GOES-R Transition

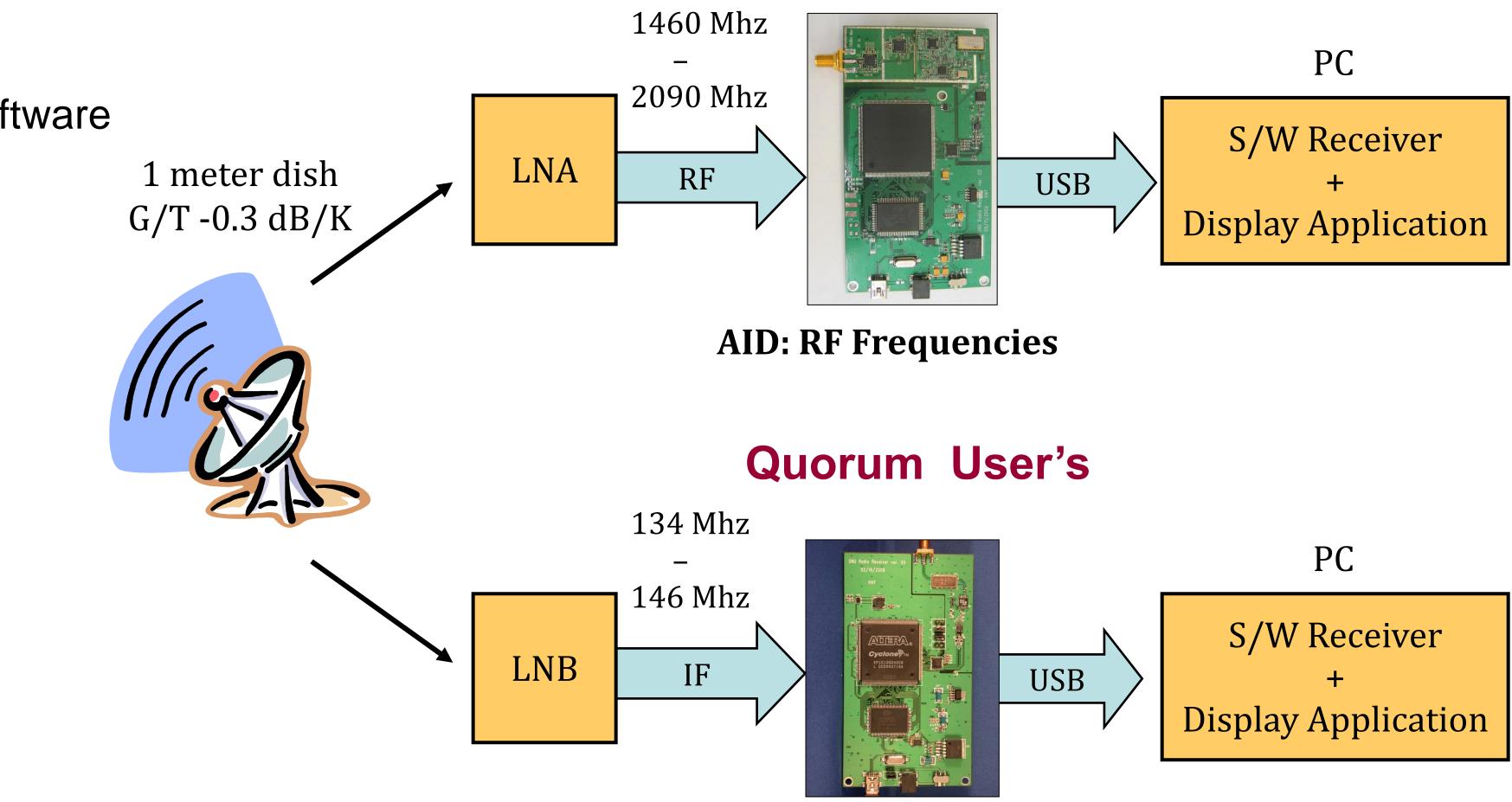
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Project Overview

- **Purpose:** To design a radio platform to ease the transition to GOES-R
- Challenge: GOES-R HRIT/EMWIN rate 927 ksps
- **Approach:** Move as much processing from hardware to software
- Architecture:
 - Software: Radio Receiver + Display Application
 - Hardware: Antenna + LNB/LNA + *IF / RF Digitizer* + PC

System Diagram Zephyrus User's



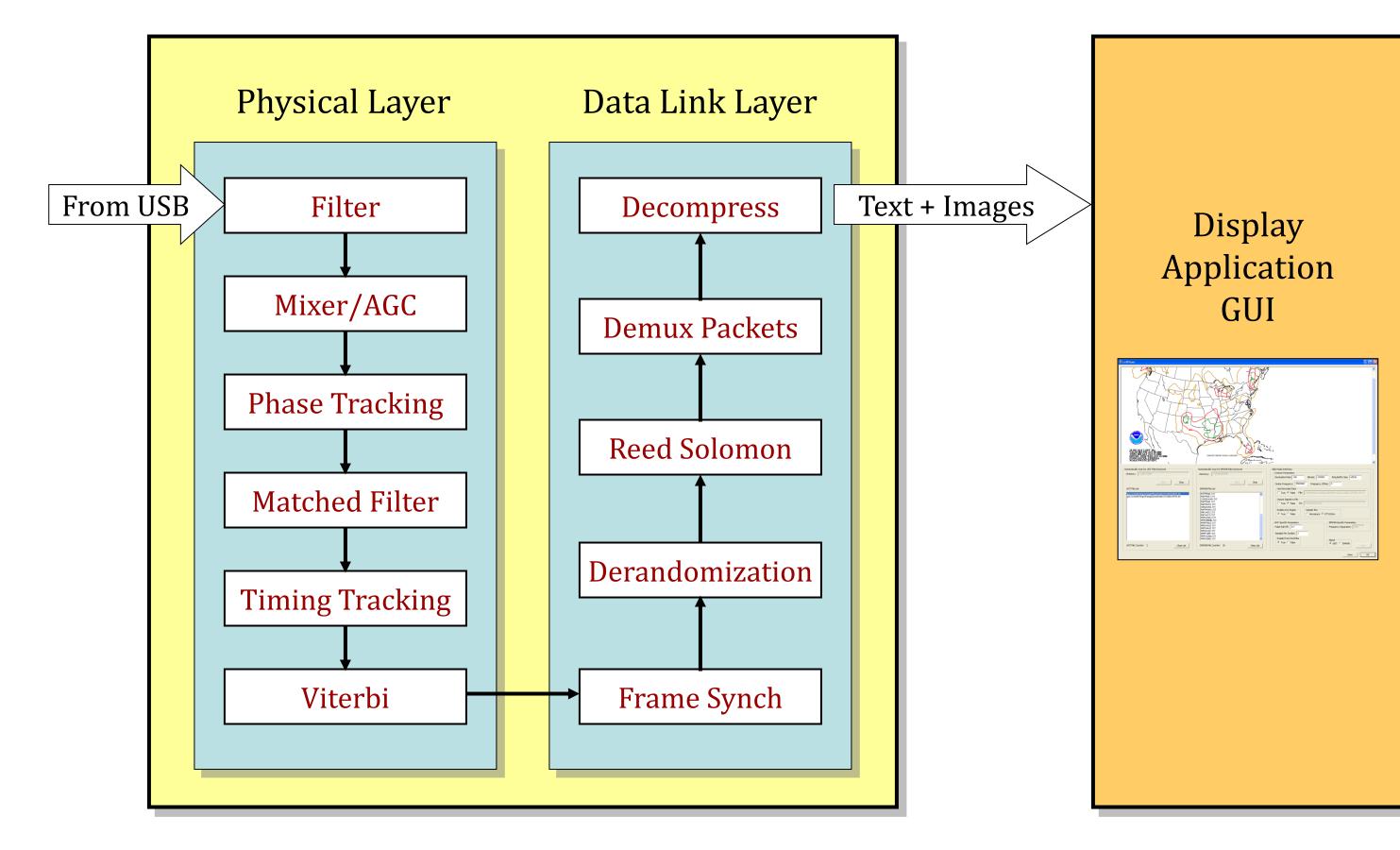
- Advantages:
 - Lower Cost and More Generic Hardware
 - Smaller Form Factor
 - Greater Flexibility
 - Upgradeability
 - Leverages Emerging Technology

AID: IF Frequencies

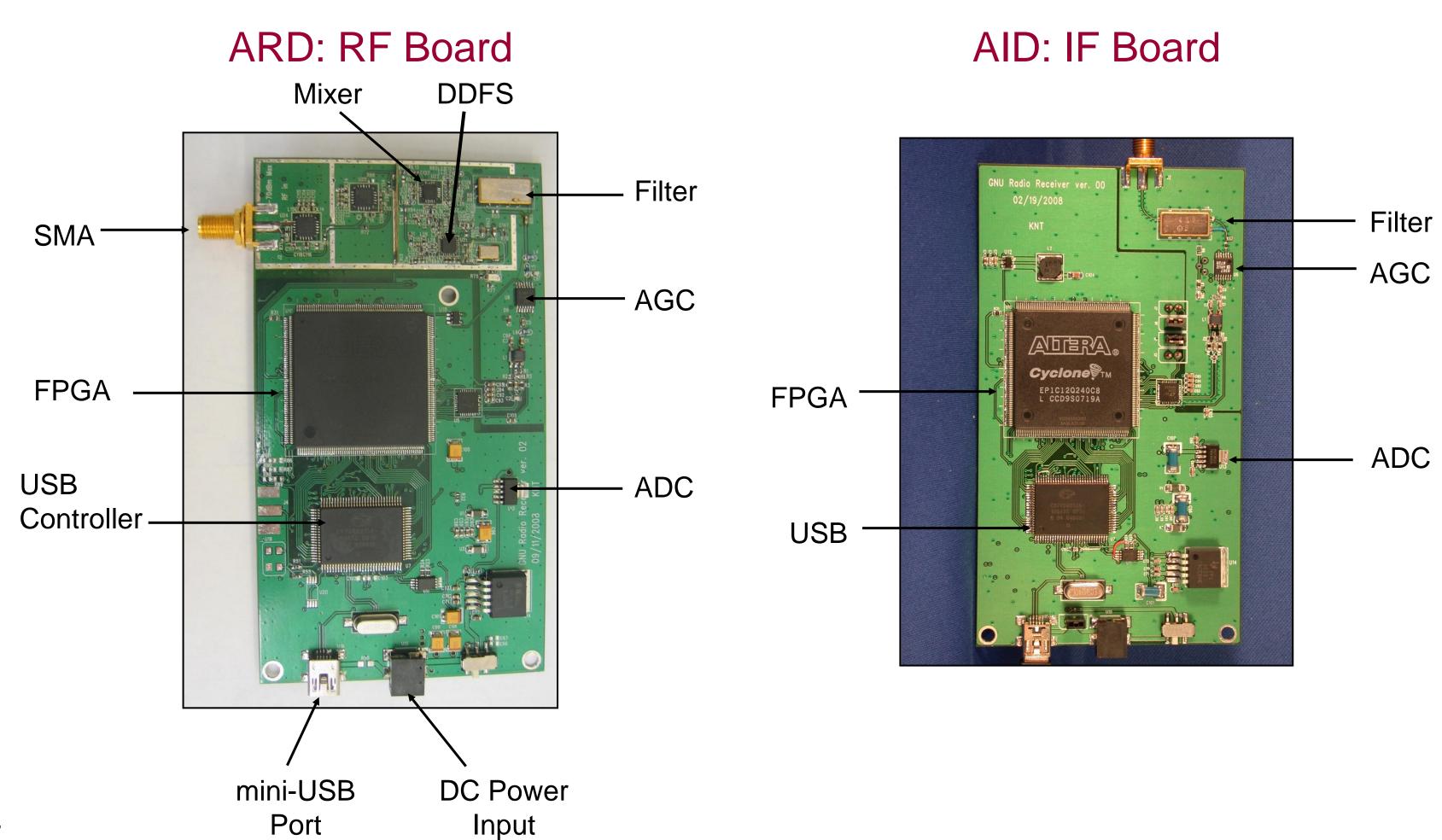
Software Receiver Block Diagram

Executable 2

Executable 1: Software Receiver



Aerospace Digitizer Boards



- The radio software and visualization software are designed to be split.
- Two different contractors can design the different applications.

Display Application GUI

Itomatically Scan for LRIT Files Received	Automatically Scan for EMWIN Files Received	GNU Radio Interface	
Directory: C:\LRITTEMP	Directory: C:\EMWINTEMP	Decimation Rate: 108 Bitrate: 293883 Ring Buffer Size: 65536	
Stitch LRIT Images Start Stop	Animate EMWIN Images Start Stop	Center Frequency: 137500000 Frequency Offset: 0	
LRIT File List:	EMWIN File List:	Use Recorded Data	
gos11chnIR04rgnNHseg002res04dat289023559511.lrit	PAFFFNEJ.TXT	True © False File: C:\temp\usrp_log\log_data\win_usrp_in_Bits2_DR108_	
gos11chnIR04rgnNHseg002res04dat289033604289.lrit gos11chnIR04rgnNHseg003res04dat289010759071.lrit	PAFFFNKI.TXT PAFFFNTG.TXT	Output Signals to File	and the second
gos11chnIR04rgnNHseg003res04dat289013811183, lrit gos11chnIR04rgnNHseg003res04dat289023750154. lrit	PAFFFNWS.TXT	C True C False Dir: C:\temp\usrp_log	
gos11chn1R04rgnNHseg003res04dat289023750154.irit gos11chn1R04rgnNHseg003res04dat289033759022.irit	PAFU40CI.TXT PAFU41CI.TXT		
gos11chnIR04rgnNHseg004res04dat289010958645.lrit	PCFFFNFJ.TXT	Enable ACQ Engine Sampler Box	
gos11chnIR04rgnNHseg004res04dat289013955730.lrit gos11chnIR04rgnNHseg004res04dat289020959106.lrit	PCFFFNKI.TXT PCFFFNTK.TXT	True C False C Aerospace ETTUS Box	Server 1
gos11chnIR04rgnNHseg004res04dat289023954939.lrit	PCFFFNTK01.TXT		a series and the series of the
gos11chnIR04rgnNHseg004res04dat289033959562.lrit gos11chnIR04rgnNHseg005res04dat289011229291.lrit	PCFFFNTU.TXT PCFFFNUE.TXT	EMWIN-Specific Parameters	- and the second
gos11chnIR04rgnNHseg005res04dat289014231466.lrit	PCFFFNWF.TXT	Pulse Roll-Off: 0.7 Frequency Separation: 3360	
gos11chnIR04rgnNHseg005res04dat289021233866.lrit gos12chnIR04rgnSHseg004res04dat072232109647.lrit	RTPTWCAZ.TXT		÷.
	SFTOAXNE.TXT	Enable Front End Filter Circul	
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			Con and

Hardware Block Diagram

- Parts Cost:
- RF Range:
- 1460 Mhz 2090 MHz

< \$100

- 134 Mhz 146 MHz
- Down sampling Range: 4-256
- Bandwidth:

• IF Range:

- Symbol Rate Range:
- Up to 10 MHz
- Up to 8 Msymbols/sec

