



# REDHAWK Software Defined Radio Framework

**Mr. Justin Sellers**

**SSC Atlantic REDHAWK Center of Excellence**

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# What is REDHAWK?

- ▼ REDHAWK is a software-defined radio (SDR) framework designed to support the development, deployment, and management of real-time software radio applications
- ▼ Benefits
  - 100% Government owned IP, Free and Open Source: <http://redhawksdr.org>
  - Scalable and distributed operations
  - Application reuse amongst across differing hardware products
  - Rapid prototyping, code generation and testing
  - Standardized receiver interfaces (FEI 2.0)
- ▼ Developed by DoD to facilitate rapid fielding, innovation software reuse and standardization for SDR applications

# Features

- ▼ Core Framework to provide run time control and configuration of SDR applications
- ▼ IDE and Code Generators to rapidly create components and waveforms from a GUI
- ▼ Sandbox for script based prototyping and testing of components and waveforms
- ▼ Standardized interfaces to hardware (FEI 2.0) and inside of components (BulkIO/BurstIO)
  - Translation component to VITA49

# Updates

- ▼ **Military REDHAWK Centers of Excellence**
  - We assist the Navy/USMC with REDHAWK adoption, training, acquisition and software development
- ▼ **REDHAWK becoming an “official” standard:**
  - Unified Cryptologic System Standards View, Appendix A
  - Gig Technical Profile under development
  - REDHAWK being integrated into emerging Tactical Open Architecture standard
- ▼ **REDHAWK 2.0 Released**
  - [redhawksdr.org](http://redhawksdr.org)
- ▼ **HAWKATHON training event held April 2015.**
  - Participants from all services and many interest areas.

# REDHAWK IDE (example)

The screenshot displays the REDHAWK IDE interface. The top menu bar includes File, Edit, Navigate, Search, Sca Editor, Waveform, Project, Run, Window, and Help. The Project Explorer on the left shows a project structure with folders like HardLimit, HardLimit\_wave, labDataPlayer, PSD, testmultimpl, TuneFilterDecimate, IDL Library, Binaries, Includes, and Cpp. The main workspace shows a block diagram with three components: labDataPlayer (containing labDataPlayer\_1), TuneFilterDecimate (containing TuneFilterDecimate\_1), and BasebandDemod (containing BasebandDemod\_1). The labDataPlayer\_1 block has a dataFloatOut port connected to the dataFloat\_In port of TuneFilterDecimate\_1. The TuneFilterDecimate\_1 block has a dataFloat\_Out port connected to the dataFloat\_In port of BasebandDemod\_1. The BasebandDemod\_1 block has three output ports: am\_dataFloat\_out, fm\_dataFloat\_out, and pm\_dataFloat\_out. The diagram is titled 'Diagram: Sca Waveform fm\_audio\_wf\_063\_302718171'. Below the diagram, the Console and Port Monitor tabs are visible. At the bottom, a waveform plot shows a green signal over time, with the x-axis ranging from 0 to 600 and the y-axis from -30 to 30.

# Industry Assistance

- ▼ Migration of legacy waveform capabilities to REDHAWK CF
- ▼ Integration of additional RF Transceivers/Receivers
- ▼ Advanced SDR processing algorithms
- ▼ REDHAWK on small embedded radio platforms
  - Resource constrained platform integration
  - Embedded OS based development
- ▼ REDHAWK and heterogeneous processing (GPU's)
- ▼ REDHAWK and FPGAs
  - RFNoC
  - Dynamic Partial Reconfiguration
  - Co-Soft & Hard core development
- ▼ Beamforming
- ▼ Analytic and Cognitive Radio algorithms.
- ▼ Spectrum Sensing
- ▼ Dynamic and Adaptive Spectrum Allocation
- ▼ Cyber/EW fusion
- ▼ Comms/Electronic Support fusion



# Questions?

