**Software Architecture**

Software architecture is of utmost importance when designing such complex systems. One must think not only about what functional requirements need to be implemented, but how they should be implemented to achieve the program’s requirements over its complete system life cycle. The software that performs the actual data processing, the ‘business logic’, is most often only a small fraction of the overall software needed to run the application. The remainder of the software, the ‘infrastructure code’, includes logic to load, configure, start/stop the application, exchange data over the bus between sensors or processors, manage memory and file systems, and so on. The infrastructure code is extremely important to ensure proper execution of the application within the platform but has little to do with the fundamental purpose of the application, which is the signal processing. In most cases today, the infrastructure code is embedded in the application code, thus making it very difficult to adapt to different environments. For every change in the environment, the infrastructure code within the application must be changed. The more complex the system is, the more painful and error prone that adaptation can be.

**SCA**

Software Communications Architecture (SCA) While there is a push towards open software architectures, none have achieved the level of completeness of the SCA for the design of HEDS. The origin of the SCA dates back 20 years. SCA version 2.2.2 was published in 2006 and have been deployed worldwide in over 400,000 radios [5]. The development of the SCA standard was initiated by the US DoD for its radio replacement program and is now evolved in collaboration with the Wireless Innovation Forum (WInnF), an international consortium of industry, academia and government labs promoting the development of software defined systems and innovative technologies for wireless systems. The current version of the SCA specification, 4.1, was released in 2015. This version was developed to enhance the flexibility, performance and security of SCA products; leveraging the advances in processor and operating system capabilities. Version 4.1 allows application developers to make better use of multi-core processors and SoC, thus facilitating parallel processing capabilities and improved performance. System boot time has been significantly reduced with novel component registration approaches. System security was reinforced by refining several interfaces in accordance with the least privilege pattern to prevent consumers (expected and unexpected) from retrieving information about other system components. Lastly, lightweight profiles and a platform independent representation of the specification were developed that provide SCA developers with more freedom to align implementations with their technology stack of choice and mission focused requirements.