# Evaluation of SCA 4.1

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# SCA Development Background

# Harris SCA Development Background

- Architecture Development/Validation: Step 1, Step 2A, Step 2B

- Participant in JTNC SCA4.x Work Group and WInnF Coordinating Committee for International SCA Standards

- Harris has developed, produced and delivered 10 SCA based radio platforms
  – Manpack, Handheld, Personal
  – Single Channel and Multi Channel
  – US DoD and International
  – JTeL Certifications

- U.S. Government JTRS waveforms
  – Developed more than 15 SCA based waveforms

# Thoughts on SCA 4.0

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- SCA 2.2.2 was a good specification
  - Straightforward, testable and well-validated
- Original 4.0 goal was to add features and optimize SCA applications
  - Reduced boot times and life cycle costs
  - Improved Information Assurance
  - Expand addressable market by supporting alternate operating environments (CORBA optional)
- 4.0 intended to maintain 2.2.2 application compatibility
- 4.0 started to become overreaching
  - Abandoned backwards application compatibility
  - Overuse of 'optionality': became a concession to resolve lack of consensus
  - Ultimately drove excessive complexity in the specification

# Thoughts on SCA 4.1

- Significant 4.0 features preserved
  - Reduced Boot Times via Application Push Packet
  - Improved Security through
  - Reduced Lifecycle costs
  - CORBA neutrality

- Addressing application backwards compatibility was top priority

- Address technical issues in 4.0
  - Implementation of scalable components
  - Late Registration problem

# *SCA 4.1 Analysis*

# 4.1 Analysis: Backwards Compatibility

- Addresses what was identified by industry as the most significant issue with SCA 4.0
- Preserves investment in 2.2.2 Applications
- SCA 4.1 includes an optional capability that allows a 4.1 framework to manage 2.2.2 application components
  - 4.1 DomainManagerComponent will be able to install, manage and uninstall both 2.2.2 and 4.1 applications.
  - 4.1 ApplicationFactoryComponent can launch both types of applications
  - 4.1 ApplicationManagerComponent can manage both types of deployed application instances.
  - CF::Resource (implementing all based interfaces) provides backwards support for 2.2.2 component interfaces
- Harris is fully supportive of ensuring 4.1 CF compatibility with 2.2.2 applications however, the approach taken continues to increase the complexity introduced by OUF
  - May have been better to roll back the features in 4.0 that broke compatibility with applications; primarily preserve cfComponents

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- Uses WInnF proposed solution
- Scalability is achieved through component level aggregations that mandate interface inheritance
  - SCA 4.1 replaces conditional inheritance with "optional composition" which is UML compliant
- Preserves the SCA 4.0 capability that allows a system developer to eliminate requirements that are not applicable for a product line
- Replacement of the conditional inheritance so standard UML can be utilized is welcomed
- Harris recommends scalable components capability and corresponding scalable certification requirements

# 4.1 Analysis: Scalable Manager Components

- Allow developers to choose whether or not to implement all of the manager interfaces.
  - Manager scalability will also be used to support the different profiles of the specification
- Uses the WInnF proposed solution
  - Removal of the ManagerRegistry interface necessitated several changes to the UML model
  - ComponentRegistry functionality was expanded to handle all registration)
- DeviceManager Interface was removed
- Harris is in agreement with the changes

# 4.1 Analysis: Lw and ULw AEPs

- Expands applicability towards DSP/Constrained processors
- Defines Lightweight (Lw) and Ultra Lightweight (ULw) profiles
  - ULw: focused on minimizing the size of the platform, so it contains the minimal number of required operations
    - Same as WInnF Base Profile
  - Lw: provides a relatively full featured RTOS, yet smaller than the full AEP – includes union of WInnF group A & B operations that are a subset of a Future Airborne Capability Environment (FACE) Safety Base profile
- Similar content to WInnF Lw & ULw POSIX AEPs
- Support adoption and modification of WInnF proposal

# 4.1 Analysis: IDL Profiles for PIM of SDR Applications

- Provides guidance to product developer which will allow them to implement highly portable interfaces

- Same content as WInnF Full & ULw PIM IDL Profiles proposed solution
  - Includes Any type in the Full profile

- Agree with utilization of WInnF proposal and extension to include 'Any' type

# 4.1 Analysis: Naming Conventions

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- Changes to Component and Interface names to improve readability and consistency
- Interfaces Definitions
  - Many of the WInnF proposals were taken
  - Limit changes to Interfaces introduced in SCA 4.0
- Components
  - Component Name changes align with WInnF proposal

- These are good changes for the specification
  - Increases its usability through consistency and clarity

# 4.1 Analysis: Push Registration – Allocation Properties

- When SCA moved to push interfaces in v4.0, device allocation properties (which describe capabilities of the device) were not included, yet the ability to fetch this information was deleted.

- This change allows both the properties to be pushed, as well as information relating to which device implementation got deployed.

- In addition, the device information registration interface was changed to the generic componentRegistry interface (vs. ManagerRegistry)
  - To support this, a new, generic ComponentType structure is also required

- Harris supports this proposal – it makes the DomainManagerComponent simpler (no need to parse DCD information), while continuing SCA 4.0's "push registration" consistency

# Application Mixture Backwards Compatibility

- Provides path for incremental migration applications 4.1
- Allows for components of the same WF Application to be utilize 2.2.2 or 4.1 features
  - Porting 2.2.2 applications to 4.1 platform
  - Developing 4.1 application and re-using 2.2.2 components
- WInnF proposal that was not taken into the SCA 4.1 specification
- Currently under discussion between JTNC SCA Standards WG and WInnF CC SCA WG
- Harris does not feel this change is necessary
  - Overly complex solution/minimal benefit
  - Creates many hard testing variations
  - Alternative: change legacy component to  be 4.1 compliant for component reuse

# Beyond the 4.1 Specification: Certification

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- Optional Units of Functionality creates a situation where certification requirements are unclear
  - Different programs may require different combination of UOFs
  - What combination does an NDI vendor target?
- Unclear SCA 4.1 certification timeline
- Unclear impact on 2.2.2 certification for existing and new products
- Lack of test procedures

# Beyond the 4.1 Specification: Driving the Ecosystem

- SCA 4.1 is favorable to tool vendors and could promote expansion of the SCA ecosystem
    - Formalization of PIM model
    - UOF partitioning provides a good licensing framework for tools vendors
- Toolset licensing models must support commercial/high quantity vendors as well as research/government use
    - Current cost structures create a barrier for large quantities of users
- Progress toward an environment where
    - There is choice of commercial Core Frameworks
    - Component Base Development tools are not tied to proprietary CFs and ORBs

# *Summary*

# Summary

| WInnF Proposal | JTNC Disposition | Harris View |
|---|---|---|
| Backwards Compatibility of SCA Applications | Incorporate As Is | Neutral |
| Scalable Components | Incorporate As Is | Agree |
| Scalable Manager Components | Incorporate As Is | Agree |
| Lw & ULw POSIX AEPs | Modified | Agree |
| IDL Profiles for PIM of SDR Applications | Incorporate As Is | Agree |
| Naming Convention | Modified | Agree |
| Push Registration – Allocation Properties | Incorporate As Is | Agree |
| Application Mixture Backwards Compability | Not included | Agree |

## Support the changes to SCA 4.1

# Summary

- SCA 4.1 maintains technical features and provides important extensions
  - Preserved investments in SCA 2.2.2 waveform applications
  - Continues effort to expand the addressable market

- Testability and Certification remain a challenge

- Specification complexity and formality may hinder its adaptation

- SCA 4.1 introduces key benefits for all SCA Value Chain stakeholders

# Contact Information

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