SHAWN Wireless Demo Automation

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Outline

The original SHAWN demo was functional, but was not practical as a demonstration tool.

I will rewrite the demo to improve its ease of use, making it more practical for use as a demonstrator.

Introduction

SHAWN (Secure High Availability Wireless Network) is a framework of protocols which aspires to replace some of the wired communication networks used between on-board aircraft computing systems with a wireless equivalent [1].

This would be done with the intentions of reductions in cable design, installation, and maintenance costs, in addition to reducing fuel consumption and emissions by reducing weight.

Roughly 30% of wires on commercial aircraft are potential candidates for replacement with an AWN (Avionics Wireless Network)[2].
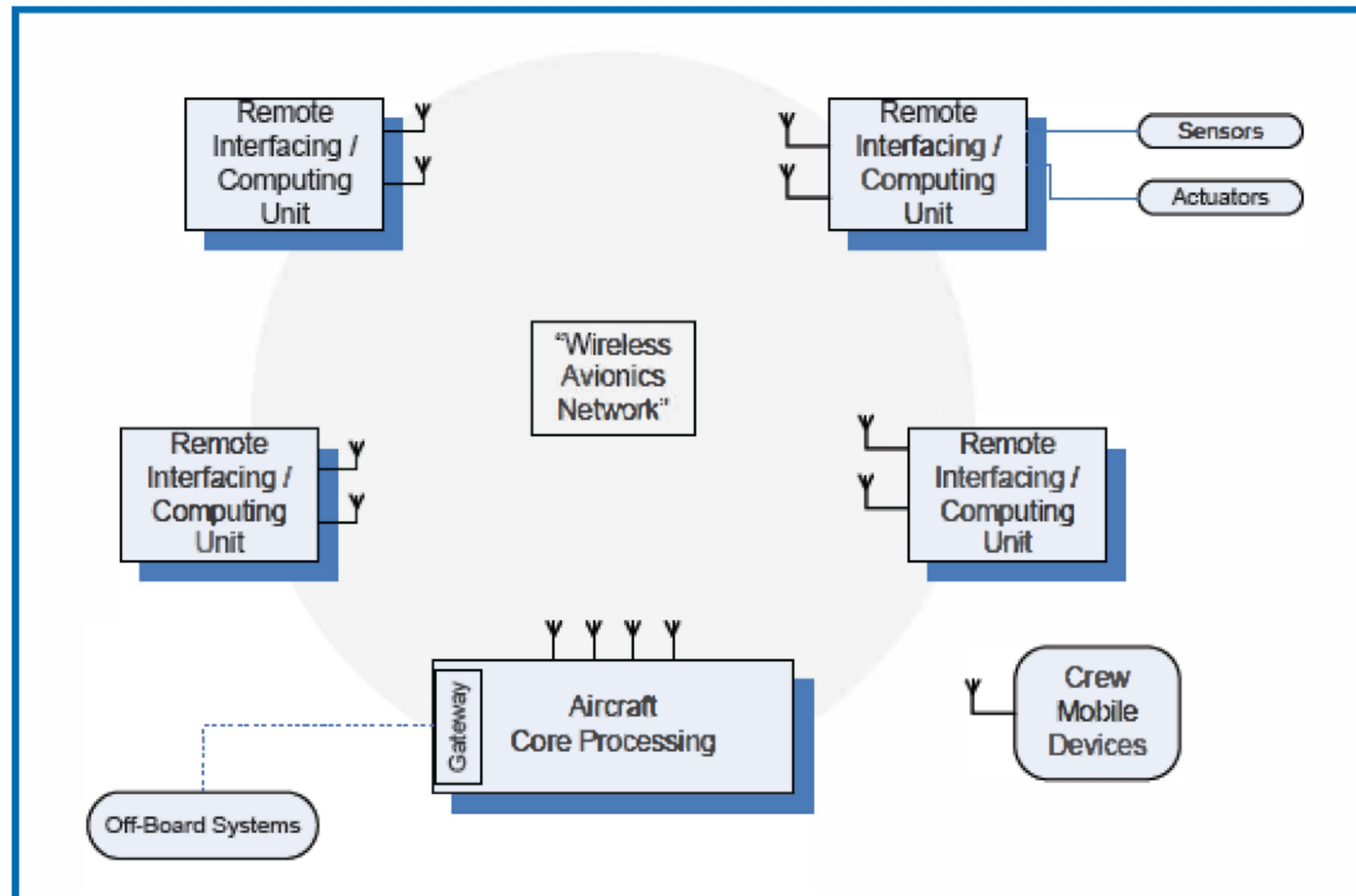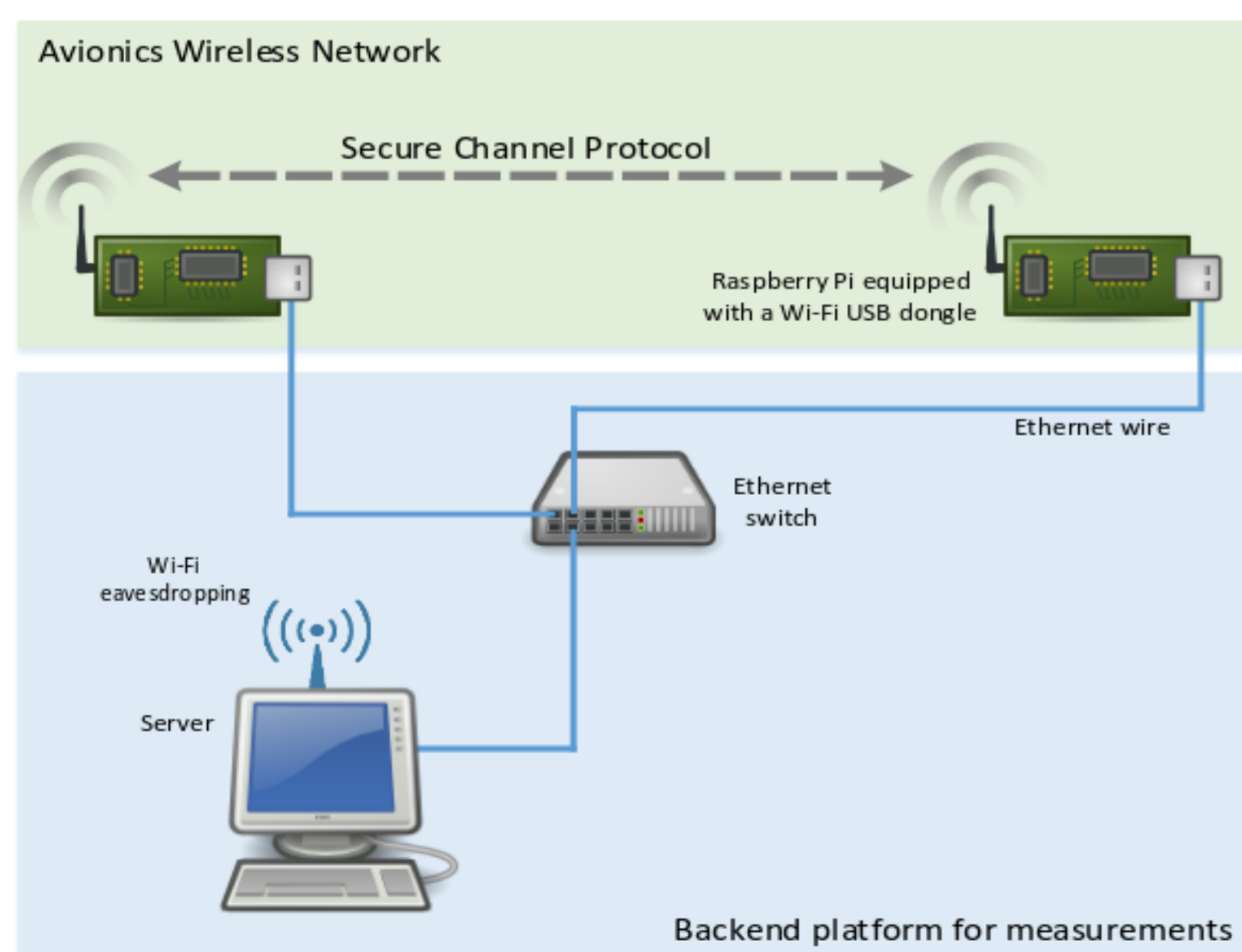
The Demo

The Demo was created as a proof of concept of the SHAWN framework, with the goal of demonstrating 4 aspects of a SHAWN network:

1. Practicality of replacing wired networks with SHAWN wireless links

2. Resilience of the network to the loss of a link

3. Authentication of wireless nodes on the network

4. Confidential communication of digital information.

Demo Evaluation

The original SHAWN demo achieved its functional requirements, but had a number of problems which need to be solved, including:

• A lengthy process of preparing the demo before it can be run.

• Instability, requiring human intervention to reset the demo when it crashes.

• A complicated troubleshooting process.

• A lack of clear documentation

Goals

In conclusion, my project will involve rebuilding parts of demo such that they still fullfill the original requirements of the demo, with these additional requirements:

R1: The demo should stable, to the point where it can be run indefinitely if needed.

R2: After assembly, the demo should be runnable with a single action, such as the execution of a script, or an automatic startup.

R3: Formal documentation should exist for the setup and troubleshooting of the demo.

References

[1] - "SHAWN (Secure High availability Avionics Wireless Networks"
 http://gtr.ukri.org/projects?ref=101658

[2] - "An Efficent, Secure, and Trusted Channel Protocol for Avionics Wireless Networks"
https://pure.royalholloway.ac.uk/portal/files/26821640/1570260400_An_Efficient_Secure_and_Trusted_Channel_Protocol_for_Avionics_Wireless_Networks.pdf

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