Document ID: SS-HYD-GUIDE-001
Document Title: Hydra-C4 Shipboard Integration Guide
Version: 1.0
Status: Released
Date: 13 August 2025

1. Introduction

1.1 Purpose

This guide provides instructions and best practices for the physical, electrical, and data integration of the Synthetic Systems Hydra-C4 Comms Module into a shipboard environment. It is intended for use by qualified technicians from the prime contractor responsible for the platform integration.

1.2 Scope

This document covers the mechanical installation, power and data connectivity, and environmental considerations for the Hydra-C4 module. It is not a replacement for detailed platform-specific installation drawings or work orders.

1.3 Audience

This guide is intended for electronics and communications technicians who are familiar with shipboard installation standards and safety procedures.

2. Security and Safety

2.1 Equipment Handling

The Hydra-C4 Comms Module and its related documentation are classified **OFFICIAL: SENSITIVE**. All handling of this hardware must be done in a manner that prevents unauthorised observation or access. The principles for protecting such assets are defined in **SS-SEC-POL-001: Defence Security Policy**.

2.2 Personnel and Site Access

SECURITY WARNING: All non-Synthetic Systems personnel (visiting technicians) involved in integration activities at Synthetic Systems facilities are classified as visitors. As such, all personnel must strictly comply with the visitor registration, check-in, and escort rules defined in **SS-VISITOR-PROC-001: Visitor Management and Escort Procedures**. All visitors will be escorted by a designated Synthetic Systems host at all times.

2.3 Electrical Safety

Shipboard power systems present a significant electrical hazard. Ensure the power

source for the equipment rack is isolated and locked-out/tagged-out in accordance with platform safety procedures before making any power connections.

3. Pre-Installation Checks

3.1 Site Readiness

Before commencing installation, verify the following:

- The designated 19-inch equipment rack has at least 5U of continuous vertical space available.
- The installation location is clean, dry, and free of debris.
- All required power and data cables have been run to the installation location.
- The ambient temperature of the compartment is within the operating range of -10°C to +55°C, as specified in **SS-HYD-SPEC-001**.

3.2 Required Tools

- Standard toolkit for rack-mounted electronics.
- #2 Phillips head screwdriver.
- Anti-static wrist strap.

4. Mechanical Installation

4.1 Unpacking

Carefully unpack the Hydra-C4 module, inspecting it for any signs of shipping damage. Report any damage to your supervisor immediately. Retain all packaging materials.

4.2 Rack Mounting

1. Don an anti-static wrist strap and connect it to a designated grounding point on the equipment rack.
2. With the assistance of a second person, carefully lift the Hydra-C4 module into position in the 19-inch rack.
3. Secure the module to the rack using four (4) appropriate rack mounting screws. Do not overtighten.
4. Attach a grounding strap from the chassis grounding point on the rear of the Hydra-C4 to the rack's primary ground bus.

5. Electrical and Data Integration

5.1 Power Interface

The Hydra-C4 requires a stable power source to function correctly. The power interface requirements are derived directly from **SS-HYD-SPEC-001**, Section 3.3.3.

- **Input Voltage:** Connect a 115 VAC, 60 Hz power source to the unit.
- **Connector:** The power input is via a **MIL-DTL-38999** series connector on the rear of the chassis. Ensure the corresponding ship's power cable is correctly terminated with the mating connector.
- **Connection:** Firmly connect the power cable to the UUT. Ensure the locking ring is fully engaged.

5.2 Data Interfaces

The Hydra-C4 provides several data interfaces as specified in **SS-HYD-SPEC-001**, Section 3.5.2.

- **Network Connectivity:** Connect the ship's tactical network cables to the four (4) 1000BASE-T Gigabit Ethernet ports (RJ45).
- **Management Interface:** Connect the ship's maintenance network cable to the dedicated 10/100BASE-T Management port (RJ45). This port is for configuration and diagnostics only and should not be connected to the primary tactical network.

5.3 RF Interfaces

Connect the platform's antenna cabling to the appropriate N-type female RF connectors on the rear of the unit. Ensure all connections are tightened to the appropriate torque setting as per platform standards. Terminate any unused RF ports with a 50-ohm terminator.

6. Cooling and Ventilation

Proper airflow is critical to the long-term reliability of the Hydra-C4 module. The unit is forced-air cooled, with air drawn in from the front and exhausted from the rear.

- **Clearance:** To ensure unimpeded airflow, a minimum of **100mm (4 inches)** of unobstructed clearance must be maintained at both the front and rear of the installed unit.
- **Obstructions:** Do not block the ventilation grilles on the front or rear of the unit. Ensure that cable runs do not obstruct the exhaust path.
- **Rack Ventilation:** The equipment rack itself must have adequate ventilation to prevent the build-up of hot air. The total heat dissipation of the Hydra-C4 is up to 450W under maximum load.

7. Initial Power-On

1. Once all connections are verified, remove the lock-out/tag-out and restore power to the rack.
2. Power on the Hydra-C4 module using the front panel switch.

3. Observe the front panel status indicators. The 'PWR' (Power) light should illuminate immediately. The 'STAT' (Status) light will blink during the boot sequence.
4. **Expected Result:** Within 120 seconds, the 'STAT' light should turn solid green, indicating that the system has successfully booted and passed its Power-On Built-In Test (PBIT).
5. If the 'STAT' light remains red or amber, or if any 'FAULT' indicators are lit, power down the unit and consult the detailed troubleshooting manual.