

Advanced Data Handling Architecture (ADHA)

“Working towards a European solution for standardized Data Handling Systems”

Tutorial: ADHA 101

Presenters:

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EDHPC 2025 Tutorial: ADHA 101
2025-10-13

ADHA Sessions at EDHPC2025



Day	Time	Session(s) Title	Contents
Monday	14:00 – 16:00	Tutorial: ADHA 101	Introduction to ADHA
Tuesday	09:00 – 10:20	Session A1 – ADHA Plenary	ADHA roadmaps (ESA, LSIs) and round-table
	10:50 – 12:30	Session A2 – ADHA Architectures and Equipment	Paper presentations
	14:00 – 15:30	Session A3 – ADHA Equipment	Paper presentations
	16:10 – 17:30	Session A4 – ADHA Equipment	Paper presentations
Wednesday	09:00 – 10:00	Session A5 – ADHA Building Blocks and Future Activities	Paper presentations



EDHPC 2025

EUROPEAN DATA HANDLING & DATA PROCESSING
CONFERENCE FOR SPACE



13th - 17th October 2025, Elche, Spain

ADHA 101 – Tutorial Session Overview



#	Time	Duration	Topic	Speaker
1	14:00 – 14:10	10 min	ADHA Overview and Introduction	David Steenari (ESA)
2	14:20 – 14:40	30 min	ADHA Architectures	Julian Bozler (Airbus)
3	14:40 – 15:10	30 min	ADHA Module Designs	Dario Pascucci (Thales Alenia Space)
4	15:10 – 15:20	20 min	Navigating the ADHA Datapack ...and how to participate in the ADHA Eco-System	David Steenari (ESA)
5	15:20 – 15:40	20 min	Technologies for thermal management in electronics units	Stephane Lapensee (ESA)
6	15:40 – 16:00	10 min	Q&A	All

Within this tutorial, we aim to cover:

- An introduction and overview to the ADHA R&D programme
- The main architectural features of ADHA
 - Module slot profiles, electrical interfaces and backplane network routing schemes
- Module level design considerations
 - ADHA data-handling functions, discrete signals, health monitoring system, mechanical form-factor
- The ADHA document datapack
 - Hierarchy, key documents, and their contents
- ...and how you can participate in the ADHA eco-system!

ADHA Introduction & Overview

ADHA & APA: Executive Summary

The **Advanced Data Handling Architecture (ADHA)** and **Advanced Power Architecture (APA)** initiatives specify an end-to-end architecture for data-handling and power sub-systems, based on European **standardized** and **inter-operable** electronics modules and units, of common form-factors and interfaces.

The **ADHA program** was initiated in 2019, in a partnership between ESA and key industry partners (SMEs, LSIs) across ESA Member States.

- Responsibility for the evolution and further development of the program is being shifted to a larger industry group (**industry-driven program**).

The **Advanced Power Architecture (APA)** initiative addresses the same objectives, for the Electrical Power Subsystem (EPS)

- Substantial commonalities and synergies between the **ADHA** and **APA** programs.

The aim of the **ADHA** and **APA** R&D programs is to deliver a **new generation of standardized data-handling and power equipment at TRL6 by 2027**, ready for use by institutional and commercial missions and constellations.



ADHA aims to:

- **Meet the evolving performance requirements of OBDH / DHS equipment** – of the next generation of applications – by utilising the latest technologies (e.g. European UDSM technology)
- Increase European **competitiveness, serialisation and non-dependence** – and reduce Non-Recurring Engineering (NRE) in Data Handling Systems

ADHA has the following objectives:

- Deliver a **new generation of On-Board Data Handling equipment at TRL6 by 2027**
- Ensure **dual- or multi-sourcing of key On-Board Data Handling Equipment by 2028**

...to be available for institutional and commercial missions.

...both large-scale missions (ADHA-6U), mid- and small-sats / constellations (ADHA-3U).

ADHA Technical Perimeter & Scope

The ADHA program defines the following elements:

- **An end-to-end data handling architecture**
 - To ensure interoperability between data handling units
- **A standard backplane electrical interconnect between modules**
 - Based on the cPCI-Serial-Space standard
 - To allow interoperability of modules from different suppliers within the same unit
- **Standard mechanical form factor and interfaces**
 - For uniformity across the OBDH subsystem, more efficient qualification, assembly and integration
 - Compatibility between any ADHA-compliant modules, for faster unit integration and configuration
- **A standard procurement and PA (Product Assurance) approach**
 - To allow clear requirements based on expectations in different mission classes

All ADHA specifications have been agreed between the ADHA consortia members, including the three LSIs (ADS, TAS and OHB), ensuring that data handling equipment suppliers / SMEs have a consistent set of requirements.



ADHA ESA R&D Programme Organisation

The ADHA R&D Programme is divided into three types of activities:

1. System-level studies (ADHA-1, -2, and -3)

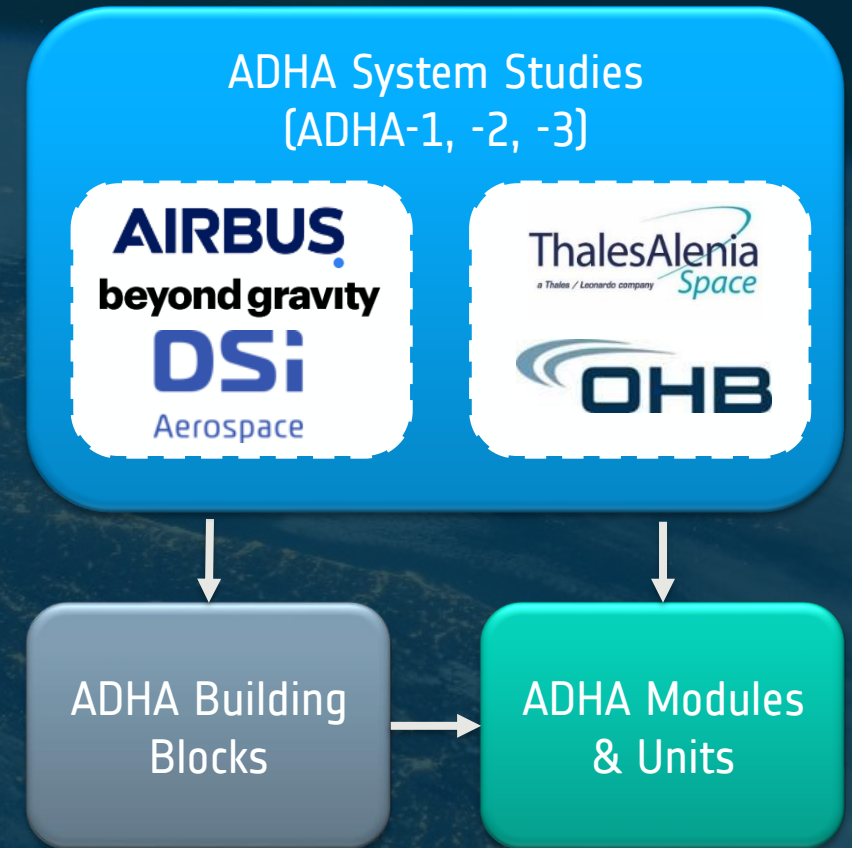
- Define the **requirements specification** for ADHA elements
- Perform **1st ADHA unit-level AIT campaigns**
- Parallel contracts: ADS (DE) and TAS (IT) primes

2. ADHA Unit and Module hardware development contracts

- Core modules: OBC, MM, Power and GNSS funded through TDE
- Others funded through GSTP, Incubed, etc - **many initiated by industry!** In total, **ca 20 development activities on-going**

3. ADHA Building Block activities

- [e.g. **backplane connector** development and qualification]



ADHA System Studies Developments



cPCI-S-S

ADHA-1

- Agreement with industry to use cPCI-S-S Standard
- Architectural definition

2019-2020

ADHA
Req.
Specs

ADHA-2

- ADHA Requirements Specs Issue#1 Published (2023) – mainly 6U
- 3x Core 6U-ADHA platform modules
- 2x 6U-ADHA Unit developments
- 6U-ADHA platform modules to be integrated in ADHA Units

2021-2026

ADHA-3

- ADHA Payload requirements specifications to be defined
- ADHA 3U requirements specifications to be defined
- Extended AIT campaign:
- 6U-ADHA Payload Units
- 3U-ADHA Platform/Payload Units

2025-2027