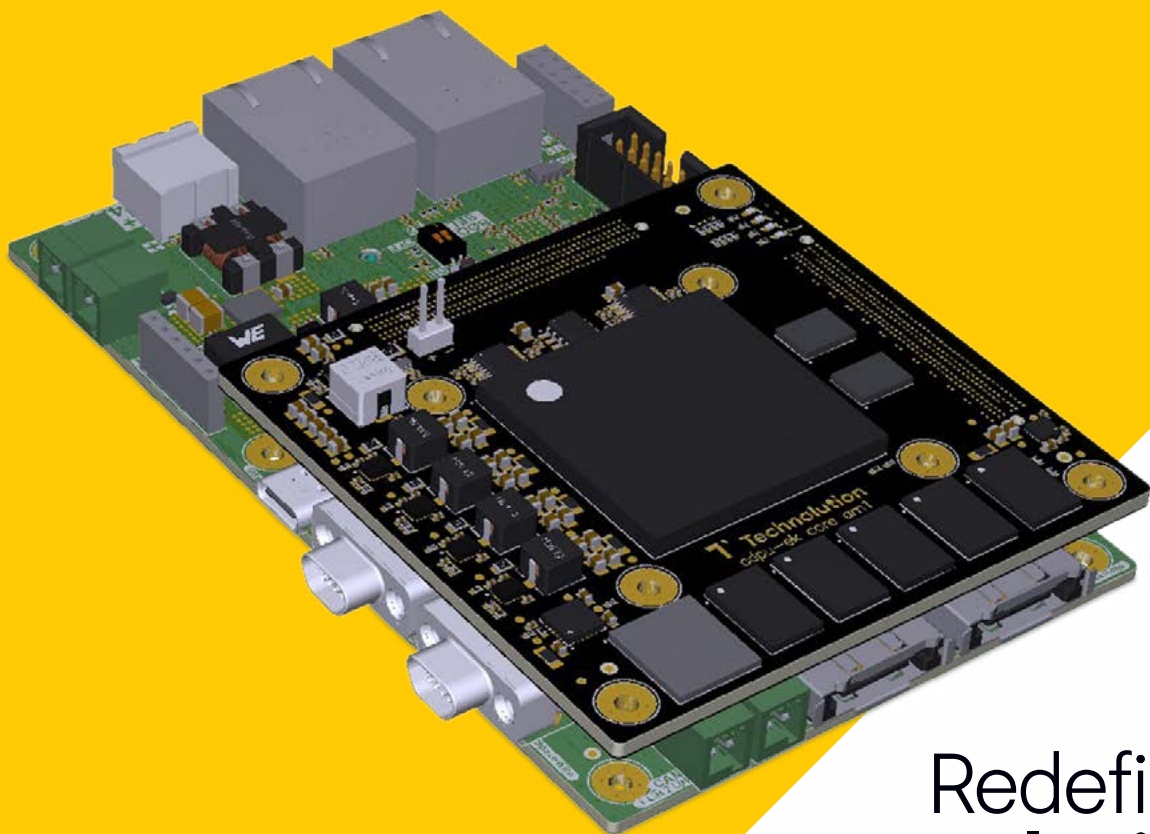




Technolution
Advance

CDPU
Control & Data
Processing Unit

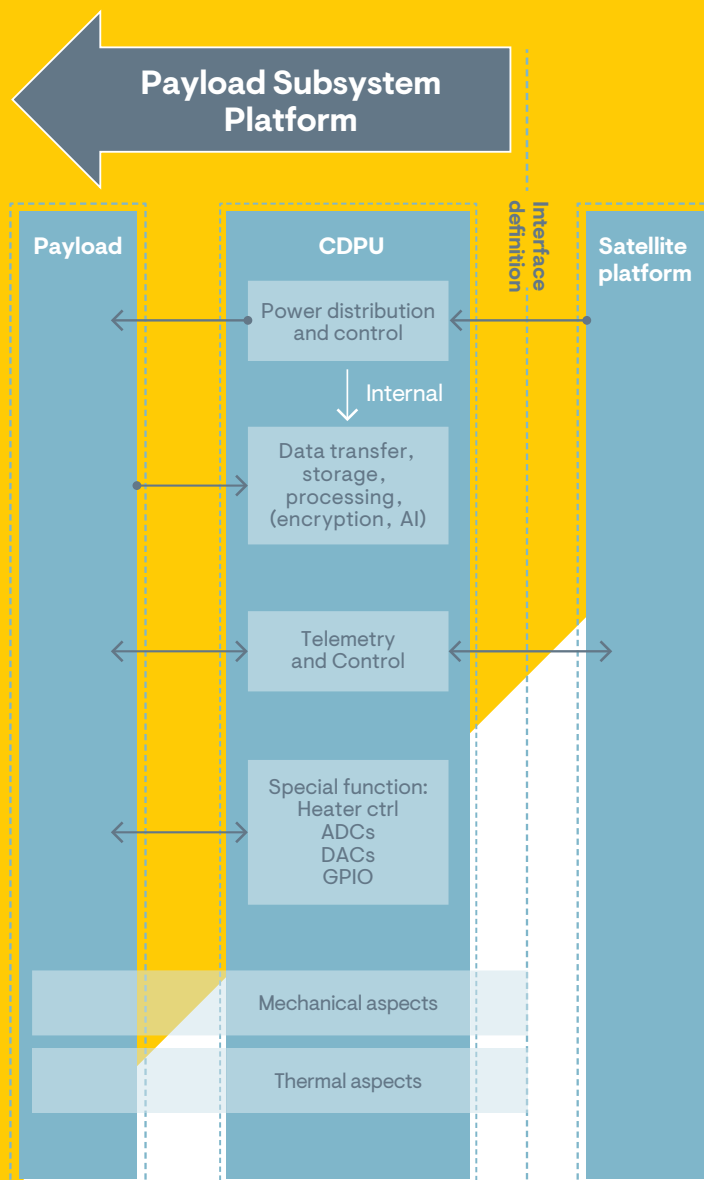
**Modular
payload control**
and on-board
processing



Redefining
solutions

Decouple your payload from the spacecraft platform

Advanced payloads increasingly require local control, high-speed data handling, storage and on-board processing. At the same time, payload developers need to integrate their instruments with different spacecraft platforms without redesigning their complete electronics and software architecture.



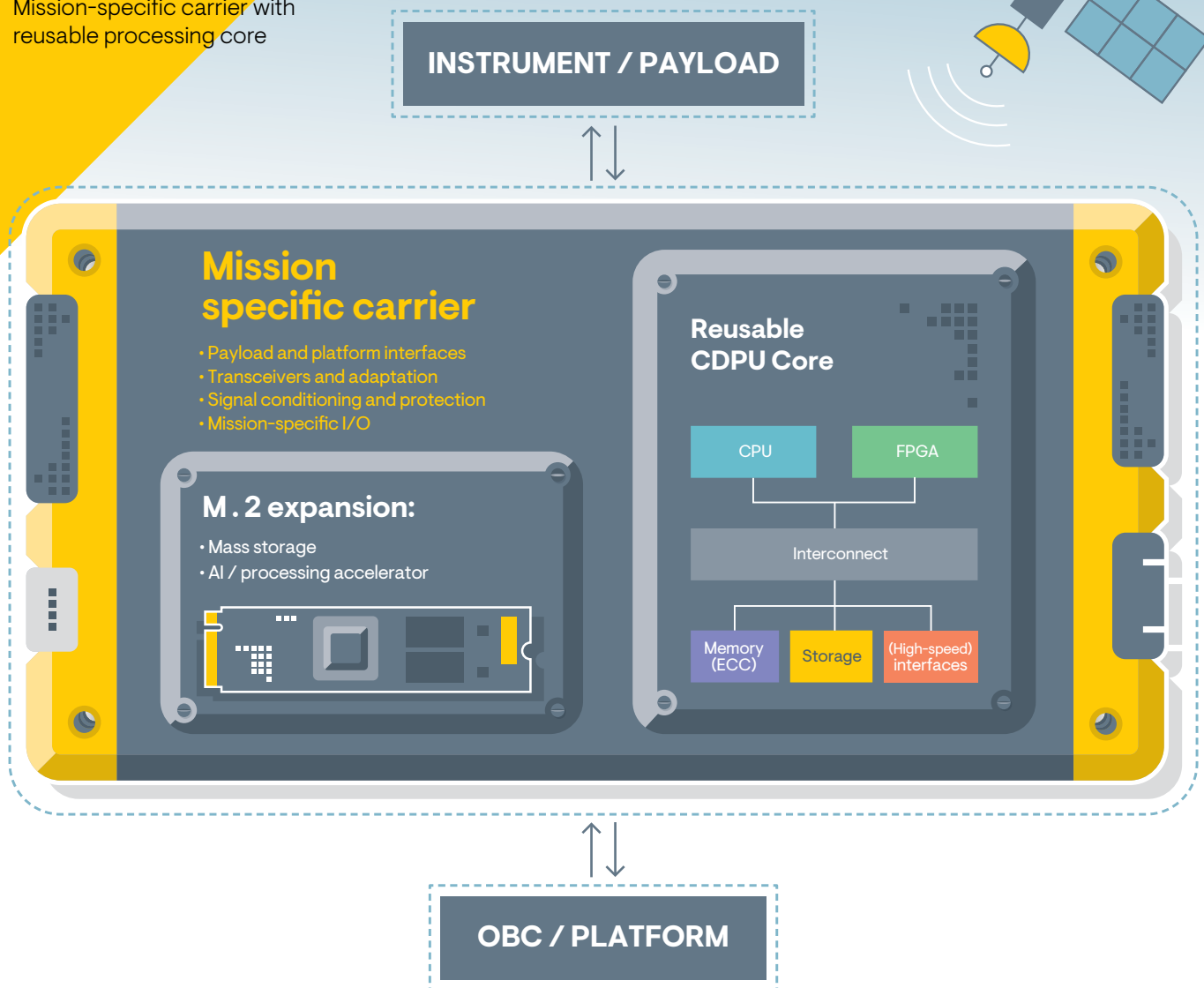
Key capabilities

- ▶ **Payload control**
Autonomous instrument control and housekeeping
- ▶ **Data handling**
Flexible high-speed payload data acquisition and routing
- ▶ **On-board processing**
CPU and FPGA-based processing close to the payload
- ▶ **Expandable functionality**
Mass storage, Artificial Intelligence or processing acceleration
- ▶ **Mission-specific security**
Data protection and security functionality integrated at application level
- ▶ **Platform flexibility**
Configurable interfaces towards instrument / payload and OBC / platform

Together, we turn the payload into an autonomous subsystem, ready for spacecraft integration, from cost-efficient COTS-based CubeSat applications to longer-duration SmallSat missions requiring higher component quality and mission assurance.

A modular CDPU architecture

Mission-specific carrier with reusable processing core



THREE LEVELS OF MISSION ADAPTATION

▼ CARRIER

Physical interfaces and mission-specific electronics

▼ FPGA

Protocol IP, high-speed dataflow and hardware acceleration

▼ SOFTWARE

Mission application, payload control, data processing and security

Reuse the processing core. Tailor the carrier, firmware and software to the mission.

Meet the CDPU-EK

The first hardware implementation of our modular CDPU architecture.

The CDPU Evaluation Kit (CDPU-EK) provides a platform for software development, interface integration, FPGA development and evaluation of payload-processing applications.

It combines the reusable CDPU Core with an evaluation carrier exposing a representative set of payload and spacecraft interfaces.

Reusable processing core. Mission-specific connectivity.

From evaluation to mission implementation

The CDPU-EK carrier demonstrates the modular architecture. For a customer application, the carrier can be redesigned around the specific instrument, spacecraft interfaces and mission requirements while retaining the reusable CDPU Core. CDPU-EK is a development and Linux-based evaluation platform; not a flight unit.

Demonstrated heritage

An earlier CDPU demonstrator was integrated with the Airbus/SRON SPEXone Engineering Model, providing practical experience with instrument control and payload data handling in a representative Earth-observation setup.

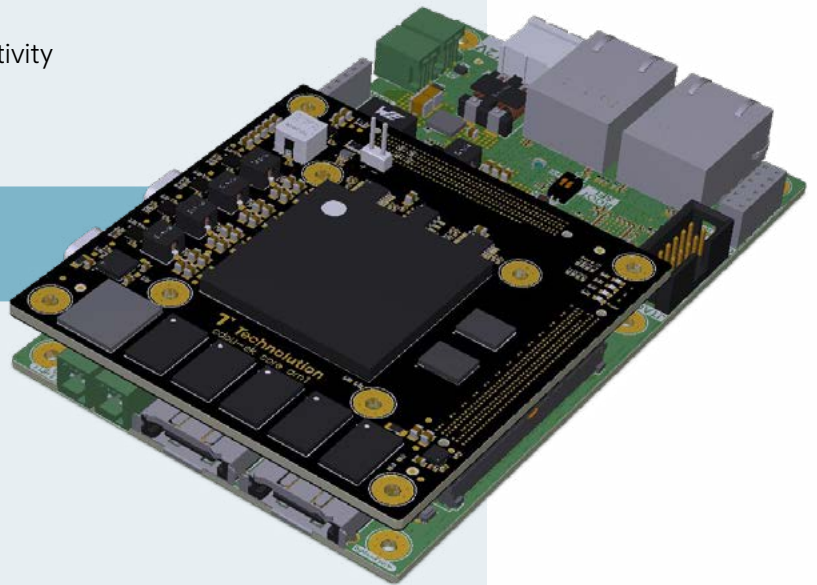
Developed within an ESA GSTP Element 2 activity.

CDPU-EK Core (80 × 80 mm)

- Microchip PolarFire SoC MPFS460T
- 4 GB DDR4 with ECC
- 64 MB QSPI flash
- 40 GB eMMC
- High-density board-to-board connectivity
- CubeSat-aligned mounting geometry

CDPU-EK Evaluation Carrier (80 × 130 mm)

- 2× Gigabit Ethernet
- 2× CAN
- 2× SpaceWire
- 2× UART
- USB
- 8× I/O
- 2× SpaceFibre
- M.2 expansion



Platform & Specifications

The CDPU platform and CDPU-EK share a common reusable processing architecture while addressing different needs: mission implementation and development & evaluation.

Capability	CDPU flexibility	CDPU-EK
Purpose	Payload control, data handling and on-board processing	Development and evaluation platform
Architecture	Mission-specific carrier + reusable processing core	80 × 80 mm core + 80 × 130 mm evaluation carrier
Processing	CPU + FPGA programmable logic	PolarFire SoC MPFS460T
Memory	Mission-dependent configuration	4 GB DDR4 with ECC
Local storage	Non-volatile system and application storage	64 MB QSPI + 40 GB eMMC
Interfaces	Configured for the mission	2× GbE, 2× CAN, 2× SpaceWire, 2× UART, USB, 8× I/O
High-speed connectivity	Mission-specific high-speed interfaces	2× SpaceFibre
Mass storage	Expandable on-board mass storage	M.2 expansion for NVMe storage
Processing acceleration	FPGA or accelerator	FPGA fabric or M.2 accelerator
Software	Portable platform architecture and stable APIs	Linux-based development environment
Security	FPGA-based implementation of security-critical protocols	Application-level software
Reliability	Scalable towards higher mission-assurance implementations	Traceable COTS evaluation implementation

Detailed specifications and latest developments: technolution.com/cdpu

Turn payload integration into a strategic subsystem

Whether you integrate satellites or develop payloads, the CDPU creates a clear boundary between payload and platform.

▼ **Integrating a payload?**

Simplify payload integration.

▼ **Building a payload?**

Create a complete autonomous subsystem.

▼ **Start with the CDPU-EK**

Evaluate the architecture with your payload or platform interfaces and define the mission-specific CDPU together with us.

▼ **Bring us your payload integration challenge**

Together, we turn your payload into an autonomous subsystem, ready for spacecraft integration.



technolution.com/cdpu

Built on Technolution expertise

- ▼ Systems engineering
- ▼ Electronics
- ▼ FPGA
- ▼ Embedded software
- ▼ High-speed connectivity
- ▼ Security



Technolution Advance

About Technolution Advance

If you are planning to develop advanced electronics and embedded systems in complex devices, you need partners that you can trust. We offer a unique combination of knowledge and experience as we join broad knowledge of software and thorough expertise in electronics development. In addition, our engineers have a profound understanding of the underlying physics. We look forward to helping you rise to the challenge!

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