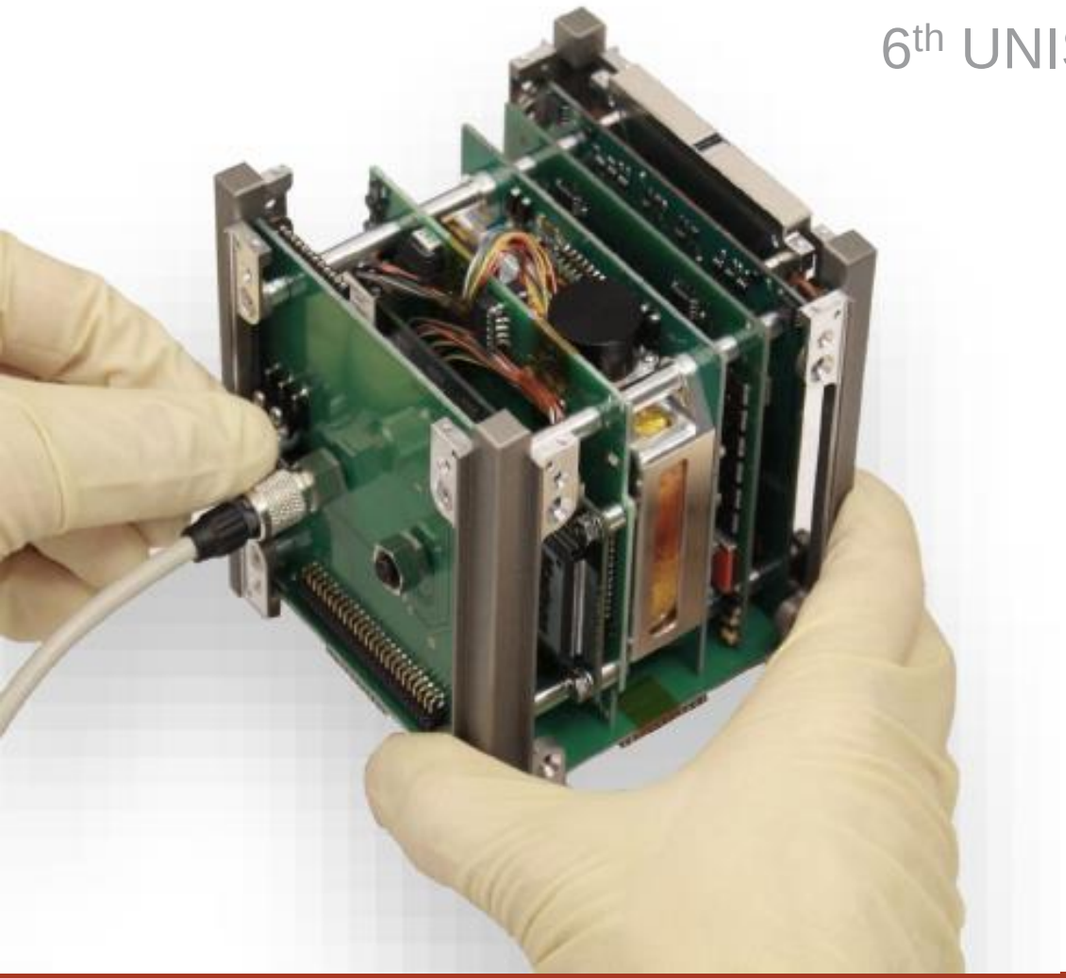
Group Discussion 7 – Standardization of Electrical Interface for Pico/Nano Satellites

6th UNISEC-Global Meeting – Strasbourg



Motivation

for a Standardization of Efficient Electrical Interfaces of CubeSats: Advantages

- Advantages for suppliers and customers of commercial products
  - supports exchangeability
  - promotes competition (“we need rivals”)

[Image from: CubeSat Kit FM430 Flight Module Hardware Revision: C Manual]

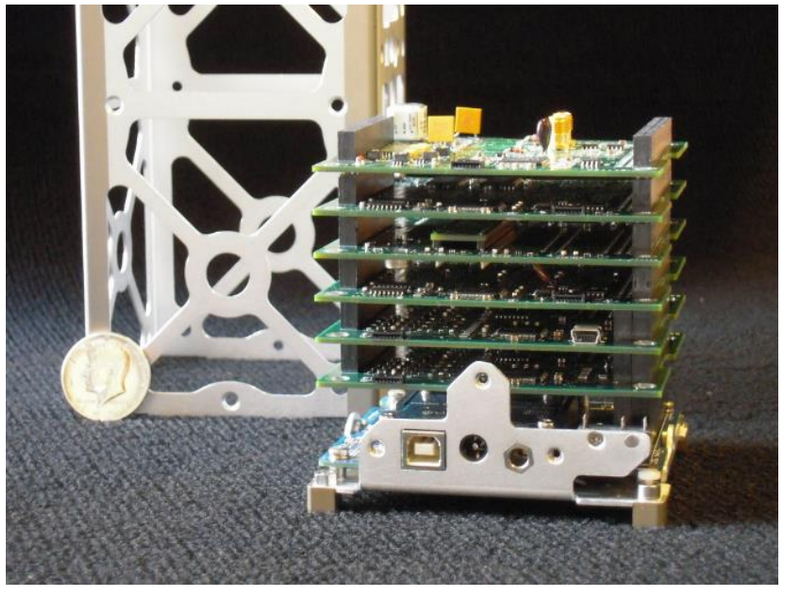


Image from http://www.isde.vanderbilt.edu/wp/wp-content/uploads/vanderbilt_payload.jpg

Motivation

for a Standardization of Efficient Electrical Interfaces of CubeSats: Advantages

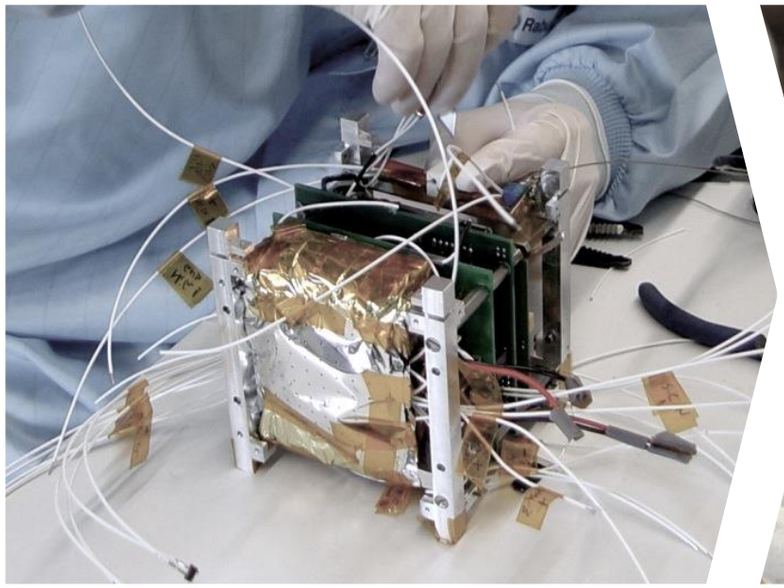
- Advantages for single CubeSat Projects or long-term programs, especially looking at
  - educational pico-satellite projects
    - enable joint projects with other Universities (e.g. BIRDS) → International, Intercultural, Interdisciplinary, but works together
    - reduce preparation time (high fluctuation of students)
    - allow to focus on core competency
  - emerging mega-constellations and formations of large number of very small satellites
    - facilitate fast and reliable system design, manufacturing and integration

„If you want to go fast, go alone!
If you want to go far, go together!“

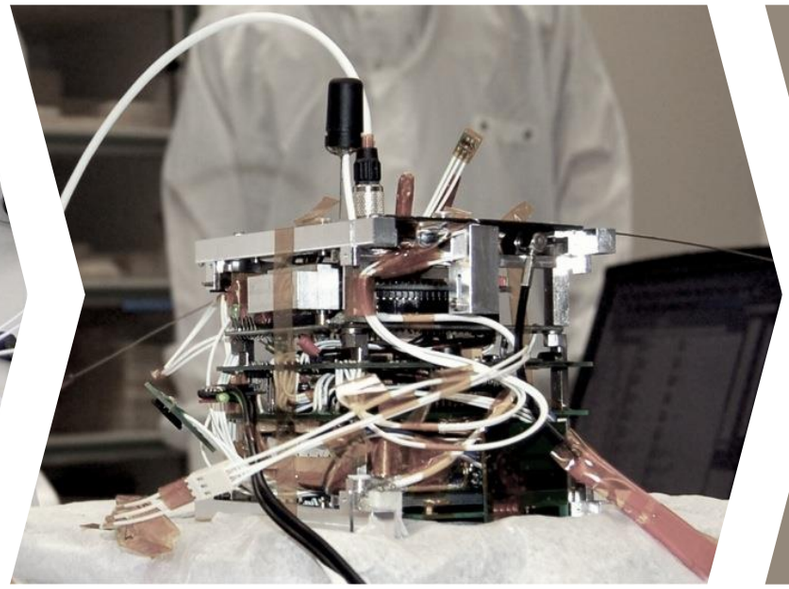
Motivation

for a Standardization of Efficient Electrical Interfaces of CubeSats: Key Aspects

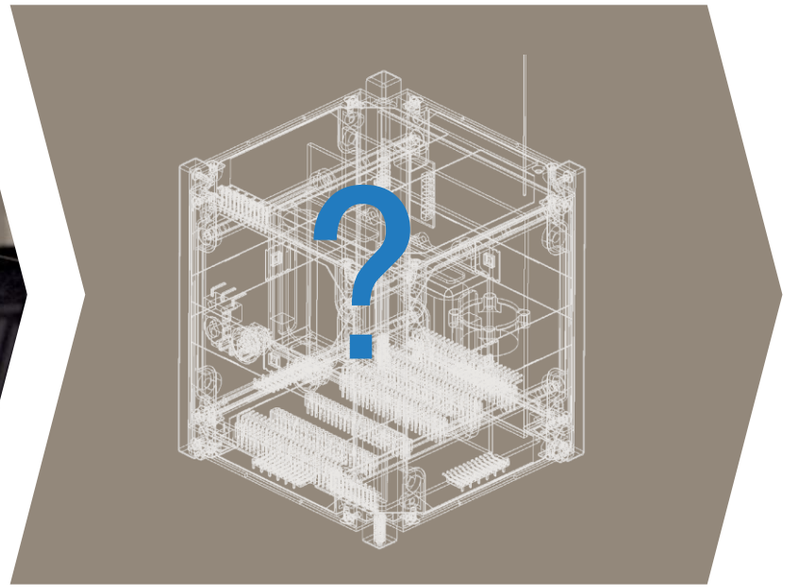
- Key aspects
  - Performance: miniaturization is key driver to limit costs
  - Durability: only 50% of miniature satellites reach primary mission objective in orbit
  - Fast Development Cycle: design, iterate, and launch within a few months
  - Modern Production: production, integration & test: from high-tech manufactures to batch production



- **UWE-1**



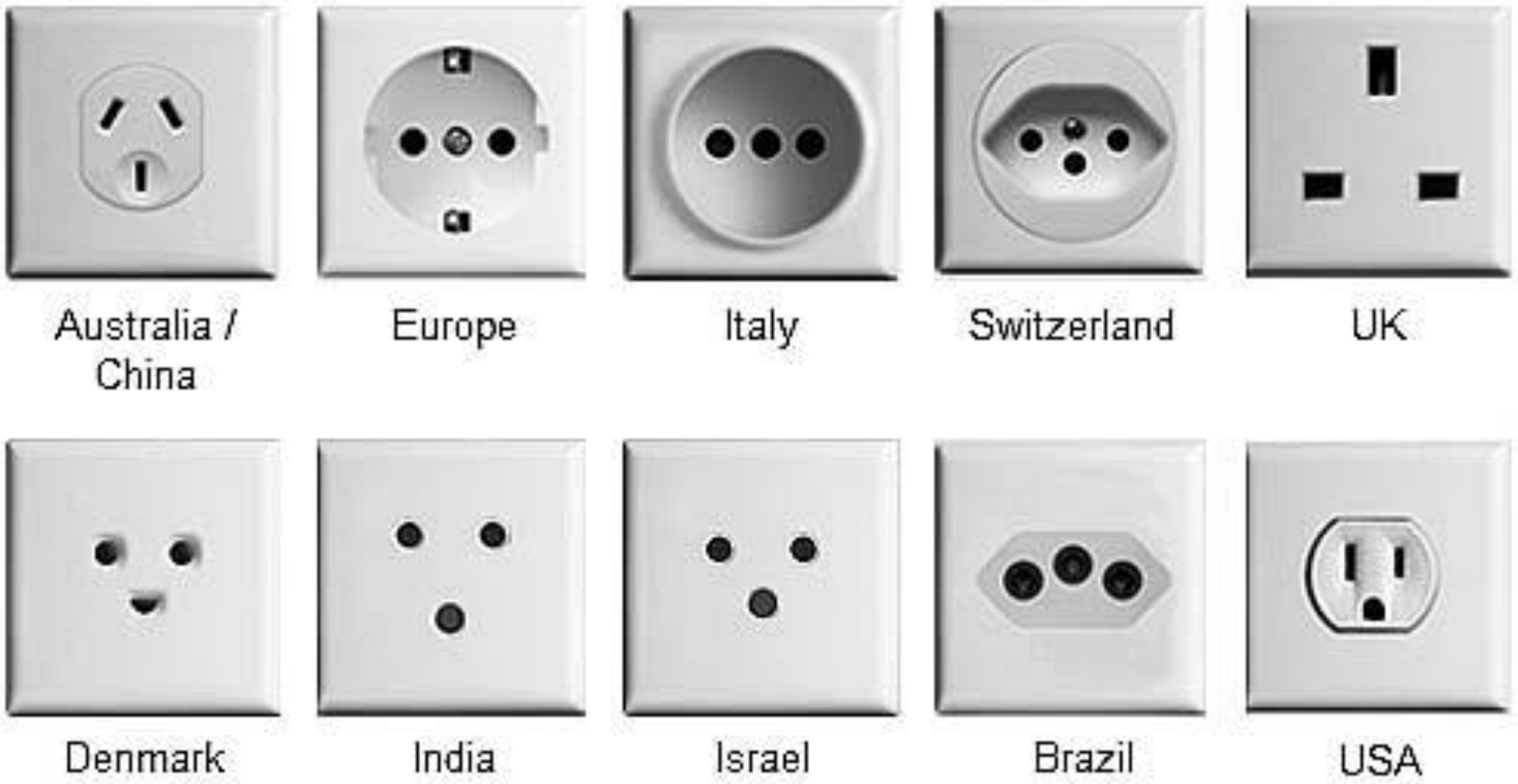
- **UWE-2**



- **UWE-3**

Motivation

for a Standardization of Electrical Interfaces of CubeSats: Global subsystem market



Motivation

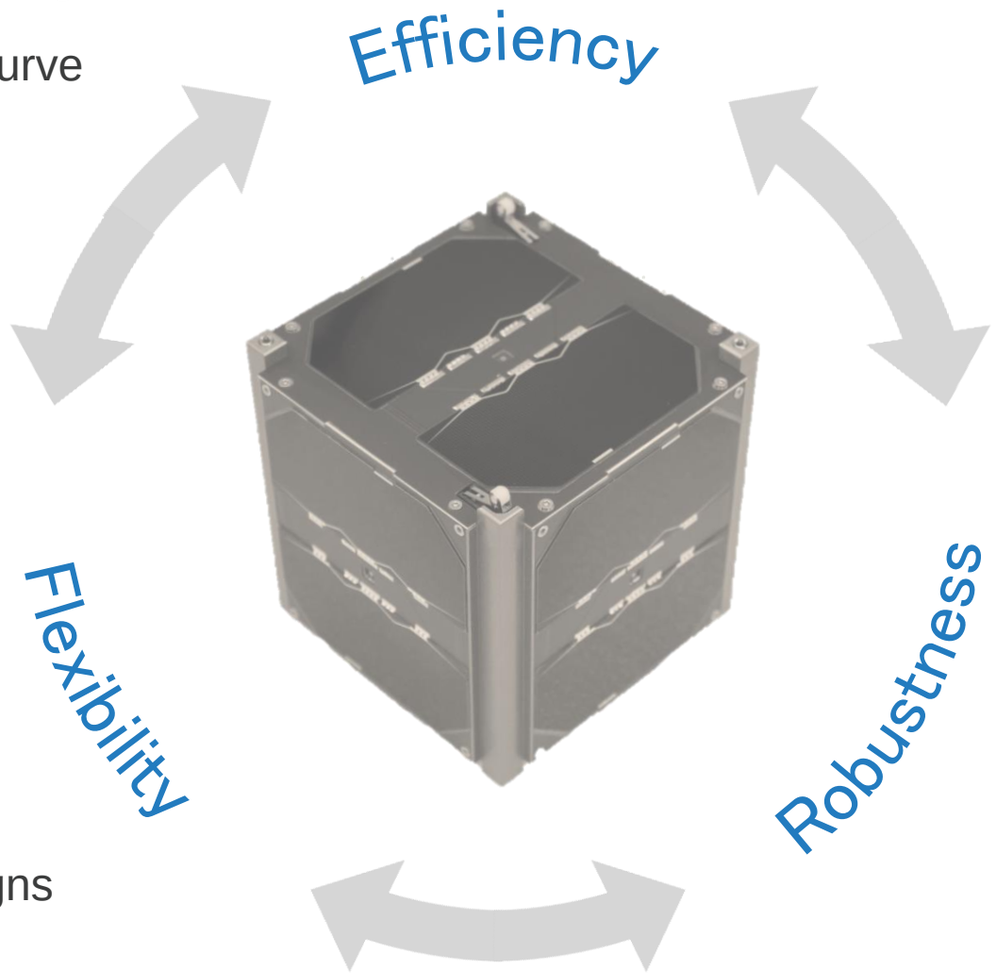
for a Standardization of Electrical Interfaces of CubeSats

- standardization is the key to economical utilization of small satellites in large numbers
- enables fast and reliable development, integration and verification
- standardized interfaces facilitate access to the system and increase testability and robustness

Chances

for a Standardization of Efficient Electrical Interfaces of CubeSats

- allow fast and compact integration
- simple maintenance of integrated bus
- support steep learning curve



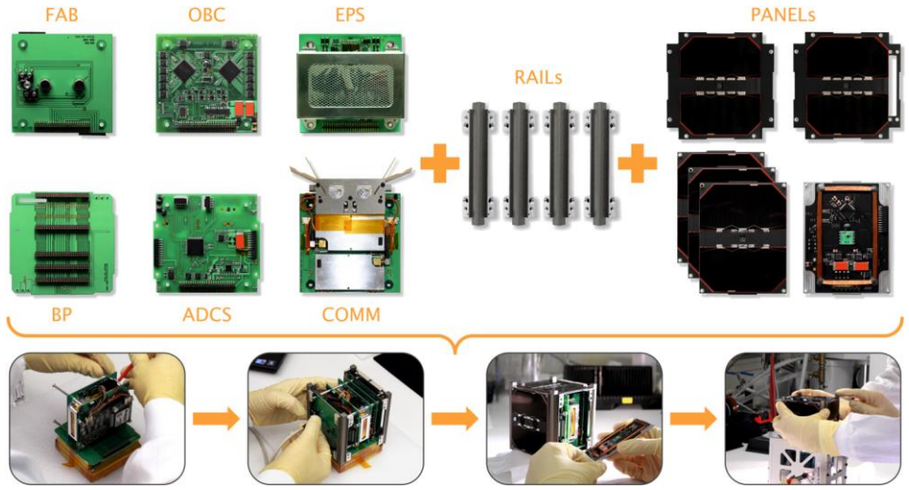
- support for scalability
- simplifies re-utilization and extension of subsystem designs

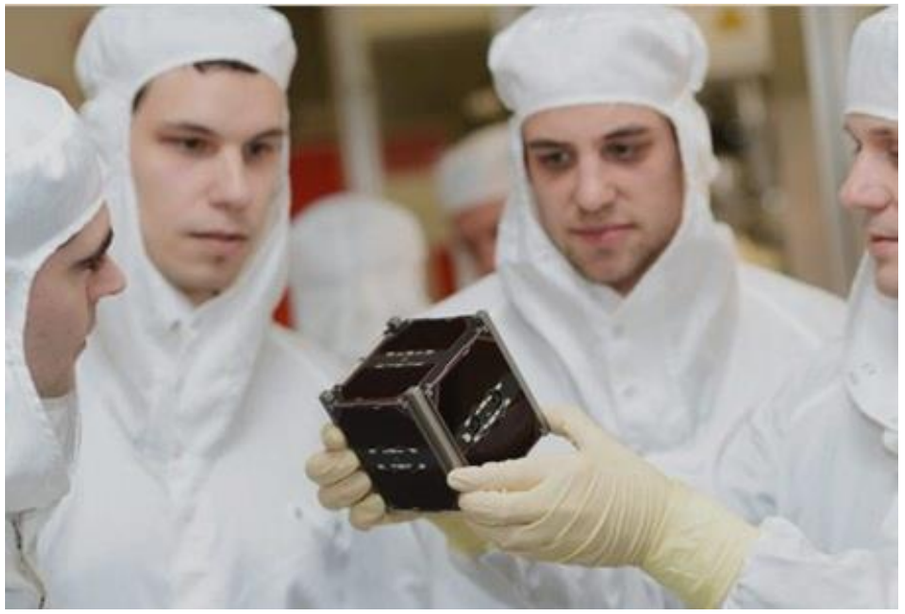
- standardized monitoring and protection of subsystems
- standardized support for testing and debugging
- (in-orbit) re-programming of (integrated) subsystems

Discussion Group

about a Standardization of Efficient Electrical Interfaces of CubeSats

- Points of discussion
  - advantages and limitations of current approaches
  - your experiences from past and ongoing missions utilizing proposed/similar/better concepts
  - your requirements for a common standard
  - hands on UNISEC Europe CSID Dev-Kit
- Expectations from discussion
  - discussion with both, (academic) customers and commercial suppliers
  - expected outcome: remarks, new ideas, and additional requirements
- Long-term goal: Establish a UNISEC Global CubeSat Interface Definition





UNISEC Europe Bus

Implementations & Missions