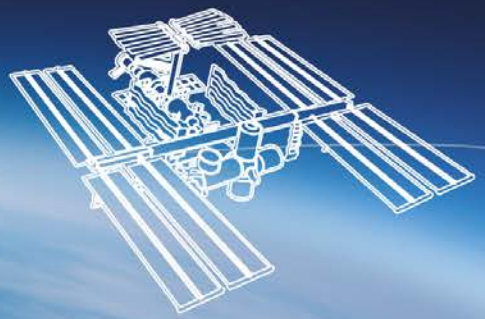

my_EPP

Research in Space Environment and Technology Development Using the International Space Station

Fast track and low cost access to low Earth orbit for hosted payloads, cubesats and small satellites

Dr. P. C. Steimle, U. Pape
Commercial ISS Applications, Airbus DS GmbH, Bremen
February 2015

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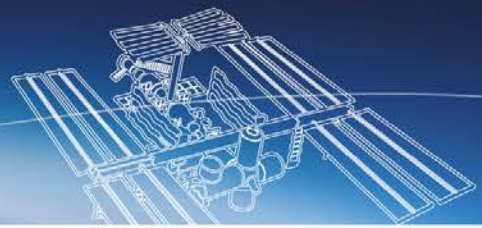
AIRBUS
DEFENCE & SPACE

Airbus DS in the context of ISS

End-to-end service provider for space-related activities



- Direct access to Earth-based test facilities (ZARM drop tower, parabolic flights)
- Sounding rocket program
- Internal and external facilities on the International Space Station
- Direct access to sub-orbital planes (XCOR)
- Cooperation in payloads for the Chinese Shenzhou / Tiangong system

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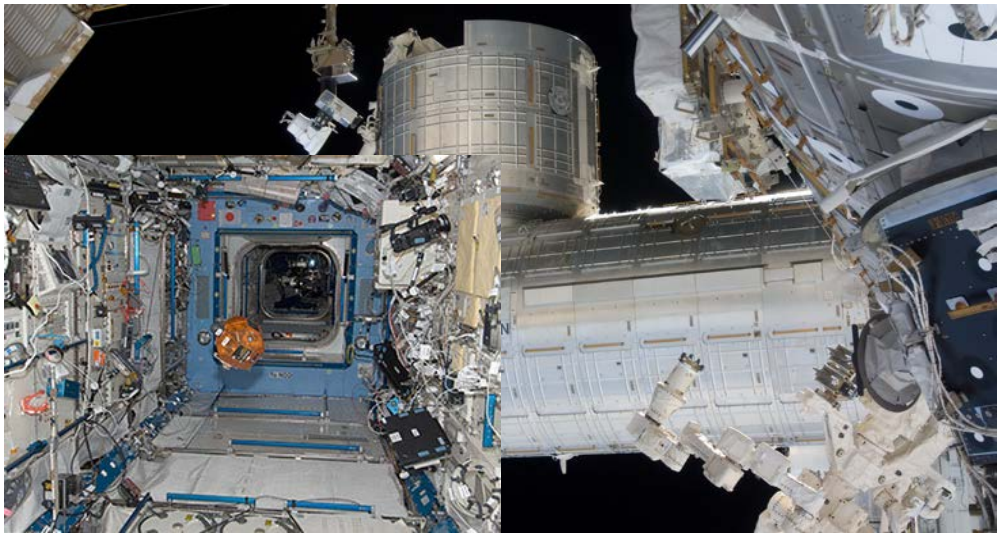
Research in the space environment

Ways to use the International Space Station

Inside ISS

- Controlled environment
- Operation of payload by crew
- Microgravity



Outside ISS

- Controlled environment
- Commanding of payload from your desk
- Microgravity
- Radiation environment of low Earth orbit
- Vacuum environment
- Thermal environment
- View on Earth
- View to the stars

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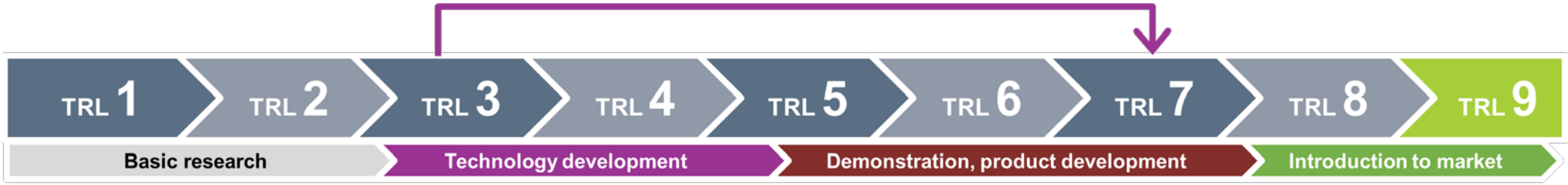
Research in the space environment

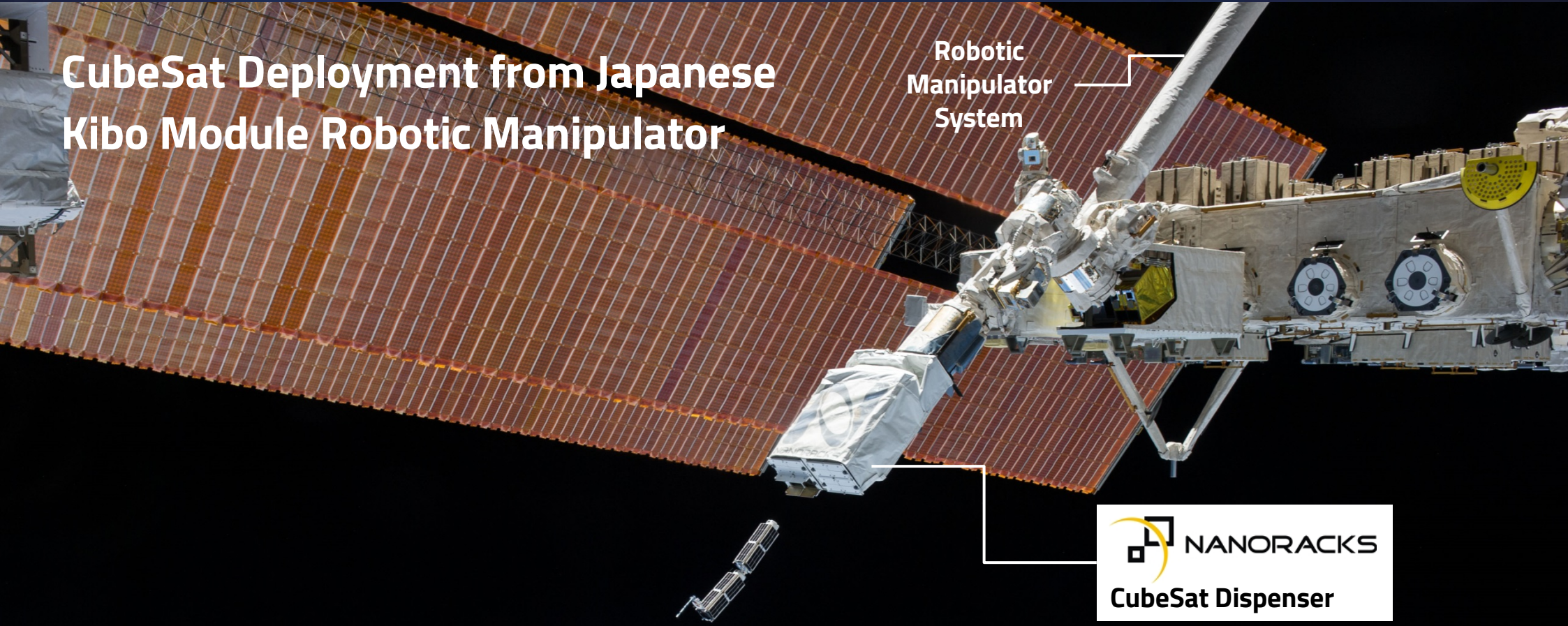
Ways to use the International Space Station

Technology Demonstration	
TRL 1	Basic principle
TRL 2	Technology concept
TRL 3	Experimental proof of concept
TRL 4	Technology validated in lab
TRL 5	Technology validated in relevant environment
TRL 6	Technology demonstrated in relevant environment
TRL 7	System prototype demo in operational environment
TRL 8	System complete and qualified
TRL 9	System in operational environment

- Accelerated improvement of available technologies, system concepts and abilities
- Reduction of the time to market of space-related products
- Cost-optimization of mission scenarios
- Fast demonstrations of mission scenarios



CubeSat Deployment from Japanese Kibo Module Robotic Manipulator



Cubesat Dispenser
Each deployer can deploy up to 6U of cubesats
8 NRCSD's per airlock cycle for a total of 48U deployment capability
2 air lock cycles per mission

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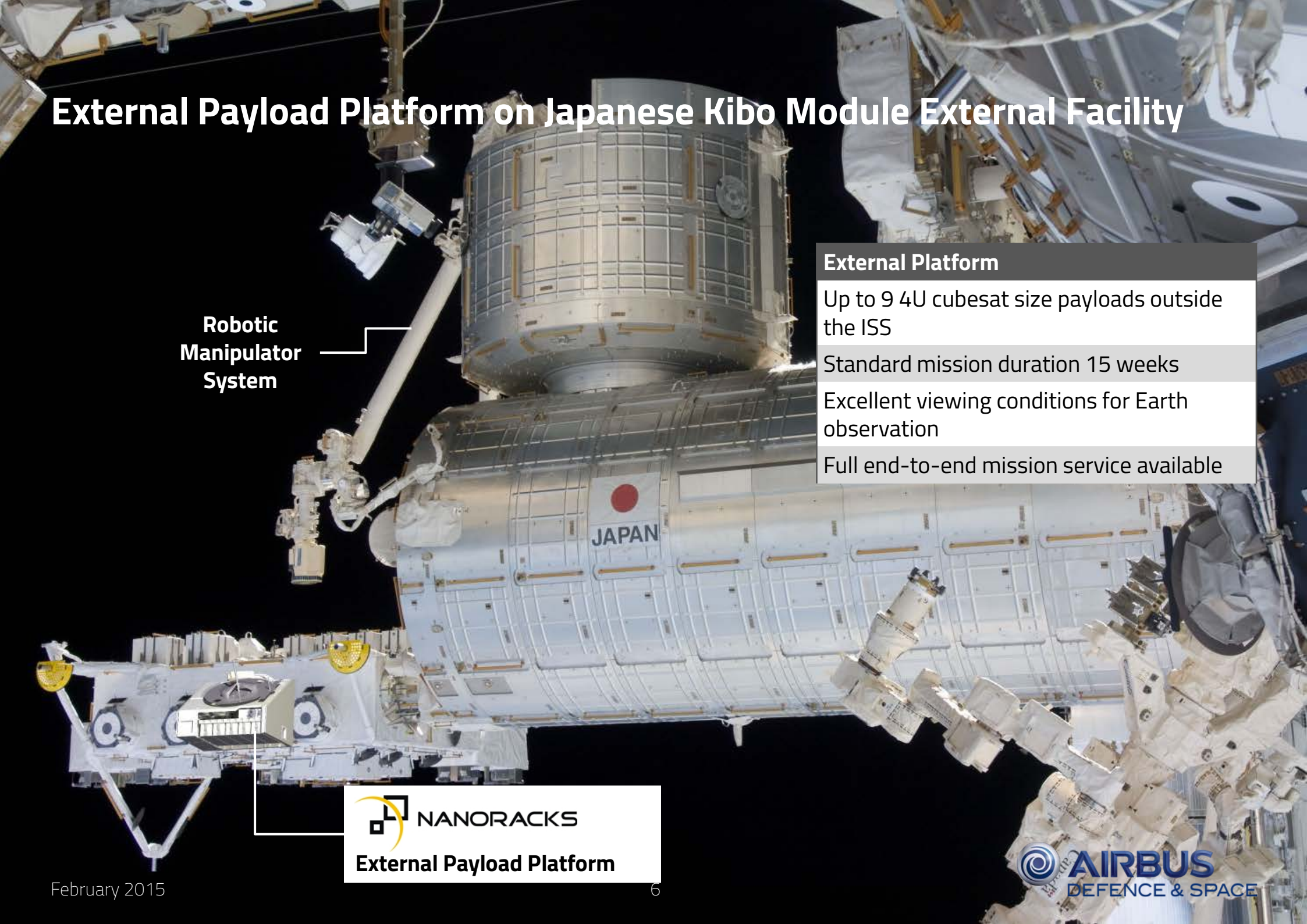
External Payload Platform on Japanese Kibo Module External Facility



External Platform
Up to 9 4U cubesat size payloads outside the ISS
Standard mission duration 15 weeks
Excellent viewing conditions for Earth observation
Full end-to-end mission service available

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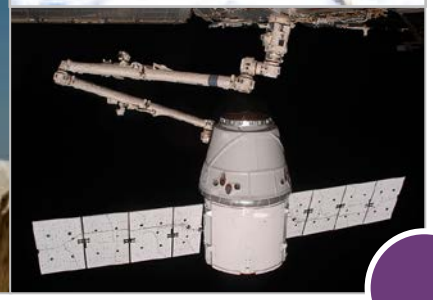
Airbus DS end-to-end service

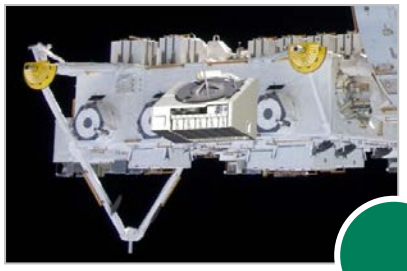
Overview



Launch

Transfer outside

Installation



Payload mission

Payload Return

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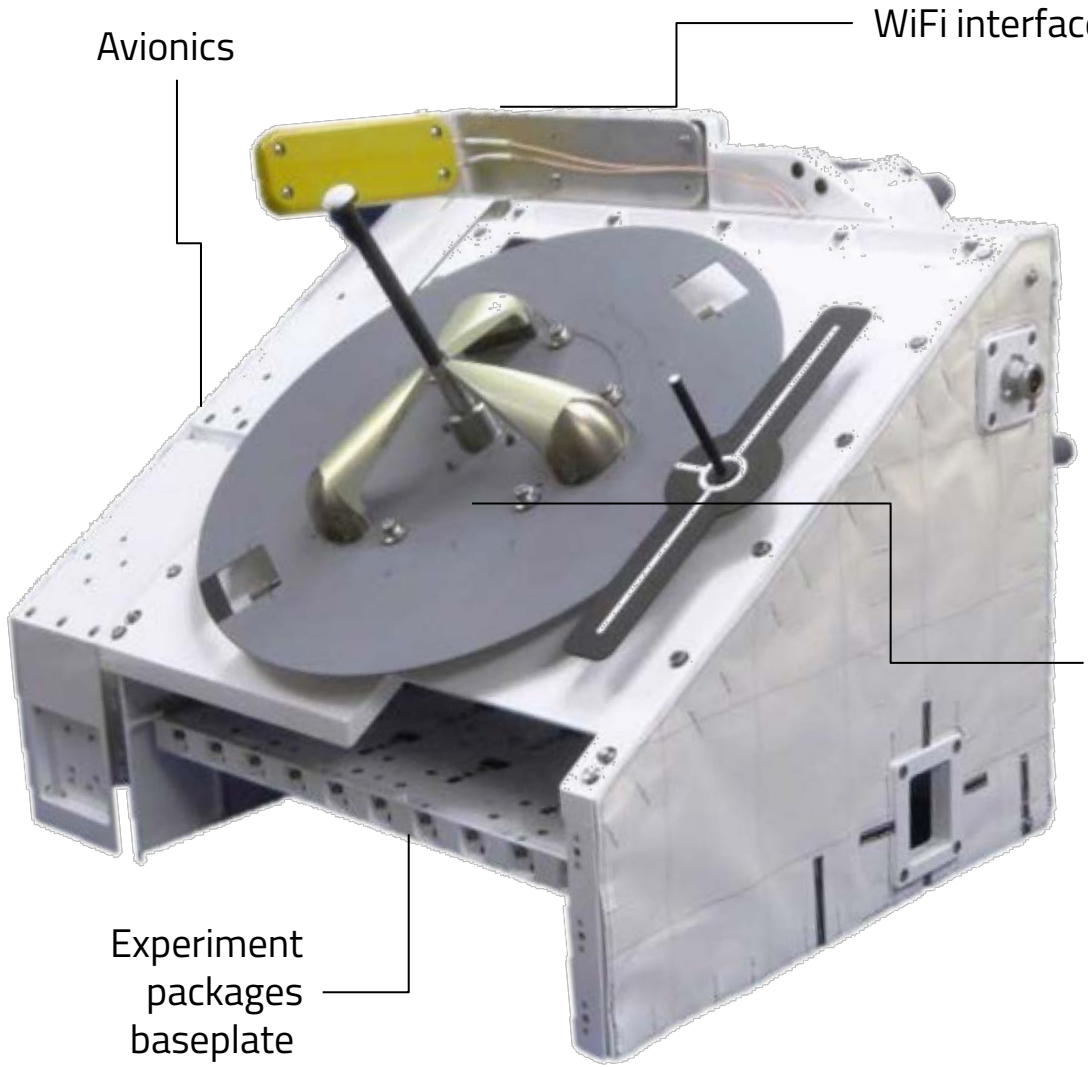
External Payload Service

External Platform System Design

Standard payload provisions	
Voltage	28 Vdc ± 2 V or 120 Vdc as option
Total power	30 W at 28 Vdc
Maximum current	2 A
USB 2.0 bus	5 Vdc / 500 mA, non-switchable
Total payload data rate	up to 8 Mbit/s



External Platform – Flight Unit

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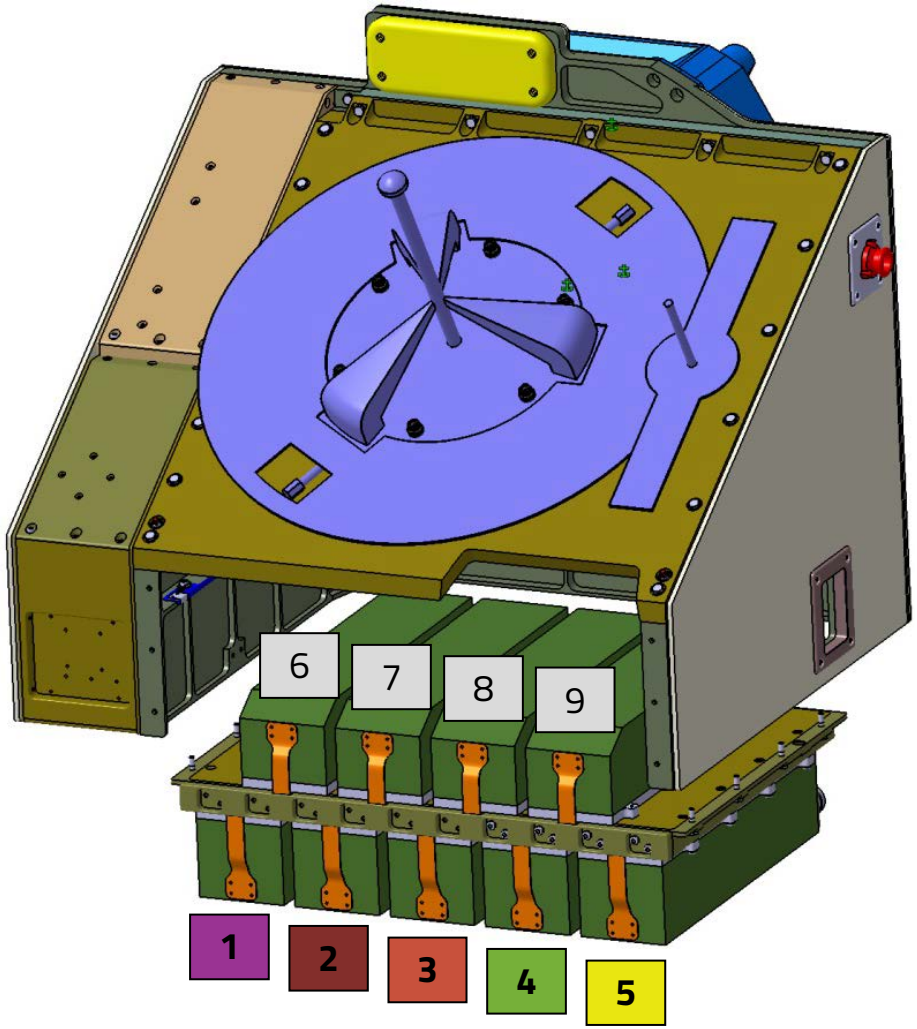
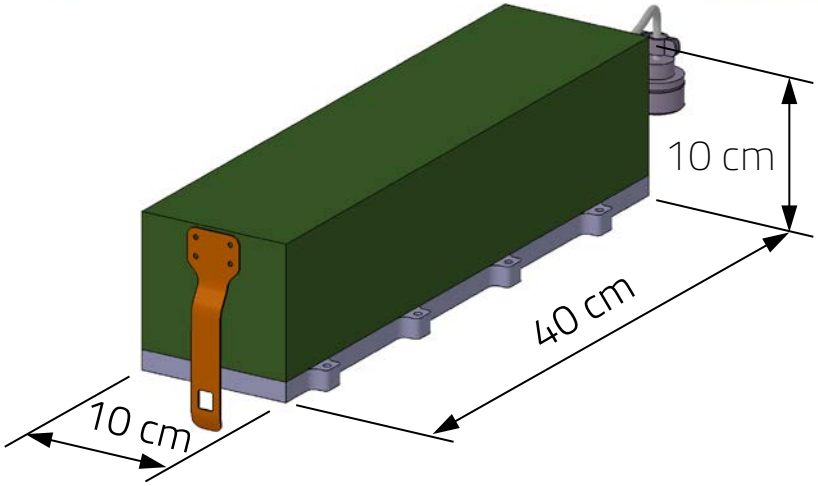
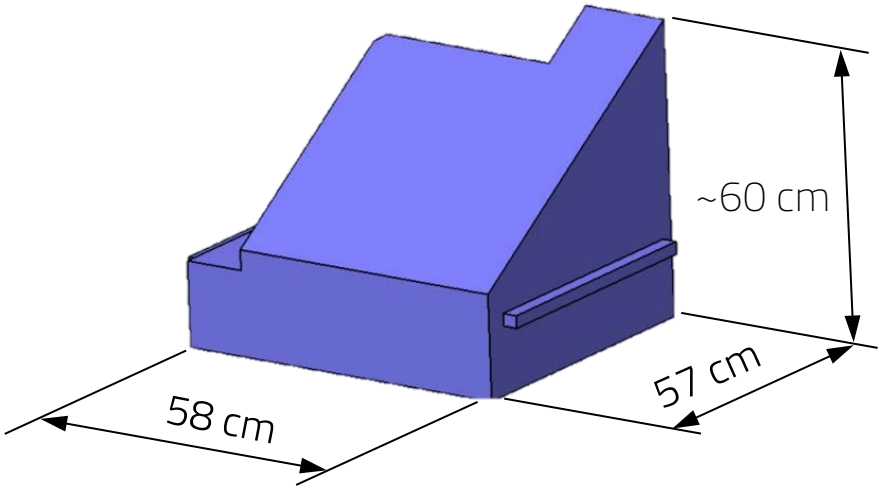
External Payload Service

External Platform System Design





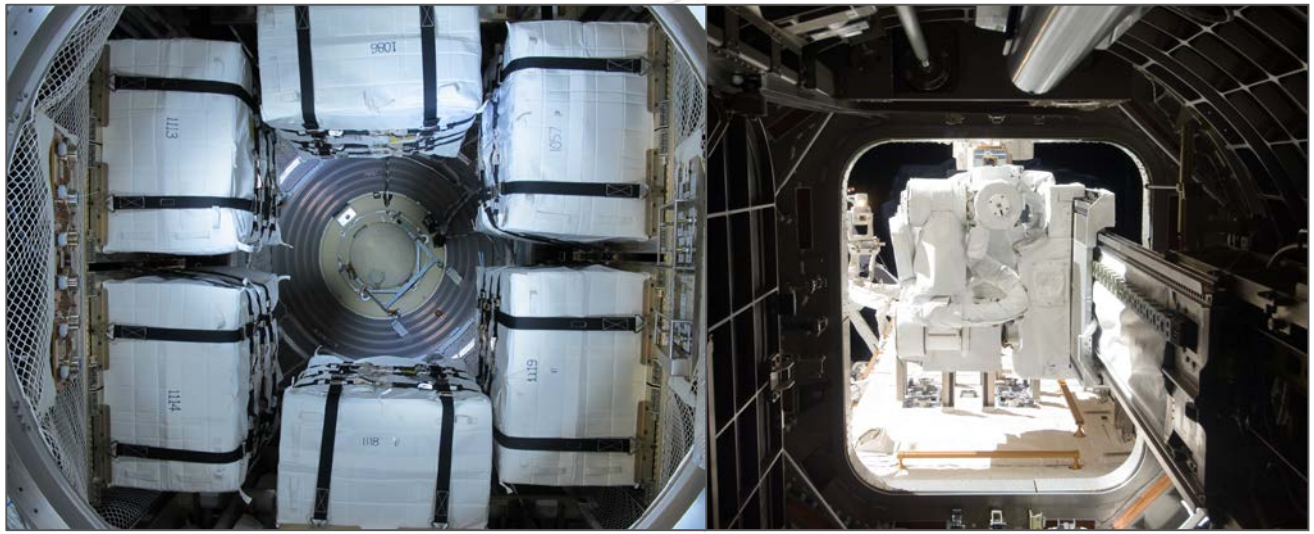
EPP-P standard 4U size payload package
(other sizes are also possible)



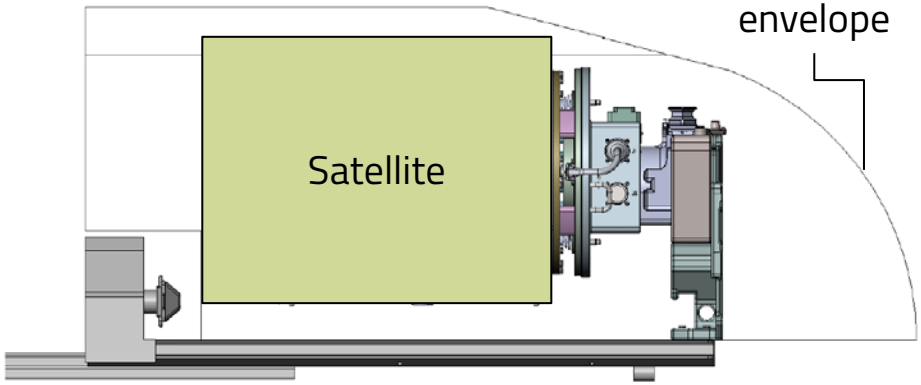
Unique payload configuration

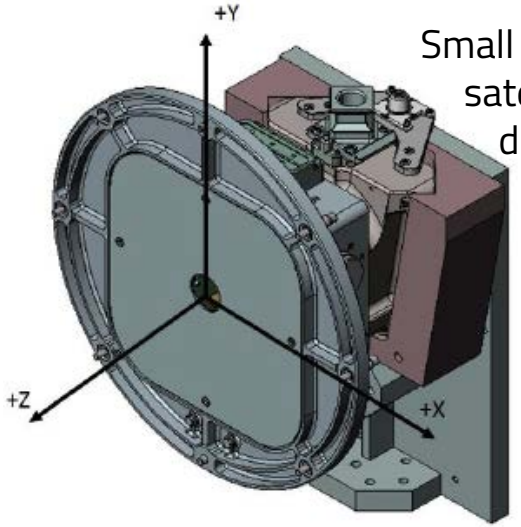
Small satellite launch system

System design



Small and microsat constraints
Maximum spacecraft dimensions 1000 mm x 830 mm x 525 mm
Maximum mass 100 kg
Maximum Ballistic number = 91.24 kg/m^2 is less than ISS Ballistic number = 100 kg/m^2
Assumption of drag coefficient = 2
Compliance with ISS safety criteria





Small satellite deployment system

Cubesat deployment system

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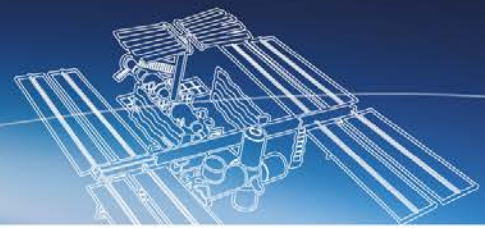
External Platform Service

Mission schedule



Time to launch	Customer	Service Provider
L-10 months	Contract and ICA core baseline signature, appendix development	
	• Payload functional description • Interface drawings • Material identification and usage list • Budget report	Initiation of ISS safety process
L-9 months	Payload thermal model	• Upload manifesting • Integrated thermal analysis until L-7
L-6 months	Description of Flight Operations	Review of Flight Operations with ISS program
L-3 months	EPP-P handover to service provider	Environmental and functional tests until L-1
L-1 months		Certification for flight and handover to launcher
L		Launch
L+2 months	Flight Operations for 15 weeks	EPP-P installation on EPP
L+12 months		EPP-P return to customer

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Airbus DS End-to-end Service in EU Horizon 2020 Programme

- **End-to-end Service accepted by European Commission as part of Research and Innovation Actions**
- **External Payload Platform is launched to ISS in third quarter of 2015**
- **First European external payload will fly in first quarter of 2016 (as part of a H2020 project)**
- **Please contact us, we make your mission possible!**

Contact

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