



PDS Support for the Democratization of Space

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Agenda

- Democratization of Space
- Expanding Data Providers
- The Challenge
- Reference "Customer"
- Discussion

Democratization of Space

- Access to space is no longer limited to superpowers and multinational firms
 - Technology advances
 - Access to education and resources
 - Lower-cost launch systems
 - Hardware and interface standards
 - Open source software

Data Providers - ROSES

- Research Opportunities in Space and Earth Sciences (PDARTS, PMDAPS, etc.)
 - Expectation that PDS support the provider
 - Enabled by low(er) cost compute resource availability
 - Use of machine learning techniques and applications of new algorithms against diverse datasets
 - Ability to access and process bulk datasets

Data Providers - Universities

- Transition from Government to University and commercial providers
 - Space Science and related programs expanding
 - University facilities increasing in capability (cleanrooms, TVAC's, mechanical fabrication, etc.)
 - Demonstrable experience delivering flight hardware and software
 - Operations support capabilities

Universities Today



Morehead
State University



Images courtesy
<https://cores.research.asu.edu> and
<https://www.moreheadstate.edu>



Arizona State
University



Data Providers - CubeSats

- Proliferation of CubeSats
 - NASA's CubeSat Launch Initiative, SmallSat Virtual Institute, etc.
 - EM-1 Mission – Many CubeSats are headed to the moon or beyond
 - ESA creating a CubeSat Systems Unit Centre of Excellence

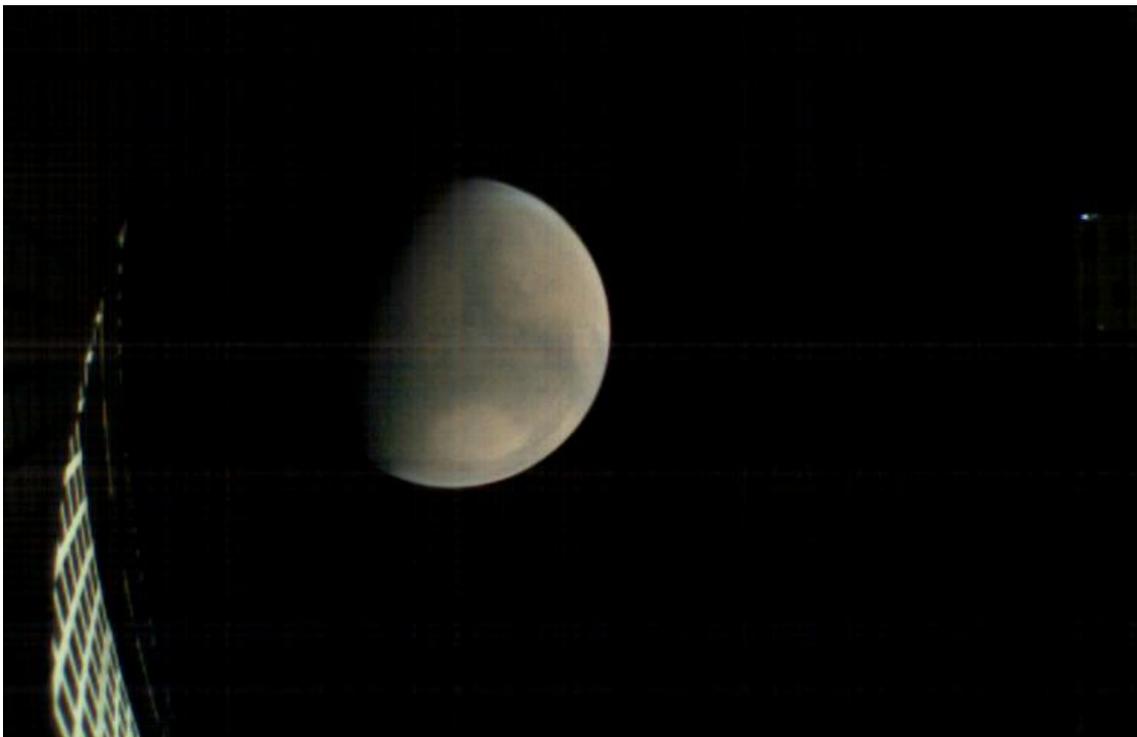


Image courtesy [jpl.nasa.gov](https://www.jpl.nasa.gov)

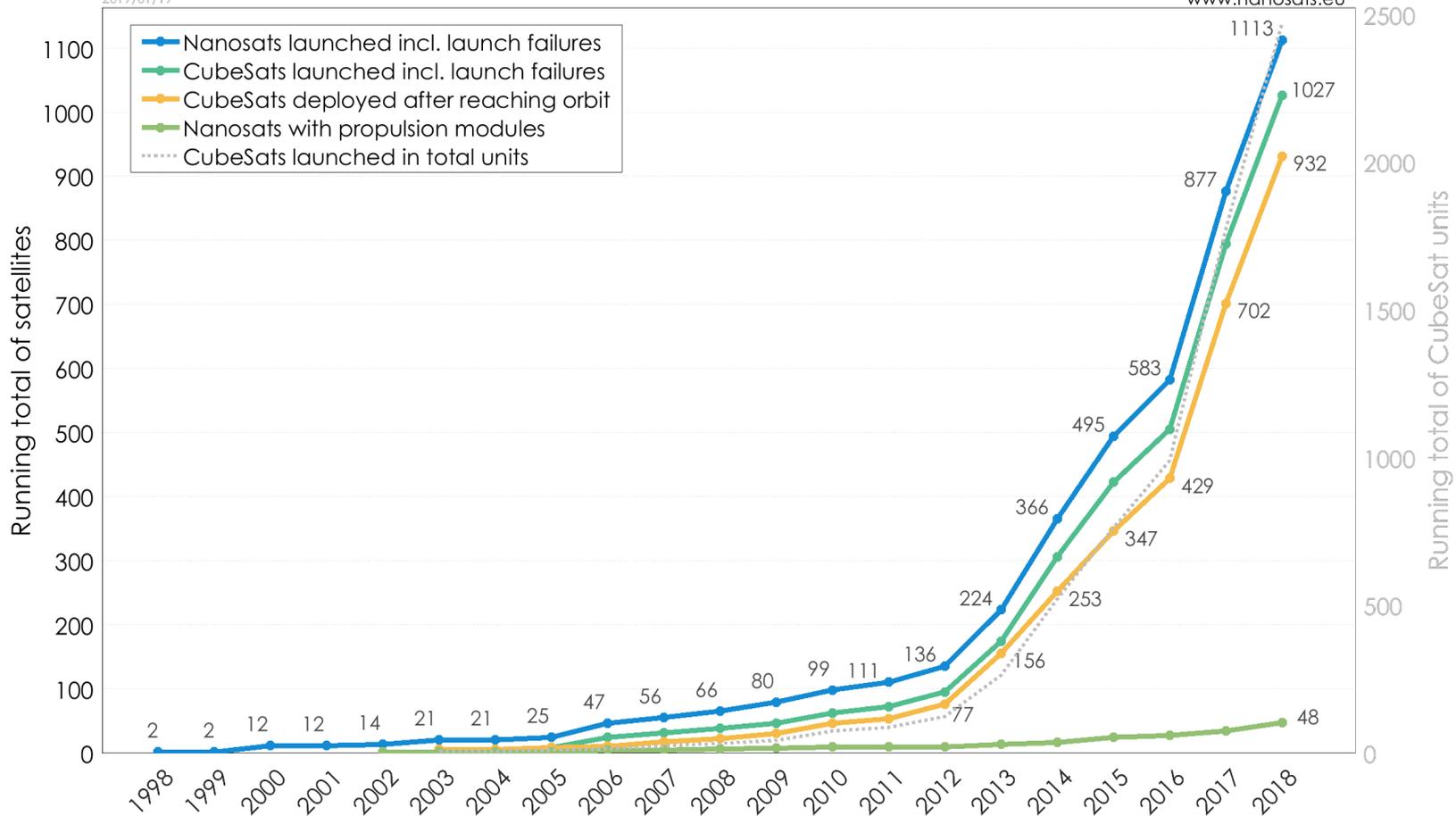
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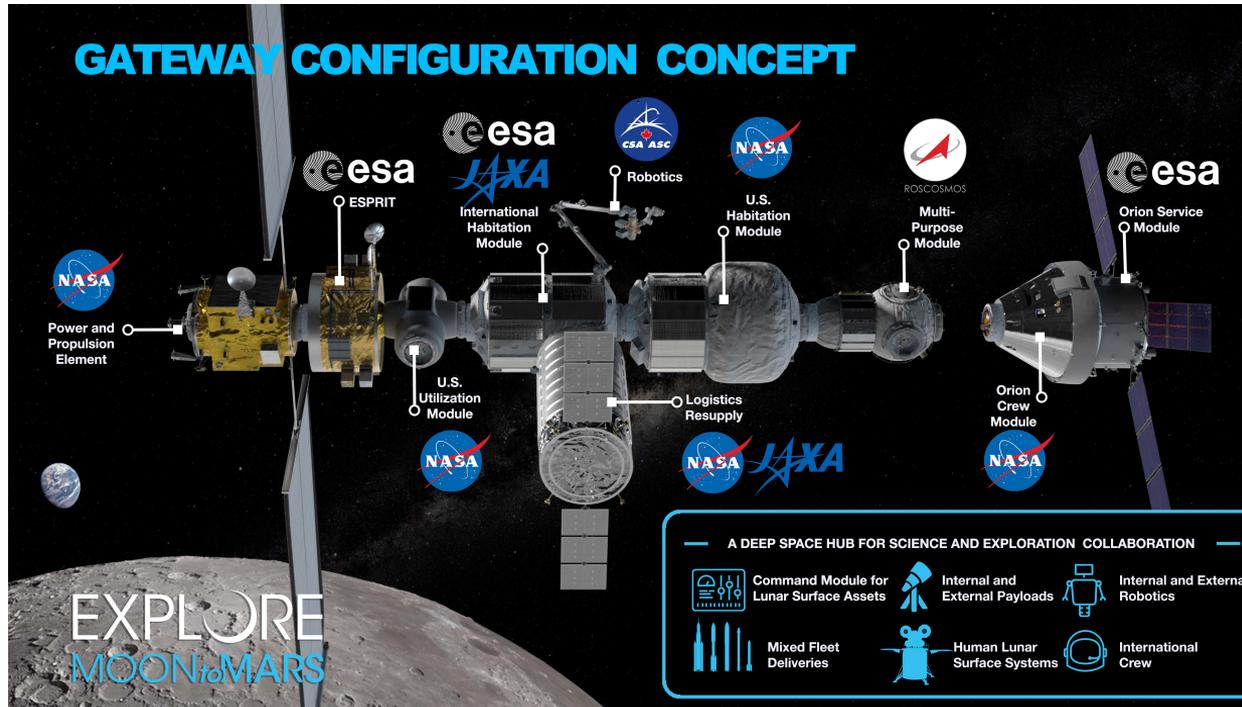
Total Nanosatellites & CubeSats Launched

2019/01/19

www.nanosats.eu



Data Provider – Moon to Mars



<https://blogs.nasa.gov/bridenstine/category/moon-to-mars/>

The Challenge

- How do we enable these and other new providers to comply with PDS4 standards?
- Can our existing approach and processes adapt and scale as necessary?
- How do we prepare to address the evolving demands?

Reference Customer

- Baseline expectations to enable a graduate student to prepare and deliver a PDS4-compliant bundle
 - Characteristics
 - Limited understanding of the benefits of archiving and the rationale behind the label requirements
 - Limited experience with PDS standards
 - Lack of historical pipeline processing environment
 - High turnover
 - Limited funding

Potential Approaches

- Mask the complexity of PDS4 behind easy-to-use enabling applications
 - e.g. the PDS Label Assistant for Interactive Design (PLAID) – <https://plaid.jpl.nasa.gov>
- Assure the information model is updated in supporting applications
- Provide a Dropbox-like capability for small data providers

Discussion

- What changes to the strategic plan need to be made to address this demand in the 2 – 5 year timeframe?
- Can we provide cloud-based resources and label processing capabilities?
- What key processes and applications need a review to address these changes?

Thank You



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