ESA VIEWS ON HUMAN SPACEFLIGHT AND EXPLORATION

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ESA's DEFINITION OF EXPLORATION

- Open ended project
- Access unknown terrains and environments
- With humans or robots (direct / indirect presence)
- Opens new frontiers
- Acquires knowledge
- Stimulates global cooperation
- Driven by political, scientific, socio-economic and humanistic motives

DG's POSITION ABOUT ESA's ROLE IN GLOBAL EXPLORATION

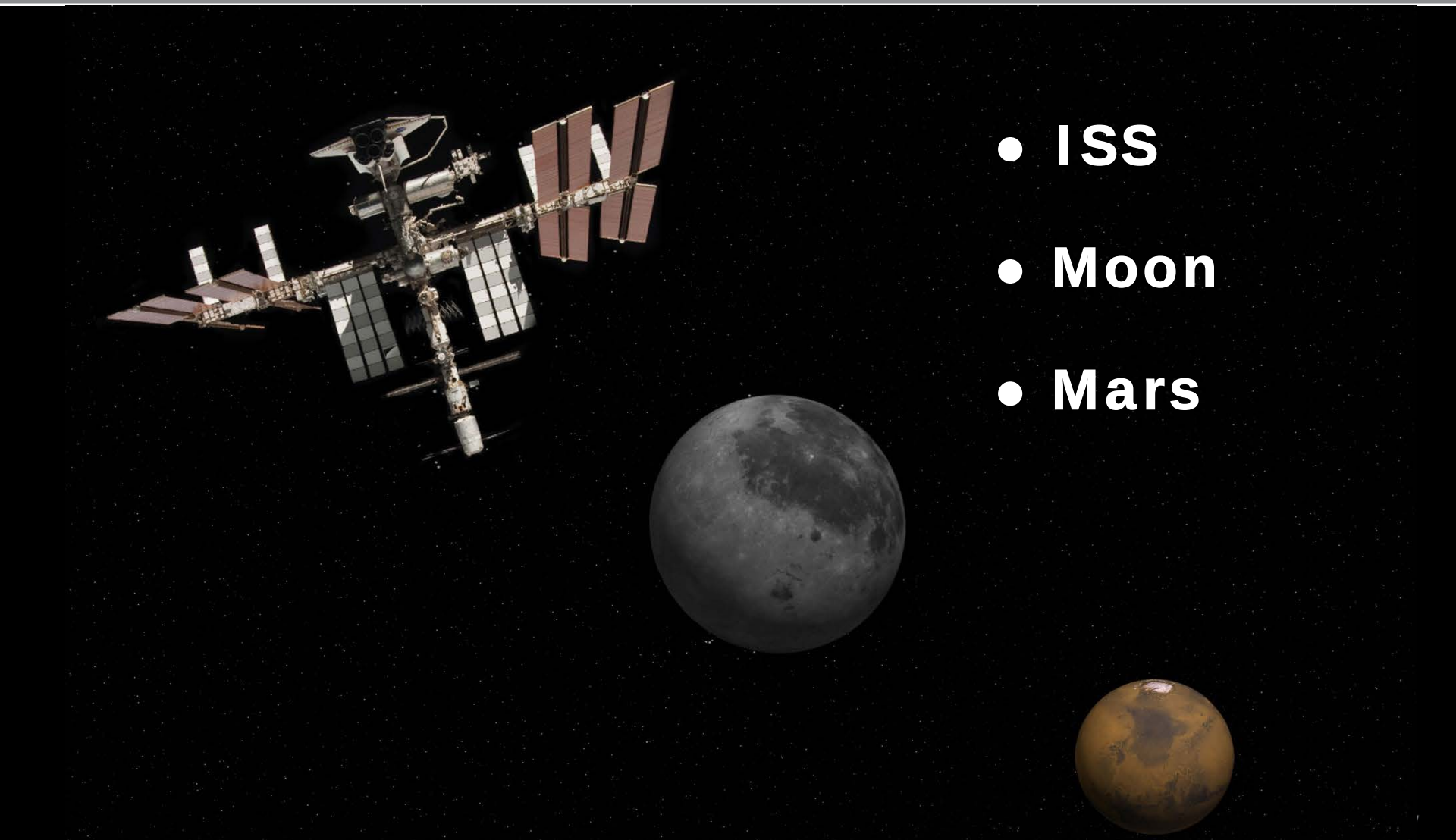
Domain of Human Spaceflight

- ESA dependent upon partners
- We can only support plans of non-dependent partners, in particular NASA, for Human Exploration projects
- Our support can be based on (unique) European capabilities (Space Transportation, Life support, etc.)

Domain of Robotic Exploration

- On the contrary, ESA can take initiatives
- open to international cooperation, in particular NASA, based on (unique) European capabilities

ESA‘s AGENDA 2015 - DESTINATIONS



- ISS
- Moon
- Mars

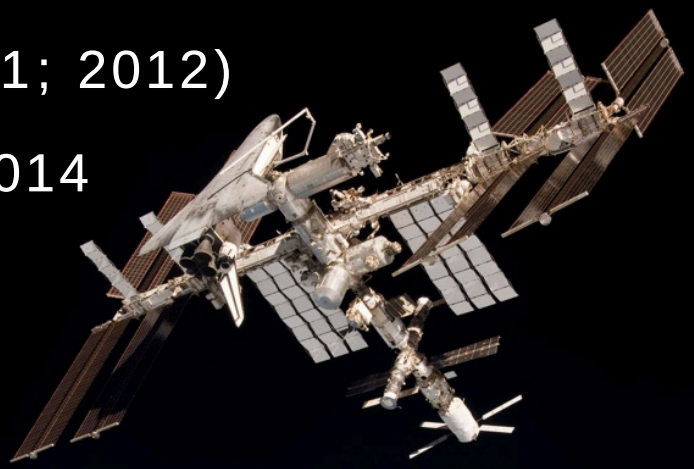
ESA ON ISS: TODAY – 2020

Columbus

- Fundamental and applied research
- Industry-driven R&D and technology demonstration

ATV - fully automated spacecraft

- Three missions so far (2008; 2011; 2012)
- Two more to come in 2013 and 2014



ESA Astronaut part of ISS crew about 1 mission / 2 years

ESA VIEWS ON ISS

- Strong international partnership
- Engineering (assembly)
- Operational (24/7 operations)
- Utilisation (accomplishments/successes)
- Technological (Logistics, Life Support, EVA, Robotics)
- Cultural (permanent human presence in space, inspiration)

ESA's PARTICIPATION IN ORION SPACESHIP

- Opens options for European engagement in missions beyond LEO
- Stabilises European participation in ISS Programme up to 2020
- Europe involved in human transportation

ESA POSITION ON EXPLORATION

Global/ International undertaking

European focus on niches, exploiting synergies

- ISS/LEO - Moon: i.e. Orion - ESM
- ISS - Mars: i.e. tele-operations
- Moon - Mars: i.e. robotic exploration of Moon and Mars, sample return missions

Mandate by ESA-Member States to develop a coherent exploration strategy in 2013

INTERNATIONAL COOPERATION

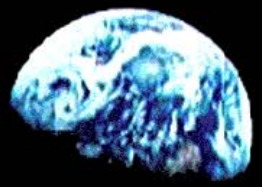
Possible approach for 2020+ initiatives

- **Flexible cooperation format - allow partners to reflect their priorities**
- **Cooperation on transportation and other space infrastructure**
- **Open on destinations while exploiting synergies (e.g. asteroid retrieval mission)**

RELEVANCE TO SOCIETY

Cooperation
- Political dimension: develop and strengthen international partnership
- Functional dimension: share resources and capabilities

Knowledge
- Limits of human life in space; biomedical problems on Earth
- Existence and origin of life
- Understanding of physical phenomena; applied research



Innovation
- Generate tangible benefits – new technologies and processes
- Build competitive capabilities

Education
- Inspiration and motivation