



The Way Forward

ESA

ESA-ESRIN, 16 January 2009



Resolution on the role of Space in delivering Europe's global objectives

Programmes

Contributing to Knowledge-based society and playing significant role in international exploration endeavour

- European Participation in the International Space Station Exploitation Programme
- European Programme for Life and Physical Sciences and Applications in Space

Contributing to unrestricted access to space and to new critical technologies, systems and capabilities, while consolidating positioning of Europe on global scale

- European Transportation and Human Exploration Preparatory Activities Programme

Milestone 2010

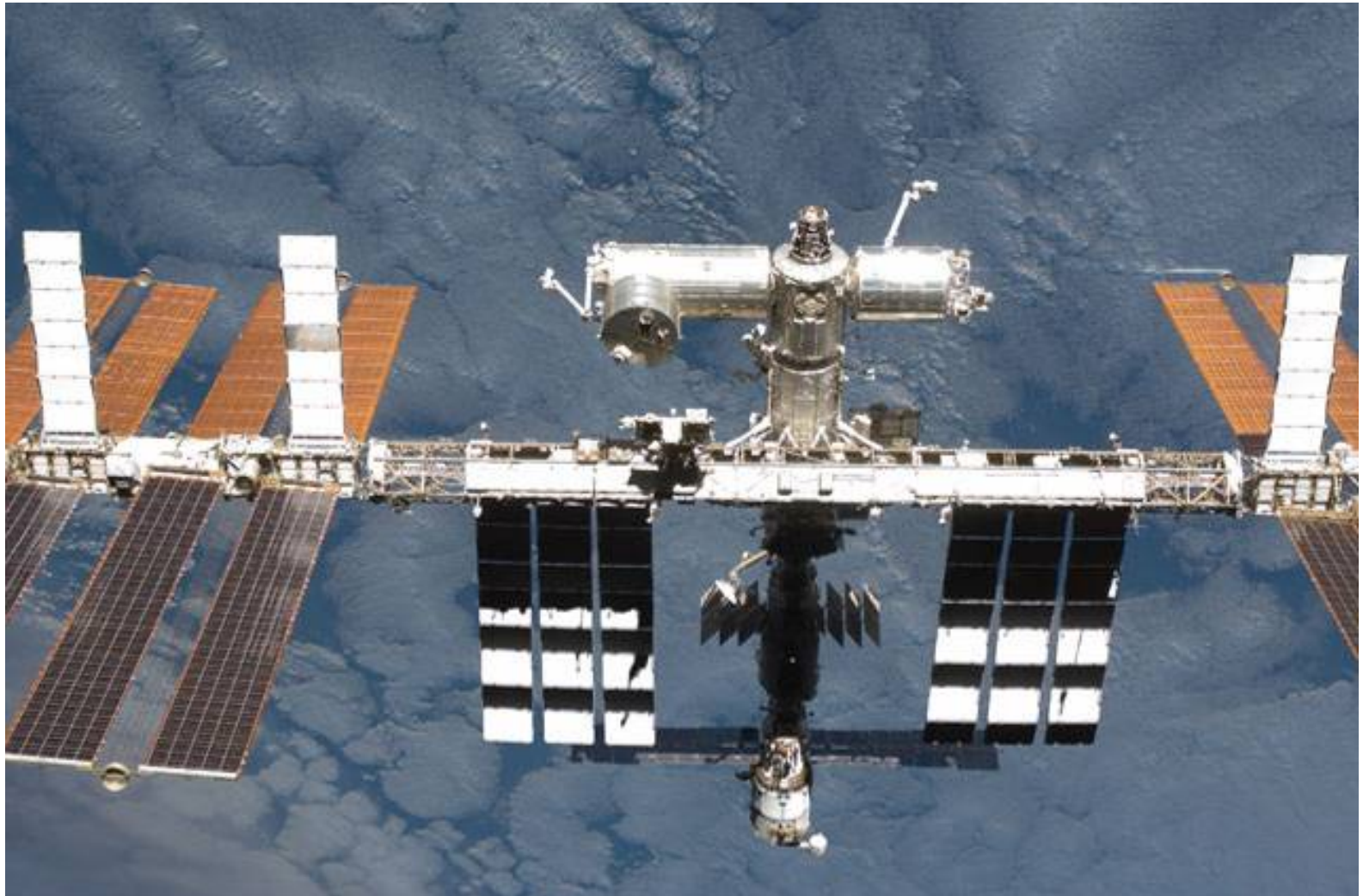
Invites the DG to prepare relevant data necessary for Participating States to the ISS Exploitation Programme to take decisions by 2010, together with the other ISS Partners, about possible continuation of ISS Operations beyond 2015

Future Decisions

Prepare for decision in 2011 on role of Europe in world wide exploration encompassing robotic exploration of Solar System and human spaceflight leading to exploration of Moon



ISS Exploitation and Utilisation





Consolidation of European Long-term Strategy and Implementation plan for Human Spaceflight and Exploration

Human Operations in LEO

- ▶ Preparation of decision on **ISS Programme Extension**
- ▶ **ARV Definition**
- ▶ Assessment of **strategic role of LEO beyond ISS Programme**

Human Exploration

- ▶ Participation in **international architecture development** for human exploration of the Moon and definition of European contributions
- ▶ Consolidation of European **lunar lander roadmap and definition of first mission**
- ▶ **Advancement of research and development** enabling sustainable human space exploration in selected fields





INTERNATIONAL OBJECTIVES

- ▶ Develop point of departure of international lunar exploration architecture by mid 2010
- ▶ Define requirements for interface standards
- ▶ Draft partnership agreements for international cooperation by 2011

EUROPEAN OBJECTIVES

- ▶ Integrate European lunar lander into international mission scenarios
- ▶ Define at conceptual level possible European contributions to surface infrastructure
- ▶ Develop requirements for international human transportation architecture
- ▶ Harmonise ESA and national objectives





Scenario	Assessment
<p>Option A</p> <p>NET 2012 Ground demo NET 2017 Soyuz lander NET 2024 Full A5 lander</p>	<ul style="list-style-type: none"> • Lowest cost first mission/ high total costs • Visible European milestone before 2020 • Limited value for human mission preparation • Very limited extensibility of Soyuz lander to A5 lander
<p>Option B</p> <p>NET 2012 Ground demo NET 2017 Shared A5 lander NET 2021 Full A5 lander</p>	<ul style="list-style-type: none"> • Visible European milestone before 2020/ high total costs • Extensibility of shared Ariane 5 to cargo lander • Possible integration of national mission interests • High value of Shared A5 and Full A5 mission for human exploration • High cooperation potential with NASA (constellation), JAXA, CSA for shared and full A5 lander missions
<p>Option C</p> <p>NET 2012 Ground demo NET 2019 Full A5 lander</p>	<ul style="list-style-type: none"> • Lowest overall costs/ avoid conflict with ARV • Earliest availability of cargo lander • High cooperation potential with NASA (constellation), JAXA, CSA for full A5 lander mission





Strengthen collaborative activities with academia, research institutes, industry and non-space stakeholders

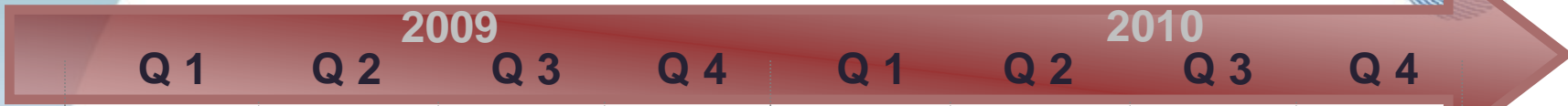
Develop framework for cooperation with EC for advancing research and development fostering broader innovation

Enhance utilisation of ISS for enabling research and capability demonstration; issue related Call for Ideas

Establish ESA-led network of human exploration related facilities



Procurement Planning



Long-term Strategy

Scenario Development and Integration ¹⁾

EC/ ESA High-level Exploration Conference

ARV Development

ARV Phase 0 ²⁾

ARV Phase A

Human Preparation Lander Mission

Consolidation of Mission Options ³⁾

Lunar Lander Phase B1

Mission Requirements/ Payload Workshop

Mission Selection Workshop

International Architecture

Human Lunar Architecture Consolidation and Integration ¹⁾

Requirements Definition ¹⁾

Cargo Lander Phase A1

Requirements Definition ¹⁾

Surface Infrastructure Phase A1

¹⁾ ESA activity with some industrial support

²⁾ Ongoing activity

³⁾ Performed within the frame of ongoing GSP studies

