











Europe
shall implement
a visible, affordable and robust
space exploration programme
driven by the long-term goal of
in-situ exploration of Mars by humans,
which creates **benefits for the society,**
engages other space-faring nations
through collaborative activities
and, thereby, contributes significantly to
the development of society.

FOUR CORNERSTONES

Cornerstones

 Key Driver

European Drivers

	European Project	Knowledge	Innovation and Development	Inspiration and Education	Global Societal Security	Cultural Development
Europeans in Space						
Habitability and Life Beyond Earth						
Sustainable Human Life in Space						
Sharing the Space Adventure and Benefits						

TWO COMPONENTS

- Strategic independent sustained core programme
- European contributions to the global/ international space exploration programme

THREE KEY ACTIVITY FIELDS

- Enabling research and capability development
- Robotic and human exploration of Moon
- Robotic and human exploration of Mars

Develop long-term strategy for

- ✓ Securing programme **sustainability** through alignment of stakeholder interest
- ✓ Optimising **societal return** of investments through prioritisation of long-term investments
- ✓ Supporting European project through **focus** and **visibility** of European role

Democratizing space through stakeholder consultation and engagement in planning stage

Achieving **sustained societal relevance** through

- ✓ Increasing broader public interest and engagement
- ✓ Maximising innovation potential and exploitation
- ✓ Incorporating ethical considerations
- ✓ Fostering open public and political debate
- ✓ Prioritising scientific objectives
- ✓ Engaging non-traditional space players



CORNERSTONE: Europeans in Space

Support the European Project and position Europe as
a visible and strategic Partner

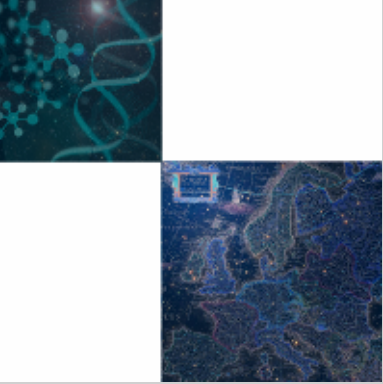
Major Objectives

- ✓ Ensure European participation to international space exploration endeavor
- ✓ Assure European access to space exploration enabling capabilities
- ✓ Ensure presence of Europeans, their culture and values, in future space settlements
- ✓ Support European project through visible role in global space exploration undertaking
- ✓ Support the implementation of European policies
- ✓ Protect interests and security of European citizens
- ✓ Strengthen strategic partnership with emerging space powers

Recommended Actions

- ✓ Foster organised debate at political level
- ✓ Develop approach for securing long-term access to strategic space exploration capabilities
- ✓ Review relevant European policy framework

*Political
Community*



CORNERSTONE: Habitability and Life beyond Earth

Increase the knowledge of life, its environment
and evolution

Major Objectives

- ✓ Study the origin and evolution of life on Earth
- ✓ Understand relationship between life and its environment
- ✓ Study how terrestrial life can adapt and survive beyond Earth
- ✓ Search for extraterrestrial life on Mars
- ✓ Strengthen the European scientific and industrial competitiveness
- ✓ Define planetary protection guidelines
- ✓ Promote scientific progress for natural and social sciences by providing a single goal in the field of exobiology

Recommended Actions

- ✓ Set-up ad-hoc survey committee to review synergies with Cosmic Vision 2025
- ✓ Implement full consultation of scientific user community

*Scientific
Community*



CORNERSTONE: Sustainable Human Life in Space

Create innovation to support
and improve human living conditions

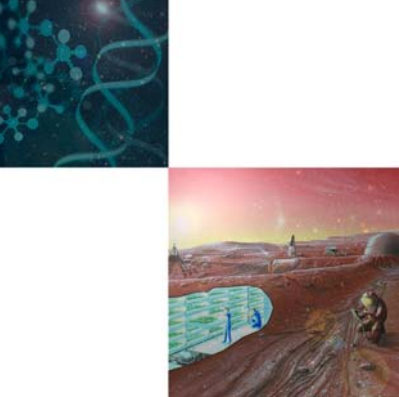
Major Objectives

- ✓ Promote research and technology development and foster integrated innovation processes engaging the space and non-space industrial sector
- ✓ Promote sustainable development
- ✓ Strengthen European industrial capabilities and competitiveness
- ✓ Enhance economic security of European and world citizens through social and technological innovation
- ✓ Increase Europe's strategic independence
- ✓ Raise standard of living and quality of life

Recommended Actions

- ✓ Identify European research priorities
- ✓ Develop research plans

*Industrial
Community*



CORNERSTONES: Sharing the Space Adventure and Benefits

Foster broad societal engagement and share
the benefits widely

*European
citizen*

Major Objectives

- ✓ Share the space experience
- ✓ Create new perspectives for cultural and educational development
- ✓ Promote global participation for the addressing of global challenges
- ✓ Establish an adequate legal and ethical framework for space exploration and utilisation

Recommended Actions

- ✓ Implement citizen juries in ESA Member States
- ✓ Create European Space Exploration network
- ✓ Develop Media partnerships
- ✓ Set-up space exploration contest



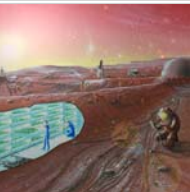
Europeans in Space

- European presence in an international human missions to Moon
- European access to lunar resources
- European-led robotic missions to the Moon



Habitability and Life beyond Earth

- Main scientific interest on Mars, but possible demonstration of enabling technologies on Moon



Sustainable Human Life in Space

- Robotic precursor missions to prepare for human missions
- Demonstration of capabilities supporting sustainable human settlement in space

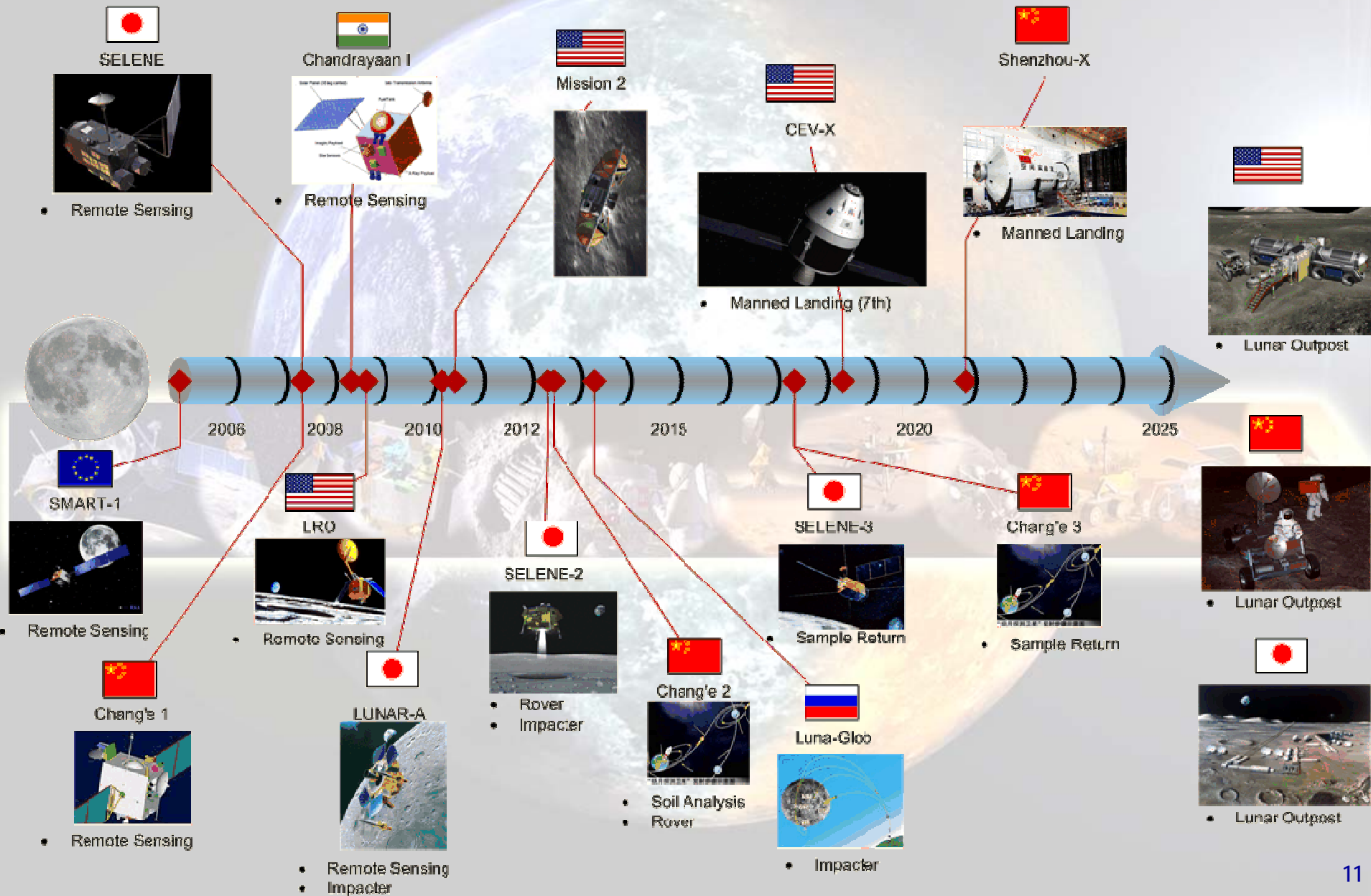


Sharing the Space Adventure and Benefits

- Commercialization of lunar activities (space tourism, lunar based power generation etc.)
- Public awareness & involvement in lunar missions

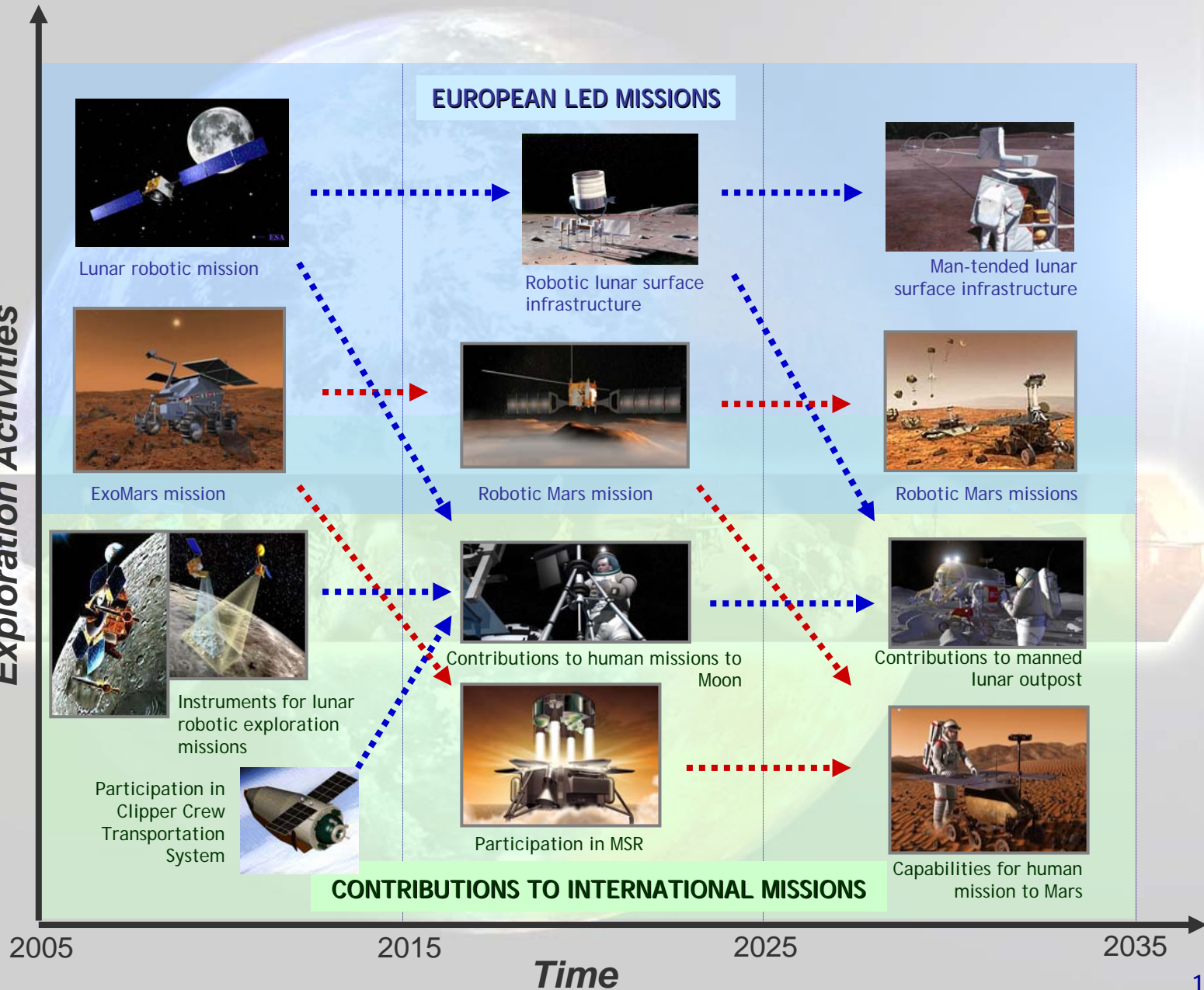
Broader scientific utilisation of Moon (e.g. far side telescope, lunar geology) to be driven by ESA science programme, exploration programme could provide new capabilities

Internationally Planned Missions to Moon



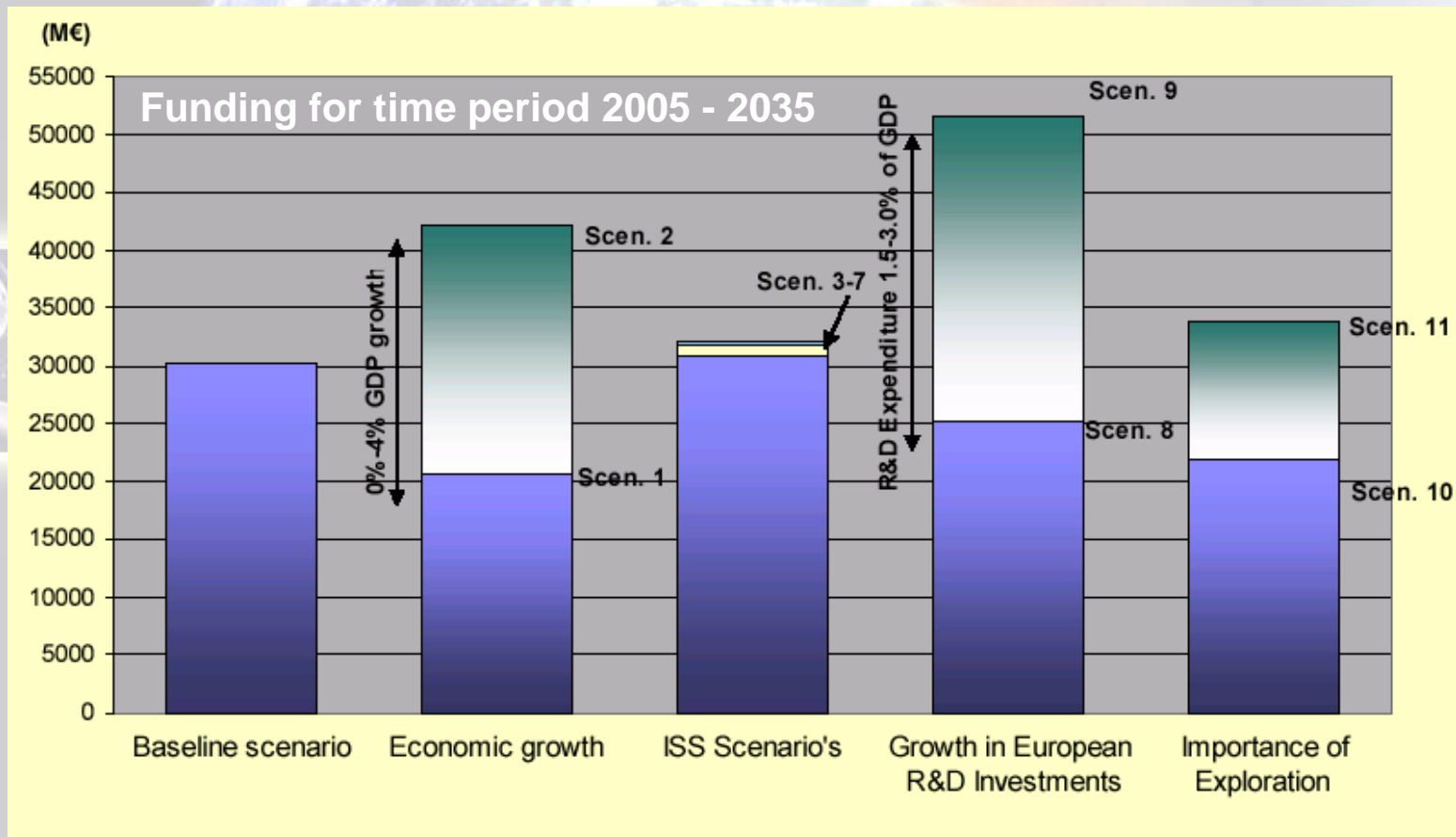
Follow balanced approach of European-led missions and contributions to international space exploration architecture to create robust cooperation scenario

Exploration Activities



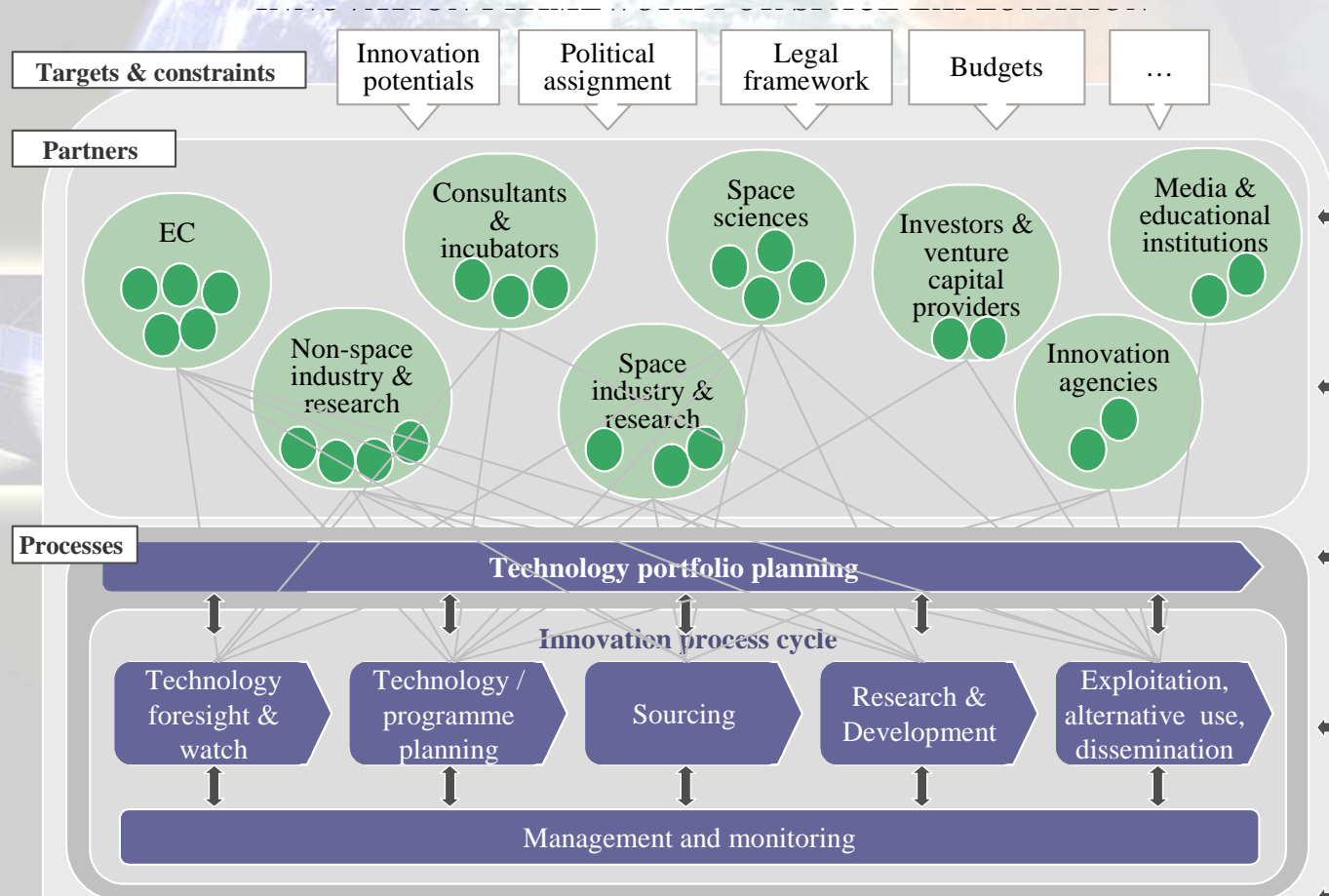
Managing Affordability

Develop flexible and robust plan which can cope with large funding variations



Fostering Innovation

Maximise innovation potential for space sector, other industrial sectors/ markets, European citizens and society



Considering Ethics

Incorporate Ethical considerations (human values, principles, concepts, purposes) in decision making process

Coordinating Science

Integrate scientific elements of space exploration within broader space science agenda

Addressing Legal Issues

Take proactive role in adapting current legal regimes for safeguarding European interest

Acknowledgements

Co-authors

Jacques Arnould, Roger Bonnet, Silvano Casini, Alain Dupas, Roberta Fantoni, Gerda Horneck, Kevin Madders, Claudio Moriconi, Laurence Nardon, Maité Jaureguy-Naudin, Rita Noestdal, Maria Perino, Pierre-Alain Schieb, Helge Spindler, Julien Tort, Christophel Waelkens, Frances Westall, James Wilsdon, Jean-Claude Worms, Jan Wouters

ESA HME Scenario Team

ESA Space Exploration Policy Assessment Group (SEPAG)

Participants of Stakeholder Workshops

- ❑ New Ways of Public Engagement, London, 26 April 2005
- ❑ Political Motivation for Space Exploration, Paris, 19 May 2005
- ❑ Space Exploration Strategy Workshop, Brussels, 12 – 13 July 2005
- ❑ Scientific Elements of Space Exploration, Paris, 16 September 2005