Space Education, Cooperation and Scientific Knowledge

Keynote Speech

Santo Marcello Zimbone
Rector of the University “Mediterranea” of Reggio Calabria, Italy
...some key-words about the space science aspects...

Key factors  Spin-off  Innovation  Multipliers
Mediterranean platform  Maritime surveillance
Space agencies  Downstream industry
Environment  Cooperation
Networking  Scientific knowledge
Dialogue  Green economy
Technology transfer  Spatial programs
Research  Blue economy
Transnational relationships
Studies of the heavens and observations of astronomical phenomena go back to archaic time and cross the centuries ...
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IV Century B.C.: Ancient Cities of Mesopotamia, Egypt and Greece

Aristotle: 384–322 B.C.
Studies of the heavens and observations of astronomical phenomena go back to archaic time and cross the centuries ...

Odyssey: IX Century B.C.
We owe to the famous “Diaries” of Leonardo Da Vinci the early most detailed representation of the Moon...
In the seventeen century, many scientists laid the groundwork for the recent development of astronomical science...

William Gilbert (1544-1603) Giordano Bruno (1548-1600) Galileo Galilei (1564-1642)
Johannes Kepler (1571-1630) Thomas Herriot (1560-1621) Isaac Newton (1642-1726)
Space observation deeply inspired the universe of art and dreamy writers...

Cyrano de Bergerac (1619-1655)  Jules Verne (1828–1905)  Herbert G. Wells (1866 – 1946)
By the middle of last century an impulse was given to the development of public domain and humankind interest in space matters .......
... a specular impulse to the general progress of technology...
The scientific knowledge developed for space systems has become important for the society...
At the global scale space systems integrated into fields as weather forecasting, communication, navigation, imaging, maritime surveillance and so on.
in the Mediterranean Region, aerospace data are used to assess forest fire risk or to track and rescue migrants in the sea...
There are many hundreds of objects developed through space-generated research, familiar to everyday life...
Each innovation example is proof of the mutual impact of technology transfer from space to Earth and vice versa...

Energy

Space satellite sector

Agriculture and environment

Canadian Space Agency

Health and welfare

UK Space sector

Many fields of everyday life

ESA

(sources: Venturini and Verbano, 2014; Clark et al., 2014; www.interestingengineering.com)
Technology transfer crosses many phases ...

(source: Petroni et al., 2010; adapted from Rogers et al., 2001)
There is no terrestrial equivalent to space technologies...

Versatility

Integrability and Flexibility

High Performances and Reliability

Small Mass and Economic Convenience

sources: Rogers et al., 2001; Petroni et al., 2013
... it is impossible monitoring natural phenomena occurring in very large areas without using aerospace technologies...

Source: Aqueduct-Water Risk Atlas
Many fields can be considered under the influence of aerospace spinoffs...

(source: Space Sector Report, 2017)
Main obstacles to the visibility to people of innovations coming from aerospace research...

- **Time lag of innovation marketing**: 18 months, 10 years
- **Cost of the space missions**: 240 billion to 500 billion $ (2030)

(source: Space Sector Report, 2017)
Main obstacles to the visibility to people of innovations coming from aerospace research...

25% People not aware about its social positive return

10% People considering space technology not solving humanity problems
It is crucial the role played by the “facilitators” of the space chain, usually space agencies and public research actors...

(source: Hof et al., 2012; Clark et al., 2014)
INTERNATIONAL AEROSPACE TECHNOLOGY TRANSFER

MAIN BARRIERS ITT

- Insufficient emphasis on R&D
- Multidimensional & complexity of technology
- Limited protection of property rights
- Inappropriate technology acquisition
- Limiting donor / recipient govt. policies
- Insufficient human resources

Transfer costs / budgetary issues
Absorptive capacity
Cross-cultural issues

UNDERLYING ISSUES

- Insufficient experience international collaborations
- Lack of emphasis on design
- Education and training
- Lack of relevant infrastructure
- Corruption & nepotism
- Insufficient management skills
- Critical & independent thinking

Lack of vision on technological capacity building
Organizational inflexibility
Insufficient management skills

Many barriers and constraints still hamper a large dissemination of scientific knowledge among countries...

(source: Hof et al., 2012; Clark et al., 2014)
Effective synergy of University with other key actors in the dissemination paths of aerospace knowledge...

(source: Hof et al., 2012; Clark et al., 2014)
“……. promotion of space capacity building, the expansion of the scientific and academic cooperation in the space field as a key factor for social, economic, and, more generally, the cultural development in the Mediterranean region …..”
International Space Station as “open structure” and symbolic research laboratory ...
Evolution over time

(Does not include multinational space agencies)

Distribution per geographic region

(source: Peter, 2006)
Number of agreements among the major space agencies

(source: Peter, 2006; 2016)
Bilateral or multilateral agreements (current or in negotiation) among countries

(source: Peter, 2006; 2016)
THE CENTRALITY OF THE MEDITERRANEAN REGION

By Santo Marcello Zimbone, 5th Sept 2019
Fields of operation and interest

**Civil, Information, Industrial and Telecommunication Engineering**

**Agriculture, Forestry and Food Processing**

**Law, Economy and Human Sciences**

**Architecture, Archaeology Heritage and Landscape**

Key-note speech presentation by Santo Marcello Zimbone,
5th Sept 2019
Fields of operation and interest

Distribution of scientific papers sample within spinoff sectors of aerospace sciences.

Key-note speech presentation by Santo Marcello Zimbone, 5th Sept 2019
“....... starting point to identify proper ways and proposals to promote scientific knowledge, education paths and cooperation possibilities specific to the whole Mediterranean Region and the related needs for security and prosperity.
This with the target of building a productive and peaceful alliance among Peoples of the Mediterranean Countries......”
With the help of courage, creativity and passion, this Community should really become the “Space for Mediterranean”.

THANKS FOR THE ATTENTION

SANTO MARCELLO ZIMBONE

Key-note speech presentation by Santo Marcello Zimbone, 5th Sept 2019