



TRANS-TECH
TECHNOLOGY TRANSFER and ENGINEERING SERVICES



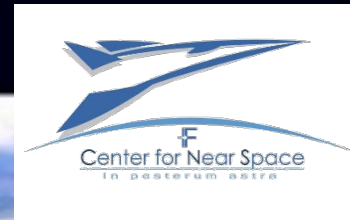
L'avventura spaziale: Le prospettive

Center for **Near Space**

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Vice-President, Italian Institute for the Future
Director General, Center for Near Space*





The analysis



0,00000015 %

Space research was stimulated by:

- awareness of the potential **improvement of life** on Earth
- but mostly **innate desire of exploration**, growth, innovation and evolution.

However, since the dawn of the Space Age, only very few people (**about 600**) had the privilege of traveling in space.

Despite the great social impact of space activities, **too few** are those who have the opportunity to know the Space and the potential it offers.

The space budget is not a big expense!



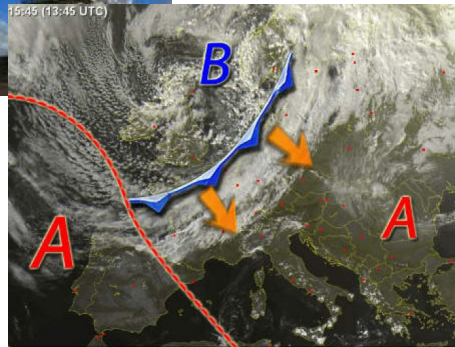
- The Italian government invests about **500 M€/year** in space activities → 7th-8th place in the world (in the past was even better)
- The realization of 1 km of **highway** costs between 10 and 35 M€ (sometime such a cost rised up to 67 M€/km!)
- The **Italian Space Agency annual budget** is therefore equivalent to about 25 new kms of highway ...
- ... or **a coffee per month** for each Italian!
- European citizens pay a little less: **a coffee every two months**, because most of States invest less than Italy

For which returns?

There is Space in everyday life



Telecommunications



Meteorology

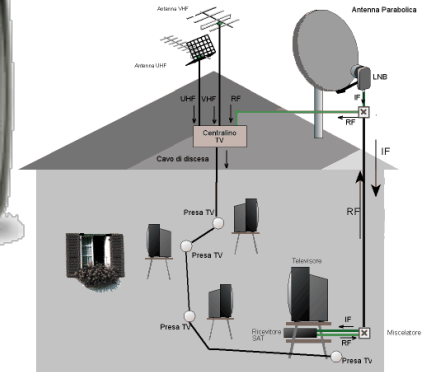
Remote Sensing



GPS



Satellite TV



Did you know that

➤ Cellular phone



➤ Velcro



➤ Non-stick pan



... and?

➤ Plate of iron



➤ Gore-tex



➤ Computer and video-game joystick

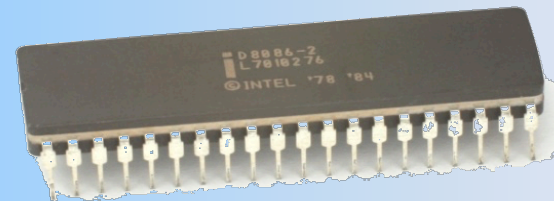


... and yet?

➤ Fluorine chewing-gum



➤ Micro-processor

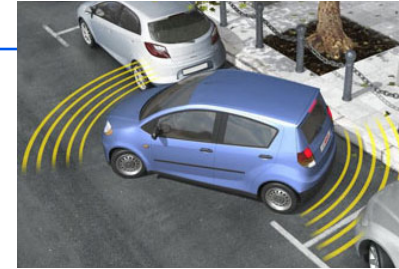


➤ Felt pen



... and then

- Car parking sensors



- Hasselblad camera



- Omega Speedmaster watch



- Homogenization and lyophilization processes



- High sensitivity gas leak detection systems



- Cordless drills



... maybe a little less known, but.....

➤ **Nomex**



➤ **Kevlar**



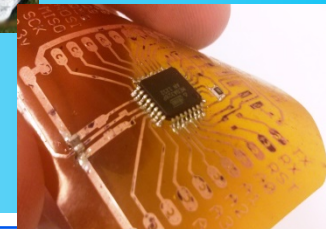
➤ **Krytox**



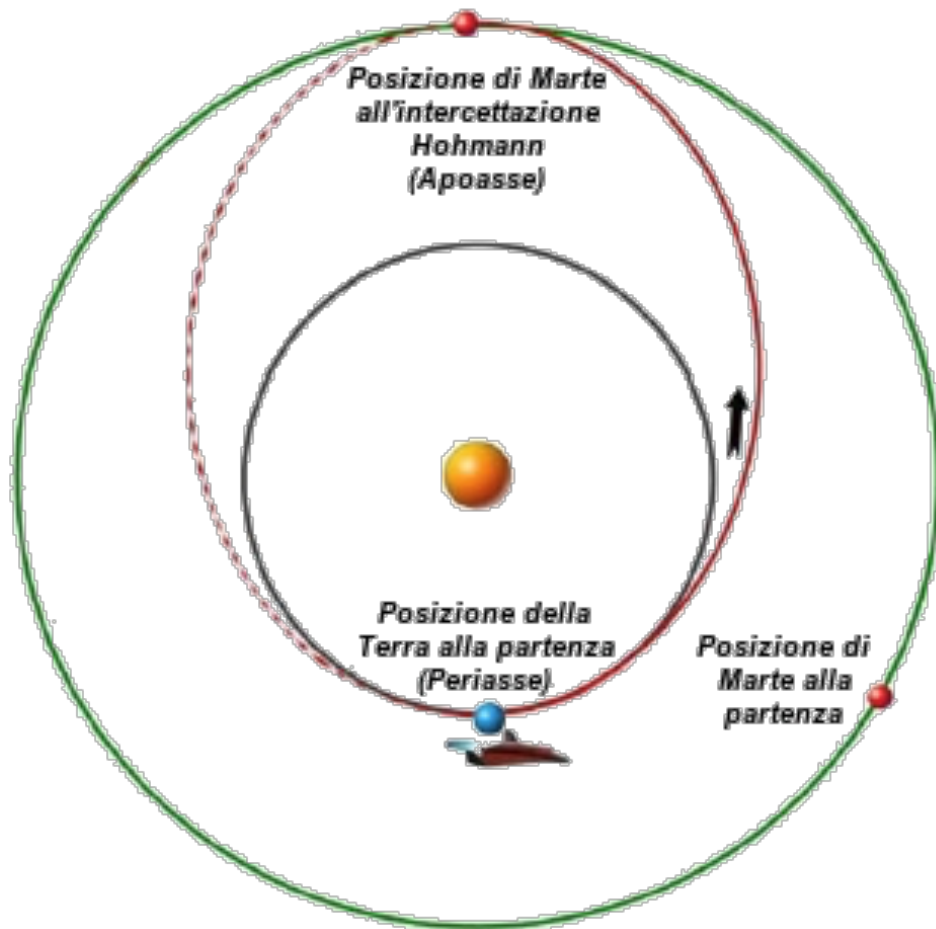
➤ **Mylar**



➤ **Pyralux**



Reference scenario



President Obama recently introduced a manned Mars mission by 2030

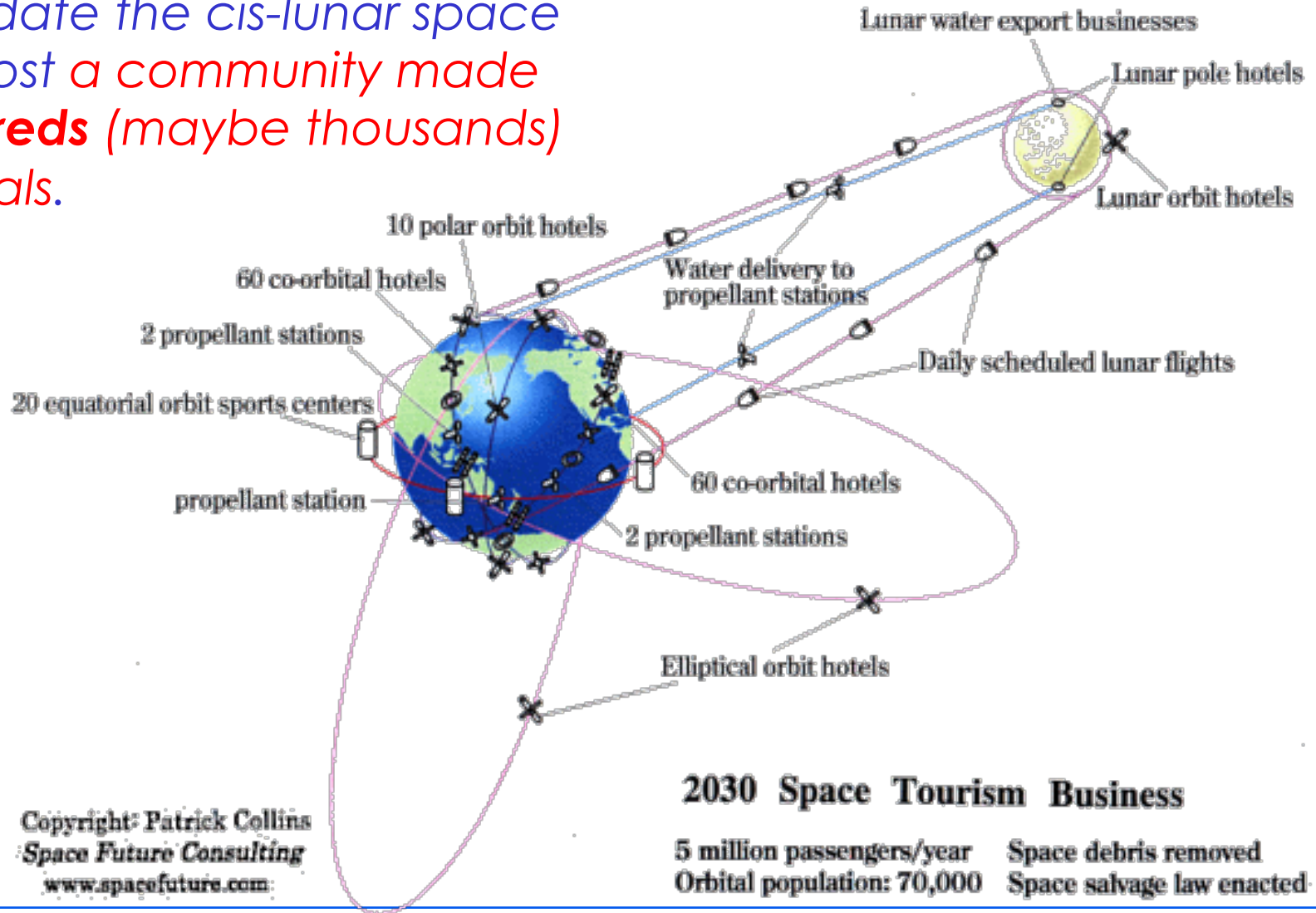
Elon Musk (SpaceX) envisages one million persons on Mars by 2060

CNS believes that by 2069 (symbolically 100 years after the first man on the Moon) the **scientific missions to Mars** will be a routine

Reference scenario

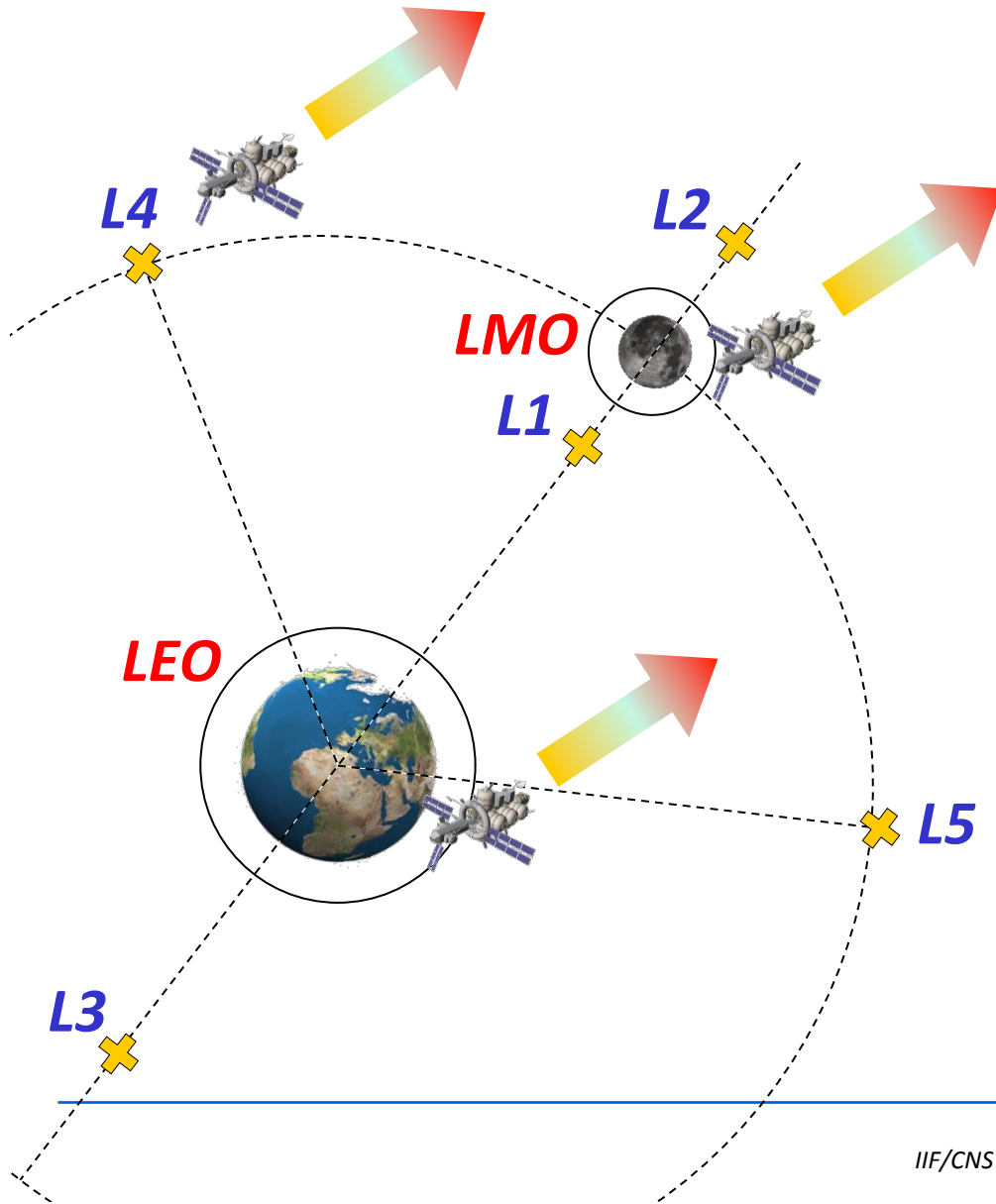


By that date the cis-lunar space could host a community made of **hundreds** (maybe thousands) individuals.



Copyright: Patrick Collins
Space Future Consulting
www.spacefuture.com

Reference scenario



Trip to Mars can **start from**:

1. Earth surface
2. Low Earth orbit (**LEO**)
3. Low Moon orbit (**LMO**)
4. Geo-lunar lagrangian point (**L4-L5**)

Objectives



CNS will:

- contribute to **spreading the space culture** among the younger generations
- promote the development of the **private sector of Civil Astronautics**
- stimulate the development of a **private users community** without which Space will only remain limited to insiders

“...Space is also important for **the future of imagination.**”

“...the ability for more people to cross the final frontier of space will be **key to human advancement....**”

(Virgin Galactic)



The concept "Near"



- encourage the increasing use of the nearest part of the **Fourth Environment**, between the stratosphere and LEO

wanting to stimulate the development of the private sector, you can only focus primarily on **that part of the Space in which man mostly worked for over 50 years**

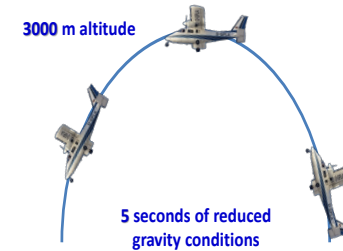
- **bring citizens closer to Space**, an inexhaustible source of **inspiration** and **freedom of imagination**, and flywheel of **wellness on Earth** as well



Space Tourism – opportunities



Step #	SISTEMA	PREZZI
1	Volo a gravità ridotta con aereo di aviazione generale (pochi secondi di assenza di peso)	100 €/pers
2	Volo parabolico con aereo dell'aviazione civile o da trasporto militare (circa 20 secondi di assenza di peso)	7-8 k€/pers
3	Volo suborbitale con velivoli appositamente sviluppati come SpaceShipTwo di Virgin Galactic i Lynx di XCOR (circa 2 minuti di assenza di gravità e visione della sfericità terrestre)	200 k€/pers
4	Habitat in orbita come navicelle spaziali, stazione spaziale, i moduli gonfiabili (10-60 giorni in orbita e vera microgravità)	20-28 M€/pers





JumpinFuture “A Direct Experience”



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Promote flight campaigns with the use of **general aviation aircrafts** able to perform maneuvers similar to small parabolic flights with about **5 seconds of reduced gravity**

- Possible way to attract people to real parabolic flights (physical sensation of weightlessness – 20 sec of micro-g) and then toward space tourism.



... just a taste of **S**pace!





NearSpaceExploratory Access to Space™





- ❖ It can fly a **series of parabolas** for space tourism to the height up to 100 km, Space Tourism 2.0
- ❖ Or, **distances of 6000 km** in less than 2 hours at a cruising altitude of 30 km
- ❑ It **integrates** state-of-art aeronautical and space technologies

- 6 seat, Mach 4-5 **aerospaceplane**
- **HTHL** from conventional airports
 - Urgent Business market
 - Sub-orbital flight (space tourism, microgravity, training, launch to LEO)

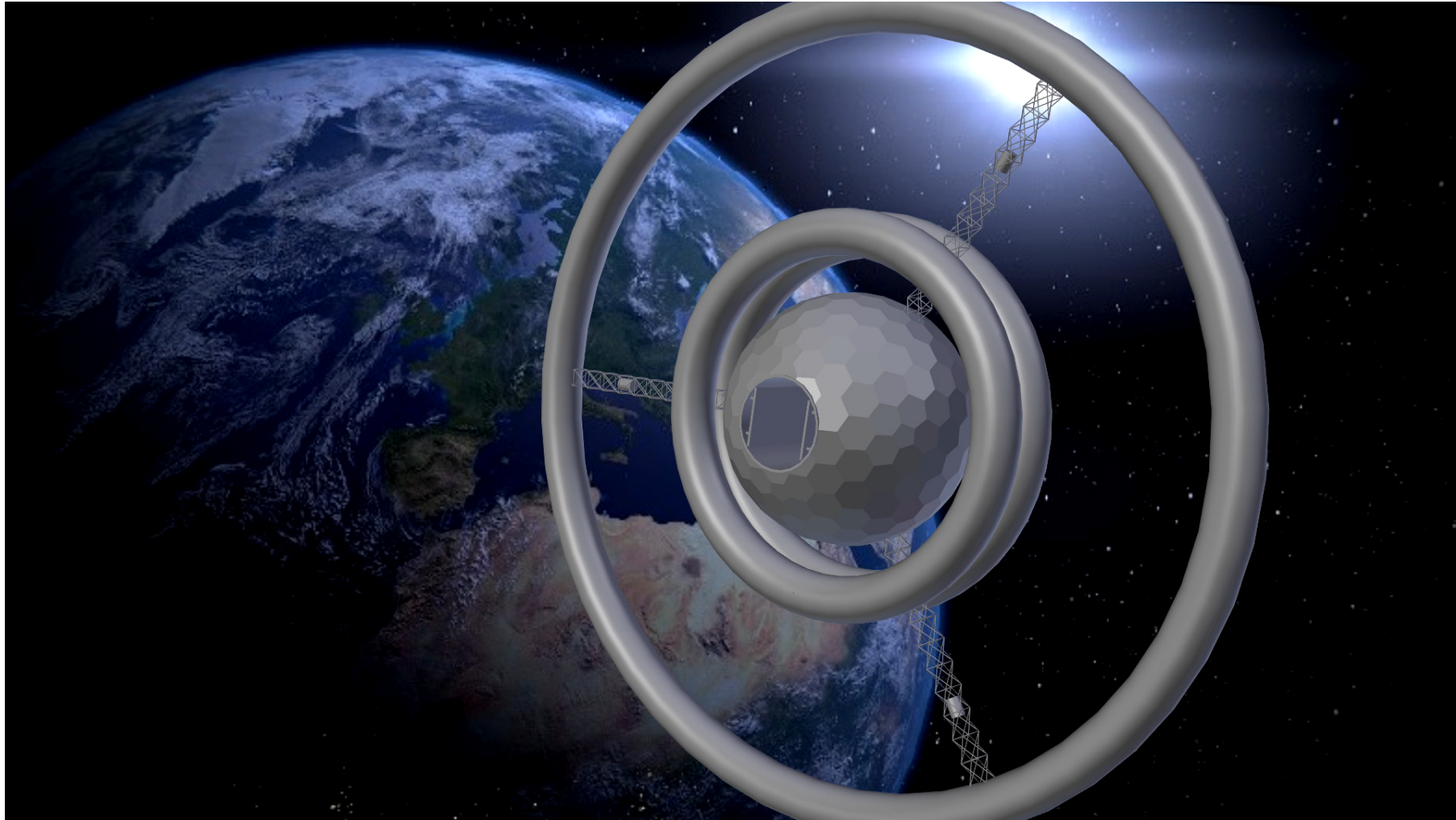




OrbiTecture *an intermediate step toward Mars*



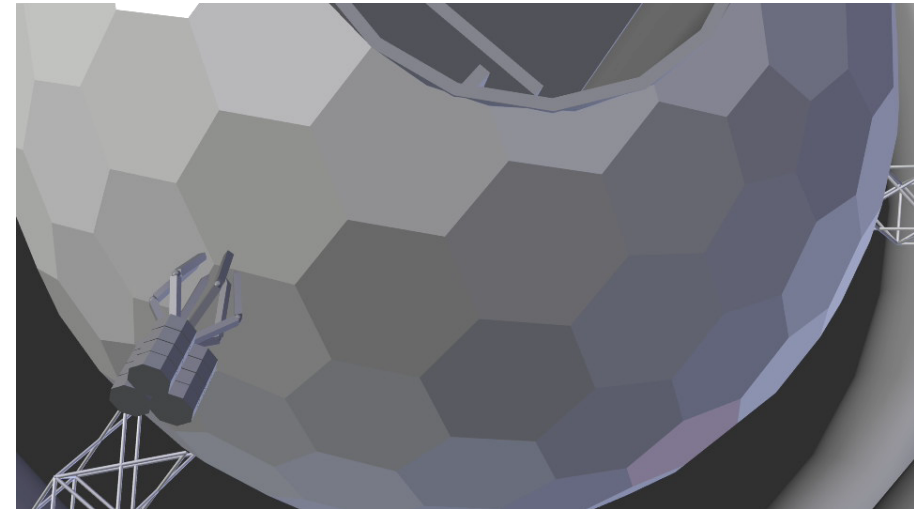
External Design



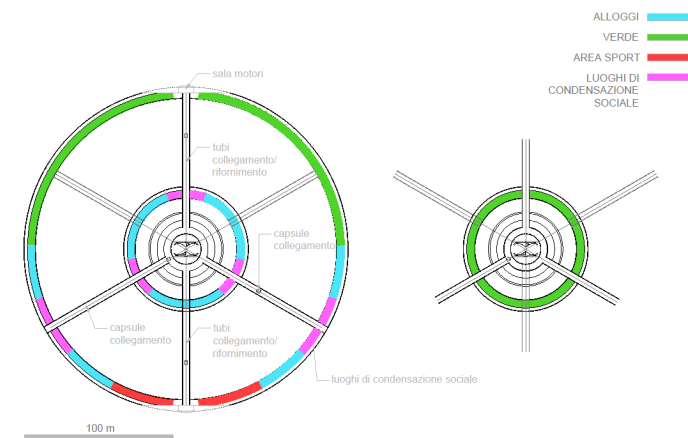
Top level requirements



A cis-lunar multi-function infrastructure continuously crowded by some 100 persons attending the following functions:



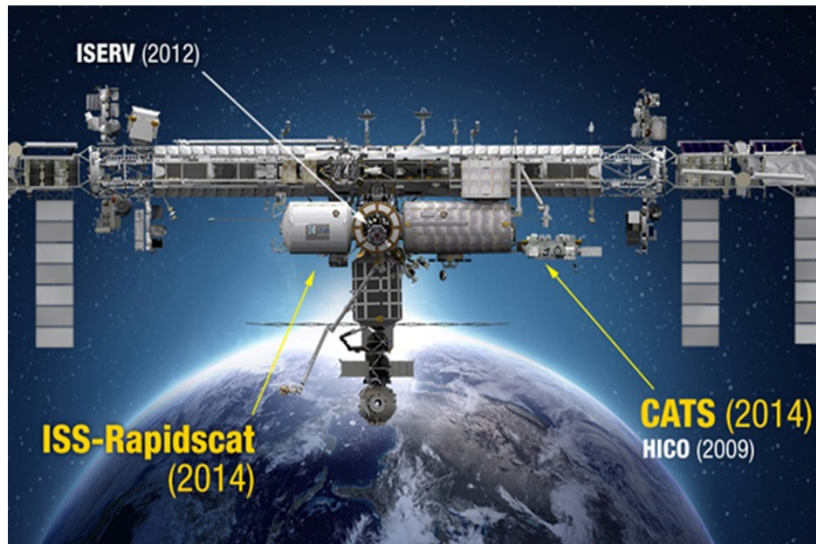
- Space interchange pier
- Maintenance and integration hangar
- Scientific laboratory
- Lodging (resort, hotel, ...)



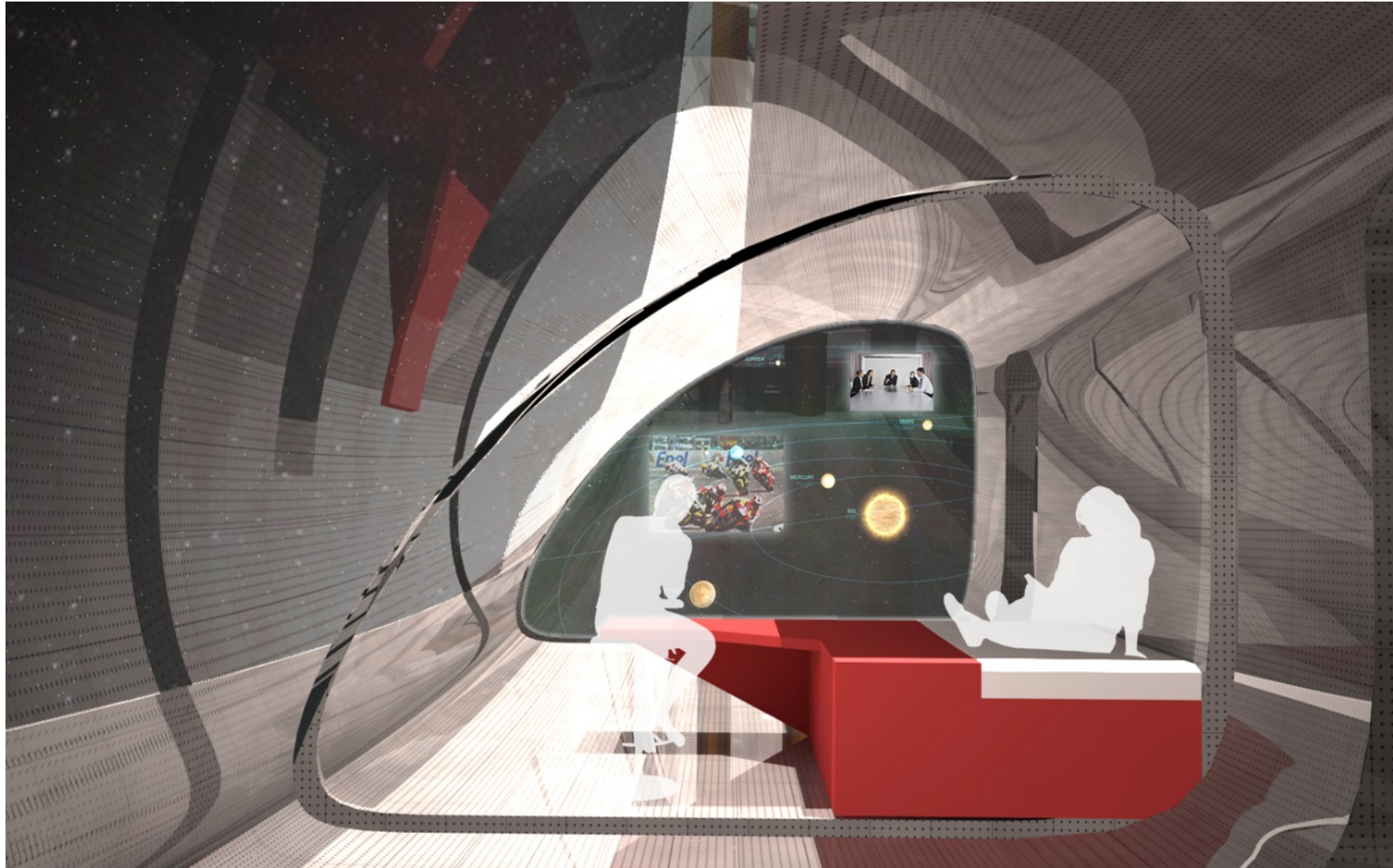
ISS – International Space Station



Go beyond the present (Paleolithic) design



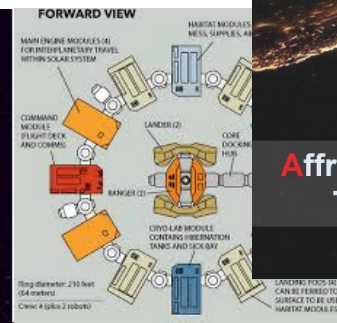
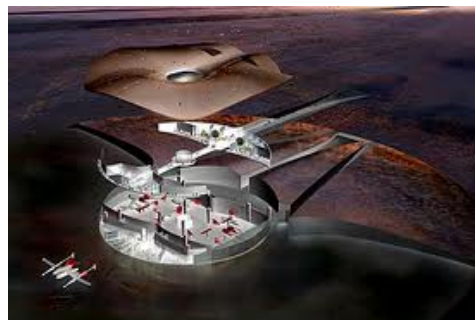
Rooms accommodation



OrbiTecture → Contest



«Future Low Orbit Resort»



FLOR2050
(Future Low Orbit Resort 2050)

Concorso di Idee a Premi
dedicato agli studenti di tutte le scuole superiori

Affrettati, prima scadenza: 29 febbraio 2016
Tutte le Info su: www.nearspace-lif.it



EduSpace *ur "nursery"*



- CNS aims at realizing concrete **training sessions** devoted to students of middle and high schools, to be developed both in the classroom, in other environments and in a participatory way with games and small competitions.
- Identify ways to ensure the **involvement of young people and students**. Increase in the youth's interest and enthusiasm for **science**
- Stimulate and support the participation of the youth's to the various international educational initiatives to get **scientific space experiences**



Gli attuali gioielli



- ***Il team SpaceLinguine del Righi, Campione del Mondo di Zero Robotics organizzato dal MIT in collaborazione con NASA ed ESA. ITI «A. Righi» Napoli, I.I.S. «Avogadro» Vercelli, Istituto USA***
- ***Il team Space4Life sta concorrendo tra i 10 migliori al mondo per mandare sulla Luna l'esperimento Radio Shield nell'ambito del Google Lunar X Prize. Mattia Barbarossa Liceo Villari – Napoli, Altea Nemolato ITIS-LS Giordani – Caserta, Dario Pisanti Dip. Ing. Industriale Federico II - Napoli***
- ***Anche il team Lunar Breath sta concorrendo per mandare sulla luna l'esperimento omonimo nell'ambito del Google Lunar X Prize. Francesco Perrelli Dip. Ing. Industriale Federico II – Napoli, Daniele Del Guercio Dip. Ingegneria dell'Automazione Federico II – Napoli, Chloé Pocard Dip. Biologia Molecolare delle Piante, Univ. Strasburgo***

FLOR2050 Winners



- **1st Classified:** project **Gravitational Terrace**, magnetic space terrace to allow to look out on Space.
Team Echelon (M. Adinolfi, G. Cesarano, R. Chiaiese, F. Gugliotta, G. Maglio, A. Soricelli), Industrial Technical Institute “Augusto Righi”, Naples.
- **2nd Classified:** project **Spider Robot Suit Explorer**, exoskeleton to facilitate manned exploration of Mars surface
Team Sfogliatella to Mars (A. Mocerino, L. Pavone, M. Perneti, F. Perrelli, D. Pisanti, E. Serpe), University of Naples “Federico II”.

The teams were **rewarded** on 4 July 2016 at Città della Scienza during the CNS events “A One-Year Trip”

They got **awards** also on 22 June 2016 in Palermo during the National Engineering Congress

And much more 😊



THANK YOU, and

..... waiting for many of you!



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