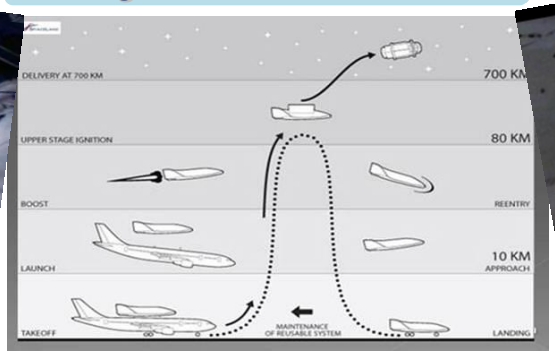
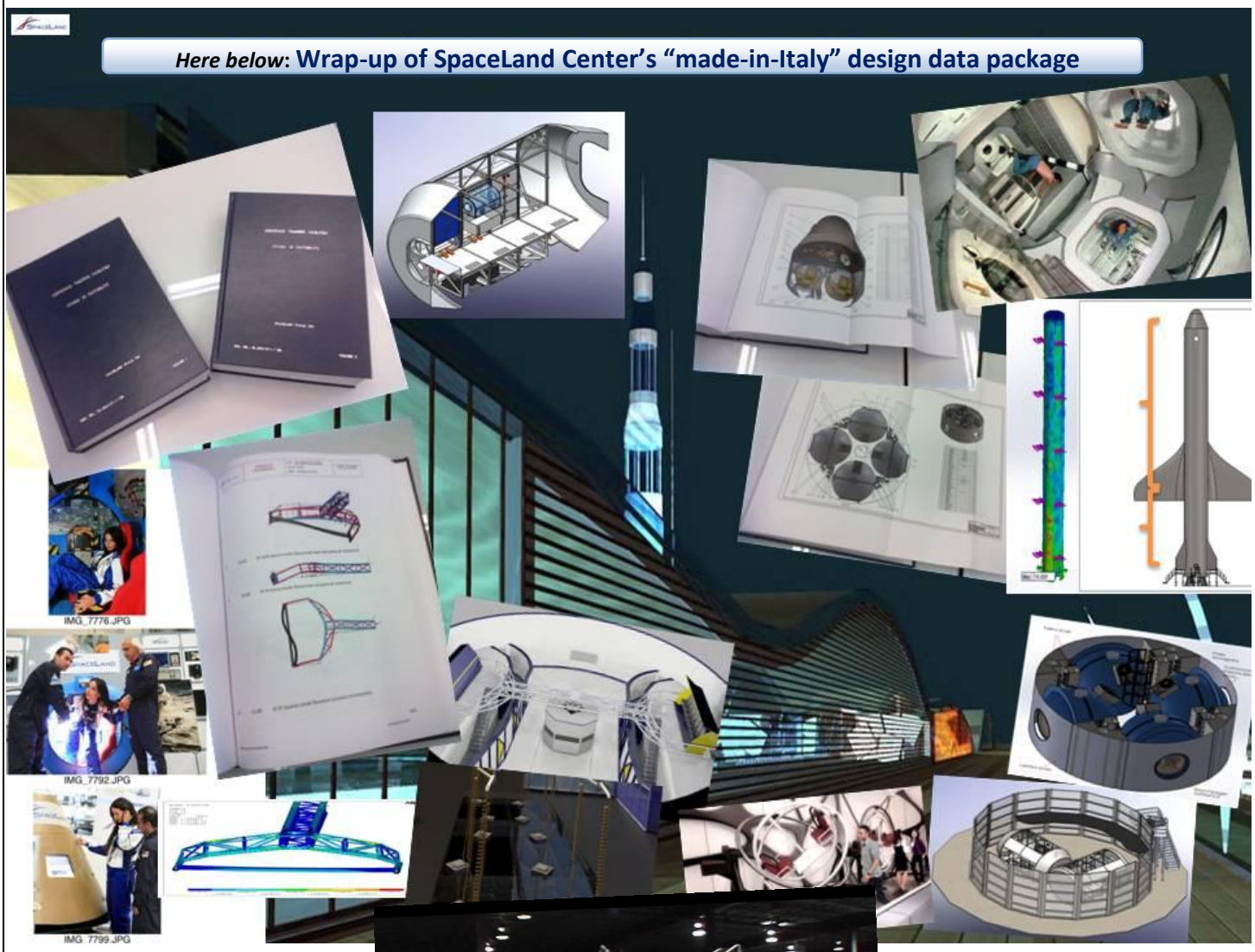
Creating the FIRST SPACELAND



Wherever gravity and/or *its absence* are a factor, *out-of-this-world knowledge* & *high-tech business opportunities arise*

***Here below*: Wrap-up of SpaceLand Center's "made-in-Italy" design data package**



Herebelow: photo of SpaceLand test hardware readiness review at NASA before installation on board Zero-G flights

PLEASE JOIN US in THIS* OUT-OF-THIS-WORLD *BUSINESS: THIS JOURNEY has JUST BEGUN

Info: Eng. Doct. Francesco Massa - Marco Brizio - SpaceLand, via Boston 76 - 10137 Torino Italy - tel. +39.011.234.14.635 - www.SpaceLand.it

Record-breaking crew-members **selected among the general public, trained and brought to fly by SpaceLand team led by former ESA-zero-gravity test engineer and Space Station MIR European Technology Experiments Coordinator Doct. Carlo Viberti for *biomedicine, technology and/or bioengineering* experiments commissioned by Nobel-Prize-winner led groups, taking off from the *NASA Space Shuttle L.F.***
(Kennedy Space Center, Cape Canaveral, Florida)

World's youngest kid as research test subject in zero-gravity: 11 yrs old

11-year-old Kim Marco Viberti flew in 2008 as test subject for neurobiological sampling experiments related to studies on neuropathologies such as the Alzheimer's syndrom, commissioned to SpaceLand by the European Brain Research Institute led by dr. Rita **Levi Montalcini (Nobel Prize winner),** Italian State Health Institute (ISS), Italian State Research Center (CNR) and University of Milan (I); results reported in scientific paper issued for the European Low Gravity Research Association's Congress in Bonn (D).

*Left : free-flying break between sampling, right: interview by **Italian State TV "TG1"** prime news report*

World's oldest man in zero-gravity: 93 yrs old

93 year old man, flying as test subject for bioengineering experiments commissioned by the **Don Gnocchi Science Foundation's Bioengineering Center** of Milan (image from **CNN TV news report**)

*Images show footages from **CNN TV reports***

World's 1st disabled for technology tests in zero-g

100% disabled woman as test operator for hand-free ICT control systems commissioned by **AIDA Modena** ("**Informatic tools for disabled and elderly**")

Footage showing Elma operating at the SpaceLand technology payload rack, broadcasted by the Italian State TV "RAI2" and Mediaset TG 4 news reports

SpaceLand / Carlo Viberti have been awarded, inter alia, the following prizes:
. European "EOS" Award for Innovation Policy, by the European Commission
. Prize "*Torre di Castruccio*" - Gold Medal by the President of the Republic of Italy
. Prize "*Etica ed Impresa*" by Italy's Federmanagement and AssoQuadri associations
. Italian Aeronautics and Astronautics Association Award
. Finalist rank for Italy's ConfCommercio "*Innovation Prize*"
and several other awards

First non-US citizen taking off from NASA Space Shuttle L.F.

SpaceLand Flight Mission Commander **Eng. Doct. Carlo Viberti** is the **1st non-U.S. citizen** authorized to take off for microgravity research flights from the NASA Kennedy Space Center He has been formally proposed by the *Head of the Italian Space Agency* to fly as **1st Astronaut-Engineer** on the ***first sub-orbital research flight campaigns.***
The program has been presented with guest lectures in Oxford at the 1st UK Space Agency's workshop on microgravity and the 1st Space Commerce Summit in 2013 in London with NASA

Left: footage from RAI and Swiss State TV ; right: Viberti with Space Shuttle pilot Rick Searforss, possible crew of first sub-orbital research flight being endorsed by the ASI President

Underwater Training Camp for Italian Space Agency & University of Cagliari's Lunar exploration technology programs

Footages from Italian State TV documentaries broadcasted on RAI 2 TV (search for videos on U-Tube and Google key words "SpaceLand Viberti")

www.SpaceLand.it

SALIVARY NGF, BDNF AND CORTISOL LEVELS DURING PARABOLIC FLIGHT

D. Santucci[a]; N. Francia[a]; C. Viberti[b]; L. Aloe[c]; E. Alleva[a]

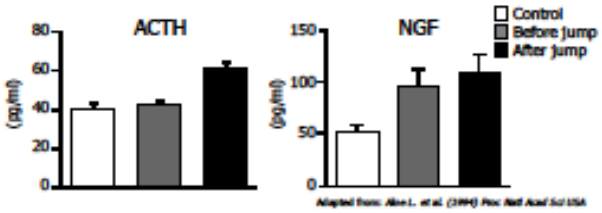
[a]Section of Behavioural Neuroscience, Department of Cell Biology and Neuroscience, Istituto Superiore di Sanità, Rome, Italy; [b]SpaceLand Italia SRL, Grugliasco, Turin, Italy; [c]Institute of Neurobiology and Molecular Medicine, CNR, European Brain Research Institute (EBRI), Rome, Italy; (daniela.santucci@iss.it)

Nerve growth factor (NGF) is a well-studied polypeptide growth factor involved in the development and maintenance of specific peripheral and central populations of neuronal cells. In the central nervous system NGF acts as trophic factor for those neurons (mainly cholinergic and peptidergic) that are known to degenerate in disorders, such as Alzheimer's disease, which is becoming progressively more frequent due to the longer lifespan of the western population. More recently, NGF target cells have been identified in the nervous, immune, and endocrine systems, and an increasing body of evidence suggest that NGF, in addition to its role as a neurotrophic agent, may operate through multiple paths to ultimately regulate physiological homeostasis and behavioural coping.

In previous studies, we used a mouse model of social stress to demonstrate that NGF levels increase both in plasma and in the hypothalamus following intermale aggressive interactions and more recently, we found an increase in NGF levels both in plasma and in some brain areas, such as the frontal cortex, hippocampus and hypothalamus, of mice exposed to rotation-induced hypergravity (2g).

In humans, experiences such as the anticipation of the first jump with a parachute also result in increased NGF plasma levels and in changes in the distribution of NGF receptors on lymphocytes.

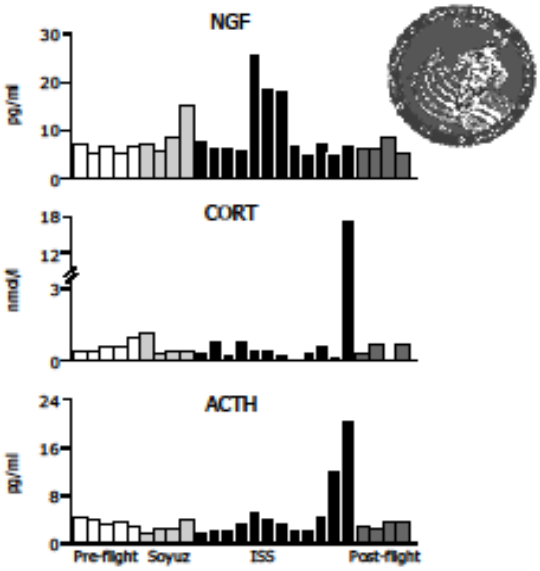
ACTH AND NGF LEVELS IN THE BLOOD OF PARACHUTISTS OF THE BRIGATA "FOLGORE" BEFORE AND AFTER JUMPING



Adapted from: Aloe L. et al. (1994) Proc Natl Acad Sci USA

Similarly, an astronaut experiencing stress related to a space mission shows an increase in the salivary levels of NGF preceding the hormonal response.

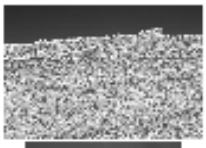
SALIVARY LEVELS OF NGF, CORT AND ACTH MEASURED IN THE ASTRONAUT DURING THE ENEIDE MISSION



In order to evaluate NGF levels and others neurochemical parameters, known to be involved in the responses to stress, saliva samples were collected before, during and after parabolic flight with Lunar-, Mars-, and Zero-gravity conditions.

Work was supported by ISS-ASI grant "Neurobehavioural effects of gravitational environment in developing mice" to DS

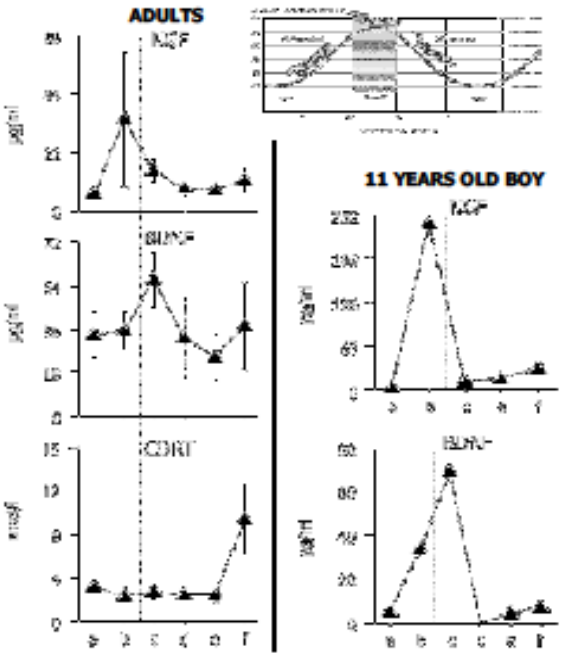
EXPERIMENTAL PROCEDURE



Saliva samples were self-collected by the experimental subjects (nine adults and a 11 years old boy) using Salivette kits (Sarstedt, Aktiengesellschaft & Co., D-51588 Nümbrecht, Germany) before, during and after the parabolic flight. Saliva was collected by chewing on a cotton rolls for 2-3 min and returned to transport vial. Samples were stored frozen at -70°C until assay.

Saliva was assayed for nerve growth factor (NGF), brain derived neurotrophic factor (BDNF) and cortisol (CORT) levels.

SALIVARY LEVELS OF NGF, BDNF AND CORT MEASURED DURING THE PARABOLIC FLIGHT



CONCLUSION

In agreement with previous studies on parachutists and on astronaut experiencing stress related to skydiving and space mission, experimental subjects showed an increase in salivary levels of NGF and BDNF only during specific phases of the flight. Moreover, individual as well as age-related differences have been observed. These data confirm the role of NGF and BDNF in the adaptative response to "extreme situations" involving psychological stress.

REFERENCES

Santucci D, Corazzi G, Francia N, Antonelli A, Aloe L, Alleva E. Neurobehavioural effects of hypergravity conditions in the adult mouse. Neuroreport. 2000; 11(10):2353-6.

Aloe L, Fiore M, Santucci D, Amendola T, Antonelli A, Francia N, Corazzi G, Alleva E. Effect of hypergravity on the mouse basal expression of NGF and BDNF in the retina, visual cortex and geniculate nucleus: correlative aspects with NPY immunoreactivity. Neurosci Lett. 2001; 302(1):29-32.

Antonelli A, Santucci D, Amendola T, Tirlaca V, Corazzi G, Francia N, Fiore M, Alleva E, Aloe L. Short-term hypergravity influences NGF and BDNF expression, and mast cell distribution in the lungs and heart of adult male mice. J Gravit Physiol. 2002; 9(2):29-38.

Santucci D, Francia N, Aloe L, Alleva E. Neurobehavioural responses to hypergravity environment in the CD-1 mouse. J Gravit Physiol. 2002; 9(1):P39-40.

Mandillo S, Del Signore A, Paggi P, Francia N, Santucci D, Hein A, Oliverio A. Effects of acute and repeated daily exposure to hypergravity on spatial learning in mice. Neurosci Lett. 2003; 336(3):147-50.

Francia N, Santucci D, Aloe L, Alleva E. Neurobehavioral coping to altered gravity: endogenous responses of neurotrophins. Prog Brain Res. 2004; 146:185-94.

Francia N, Santucci D, Chiarotti F, Alleva E. Cognitive and emotional alterations in periadolescent mice exposed to 2 g hypergravity field. Physiol Behav. 2004; 83(3):383-94.

Simeoni M, Francia N, Santucci D, Chiarotti F, Alleva E. Effects of acute hypergravity exposure and parity on maternal behavior in CD-1 mice. Acta Neurobiol Exp (Wars). 2005; 65(2):151-60.

Francia N, Corazzi G, Petruzzi S, Santucci D, Alleva E. Behavioural responses to hypergravity in the CD-1 mouse. Acta Astronaut. 2006; 58(8):401-10.

Francia N, Simeoni M, Petruzzi S, Santucci D, Aloe L, Alleva E. Repeated acute exposures to hypergravity during early development subtly affect CD-1 mouse neurobehavioural profile. Brain Res Bull. 2006; 69(5):560-72.

Example of *science paper* presented at the *European Low Gravity Research Association congress* in Bonn (Germany) by SpaceLand and the Nobel-Prize-winner's group *European Brain Research Institute* on weightless-flight-based research activities from the NASA Space Shuttle L.F., on hormonal output neeed for basic studies on Alzheimer and neurodegenerative pathologies

www.SpaceLand.it

Short curriculum summary of the SpaceLand program founder

Carlo Viberti, graduated with Honours at 24 years of age as Aeronautical Engineeering Doctor in the prestigious *Politecnico di Torino*, is a **Flight Veteran** of **European Space Agency**'s **Zero-Gravity** and **Moon-gravity test flights** and worked for several years as **European Astronaut Activities Office *Lead-Engineer***.

In the 1990's he managed underwater and microgravity flight campaigns for the design and development of ESA **astronaut systems** for the **NASA/ESA International Space Station** and of *European and Italian technology facilities and experiments* on the **Space Station MIR**; in 2005 became the **first non-U.S. citizen** on the *NASA Microgravity Pathfinder Flights* at the *NASA Space Shuttle* L.F. - Kennedy Space Center in Cape Canaveral (Florida).

Inter alia, he designed the *first underwater astronaut training facility* for the ESA-ISS Space station program and, for SpaceLand, has worked as flight test-subject and chief operator to qualify in *zero-gravity* the *bio-engineered telemedicine undergarment* launched this year (2015) to the International Space Station.

Heading several weightless science research and technology testing and educational flight campaigns supported, inter alia, by the 2006 **Winter Olympic Region of Piemonte** and by **Florence's Region of Tuscany**, he personally prepared and brought on board the world's oldest (**93**) and **youngest** (his son Kim Marco Viberti, **11**-year-old) **zero-gravity test subjects** and the **first disabled woman** to fly in *weightlessness* (between 2005 and 2009) ; he also organized and managed several space training and/or flight events and TV reports for *Italian and Swiss State Televisions, CNN, Discovery Science TV.*

In 2010-2011 he has been candidated by the *Italian Space Agency's President* as ***first astronaut-engineer*** for ***research sub-orbital flights***, after winning several Prizes and Awards in his 25 years of career in these sectors.

Founder and CEO of the Italian-Swiss company, he is setting the **world's first Center of Excellence for Microgravity,** thanks to his hand-on microgravity flight experience recording more than **550 flight parabolas** in *weightlessness* and in *Lunar-gravity* and *Mars-gravity* flight conditions for the **ESA/NASA International Space Station** and for *SpaceLand weightless research flight programs*, including science research activities for groups coordinated by the **Nobel Prize winner Levi-Montalcini** (see previous page).

He has been recently proposed by the ***President of the House of Commons*** of the Italian Parliament for *Public Honours* by the ***President of the Republic of Italy .***

A recent video-interview on the request by the European Space Agency's industries last year to SpaceLand for engineering services to sy a series of microgravity test flights, which *could take place in the chosen Island,* for the critical **European « Clean Space** » program, to avoid possible risks of catastrophic satellite collisions in orbit, can be viewed at the website

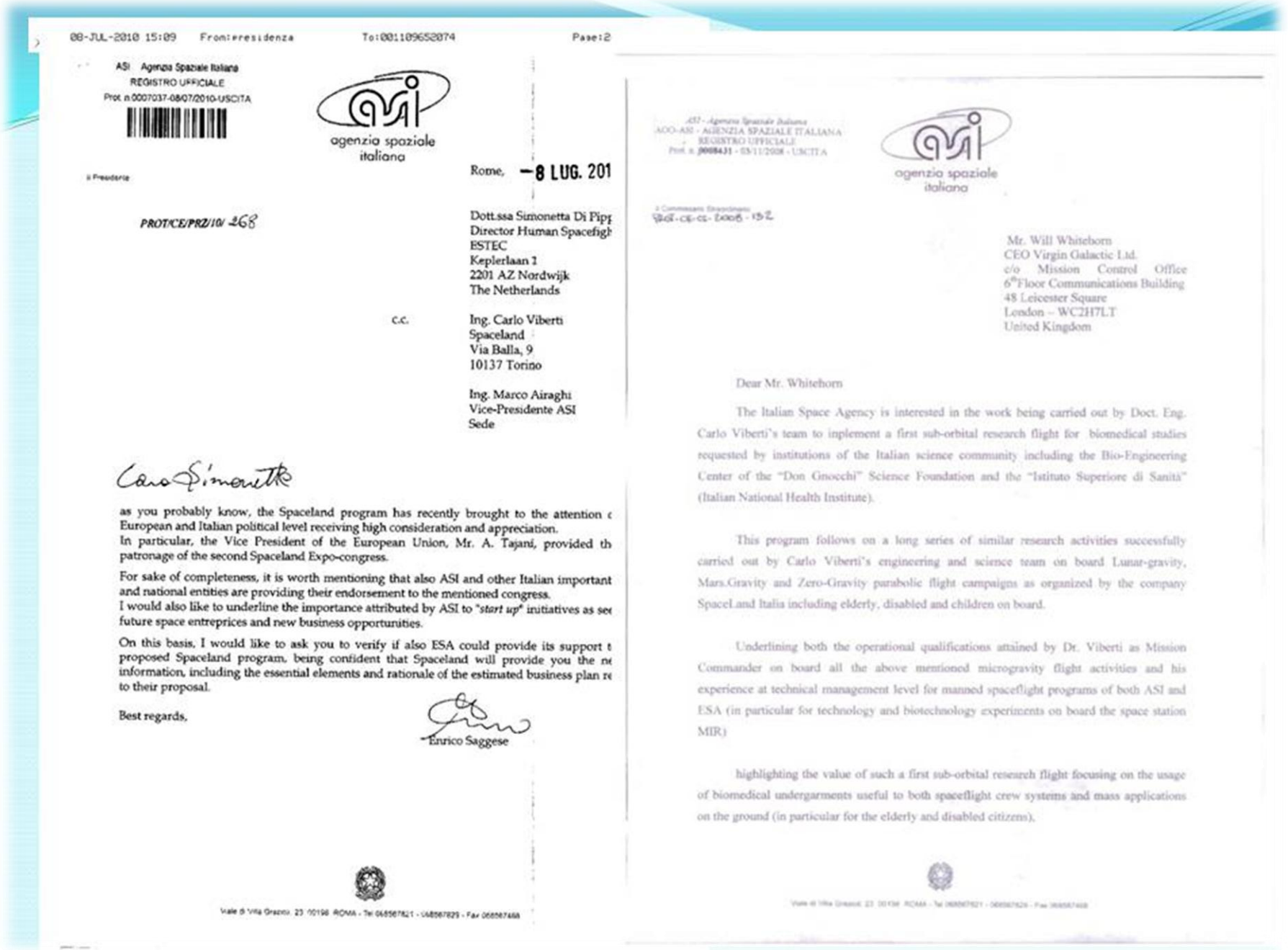
http://www.lastampa.it/2015/02/25/multimedia/scienza/come-catturare-la-spazzatura-spaziale-eXnomkbGZgP5e2qnay3o9O/pagina.html

For info :

- Eng. Doct. Francesco Massa
- SpaceLand, via Boston 76 Torino Italy
- Email : SpaceLand@SpaceLand.it
- Skype : COSMO_SpaceLand
- +39.011.234.14.635 - mobile +39.329.067.33.33

Support letters from the Italian Government

(Meeting Notes and Action Plan produced by Vanille Islands' Government available upon request)



08-JUL-2010 15:09 From:presidenza To:0011096528074 Page:2

ASI Agenzia Spaziale Italiana
REGISTRO UFFICIALE
Prot. n.0007037-08/07/2010-USCITA

agenzia spaziale italiana

Il Presidente

Rome, – 8 LUG. 201

PROT/CE/PRZ/10/ 268

Dott.ssa Simonetta Di Pipp
Director Human Spacefligh
ESTEC
Keplerlaan 1
2201 AZ Nordwijk
The Netherlands

c.c. Ing. Carlo Viberti
Spaceland
Via Balla, 9
10137 Torino

Ing. Marco Airaghi
Vice-Presidente ASI
Sede

Cara Simonetta

as you probably know, the Spaceland program has recently brought to the attention c
European and Italian political level receiving high consideration and appreciation.
In particular, the Vice President of the European Union, Mr. A. Tajani, provided th
patronage of the second Spaceland Expo-congress.

For sake of completeness, it is worth mentioning that also ASI and other Italian important
and national entities are providing their endorsement to the mentioned congress.
I would also like to underline the importance attributed by ASI to "*start up*" initiatives as see
future space entreprices and new business opportunities.

On this basis, I would like to ask you to verify if also ESA could provide its support t
proposed Spaceland program, being confident that Spaceland will provide you the ne
information, including the essential elements and rationale of the estimated business plan re
to their proposal.

Best regards,

Enrico Saggese

Viale di Villa Grazioli, 23 - 00198 ROMA - Tel 068567821 - 068567829 - Fax 068567468

ASI - Agenzia Spaziale Italiana
AOO-ASI - AGENZIA SPAZIALE ITALIANA
REGISTRO UFFICIALE
Prot. n. 0008431 - 03/11/2008 - USCITA

agenzia spaziale italiana

Il Commissario Straordinario
ASI-CE-CS-2008-152

Mr. Will Whitehorn
CEO Virgin Galactic Ltd.
c/o Mission Control Office
6th Floor Communications Building
48 Leicester Square
London – WC2H7LT
United Kingdom

Dear Mr. Whitehorn

The Italian Space Agency is interested in the work being carried out by Doct. Eng. Carlo Viberti's team to inplement a first sub-orbital research flight for biomedical studies requested by institutions of the Italian science community including the Bio-Engineering Center of the "Don Gnocchi" Science Foundation and the "Istituto Superiore di Sanità" (Italian National Health Institute).

This program follows on a long series of similar research activities successfully carried out by Carlo Viberti's engineering and science team on board Lunar-gravity, Mars.Gravity and Zero-Gravity parabolic flight campaigns as organized by the company SpaceLand Italia including elderly, disabled and children on board.

Underlining both the operational qualifications attained by Dr. Viberti as Mission Commander on board all the above mentioned microgravity flight activities and his experience at technical management level for manned spaceflight programs of both ASI and ESA (in particular for technology and biotechnology experiments on board the space station MIR)

highlighting the value of such a first sub-orbital research flight focusing on the usage of biomedical undergarments useful to both spaceflight crew systems and mass applications on the ground (in particular for the elderly and disabled citizens),

Viale di Villa Grazioli, 23 - 00198 ROMA - Tel 068567821 - 068567829 - Fax 068567468

Event of the 20th Week of Science Culture by Italian Gov's Ministery of Education, University and Research

http://www.lavin.it/eventi/settimana/2010/ventesima_settimana_cultura_scientifica/sardegna/expo_congresso_space_land

2nd SpaceLand Expo-Congress

- Technology, Science, Finance and Academia Workshops
- Pre-planned Bilateral Meetings with SMEs and Entrepreneurs
- Open Flight Demos

21-23 October 2010

Venue: *ECCELSA AVIATION* "Costa Smeralda-Olbia Airport" (Sardinia, I)

with the Patronage of European Commission's Vice President Antonio Tajani

CANAPARO WINES

Meridiana fly

COSMICA SPACELINES

Organization: www.SpaceLand.it

European Commission Vice-President's endorsement of the SpaceLand Congress

Screenshots from the Italian Government's ASI website

1st SpaceLand Expo-Congress 2009

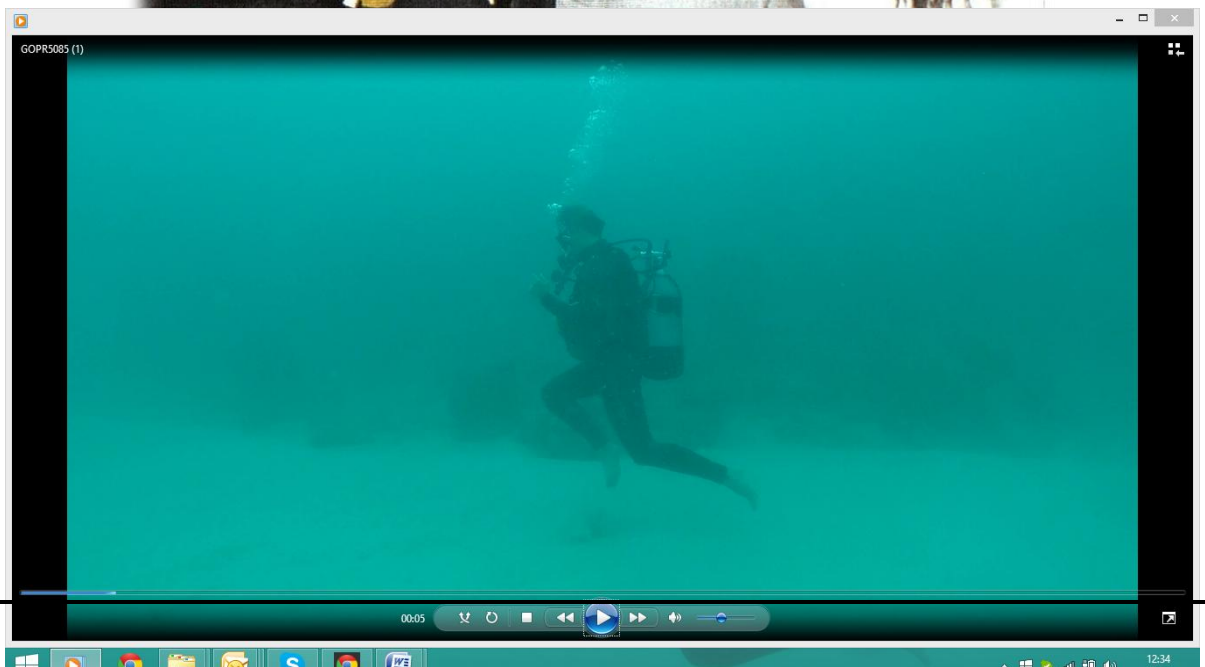
Opportunities for Science Research and Technology Transfer within the Lunar-gravity, Mars-gravity & Microgravity Parabolic Flight programs and synergies for Space Tourism

21-22 September 2009 - Chia Laguna Resort - Domus De Maria (Cagliari-Sardinia-Italy)

SPACELAND: the world's 1st research flights in Lunar-gravity, Mars-gravity and Zero-gravity open to *everybody*

Conceived and organized by SpaceLand Italia, Via Rivalta 9 - 10095 Grugliasco Torino (Italy)
tel. +39.011.234.14.635 - .684 ; fax +39.011.09.65.20.74 ; Skype: COSMO_SpaceLand
www.SpaceLand.it

SpaceLand Camps for zero-G operations tests, External-Vehicular Activities, Moon-Walking simulations




SpaceLand - Diretta su Tg3 Buongiorno Regione Sardegna
SPACELAND
PROVE DI VOLO SPAZIALE
BUONGIORNO REGIONE
07:38
0:32 / 3:52


SpaceLand - Diretta su Tg3 Buongiorno Regione Sardegna
SPACELAND
PROVE DI VOLO SPAZIALE
BUONGIORNO REGIONE
07:41
3:41 / 3:52