



## Space Renaissance International - 2nd World Congress - September 2016

# Theses 1 - Our Commitment to Astronautics

Five years after 2011, an update of SRI analysis and strategy

Document status: DELIVERY

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## 1 Premises

### 1.1 Scope of this document

The scope of this document is to provide an update of the SRI analysis of the status of civilization and the status of development of civilian astronautics. Main tasks for SRI for the next 4 - 5 years are driven by this analysis.

Warning: some points, e.g. the status of civilization, still need further development.

We will work on this document before the deadline, July 31st 2016, when the document should be released in its complete and steady version.

The document was composed also using parts of email exchanges intercurrent during the months of May and July, with Jeff Greason, Manuel Perez, Eric Hunting, Amalie Sinclair, Patrick Collins. Names of other contributors will be added to the co-authors list, as they will join.

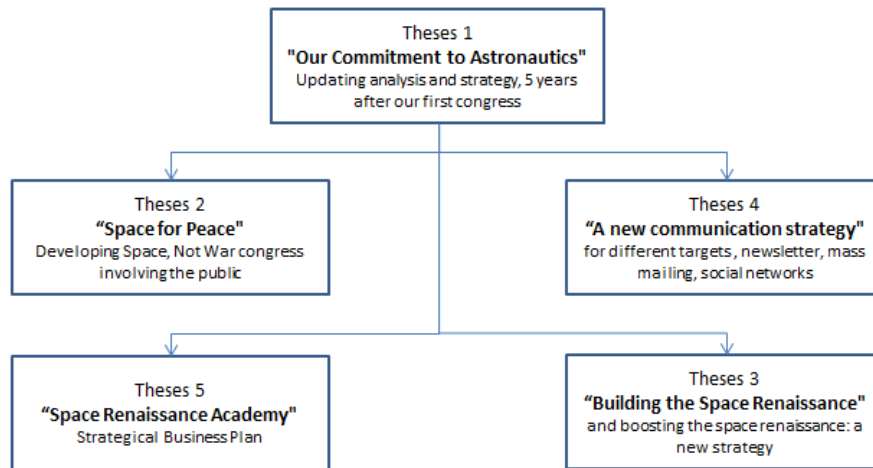
### 1.2 List of revisions

revision	date	author	reason for review
1.0	June 15th 2016	A. Autino	First issue
1.1	June 15th 2016	J. Greason	<ul style="list-style-type: none"><li>- added from "One major theme..." to "...advanced technology", end of point 1.3</li><li>- added from "The transhumanist..." to "... could be", point 2.4.3, 3rd paragraph</li></ul>
2.0	August 3rd 2016	A. Autino	<ul style="list-style-type: none"><li>- added considerations about the forecast made in the first SRI Congress, section 3.</li><li>- added section 7. Our priorities for next four years 2016 - 2020 and its subpoints: 7.1 key themes and 7.2 Projects</li></ul>
2.10	August 11th 2016	P. Sunter	<ul style="list-style-type: none"><li>- English language editing</li></ul>
2.20	September 18th 2016	A. Autino	<ul style="list-style-type: none"><li>- added subpoint 2.5 The challenge towards 2025</li></ul>
2.30	September 29th 2016	A. Autino	<ul style="list-style-type: none"><li>- added "5) Collaboration with United Nations" to point 7.1 Key themes, for the opening of the space frontier</li><li>- added point 7.2.1 The Space Renaissance Tour</li><li>- the documentation tree was updated</li></ul>



### 1.3 SRI 2nd Congress Documentation Tree

#### SRI 2<sup>nd</sup> World Congress 2016 – Documentation Tree



**Authors:**

Theses 1: AA + PC, MP, AS, JG, EH

Theses 2: AW + All

Theses 3: AA + MP, AS, JG

Theses 4: MP + All

Theses 5: BF + AA

**Note:** the authors are indicated as "at least", all contributes

Figure 1. The Congress Documentation Tree

### 1.4 Instead of an abstract: the renaissance will flourish in space, or it will die!

We live in a state of separation, that comes from a lifestyle transformed by new technologies and the persistence and inconsistency of old ideologic concepts, in a kind of pseudo-equivalence among good progressive concepts and backward ones. The new technology is evident to those of us who remember the first satellite and the moon landings, but for our youth this technology is part of their lives. The persistence of false concepts in global media, though, is seen as good for advertising and marketing, though many individuals quickly learn not to believe what they see and hear. Yet before that happens, we hope that true, proven useful concepts taught in our schools have been able to generate a real cutting edge in the few individuals who have intellectual curiosity and the persistence that sets apart a true learner.

In this cultural climate we must also consider the presence of futile and destructive rebellion, usually incited by opportunistic individuals: the resentful anger and frustration of the eternal losers and victims, the ideologies of fear, which go back to past lifestyles, and destructive interpretations of religious precepts. These destructive urges, all together concur, by their attitudes and memes, to the idea of an imminent Armageddon.

But, can a Renaissance arise, in this context? Yes, not only can it happen, but it is happening right now. And the leaders of the renaissance are quickly learning the essential concepts of transformation. It is easy to see that innovators and humanity have focused on commercial, industrial and cultural development: art, communications, entertainment, equality, participation, transparency, trust, health, mobility, and visionary sciences are among the areas that are growing, developing and expanding, steadily and strongly. Now, imagine this process taking place in the only environment full of resources, energy, and fraught with new perceptions of reality, in three dimensions, outside of the physical and mental labyrinth of Earth's globe. If you can imagine and dream it, let's tell the world: the Space Renaissance is here!

A century ago, Filippo Tommaso Marinetti's "Futurism" was born on the wave of the industrial revolution, the socialist revolution, the artistic and cultural avant-garde of the first half of the Twentieth Century. At that time,



impetuous and violent political movements exploded with a huge driving force, resulting in world wars and devastating conflicts. Yet the Twentieth Century revolutions fertilized our industrial civilization, leading to improvements in health, social growth, technology, education, and other fundamental systems.

Futurism today will not be seen as a revolution, but as a renaissance of civilization.

- A revolution is violent, while a Renaissance is fundamentally joyous and peaceful.
- A revolution feeds on hatred, a renaissance is nurtured by love and hope.
- A revolution is destructive, while a Renaissance is constructive, and automatically results in new development.

In this environment, today's conflicts cannot be seen as between paralysis and innovation, authoritarianism and libertarianism, collectivism and individualism. The true conflict is between those who aspire to growth and change (the Renaissance) and those who want de-growth, de-industrialization, de-culturization, which will lead to the implosion of civilization.

Our new renaissance, the space renaissance, is the last stage of the Renaissance initiated 500 years ago, at the end of the Middle Age, with the Copernican Revolution, that for the first time in history acknowledged that we are not living on a small planet, but we are immersed in a cosmic nature.

One major theme of the Renaissance was the increase in the value of labor. Indeed, it has been argued that it was the shortage of labor brought on by the plagues of the late middle ages that paved the way for the social transformations that became the renaissance.

There is widespread concern that humans are losing their economic value in the terrestrial economy. And one thread that people don't seem to emphasize is that the number one problem in the space economy right now is ... a shortage of labor! There are so many, many economic activities which we can't conduct economically because there is no source of labor in space to do the jobs that need doing.

Therefore, it is in space that we will rediscover a new answer to the question; in a world of high technology, computers, and robotics, what ARE the economic uses of human labor? Not by the old techniques of guilds and protectionist measures, but by putting humans in a situation where the challenges of their environment force them to get the most out of both their people and their machines, we will then find out, by the trial and error process of market economies, how to rebalance our work between human and machine and find out how humans can be productive, vital, necessary participants in the economy WITH advanced technology.

The renaissance needs space and resources that our planet can no longer provide for eight billion people and more.

To paraphrase Andre' Breton (a surrealist writer of the Twentieth Century):

**the renaissance must flourish in space, or it will never be!**

Faced with the awful actions of terrorists and of all the supporters of death, we give our contribution to peace, freedom and development: we work for the space renaissance!

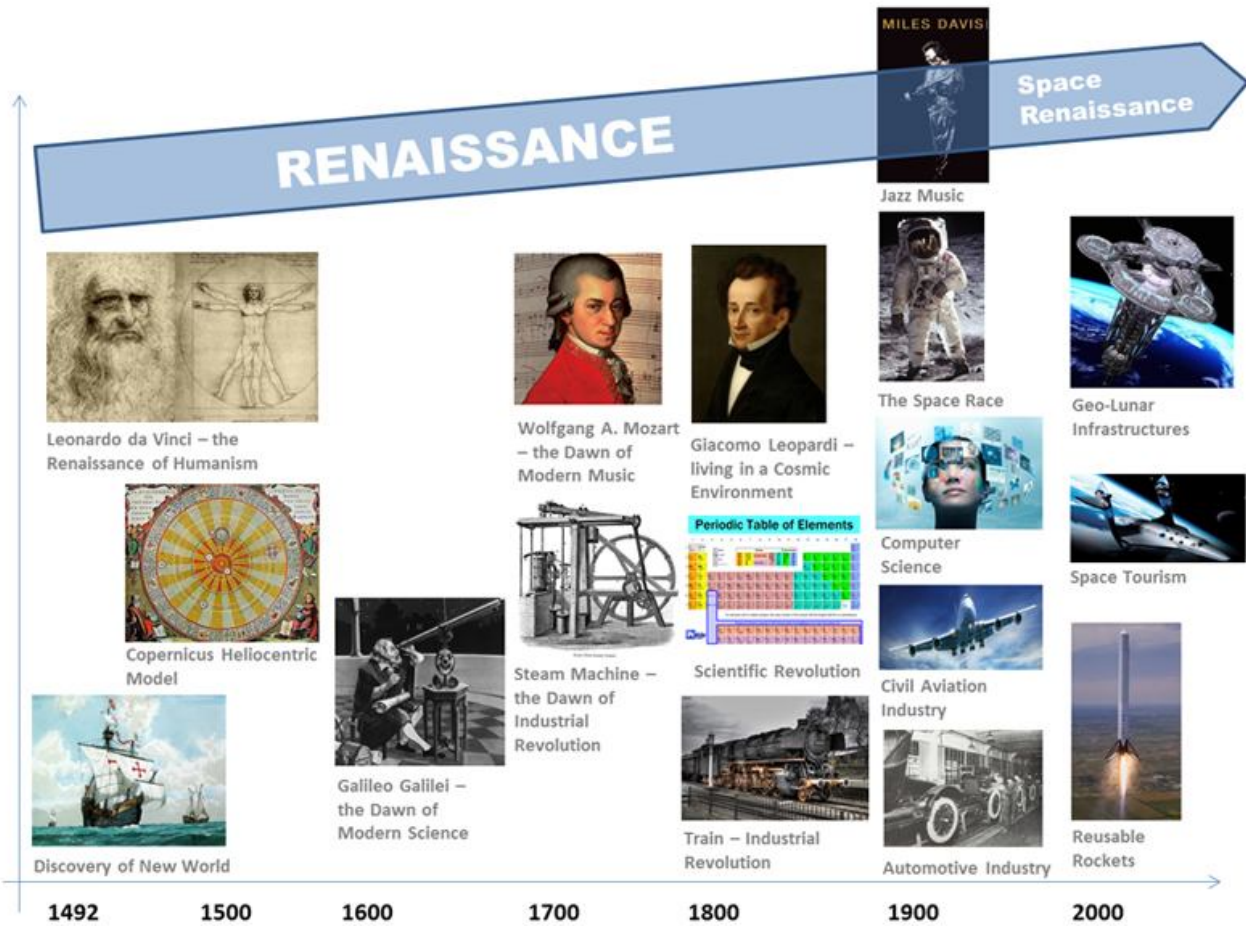


Figure 2. The history of the Renaissance

## 2 The status of civilization

### 2.1 The global crisis worsened, instead of being superated

In the SRI newsletter 2016#01, we wrote:

"Nowadays many economic and international relations experts talk openly about the collapse of the Western civilization and also attempt to predict the date of such a collapse with the five-year period from 2025 to 2030 considered to be "very critical". One such example: " Global Trends 2025: A Transformed World" was recently published by the US National Intelligence Council".

This comprehensive document covers various topics including the development of a multipolar society, continuing population growth, limiting resources at all levels and the considerable risk of conflict proliferation including significant concerns about the spread of nuclear weapons. Within such a period, a number of crucial attributes will emerge and global conflict may erupt with long term and destructive consequences. After the fall of the Berlin wall during the last quarter of 20th century, no concrete plan for a newer world order was implemented. The West now appears to be incapable of facing declining security, the threat of terrorism, the deficits of a so called postmodern era and is unable to protect its citizens and its newer generations from the threat of violence. After witnessing the recent disruption of many national societies including those in the Middle East and North Africa, the West, however, has failed so far to propose any further reiteration of the democratic social model which could feasibly contribute towards global stability, development and world peace."

<sup>1</sup> [http://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025\\_Global\\_Trends\\_Final\\_Report.pdf](http://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025_Global_Trends_Final_Report.pdf)





Symptoms of a status of diffused social decay are now evident also at the political layer. Nationalisms and “anti-political” movements appear everywhere in the world. And in some cases they explicitly refer to the extremely anti-human Nazi ideology.

The gangrene of the crisis already has passed from the economic layer to the social one. Terrorism is getting worse. The trend initiated on September 11th 2001 with the Twin Towers extended to Europe - in Spain, the UK, France, Belgium, Germany - and is threatening all of the western metropolises from within. That means that terrorism finds members in the futureless European youth.

Whatever the parents of terrorism could be, it constitutes now a powerful tool of the forces leading to civilization implosion, together with the giant migration flows occurring over recent years. Migrants should not be rejected by Western countries, but the destination countries should hold a strong culture and big socio-technical projects in progress. But in many cases their contemporary culture is moving opposite to this need - decadent, in general terms aimed to de-growth, and with political leaders who are blind to the enormous opportunities brought by the industrial revolution and by the still ongoing scientific renaissance.

In such a situation of cultural weakness of the Western countries, migration flows will generate more fear in the population, increasing the danger of authoritarian antidemocratic involutions in all the post-industrial countries.

Lacking big inspiring projects, the young generations will be desperate, constituting a ground of recruitment for terrorism and for any authoritarian reactions.

## 2.2 The deep causes of the crisis are not superated

The global crisis that exploded in 2008 was catalyzed by trash finance. But trash finance alone couldn't cause such a devastating crisis, which has lasted over eight years, and seems to be self sustaining, by a series of negative concatenated vicious effects. The situation of Europe is emblematic:

- 1) the crisis jeopardizes both industry and the consumer economy, millions jobs are lost
- 2) thus the governments tax incomes decrease
- 3) the governments apply austerity policies, reducing social benefits, cutting public expenses
- 4) social unrest and revolt spread in the society
- 5) xenophobe, nationalist and violent ideologies gain momentum
- 6) the economy is further depressed

Five years ago, an economic recovery took place in the USA, thanks to a continuous infusion of cash into the economy, directly to enterprises, since the beginning of the crisis. We are recently witnessing that a similar policy, adopted by Europe after a huge delay, is however not solving the problem.

Two of the major emerging countries, China and Brasil, have already experienced a structural stop to their growth, due to several concurrent factors: the close interconnection of the globalized world economy, a generalized weakness of the international demand of consumer goods, the lack of raw materials, and the cost of energy. India and many African countries are indicated at top level by the human development indicators. USA, China and Japan score the first three places for GDP.

Should such a situation keep on producing this sort of damage for another, say, ten years (let's remember the Kondratieff cyclic crisis occur every 60 years, and last 20 years), we would witness heavy anthropological consequences. Being the first global crisis of the global economy, it works as a strong factor raising of the pressure on the planet Earth's inhabitants. Darwin keeps on working of course. And, while in an open environment with abundant resources evolution prizes the most intelligent ones, able to use the resources for social benefit, when the environment becomes narrow and the resources scarce, Darwin could turn back on the evolutionary scale, prizing again the most brutal, arrogant and primitive. Democracy is not a warranty against such a perspective, rather an accelerator: when people are desperate and don't see means of escape, they will vote for another Hitler, Mussolini, Stalin, Mao Tse Tung, Pinochet... Violence, war, torture, murder, and any kind of horrors will be the normal way of living, as already seen in history.

That's why the global crisis shall be opposed and defeated, and the renaissance shall overcome.

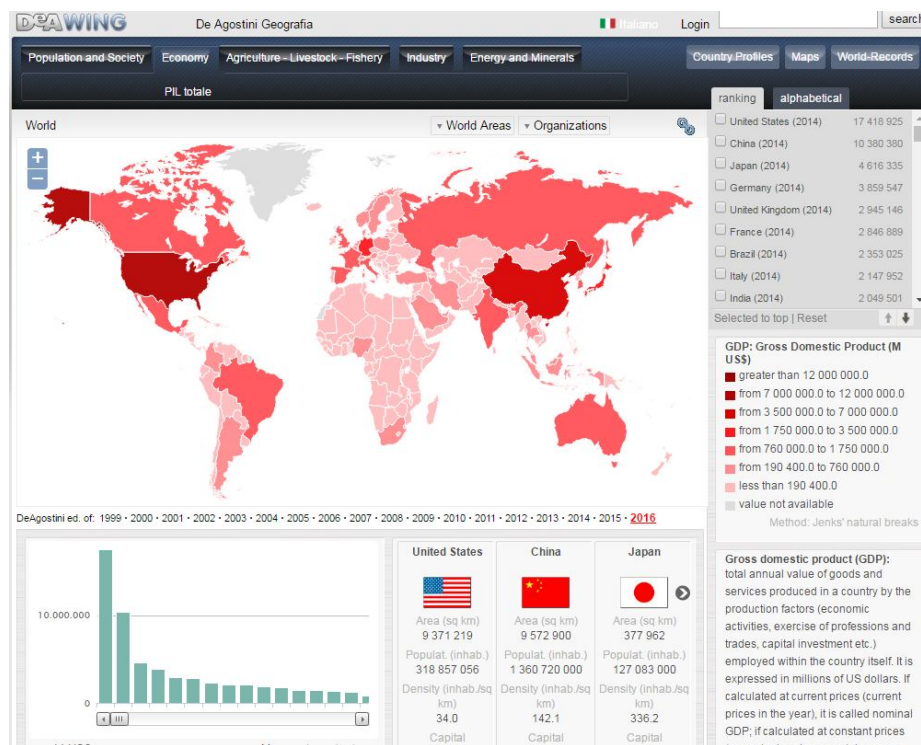


Figure 3. World GDP ranking

New technologies are diffusing everywhere, but the economy is still based on car industry and oil. Nano-electronic and additive manufacturing (3D printing) will change the world, but so far the old heavy industry is still keeping the world in its heavy jaws. And deflation is now the spectre threatening the global economy, in Europe and other countries.

However, the main structural reason of the crisis -- lack of terrestrial raw materials and energy sources -- impacts with equal violence upon both the old and the new industries. So, only by reaching to the virtually infinite resources and energy of space, the new industries -- including new rockets, spacecrafts and space infrastructures for space tourism and space industry -- have a chance to really develop to their full potential.

### 2.3 The scientific and cultural renaissance is however going on

We are transforming our civilization and the world. Since the 15th Century the Renaissance has been going progressing, each Century profiting from events and developments of the previous century. Thanks to the Medici family, the world took the road for progress, 500 years ago. The great transformation of our sciences, technology, cultures and population has its roots back in the genius of Leonardo da Vinci, Galileo Galilei and their struggle against the blind greediness of bullies and bureaucrats. These were the harbingers of the global industrial revolution, developed during the last two centuries, and the political and social developments of the 20th Century. As the popular song of the 1960's says "For the times, they are a'changing". Since five centuries, at least.

Disruptive technologies and new ways of looking at reality are arising everywhere, and most (if not all) established authorities are feeling attacked or pressured by these changes. Yet humanity is achieving greater freedoms, civil rights and education for all. Multinational interests, national advocacy groups, global communications, and the social media phenomenon are but a few of the positive enablers of the new Renaissance, and of the completion of the Renaissance, including the Copernican revolution, improbable as it may seem.

Revolutionary leaders of the 19th and 20th Century would be shocked at how the world has been transformed by individual efforts, collective yet uncoordinated, that cannot be contained, much as the Vatican and Kings could not contain the transformations that we now call "the Renaissance Period". Yet we are really living in this new "Space Renaissance", which sped up and became global when mankind realized we could actually leave our planet. With Sputnik and the moon landings we realized that past limits were nothing more than beliefs, just as the flat world belief had been a false limit centuries ago.



This Space Renaissance, which some philosophers thought would accompany human settlement of the moon and planets, is actually happening now. The international space programs' technological and ideological stimulation served as a catalyst for global inventiveness, and we now speak of "disruptive" technologies and business models, in which traditional industries can be wiped out by new ways of doing things and not just by one separate invention. Individuals all around the world are learning traditional technologies and sciences, and transforming them into new ways of doing, and sometimes even inventing and generating previously unknown technology: in all fields.

Innovation is key, with the magic of the Internet and modern communications serving to spread the ability to transform reality, as Krafft Ehrlicke profetically guessed, when he described our age as the age of the "metabolism of information"<sup>2</sup>. Magic? Well, as Robert Heinlein said, "One man's magic is another man's engineering". Among other things, today we can print bridges and houses; our cellphone can be our bank; we have virtual money (hello Bitcoin); unlicensed taxi drivers come via Uber; miniature flying machines, called drones, can be insect sized, or large enough to deliver food and medicine; and satellites collect all sorts of information to make our phones adapt to our needs and desires as we go through a city. Some are afraid of the transformation because these technologies have military uses, but I see that they are often first used among the wealthy. In a short period, though, recent history has demonstrated their low cost has allowed the technology to be quickly shared with the poor and uneducated of our globe. As a philosophical research team, SRI analyses this process from an evolutionary point of view. "In this view, humanity's ability to command a broader range of resources - as, for example, through its chemical or nuclear industries - forces us to transcend Earth. Our planet cannot support our information metabolism and cope with its waste products by itself. That is why," Ehrlicke says, "you may become a prophet of doom and of limits to growth if your vision does not reach beyond this planet". He wrote these concepts in the early '80s, in explicit polemic with Claudio Peccei and his Club of Rome<sup>3</sup>.

Education, global education, is also a key result of the renaissance, and of the industrial revolution in particular, that gave jobs conferring dignity and a minimum welfare to million people, allowing them to send their children to school. Most children get a basic education, all over the world, including girls. Universal education is now open to girls and the poor, including colleges and universities. The space renaissance requires all humans, all of us, to be educated and capable of reading, writing, solving problems and using a computer! Even the poor and uneducated of the world are being offered educational and economic opportunities through global charities and non-governmental organizations, making for slow yet unrelenting progress. Canada, for example, offers all legal immigrants education, support and services so that they may quickly become productive citizens. Europe offers services for refugees, and other social services and benefits to protect families and children are common globally. The change in our social structures and expectations are great, bringing with it huge economic development in the places that embrace human development. Just imagine what will happen when we start real civilian space development!

Will we follow a "colonization" process, much as the Europeans did with the frontiers they found? It is a good question because historical colonization was destructive at many levels. Colonizing the Moon and other planets will need a constructive, collective and collaborative effort in which we create Earth-like environments for humans to live in. The technology is still incomplete and the development of necessary radiation protection and gravity engineering predicted by Albert Einstein appears to still be in its infancy. But after 50 years of research I certainly believe we will discover how to utilize both forms of energy in a way that Albert Einstein and other great physicists would be proud of.

The Sky is NOT the limit, is the message we received decades ago. The sky... outer space... the Moon and Planets... and beyond have been touched by our people. Humanity has always thrived by changing climates and environments through tools and technology, and now we are creating the means for establishing human habitats wherever we wish!

## 2.4 Culture: a missed space age?

Will humans become redundant, thanks to the development of Robotics and Artificial Intelligence? We already discussed this issue, raised, among other authors, by Vivianne Forrester in her book "L'horror economique"<sup>4</sup>. While years ago this appeared as a vague possibility of the distant future, this issue became more and more pressing, with the combined effects of the crisis and of the distorted use of technology made by our economically driven society.

<sup>2</sup> Ehrlicke, Krafft A. - "Extraterrestrial Imperative"

<sup>3</sup> [https://en.wikipedia.org/wiki/The\\_Limits\\_to\\_Growth](https://en.wikipedia.org/wiki/The_Limits_to_Growth)

<sup>4</sup> Forrester Viviane "The Economic Horror" Paperback – June 2, 1999 - [https://en.wikipedia.org/wiki/Vivianne\\_Forrester](https://en.wikipedia.org/wiki/Vivianne_Forrester)





According to a certain subculture, technological progress is the cause of all evils. And this is the case advanced against robotics and artificial intelligence development, in particular. The latter criticism is worth engaging with as part of our philosophical efforts.

The actuality of a concept of human redundancy deeply and totally depends on the scheme of values ruling in a given society. In a society dominated by economism, progress is measured only by economic indicators. And these apparently prized, for a while, the brutal replacement of human workers by robots. But it is already demonstrated that this was a very shortsighted perspective: workers are also consumers and, if they are thrown out of the jobs market, they can't buy goods. And this is a big factor leading towards crisis. Even worse, further noxious social processes could be ignited, such as the growth of luddite tendencies in the society.

If our philosophical base is a humanist one, the perspective completely changes. Artificial Intelligence will benefit humans, and not only in the form of short-term benefits to the economy. Dangerous, tiring and boring activities will be done by robots. The quick solution of complicated problems and design matters will be supplied by supercomputers duly programmed. In space, there will be a big number of these cases, therefore robotics and AI are of great use, for any purpose, both exploration and settlement.

However, we can't deny that we have a real problem: society is currently ruled by economism, indeed. And space futurism was maybe not able, so far, to develop an up-to-date narrative of our future in space. And this could be a major issue, indeed, when we identify one of our main tasks being public education and outreach. Space Renaissance's scope is not to ignite a social revolution, to change the governance concepts. Space Renaissance was born to help humanity to expand into space, and for giving birth to a Solar Civilization. This needs to be initiated now, and is the maximum priority, for the sake of civilization survival, and in order for the fantastic progress, since the first Renaissance in 1500 to nowadays, not to be wasted. But we have to acknowledge the real issues, in order to setup our cultural struggle with proper tools and arguments.

Some recent announcements by Elon Musk, about a science-fiction style for the design of space suits work in this area: the cultural side of astronautics. Yes, it appears a bit as a steam punk thing... but all new arts generate disconcertion and controversial reactions, at their beginning... a "back to the future" urge, in a general context in which there's no hope in the future. But that will change: Elon is reconnecting space to the future, and to a true vision of a possible and perfectly feasible future.



Figure 4. Next generation space suits

Art matters. Aesthetics matters. Beauty matters! Emotional communication matters. Human presence and communication matter, very much more than virtual communication and tele-presence.

We will use, here, parts of an essay recently contributed by Eric Hunting, one of the first SRI members, in 2010.

#### 2.4.1 Growing anachronism and incoherence of space futurism

We've witnessed the space advocacy movement succumb to a chronic malaise that has many causes but which is most deeply rooted in the growing anachronism and incoherence of space futurism. We lack a coherent, comprehensive, truly contemporary, vision of space development, both in the advocacy community as well as in the formal space establishment. Obsessed more with 'getting there' than 'living there', we lack a



viable, plausible, model of The Good Life in space to aspire toward. Mainstream culture has moved beyond the era of Big Machine Futurism of the 20th century, with its expressions of progress in the form of gigantic creations of state, corporations, and finance, to an era of Small Machine Futurism rooted in technologies of small scale yet exponential impact and organic, bottom-up, stigmergic organization. Stigmergy, Metcalf's Law, and Singularity are the memes of this century and its emergent Post-Industrial Age, and yet this transition seems to have left space behind. Space futurism, to the extent it still persists, dwells on a mixed bag of retrofuturist ideas and anachronistic premises little changed since the era of Wernher von Braun beyond graphic styles, ignoring the trends and technologies the rest of futurology anticipates. And not to dwell on this too heavily, this relates to a clinging to childhood fantasies of space adventure and a fundamental problem with effectively communicating new ideas and visions. The second problem is exacerbated by the poor nature of on-line communications and an inaccessibility of visual communication media now that we have lost the talent pool of traditional commercial illustration.

#### **2.4.2 Today's biggest space hero isn't an astronaut**

The 'heroic' era of space is over, and that's a good thing. Though the agencies seem to be always trying to extend that era, setting more distant goals -- Mars -- without having consolidated the previous ones, the Moon, for the benefit of the whole of mankind. It's time to embrace technologies and ideas that can enable expanding participation for the mainstream of society. To start building 'highways', and no longer just opening pioneer paths. Remotely Operated Vehicles (ROV) brought us a vast expansion to oceanography and marine construction and our knowledge of the sea. Such vehicles can, and likely will, do the same in space. Relying on traditional astronauts -- a very costly labor force -- to do what we need to do out there makes no more sense than relying on Olympic athletes to build houses. Thankfully, being a traditional astronaut is no longer necessary for doing things in space--though that fact remains largely unknown and un-illustrated in contemporary media. There has long been a common--and I think quite erroneous--belief that the astronaut-hero was necessary in order to provide the public with people to identify with and thus instill a reason to care about space. Consequently, we have cultivated a false public expectation about EVA and the human role in space in zero gravity. Agencies have gone to great lengths to create the illusion that EVA can be safe and routine while suppressing, until quite recently, the development of the telerobotics they know full well must be developed to really make space activity accessible and commercially practical.

Yet today's biggest space hero, particularly among the current space advocacy community, isn't an astronaut. It's Elon Musk--an impatient billionaire no longer willing to wait on space agencies and the old aerospace establishment to get around to developing the personal access to space he desired. We have more active astronauts than ever in history, and the average school kid is lucky if he can name one. Hero-worship is no longer enough.

Waving pennants outside the space center fence is no longer enough. Some notion of vicarious participation through contribution to the general, national, productivity is no longer enough. If we can't actually, directly, participate, we have no reason to care--at least to any extent beyond the attention we might offer Big Science.

The 2016 IAF congress, to be held in Mexico, is entitled: "Making Space Accessible and Affordable to All Countries". This title is very much relevant for the possible revision of the 1967 Treaty on the Pacific Use of Outer Space, the 50-years celebration of which will be next year (on which SRI will likely setup one of our main campaigns). However it is worth observing that the title is using the concept of "Countries", avoiding entering the discussion about military and civilian use of space...

#### **2.4.3 Robots will be more economically efficient than humans?**

Many could be scared by the possibility that the window of opportunity for human beings in space--at least, organic human beings--could be closing, should our choices only be driven by economism. The only economically practical role left for the human being in space would be a solution to telecommunications latency: to be a mind controlling telerobots from a distance suited to synchronous communications. That is how we must do things in space if we are to do them at any significant scale. All the biggest space programs now have a telerobot program--even if they're still funded rather reluctantly.

We have cultivated a culture that functions by economic Darwinism--by survival of the most cost-effective--and doesn't let us do many things that aren't economically rationalized. Therefore this is a risk we should consider, in our work. But, could a non human kind of mind come, and become a true competitor? To do that, such a mind would need to evolve a self-consciousness, and that is still a theme for science fiction: we still know very little about how a true self-conscious mind works, let alone how to reproduce it in a machine. An artificial mind would likely completely overcome any concept of economy, as we know it: the concept of economy implies the concept of exchange, individual interests and community ones, competition and



collaboration. An artificial mind, if self-conscious, might not appreciate competition and concurrence, finding very much more rational simply to incorporate all the existing AI's in a unified giant intelligence, allowing maybe parallel processing, to develop concepts, but for sure it wouldn't be a democracy. We would have been a kind of parent species, generating a children super-species.. another topic, dear to science fiction. But we are not faced with that, so far. In a pragmatic spirit, we shall face the issues that we have to already, because the critical moment will come soon, well before such a dystopian future could become reality.

If the human species is to become a space settler species, we have to accept that our minds and our physiology as well will change. The transhumanist philosophical and scientific work will be helpful on this issue: by means of bioengineering and cyborg engineering, humans will carefully and progressively adapt themselves to space conditions, and directly connect computer science features and capabilities to the human psycho-system. We don't know how distant in the future such developments could be.

In our *humanist* vision *for today*, we strongly advocate a roadmap that allows us to keep our shape and physiology as much as possible similar to what we have on Earth. That means solving the issues of protection against cosmic radiations and developing mechanisms to produce artificial gravity. These are the main issues, concerning living in space, for long resident civilian people. Krafft Ehrlicke wrote about the anthropology of astronautics, in his main philosophical work "The Extraterrestrial Imperative".

With the SR Academy project we are trying to restart from that point, and from Gerald K O'Neill's work. Krafft wrote about Selenopolis, Gerald about artificial toroidal cities at Lagrange points, in the cislunar region. The two of them also had a quarrel, about their two alternative visions. As far as I know, though we consider the two of them forerunners of astronautic humanism, none of them thought about the protection of human life and physiology. Using a less Aristotelian (black and white) method, we could combine their two visions, to solve both of the key physiological problems. To capture a NEA seems not such a difficult thing to be done. Then bring it to L4 or L5, dig inside it, make it spin to produce gravity, 3d print everything inside, with several meters of solid rock between houses and micrometeorites and radiations...

Could that be a social model good enough, to begin a near Earth space narration?

In a more general anthropological view, should someone be tempted to think that "humans are redundant" and scopeless, we will reply, from our humanist concepts (from the teachings by Julian Simon and Robert Pirsig), that people are not just working arms, but mostly thinking brains and emotional hearts. People are resources and never a burden, always, whatever the degree of automation of the productive powers. The main responsibility of any government or coordination team is and will be to include and involve people, turning their intelligence into benefit: the larger the platform of human intelligences the greater the goals we can formulate and achieve. The goal of any government or coordination team always will be to help all humans to reach their maximum level in the Maslow pyramid.

#### **2.4.4 A coherent social model for space settlement**

Our task is to design a comprehensive and coherent social model, of what it will be human life in space, supported by robots and artificial intelligences.

In such a vision, many things will be done by AI, but not everything: the situational awareness transmitted by telemetry will never equal human capability, being physically present on site.

Civilian space settlers will not have to go around in zero gravity wearing a space suite so often. When we travel by airlines, we don't need to go outside the aircraft and do things around the machine. When civilian space travel becomes as routine as flying on Earthling airlines, there will be no need to be a trained astronaut. This is fundamental of the paradigm change, from military to civilian astronautics. But this brings us to another issue, even more fundamental: will humans find it useful, convenient and/or fun to travel and live outside their mother planet? Or are they running the risk to remain prisoners of their closed world economist philosophy? This is possible, of course. All civilizations, at a certain point of their development, shall face the decision between two main options: to accept decay and extinction, or to evolve, ascending to a bigger niche. Choosing the first option, the species will quickly age and die. Choosing the second option, the species will experience a renaissance, and be very young. In our case, endowed with an entire Solar System, to explore and settle.

This is what we are here for: renaissance.

First. We are confident that young generations will be willing to travel and live in space, provided that the mass education systems will not collapse, at least in the next 20 years. Our duty is to design a proper exo-social model, following the studies on the Anthropology of Astronautics, on the path tracked by our forebears Tsiolkowsky / Von Braun / Ehrlicke / O'Neill.



Second point: we humans are too many, being almost eight billion, in the closed environment of Earth. But, if and when the diaspora in the Solar System begins, we will be very few. Just think about the virtually infinite number of migrant communities that will spread out around the solar system, when we master the techniques for mining the asteroids and get raw materials to build big rotating colonies, or dig them inside asteroids themselves. Tele-transmission of design CAD/CAM data for in-situ 3D printing will be a key part of this process.

Third: technology needs big numbers and scale. The cellphone technology is evolving so rapidly only because they are selling billions of product units, at a price comparable to the price of a tv-set or a washing machine. That is solid industry, not virtual. With a market of eight billion people any valid industry can relaunch the global economy at a very high level. Civilian space travel will generate economic wealth in a proportion very much greater than the civilian aeronautical and car industries. However, if and when humans were removed from the social process, considered "redundant", these numbers will fall at terrible speed: the enormous profits made by anti-social automation would quickly disappear, and the poor Mickey Mouse will just have to hope for the return of the maestro wizard, in order to stop the brooms by bringing water inside the house<sup>5</sup>...

There will be a critical transition, during the next 10 or 15 years, in which the technical and social opportunities brought by the renaissance of the last 500 years will balance the threats, the social conflicts, the wars, the horrible incoming armageddon, i.e. the implosion of civilization. In that critical conjuncture, an intellectual vanguard will emerge, in the world, indicating the way forward.

It is our duty to prepare the ground for such a vanguard, in order that it can attract the largest consensus, financial means and active intelligences, for the right decisions to be taken.

The window is closing faster than what we could have expected even a few years ago. But the main reason is not the obsolescence of the human future in space in favour of other options. The window will close because, should our number keep on growing inside the philosophically and materially closed Earth system, the civilization will implode. Seven billion people or more will be exterminated, technologies will die, the survivor humans will be little more (or even less) than monkeys. At that point, AI will not be evolved enough to be able to self-reproduce. The torch will then pass to a smaller species -- maybe mice -- that will maybe reach the critical mass (big number of individuals) needed to spread into space.

We are now seven and a half billion human souls, maybe more. Each one owns right to the future. Each one is a unique individual, capable of a vision, of understanding and perceiving reality, and the global mix of our feelings and thoughts determine the reality of the world.

We can have a future, i.e. children, only if humanity will expand into space.

If we keep on thinking that the world is closed, it will remain so.

If we instead are able to ignite a meaningful vanguard, then the space-enabled future can be opened.

From a humanist point of view, we are tackling this problem: to draft a social model, a futuristic one, to allow humans to live and work in space. This is something the space agencies and their groupies never did, partly because -- NASA at least -- they are still military agencies, and don't have any interest to allow civilians to settle in space. The same goes for government-connected space industries in the past.

Some slides by Jeff Greason at the 2011 ISDC are particularly clear about the agencies paradigm:

stage 1 = exploration / stage 2 = ? / stage 3 = settlement!

They had to tell the fairy tale of settlement, to maintain their popularity, but they never explained what could be the transition (stage 2) from the exploration phase to the settlement one.

#### **2.4.5 Future needs to be represented: the relevance of art**

We might cultivate a compelling vision of The Good Life in space and actually be able to leverage the power of this emerging technology for establishing an infrastructure that can realize it.

The cost and accessibility of visual media is the single biggest issue for space advocacy, that is a barrier to dragging space futurism out of the von Braun era. We must communicate new, plausible, compelling impressions of life in the future, but they must reach a society now very dependent on visual explanations and conditioned to equate credibility and plausibility with production value. Hollywood, with its compulsive

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<sup>5</sup> Walt Disney - "Fantasia" - [https://en.wikipedia.org/wiki/Fantasia\\_\(1940\\_film\)](https://en.wikipedia.org/wiki/Fantasia_(1940_film))





dystopianism, dominates the popular cultural vision of the future simply because no one else can afford the media.

Futurism deals in a realm of things which cannot be photographed because they do not yet exist and thus must be illustrated to be shared. The heyday of futurist literature relied on a vast pool of commercial illustration talent trained to produce diverse ad copy with speed and efficiency.

The incredibly enhanced graphic and photographic tools we have now, give us an immense capability to draw the future, in a fantastic emotional way, via pictures, videos, music, theatre, and mixed arts techniques too. Illustration became highly specialized in application over the years--particularly comic books and children's books. There are today perhaps a couple of hundred professional space artists in the entire world. SRI should attract some of them to work on books but also videos and, maybe, a portable walk-through exhibit based on a trade show display labyrinth. The key is to find concepts of alternative presentation and communication. Today the physical mock-up, prototype, or demonstration can sometimes be easier and cheaper than art, or combined with art. An approach used by Living Museums to communicate impressions of life in the past could be re-employed to illustrate lifestyle in the future.

The key concept, however, is that the future cannot be photographed, since it doesn't exist yet.

The future needs artistic representation, and the space future even more so.

This is a formidable call to young artists, to draw the human future in space.

## 2.5 The challenge towards 2025

Thirty years after the UN Declaration on the Right to Development, we have to acknowledge that many analysts paint a dismal picture of the status of civilization in spite of meaningful advances in education, longevity, civil rights, malnourishment, poverty and in other critical societal areas. Yet, there exists new threats to human development that must be dealt with, such as serious environmental issues, increasing scarcity of material and energy sources, that are becoming more and more evident and serve to enhance conflicts, terrorism and migration fluxes.

We identify the problem of a growing human population within the closed system of planet Earth as the main cause for the worsening of all the well-known global problems. There will soon be 8 billion humans on our home planet who are facing resource shortages, mass migrations, economic and political disenfranchisement, and widespread civil unrest exacerbated by this population pressure, not to mention the huge environmental issues, general pollution and the decay of the oceans. The global financial crisis initiated in 2008, is devastating society and jeopardizing its industrial capabilities that are necessary for development.

The great impulse to the progress of civilization that was provided by the industrial revolution, that we can see as the last act of the renaissance, initiated in 1500, is now running out of its thrust Today's industrial capabilities are under attack, by the current global crisis, and it is dramatically urgent to contrast and reverse such a crisis by relaunching industrial development, fully profiting from the fantastic new technologies that have raised in recent years.

As humanists we know that growth - economic and cultural growth - is essential for the progress of ethics, freedom, democracy and well-being. With almost eight billion intelligent human beings, our species was never so rich, provided that we will be able to allow such a huge patrimony to realize its full value by investing in itself and continuing its progress. Enduring cultural and economic growth decreases social fear and progressively reduces the causes of conflicts.

At this moment there are two major forces fighting in the world:

- 1) A multifaceted global crisis which is devastating our culture and paving the way to a general decadence of civilization accompanied by the emergence of populist and new feudal authoritarian regimes.
- 2) The forces of the renaissance, the courageous entrepreneurs -- in the new space domain but not only -- who are betting their lives on new technologies and methodologies. With a trust in scientific research, and with a new pragmatism, they refuse to look too far into the future. They do not stop dreaming, but do what they can with available technologies and with technologies that are expected to appear soon.

We believe that space development is the simplest measure available to humanity that can mitigate and progressively resolve the main global risks our civilization is currently facing. When a species is close to saturating the ecological niche where it was born and evolved, there are only two choices: to expand into a greater ecological niche by utilizing the available technologies or to condemn itself to limitation, decadence and extinction. On our home planet we see a growing scarcity of basic resources and useable spaces for the development of all its citizens, whereas the expansion of humankind into the solar system will provide space





and resources enough for the future development of perhaps trillions of human beings in the coming millennia.

The expansion of human industrial and commercial activities in the geo-lunar space region should be kicked off between now and the year 2025 – a date that many forecasters see as the beginning of a very critical period, in which the danger of a global conflict will escalate, bringing with it unpredictable consequences. The opening of the space frontier to human development will relaunch the global economy at unprecedented rate, and will be the key element to defuse a potential World War III.

The first essential step on such road is to accelerate the development and marketing of technologies for civilian passenger transportation in space. We advocate a change of paradigm from space exploration dealt by military trained astronauts, to civilian space flight, which will allow anyone to travel into space and as convenient as taking a normal airline flight. When low cost space transportation vehicles will become available, a season of great innovation (renaissance) will be triggered and new answers to human needs will create new self-sustaining markets. History shows examples of new routes, created by explorers, followed by merchants and then used by many others. Searching for and discovering new lands are essential aspects of human nature. The exploration and discovery of the solar system represents the exciting historical age that is now before us, one that is far greater and transformative than any previous age. Opening the new frontier of extraterrestrial space is now an urgent necessity for humanity, but, until now, this process has been restricted and delayed by monopolistic interests and governmental control.

In a problem solving perspective national and international communities will expand human presence in Earth orbit, working together in peaceful cooperation and collaboration. Innovative services can be provided for space debris recovery and reuse, fueling stations, spacecraft assembly and maintenance and for global communication and educational satellite networks. Space development can quickly achieve both the near term and long term goals of exploration and settlement, while supporting the sustainability and prosperity of our global communities on Earth.

However, time is of essence: supporting the forces of the renaissance to relaunch global development for all people of Earth before the year 2025 is the duty of all persons and institutions caring for the survival and continued progress of human civilization.

### 3 The status of civilian astronautic industry and commercial space tourism

5 years after 2011, the situation is much more dynamic.

Many things have changed, since 2011. Some of our forecasts are confirmed, some others denied. The space industry developed significantly, but more by Elon Musk's efforts than those of Richard Branson.

In our 2011 Congress theses Issue 1, we wrote:

"Having clearly presented all of the strategic middle and long term goals in our Philosophical Manifesto, the SRI indicates the following themes, as priority for the next four years: **(i) space tourism – both suborbital and orbital;** (ii) space based solar power; and (iii) Geo-Lunar region industrialization, as the three main leverages suitable to begin building the space industry, market and economy."

We clearly indicated space tourism (ST) as the first priority, since we analyzed suborbital ST as the only industrial development line that could accumulated capital by selling travel tickets, and use those financial resources to improve the technologies, and thus develop low cost access to space. It didn't happen, so far. But we also wrote:

"The new space industry and its business figure had an exciting growth, after the victory of X-Prize by Scaled Composites in 2004, from around 20 up to 100 companies and growing. **But that could be still too weak to reverse the crisis and re-launch the economy in time to avoid a general bankruptcy.** That's where the governments and public money keep having a key role, not only promoting space science and exploration, but also supporting the private industries in their dramatically decisive task of opening the Earth orbit to private enterprise! The task of the SRI and of the whole space movement for the next 4 years is then clear and simple: we must quickly elevate the public awareness of the absolute urgency to open the space frontier."

So it was not space tourism's role, so far, to be the main paradigm change catalyst, our forecast was wrong. Space tourism is still some time away, as it was 5 years ago. The main need, still unfulfilled, remains cheap, fully reusable, space transportation, key for opening outer space to tourism and any other civilian activities.

Until such key milestone are achieved, civilian space travel will not be economically feasible. Space will remain the prerogative of governments, for military purposes.



However we were also right, having analyzed that the new private space industry, working alone without any public support, could be too weak, and possibly fail to open the frontier in time.

Another commendation is due, therefore, to the business genius of Elon Musk, who strategically chose to work with NASA, in order to have the necessary public support to pursue his goals. While the first step has not yet supported civilian passenger transportation, his company has achieved a meaningful downsizing of the cost to orbit, and this is key for any serious space settlement program.

### 3.1 Reusable first stage rockets downsizes the cost to orbit

SpaceX opened the age of reusable rockets, by bringing back to the ground the first stage of Falcon rockets. Is this a step forward made by civilian astronautics? Not exactly: Elon Musk's client, so far, is still NASA. So we can say that Musk is still working for the military. But, and this "but" is very important, the reuse of rocket engines allows downsizing the cost to orbit, and this will allow private space industry to grow up during coming years.

While the construction of a Falcon 9 costs \$60M, the refurbishment between two flights (if any refurbishment is needed) is estimated at not higher than \$0.5M. The saving, for each launch, is huge indeed. And it will improve, with more experience. We can expect that this technological dramatic progress will support the initiation of space tourism commercial vehicles, at least from the point of view of technological, production and maintenance costs.

<http://www.theverge.com/2015/12/24/10661544/spacex-reusable-rocket-refurbishment-repair-design-cost-falcon-9>

### 3.2 The change of paradigm is not completed, yet

But putting the pencil vertically is not enough: we need to change the underlying operation mode. The agencies are not yet thinking in terms of civilian passenger transportation in space. Governments could keep on blocking, in fact, the take-off of space tourism, in order not to release their total control on the access to outer space. The true space renaissance will begin only when private space flights will begin leaving Earth's surface, targeted to sub-orbit, LEO, GEO, the Moon, the cis-lunar space. This requires a number of new policies:

- a) government space policies, open to private industry and civilian space travellers
- b) taking responsibility by the space agencies, because, even if the space agencies main mission will remain science and exploration, there are meaningful scientific aspects related to civilian space transportation and settlements

It could begin a period in which space could become affordable for private investments, but they will be kept on the ground by governments. In fact, Elon Musk is flying (for NASA), while Richard Branson didn't take off, yet. We can observe that both of them had accidents, but Musk retried a few months after and succeeded. While Branson, after the last failure, was hammered by environmentalists and other detractors, and is striving to solve technical problems and hold a sufficient number of flight tests before starting commercial flights.

However the difference is evident: Elon Musk works with NASA contracts, and has money enough to make many rockets, and the due number of tests, not stopping after failures. Virgin Galactic works with their own capital only, and laboriously collected pre-sold tickets. After SpaceShipTwo crashed, they had to build a new one. The other main enterprises of the space tourism segment -- Bezos's Blue Origin, Greason's XCOR, and the British Reaction Engines (Skylon) -- will maybe be ready to fly their vehicles when Virgin Galactic will be ready too. Space X itself, though Musk doesn't seem interested in suborbital space tourism, is developing vehicles for passenger transportation as well.

### 3.3 Space Tourism is on its way, however, but needs to be supported

In September 2015 the Observer wrote: "In any case the Space Tourism industry and the New Space Industry as a whole have survived the great recession and are emerging as small, but important players in the US aerospace industry. If the US and the world economy soars in the next few years, the market for rides into space will just keep growing."

<http://observer.com/2015/09/2016-could-be-the-year-space-tourism-takes-off/>

<http://www.parabolicarc.com/2016/02/21/spaceshiptwo-unshape/>



It could be, in this statement, a possible inversion of cause and effect. We should maybe say: "If the market for rides into space will be allowed to soar, in the next few years, the US and the world economy will just restart growing."

The goal should be pursued in various ways, also through governmental and intergovernmental initiatives, to support private investments, and decrease the precariousness of the new space industry. India has new launch programs, with a shuttle which is intended to be quite inexpensive.

### **3.4 What is the way forward? Via legislation, or private industry, or both?**

So, there are negative factors, on the side of the civilization status, and positive but limited ones, on the side of civil astronautic development. SpaceX's market is still NASA, and not a private market.

There's a big urgency to open the frontier, before 2025, or civilization will enter a very critical period.

Our strategy shall change in several ways: lobbying, talking to the general public, giving education and outreach, building chapters in all countries.

Space Tourism shall finally begin, and suborbital flights continue to be a key step to orbital tourism. SpaceX and the civilian astronautic companies shall be supported, by public friendly policies.

Our program shall be offered to all governments, and political parties too, in the whole world.

It will take a great marketing promotional effort plus attracting key space related personalities to join us and champion our SRI mission.

We will press for national and international measures of legislation which will enable global collaboration and, at the same time, we'll promote enabling the competitive environment, space tourism, that requires national commitment.

### **3.5 Civilian and military space**

A real problem is the different capabilities available between the civilian astronautic industry and those which are enabled by military programs. So far manned launch has only been available to military communities.

Public lobbying is our first duty, and possibly creating events that make people reflect on the urgency of the development of civilian astronautics, and make positive outreach, presenting the enormous benefits of space development for at least the following rationales:

- economy - extreme urgency to create millions of new qualified jobs, in all countries of the world
- peace - extreme urgency to open a new horizon of development, to make all conflicts decrease and mitigate the effects of mass migration
- environment - extreme urgency to start moving part of our industrial activities outside Earth
- culture - extreme urgency to start big projects, to boost the new renaissance, relaunching a culture of development, vs. de-growth, including arts
- social - extreme urgency to giving hope to youth, and relaunching social growth in a broad sense

Humanity had two centuries of impetuous progress: it shall not be wasted, but conserved and continued in space. That's why we don't speak about a revolution, as revolutions were meant in the past century: we are talking about renaissance, that means to take the dividend of our progress so far, to make our civilization be reborn in a greater ecological niche.

## **4 United Nations and the 1967 Treaty on Pacific Use of Outer Space**

There's a huge possibility for SRI to run an international campaign: the incoming 50-years of the Treaty on Pacific Use of Outer Space, in 2017, the related possible UN program, and the initiative of Lifeboat Foundation at USIP.

<http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

This is also an opportunity, for SRI to propose a Civilian Space Platform, to be integrated in the one already sketched by the Lifeboat Foundation.



To work with UN, UNOOSA, the celebration of the 1967 Treaty may be an excellent opportunity to gain visibility for our shared goals, that we will briefly call here the "civilian astronautic development platform".

Of course we have to be aware that it will be a public festival, with a lot of discussion, and limited results, in terms of true policies in support of the civilian astronautic industry.

The mentioned USIP document includes a list of programmatic points, that can be found on the first page:

- 1) US engagement for inter-agency and international space programs and the global exploration agenda.
- 2) LEO observational techniques for climate change mitigation.
- 3) Space based IT for global development.
- 4) Communications interchange for global security.
- 5) Space based information for global non-proliferation.
- 6) International agreements for further levels of space-based usage, and negotiated practice through the UN basis.
- 7) Space development rationales and topics, such as plans for terrestrial asteroid impact mitigation, space based solar power, cis-lunar development, advanced technologies within laser, nuclear and fusion basis, space settlement and colonization.
- 8) Other yet unknown needs for the US and international space agenda that may arise from technological and social change in the coming months.

The most interesting point, number 7, could be extended, and the points could be reordered, according to their relevance: point 7 at first place, and much more detailed, space for peace at second, international commitment at third.

More than talking about climate change, we'd better talk about beginning civilization expansion into space, with the goal of progressively moving our industrial burden off Earth (see Jeff Bezos talk about this), making of Earth a beautiful garden. And a point should be added, about the global risk of civilization, if the world will remain closed, considered that security agencies foresee a very critical period from 2025 to 2030.

The UN has been pretty much useless in the space field throughout the years. That isn't for lack of trying, by coherent space advocates. The UN is really the organization that should be playing a leading role on dealing with space debris, but the conflict of interests of member states (particularly Russia) has prevented forward movement. There are ongoing efforts by some 'neutral' countries to try to move that project forward, that the U.S. quietly supports. Whether that effort will or won't resume via some activity at COPUOS is unclear.

The UN has been actively hostile to good progress on space resources and it is for that reason that most in the industry are not eager to see COPUOS get more active. The Moon Treaty was a near-disaster and had it not been defeated in the U.S. at the ratification stage it would have ended any hope of commercial space activity -- and yet it is still on the books and still reflective of the desires of far too many UN member states (what we used to call the "third world"). We could address international forums in the hopes of starting a long process of changing those attitudes and attacking the underlying logical fallacy -- but honestly we don't expect to change too many minds that way. A few might help, of course, which is why it's worth it to try.

#### 4.1 The Treaty abstract

- the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;
- outer space shall be free for exploration and use by all States;
- outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;
- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- the Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- astronauts shall be regarded as the envoys of mankind;
- States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;
- States shall be liable for damage caused by their space objects; and
- States shall avoid harmful contamination of space and celestial bodies.



## 4.2 ARTICLE VI

"States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization."

At a quick read, this is the article that definitely to be changed, since it requires the close control by states on any non-governmental entities activity.

The Treaty however only talks about states' space activities. And that is quite normal, thinking that it was written during 1960s, when any private activity in space was far from being even conceived.

Could the Treaty be used, especially regarding its recommendations in favour of pacific use of space, as a base for space laws to be written? If yes, which are the main points to be changed, and what should be added?

Before engaging in a campaign about the celebration, we will have to discuss and take positions about the above issues, at least.

## 4.3 Industry, agencies, government and UN

The real 'action' in space for the next 20 years is going to be in the private sector, and the real question for civil space and policy agencies is how to foster that activity and how to leverage it for other governmental objectives, as well as how to preserve space as an arena for peaceful use while accepting that it is and will be also an arena of military action. Navigating this balance includes shaping the rules so that it doesn't make sense for nation states to do things that mess up the space environment on purpose as a military action.

That's a complicated geopolitical question, and international forums should be a part of that question, but it's hard to foresee if the UN can rise to that challenge. The UN has usually only acted when there was some consensus between the major powers and that consensus is very elusive right now. What is more likely to be effective is if some international codes of conduct could be agreed to among what we used to call "the free world" (The U.S., Canada, Brazil, European nations either singly or through the EU, Japan, Australia and New Zealand), then over time, those will take on customary force.

## 4.4 Working with agencies at international level

Should we want to work for a coordinated effort among civil space agencies (NASA, ESA, JAXA, and perhaps Russia or China), the UN is a very unlikely forum for that.

There *is* an opportunity there, because after the next Presidential election in the US there will be another reassessment of NASA direction, and so work is going on by many individuals behind the scenes. We can try to work in this area too, trying to find some areas where multinational cooperation is possible.

# 5 The astronautic vanguard

## 5.1 The supporters of civilian astronautics

As we know, many of them are just fascinated by anything including the world "space". They are followers, with all due respect, because without them we couldn't even talk about a "space movement". However many in this category often don't understand the difference between "space exploration" and "space settlement" - they think space agencies have historically and are currently doing their best, and nothing more was possible.

A few people (but we hope to be wrong on this, and that we are not that few...) think that a change of paradigm is very overdue, since technologies already allowed, at least 30 years ago (considering the X-15 project of 1969, suppressed in favour of the space shuttle, a largely non reusable launch vehicle) to develop





fully reusable launch vehicles, and thus to downsize the cost to orbit. We refer to these persons as the vanguard of the space movement, understanding the true challenges of this historical period.

A number of people, even fewer, are developing a *humanist philosophy* of the space age, therefore providing concepts oriented to allow many (civilian) humans to live, work, survive and keep their human physiology and shape, in space settlements and habitats, and not just to go and come back for exploration missions (military trained). I call this smaller community the astronautic humanist wing of the movement.

May we understand how large is the civilian astronautic vanguard? And how large is the astronautic humanist one? There's a handful of real thought leaders who do the real work, and we don't all work together. When we got together (in the US) for a serious summit meeting, it was maybe 75 or 100 people, and probably 40 did most of the work at the summit. And we had to exclude a number of leading figures, like CEOs of various space companies, who are not cooperative by nature (another dozen or so). But, if we include the people who are working at the various companies, who really believe in the dream and have put their careers at stake to work on it, it's probably up to the thousands now. Then another tens of thousands who are members of various "space is neat" organizations like NSS, Space Frontier Foundation, etc.

## 5.2 Space Renaissance and the astronautic humanists

Space Renaissance is a title that raised in popularity, during the last two years, after SRI existence since late 2008. There is now a Space Renaissance Act (by congressman Bredentine), NSS called its 2014 ISDC "a space renaissance", and the concept that the only possible renaissance will be in space (that we have been spreading for eight years) finally crossfertilized to some extent the US environment, among others. SRI increased this spring the number of national Facebook pages, from 8 to 18, and counting.

We think that SRI -- due to its deep philosophical elaboration and international presence -- can be the most suitable room, to welcome the astronautic vanguard. And, in the US, the status of 501(c)4 is properly suitable to deal with political activities and lobbying. Profiting from the US experience, as it progresses, we can develop lobbying activities in other countries as well.

Through the participation in the USIP event and other public initiatives, we will gain more public visibility, and qualify as the best advocates of civilian astronautics development.

We have to retake the threads of the space advocacy movement, to select the serious astronautic humanists and build the Space Renaissance, a "spacecraft" big enough to accommodate all of them, including the names of their organizations, if they are inclined to join... which is a project we already initiated, in 2009, collecting more than 90 organization to be members of SRI. However at the time we didn't have the organizational nor financial means suitable to coordinate that large a group.

As far as we know, SRI is the only organization who holds congresses, developing theses and adopting coherent resolutions.

Many organizations, very much bigger than SRI, make conventions, talk and talk, and then each person goes away alone, without a discussed and shared strategy.

To build shared strategies is a major work, but it is essential, if we want to be active in global society.

## 6 Seed of a space industrial renaissance platform

### 6.1 Main points of a space industry political platform

Government, as a developer of technologies, has not been very productive, so far. Things might change as a result of well-planned lobbying activities.

- 1) To move NASA, ESA, and JAXA to increase their activities in space, and to procure their transportation needs in an open, competitive marketplace, establishing a "free trade zone" in launch among the partners, so that the market will expand in a way that supports lower cost solutions such as reusable launch vehicles developed by the private sector.
- 2) To move NASA, ESA, and JAXA to become customers for space resources -- for example, by buying propellant, water, or mass for radiation shielding in space, providing a market for those resources to stimulate the private sector to supply them.
- 3) To move government space agencies to prioritize research and technology for the unsolved problems needed for humans to live in space and on the Moon and other celestial bodies indefinitely,



- such as protection from cosmic radiation, studying effects of Martian and Lunar gravity, effective artificial gravity for free space, faster and more economical transportation techniques, and in-situ resource extraction and utilization for the Moon, Near Earth Objects, and Mars.
- 4) To move Governments to support -- by tax discounts, grants and a friendly fiscal policy -- the civilian astronautic industry, the development of space tourism (suborbital, orbital, Moon), the Near Earth Asteroids mining and using them as space urban infrastructures, the validation of the new technologies for low cost and safe access to Earth's Orbit, the development of technologies, systems and methodologies for astronautics.
  - 5) To convince the larger public that expanding civilization into space, giving birth to a true space renaissance, is possible, convenient, and urgent; and that passenger space travel will, like air travel, create tens of millions of jobs around the world.
  - 6) To create space renaissance investment funds, to allow all savers to direct their savings into the astronautic industry enterprise.
  - 7) A wide international cooperation, for a peaceful space development. All the already space faring Nations and Nations which aim to develop space activities, to run wide-scope international collaborations & initiatives for support and foster a space based commerce & trade marketplace through joint projects and mutual support. Create and update an International Space-Peace Treaty, for the peaceful development of space, and for banning of all weaponry development in outer space. For the US and other nations, to remove the political hurdles designed for preventing international collaboration and sharing of human collective intelligence in space exploration and development, such as the ITAR and similar rules.

We have to be careful to make clear that we are not just advocating giving more money to space agencies - which many people might believe, from what we write - but which would NOT bring about the Space Renaissance.

There is a MAJOR "Paradigm Shift" needed in order for space activities to contribute to the economy and society as they most effectively can - which is of course to rapidly develop reusable passenger spaceplanes and rockets that will lower the cost of travel to and from orbit by about 99% - thereby opening up limitless opportunities for profitable activities in space.

So it is very important to keep people clearly aware of the key concrete step that is needed -- developing low cost fully reusable launch vehicles -- and the major economic benefits it will have.

However, some considerations need to be taken into account.

First: our main task, as SRI, is not just to celebrate the new space industry, I.E. "how cool they are and we should all cheer for them!". Of course we do, but our main task is to help them in all possible ways, by lobbying, education and public outreach.

Second: SRI entered its 2.0 phase. We are growing, and so grows our responsibilities, and so our methods shall evolve. We can no longer just declare the truths, in a propagandistic way. The truths will not change of course. The main truth is that, after spending two trillions of taxpayer's money in the over 45 years after the Moon landing, space is still just a prerogative of governments, for military, science and exploration purposes. We wrote: agencies so far have acted as the frontier's customs officers, more than as pioneers. But, NASA is de-facto financing Space X, supporting the development of reusable rockets... so, we shouldn't be "sectarian".

We have however to work with the agencies, lobbying to widen their activities that produce good things (like Falcon 9), even if their White House masters don't like it.

Another key point, with agencies, is scientific research. Our main task in this respect is point (3) of the above list: move them to research real solutions for what they didn't do in the past 45 years (radiations protection, artificial gravity, technologies for low cost reusable launch vehicles). Why throw the baby out with the bathwater?

Agencies cost us all a lot to create, let's use them!

Shouldn't we ask for more public money to be directed to the agencies? Why not? In my opinion we should ask for even a small amount (50 bn/year?) to be moved from military to civilian research lines, especially the three priority ones already mentioned.

So they will not see us as enemies, and will maybe listen to our proposals.



## 6.2 A positive message to the world: a space industrial renaissance tour?

Our main tasks, during the next four years, is to announce positive messages to the world, so as to raise enthusiasm and stimulate young people's creativity.

Having well known individuals already onboard, like Jeff Greason and Rick Tumlinson, maybe we could get other celebrities as ambassadors onboard... and ignite the media's interest.

Such a campaign could be crowdfunded, so as to achieve the needed funds.

Among several possibilities for public campaigns, we can list the following ones:

- a space industrial renaissance tour, with stages in several countries
- the "space, not war!" or "space for peace" public congress (could be one stage of the tour)

We all remember the famous Al Gore tour about climate change. We could make something similar, taking around our space industrial renaissance platform.

## 6.3 The initiative for Space Renaissance Investment Funds

One of the SRI project for the next four years period -- 2016 - 2020 -- will be the creation of *Space Renaissance Investment Funds*, where all citizens can invest their own money for the sole truly worthy industrial enterprise: space colonization.

The project will likely kick-off in the USA, by the SRI USA chapter, but its horizon will be world wide. The subject will be a commercial entity, spin-off of SRI, including the "Space Renaissance" name in its public title.

Connected to the project several possible facilities will be developed, to allow the growth of the space funds, such as, but not limited to: small percentage on credit cards, a small percentage on sport tickets, luxury goods, or anything that can let people know what they are doing: donating small amounts of money for the future of our children!

Should we succeed in establishing Space Renaissance Investments Funds, that will be of great help for astronautic startups, asteroid miners, Moon settlers, and all enterprises working to develop fully reusable launch vehicles.

## 7 Our priorities for next four years 2016 - 2020

### 7.1 Key themes, for the opening of the space frontier

- 1) **Collaboration with space agencies**, working with private industry to promote progressive programs, such as, but not limited to: Earth orbit colonization, orbital manned activities, geo-lunar space industrialization.
- 2) **Low cost reusable launch vehicles**, civilian passengers transportation and accommodation in space.
- 3) **Lobbying governments**, to promote progressive space programs oriented to the development of civilian astronautics, and friendly policies towards the new space industry.
- 4) **Urgent research themes**: protection from cosmic space radiations and artificial gravity.
- 5) **Collaboration with United Nations** and its space branches, to promote the opening of the outer space to civilian commercial and industrial activities, and to the international collaboration to build the space infrastructure in the Geo-Lunar.
- 6) **Supporting space tourism**, helping ST companies to get public contracts, developing outreach towards public opinion, showing the high social value of Space Tourism, for the survival and progress of civilization.
- 7) **Promoting the settlement of the cislunar space region**, lunar and asteroid mining, construction of rotating habitats at Lagrange points and the Earth-Moon midway point.



## **7.2 Projects and programs**

### **7.2.1 The Space Renaissance Tour**

A space industrial renaissance tour, with conferences in several countries, at least: Europe(Italy), USA, South America, India, Russia, Australia. The “space, not war!” or “space for peace” public congress will be one of the main themes. The program will be designed within the end of 2016.

### **7.2.2 The Space Renaissance Academy**

This is one of the strategic projects, to be developed during the next 4 years.

The plan is defined in Theses 6 document.

### **7.2.3 Civilization Risk Assessment and Mitigation**

This project was initiated in 2012, and planned together with the Lifeboat Foundation.

The project will now be developed in the frame of the Space Renaissance Academy.

### **7.2.4 Asteropolis - Lagrange Asteroid City**

The project abstract is available, in dropbox:

X:\Dropbox\SPACE RENAISSANCE INTERNATIONAL\6000 - PROJECTS\ASTROPOLIS\ Asteropolis LAC Project Abstract.pdf

A General Requirements document (draft) was prepared, covered by an NDA among the project participants.

The project will be developed in the frame of the Space Renaissance Academy.