

INFLUENCE OF SPACE AGE IN ART AND CULTURE

A.Guidi,^{*} B.P. Ancarola,[†]

Faculty of Aerospace Engineering, University Federico II, Napoli, Italy

To enable a space education that involves not only the scientific community and also opens the door to a real "Space Age", a wider variety of experiments should be brought on the International Space Station (ISS).

From the first ages of the human history, culture has driven the growth in quality of life. Culture has no boundaries and encompasses everything from philosophy to space technology. However, during the evolution of the culture, its contents and the way it is divulged are strongly changed. Through the centuries the relationship of science with other aspects of culture has always been complex. How much science and art have influenced one another? It is well known that the artistic productions in the history were strongly influenced by the place where artists were living and by the technical level in which they were working. How would the style and the technique of the painter be influenced if she would leave in space? How would a writer or a philosopher write or think in the space? How will be her work compared with one written before living in the space?

This type of experiments would also open sociological and psychological study. Finally this type of experiments will also bring the space age closer to a public that has least interest in technical fields. This increase of public support will bring to the space technology an increase in development. The more public interest there is in a certain technology, the larger it is its development.

INTRODUCTION

Science is an important part of the Culture of the Humanity. Scientific discovery contributes widely to improve the quality of human life. Through the centuries the relationship that science has had with other aspects of Culture has always been complex. Unlikely as it may seem many great scientists have often been great philosophers or artists. Nobody would be able to say when and where the essays on the "Theory of Relativity" of Einstein start to be philosophical or scientific treatises. Nobody would be able to define Leonardo da Vinci as an artist or a scientist. Fundamentally a great scientist, a discoverer of the mysteries of reality, must be an artist since he must first create an artistic concept of the vision of the reality in the own imagination.

Science is the knowledge dealing with a universe in which no changes can be done in

the inner structure of itself and in the real laws, and to which not any opinion can be added. On the other side, art is the knowledge of a universe in which the poet, the philosopher, the painter, the artist is the only creator of the rules and the only "God" of the created universe. Who is the truest genius between the scientist and the artist?

The product of the scientist is something that could be reproduced and repeated, in principle, at any time and in any point of the universe if certain good boundary conditions are met. The product of an artist, instead, is something that cannot be produced again and is unique in its shape and inner meaning. The top of the beauty can be reached as soon as art and science do not fight one against the other but co-operate and try to reach the same goal: the truth.

^{*}Graduating Student, Faculty of Aerospace Engineer, University Federico II, E-mail: oceanomare@inwind.it

[†]Undergraduate Student, Faculty of Aerospace Engineer University Federico II, E-mail: ancarolb@tin.it

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"Imagination is more important than knowledge" A. Einstein	.. Still around the corner there may wait a new road or a secret gate and though I often have passed them by a day shall come at last when I will take the hidden roads that run... ... East of the Moon... ... West of the Sun... E.A. Poe
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ART AND SCIENCE

In the last century, how much science and art have been walking along the same direction? And how much have they influenced one another? In this case, how much has space science been influenced by and on art?

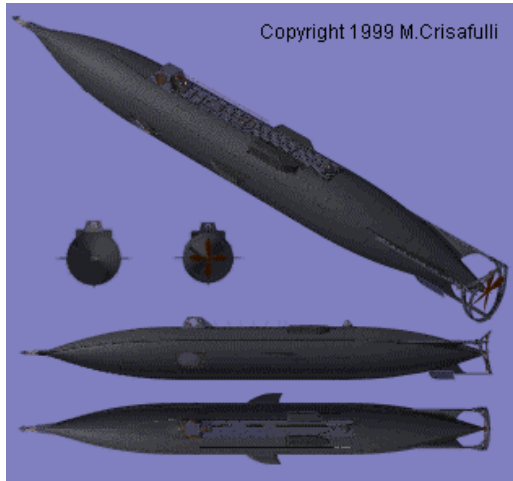


Figure 1 Tridimensional reconstruction of the Nautilus from the description in the book "20,000 leagues under the sea" (courtesy M.Crisafully)

It cannot be denied that Art gave a deep source of inspiration and a great life to science and, in particular, to the most difficult and amazing space missions. Jules Verne, more than a century ago wrote about a phantom submarine, "The Nautilus", and also about a trip to the Moon. It is amazing to see how deep the technical description was close to the further developed ideas. Leonardo da Vinci's sketches inspired engineers throughout the centuries.



Figure 2: The "ornithopter" built in 1902 from Edward Frost

In 1902 British inventor Edward Frost built an ornithopter from willow, silk and feathers. The wing action of the ornithopter was intended to mimic that of a crow. Frost's ornithopter never took flight. In 1903, the Wright Brothers successfully sustained flight using stationary wings, and the flapping-wing machine dropped out of the spotlight. But it is still amazing to see how Leonardo da Vinci was describing a helicopter six centuries ago. The previous ones are just easy examples of how art influenced science and the "Space Age", many other examples could be made, for instance science fiction.

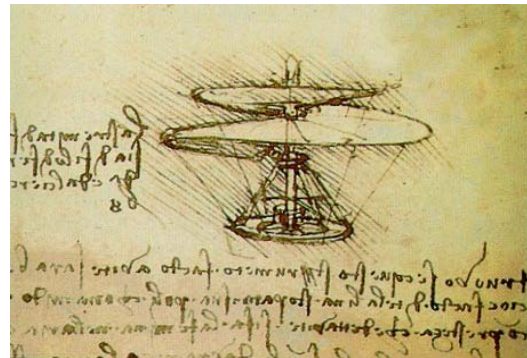
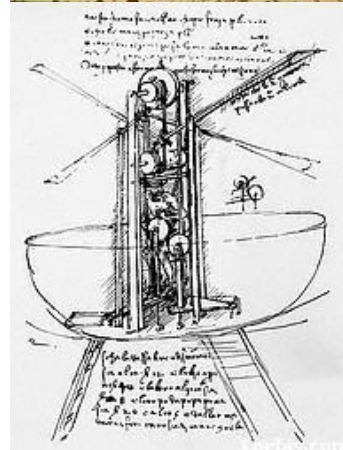


Figure 3: Study of Leonardo da Vinci on the Helicopter.



It is harder to explain how Art has been influenced by science and the "Space Age". Modern society is, unconsciously, fully immersed in the process of space evolution so that the influence of space on art can be shaded. By making a deeper analysis on "what is art", many connections can be found on this influence. In the past, art was many times considered as the representation and the communication of the feeling and the ideas of the artist through paintings, statues, poetry and sounds. In the past, space influenced art through the meanings given by men to the sky, the stars and all natural objects coming from above.

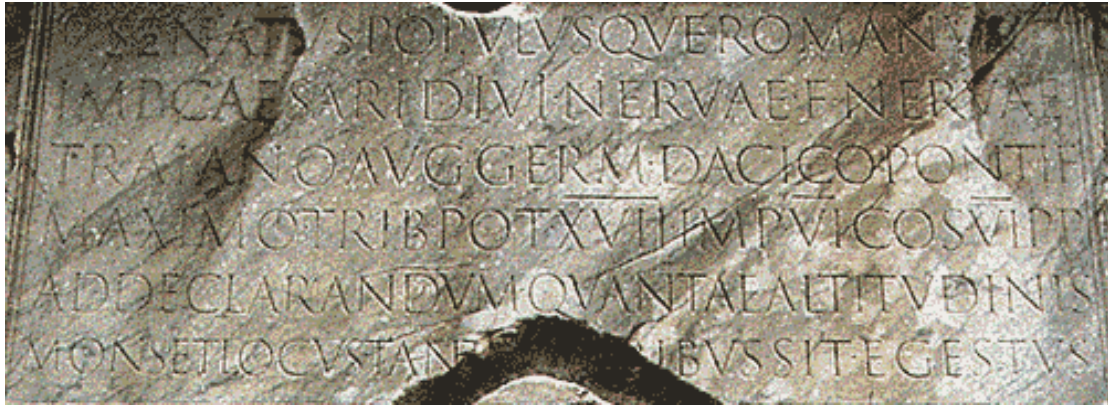


Figure 4: The inscription on Trajan's column, considered for centuries to be the model for the perfect Roman letterform. (Photograph by Bill Thayer, courtesy of [The Trajan's Column WebPage](#))

The absence of true knowledge about the sky gave a different and romantic meaning to space. It was such a mysterious thing that it was considered as a huge dome with fixed stars. The meaning of space was often correlated to magic, religious and romantic events. Why was God always up in the sky and not down on the Earth? In the common imagination, the first manned space flight could have even been a way to find God. In the past, close space was just a black mysterious box to be opened with care.

Obviously today this relationship with the sky has changed and, in a certain way, the knowledge of what is really happening above the Earth limits the imagination on sentimental and romantic aspects. However, due to the huge development of technology, Art has gained several other features and new aspects. The modern cinematography, the new computerised music and modern design have assumed predominant roles in the contemporary society. Certainly the influence of space science on all these disciplines is very easily verifiable. However, even the other disciplines of Art strongly changed, not only in the shape but also in the manufacturing and exhibition. The main way in which Science influences Culture is, in fact, in its "tools". An example is the evolution of one of the ancient artform: acting. From the theatre it is as now new "tools" in Cinematography and Television. This last is also the latest "tools" for information circulation, which had as previous one Radio and Papers. In 1831, less than 200 years ago, Victor Hugo in one of his Masterpieces, "Notre Dame de Paris" was writing about how the printed word was changing the way in which cultural ideas are

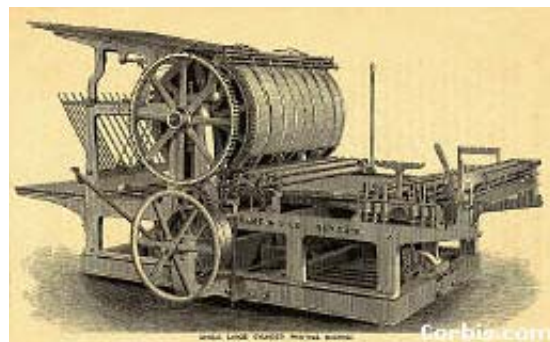


Figure 5: Single Large Cylinder Printing Machine (© Bettmann/CORBIS courtesy Corbis.com)

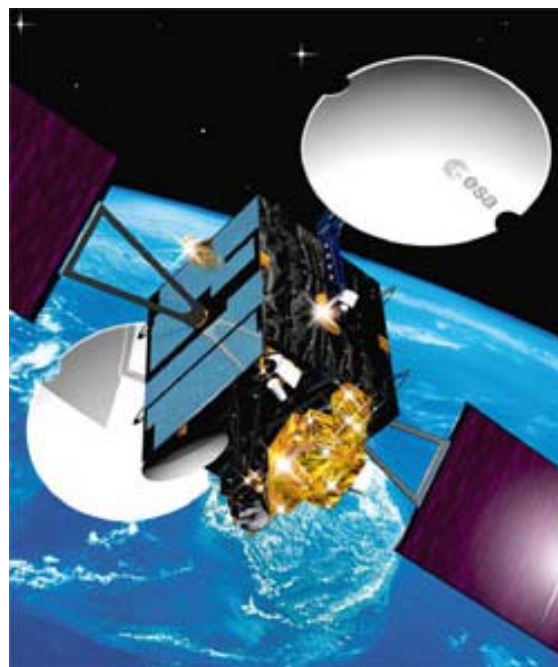


Figure 6 ARTEMIS, the latest experimental telecommunications satellite of ESA (courtesy ESA)

diffused. His point of view was that the cheaper and easier method of printing books would be replace building large monument as a means of cultural expression.

Today information technology is again changing this status and is going to decrease the effective communication power of books. Space technology has a relevant role in this evolution, the revolution of printing that Victor Hugo described, today is represented by satellite telecommunications that allow circulation of information at global level in real time.

ART AND SPACE TECHNOLOGY

A period of criticism and/or skepticism follows scientific discovering, especially from the side of the non-scientific community. A period of acquaintance and acceptance is identified with the new coming technology and this period smoothly decreases as long as the medium level of technology increases without any gap in the evolution. Moreover, the behavior and skepticism towards the new technology is less intransigent. For example acceptance of the new researches in genetics were strongly rejected as a response to a sudden jump or a gap in the development in bio-technology, while nuclear energy, though contested on environmental grounds is an accepted energy source. It is clear that the development of a technology is directly connected to the amount of people that can be interested in it.



Figure 7: The ISS and the Earth(courtesy ESA)

It is fundamental, for the development of the space technology, that it is present in the life of the general public. The International

Space Station (ISS) can be a very powerful means for the general public to get in touch with space technology and its application in every day life. For this reason the number and the variety of the experiments should be as wide as possible and in other non traditional areas.

In this context arts are important channels of communication. Several experiments that involve art and science can be performed with the help of the ISS. As previously mentioned, Art is something without a clear boundary. The artform of Literature is one of the most important, because it involves the primary communication channel: words. It would be interesting to analyze the influence on the artistic production of a writer living in space. How would it be influenced? In the way of writing, in the contents... how would it be different "The Hymn to the Moon" write into space?



Figure 8: The ISS with the Moon.(courtesy ESA)

What about the art of sound? How would a musician be influenced in the creation of new melodies? The performance is straightly linked to the physical sensibility of the player. How would he be influenced in the way of performing? Most of the activities of a musician are directly connected to the hands, and it is well known that the sensibility of the hands of a musician can completely modify the beauty of a performance. The hand is as well fundamental in everyone's life. In the last two ESA Student Parabolic Flight Campaigns, some experiments have been performed during the microgravity periods involving the study of the hand by means of an electronic glove connected to a computer. It was found that the responses of the hand to simple external inputs were different from the ones verified on ground. In many circumstances the way a man reacts to the variation of the environmental

conditions can be non linear behavior. This means that, to small changes in the input, even great responses in the output can be recorded. Further studies will be done on this subject and the hand of a musician can be one of these.

A similar analysis can be done about a painter. Also in this case it the sensibility of the hand is fundamental, furthermore he communicates through vision, one of the most important senses for a human being. It follows that the painter feels the influence of the environment especially through his eyes. What will they portray from space? It is well known from production of famous painters that the place where they were living was of fundamental influence on their masterpieces. For instance walking in the Van Gogh museum, in Amsterdam, it is easily understandable through the paintings, all the ages of the author, and whether he was living in The Hague or in Paris.

What then about the arts of the body motion? Since the body motion is the most influenced by the microgravity environment and many expressive arts involve it, surely the representation and the communication through the body language will be another interesting aspect to study in a space environment. The example of the hand can be extended to the whole body, and the sense of freedom and lightness given by the moving body of a dancer will be wider and probably truer.

All the previously discussed points are still a great limit for actual society. For sure, it is not easy to think that now such experiments would be feasible since the main goals of the actual space society are the research on new technologies, medical and scientific knowledge. At a first glance these type of studies may appear as more interesting and important for the scientific community. However, the first commercial space-station enterprise was announced on 10 December 1999, when SpaceHab (USA) and Rocket Space Corporation Energia (Russia) described a \$100-million pressurized module to produce original educational and entertainment programmes for terrestrial distribution via television and the Internet. The module, named Enterprise, will be built in Russia and Space Media Inc. will broadcast commercial multimedia programmes live from it.

The excitement and public interest that these types of experiments will produce, together with the transfer of space technology coming from more traditional programs, will help to destroy the long held skepticism the public has towards space research. It is easy to



Figure 9: The Above are both flowers painted by Vincent Van Gogh. Just looking at the two paintings, an expert can say several things about the life of the painter at the moment of the two different paintings, just looking at the different colours, techniques and subjects (Copyright © Bob Friesenhahn)

see how large the resonance was of the first "Space Tourist" compared to all other mission. It should be a great aim of the future closest space community to plan space activities involving large quantities of non-experts with as many different backgrounds as possible. For sure the mind of a "child" would be purer and fresher than the one of an expert, who is somehow blinded by knowledge. Considering such a scenario for the future of space, many new important discoveries will be made. It was by chance that Newton discovered gravity though it has always existed.

Furthermore, in order to be ready for a future space tourism and then colonization this aperture towards the research types will give also new knowledge in the psychological and sociological fields. It would be interesting to focus the attention on the comparison between the common person before and after a certain period in the space environment. This could be important even to build a space environment for the man of the street.

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