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RESEARCH ARTICLE

THE SPACE ERA“ERA FROM THE VIEWPOINT OF PIONEER ARCHITECTS”

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Abstract

The human being developed his life through the context of time by questioning and finding the proper responses, overcoming limitations, and reaching his dreams from ancient till the present and defiantly in the future. When solved the rational problems in all scientific areas and employed the best tools to build the masterpieces. The Architects opened new “**Free Views**” in architectural discourses and revolutionized architectural works through the bedrock of machines, electronics, and finally space. In this research I have precisely studied a set of complex resources with an analytical view in order to extract the convergences, results reveal that with the advancement of technology, employing complex computations, interactive robotics, and AI, empowering the aerospace networks, soon we will be able to employ the remote design method deep into the space, as a revolutionary step in the architectural history, so, “**A Free Volume**” will settle in the space era.

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Introduction:-

The developments of human life have formed in the context of time. Right since he has followed up questions, the Era of Leonardo is evident. With the discovery of perspective, he could translate his spatial imagery into an artistic language, the “**Baroque Perspective**” with its unlimited landscape, when “**mathematical discipline**” realized **infinitely** as the basis for practical calculus. In 1908, “Hermann Minkowski”, a great mathematician, depicted the four-dimensional world for the first time. He stated: “Time and space won’t have any meaning separately, there is an interlinking between them”. In the seventeenth century, geniuses introduced the unified, multidimensional, multifaceted human who was able to use integral calculus science. Explorations that transformed the atmosphere around human life. The scientific achievements in mathematics and physics were employed in the nineteenth century to improve his life, ongoing in the twentieth century, reaching their peak and continuing to flourish. As far as he was able to achieve, his own achievements in exploring the farthest points of the sky.

This Question will arise as:

If there is a reason for the creation of other planets in our universe or other exoplanets, definitely, we shall gain the various type of opportunities to expand our knowledge of surveillance and employ all these capabilities for improving human life. But how we are going to bring this idea to life? in what kind of process?

Besides a few pieces of research close to this area, I have studied so many related references in order to extract the convergences, with a precise analytical view. Finding a proper response to the questions that I have discussed.

Machine, Electronics & Space, A New Definition as an “Architect”

I still remember when I was reading that: “a house is a Machine for living” **Le Corbusier** has pointed to that. And really the machine and industry have changed the face of human life. Le Corbusier gained the structure of an airplane for his urban design also posed the “**Free Plan**” in architecture.

Another famous and effective Architect **Rem Koolhaas** in our era stated the architecture is supported through the “**Electronics Era**”. He has also brought different kinds of opportunities to architecture. Despite his abnormal design, which is not formal and mostly programmatic, also posed the “**Free-Section**” in architecture.

But something that seems too obvious is that like so many “Fictional Thoughts”, or it’s better to say “**Real Thoughts and Creative Mental Images**” the next era should be called as “**The Era of Space**” accommodating both characteristics of “**The Super Machines & Digital Era**” and that obviously will affect the architecture as well. Multiple kinds of effects will be presented in a “**Multi-dimensional Design**”. Perhaps we are going to talk about a “**Free Volume**”. (Figure 1)

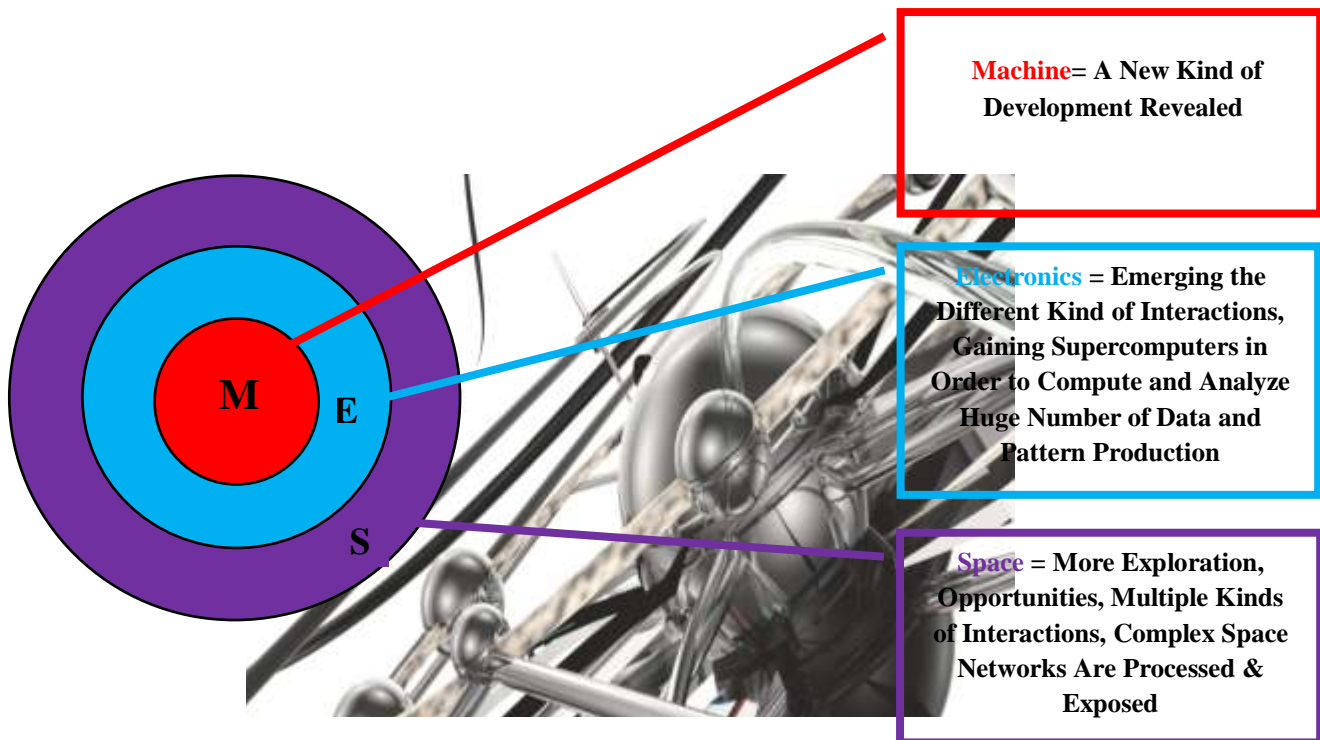


Figure 1:- The “MES” Conceptual Diagram of Shaghayegh Naeimabadi, Shaghayegh Naeimabadi Research & Architectural Design, A Creative Side of “A New Vision”.

Past Present Future of Aerospace Explorations

Our findings as today’s astronomy rooted in “Ancient Greece”. The first “**Mathematical Views**” of the universe have been discussed by “Pythagoras”. Finally, we gained the great revolution of “Nicolaus Copernicus”. Today, advanced studies in this field are related to the findings of Physics discoveries with precise and complex computing. This curious vision gained the supercomputers, in order to generate mathematical patterns of theoretical physics. Also, it is possible to deeply analyze and predicate the interacting galaxies. Besides the precise studies of mathematics and physics, the development of processing tools plays a key role. Yet, other scientific areas found the exact relation & benefits of investigation in this field and are improving “interdisciplinary interactions”. It seems that future advancements in this area will completely focus on “**interdisciplinary convergences**” in all aspects “**from theory to practice**”.

1. Gaining Knowledge of Theoretical Physics, Quantum and Fundamental Particle Physics, Astrophysics, Findings of Interdisciplinary Studies
2. Generating Mathematical Patterns, & Prototypes as a Result of the Theoretical Physics

3. Applying the Supercomputers, AI, Robotics and the Virtual Mega-Telescopes, and Complex Space Networks. (Figure 2)

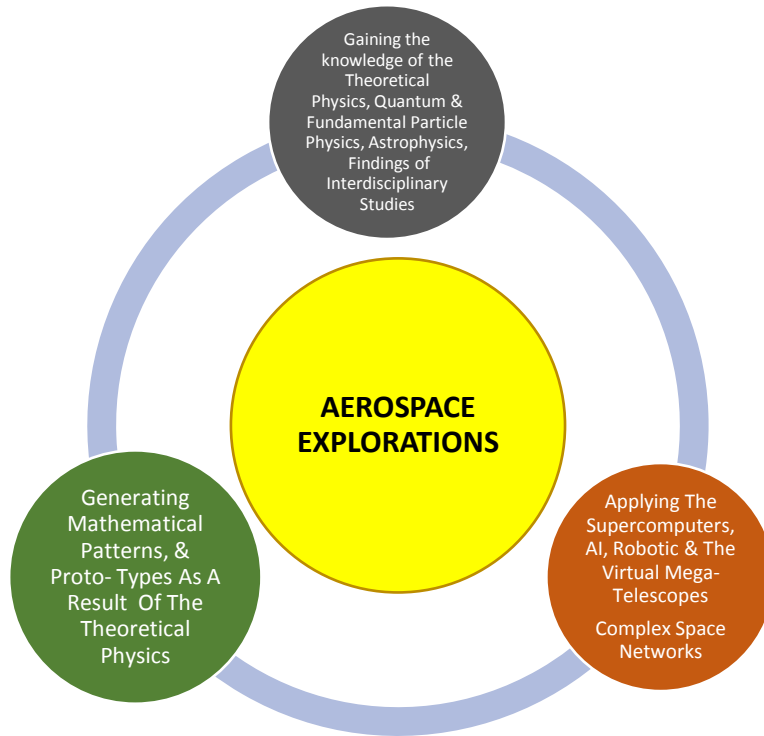


Figure 2: The Conceptual Diagram of Space Exploration, ShaghayeghNaeimabadi.

Architecture & Astronomy, A Great Architectural Archetype

Studying the sky is not something new in architecture, human has always been curious about it, also, has gained it in architectural studies, in this regard, it has an ancient function, like the Stonehenge and the Giza pyramid and many other archetypes, here, I mention to Khufu's pyramid and that kind of effect that the architect has gained in his design, like the mathematical discourses we can easily find the “cause and effect and underlying logic” in each part of it, that truly represent the reason that it is an architectural masterpiece. Also, today, precise computation advancements confirm these findings. **A great wonder how in ancient history the regulated architect’s thought has settled and gained a set of rules to build up a precise system that can be expanded to “infinity”.** In so many references, Khufu has been considered a great architectural archetype. (Figure 3)

The architect not only revealed “a giant calculated effective geometric outstanding” but also, presented “a precise internal relation” inside the pyramid, even in its name: Name: “**Khufu**”.

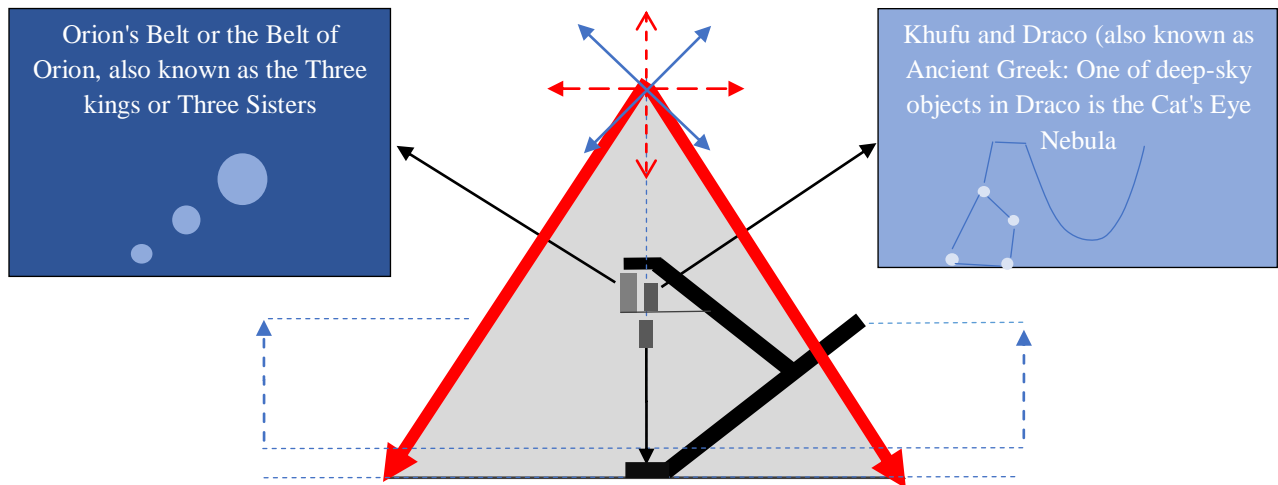


Figure 3: A Great Architectural Archetype, The Khufu's Pyramid, ShaghayeghNaeimabadi's Analysis Diagram of Design.

With precise spatial studying, along with archeological findings and recent computations, there is no doubt that it is situated based on the actual spatial orientations. It is reasonable to conclude that according to this outstanding architectural prototype, the sky has an ancient history in the architectural journey, as the main source of study and guide.

Future Architectural Design, Remote Design Method - The Other Hand

The idea of easy access to space has always been discussed by various scientists throughout history like “Konstantin Tsiolkovsky”, when saw the “Eiffel” or “Arthur C. Clarke” who considered the space elevator as the “columns of heaven” - his book, in 2000, called “Space Odyssey”- before 1979 this idea sounds ridiculous to so many scientists but now with great developments in the field of material, it is situating to a real fact. (Figure 4)

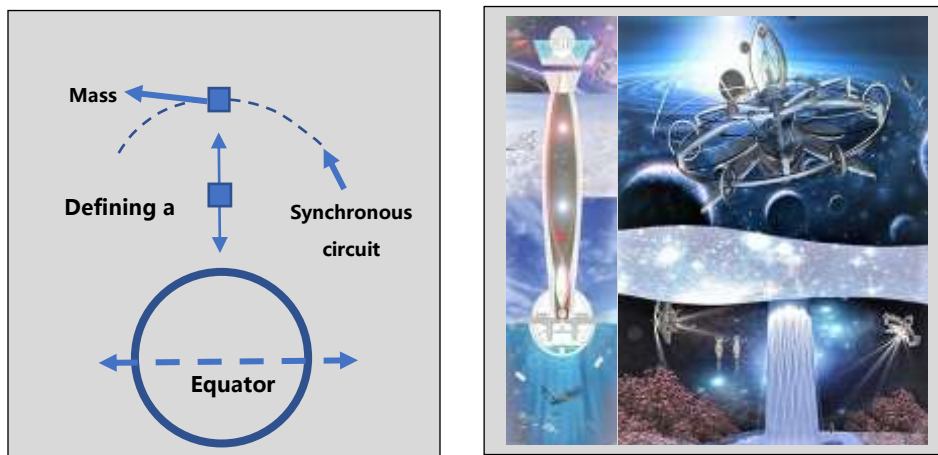


Figure 4: The First Space Elevator Diagram, The SAVE, ShaghayeghNaeimabadi Research&Architectural Design, Jacques Rougerie Foundation Awards.

Here, I can discuss a “Remote Design Method” which is quite a new subject in our architectural discourses. This new field is linked to various digital technologies, as the man’s “OTHER HAND” into infinity. Remote modeling is not something new, perhaps the methods of remote designing can be considered a pioneering gate. It is a completely interdisciplinary field. Yet, we have experienced various kinds of digital design in our software and gaming situations, with the simulation of the real atmospheres that were out of reach or have been considered

as the basis of experiments. Like the virtual reality-the name that “Jaron Lanier” corporation elected for the products in the field of virtual games experiences- tools that are experiencing the first steps in this process. Also, being developed all the time. For employing the remote design method, we should employ complex computational systems, strong spatial networks, and a medium that is considered a robotics advancement. (Figure 5)



Figure 5: The Concept of Remote Design Method, ShaghayeghNaeimabadi.

Robotics & Remote Construction

Robotics play its role in our daily life hidden or obvious which is the main characteristic of the digital era, facilitating the processes and challenges that we are dealing with today in so many areas, including education, health & medical, energy, farming, climate changing, different kinds of pollutions, extinction of different types of animals & plants. It is quite obvious that the advanced robots will pave the way into the unknown with fewer risks, as the first constructors into space. Today, investigation agencies, all around the world, employ the best-designed and programmed robots in order to gain a wide range of opportunities. **“Programming & Software” as its context and the digital tools will bring the idea to life, in other words, we are programming a digital mind and applying a proper tool to use it.** And that seems quite close to the situation of gaming. So many years have been experienced with various robots which have been sent into space, an effort without any kind of withdrawal. Each one is revealing a new side of spatial explorations. But what has been done till now involved observation, data collection, and mapping, Perhaps the main achievement for upcoming years is situated in the communicative- interactive advanced robots gaining the best-designed AI (Artificial Intelligence), where we find direct regulating without any kind of waste that we have left behind in the aerospace explorations. In other words, we need more active automation ways of design which are more interactive. **The main point is situated in the advancement of robotics technology and AI that provide interactivity in deep space. Generating the DNA of advanced robots in a process.** (Figure 6)

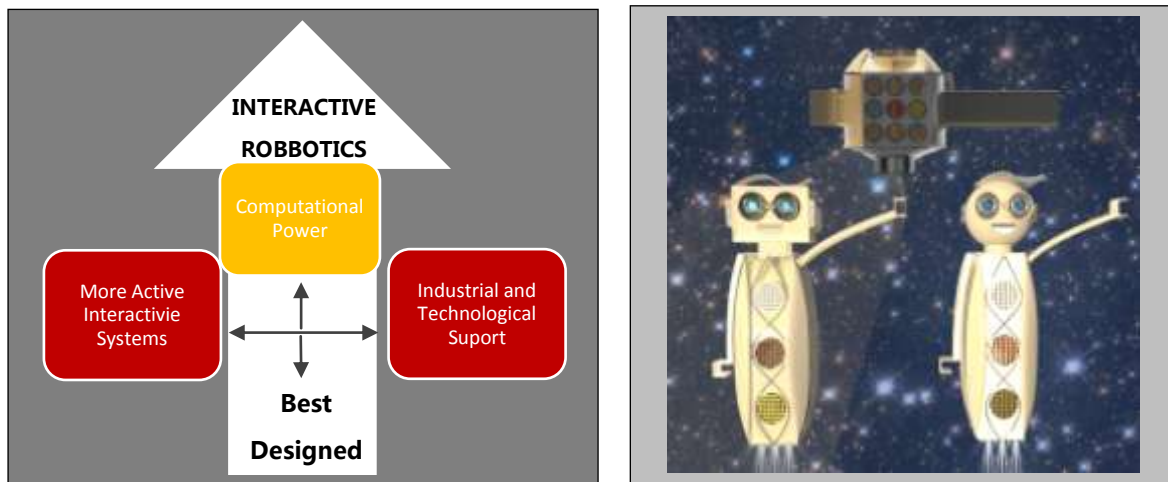


Figure 6: The SAVE, ROBOO, ShaghayeghNaeimabadiResearch&Architectural Design, Jacques Rougerie Foundation Awards.

The Situation of Advanced Structure & Material

The situation of material has always been unique in architecture history. And it's going forward in various ways. What kind of material makes this idea real? SMALLER, FASTER, LIGHTER & SMARTER. In recent years, a moving direction in the field of material has reached from an "unconscious to a conscious" point. So, the structure & material will play a major role. Including, the recent nanotechnology achievements & other digital matters that have opened new doors to advanced applications. Considering that our construction has gone through a revolution from hand to industrial & now it's time for the digital one. In recent years, Nanotechnology & digital matter are being developed in a fast way. With The support of applied robotics in order to create a "desirable climate" for "complex applications".

Here, I discuss the material as an "**Organism**", with more benefits, and fewer damages. The main subject is how we can design a sustainable prototype with an appropriate material. Decreasing the cost & increasing the benefits. And that challenge will reduce the cost of aerospace programs. Yet, spatial studies demand huge funding, and any kind of misleading is considered as a huge failure.

All new materials considered to be smart means that they are self-regulating, self-repairing, self-cleaning, ... AS AN ORGANISM PROVIDING THEIR NEEDS. For example, The Smart Hybrid Materials consist of Floating Graphene with a carpet of Nanotubes that grow like skyscrapers. (**Figure 7**)

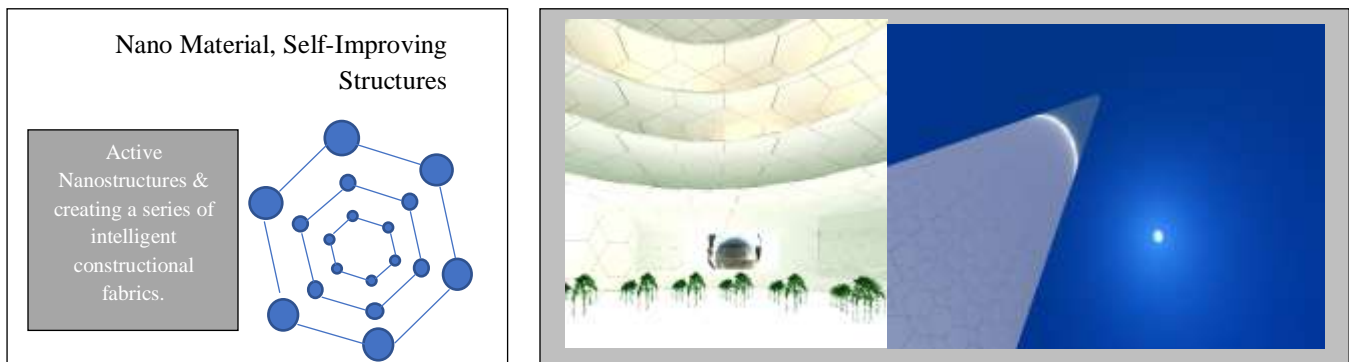


Figure 7: The SAVE, ROBOO, ShaghayeghNaeimabadi Research&Architectural Design.

Designing the first applicable home into the space

The final step of the aerospace efforts is to employ all of our studies & tools in order to design an applicable home. So, we are going from "Science Fiction" to "Science Real". Two recent aerospace programs are focusing on the "Moon and Mars", with a priority of settling on the Moon, we can provide the proper bedrock of deep aerospace networks. As the basis for other farther space explorations. Besides so many benefits like various resources, yet, there are so many difficulties at the same time. Like the preserving health, huge radiation factor, thermal difficulties, providing cargo, and vital supplements in the long run. But the challenges have always been considered as a pioneering point for the development of human life. (**Figure 8-9**)

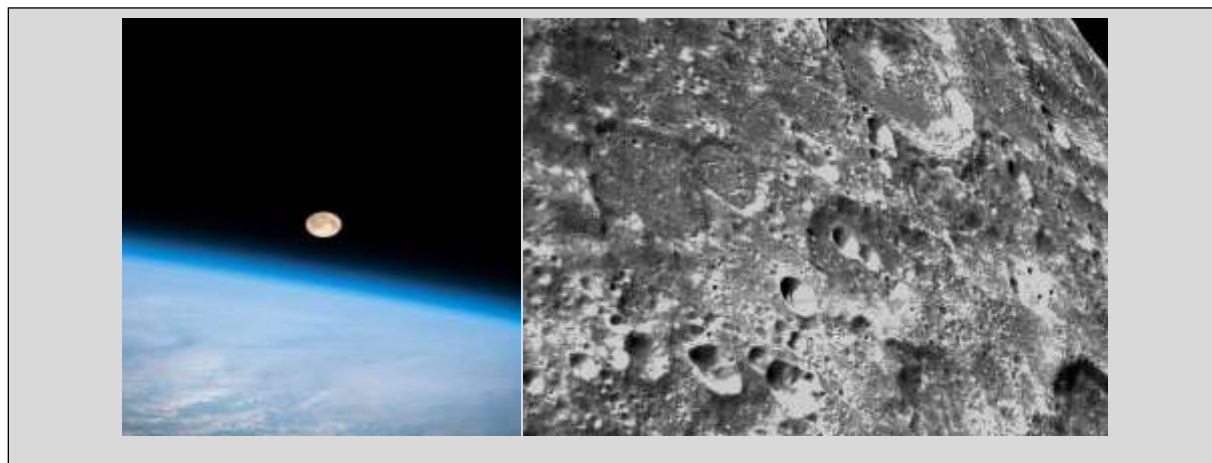




Figure 8:- Nasa, Moon Images.

Table 1:- ShaghayeghNaeimabadi Analysis.

BENEFITS	DIFFICULTIES
Reaching to the historical findings	Health & Huge amount of radiation
Establishing first aerospace center	Thermal difficulties in daytime and night
Tracing the formation of life	Providing supplements in the long run
Facilitating other aerospace programs	Preserving the vital supplements



Figure 9:- A New Settle, Evolo Competition, ShaghayeghNaeimabadi Research&Architectural Design.

A New Settle on the Moon, As the first “Case Study”

In the first steps, we will settle the first center on the Moon for understanding & gaining other types of opportunities. So, The Moon is just a passage for discovering all the other ones and perhaps as a first communication center where we can set up stronger spatial networks.

A NEW SETTLE GOALS

we can set up stronger spatial networks.

1	Gaining the opportunities to provide a better life on the earth
2	The best situation for sending satellites into space
3	Gaining the Low-cost energy
4	Exploring Best ways of quality for pure drugs, medical advancements
5	Gaining clean energy with giant solar cells into space
6	The better situation for space explorations
7	Gaining the planet's materials, mining & a new context for a free scientific exploration
8	Improving the aerospace networks, communication & robotics contexts, and commercial goals

Table 2:- ShaghayeghNaeimabadi Analysis.

Discussion:-

1. Human has always proceeded with his imaginations and exact underlying logic, solved his problems, and provided the technology to facilitate his understanding, after his significant achievements in the era of machine and electronics, space will provide a wide range of opportunities for him, yet this step is farther, it is necessary to go through a calculated and programmed process to reach the new findings.
2. As architects always have a great impression on their society, they not only employ the properties and advancements of their time but also, their point of view always proceeds and that's when the great masterpieces are born and will exist. In my opinion after the manifestation of our great architects that opened the new discourses in design like Le Corbusier with "**Free Plan**" and Rem Koolhaas with "**Free Section**", the future revolutionary part in architectural history will be the "**Free Volume**" which soon will settle in other planets and aerospace activities.
3. The architectural process of design went through a set of revolutionary sections employing various software in design. It seems that with the support of complex computational programs, we will be able to employ remote design methods along with empowering our aerospace networks, here the advanced interactive robotics will facilitate the project.
4. The utilization of new materials enabled the architects to examine their new strategies in design throughout history, they always kept themselves up with progress. So, any kind of design in the space is closely linked to the advancements of material and structural progress, which seems that nanotechnology and other avant-garde views in this field are paving and easing the processes.
5. There are various sets of benefits that will be achieved in the first settle into space, Moon, and Mars, gaining in energy, medical, mining, aerospace investigations, space network, easy bedrock for satellites, and so on.

Conclusion:-

Each "Era" has its own unique characteristics & represents its capabilities. The evolving & changing one may have various effects on its viewers. Some may find it destructive & see the bedrock against each other, while others could see among all the chaos a unified effort for solving the problems. Judging between these two different visions in order to decide which one has completely understood the main signs of the era is not easy. And it needs neutral guidance in order to find out what is deeply going to happen through the context of time. Meanwhile, **today we are facing a symphony of simultaneity in all aspects of human activity and despite gaining the various methods, results are closely linked to each other.** Among all the challenges that we are dealing with including, health, climate change, different kinds of pollution, and extinction of different types of animals & plants, architects are experiencing new challenges in design, defining a new situation for life, as of course won't be considered as the old ordinary ones. It seems that our great challenge for designing in other new situations is as "**An Architect**" how we are going to define a new **lifestyle**, after past revolutionary "**Free Visions**" in architecture "**Free Plan**", "**Free Section**", the **near future one: "Free Volume"** will bring a new set of opportunities not only in design but also in all aspects of human being life. Considering that, human has always adapted himself to his surroundings. Moreover, we should consider all the threats that will damage human life.

In this exploration, improving the moving knowledge of complex computation, advanced AI and interactive robotics and smart self-regulating materials are the only way that has enabled us to realize and bring the science-fictional

stories & great dreams of scientists in a logical basis to life. So: “The man won’t stay, there is no limit, we will go on, knowing how way leads on to way & will improve it.”

Day by day, we are on the way to realization and one step closer to reaching it by:

Improving complex computation, automation, smart materials, interactive robotics & intelligent construction, and remote method in design seems to be the major key point.” **All in all, with an enormous collaboration of “Researchers & New Scientists” in all fields of human knowledge, we are moving toward “SPACE ERA”.**

Acknowledgements:-

This research is an outcome and accomplishment of my six years of pioneer studying and designing simultaneously. As a result of my theorizing process, I have announced my “**Personal View**” in the architectural atmosphere as “**Free Volume in The Space Era**”. **Shaghayegh Naeimabadi.**

References:-

- [1]. Giedion, S. Space, Time and Architecture, the growth of a new tradition, 1888-1968.
- [2]. Orofino, V. Bernardini, P. Archaeoastronomical Study of the Main Pyramids of Giza, Egypt: Possible Correlations with the Stars? Dipartimento di Matematica e Fisica “E. De Giorgi”, Università del Salento, Lecce, Italy, 24 November 2015.
- [3]. Clarke's, A. C. The Complete Arthur C. Clarke's Space Odyssey Series Books 1-4 2001: A Space Odyssey, 2010.
- [4]. Jencks, Ch. The Architecture of the Jumping Universe: A Polemic: How Complexity Science is Changing Architecture and Culture Paperback – May 19, 1997.
- [5]. Koolhaas, R. Mau, B. Werleemann, H. S M L XL Hardcover, The Monacelli Press, October 1, 1997.
- [6]. Advances in Human Factors in Robots and Unmanned Systems Proceedings of the AHFE 2017 International Conference on Human Factors in Robots and Unmanned Systems, The Westin Bonaventure Hotel, Los Angeles, California, USA, July 17–21, 2017.
- [7]. Tannoudgi, C. Diu, C., Laloe F, B. Quantum Mechanics, John Wiley, New York, 1977.
- [8]. Heisenberg, W. The Principles of the Quantum Theory, Dover, New York, 1957.
- [9]. Omnes, R. Interpretation of Quantum Mechanics, Princeton University Press, Princeton, N. J. 1994.
- [10]. Brenstein, Fishbane P.M. Gasiorowicz, S. Modern Physics, Prentice Hall, Upper saddle River, N, J. 2000.
- [11]. Mitchell, M. Artificial Intelligence: A Guide for Human Thinking, Macmillan Audio, 15 Oct. 2019.
- [12]. Russell, S. Norving, P. Artificial Intelligence: A Modern Approach (Pearson Series in Artificial Intelligence), Pearson; 4th edition, April 28, 2020.
- [13]. Goodfellow, I. Bengio, Y. Courville, A. Deep Learning (Adaptive Computation and Machine Learning series), The MIT Press; Illustrated edition November 18, 2016.
- [14]. Greengard, S. Virtual Reality, MIT Press Essential Knowledge series, September 10, 2019.
- [15]. Corke, P. Robotics, Vision and Control: Fundamental Algorithms In MATLAB, Second Edition (Springer Tracts in Advanced Robotics, 118) 2nd ed. 2017, Springer, 2017.
- [16]. Siciliano, B. Sciacivico, L., Villani, L. Oriolo, G. Robotics: Modelling, Planning and Control (Advanced Textbooks in Control and Signal Processing) 1st ed. 2009 Edition, 2009.
- [17]. Hopcroft, J. E. Ullman, J. D. Rotwani, Motwani, R. Introduction to Automata, Theory, Languages and Computation 2nd Edition, Addison-Wesley, January 1, 2000.
- [18]. Tro, T. Chemistry: A Molecular Approach 5th Edition, Pearson, January 28, 2019.
- [19]. Silberberg, M. Amateis, P. ISE Chemistry: The Molecular Nature of Matter and Change (ISE HED WCB CHEMISTRY) Paperback – International Edition, McGraw-Hill Education, February 28, 2020.
- [20]. Wolf, M. J. P. Game studies and beyond, games and culture, Volume 1 Number 1. 2006.s
- [21]. Walz, S. P. Toward a ludic Architecture: The Space of play and games, Steffen P. Waltz and ETC Press. 2010.
- [22]. Davis, M., Sigal, R., Weyuker, E. Commutability, Complexity and languages, 2nd Edition - February 3, 1994.
- [23]. Jackson, J. D. Classical Electrodynamics 1925, Hamilton printing company, 2001.
- [24]. Williams, D. Why game studies Now? Gamer Don't Bowl Alone, Games and Culture, Vol.1, N.1. 2006.
- [25]. Roco, M. Bainbridge, W. Societal Implication of Nanoscience and Nontechnology. Boston, Massachusetts, Kluwer Academic Publisher, 2001.
- [26]. Poole, C. Jr. and F. Owens. Introduction to Nanotechnology. Hoboken, New Jersey: Wiley-Interscience, John Wiley and Sons. 2003.

- [27]. Goodsell, D.S. BioNanotechnology: Lesson from Nature. Hoboken, New Jersey: Wiley-Liss, inc. 2004.
- [28]. Fritzsche, W. ed. DNA-Based Molecular Construction. International Workshop on DNA-based Molecular Construction, Jena, Germany. 2002.
- [29]. Insurance Industry Context. Environmental Science and Technology, 4 October 2005.
- [30]. Naeimabadi, Sh. "The save", Jacques Rougerie Foundation Awards, 2019.
- [31]. Naeimabadi, Sh. Nasa, The Cinspace Short Film Competition, Nasa, 2019.
- [32]. Naeimabadi, Sh. Evolo Skyscrapers Competition, 2020.
- [33]. Carroll, B. W. Ostlie, D. A. An Introduction to Modern Astrophysics 2nd Edition, Cambridge University Press, October 30, 2017.
- [34]. Sokolsky, P. Sinnis, G. Large Area Networked Detectors for Particle Astrophysics Kindle Edition, World Scientific Publishing Company, September 9, 2022.
- [35]. <https://www.nasa.gov/multimedia/imagegallery/index.html>.
- [36]. <https://www.edx.org>, Pyramids of Giza: Ancient Egyptian Art and Archaeology. HarvardX - SW38Access expired on Jun 25, 2020 for Pyramids of Giza: Ancient Egyptian Art and Archaeology.2020.
- [37]. <https://ocw.mit.edu/> online course.
- [38]. [https://en.wikipedia.org/wiki/Draco_\(constellation\)](https://en.wikipedia.org/wiki/Draco_(constellation))
- [39]. https://www.nasa.gov/mission_pages/chandra/more-than-meets-the-eye-delta-orionis-in-orions-belt.html.