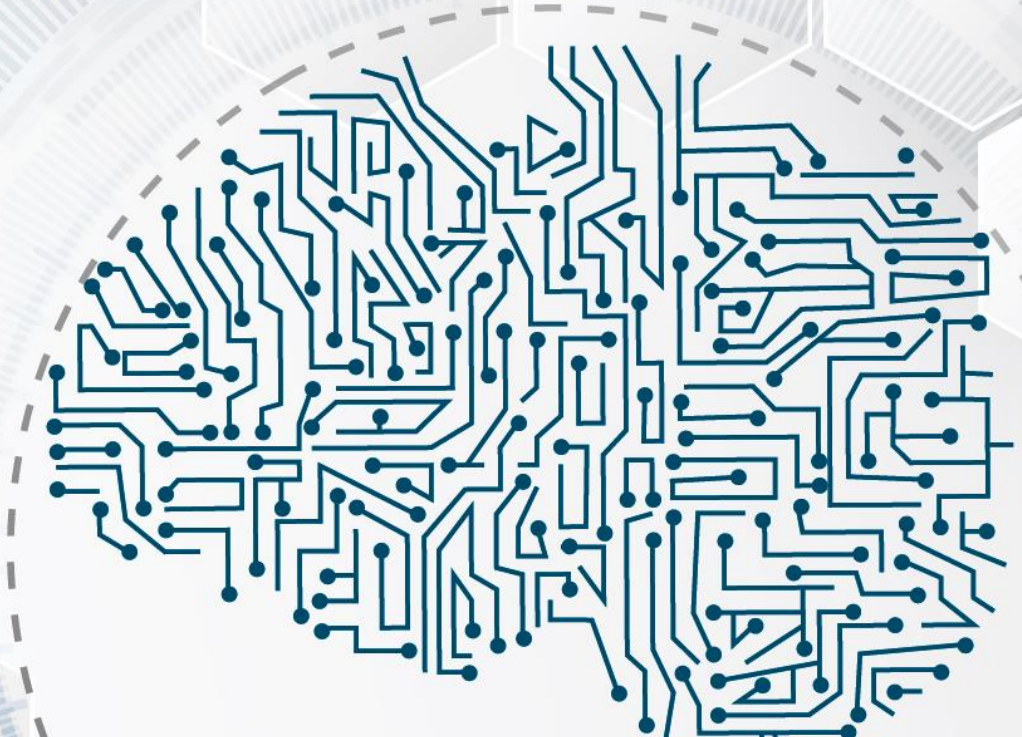
(Biotechnology I Robotics I Artificial Intelligence I Nanotechnology I Space I Strategic Services)

BRAINS² TÜRKİYE

SPACE PROGRAM

"Development of Vision, Strategy, Ecosystem and Market, through the International Comparison"



BIOTECHNOLOGY PROGRAM
ROBOTICS PROGRAM
ARTIFICIAL INTELLIGENCE PROGRAM
NANOTECHNOLOGY PROGRAM
SPACE PROGRAM
STRATEGIC SERVICES PROGRAM

TASAM BGC
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(**B**iotechnology | **R**obotics | **A**rtificial **I**ntelligence | **N**anotechnology | **Space** | **S**trategic Services)

BRAINS^2 TÜRKİYE* SPACE PROGRAM

"Development of Vision, Strategy, Ecosystem and Market, through the International Comparison"

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* **BRAINS^2 TÜRKİYE** is a brand/initiative with multi-programs based in Turkey which develops market, ecosystem and capacity in the 'Biotechnology', 'Robotics', 'Artificial Intelligence', 'Nanotechnology', '**Space**' and 'Strategic Services' fields. The programs planned through identical visions and strategies for each main fields which transforms the new business models and multidimensional power distribution in the global economy, are implemented under the common title of **BRAINS^2 TÜRKİYE.**

VISION (DRAFT)

Launch of "Sputnik 1", the first artificial satellite in the world, into space in 1957 is considered as the beginning of the competition in space, which is one of the most important fields of the Cold War period. Such unpredicted achievements of Soviet Union raised the concerns in USA and the Western block in this era, and led the importance of space regarding the military issues to be noticed. Just after the launch of Sputnik 1, USA declared national mobilization with all its military and civilian sources, at least in order to catch its' rival. The fact that firstly the Soviets, and afterwards the US sent human to space in the early 1960s, oriented a very rapid advance on the competition in space. In 1969, the United States transported humans to the Moon surface for the first time and it was noted as a "one giant leap for mankind".

The efforts towards space studies were mainly focused on military applications in the early period as it was also applied in scientific and civil fields. Two superpower countries of this era determined to get more advantage in military application of space science. As the satellites has highest observation view range, it provide military advantage which are not possible to gain from the earth for discovery, intelligence, communication and navigational support practices. The satellites are able to fly over any place of the world with any altitude between 400 and 40,000 km depending on its purpose.

Space armament would have unimaginable destructive power if we consider its' other usage areas apart from the communication category. This situation caused USA and the Soviet Union to start the negotiations towards regulating the space activities in 1959 in the UN. OST (Outer Space Treaty) was executed in 1967. OST was approved through being signed by almost every countries in the world, including all the ones which have space capabilities.

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OST is the main document of space law and stipulates that every country has right to travel space and to use space; and it prohibits establishing mass destruction weapons into the space while adopting the principle of using space for peaceful purposes. However, it is not prohibited to establish weapons in space other than the nuclear, biological, chemical and radiologic weapons. In fact, it is commonly known that the explicit and implicit researches on space-specific weapons which are not considered as mass destruction weapons are being performed. Military competition in space still continues even the Soviet Union was collapsed in the 1990s. Today, China has joined the leading countries in military space beside the USA and Russia. However, it is known that the European Union, Japan and some other countries have some superior technological abilities, not for military purposes. The space is used for wide range of purposes in many scientific, civil and commercial fields. In fact, we can say that we have become fully dependent on satellites. Observation satellites provide up to date information to us about agriculture, environment, forest, urbanism, etc. and gives warnings about climate trends through allowing closely examine the polar and oceans, as well as daily meteorological data. Thanks to the communication satellites, ten millions of houses are able to watch live news, sports and concert broadcasts from all over the world. Intercontinental banking and commerce services are facilitated by satellites. Navigation satellites allow us to find our routes not only in cities, but also all over the world, deserts, seas, etc. The competition in space is very intense and the total annual income of the space activities of the global private sector is over 300 billion $.

This new ecosystem, which has emerged after the space competition in 1957 and which is still considered in infancy period, currently offers a huge market on this scale - which has no matured competition and provides many new opportunities - as it creates new markets for SMEs through offering billions of dollars market growth for main contractors and technology companies, and continues to grow with the private sector initiative.

Many new topics are included in the space economy in recent years. One of these topics is space tourism and the other one is asteroid mining. As there are precious mines in asteroids and other celestial bodies, the visionary companies has emerged which intend to drive and aspire the future and to operate and profit from this opportunity. However, by considering the difficulties, costs and time required to develop the necessary technologies, some initiatives are continue realistically (Elon Musk's SpaceX projects etc.), even though these ideas can be perceived as crazy projects by the society for now.

In addition to all these developments, legal debates are also continuing. On the one hand, one party says “celestial bodies are the common property of humankind”, on the other hand, the ones who has space abilities say “commercial activities on celestial bodies are not prohibited”.

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The countries which are aware about the importance of space activities regarding the military and economic fields, continue their activities within the bounds of their own resources and capabilities. China, USA and Russia are able to neutralize the satellites of their rivals. It is known that other countries are interested in space weapons and perform research at least on a theoretical level, even they have no such capacity. In 2018, US President Mr. Trump decided to establish space forces as a branch of the US army. In addition to the land, air, coast guard and naval forces; the space forces will be a sixth armed force of USA. If it is considered in commercial manner; the ones who get ready for space activities will be the leader of this sector as the countries will take space technologies into consideration while preparing their budgets.

There is a paradigm shift in space technologies used in the civil areas. In addition to the big space projects and big satellites of the big countries; smaller states, smaller companies and even universities are able to produce and launch small satellites. Today, the satellites weight a few kilograms; they are no longer weight tons. The satellite budgets are not a few hundred million dollars, even a few million dollars, the cost of a satellite can be less than a million dollar. Within next few years, the number of launched small satellites will be expressed with thousand figures, and the missile companies will emerge which deal with only launching small satellites. As the size of the satellites get smaller, this situations offers new possibilities for many intermediate level states such as Turkey to involve in the space technology. And also it is clear that such smaller satellites will lead new developments in security issues.

BRAINS² TÜRKİYE Space Program will analyze which Space fields would provide highest potential for future growth and which benefits can be gained from this growth by the Turkish Space sector, through considering Turkey's available strength and potential both in academic and industrial sectors.

Upon determining the industrial fields together with their sizes and scales as a result of the studies performed towards discovering the idle potential of Space industry in order to find the most reasonable and promising interests for the **National Space Sector** and to increase the efficiency of the private and public sector; such determined industrial fields shall be considered as the sectors which might have the strongest contribution to the competitiveness of the country, the efficiency of the economy and the welfare of the nation.

BRAINS² TÜRKİYE Space Program; aims to provide "Space Strategy" options to Turkey and to be one of the leading stakeholders in the field of Space in Turkey through asking the right people** the right questions***.

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The purpose of the program includes: “Connecting the global trends with local needs” through the contributions of Turkish experts; bringing the space experts in Turkey and to utilize the output of such meetings and knowledge for the benefit of the Country; preparing an environment for events to strengthen the connections between the expert community; **contributing Turkey's commercial position in the market which grows rapidly, determining the products which Turkish companies are capable to produce and which potential customers to which Turkish companies are capable to serve depending on the capability analysis and the potential of the markets, in order to contribute the Turkey's space capacity, ecosystem and market development.**

BRAINS² TÜRKİYE Space Program; will match the products and customers in accordance with the domestic and global position of the Turkish companies through analyzing the capabilities of the leading Turkish companies while finding answers regarding where our country should be positioned in that sector. Within the scope of this Program; the multidimensional specific studies and activities which comparatively examines the Space Strategies/documents and markets of the countries such as US, Russia, China, Germany and in which the ideal strategy option for Turkey is presented shall be analyzed.

Main Theme

Development of Vision, Strategy, Ecosystem and Market through the International Comparison

Sub-Themes

Development/Inventory of Space R&D

Space Sources Ecosystem

Space Governance and Regulation

Space Human Resource

Space and Security

Sectorial Analysis and Classification of Global Space Market

Analysis of Leading Turkish Firms and Product Matching

Cooperation and Competition through International Comparison

Journey to the Moon, Mars and Other Destinations

Commercial Space and Licensing

Commercial Space Traffic and Regime

Military Space Operations

Diplomacy of Space

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STRATEGY (DRAFT)

To Develop Social Awareness towards Space

- To increase the awareness of youth about the professions of future and to forward them towards these professions
- To increase the awareness about the current and near future space technologies and specialization areas
- To develop forecasting approaches for sub-branches of such professions

Planning the Space Brains and Workforces towards the Professions of Future

- Detailed assessment of the Space brains, workforce and professions of future towards finding out the skills required for these professions and to reveal related academic and occupational skills.
- To determine the professions with changing basis and procedures for focusing on the space industry and to plan alternative education and employment fields for the people who want to be qualified for this profession
- To develop the academic and occupational skills of the people who will develop and support products/services which will be required by “Space studies” in the near future within the scope of brain and workforce

Focusing on the Use of Space Technologies in Defense and Security Fields

- To establish a center where institutions and individuals from all over the country can apply for the implementation of education and information activities towards “Space Conjuncture” and “Space Technologies”.
- As the center to be established will have a crucial importance for achieving the development in a better way, it shall be established as an institute where orienting and sector based trainings can be provided.
- To provide R&D funds and facilities for primary topics determined for researchers in this center which will be supported by the government or authorities.

Focusing on Usage of Space in Education

- To lead the establishment of a Space-focused “data collection policy” at all levels of education
- To contribute the development of products which will support the teachers at preparation, process and evaluation of Space-themed content during the teaching activities.

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- To collect data about the individual learning for personalization of education on every aspect of the development of Space
- To perform studies regarding the use of collected data in the "teaching design" process, which is specified through determining the teaching content, processes and product.

To Arrange Trainings to Train Experts in Space

- To provide trainings in order to ensure development and usage of space technologies (for aerospace, aircraft, computer, electronics, machinery, biomedical engineering and information technology experts)
- To provide trainings on topics (data labeling, data cleaning, sharing the data to support the studies when this data is required to be stored regularly on a platform determined by the government etc.) for training assistant and intermediate personnel required for the development of tools which will be used by the Space professionals.
- To create awareness among the researchers in universities about Space applications
- To contribute arrangement of the curriculum to include sector-based use of space technologies especially at the undergraduate degree of the universities.
- To provide trainings for researchers from different disciplines (health, law, education, history etc.) to ensure them to use Space technologies and outcomes in their researches.
- To arrange informative studies on space application areas
- To provide trainings for entrepreneurs about the “Space Conjuncture, Technologies and Opportunities”

Sectorial Review and Classification of Global Space Market

- To divide the global space market into sectors, and to determine the market potential for the future through analyzing the related global markets and customers
- To analyze and classify mainly the **Satellite Production**, **Launching Services**, **from Satellite directly to house TV**, **Satellite Radio**, **Satellite Broadband**, **Satellite Services**, **Fixed Satellite Services**, **Transponder Leasing**, **SUS Managed Services**, **Mobile Communications**, **Monitoring the Earth** [Ground Monitoring], **Data Analytics Based on Earth Monitoring**, **Consumer Earth Equipment**, **Global Navigation Satellite System Devices**, **Chipsets and Applications**, **Earth Network Equipment**, **Ubiquitous Global Broadband**, **Commercial Space Situational Awareness**, **Launching Special Small Satellites** [Micro Satellite Launch], **Small Satellite Production** [Micro Satellite Production], **Suborbital Human Space Flight** sub/side-sectors of R&D, education, application, software, hardware, production, service etc. sectors in the Space market.

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Analysis of Turkish Companies that will Lead the Sector and Product Matching

- To determine in which sectors of this market Turkey would be a significant actor
- To determine the leading companies for these sectors
- To determine the required certificates and processes for the market
- To determine the products which can be produced by these companies
- To match the products and leading companies which are determined for these sectors

Informative Studies for Adaptation of the Space in the Social Life and Industry

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** Right Persons

It is also very important for achieving the goal of this program to ask right questions as well as asking the right questions to the right people. It shall be ensured that the ecosystem shall include all stakeholders in order to analyze the global trends accurately and to determine the right options for Turkey. Therefore, it is a priority to ensure the inclusion of the representatives of the private sector, who create and experience this transformation, besides ensuring all stakeholders such as academicians, public and non-governmental organizations etc.

*** Right Questions

It is one of the most important steps of this Program to identify and ask the right questions. Targets of this program towards achieving “holistic and holistic results” and maintaining the focused approach, are highly dependent on asking the right questions.

- Does Turkey really need a Space strategy? If so, why?
- What should be the scale of Turkey's Space target? Should it compete globally or compete just with equivalent countries?
- How can we participate the international organizations’ - NATO, UN etc. - the policy building processes for Space and what kind of contributions can we provide?
- On which space areas should Turkey focus? Science, military, industrial or commercial areas? Should related studies be undertaken by the Government, and should the civil and private sectors also be encouraged? etc.
- What should Turkey aim for raising its’ labor force regarding the space objectives?

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- What should be the priority and methodology of Turkey regarding the studies towards hardware and software which are required for technological and industrial progress in the Space?
- How should the criterion and roadmap of Turkey be shaped in order to generate/develop, transfer/adapt Space technologies and to benefit from such technologies to the maximum extend?
- What is the current situation of the infrastructure in Turkey which is required for the production and development of space technology products?
- In which critical sectors the space technology would increase the efficiency exponentially? Which steps should be taken if production and development studies are initiated towards these sectors?
- Which export markets should be targeted if Turkey produces space products and services?
- How to deal with prejudices and errors in the field of space field? Is there a model about these issues which can be presented by Turkey for the world?
- Should it be considered in the Space strategy to develop policies for the sectors where the employment rates will decrease as the usage of the Space technology expands?
- How Space education would be delivered at universities?