
PROCEEDINGS FOR THE FIRST SYMPOSIUM ON SPACE ECONOMY, SPACE LAW AND SPACE SCIENCES

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**First Symposium on
Space Economy,
Space Law and
Space Sciences**
May 29-30, 2021
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PREFACE

Nations which desire a wealthy society in the future should match their knowledge from their past and present scientific capabilities. Nations that desire a wealthy society in the future should match their past experience with their present scientific capabilities. Space industry provides the opportunity to improve many sectors such as defence, engineering, medicine, communication, meteorology and agriculture. With the advance in technology, other areas such as thermal regulation, navigation, earth observation through optics, mechanics, electronics, materials science, and research areas such as astrophysics exploration are also enhanced by the space industry. Thus, the need to address all aspects of this industry, including economic, legal, and scientific aspects, has emerged.

This book of Symposium Proceedings contains the written versions of most of the contributions presented during the first *Space Economics, Space Law and Space Sciences Symposium* on 29-30 May 2021 at Istanbul University. The symposium was held by Istanbul University Faculty of Economics together with co-organizers, the Faculty of Law and the Observatory Application and Research Center.

The symposium brought together experts from different disciplines to share information and to develop a common purpose toward 1) understanding the limitations, opportunities and features of the space industry, 2) analyzing the differences between local and global legislative regulations, and 3) establishing a national strategy of action for research to build the capability of the Turkish space industry.

Twenty-four distinguished researchers from six different universities and the Scientific and Technological Research Council of Turkiye gathered for this symposium, and twenty-one well-qualified papers were presented in four sessions. The Head of the Turkish Space Agency and the Head of Turkish Aerospace Industries were invited as keynote speakers. The President of Defense Industries and the Deputy Minister of Industry and Technology participated as opening speakers. Their presentations provided a good balance between the needs and conditions of the industry and the trends and developments in economic, legal and scientific aspects of space. The main goal of the symposium was to promote research and activities in space studies and share information on space laws and space economics for Turkish Space Policy.

The contents of the papers in the symposium were delivered using a multi-disciplinary approach to space studies and an enlightening approach to the Turkish Space Program. In terms of disciplines, contributions included the international space race, the importance of the TURKSAT-6A satellite project, asteroid mining, effects of a solar flare on satellites, economic growth, mission state, management, public finance, international relations, technology policy, space race, international agreements on space law, satellite constellation, the East Anatolian Observatory Project, and space tourism. We would like to thank all participants for their contributions to the Symposium program. However, the book contains only the papers that were submitted by the authors.

The Symposium Organizing Committee included Prof. Dr Sayim Yorgun, Prof. Dr Omer Ekmekci, Prof. Dr Tolga Guver, Prof. Dr Faruk Kerem Giray, Assc. Prof. Dr. Hakan Bektas, Assc. Prof. Dr. Baris Kablamaci, Asst. Prof. Dr. Sinan Alis and Dr. Verda Neslihan Akun. The success of the symposium was due to the collective efforts of large numbers of individuals. We would like to thank Assist. Prof. Dr Billur Engin Balin, Dr. Verda Neslihan Akun and Assist. Prof.

Dr Sinan Alis who edited the book. We would like to thank the Rector of Istanbul University, Prof. Dr Mahmut Ak, for his unwavering support and contributions to the symposium. We are grateful to assistants for capably organizing the live streaming online of the symposium.

We hope that those interested in space studies find this proceedings book interesting and enjoyable.

Prof. Dr. Sayım YORĞUN
On behalf of the Organizing Committee of the Symposium
Istanbul University Faculty of Economics
Dean

OPENING SPEECH

Distinguished Guests, Participants, Colleagues and Students,

We have organized the first national symposium on Space economy, Space law and Space Sciences in this hall of Istanbul University which shall continue during the course of these two days in collaboration with the Faculty of Economics, the Faculty of Law and the Observatory Application and Research Centre. This symposium is the first multidisciplinary academic meeting in which economics, law and astronomy sciences come together to deal with space and related issues. Having taken this first step we hope to develop it in the future.

Since the academic year of 1996-1997 our Faculty of Law, a leading academic institute in Turkiye, has been teaching space law as a part of its curriculum under the discipline of public international law. I would like to use this occasion to expound and draw your attention to our teaching vision.

The Space Age was initiated by the launch of the first man-made artificial satellite, named Sputnik, by USSR in 1957. This adventure, which started by observing, imaging and viewing the Earth and other planets and transmitting information to the world, has not only served the purposes of remote sensing and communication, but has also evolved today into the search for life opportunities on other planets, space mining, space tourism, and the activities of private law persons in space. International space law, which was born and developed entirely as a part of international law, is on the agenda of both international law and national laws, with possible problems that may arise from new commercial ventures in space, as well as technological developments.

It is clear that the new activities of private entities in space will henceforth give rise to responsibility issues in domestic law in addition to the responsibility arising from international law. Moreover, the problem of space debris, in other words the pollution created by satellites which have completed their functions as a result of the satellite launch activities carried out in space in the past, is one of the issues needing to be resolved in space law.

One of several countries that have satellites in space, Turkiye has six active satellites, three of which are for communication and the other three for observation purposes. With the establishment of the Turkish Space Agency in 2018, our country is showing its presence in the international arena with its targets for our national space program, a program which is extremely dynamic and which is expectant of rapid development. In this race, we aim to train lawyers who will support Turkiye's space policies and protect their interests in this field, both at undergraduate and graduate level. I believe that the 1st Space Economics, Space Law and Space Sciences Symposium will make a significant contribution to academicians working in the fields of economics, law and astronomy, and to the students of these departments, and I conclude my words with the hope of having a productive weekend.

Prof. Dr. Ömer EKMEKÇİ
Dean
Istanbul University Faculty of Law

OPENING SPEECH

Distinguished participants,

Welcome to the 1st Space economy, Space law and Space Sciences Symposium that we have organized here at Istanbul University.

Dear participants, throughout history, studies in astronomy and space have always led to new scientific breakthroughs while also inspiring humanity.

Already in the Stone Age people were probably watching the unique scenery in the sky at night, while also trying to work out the time by simply following the moon's stages or the movements of the sun. Thereafter, over many years, observation of the visible movements of planets and other objects in the solar system brought us to the law of gravity that we know very well today and, in a sense, allowed the start of modern science.

Studies in the basic sciences may not produce results that affect our lives immediately, but when they are viewed from a historic perspective, the developments they cause can be seen immediately. Studies related to astronomy and space are perfect examples of this. Moreover, because of the fact that extreme conditions that we cannot even imagine or apprehend already exist in the universe, sometimes simply by conducting careful, scientific, observational studies can even lead to unpredictable discoveries.

As already mentioned, there are two important features of astronomy and space related studies. The first is the contribution to our comprehension of the laws of nature thanks to the extreme conditions, which we can't predict but which already exist, in space. The second is what we learn during this quest. Today, astronomy and space studies investigate objects that are hundreds of thousands of times dimmer than a human eye can see and often in wavelengths that cannot even be seen by us at all. These studies are conducted using ground and space-based telescopes and many other instruments. By means of these studies astronomy contributes to our understanding of the basic laws of physics while also developing new technologies because all these studies require the most advanced technology.

In that sense, studies related to astronomy and space are always multi-disciplinary in nature. They always either support the development of advanced technology or are directly supported by advanced technology. Perhaps, the most beautiful example of this is Galileo Galilei, who apparently hears about the use of lenses by Dutch sailors and makes his own and turns it to the sky, which results in the observations that we all know of today. From MRI technology used in medicine to the cameras on our mobile phones, it is possible to see similar examples from our everyday life today.

As space becomes more accessible to humans these studies become more and more associated with technology and become even more multi-disciplinary. Today, people who are dealing with space sciences should not only have knowledge of basic physics, mathematics, and astronomy but should also be familiar with electronics, computer sciences and similar areas.

Within the classical structure of universities, which consists of Faculties and Departments, it is not always possible to conduct such studies with the desired efficiency, and rifts between departments can form. Administratively, one of the easiest ways to overcome this problem is the

establishment of application and research centers, or the strengthening of existing ones, to bring together researchers from different disciplines within these centers. Here at Istanbul University Observatory Application and Research Center, we have adopted this as a mission to ourselves and we continue to work with the support of our rectorate.

Observatories are mostly seen as places where observations are made under the magnificent sky at night. Although there is some truth in this perception, today observatories are establishments where data is served to astronomers. This data comes from satellite observatories using advanced computer systems and statistical methods. Observatories became places where such engineering service is being provided for these purposes. In a way, observatories became data factories or archives where technology is either being used very actively or actually developed.

Of course, when the subject is space, even larger umbrella organizations are needed that are beyond the centers within universities. The establishment of the Turkish Space Agency and the announcement of a national space program all within a short space of time, both of which are realistic and achievable, have been a great development for studies in space related topics. One of the most important achievements of all space agencies around the world is to be able to bring together researchers working in different disciplines and generate synergies from them. The Turkish Space Agency has also started to make a similar contribution in this regard.

Our department was established in 1933 during the time of the University Reform, and Istanbul University's Observatory was established shortly thereafter. It is therefore an important task for us to provide support to our Space Agency with the support of our rectorate.

Dear guests, this two-day symposium is extremely important to show the multi-disciplinary nature of space studies. Space and Emerging Space Technologies have turned into a rapidly growing economy in the world and this growth has naturally brought with it various legal issues. It is obvious that there is a great need for studies in both space economy and space law.

Realization of these studies in space economy and space law while also following the fundamental scientific developments that feed them directly allows for a health progress.

I think that this is the most important point of this symposium. In other words, to embody what needs to be done in space economy and space law, while also taking into account the scientific and technological developments or to increase the awareness to support the multi-disciplinary studies.

For the idea of the symposium and the realization of it, I thank the deans of the faculties of Economics and Law, Prof. Yorğun and Prof. Ekmekçi, together with our Rector Professor Ak and all the professors in the organizing committee.

Finally, once again, I thank our very valuable speakers for their participation. I offer my wishes for a successful symposium.

Best regards,

Prof. Dr. Tolga GÜVER
Director
Istanbul University Observatory Research and Application Center

PROGRAM

SYMPOSIUM ON SPACE ECONOMY, SPACE LAW AND SPACE SCIENCES

29 – 30 May 2021

29 May 2021, Saturday

10.00-11.30	<p>Opening Speeches</p> <p>Prof. Dr. Tolga Güver – <i>Director, Istanbul University Observatory Research and Application Center</i> Prof. Dr. Sayım Yorğun – <i>Dean, Istanbul University, Faculty of Economics</i> Prof. Dr. Ömer Ekmekçi – <i>Dean, Istanbul University, Faculty of Law</i> Prof. Dr. Mahmut Ak – <i>Rector, Istanbul University</i> Mehmet Fatih Kacır – <i>Deputy Minister, Ministry of Industry and Technology</i> Şuay Alpay – <i>Deputy Minister, Ministry of Defence</i> Prof. Dr. İsmail Demir – <i>President, Presidency of Defence Industries</i></p>
11.30-11.45	<p>Break</p>
11.45-12.30	<p>Keynote Speaker: Prof. Dr. Temel Kotil – <i>President, Turkish Aerospace</i> Past and Present of Türkiye’s Satellite and Space Projects</p>
12.30-14.30	<p>SESSION I Moderator: Assoc. Prof. Dr. Barış Kablamacı – <i>Istanbul University, Faculty of Economics</i></p> <p>Assist. Prof. Dr. Korhan Yelkenci – <i>Istanbul University, Faculty of Science</i> The History of Space Explorations: Yesterday, Today and Future</p> <p>Dr. Tamer Özalp – <i>Ministry of Environment and Urbanization & Middle East Technical University</i> “New” Space and Türkiye’s Space Strategy</p> <p>Assoc. Prof. Dr. Semih Akçomak – <i>Middle East Technical University, Faculty of Economics and Administrative Sciences</i> Türkiye’s Technology Policy and Space Industry</p> <p>Assist. Prof. Dr. Billur Engin Balın & Assist. Prof. Dr. Türkan Turan – <i>Istanbul University, Faculty of Economics</i> The Contribution of the Space Sector to Development and Growth in Türkiye</p> <p>Dr. Cevher Levent Ertürk – <i>The Scientific and Technological Research Council of Türkiye</i> TURKSAT-6A Satellite and its Contribution to the National Economy</p>
14.30-15.00	<p>Break</p>
15.00-15.45	<p>Keynote Speaker: Serdar Hüseyin Yıldırım – <i>President, Turkish Space Agency</i> Türkiye’s Space Goals</p>
15.45-17.45	<p>SESSION II Moderator: Prof. Dr. Ahmet İncekara – <i>Istanbul University, Faculty of Economics</i></p> <p>Assoc. Prof. Dr. Emine Tahsin & Dr. Furkan Börü – <i>Istanbul University, Faculty of Economics</i> An Investigation of Türkiye’s Space Activities in the Context of Technological Capabilities and Mission-Oriented Tasks</p> <p>Assist. Prof. Dr. İtir Toksöz Bullens – <i>Doğuş University, Faculty of Economics and Administrative Sciences</i> To Go or Not to Go to Space: That is the Question!</p> <p>Dr. Verda Neslihan Akün – <i>Istanbul University, Faculty of Law</i> Space Law under International Conventions and International Documents</p> <p>Dr. Enver Arıkoğlu – <i>Istanbul University, Faculty of Law</i> The Concept of Common Heritage of Mankind and Legal Status of Outer Space in International Law</p> <p>Doç. Dr. Bora Yıldız – <i>Istanbul University, Faculty of Economics</i> New Management Paradigms in the Space Age</p>

PROGRAM

30 May 2021, Saturday

- 11.00-13.30** **SESSION III**
Moderator: Prof. Dr. Faruk Kerem Giray – *Istanbul University, Faculty of Law*
Prof. Dr. Cahit Yeşilyaprak – *Atatürk University, Faculty of Science*
Space Sciences 2023 Vision Project of Türkiye: Eastern Anatolia Observatory (DAG) and Space Sciences Ecosystem
Assoc. Prof. Dr. Z. Funda Bostancı – *Istanbul University, Faculty of Science*
Solar Flares and Their Impacts
Dr. Merve Erdem Burger – *Ankara University, Faculty of Law*
Current Issues Being Discussed in Space Law
Dr. Medeni Soysal – *The Scientific and Technological Research Council of Türkiye*
The Interaction of Technology and Law in Space and the Role of the United Nations
Assist. Prof. Dr. Sinan Aliş – *Istanbul University, Faculty of Science*
Satellite Constellations as an Issue in Space Law
Yeliz Neslihan Akın – *Istanbul University, Faculty of Economics*
Public Procurements in the Space Economy: Space Procurements
-
- 13.30-14.00** **Break**
-
- 14.00-16.00** **SESSION IV**
Moderator: Prof. Dr. Mithat Zeki Dinçer – *Istanbul University, Faculty of Economics*
Assist. Prof. Dr. Murat Kaplan – *Akdeniz University, Faculty of Science*
Asteroid Mining
Assoc. Prof. Dr. Reşat Volkan Günel – *Near East University, Faculty of Law*
The Political Economy of Space Law
Prof. Dr. Sadık Ünay – *Istanbul University, Faculty of Economics*
Türkiye’s Space Program in the Context of Global Competitive Strategies
Prof. Dr. Füsün İstanbullu Dinçer – *Istanbul University, Faculty of Economics*
Space Tourism
Assoc. Prof. Dr. Yasemin Taşkın & Dr. Zinnur Tunç – *Istanbul University, Faculty of Economics*
Seeking Financing in Increasing the Budget Allocated to Space Research and Searching for Taxpayer Compliance in Terms of Taxes as a Source of Financing
Prof. Dr. Haluk Zülfikar – *Istanbul University, Faculty of Economics*
Assessments on the Relationship between Climate Change and Space Economy
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