

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 1 : European Space Agency - Wikipedia

Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied. Author: Patricia E.

August 11, A host of ambitious nations are boosting their space exploration programs, ensuring major competition in the field. Here is a list of the top 10 countries according to Aerospace-technology. Their space program currently entails a number of navigation satellites, remote sensing satellites, communication satellites, surveillance and spacecraft. This has made many GPS-based technologies possible. China is also one of three nations that can recover satellites and conduct a manned space flight. Russia now operates the third largest fleet of spacecraft including communications, meteorological and reconnaissance satellites. Some of their famous projects are the Soyuz manned spacecraft, Salyut 1 space station and Lunokhod 1 space rover. Their space agency, called the Russian Federal Space Agency Roskosmos , specialises in civilian supervision space activities. Their other agency called the Russian Space Forces VKS handles defense satellite launches and military flight control assets. It currently operates a fleet of communications, meteorological, earth observation and astronomical observation satellites. The country currently operates a large number of satellites including civil and military communications satellites, earth observation satellites, and scientific and exploration spacecraft. They serve both civilian and military applications. India also has a dedicated defense satellite GSAT-7 which serves the military. The nation currently possesses no indigenous launch system, and depends on the US, India and Russia to launch its spacecraft. The country has since then launched several spacecraft including telecommunications, navigation and earth observation satellites. Germany is also involved in the core missions such as Cassini-Huygens mission to Saturn and its moons, European space laboratory Columbus, Dawn - Mission to Vesta and Ceres and the European Galileo navigation system. The organisation is responsible for the development and execution of space programmes alongside industry and the scientific community. The ESA is headquartered in Paris. The Luxembourg Space Cluster unites highly specialised companies and government research agencies focusing on space telecommunications, global navigation satellite system and location-based services, earth observation, maritime safety and protection, and space technologies. Interested in General Knowledge and Current Affairs? Click here to stay informed and know what is happening around the world with our G. To get more updates on Current Affairs, send in your query by mail to education.

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 2 : Outer Space Treaty - Wikipedia

The Resource Space activities of the United States, Soviet Union, and other launching countries/organizations: report, prepared by the Congressional Research Service, Library of Congress, transmitted to the Committee on Science, Space, and Technology, House of Representatives, One Hundred Second Congress, first session.

Although the s boom made it possible for Western European countries to invest in research and specifically in space-related activities, Western European scientists realised solely national projects would not be able to compete with the two main superpowers. In , only months after the Sputnik shock , Edoardo Amaldi Italy and Pierre Auger France , two prominent members of the Western European scientific community, met to discuss the foundation of a common Western European space agency. The meeting was attended by scientific representatives from eight countries, including Harrie Massey United Kingdom. The Western European nations decided to have two agencies: The latter was established on 20 March by an agreement signed on 14 June From to , ESRO launched seven research satellites. ESA had ten founding member states: During this interval the agency functioned in a de facto fashion. ESA launched its first major scientific mission in , Cos-B , a space probe monitoring gamma-ray emissions in the universe, which was first worked on by ESRO. A number of successful Earth-orbit projects followed, and in ESA began Giotto , its first deep-space mission, to study the comets Halley and Griggâ€™Skjellerup. Ariane 1 , launched in , carried mostly commercial payloads into orbit from onward. The next two versions of the Ariane rocket were intermediate stages in the development of a more advanced launch system, the Ariane 4 , which operated between and and established ESA as the world leader[citation needed] in commercial space launches in the s. Although the succeeding Ariane 5 experienced a failure on its first flight, it has since firmly established itself within the heavily competitive commercial space launch market with 82 successful launches until The successor launch vehicle of Ariane 5 , the Ariane 6 , is under development and is envisioned to enter service in the s. Although ESA had relied on co-operation with NASA in previous decades, especially the s, changed circumstances such as tough legal restrictions on information sharing by the United States military led to decisions to rely more on itself and on co-operation with Russia. A press issue thus stated: There is a framework agreement between ESA and the government of the Russian Federation on cooperation and partnership in the exploration and use of outer space for peaceful purposes, and cooperation is already underway in two different areas of launcher activity that will bring benefits to both partners. ESA maintains its scientific and research projects mainly for astronomy-space missions such as Corot , launched on 27 December , a milestone in the search for exoplanets. Mission[edit] The treaty establishing the European Space Agency reads: They want greater security and economic wealth, but they also want to pursue their dreams, to increase their knowledge, and they want younger people to be attracted to the pursuit of science and technology. I think that space can do all of this: This is the reason space exploration is an integral part of overall space activities. It has always been so, and it will be even more important in the future. Activities and programmes[edit] ESA describes its work in two overlapping ways: For the general public, the various fields of work are described as Activities. Budgets are organized as Programmes British spelling retained because it is a term of official documents. These are either Mandatory or Optional. According to the ESA website, the activities are:

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 3 : International Governance of Space Activities | Secure World

This is a list of government agencies engaged in activities related to outer space and space exploration. (There is also a List of private spaceflight companies.). As of , 72 different government space agencies are in existence; 14 of those have launch capability.

The Global Nature of Space Activities International Governance of Space Activities Although some may think space is ungoverned, there are in fact a number of existing international treaties that provide a legal framework. The United Nations plays a significant role in the governance of space activities and the negotiation and adoption of international treaties and other agreements on space, but there are other bodies that play a role as well. Six permanent committees help the UNGA manage its work on global issues; for space matters, two committees are especially important. The First Committee deals with disarmament and security matters and the Fourth Committee focuses on special political matters, including outer space. It does not deal with military space issues. The Conference on Disarmament CD , which is not a UN organization but works under the UN auspices, is the international forum for work on disarmament, and therefore the body responsible for matters related to weapons in space and other space security issues. Its work is divided between two subcommittees: Matters that come before COPUOS are deliberated first in working groups within one of the subcommittees and when agreement is reached, the matter is presented to the full committee as a report of the Subcommittee. Additional non-binding agreements for outer space have been developed by COPUOS to address orbital debris mitigation, cooperative arrangements for sharing remote sensing data, and other related matters. The Outer Space Treaty was opened for signature in and entered into force the same year. One hundred states have ratified the treaty, which provides the basic framework for international space law. Key principles include the exploration and use of outer space for peaceful purposes by all States for the benefit of mankind, barring of national appropriation or claims of sovereignty of outer space or celestial objects, ban on placement of weapons of mass destruction in orbit or on celestial bodies, and that States are required to supervise the activities of their national entities. Rescue Agreement Requires States to take steps to rescue and assist astronauts in distress and return them to the launching state, and assist launching states in recovering space objects that return to Earth outside the territory of the launching state. Liability Convention Outlines the liability of Launching States for damage caused by their space objects on the Earth or in space, and procedures for the settlement of claims for damages. Registration Convention Launching States must maintain a registry of their space objects and provide the UN with information on the objects they launch into outer space. Moon Treaty Reaffirms and elaborates OST provisions applied to appropriation and exploration of the Moon and exploitation of resources found on the Moon. Though technically in force, this treaty has been ratified by relatively few countries and is ignored by most. International Telecommunications Union During the s, it became clear that private and public use of geosynchronous orbit for telecommunication and other services would need to be regulated using an international system agreed upon by stakeholder nations. The International Telecommunication Union ITU , established in to develop international radio communication standards, was tasked in by the UN to manage the GEO belt for purposes of preventing physical and electromagnetic interference. The ITU assigns GEO slots to the Member states by considering orbital parameters west or east degrees longitude , type of frequencies used, and covered regions or footprint. Member states use national regulations to license their use of assigned GEO slots. The primary purposes of the IADC is to exchange information on space debris research activities between member space agencies, facilitate opportunities for cooperation in space debris research, to review the progress of ongoing cooperative activities, and to identify debris mitigation options. In , the IADC published a set of voluntary guidelines designed to reduce the creation of orbital debris. Limit production of debris during routine operations. Minimize the potential for accidental on-orbit breakups. Dispose of spacecraft post-mission.

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 4 : Intro to Space Activities | Space Foundation

The Resource Space activities of the United States, Soviet Union, and other launching countries: report, prepared by the Congressional Research Service, Library of Congress for the Subcommittee on Space Science and Applications, transmitted to the Committee on Science, Space, and Technology, U.S. House of Representatives, One.

It includes all public and private factors involved in developing, providing and using space-related outputs, space derived products and services and the scientific knowledge arisen from space research. Special Features of Space Economy The space sector has distinguishing features such as the use of cutting edge technologies and longer terms for both project development and return on investments. It is a government dominated sector, as access to space is costly, involves technical risks and the viability of space enabled services requires large users markets. Nowadays, despite the growing importance of commercial space sector, the use of space for defense purpose remains prominent thanks also to space technologies that have both civil and military applications like weather forecast, which can also be used for early warning, remote sensing, with its applications in intelligence, and global navigation, a precision targeting system. Main customers of space-related products and services are still Governments, investing in a wide range of activities due to the value of space for strategic, economic goals and national prestige. Space manufacturing is particularly dependent on institutional civil and military investment. The traditional massive involvement of public actors in space can be explained with the particular features of this sector, whose complexity and economic parameters might sometimes discourage the private sector. However, the increasing number of private entities currently engaged in space activities is gradually operating a shift in the traditional roles of public and private sector. Cosmo-SkyMed dual use system. Main Segments of Space Economy As indicated by the OECD, main segments of space economy can be schematized in manufacturing, services from satellite operators and consumer services. The space manufacturing supply chain includes different kinds of actors involved in the production of space systems. Satellite operators own and operate satellites, providing telecommunications, fixed and mobile satellite services, satellite radio services, remote sensing. Consumer services include actors, usually outside the space community, which rely on some satellite capacity for part of their revenues. They encompass direct-to-home satellite television service providers, satellite navigation consumer equipment and value-added services. The downstream covers the exploitation of technology such as satellite broadcast services, Earth observation, financial services and satellite communications. Downstream actors are the companies providing commercial space-related services and products to the final consumers. These companies are generally not connected to the traditional space industry, as they only use space signals and data in their own products, typically concerning communications, satellite television, geospatial products and location based services. Upstream and downstream activities as a whole contribute to shape the overall space value chain. Each step adds some form of value. The space sector is lately attracting much more attention worldwide, as public and private investors look for new sources of economic growth and innovation, and space economy has become a relevant domain for high-tech innovation, commercial opportunities and strategic purposes. Different kinds of activities, inputs and processes contribute to shape the global space value chain. Commercial space infrastructure and support industries include satellite manufacturing, launch services, ground stations and related equipment, while commercial space products and services encompass satellite broadcasting, communication, Earth observation, geo-location, and global navigation equipment and services. DTH Direct to Home television services represent a majority part of revenues in the commercial space products and services sector. Satellite communications market is composed of satellite operators, which lease out the transmission capacity of their satellites to private and government clients in need of transmission capability. FSS refers to the delivery of satellite communications to stationary ground receivers that can be moved from one location to another but do not work while in transit. Capabilities offered by MSS are similar, but the communication link connects with mobile receivers, such as satellite telephones or in-flight

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

communications. Satellite technology enabling Earth observation and imaging services constitutes a small, but very important part of the global space economy, providing a wide spectrum of applications in different fields; the largest revenue growth occurred in defence, intelligence and in the sectors of energy and natural resources. The Space Value Chain. Socio-Economic Impacts from Space Investments Space systems play an increasing role in the functioning of modern societies, their strategic order and their economic development thanks to the use of satellite technology in navigation, communications, meteorology and Earth observation. Space technologies also affect agriculture planning, disaster management, medicine, land monitoring, transportation and urban planning. Its manifold fields of application make space an engine of economic growth. Despite the economic crisis, institutional space budget faced less decrease than other productive sectors. OECD underlined that, even though space often has a reputation of being an expensive industry, all G20 Countries invest in their respective national space program a very small percentage of the GDP Gross Domestic Product. The benefits provided by the use of space assets range from qualitative aspects, such as strategic advantages and improved decision-making processes based on satellite imagery, to monetarily quantifiable ones, such as cost-efficiency and increased safety derived from using satellite navigation tools for ground, maritime and aviation applications. Scientific and technological innovations are making space applications accessible to more people, being vehicle of social and economic growth also for developing Countries. The importance of space for everyday life and the various domains affected by its use explains why a steadily increasing number of countries and public and private actors are getting involved in global, often international, space activities.

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 5 : Space Activities for Kids - Fun Astronomy Lesson Plans, Planets, Teaching Ideas, Resources

The Space Foundation created Introduction to Space Activities, a broad educational and informative tool for individuals interested in learning more about space activities. This introduction includes basic information about the mechanics of space activities and the space industry.

A first for the Arab world, the mission and accompanying Space Agency are a big deal for the UAE – scientifically and politically. Investing in space activities is not new territory for the UAE. This is not surprising when we live in an age where space hardware is important for a range of practical everyday uses such as telecommunications and navigation. Accordingly, many countries have invested in purchasing satellites and their launches, data from space, and other space infrastructure. The plans indicate that the UAE will develop its own spacecraft building and perhaps also launching capabilities. While many countries participate in space activities through the purchase of hardware and launches from external providers, the ability to build and launch their own craft domestically lifts a country to the next level of the space faring elite. The announcement also implies that the UAE plans to pursue hugely expensive space activities with a primarily scientific purpose. Yes, this project has a practical purpose in that it is to inspire UAE technology growth and the education of forthcoming scientists. However a country is also making a statement when it moves from space-related activity for purely practical purposes, to the more heady goals of exploration, inspiration and science. Power, prestige and politics The leap from practical to primarily scientific space activity is noteworthy. This is partly because a space programme is a way for states to assert their prestige. There is historical precedent that undertaking space activities for exploration garners prestige and indicates power: But we have moved on from the days where space was a bipolar activity: Also non-state actors are increasingly active in space, including several such as Mars One that have planned manned missions to Mars. Regionally, the project indicates leadership within the Middle East region. And globally, the mission marks the entry of an Arab nation into the elite club of countries with such ambitious space programs. Will this project work, both scientifically and in order to build international prestige? Scientifically, Mars missions have proved tricky. It puts the Middle East on the map with regards to space exploration for scientific purposes. It could also drive the creation of a Middle East space programme, akin to that of the European Space Agency. This does not undermine the scientific value or importance of the project proposed by the UAE. The space science research community is well-networked transnationally, and a well-funded project to the red planet by the UAE should be welcomed.

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

Chapter 6 : Luxembourg government to continue commercial space initiatives after election - calendrierdel

The Iran Space Agency runs the country's space exploration programs, and is also a participant in the Asian space race. The Iran Space Agency was created in 1997, with the mandate to support all space-related activities in the country governed by the country's president.

Launch Vehicles Sectors of Space The space industry is commonly divided into four sectors: Although these sectors operate programs largely independent of one another, they share an industrial base, workforce and infrastructure. The intelligence sector encompasses all space-based or space-enabled intelligence capabilities that support national interests. Commercial space is generally segmented into satellite manufacturing, support ground equipment manufacturing, and the launch industry. The commercial sector includes prime contractors, entrepreneurial space companies and emerging markets for space capabilities. Government Space Program The U. The President creates space policy for all government agencies and initiatives, while Congress is responsible for approving funding for and routine oversight of the space activities of the federal government. These federal agencies are charged with executing the space activities of the U. Another executive body called the National Space Council plays a large role in the formulation and execution of U. This group of advisors and experts existed from the early years of NASA through the Apollo program under a different name, and was reestablished once in 1959 for four years, and again in 1989. It is chaired by the Vice President of the United States. The mission of NASA is to pioneer the future in space exploration, scientific discovery and aeronautics research. NASA carries out its work across four mission directorates: It also operates multiple Earth-observing and remote sensing scientific satellites. NASA Headquarters provides overall guidance and direction to the agency. The ten NASA field centers are: Stennis Space Center, Bay St. Louis, MS John H. NOAA was established in 1970 and is charged with providing reliable information about the oceans and atmosphere, including weather warnings and forecasts, as well as climate, ecosystems and commerce. NOAA has nine key focus areas: Using space capabilities is vital for NOAA to complete many of its activities. Its mission is to foster the conditions for the economic growth and technological advancement of the U. Other organizations across the Department of Commerce that handle space include: The Federal Aviation Administration of the United States is a national authority with powers to regulate all aspects of civil aviation. AST also encourages, facilitates and promotes U. The FAA was formed in 1958. The FCC has regulated interstate communications by radio, television, wire, satellite, and cable since 1934. The Office of Engineering and Technology OET within the Federal Communications Commission oversees policies, rules, procedures and standards for licensing and regulating orbital assignments for satellites. The OET also conducts technical studies of advanced phases of terrestrial and space communications. The Department of Defense is charged with coordinating and supervising all agencies and functions of the government concerned directly with national security and the United States Armed Forces. The DoD was formed in 1947. Intelligence Community since 1949. The NGA uses imagery from space-based, national intelligence reconnaissance systems, as well as commercial satellites and other sources, to develop imagery and map-based intelligence solutions and provide geospatial intelligence support for global world events, disasters and military actions. The MDA uses satellites and ground-based sensors to provide worldwide coverage. The MDA was established in 1976. Strategic Command is one of nine U. It is charged with multiple missions, including full-spectrum global strike, space operations, integrated missile defense and global C4ISR command, control, communications, computers, intelligence, surveillance and reconnaissance. JFCC-Space is involved with coordinating, planning and conducting space operations. It even monitors orbiting satellites and space debris, allowing high-value spacecraft including the International Space Station to maneuver and avoid collision. SMDC serves as the Army-specific proponent for space, high-altitude and ground based midcourse defense. SMDC conducts space and missile defense operations and provides planning, integration, control and coordination of Army forces and capabilities in support of strategic deterrence, integrated missile defense, and space operations. SMDC also serves as the Army force

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

modernization proponent for space, high altitude and global missile defense and as the Army operational integrator for global missile defense. AFSPC is a major military command that organizes, trains and equips forces to supply combatant commanders with the space and intercontinental ballistic missile capabilities necessary to defend the U. The DSC is charged with aligning requirements, acquisition and budget planning and execution of strategy and policy. Global Space Programs Introduction Most space activities are inherently dual-use. Many countries carry out military space activities in conjunction with civilian space activities. The information in this segment is focused on the publicly recognized space activities of other nations. While many countries have different means of collaborating with others, when it comes to international concerns, regulations, and laws in outer space, most turn to the United Nations for guidance. The UN has its own body for deliberation and cooperation on space issues and activities. In , the Algerian remote sensing satellite Alsat-2A was successfully placed into orbit. Alsat-2A was the second remote sensing satellite launched by Algeria; Alsat-1 launched in . In , satellites, Alsat-1B a satellite designed for agricultural and disaster monitoring and Alsat-1N containing amateur radio payloads were launched. Alcomsat-1 is a communications satellite scheduled to launch before . Brazil also actively participates in international space programs. Canada Canada became the fourth nation to operate a satellite in space with the launch of Alouette 1 in . Canada employs a niche strategy, focusing on expertise in three areas: Budgets focus heavily on space science and Earth observations, as well as human spaceflight. Europe Government spending on space programs and activities in Europe comes from three distinct sources: The EC focuses its resources on three primary areas: ESA is the primary space actor in Europe, with 22 member states that contribute a set amount, based on gross domestic product, for space science and some mandatory technology programs. Voluntary contributions from countries can also be made to other optional programs, such as human spaceflight, Earth observation, launchers, or telecommunications. The biggest contributors are France, Germany, Italy, and the UK, with a collective contribution of . ESA has focused its efforts on upgrading and developing its launch vehicles, Earth observation activities, and space science missions. France The French space program is the third oldest institutional space program in history, and France became the third nation to launch a satellite to orbit on its own domestically produced rocket in . France is the top contributor to the ESA budget. The activity of CNES is focused on five main fields: Ariane launchers , sciences, observation, telecommunications, and defense. Ten French astronauts have flown aboard the International Space Station. It is also the German national space agency. DLR focuses on planetary science and Earth observation, and is conducting applied research for protecting the environment and development of environmentally friendly technologies to promote NextGen aviation, autonomous mobility, communication, navigation, and security. Major German space programs have continued to emphasize applied Earth observation and space robotics. In the realm of human spaceflight, Germany has sent many astronauts into space with the Space Shuttle and Soyuz, including three astronauts who worked onboard the ISS. Multiple Italian astronauts have flown on the ISS over its lifetime. China China owns the second largest fleet of spacecraft in orbit. Funding for space is part of military budgets, which are only partially disclosed. Programs focus on manned spaceflight and space applications, such as remote sensing, communications, navigation, and space science and technology. In parallel, China has developed capabilities to limit or prevent the use of space-based assets by potential adversaries during times of crisis or conflict. It was the first soft landing on the Moon since , making China the third country to land on the Moon. CNSA announced it would conduct 30 launches in , a new record. CNSA has its own small space station, with plans to launch another station, Tiangong 3, in the s. China is not involved with the International Space Station. Only recently has the country migrated toward programs such as space exploration and military applications. India often emphasizes its strategy of international collaboration with leading space powers and has strengthened its relationships with Europe in its efforts to commercialize its launch capability. India has also worked with Russia to develop its own geostationary launch vehicle, and successfully launched its own spacecraft to the Moon in . Israel The Israel Space Agency ISA coordinates government space activities and focuses on satellite development for communication and remote sensing. ISA partners with a number of

DOWNLOAD PDF SPACE ACTIVITIES OF THE NON-LAUNCHING COUNTRIES

nations on various space activities, including technology development and human spaceflight. ISA developed and operates its own launch vehicle, Shavit. The Israeli contribution will be funded by the Israel Space Agency and launch is expected before 2010. Today, Israel is the smallest country with indigenous launch capabilities. Japan became the fourth nation to launch its own satellite with a domestically produced launcher in 1970. In 2003, Japan enacted a new Basic Law of Space, allowing the country to use space for national security purposes. Its space science program includes successful missions to asteroids and the Moon, with follow-on return missions planned. Some of the most important new developments among JAXA programs are the new H3 launcher aimed to launch in 2015, and development of the upgraded HTV cargo spacecraft. Due to increased regional security concerns, Japan has been increasing its focus on a national security satellite system that will improve its information gathering capabilities. This direction was reconfirmed by updates to the Basic Plan for Space Policy in 2013. Luxembourg now has one of the largest commercial satellite industries, second only to the U.S. In recent years, Luxembourg has also taken interest in the asteroid mining industry. Also in 2013, the Deputy Prime Minister of Luxembourg announced that to become a leading nation in asteroid mining, Luxembourg will soon be introducing a national space agency, as well as a new national space law. While Mexico has yet to create a space infrastructure, it is well on its way.

Chapter 7 : History of Europe in space / ESA history / Welcome to ESA / About Us / ESA

International Governance of Space Activities Although some may think space is ungoverned, there are in fact a number of existing international treaties that provide a legal framework. The United Nations plays a significant role in the governance of space activities and the negotiation and adoption of international treaties and other agreements.

Chapter 8 : List of government space agencies - Wikipedia

From the first moon landing to the International Space Station, the US government agency NASA has been leading space exploration since its creation in 1958. US spending on space-related research saw a dramatic increase during the height of the space race with Russia, from 0.1% of GDP in 1958 to more than 0.5% in 1964.

Chapter 9 : Which countries spend the most on space exploration? | World Economic Forum

The United Kingdom launched its first satellite Ariel 1 in the year 1962. The country currently operates a large number of satellites including civil and military communications satellites, earth observation satellites, and scientific and exploration spacecraft. European Space Agency (ESA) gets most of its contribution from the United Kingdom.