وكالة الإمارات للفضاء UAE SPACE AGENCY







66 It is He who created the night and the day, and the sun and the moon - each gliding in an orbit. 22 (33) (The Prophets)

66 The United Arab Emirates (UAE) aims to "Enter the space industry sector and benefit from its technology, in a way that enhances development and work to build national specialized capabilities in the field. **30**



His Highness Sheikh Khalifa Bin Zayed Al Nahyan
President of the United Arab Emirates

The new limit of the ambitions that we set for our future generations is space. The limit of our aspirations is the sky. **30**



His Highness Sheikh Mohammed Bin Rashid Al Maktoum Vice President and Prime Minister of UAE and Ruler of Dubai

We are committed to the determination of the sons of Zayed to achieve our ambition to reach Mars. **33**



His Highness Sheikh Mohammed Bin Zayed Al Nahyan Crown Prince of Abu Dhabi and Deputy Supreme Commander of UAE Armed Forces

NATIONAL SPACE STRATEGY 2030 (SUMMARY)



Foreword



H.E. Dr. Ahmad bin Abdullah Humaid Belhoul Al Falasi Cabinet Member and Minister of State for Higher Education and Advanced Skills, Chairman of UAE Space Agency

In June 2018, the United Nations approved an international resolution entitled "Space as an engine for Sustainable Development". This resolution came as a confirmation and renewal of the global recognition of the importance of space and its large impact on improving the daily lives of humans, and in establishing sustainable development of countries and the world in social, economic, political and security aspects, particularly in relation to the UN Sustainable Development Goals 2030.

Space utilization and discoveries have been able to enrich the human knowledge of the universe and contribute to improving the daily lives of humans, where communication, broadcasting and navigation applications using satellites contribute remarkably to the conduct of daily human lives and to supporting the other vital services and sectors. Space utilization also plays a vital role in monitoring weather, climate and the environment, management of natural resource, crises and disaster management, and rescue and humanitarian aid programs. Also many capacities and advanced technologies that were developed for space have been widely used in other domains such as medicine, energy, manufacturing and others. Hence the space sector has become a source of innovation and inspiration for humans particularly for upcoming generations.

The good leadership of the UAE has realized the increasing importance of the space sector and its continuous growth on a regional and global level, this is why it has been investing in it since the early 90s. Today the UAE is proud to have a strong and diverse space sector, where it has managed over the past three decades to develop capacities and expertise qualifying it to compete globally and to move on to a new phase in its national program for space. Thus in 2014 came the announcement of the creation of the UAE Space Agency, and of the UAE Mars exploration program.

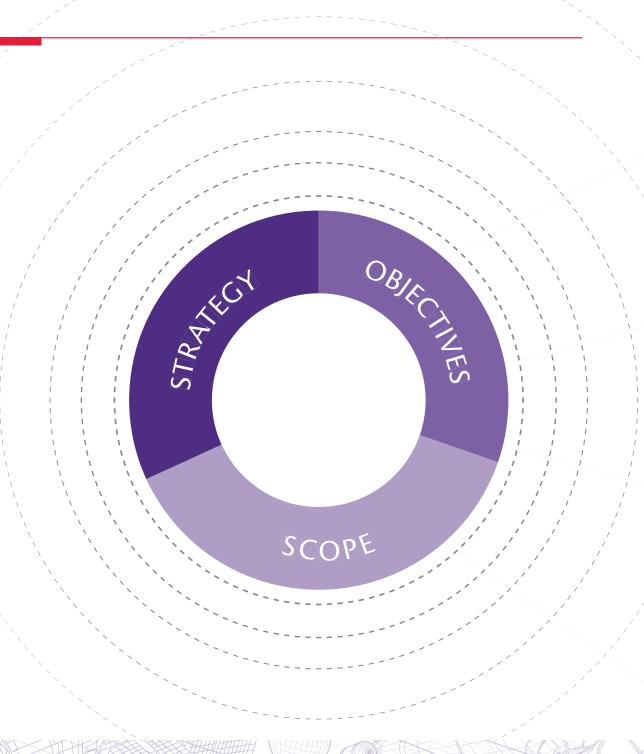
With a growth of national investments and activities in the field of space, and considering what the space industry witnesses from technical, economic and political developments, the UAE government aims at putting national policies and frameworks to support and regulate the space sector in the state according to what suits these international developments, and aligns with the UAE government's ambitions and higher interests that have manifested in the national agenda of the UAE vision 2021 and centennial 2071. They are aimed at enhancing the role of the space sector and its contribution to making the UAE among the best countries in the world, to have a stable and diverse economy and to transition towards a knowledge-based economy centred around innovation, and at uplifting the level of education, and increasing national expertise and qualifications, thus ensuring the flourishing of current and upcoming Emirati generations.

The national strategy for space aims at supporting the achievement of this national vision by the space industry with its different sciences, technologies, applications and services. It also translates the space policy issued in 2016 into a group of programs and initiatives that the space sector in the state will work on executing during the coming decade, with the purpose of reaching the national ambitions drawn by the space policy.

The strategy, objectives and scope

The purpose of this strategy is to translate the national space policy issued by the UAE in 2016 into Areas of Focus and a collection of high priority initiatives and programs that seek to establish the national purposes and ambitions in the space industry that have been drawn by the national space policy, with a guaranteed commitment to the principles mandated by the policy.

This strategy is concerned with the space industry and space activities of the UAE during the period 2018-2030, and this includes governmental (non-military), commercial, and scientific space activities executed by the operating bodies of the public and private sectors, the academic institutions and R&D centres. This strategy is also concerned with the national space activities and those of other countries that national operating bodies participate in or contribute to.



The UAE Space Agency has developed the national space strategy based on:



Decree-Law No 1 in the year 2014: concerned with the creation of the UAE Space Agency and which states the relevant objectives and competences;



The national space policy, issued in 2016, which defines the role of the agency in guiding the sector, and in coordinating and cooperating with the different concerned parties to apply the policy and reach its objectives and ambitions:



Launched in April 2017, the UAE national space program aims to achieve an integrated scientific plan and prepare scientific and technical UAE executive staff specialized in the exploration of the Red Planet, and in its final stages targets building the first human colony on Mars within 100 years;



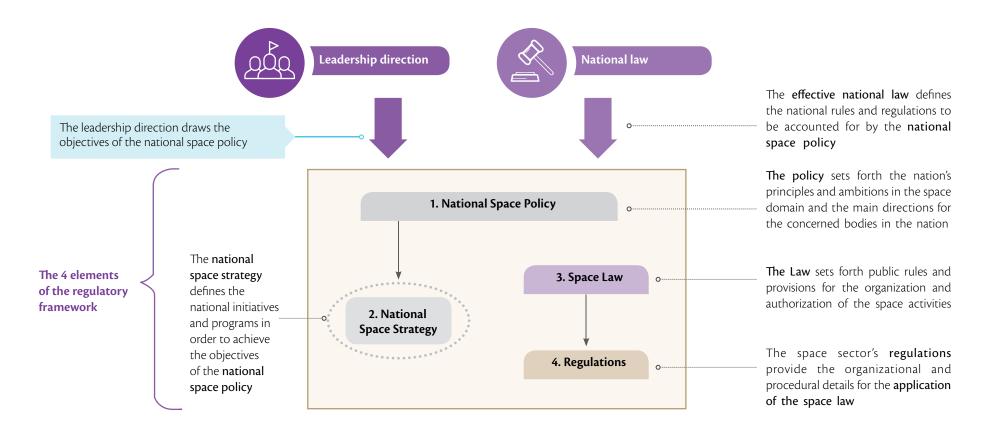
The higher policy on sciences, technology and innovation and the national strategy for innovation



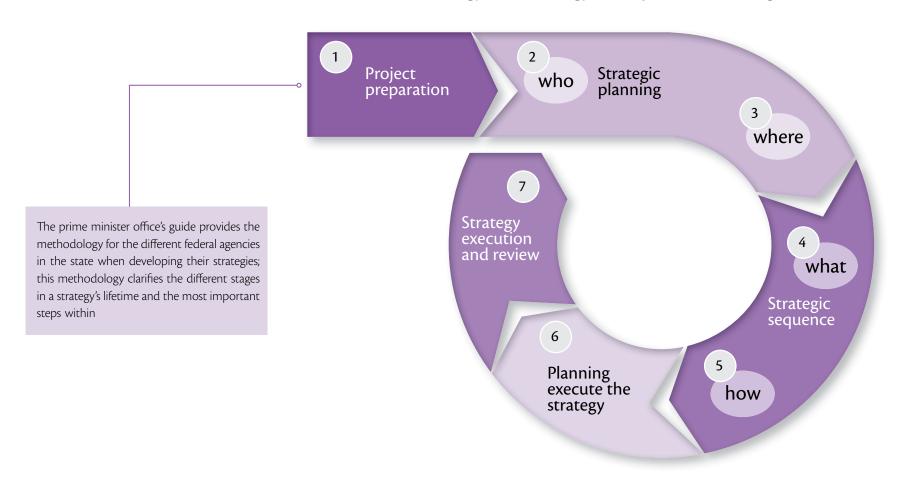
The fourth industrial revolution strategy

The regulatory framework of the space sector

Based on the relevant objectives and competences, the UAE space agency is working on developing the strategic and regulatory framework of the state's space sector. This strategy is considered one of the four main elements for organizing the space industry, and is inspired from the national space policy, as presented in the following figure



The methodology of the strategy development and its stages



Linking the strategy with the national space policy

The national space strategy originates from and aligns with the policy. It also defines the areas of focus and initiatives necessary to achieve the objectives and ambitions of the policy.

National Space Policy

Principles:

they have been consulted to select prioritization standards

Objectives:

they have been consulted to define the objectives of the areas of focus

Guidelines:

they have been consulted for the initiatives of the areas of focus and the enablers

Enablers:

they have been consulted in the initiatives and the objectives of the enablers

Execution

Methodology of the strategy preparation

The national

space policy

guides the

strategy

Value chain definition of the space sector, made of 23 elements

Selection of the areas of focus of the UAE through prioritization and

grouping of elements

Selection of the objectives specific to the areas of focus

Development of particular initiatives in each of the areas of focus to achieve their objectives

Development of particular initiatives and objectives for each of **the enablers** that is considered necessary to support the areas of focus

Defining the execution plan and the governance model

Market studies' inputs to the strategy placement process

Space market studies

They have been consulted mainly to evaluate all the elements of the value chain and to place the objectives of the areas of focus

Evaluation of the global space market and sector

The main level of the UAF capabilities

Desk research and experts' inputs

Source: UAE Space Agency, experts in the field

Studies performed to develop the strategy and the regulatory framework of the space sector

Various studies have been performed and analysed based on trusted and reliable sources, with the purpose of developing the regulatory framework including the UAE space strategy:

Studies

Legal studies

- International treaties
- Space laws of other states
- Related national laws

Political studies

- Leadership guidelines
- Other states' space policies
- Federal policies in the UAE

Global market evaluation

- Market reports
- Inputs of experts in the field
- Desk research
- Interviews with experts

Current situation in the UAE

- Polls for concerned bodies
- Interviews with Stakeholders
- Interviews with responsible people in the space agency
- Desk research

Inputs from experts in the field and international partners

- Other space agencies
- Inputs from experts in the field
- International organizations expertise

Outputs

1. Policy

2. Strategy

3. Law

4. Rules and regulations

Alignment with other national strategies and policies

In October 2017, The UAE government launched "The Emirates Centennial Plan 2071" through which it announced its intention to become the best government in the world and among the top countries worldwide in the various relevant disciplines by 2071, i.e. 100 years after the establishment of the UAE.

This fierce vision stems from the leadership of the UAE thanks to its achievements, which have preceded expectations in establishing its national vision for 2021, where the state proved its success and its capability to be among the top countries of the world within the 50th anniversary of the union's establishment. It has also managed to become the world leader in more than 50 international indicators.

The national space strategy aims at supporting the establishment of this vision by including the space industry in its various sciences, technologies, applications and services. It was therefore important when developing this strategy to align with the objectives, ambitions and priorities that both the UAE vision for 2021 and Emirates Centennial Plan 2071 pointed at.

The study of the development of the strategy included the analysis of more than 29 strategies and federal & local plans at the UAE level. It also considered the objectives and priorities to select the national initiatives in the space domain that support these plans and strategies, and that contribute to establishing the ambitions and priorities of other sectors. Among the most important of these national and local strategies and plans are:

- Centennial plan 2071
- UAE vision 2021
- Sciences, technologies and innovation policy
- Artificial Intelligence strategy
- The fourth industrial revolution strategy
- Future Foresight Strategy
- · The guide on policy alignment to establish happiness
- Education strategy 2020
- Energy strategy 2050

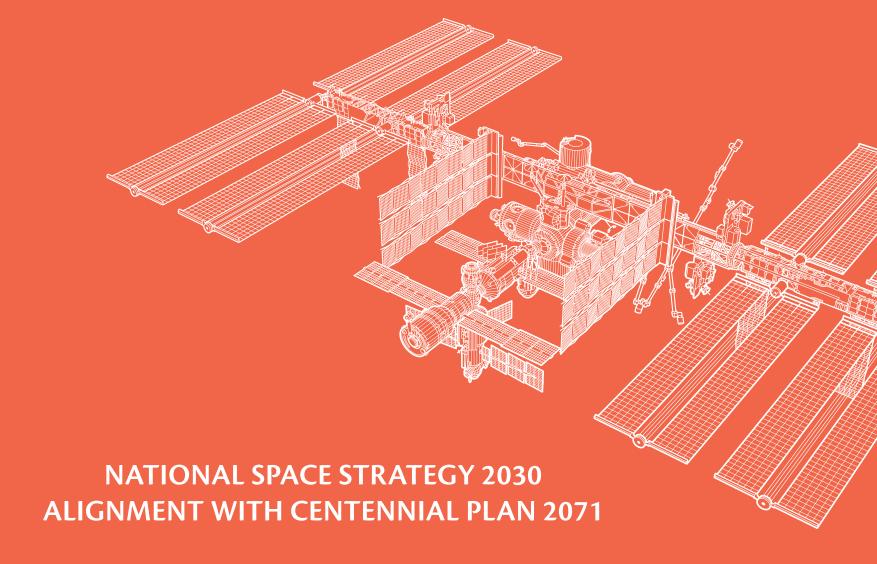
- UAE water security strategy 2036
- Electronic infrastructure protection policy
- Youth empowerment strategy
- The guide for gender equality at work
- UAE soft power strategy
- Foreign aid strategy
- · Communications policy
- Aviation policy
- · Nuclear power evaluation and development policy

- Abu Dhabi plan 2030
- Dubai plan 2021
- · Abu Dhabi Economic and **Environmental Vision**
- Abu Dhabi Surface Transport Master Plan (STMP)
- Dubai 3D printing strategy
- Dubai autonomous transportation strategy

NATIONAL SPACE STRATEGY 2030 ALIGNMENT WITH UAE VISION 2021

National Space Strategy 2030 alignment with UAE Vision 2021

	NATIONAL SPACE STRATEGY 2030							
UAE VISION 2021	Provision of Competitive and Leading Space Services	Development of advanced local capacities in Space technology manufacturing and R&D	Launching Inspiring Space Scientific and Exploration Missions	Creating Space Culture and Expertise	Effective Local and International Partnerships and Investments in the Space Industry	Ensure a supporting legislative framework and infrastructure to match the future developments in the sector		
Sustainable environment and infrastructure	x				x	х		
First-rate education system	х	X	x	x				
Cohesive society and preserved identity			x	x				
Safe public and fair judiciary	х	x	X	X		x		
Competitive knowledge economy	x	×	x		x	x		
World-class healthcare	х	x	×					



National Space Strategy 2030 alignment with Centennial Plan 2071

CENTENNIAL PLAN 2071		NATIONAL SPACE STRATEGY 2030						
		Provision of Competitive and Leading Space Services	Development of advanced local capacities in Space technology manufacturing and R&D	Launching Inspiring Space Scientific and Exploration Missions	Creating Space Culture and Expertise	Effective Local and International Partnerships and Investments in the Space Industry	Ensure a supporting legislative framework and infrastructure to match the future developments in the sector	
[>	Twenty-second century skills	х	x	x			
The best education in the world		Latest educational methods			x			
	>	Education is available anytime and anywhere			х			
Γ	>	Professional Future Powers		×	x			
The best economy		Pioneer and global economic sectors			x		X	х
in the world		Advanced economic environment			x		X	x
	>	Sustainable development for future generations		x	x			x
The happiest society in the	>	Future generations	x		x	x		
world	>	Best cities to live in the world			х			х
The best	>	The role of future government	x				х	х
government in the world		Future government services	x					x
L	>	Policies and legislation of future government						x

Alignment with international policies

In September 2015, the world leaders adopted the 17 sustainable development goals and their 169 purposes for the SDG2030. Given the important role of the UAE in supporting these goals and given the role of space in achieving many of these goals, they have been accounted for when preparing the strategy.

In 2016, the high level forum that took place in Dubai on the role of space as a driver of social and economic sustainable development under the umbrella of the UN, announced "Dubai 2016," which defines the most important recommendations for emphasizing the global economic and social role of space, and which were taken into account in the UN's decision about the role of space in sustainable development in 2018. This announcement was also considered when preparing the national space strategy.

In 2017, after several years of international negotiations, the COPOUS committee approved a group of guidelines to enhance the sustainability and stability of the space environment (Long Term Sustainability Guidelines), which have also been taken into account when preparing the strategy.

In January 2018, the international coordination team for space exploration issued an international space exploration roadmap for 2040 (ISECG Roadmap), and this roadmap has been considered when preparing the national space strategy

In March 2018, the second international forum for space exploration (ISEF2) issued the principles of space exploration that have been supported by more than 50 countries, and these principles have been taken into account when preparing the national space strategy.







































Alignment with national and international laws

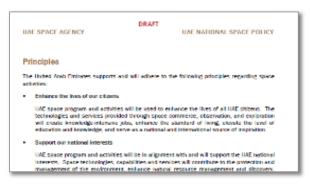
This strategy has been reviewed to ensure its alignment with the relevant national laws of the UAE, such as communications and aviation, etc.

The strategy has also been reviewed to ensure its alignment with space international agreements that are relevant and of which the state is considered a member, such as the Treaty on the Peaceful Use of Outer Space, the Liability Treaty, the Space Objects Registration Treaty, and the International Radio Regulations, etc.

Space sector value chain analysis and the definition of the Areas of Focus

The 23 elements have been evaluated based on recruitment (attraction) and feasibility (possibility) criteria derived from policy and capacity requirements:

a. Recruitment criteria have been drawn from the policy principles



#	The state's recruitment criteria
S1	Future market size
S2	Financial return
S3	Participation in R&D and IPRs
S4	Advantages with respect to other sectors
S5	Partnership possibility
S6	Participation in the basis of knowledge
S7	Balancing the quality of life
S8	Participation to pride and ambitions on a national level
S9	Supporting national interests

b. Feasibility criteria have been drawn based on capacities, requirements of the different elements of the value chain and on enablers.



With 23 elements in the value chain, ranks were put for each one based on 18 criteria, and a total of 32 sub-criteria

 $32 \times 23 = 736$

evaluation procedures

#	The state's recruitment criteria
S 1	Current sector activity
S2	R&D activities
S3	Initiatives supporting the space sector
S4	Support from other sectors
S5	Enabled partnerships
S6	Educational programs and the availability of human resources
S 7	Capital and financing
S8	Facilities and infrastructure
S9	Rules and regulations

Consultations and coordination in preparation

More than 17 local entities have been coordinated with; furthermore, the agency has consulted the most well-known experts in the space domain through the consultation committee:

A. ADVISORY COMMITTEE

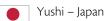
Farouk Al Baz – USA

Jean-Jacques Dordain – France

Charlie Elashi – USA

Mazlan Othman – Malaysia

Sir Martin Sweeting – UK



Sundong Park – Korea

Tayeb Kamali – UAE

Saeed Al Dhaheri - UAE



B. SPACE LAW AND POLICY DEVELOPMENT TEAM





















C. OTHER ENTITIES













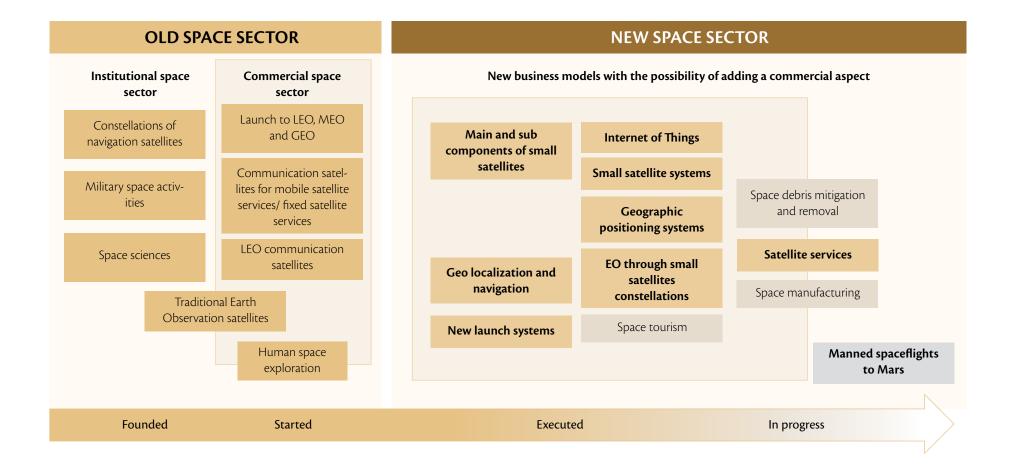




CHAPTER TWO: THE GENERAL SCENE OF THE LOCAL AND GLOBAL SPACE SECTOR

The global scene: development in the activities of the old and new space sector

The space sector witnesses global economic, technological and geopolitical developments, and highlights the commercialization of activities, which will contribute to enhancing innovation, growth and the development of new business models:



Main global directions in the space sector

There are 7 main global directions in the space sector

Increasing number of players: 72 space agencies and centres, 14 space faring nations, 59 nations with satellites. Strong representation from governments and developing countries and the educational sector

Growth in the space economy: 350 B\$, 76% of commercial financial return, 9,6% growth rate, increase in spending, increase in investors, growth of private investment by 30%, emergence of new companies, SMEs, competition between China and India

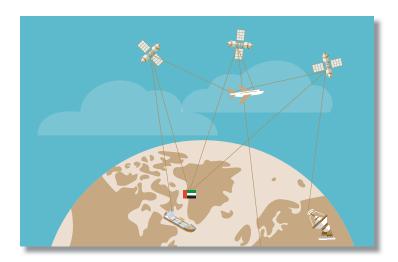
Bigger international cooperation: active regional alliances in Asia and Europe, the start of African cooperation, start of Arabic cooperation, more partnerships in exploration, bigger opportunities for collaboration and cooperation, information exchange and open data policy, enhancing the role of space in sustainable development

A leap in space security and military utilization: for Sustainable development goals, navigation, transportation, logistics and R&D

Higher quality technologies: reusable launch vehicles, small satellites, wide range, internet of things, laser, high resolution remote sensing and navigation, advanced data processing and analysis capacities, advanced energy storage capacities

New Activities: sub-orbital flights, space resources extraction, launch from space, space tourism

Crowded space environment: > 1700 active satellites, 20000 catalogued space bodies and debris, 70% in LEO, expected 10X increase within the next 7 years, increase in launch operations, re-entry, number of satellites, space debris and the number of operators, scarcity in frequencies and orbital locations





A general overview on the global directions in the space sector value chain (1/2)











Science

- Increasing interest in space sciences and astronomy
- Increasing interest in performing scientific experiments in space
- Main research areas: discovering newspace bodies and dark matter, learning from nature, life on other planets, impact of space weather and space environment

R&D

Courtesv: NASA / IPL-Caltech / Lockheed Martin

- · Science technology and innovation roadmap
- Programs for space technology transfer into other sectors
- Dedicated and published R&D budgets
- Focus on: small satellites, launch. remote sensing, navigation, communications, robotics and energy

Manned spaceflights

- · Increasing global interest and from the private sector
- · Russians control manned spaceflight launches
- The US intends to bring back its manned spaceflight launches through the private sector
- Sub-orbital manned spaceflight and space tourism
- · Announcing manned spaceflights to Mars

Exploration

- · Increasing global interest and from the private sector
- Developing common strategies and missions
- Focus on: the space station, Moon, Mars and asteroids
- Common robotic and manned spaceflights

Launch

- 10 launching nations (6 commercial), India and China competing
- 80 launches annually, 60% to GEO
- 90 launch vehicles currently available
- Developments: reusable vehicles, light weight cargo vehicles, heavy cargo vehicles, sub-orbital launch vehicles, horizontal launch, and launch from space

A general overview on the global directions in the space sector value chain (2/2)









Source: Yahsat

Ground systems manufacturing

- The private sector controls the manufacturing of ground stations and networks, fixed systems and mobile devices systems
- Limited but fierce competition between manufacturing companies
- Increasing interest in mobile devices systems (very small chips), also mobile devices for aircrafts, ships, vehicles, and integration with ground communications

Satellite manufacturing

- High technology cargo
- Small satellites and the pursuit to develop their utilisations and capacities
- Mass production and the move towards unified standards and automation
- · Assembly in space

Applications and value added

- Broadband, radio, remote sensing and navigation applications dominate over space services and applications
- Increased interest in broadband applications and navigation on vehicles and mobile devices of all kinds
- Interest in the integration of space applications, and with the ground applications
- Insurance services are working to keep up with developments in the sector

Operations of ground stations

- Increase in the number of operations, control and surveillance stations due to the increasing number of satellites and small satellites
- Utilization of small satellite stations by the academic sector and amateurs
- The US has the biggest capacities for space bodies tracking
- Limited number of nations globally with capacities in deep space stations

The journey of the development of the UAE space sector

The UAE has witnessed many leading achievements and projects regionally and internationally since the year 2000, and it plans to continue and enhance these successes through the next phase...

- Launching the first UAE satellites for mobile communications
 ThurayaSATs 1-3 for
 - ThurayaSATs 1-3 for mobile satellite communications
- Launching the first UAE satellites for fixed communications
 - YahSAT Y1A for fixed communications and broadcasting
 - YahSAT Y1B for broadband services

- Founding the UAE Space Agency
- Announcing the Mars exploration program (hope probe)

- Issuing the Space Strategy
- Launching the first UAE nanosat for scientific research
 - Manufactured by UAE hands
 - Partnership with local and international universities
- Announcing the astronaut program and Mars 2117 program

- More achievements ...
- Sending astronauts
- The enactment of regulations and regulatory procedures
- Launching new research projects
- Launching UAE satellites
- Launching hope probe



- 2014
- 2017

2015/2016

2018

2019 ≥

- Launching the first UAE satellite for remote sensing
 - DubaiSAT 1
 - 30% manufactured by UAE hands
 - 4m resolution

- Launching the second UAE satellite for remote sensing
 - DubaiSAT 2
- 50% manufactured by UAF hands
- 1m resolution

- Creating the
 Mohammed Bin Rashid
 Space Center
- Issuing the national space policy
- Founding the UAE center for space research and sciences
 - Specialized R&D
 - Small satellite manufacturing

- Launching the 3rd YahSAT
 - Coverage of South America
 - Broadband and broadcast
- Launching KhalifaSAT
 - 100% manufactured by UAE hands
 - 0,6m accuracy
- Issuing the space law

The UAE has witnessed many leading missions and projects regionally and internationally since the year 2000, and it plans to continue and enhance these successes through the next phase...

Activities in the UAE Space Sector

Current grand initiatives in the UAE Space sector

EXPLORATION AND DEVELOPMENT COMMERCIAL SERVICES Manufacturing, assembly, R&D Value added services Ground operations integration, testing Conventional communications companies utilizing satellite technologies Communications Innovation and space Providing broadcasting services research Satellite communications solutions for non serviced areas Mobile satellite • R&D with focus on Earth Broadcasting services services providers observation and remote Designing and selling satellites cell phones sensing Solutions for fast internet and satellite broadcasting services Fixed satellite • Projects with private Satellite services for defence applications companies Satellite communication solutions SMEs in satellite Space broadcasting • Beginning the Operating ground stations development of smallsats through partnerships SMEs in Earth Conventional communications Observation companies utilizing satellite technologies Founding the national centre for space sensing Providing broadcasting services sciences and technology Space Insuring launch operations Insuring orbital operations R&D • Research related to · Design and manufacturing • Earth observation and control operations · Earth observation and satellite imaging centres for particular missions Renting ground activities services the Space R&D in satellites and · Design and manufacturing Earth Observation satellite domain 3rd YahSAT satellite project technologies KhalifaSAT project UAE Mars exploration project

A general overview of the national developments in the space sector value chain (1/2) *











Science

- Research and centres specific to space sciences and astronomy
- The Mars project has created a big interest in the sciences of planets and bodies
- Increasing interest in performing scientific experiments in space
- Main research areas: astronomy, tracking space objects, solar energy dynamics, encryption, sciences of resources and structures

R&D

- 4 space research centres,
 15 entities interested in space research
- National strategies for sciences and innovation, the 4th industrial revolution, artificial intelligence, automatic control
- Satellite tasking, sensing and communication technologies, robots and autonomous control, unmanned vehicles, energy and computer processing

Manned spaceflights

- Announcement of the astronaut program
- Interest in space tourism flights projects

Exploration

- Probe of hope project
- Project to build a city on the surface of Mars by 2117

Launch

- No launch capacities
- Interest and investment in foreign projects for sub-orbital flights

^{*} The local sector scene up to December 2017

A general overview of the national developments in the space sector value chain (2/2) *









Ground systems manufacturing

- No capacities in ground systems manufacturing
- Cooperation in designing reception stations and receivers
- Collaboration in designing mobile satellite services phones

Satellite manufacturing

- Local centre and capacities to manufacture and assemble medium satellites
- Developing a centre to manufacture small satellites
- Commencement in university capacities and laboratories to manufacture nanosats
- Manufacturing 100% of the KhalifaSAT satellite
- Manufacturing focuses on observation satellites for LFO

Applications and value added

- Local applications exist on a level of high quality concerning broadband, radio and remote sensing
- Insurance company on an international level
- Increasing local interest in broadband, radio and remote sensing
- 5 main national institutions and a number of SMEs

Operations of ground stations

- Stations inside the state to operate and control fixed and mobile communication satellites, and Earth observation satellites
- Stations outside the state to operate communications satellites
- Stations for space data transfer services
- Areas to host antennas and stations for rent

^{*} The local sector scene up to December 2017



CHAPTER THREE: THE VISION, MISSION AND STRATEGIC GOALS

General overview of the national space strategy

The national space strategy 2030 includes:

71 initiatives to accomplish 18 programs for achieving the strategic goals and vision



The strategic mission of the space sector

"The UAE will continue to establish its position among leading nations in the space sector and enhancing the sector's role in supporting its knowledge based economy, through executing ambitious space programs and missions; promoting R&D efforts in space; expanding the scope of space utilization and the opportunities to benefit from sciences, technologies and space applications; creating an effective and attractive regulatory environment; developing specialized expertise and attracting intellectuals; motivating innovation in youth; building practical partnerships between industrial, educational and research institutions; and strengthening cooperation on the regional and international levels."



UAE strategies in the national space program



Strategic Goal 1

Provision of Competitive and Leading Space Services

Direction: The UAE will work on enhancing its leadership and expanding its activities in the domain of space-based services. It will work on enhancing investments in innovative solutions and applications on this topic, and encouraging and expanding the scope for benefiting from these services locally and globally.



Strategic Goal 2

Development of advanced local capacities in Space technology manufacturing and R&D

Direction: The UAE will work on enhancing and expanding its R&D and manufacturing capabilities of satellites and related technologies. It will also work on coordinating programs and national efforts on this matter, and the development of its national expertise and partnerships in this discipline.



Strategic Goal 3

Launching Inspiring Space Scientific and Exploration Missions

Direction: The UAE will work on the development and sustainability of ambitious activities in space sciences and exploration, including manned trips. It will increase its contribution to the space science community and enhance its plans, expertise, capacities and partnerships in this area.



Strategic Goal 4

Creating Space Culture and Expertise

Direction: The UAE will work on the efficiency and diversity of its awareness activities on the UAE space industry and on the space sector in general. It will address the different types of the population and shed light on the accomplishments of the state, the Arabs, the Muslims and the world in this inspiring scientific domain. It also aims at coordinating the efforts to achieve competence, diversity, and complementarity in the awareness programs.

The UAE will continue to develop its national expertise in the different domains related to space. It also continues to enhance the national efforts and the placement of a complete program that matches the national needs, ambitions, priorities and the market demand of the sector. It continues to enhances the partnerships and cooperation locally and internationally on that matter, and the placement of a methodology for the continuous development and stimulation of the national capacities.

UAE strategies in the national space program



Strategic Goal 5

Effective Local and International Partnerships and Investments in the Space Industry

Direction: The UAE will work on enhancing collaboration and partnership opportunities in the space sector locally, regionally, and internationally. There will be evaluations on the efficiency of these collaborations and partnerships as well as on the membership of the state in international organizations and its level of participation. The state will continue to host major global space events.

The UAE will work on enhancing financing and investment opportunities for promising space projects and institutions. Policies and other mechanisms will be developed to attract foreign investment and international companies, and to encourage start-up projects and small and medium enterprises (SME) and entrepreneurship. The role of the media will be enhanced, and there will be hosting of events to increase knowledge on the different opportunities for investing in space, to facilitate the connections between entrepreneurs and investors.



Strategic Goal 6

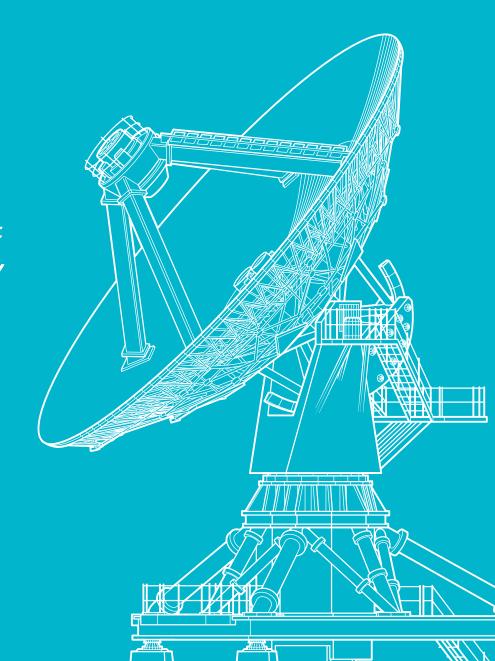
Ensure a supporting legislative framework and infrastructure to match the future developments in the sector

Direction: The UAE will work on the development of a regulatory environment attractive to the different space activities, that is transparent and futuristic, and that balances between the safety, security and environmental needs on one side, and the economic, commercial and innovative needs on the other. It will also enhance the efforts internationally in decision making, and the alignment between local and global regulations.

The UAE will continue developing its capacities and regulations in orbital frequencies and position management that are used by space activities, and it will enhance its efforts in utilizing new frequencies and modern technologies ensuring safety and competence. It will also carry on with its leading role, and its effective coordination on a regional and international level on this matter.

The UAE will work on enhancing the opportunities of benefiting from the facilities of its space activities particularly in R&D, manufacturing and testing. This will happen through its local, regional and international participation in what is relevant, and a mechanism will be developed to ensure the application of standards that enhance the safety and security of its space facilities. The needs of the sector will be followed up from other supporting services, and the coordination of their availability to the extent possible.

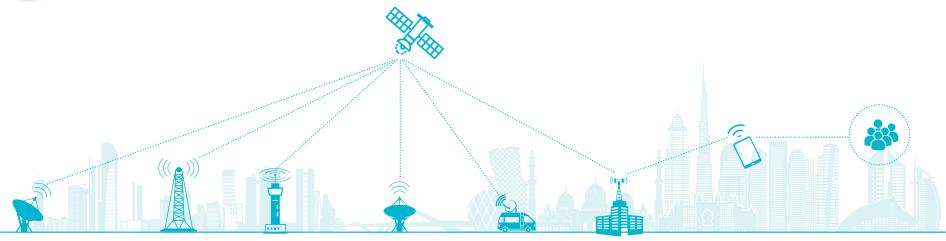
LIST OF STRATEGIC GOALS, PROGRAMS AND INITIATIVES OF THE NATIONAL SPACE STRATEGY



Strategic Goals, Programs, and Initiatives



1. Provision of Competitive and Leading Space Services



Program 1.1

Leadership of the national institutions in the space sector, and increased utilization of its applications and services

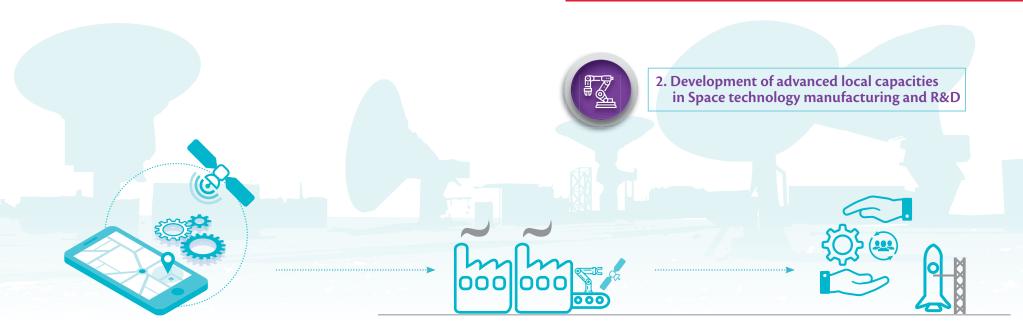
Initiatives

- 1.1.1 Define the international changes in the space market, and the short and long term opportunities for the leading national institutions
- 1.1.3 Evaluate the capacities and capabilities of R&D and determine the priorities in the opportunities for improvement
- 1.1.4 Develop and promote the contribution of space services and applications in achieving the Sustainable Development Goals
- 1.1.5 Develop and enhance the utilization of satellite services and technologies in national disaster and crises management

Program 1.2

Developing new value added space services

- 1.2.1 Develop systems and capacities to enhance satellite based navigation
- 1.2.2 Develop integrated space applications and integrating them with ground applications
- 1.2.3 Support the development and provision of space insurance services
- 1.2.4 Facilitate the provision of "space tourism and space trainings" services



Program 2.1

Enhancing space R&D activities, capacities and efforts

Initiatives

- 2.1.1 Develop the national roadmap and priorities specific to science, technology and space innovation
- 2.1.2 Launching research projects in high national priority fields
- 2.1.3 Evaluate the capacities and capabilities of R&D and determine the priorities in the opportunities for improvement
- 2.1.4 Put in place programs to enhance the capacities and expertise of workers in R&D centres and to attract minds
- 2.1.5 Develop the capacities of space R&D centres and facilities in the UAE including data storage facilities

Program 2.2

Supporting and enhancing satellite manufacturing capacities and related technologies

Initiatives

- 2.2.1 Develop an active mechanism to transfer knowledge and technologies in space and satellite manufacturing to the state
- 2.2.2 Enhance and support capacities in design, assembly and integration of advanced space systems and technologies of high national priority
- 2.2.3 Perform experiments and missions to increase the capacities of small satellites including utilizing them in space exploration missions
- 2.2.4 Create a national program for small satellites to encourage and organize projects and to support innovative ideas
- 2.2.5 Develop guidelines to enhance efficiency and safety in small satellite utilization
- 2.2.6 Expand the facilities and capacities for additive manufacturing, integration and testing, and commence utilizing them

Program 2.3

Increase the opportunities for the transfer of space technologies from and to other industrial sectors

- 2.3.1 Development of a program and mechanism to support the transfer of space technologies to other industrial sectors (spin-off)
- 2.3.2 Develop a mechanism to stimulate technology spin-ins from other industries to the space sector



3. Launching Inspiring Space Scientific and Exploration Missions



Program 3.1

Developing the basic sciences related to space and astronomy

Initiatives

- 3.1.1 Develop and implement research projects in space sciences and astronomy
- 3.1.2 Create a program for conducting scientific experiments in the space environment
- 3.1.3 Design national and international competitions and prizes for space science, applications and solutions

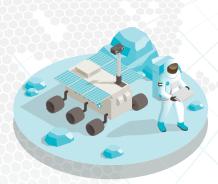


Program 3.2

Sustainability and expansion of the national space exploration program scope

Initiatives

- 3.2.1 Emirates Mars exploration program (Hope Probe)
- 3.2.2 Develop a long term road map for space exploration missions and the stages of the Mars 2117 program
- 3.2.3 Attract the private sector into the space exploration activities including space resources utilization
- 3.2.4 The Arab program for space exploration
- 3.2.5 Create the Emirati astronauts program
- 3.2.6 Conduct experimental and testing projects related to sub-orbital flights and manned orbital flights



Program 3.3

Developing centres and facilities to support space exploration activities

- 3.3.1 Enhance the control and operations capacities for space exploration operations
- 3.3.2 Develop facilities that simulate space living conditions



Program 4.1

Support the initiatives for raising awareness on space activities and achievements of the Arab region and to foster a sense of national pride

Initiatives

- 4.1.1 Develop an informative program to spread knowledge about the national achievements in space and about the space sector in general
- 4.1.2 Develop a program to introduce and promote the UAE space sector, including Expo 2020 (Dubai)



4. Creating Space Culture and Expertise



Program 4.2

Achieve compatibility of education systems with the requirements of the space sector

Initiatives

- 4.2.1 Develop a scholarship program for the space domain
- 4.2.2 Develop space related curricula for general education
- 4.2.3 Provide local educational programs and curricula for university students on space technologies
- 4.2.4 Develop interactive learning platforms for the field of space and the national space sector



Program 4.3

Develop and motivate personnel in the space sector

- 4.3.1 Provide specialized programs for knowledge transfer and development in the space sector
- 4.3.2 Stimulate and retain space sector personnel while taking gender balance into consideration
- 4.3.3 Identify labor market requirements and priorities of the space sector while taking gender balance into consideration
- 4.3.4 Space Scientists Program



5. Effective Local and International Partnerships and Investments in the Space Industry

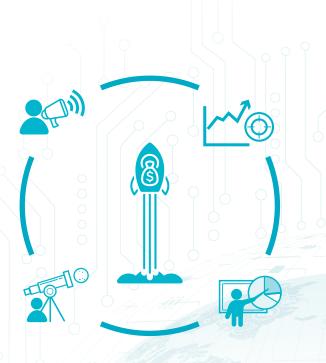


Program 5.1

Enhance partnerships in the space sector and with other sectors

- 5.1.1 Strengthen the coordination and partnerships between institutions operating in other sectors
- 5.1.2 Develop a database for the capacities and products in the UAE space sector and related projects and identify opportunities for local cooperation and partnerships
- 5.1.3 Develop a plan for international partnerships in the space sector with a focus on education, research and development, technology transfer, private sector stimulation and enhanced access to space
- 5.1.4 Join international alliances for the exchange of space data and expertise related to the protection of the environment and the management of disasters and crises
- 5.1.5 Develop and implement a national plan to enhance representation in international space organizations and participation in international agreements
- 5.1.6 Develop and implement a plan for hosting major international space related events

- 5.1.7 Host an international (or regional) center / office in collaboration with an international space organization
- 5.1.8 Develop a mechanism to identify key international projects of interest to the state and the opportunities of joint participation
- 5.1.9 Create a regional working group in the field of space and develop a joint work plan









Program 5.2

Increase financial support and investment attractiveness in the space sector

Initiatives

- 5.2.1 Develop a policy to promote the financial support of national projects on space sciences, research and exploration
- 5.2.2 Develop a plan to promote investment in the space sector
- 5.2.3 Develop a plan to conduct campaigns to promote investment in the space sector

Program 5.3

Support innovation and entrepreneurship in the space sector

- 5.3.1 Develop a mechanism to support innovation and entrepreneurship in the space sector
- 5.3.2 Promote investment opportunities in new space fields, especially in launch capabilities
- 5.3.3 Launch the energetic and creative Emirati youth into the space sector through a Space Youth Council



6. Ensure a supporting legislative framework and infrastructure to match the future developments in the sector

Effective management and coordination of the interests of the space sector regarding the radio spectrum and orbital positions

Initiatives

- 6.3.1 Identify frequency bands and orbital positions of priority to UAE's space related activities
- 6.3.2 Develop standards, procedures and capacities to increase the efficiency of spectrum and orbital use as well as situational awarenes

Encourage the sharing of space facilities and infrastructure

Initiatives

- 6.4.1 Develop a plan to ensure the application of protection and security standards for the facilities and infrastructure of the space
- 6.4.2 Establish a program to share space facilities locally and internationally
- 6.4.3 Evaluate and provide recommendations on current and future needs for infrastructure, facilities and other logistical services supporting institutions and space activities

Effective management of risks and threats to enhance the security and protection of space facilities and infrastructure

Initiatives

- 6.2.1 Develop a national plan for space risks management
- 6.2.2 Establish an investigation mechanism for space related accidents and incidents

Program 6.2

• Program 6.4

• Program 6.3

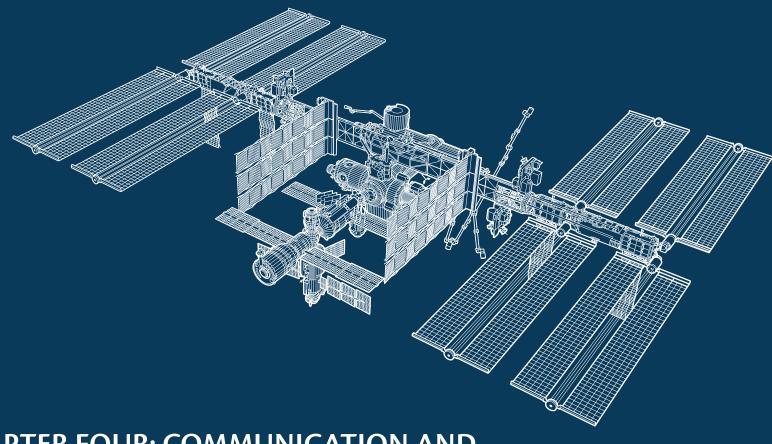
Create an attractive regulatory environment for the space sector

Initiatives

- 6.1.1 Develop the regulatory framework for the space sector and monitor compliance
- 6.1.2 Develop the authorization system for space activities
- 6.1.3 Establish a mechanism to ensure effective participation on an international level through paper work and reports on the state's effort
- 6.1.4 Develop a plan to reflect on the size of the space economy and its growth in global reports

Program 6.1





CHAPTER FOUR: COMMUNICATION AND GOVERNANCE



COMMUNICATION

The National Space Policy Framework (NSPF) has seven primary stakeholder groups, in addition to the general public

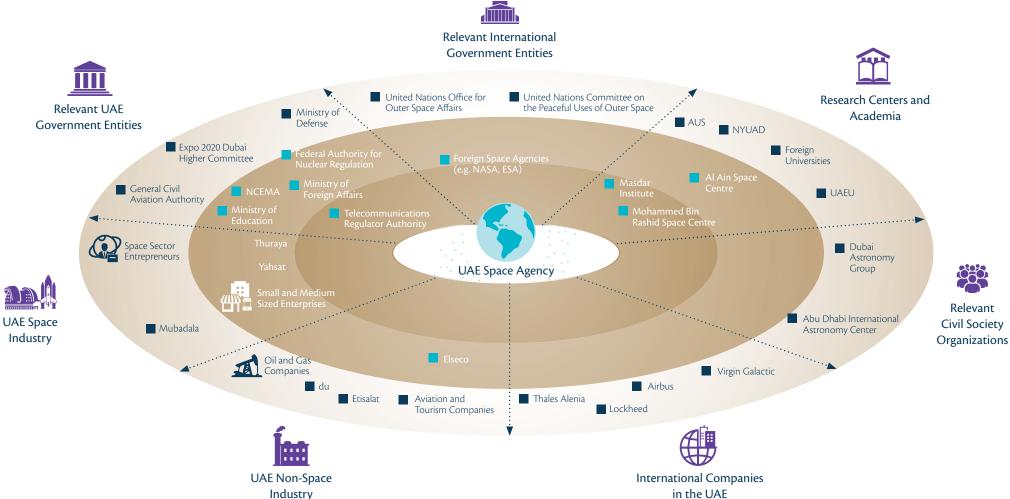
NSPF stakeholder groups¹

	RELEVANT UAE GOVERNMENT ENTITIES	RELEVANT INT'L GOVERNMENT ENTITIES	UAE SPACE INDUSTRY STAKEHOLDERS	UAE NON-SPACE INDUSTRY STAKEHOLDERS	INTERNATIONAL COMPANIES IN THE UAE	RESEARCH CENTERS AND ACADEMIA	RELEVANT CIVIL SOCIETY ORGANIZATIONS
Description	Public sector entities that contribute to the development and achievement of UAE policies, visions, regulations and strategies within their domains	Foreign space agencies and international governance bodies that facilitate a growing role of the UAE in the global space community	Private sector companies and individuals that directly contribute to the economic growth of the UAE space sector	Private sector companies that have the potential to benefit from space sector development thereby growing the overall UAE economy	International space and aerospace companies with active operations in the UAE that enable UAE space sector growth by offering more advanced capabilities	Research centers and academic institutions that are critical in driving space research and technology development and preparing the next generation of space experts	Civil society organizations that contribute to increased interest in space among the wider population and support in basic space science development
Key stakeholders	 Telecommunications Regulatory Authority Federal Authority for Nuclear Regulation Ministry of Education Ministry of Foreign Affairs 	 Foreign Space Agencies (e.g. NASA, ESA) United Nations Office for Outer Space Affairs United Nations Committee on the Peaceful Uses of Outer Space 	 Yahsat Thuraya Mubadala Small and Medium Sized Enterprises (e.g. Global Scan Technologies) Space Sector Entrepreneurs 	 Telecom Companies (e.g. Etisalat, Du) Oil and Gas Companies (e.g. ADNOC) Aviation and Tourism Companies (e.g. Emirates) 	LockheedThales AleniaAirbusVirgin Galactic	 Mohammed Bin Rashid Space Centre Masdar Institute UAEU NYUAD AUS Al Ain Space Centre 	 Abu Dhabi International Astronomy Center Dubai Astronomy Group

^{1.} These stakeholder groups have been revised from those identified in the 2015 Stakeholder Analysis Report to better align with the National Space Strategy and therefore better inform the stakeholder engagement required to implement the National Space Policy Framework, including the Policy, Law, and Strategy.

Implementation of the NSPF will require that the Space Agency conduct effective, tailored engagement with each stakeholder group

NSPF stakeholder landscape

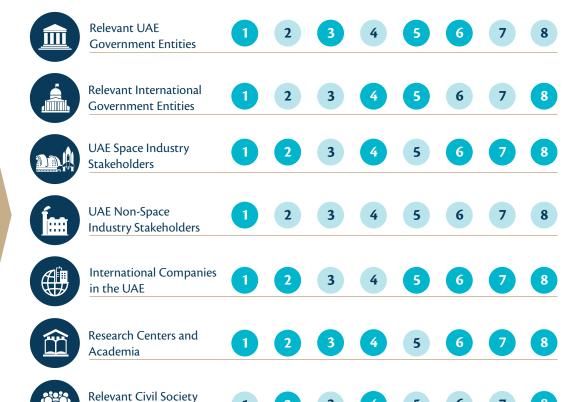


Beyond the Committee, the Space Agency should also engage each stakeholder group directly to achieve key objectives...

Direct stakeholder group engagement

ADDITIONAL ENGAGEMENT OBJECTIVES

- Assess and identify major space capabilities/ technologies that can enable space industry growth and economic diversification
- Understand ongoing and planned space activities and their alignment with the NSPF
- Study and identify high-potential options for future space science and exploration missions
- Brainstorm/identify potential competitions, prizes and other mechanisms that can spur innovation in the space sector
- Identify regional and global collaboration opportunities and major events that can enhance the UAE position as a regional hub and leader in space
- Determine core competencies and curricula needed to develop world-class Emirati space professionals
- Analyze shortcomings and potential improvements in infrastructure that can help enable the UAE space sector
- Stay up to date with the latest global and domestic developments and trends in the field of space



Organizations



Relevant Objectives

... and leverage a range of communication channels to raise awareness and engage the public in achieving UAE space ambitions

Communication channels and objectives

Publications

S Mars Mission Hope Journey To be a country To the a country To

Website



Social Media



News



Non-exhaustive

Events



- Introduce complex topics and present research findings to interested members of the public
- Provide reference documents for domestic and foreign audiences interested in UAE space activity
- Raise awareness of ongoing activities within the space sector
- Provide updates on key topics (e.g. Mars 2117, the UAE Hope Mission to Mars. etc.)
- Present interesting / compelling developments immediately to interested members of the public
- Engage directly with existing audience members
- Present interesting / compelling developments to the broader public
- Raise interest in space activities and enhance national pride
- Increase interest in space and expand the public audience for space
- Gauge public sentiment and crowdsource topics of interest to the public
- Present interesting/ compelling developments

Objectives

Level of Engagement



Implementation and governance – success factors



Effective stewardship by the UAE Space Agency

The UAE Space Agency leads:

- Developing and coordinating the strategy and identifying the sector priorities
- ° Coordinating and Monitoring the implementation progress
- Performance evaluation of the implementation



Active stakeholder involvement and coordination

- Establishment of a National Committee for Oversight and Implementation that will:
 - ° Coordinate the implementation of the Strategy
 - ° Identify roles and responsibilities
 - ° Identify strengths, weaknesses, and areas of future improvement, and make appropriate recommendations
- Monitoring and coordination with the Prime Ministers
 Office about the performance in achieving the strategic KPIs



Assessment to identify gaps and opportunities

Study and Assessment of:

- Core competencies and qualifications
- capacities, space technologies and/or programs needed
- Options for future science and exploration missions
- Global collaboration / partnership opportunities
- Potential improvements in facilities and infrastructure
- Potential improvements in the laws and regulations



Review and revision of the Space Policy

- The UAE Space Agency shall review the National Space Strategy every five years or as determined necessary
- Objective of the review is to:
- ° Stay up to date with the latest global and domestic developments and trends in the field of space
- Identify and recommend required improvements to the Strategy
- ° Seek recommendations approval



Initiatives Implementation Charter

- Development of initiatives implementation charter.
- Includes primary entities concerned with the implementation, their roles, expected implementation timeline, associated cost, and execution activities.



Risk Management during Strategy Implementation

- Identification of tactical and strategic risks that might occur during the implementation of initiatives and activities.
- Implementing procedures to minimize risk effects.



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