

韓國에 있어서의 宇宙開發計劃과 立法에 관한 諸問題

(The Problems on the Space Exploitation Program
and Legislation in Korea)

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- I. Introduction
- II. Space Exploitation Program in Korea
- III. Space Legislation in Korea
- IV. Conclusion

I. Introduction

The “space already exists for Asia, so the question is what we do there.” It’s our job to make sure that all the opportunities are used to integrate the power of the space exploitation among the Asian countries. In the 21st century, space science and technology will develop with greater rapidity. The continuous development in the space industry is expected, which is led by the increase of communication & broadcasting satellites and the expansion of

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이 논문은 중국우주법학회(CISL)와 세계우주법학회(IISL)가 공동주최하고 중국국립우주행정청(CNSA), 과학기술성(MST) 및 중국항공우주과학기술공단(CASTC)이 후원하고 중국우주발사체기술학원(CALVT), 중국우주기술학원(CAST), 상해우주비행기술학원(SAFT), 중국위성데이터 및 응용연구센터(CCRSDA)가 지원하는「2003년도우주법대회」가 “아시아 지역의 우주협력(Asia: a Regional Force in Space)”이라는 주제로 2003년 4월 6일부터 8일까지 중국 북경에 있는 국제 Xiyuan호텔에서 개최하기로 되어 있어 필자는 공동주최자측으로 붙어 Speaker로 초청을 받아 참가하려고 하였으나 동국제 대회가 최근 중국에 발생한 SARS(중증급성호흡기증후군)의 만연에 기인하여 돌연히 금년 7-8월경으로 연기 되어 참가를 하지 못하게 되었지만 당초 이 국제대회에서 발표하려고 작성하였던 원고를 보완한 내용이다.

satellite application.

The space industry will grow considerably according to the expansion of private mobile communication industry, the increase of activities of space exploration, and the implementation of international space station program. The market size of the global space industry will grow continuously at the annual average of 10%. Korea launched two science satellites, the so-called "Uri-Byul 1, ¹⁾ 2 ²⁾" (Our Star) in 1992 and 1993, respectively and launched two scientific sounding rockets in 1993. Since then, space activities have focused upon research and development (R&D) in this area. By launching three communication & broadcasting satellites "KOREASAT 1³⁾, 2,⁴⁾ 3 ⁵⁾" (Mugoonghwa: Korean national flower) of KT (Korea Telecommunication Co.) in 1995, 1996 and 1999, respectively, Korea has expanded the commercial uses of satellite.

Korea has built up the infrastructure for the development of space technology by developing ① micro science satellites Uri-Byul 3 ⁶⁾(Our star, 100kg: indigenous development) and ② the Korea Multi-Purpose Satellite-1 (hereafter referred to as "KOMPSAT-1")⁷⁾ in 1999, which was the first multipurpose satellite in Korea. In case of satellites, KOMPASAT-1, launched successfully in 1999, has been performing its mission beyond its designed life

¹⁾ <http://satrec.kaist.ac.kr/english/SaTReC.html>

²⁾ <http://satrec.kaist.ac.kr/english/SaTReC.html>

³⁾ <http://www.kt.co.kr/kt/eng/frame.html>

⁴⁾ KoreaSat Unit 1 and 2 are loaded with 12 FSS (Fixed Satellite Services: for communication purpose) transponders and 3 DBS (Direct Broadcasting Services: for broadcasting purpose) transponders, respectively, and operate at geostationary orbit (GEO) 36,000Km over the equator, and 116 degrees of east longitude. Centering on Muju, North Jeolla Province, Korea (127 degrees 5 minutes of east longitude, 36 degrees of north latitude), KoreaSat Unit 1 and 2 cover the entire Korean Peninsula, the Japanese Archipelago, and part of China and Russia.

⁵⁾ Launched on Sept. 5, 1999, KoreaSat Unit 3 has a 15 year-lifecycle, and is loaded with 24 units of FSS transponders (Ku-band) and 6 units of DBS transponders, accommodating the combined capacity of KoreaSat Unit 1 and 2 transponders. Furthermore, it is loaded with 3 Ka-band transponders, making available high-speed satellite communications services. KOREASAT 3, as a cutting-edge dual-purpose satellite for communications and broadcasting, has set the stage for transforming Korea into an information powerhouse in the future, by providing up to 168 satellite broadcasting channels and high-speed multimedia services.

⁶⁾ <http://satrec.kaist.ac.kr/english/SaTReC.html>

⁷⁾ http://www.kari.re.kr/new_html/English_version/E_index4.htm

span, and yet has capability for two more years of operation. With KOMPSAT-2⁸⁾ continuing to progress, COMS (Communication, Ocean monitoring & Meteorological Satellite) program is set to begin in 2003.

In the year 2002, the National Space Program brought a number of activities to fruition and laid groundwork for initiatives for coming years. The successful launch of a liquid-fueled rocket KSR-III⁹⁾ marked a major advancement in domestic satellite launch capability. As a sequel to this success, a new project for KSLV-I¹⁰⁾ was initiated, a space launch vehicle for small satellites of 100kg in low earth orbit. Korea will enter more actively into the global space market through the participation in the International Space Station Program and international cooperation.

II . Space Exploitation Program in Korea

1. Revised Basic Mid-and Long-Term National Space Development Plan

Space technology is the complex of future high technologies such as super accuracy manufacturing & assembly, high-qualified electronic component technology and extreme environmental technology. The aerospace industry may create many benefits for the 21st century with new materials and life science industries. Aerospace technology in Korea is in the vanguard of scientific and technological progress in the 21 century.

For this reason, the 'Aircraft Industry Promotion Act' was replaced by the 'Aerospace Industry Development Promotion Act' of 1987 in order to ensure appropriate measures for the active development of the aerospace industry.

⁸⁾ http://www.kari.re.kr/new_html/English_version/E_index4.htm

⁹⁾ http://www.kari.re.kr/new_html/English_version/E_index4.htm

¹⁰⁾ http://www.kari.re.kr/new_html/English_version/E_index4.htm

The Korean government regards the promotion of high-technology, including the aerospace industry, as the best way to achieve international industrial competitiveness. In addition, the government set up a mid-and-long-term development scheme that took concrete shape in the 'Basic Mid-and Long-Term National Space Development Plan' in Korea passed by the 'National Science and Technology Council' in April of 1996 and the 'Basic Plan for Aerospace Industry Development' passed by the 'Aerospace Industry Development Policy Council' in April of 1999. The 'Revised Basic Mid-and Long-Term National Space Development Plan' in Korea had been passed by the 'National Science and Technology Council' in December of 2000. Space research and development in Korea progress in accordance with "The Basic Mid-and Long-term National Space Development Plan" of the Ministry of Science and Technology of the Korean Government, and "The Master Plan for the Development of the Aerospace Industry" of the Ministry of Commerce, Industry and Energy of the Korean Government.

I would like to explain mainly the summarized contents of the Korean national Space Programme ('Revised Basic Mid-and Long-Term National Space Development Plan') with chart and figure.

2. National Space Program

1) Satellites

The Korean government established its first "National Space Program" in 1996, and revised it in 2000. As embedded in the National Space Program, Korea aims to become one of the world's top ten countries in space technology by 2015. The total of 20 satellites are planned to be put into orbit as schematized , which include 8 multi-purpose satellites, 7 science satellites and 5 geo-stationary orbit satellites. The objectives laid out for such national long-term space development program are:

- achievement of the capability of launching micro satellite indigenously by 2005;
- indigenous development of low earth orbit multi-purpose satellite and launcher by 2010 ; and
- plan to enter into worldwide top 10 countries in the space industry by 2015.

In accordance with such a program, the development of a space launch vehicle for micro satellites and the construction of the Space Center equipped with launch facilities are to be accomplished by 2005. The development of the core technology in space science is to be pursued. Korea will also promote international cooperation in such areas as space environment and solar activities, the establishment of space monitoring system, and seek joint participation in international space programs and exchange of technology. The strategies to be employed to implement the National Space Program include

- coordinating comprehensively the R&D activities in space technology; and
- fostering public private partnerships amongst firms, research institutions and universities.

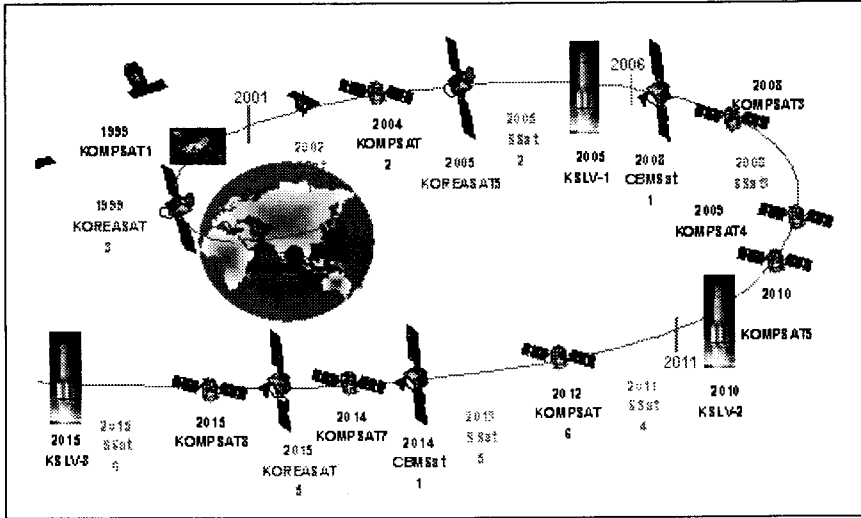
In order to achieve such coordination it is necessary to coordinate the policy by 'The Expert Committee on Space Development' of the National Science and Technology Council.

(1) KOMPSAT Program

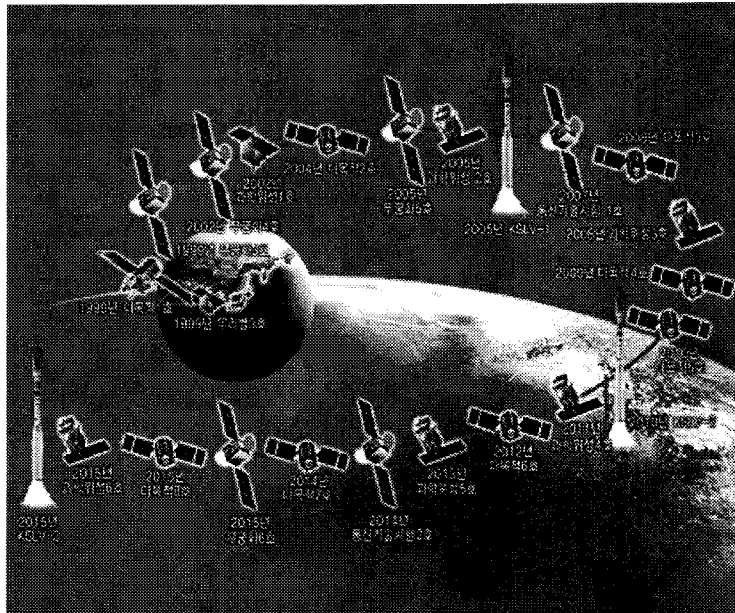
KARI(Korea Aerospace Research Institute)¹¹⁾ had developed a Korea Multi-Purpose Satellite-1 (KOMPSAT-1 or Ariang), a small sized earth observation satellite of 470kg with an orbital altitude of 685km over 5 years of collaborative research with TRW of the U.S.A. KOMPSAT-1 was successfully launched at the Vandenberg Air Force Base, California in the U.S.A. on December 20, 1999.

11) http://www.kari.re.kr/new_html/English_version/E_index.htm

(Figure 1) The National Space Programme (2000~15) in Korea



(Figure 2) 韓國의 宇宙開發中 · 長期計劃 (2000~15)



(Chart 1) Development Plan of Satellites

Classification		Implementation Plan																		
		1st Stage				2nd Stage				3rd Stage				4th Stage						
		95	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
5 GEOSs 1	KS 5				3rd						4th									5th
	COMS 6												1st						2nd	
8 MPSs 2	EOO 7				1st					2nd			3rd		5th		6th		7th	
	BBO 8													4th						8th
7 SSs 3	SS(Uri) 9				3rd															
	SS 10						1st			2nd			3rd		4th		5th		6th	
DST 4	S&PT 11																			
	SDPT 12																			
	SDAf 13																			
	CBPT 14																			

Note : 1. GEOSs = Geo-Stationary Satellites; 2. MPS = Multi-Purpose
 3. SSs = Scientific Satellites; 4. DST = Development of Satellite
 Technology; 5. KS = KOREASAT (Mugoongwha Satellite); 6.
 COMS = Communication, Ocean Monitoring & Meteorological
 Satellite; 7. EOO = Electronic Optic Observation; 8. BBO =
 Broad Band Observation; 9. SS(Uri) = Science Satellite (Uri-
 Byul); 10. SS = Science Satellite; 11. S&PT = Satellite
 Payload Technology; 12. SDPT = Satellite Data Processing
 Technology; 13. SDAT = Satellite Data Application Technology;
 14. CBPT = Communication & Broadcasting Payload
 Technology

Source : Ministry of Science and Technolog

(Chart 2) The Comprehensive Coordination of R&D in Space Technology

1995	2000	2010	2015
Starting space development & building infrastructure	Joint development of satellites and indigenous development of sounding rocket	Indigenous development of the satellite and launch vehicle	Entering into Worldwide top 10 countries in the space industry

Source : Ministry of Science and Technology

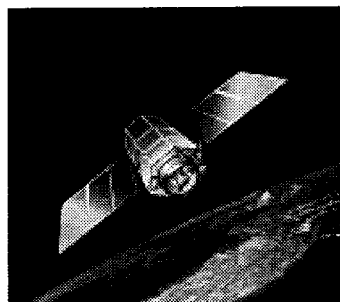
The KOMPSAT-1 has three payloads, which include high resolution Electro-Optical Camera (EOC), Ocean Scanning Multi-spectral Imager (OSMI) and Space Physics Sensor (SPS). The EOC, a main payload, collects panchromatic imagery with a Ground Sample Distance (GSD) of 6.6m and a swath width of 17km by push broom scanning.

The KOMPSAT-1 EOC Imagery could be used as a basic material for GIS and land development program. The primary mission of OSMI is to conduct worldwide ocean color monitoring and environmental monitoring.

The Republic of Korea has been releasing relevant data to local and overseas users

Since on June 1, 2000. Such data are authorized for use for peaceful purposes only. KOMPSAT-1 was the first Korean satellite for earth observation. Following the success of KOMPSAT-1 project, Korea has built national infrastructure related to the earth observation satellite.

Since the successful launch of the KOMPSAT-1, KARI has been developing Korea Multi Purpose Satellite-2 (KOMPSAT-2), a 765kg earth observation satellite with an orbital altitude of 685km.



(Chart 3) Multi-Purpose Satellite

Classification	Period of Development	Size		Task	Development Method
		Orbit	Weight		
1st	1995~1999	658km(a) 1 SSO 2	500kg	Earth observation, Ocean observation, Science observation	Indigenous development in order to meet demands of related-organization
2nd	1999~2004	658km(a) SSO	730kg	Earth observation	
3th	2003~2008	Low earth orbit SSO	800kg	Earth observation	
4th	2004~2009	Low earth orbit SSO	1 ton	Earth, ocean, the polar region, environment and meteorological observation	
5th	2005~2010	Low earth orbit SSO	1 ton	Earth, ocean, the polar region, environment and meteorological observation	
6th	2007~2012	Low earth orbit SSO	1 ton	Earth observation	
7th	2009~2014	Low earth orbit SSO	1.2 ton	Earth observation	
8th	2010~2015	Low earth orbit SSO	1.2 ton	Multi-purose observation such as earth, ocean, the polar region, environment, etc.	

Note: 1. (a) = altitude; 2. SSO = Sun-Synchronous Orbit.

Source: Ministry of Science and Technology

The main mission of KOMPSAT-2 is the acquisition of GIS(Geographic Information Systems) image (PAN, MS) for the Korean peninsula with three years of life span.

Multi-Spectral Camera (MSC) is the main payload of KOMPSAT-2 and now is being developed jointly with ELOP Ltd., Israel. MSC will be capable of taking Photo static images with the 1m panchromatic resolution and 4m multi-spectral resolution with a swath width of 15km by push broom scanning.

Participating companies include KAI, HANWHA, KAL, DOOWON. ELOP and Astrium take part in this program as foreign partners. Last year, Eurokot (German and Russian Joint Venture Company) was selected as a launch service provider with the launch scheduled in 2004.

(2) KOREASAT Program

Towards the end of the year 1999, the new Korean broadcasting law, entitled "Integrated Broadcasting Act" was passed by the Culture Tourism Committee of the National Assembly, under the auspices of which the commercial broadcasting service via satellites was commenced in Korea. Korea will be able to acquire high quality television, telecommunication and internet services using communication satellites.

This new Broadcasting Act encourages many companies to participate in the internet service business via satellites. As the demands of high speed and multi-services are increasing, the KOREASAT-2 & 3 should play the key role in the information business sector.

To continue the mission of KOREASAT-2 and extend the satellite services, the KOREASAT-5 program was initiated in 2002, with a launch planned in 2005. The KOREASAT-5 has a hybrid mission of commercial communication services. The commercial service areas include Japan and the northeast part of China as well as the Korean Peninsula. Acatel Space was recently selected as the prime contractor of this program having won a fierce competition from

Astrium and Lockheed Martin.

(3) KAISTSAT-4 Program

The fourth Korean small satellite, KAISTSAT-4,¹²⁾ is under development jointly under the direction of the Satellite Technology Research Center (SaTReC), Korea Advanced Institute of Science and Technology (KAIST) and Korea Aerospace Research Institute (KARI). KAISTSAT-4 program was commenced in October 1998. The KAISTSAT-4 was originally scheduled for launch in 2002, but the launch was delayed and rescheduled to the around on September of 2003.

The mission of KAISTSAT-4 in the applications of space science and technology is manifold. It carries payloads for various space science observation and space engineering tests. The KAISTSAT-4 will be launched in Russia around September this year.

The main aim of its space science missions is to investigate the evolution and spatial distribution of hot interstellar medium by performing spectral diagnostics in the Far Ultra Violet (FUV) ranges. Also the space physics of the earth's polar region will be studied by simultaneously measuring the populations of charged particles precipitating into the earth's upper atmosphere. KAISTSAT-4 shall deploy the satellite based Data Collection System (DCS) to carry out environment monitoring, wildlife tracking, and transportation monitoring. The DCS is being jointly developed through an international cooperation with Australia.

(4) COMS Program

Along with the long term plan of the National Space Program, the Communication, Ocean and Meteorological Satellite (COMS) program was approved by the National Science and Technology Committee in 2002. KARI

¹²⁾ <http://satrec.kaist.ac.kr/english/SaTReC.html>

will develop the COMS-1, a geosynchronous multi-mission satellite to be launched in 2008. The mission of COMS is three fold. The first is weather monitoring of full Earth disc, East Asia and the Korean peninsula with high spatial, temporal and spectral resolution. The second is ocean color monitoring to preserve and develop marine resources and ecosystem around the Korean peninsula. The third is to foster domestic institutes to develop and acquire the in orbit verification of communication payload technology.

Four Ministries in the Korean government are involved for COMS project: MOST (Ministry of Science and Technology), MIC (Ministry of Information and Communication), MOMAF (Ministry of Maritime Affairs and Fisheries), and KMA (Korea Meteorological Administration).

Each Ministry takes responsibility over requirements and objectives in their specialty of COMS program. MOST supports the satellite system and bus development. Moreover, MIC supports the communications and broadcasting payload development while MOMAF supports the ocean observation payload development. Lastly, KMA is in charge of the meteorological payload development.

2) Space Launch Vehicles

Korea Aerospace Research Institute (KARI)¹³⁾ embarked on a research and development program for the science and observation rocket, KSR-I (Korea Sounding Rocket I) in 1990, which was the first domestic single stage unguided solid propellant scientific rocket with a length of 6.7m, a diameter of 0.42m and lift off weight of 1.2tons.

KSR-I was launched on June 4 and September 1, 1993, respectively carrying an ultraviolet radiometer with the mission to measure the vertical ozone distribution in the stratosphere over the Korean peninsular.

¹³⁾ http://www.kari.re.kr/new_html/English_version/E_index.htm

Temperature, acceleration and the other parameters were also measured to examine the performance of the rocket throughout the test flights. KSR-I had the payload capacity of 150kg and could reach the altitude of 75km.

(Chart 4) **Development Plan of Launch Vehicle**

Classification		Implementation Plan																			
		1st Stage					2nd Stage					3rd Stage					4th Stage				
		96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Scientific Rocket	1st & 2nd SR 1			III																	
	3rd SR 1																				
Satellite Launcher	LVMcS 2									I											
	LVMS 3													II					III		
Space Center	McSC 4																				
	MSC 5																				
Development of Launch Vehicle Technology	BTLV 6																				
	HPLRET 7																				
	SWRTSS 8																				
	FACT 9																				
	BTNGLV 10																				

Note: 1. SR = Sounding Rocket; 2. LVMcS = Lunch Vehicle for Micro Satellite; 3. LVMS = Lunch Vehicle for Multi-purpose Satellite; 4. McSC = Micro Satellite Class; 5. MSC = Multi-purpose Satellite Class; 6. BTLV = Basic Technology for Launch Vehicle; 7. HPLRET = High Performance Liquid Rocket Engine Technology; 8. SWRTSS = Structure Weight Reduction Technology; 9. PACT = Precision Attitude Control Technology; 10. BTNGLV = Basic Technelogy far Next Generation Launch Vehicle

Source: Ministry of Science and Technology

KSR-II was a 2 stage solid propellant scientific rocket developed for the scientific experiments at the upper atmosphere. Based on the experience acquired through the development and launch of the single stage rockets, KARI was able to build the KSR-II, powerful enough to reach the altitude of maximum 150km and beyond.

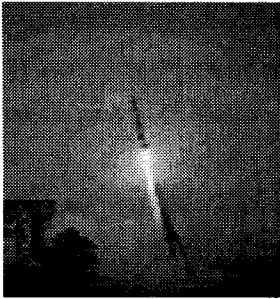
The rocket has a length of 11.04m, a total weight of 2 tons, and a diameter of 0.42m. It measured the vertical distribution of ozone by using ultraviolet radiometer. Korea plans to build indigenously a launch vehicle with the capability of hoisting micro satellites into orbit by 2005.

(Chart 5) **Development of Launch Vehicle Technology**

Classification	Period of Development	Objectives	Development Method
HPLRET 1	1999~2013	Acquirement of advanced basic technology to development liquid propulsion system for satellite launch vehicle	Government-led indigenous development
WRTSS 2	2002~2003	Acquirement of advanced basic technology to reduce the structural weight of launch vehicle	
PACT 3	2002~2013	Acquirement of precision attitude control technology	
BTLVNG 4	2010~2015	Acquirement of basic technology for next generation launch vehicle	

Note: 1. HPLRET = High Performance Liquid Rocket Engine Technology;
 2. WRTSS = Weight Reduction Technology for Satellite Structure;
 3. PACT = Precision Attitude Control Technology; 4. BTLVNG
 = Basic Technology for Launch Vehicle in the Next Generation

Source: Ministry of Science and Technology



KARI successfully launched its first liquid-fuel rocket, KSR-III on November 28, 2002. It reached an altitude of 42.7km and flew over 84 km. The launch of the Korea's first liquid fuel rocket was delayed by one day because of strong winds. This project can be considered a preparatory step towards a satellite launch vehicle development in

the Korea Space Development Plan.

KARI embarked on KSR-III in December 1997. In this project, KARI developed a liquid propulsion rocket system, KSR-III. It incorporated core technologies for the satellite launch vehicle; propulsion, guidance/control, mission design, etc.

KARI and the Ministry of Science and Technology plan to develop a satellite launch vehicle capable of putting a 100 kg payload into orbit by 2005. Therefore, the KSR-III sounding rocket's successful launch indicates that Korea has secured the basic technology needed to develop a satellite launching vehicle by 2005. As most of the core technologies of KSR-III can be applied to KSLV-I (Korea Space Launch Vehicle), the core technologies obtained for KSR-III in cooperation with universities and industries will serve a basis for the KSLV-I development.

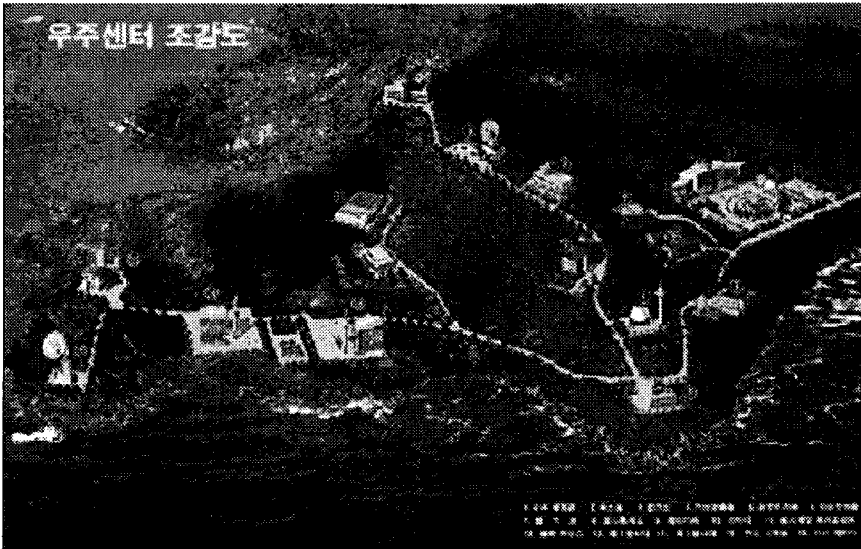
3) Space Center¹⁴⁾

The space center will be constructed for space launchers. Space Center is a launching site for launching artificial satellites to the space by using space launching objects (rockets). It is the outpost base to be built for the first time in Korea for ultramodern space science. It is also a place for launching not only satellites but also science observation rockets to perform space

¹⁴⁾ http://www.kari.re.kr/new_html/English_version/E_index6.htm

observation, which is composed of general ultramodern facilities and equipment. Space Center is to be built at Woinara-Do, Haban Village, Yenae-Ri, Bongrae-Myon, Koheung-Goon, Junlanam Province on the southern coast of the Korean peninsular.

(Figure 3) Topography of Korean Space Center
(韓國外羅老島宇宙Center의 地形圖)



Source: Korea Aerospace Research Institute (KARI)

The first phase of the construction of the center will be finished by 2005 for launch of KSLV 1. This will make Korea be the 13th advanced country in space development having a launching site in the world.

The "Space Center" will serve as the infrastructure for space and technological development and plan to launch a low earth orbit satellite in 2005." A second science satellite made in Korea will be launched from the space center by 2005 and by 2015, four multi-purpose and five science satellites will be launched. From 2010, the center will be operated on a

commercial basis operating launch facilities for low-to mid-altitude orbit satellites. The 150 billion Won(Korean currency) project will be constructed 11 facilities including a launch platform, control center, telemetry and radar facilities, an assembly hangar and space experiment centers. The establishment of the space center would save the launching expense that has been paid to foreign countries for launching Korean satellites.

As of the year of 2001, 7 artificial satellites owned by Korea were set for the space by using foreign launching vehicle spending the expensive foreign money. This was connected to the problems with flow-out of foreign money, direct disclosure of domestic manufacturing technology of artificial satellites, etc. If no Space Center is built in Korea, and artificial satellites which is to be launched by 2015 is to be launched through a foreign launching site, it is expected to consume about 11.3 billion won per satellite totaling about 102 billion won in foreign money.

4. Space Technology Application and Space Science

1) Space Technology Application

The data distributed from KOMPSAT-1 has affected the remote sensing community in Korea. The policy on data requires the basic strategy on the KOMPSAT-1 data application. Its basic objectives are to maximize the use of KOMPSAT-1 data and stimulate a balanced development of public, academic and commercial applications. Domestic user groups can use KOMPSAT-1 data for non-commercial, public and research purposes.

They are required to register the names of their organizations. The commercial and overseas users can purchase KOMPSAT-1 data from the Korea Aerospace Industry Ltd.(KAI), the marketing agency of KOMPSAT-1 data. KAI receives KOMPSAT-1 data from KARI and sells the data to the domestic commercial and private users as well as overseas users. Now, we

have 100 registered governmental and public organizations, institutions and universities for public and research purposes. The applications of data by the registered users had been monitored for 8 months of test and regular distribution period. The applications of data by the registered users had been monitored for 8 months of test and regular distribution period. KARI distributes stored EOC, OSMI and SPS data. In case of emergencies related to the national security or disaster KARI collects and distributes KOMPSAT-1 data with top level priority. During the normal operation of KOMPSAT-1, the registered users can acquire KOMPSAT-1 data with the normal procedure.

2) Space Science

The space science research in Korea has been carried out by KARI, KAO (Korea Astronomy Observatory) and SatReC of KAIST,¹⁵⁾ and major universities in Korea. As the satellite and sounding rocket programs have evolved in 1990s, the space science research activities have also become more active in the Republic of Korea. The data analysis of foreign programs or ground based observations consists of major portion of space science research in Korea. The KAISTSAT series have measured global high energy particle distribution and the earth's magnetic fields.

The KOMPSAT-I carries out global ionospheric measurements as well as high energy particle experiment. The sounding rocket programs have also contributed to the ionospheric and ozone layer experiments. Other experiments in UV and X-ray observation are also rapidly growing subjects for upper atmospheric science and astronomy using satellites and sounding rockets.

¹⁵⁾ The Satellite Technology Research Center (SaTReC) is a university-based research center for satellite technology and applications research established in 1989. SaTReC, which is located within the Korea Advanced Institute of Science and Technology (KAIST), promotes the education and training of satellite engineers through research programs in satellite engineering, space science and remote sensing.

3) International Cooperation

The aerospace industry is a high-tech industry which requires a vast R&D investment. In order to avoid financial and technological risks, international collaboration is pervasive in this particular industry.

Since KARI foundation in 1989, KARI has expanded its international cooperation in the aerospace field to 28 organizations in countries including the U.S.A., Russia, England, France, China, Israel etc.. Through collaboration, KARI has improved its R&D capabilities. Korea is also trying to participate in ISS program. KARI has been discussing with NASA for the joint ACCESS mission. At the same time, the talks with Boeing/NASA on the participation in Zarya module are continuing.

(Chart 6) International Cooperation

Classification		Implementation Plan																			
		1st Stage					2nd Stage					3rd Stage					4th Stage				
		96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Program of IC 1	ICIPM 3						Establishment of essential technology for inter-planetary exploration					Lunar exploration					Planetary exploration				
	ISSP 4						Acquisition of space station technologies					Research on new materials and medicine technology through the use of space station, etc. 1)1									
	BUA 5						Implementation of activities on space station and inter-planetary exploration														
Regional IC	Asia-Pacific						Joint development of scientific payload and meteorological satellite, etc.														
	Europe						Joint development of GNSS satellite, etc.														
	USA						Joint development of advanced space technologies, etc.														
HRD 2	BUM						Continuous acquirement of space science-related manpower														

Note: 1. IC = International Cooperation; 2. HRD = Human Resource

Development; 3. ICIPM = International Collaboration for Inter-Planetary Mission; 4. Issr = International Space Station Program; 5. BUA = Bringing Up Astronaut

(Chart 7) **Regional international cooperation**

Classification	Period of Development	Objectives	Development Method
Asia-Pacific region	2001~2015	Activation of space collaboration such as the implementation of joint development program for meteorological satellite	International cooperation led by domestic organizations
Europe	2001~2015	Implementation of cooperation in space development which Europe is superior (e.g. Galileo program)	International cooperation led by domestic organizations
USA	2001~2015	Joint research on advanced space Technology such as Nano technology	International cooperation led by domestic organizations

Source: Ministry of Science and Technology

4) Possibility of Establishing an Asian Space Development Agency

The idea of creating an "Asian Space Development Agency (hereafter referred to ASDA)" is only my academic and practical opinion. It is necessary for us to establish ASDA as a regional and international organization in Asian zone. In order to establish as a preliminary procedure, It needs to make the Draft for the Convention for establishing an ASDA among the Asian countries.

The creation of an ASDA would lead to a strengthening of the cooperation deemed essential by the Asian community towards joint undertakings in space and would act as a catalyst for the efforts on space exploitation and allow resources, technology, manpower and finances to be centrally managed in an independent fashion to the benefit of Asian countries.

It is desirable for us to establish ASDA in order to promote cooperation in space program, policy, law, technology and industry among the Asian countries.

The establishment of the ASDA will promote the international cooperation among Asian States in space exploitation, research and technology, as well as their space application and developments, much like the European Space Agency at Paris does.

The ASDA is regarded as a new road for Asia's space policy and space exploitation in Asian countries. The ASDA also coordinates the broad thinking needed to meet new challenges in Asian countries.

I believe that it should be possible to establish an electronic Asian Space Development Agency like electronic government through Internet, as well as an electronic Asian Center for Space Law as a first step. Since the Asian air and space industry will become a very promising market in the 21st century, we can expect very severe competition among the Asian countries and the developed countries, such as the USA, Russia, Canada, and EU countries, in order to occupy the Asian market. To win this severe competition in the Asian air and space industry market, it is necessary for the Asian peoples to work together in union, to strengthen cooperation in research, and to establish friendly relations for the benefit of the air and space industry in all Asian countries.

Finally, a very important point is that a political drive, at the highest level, should be effected mobilize states toward this initiative, possibly taking the form of a solemn statement by heads of state of Asian countries setting out objectives and prospects for the long term. It should be noted that this

political drive will be necessary not only to set up the organization, but also during a subsequent period.

III . Space Legislation in Korea

Since the 'Aircraft Industry Promotion Act' was replaced by the 'Aerospace Industry Development Promotion Act' of 1987 in Korea, this Act had been amended six times from 1991 year to 2000. The purpose of this Act is to contribute to the sound development of the national economy and the improvement of national life by supporting and promoting rationally the aerospace industry, and researching and developing efficiently aerospace science and technology. In order to develop the aerospace industry, the Korean government shall establish the basic plan for the aerospace industry development (hereafter referred to as "the basic plan") including the following matters:

- (1) Demand by year and category for aircraft, spacecrafts, vehicles and materials purchased by the government;
- (2) Specialization and systematization of the aerospace industry;
- (3) Comprehensive research system and research and development budget for the research and the development of the aerospace science and technology;
- (4) Plan on participation in international joint development projects and technology introduction; and
- (5) Other important matters concerning development of the aerospace industry.

The Korean government shall establish and execute each year the operational program in accordance with the basic plan regulated under this Act (Article 3).

The government may support the long-term low-interest fund and

research and development expenses for the purpose of fostering the aerospace industry and researching and developing the aerospace science and technology (Article 12).

Notwithstanding the provisions of the State Properties Act, if it is necessary for the research, development or production of aircraft, spacecraft, apparatus or materials, the government may, gratuitously or onerously, lend or concede State-owned facilities, apparatus, etc. to an aerospace industry businessman or have him use or benefit by it (Article 13).

In order to deliberate matters concerning the establishment of the basic plan and coordination of the accompanying important policies of the Government and main affairs among ministries and agencies, the Aerospace Industry Development Policy Council shall be established under the jurisdiction of the President (Article 14)

The Korea has not made the public or private space law until now.

According to my personal opinion, it is necessary for us to legislate the Draft for “the Korean Space Activities Act (hereafter referred to as “the Draft”; tentative title)” including the public legal items ① the concept and purpose of space activity, ② registration of space objects, ③ licensing of space activity, ④ space flight control, ⑤ ensuring safety of space activity, ⑥ legal status of astronaut, ⑦ establishing of a new Korea National Space Development Agency (hereafter referred to as “KNSD”; tentative title). ⑧ financing of space activities and foreign investments, ⑨ the space development fund, ⑩ ground and other objects of space infrastructure, ⑪ the legal regulation of international cooperation etc, and private legal items ① liability for the wilful misconduct or fault caused launching by space objects, ② compensation for damage caused by space object’s accidents, ③ Search-and-rescue, ④ clean-up of accidents, ⑤ liability insurance of space activity etc..

In order to legislate in advance the abovementioned Draft, we must insert a regulation relating to secure compliance with the Korean international

obligations under UN Space Treaties and Conventions such as (① Space Treaty of 1967, ② Rescue Agreement of 1968, ③ Liability Convention of 1972, ④ Registration Convention of 1975 etc.) covering the use of outer space, including liability for damage caused by space objects and registration of objects launched into outer space. It introduced a licensing regime for space activities carried out on by Korean nationals and companies.

I think that it is also desirable and necessary to insert the following contents within the Draft based on my personal opinion.

If Korean nationals and companies intending to launch or procure the launch of a space object, operate a space object or carry on any other activity in outer space should make themselves familiar with the provisions after passed this Draft from congress.

Aside from compliance-monitoring, KNSD (tentative title) must insure that no persons are engaged in launch or launch site operations illegally, that is, without a license in this Draft. Any person proposing to launch a launch vehicle or to operate a launch site within the Korea must obtain a license authorizing the launch or the operation of the launch site. A Korean citizen or company proposing to launch outside the Korea or to operate a launch site outside of the Korea must also obtain a license authorizing the launch or the operation of the launch site.

A foreign corporation, partnership, joint venture, association or other foreign entity controlled by a Korean citizen and proposing to launch from, or to operate a launch site within, international territory or waters must obtain a license if the Korea does not have an agreement with a foreign nation providing that the foreign nation shall exercise jurisdiction.

Furthermore, we must study thoroughly the foreign countries' space activities act such as the following American, British, Russian, German, Japanese, Swedish, Australian and South African space law relating to the space activity and establishment of the national space agency etc. in the view of points of comparative legal method in order to unify and to make

standards of enacting it so as to adapt to the international treaties, conventions and principles.

It is advisable for us to adopt the merit from the following foreign countries' space law so as to promote the Korean space industry as well to adapt the space situation and environment in Korea. I am going to introduce the name of foreign countries' space law as the followings:

- (1) United States: ① Title II, NASA Authorization Act of 1991
② Public Law 105-303: Commercial Space Act of 1998
③ 49 USC Chapter 701 - Commercial Space Launch Activities of 1984 and of 1994
④ Space Exploration Act of 2002
⑤ Land Remote Sensing Policy Act of 1992
- (2) The United Kingdom: Outer Space Act of 1986
- (3) Russia: Law on Space Activity of 1993
- (4) Canadian Space Agency Act of 1990 and 2000
- (4) Germany: Telecommunications Act of 25 July 1996
- (5) Japan: The National Space Development Agency Law of 1969
- (6) Sweden: Act on Space Activities of 1982
- (7) Australia: Space Activities Act of 1998
- (8) South Africa: Space Affairs Act No. 84 of 1993
- (9) Ukraine: The Law of Ukraine on Space Activity

IV. Conclusion

Korea has been carrying out its space program step by step according to the National Space Program. Several accomplishments in 2002 marked a milestone in Korean space technology development.

First, through the successful launch of KSR-III rocket, significant and

meaningful on its own right, Korea was able to secure the basic technology needed to develop a satellite launching vehicle, KSLV-1.

Secondly, KOMPSAT-1 has been carrying out its mission for the past three years and it will continue for another two years beyond its expected life span.

Finally, the COMS (the Communication, Ocean and Meteorological Satellite) program was embarked while the development of KOMPSAT-2 continues.

Overall, last year was a memorable and significant year for Korean Space community. This year Korea anticipates accomplishing its space programs pro-actively.

Korea also will continually strengthen the exchange and cooperation with all the countries in the world under the principle of equality, friendship relations and mutual benefits. Together with all other peoples around the globe, Korea will make due contribution towards the peaceful utilization of space resources and promotion of human progress and prosperity.¹⁶⁾

I hope that our government would like to legislate the space activities act so as to become an excellent model in the Asian Countries as soon as possible.

Furthermore, the ASDA is regarded as a new road for Asian's space policy and exploitation in Asian countries. The ASDA also coordinates the broad thinking needed to meet new challenges in Asian countries.

The ASDA will be provided a vision of Asia's future in space, and of the benefits for Asian people on the ground that satellites can supply. It also develops the strategies needed to fulfill the vision, through collaborative projects in space science and technology.

It is desirable and necessary for us to establish the ASDA, in order to develop the space industry, to strengthen friendly relations and to promote

¹⁶⁾ http://www.cnsa.gov.cn/main_e.asp

research cooperation among Asian countries based on oriental ideology, ethics and creative ideas. If the heads of the Asian countries agree to establish ASDA at a summit conference, I am sure that it is possible to establish ASDA in the near future.