SpringerWienNewYork

Yearbook on Space Policy

Edited by the
European Space Policy Institute
Director: Kai-Uwe Schrogl

Kai-Uwe Schrogl
Spyros Pagkratis
Blandina Baranes (eds.)

Yearbook on Space Policy 2009/2010

Space for Society

SpringerWienNewYork

Kai-Uwe Schrogl
Spyros Pagkratis
Blandina Baranes
European Space Policy Institute, Vienna, Austria

Printed in Austria

SpringerWienNewYork is a part of
Springer Science + Business Media
springer.at

Cover illustration: ESA-ADES Medialab (ESA's Earth explorer CryoSat 2 mission, launched on 8 April 2010, dedicated to the study of polar ice)

Typesetting: Thomson Press (India) Ltd., Chennai
Printing: Holzhausen Druck & Medien, 1140 Wien

Printed on acid-free and chlorine-free bleached paper

SPIN: 80084405

With 23 Figures

CIP data applied for

ISSN 1866-8305
ISBN 978-3-7091-0941-0 SpringerWienNewYork

Preface

The financial and economic crisis is still an issue of great concern for the global space sector. While space activities fared quite well during the first year of the crisis, effects on public programmes and commercial activities might still become more visible in the future, when public budgets have to be confirmed and when investment cycles in the private sector are completed. So far, however, the governments as well as the companies in the sector have kept to their promises and have been able to even modestly increase their business. This shows that space is regarded on the governmental level as a strategic asset and that it has generated a robust market, which through its services in telecommunications, direct broadcasting, navigation and Earth observation still has a huge potential that can be even further tapped during a situation like the global crisis. Europe is well positioned in this context, but the largest dynamic can be seen in emerging countries, which are partners, markets and competitors at the same time. But so far, growth in the space sector has allowed for beneficial international cooperation and joint economic growth. Europe is taking strong efforts in further developing its internal structures for governing space activities efficiently and seeing a competitive industrial base with manufacturers, operators and service providers grow.

One remarkable event in the timeframe that to is covered by the Yearbook – the period from July 2009 to June 2010 – has been the issuing of a new U.S. Space Policy. A rare expression of a comprehensive approach to all space activities, this document has become the point for extended analysis. While it contains remarkable statements and also changes from the last document of its kind, its impact will have to be seen only in the future. More immediate impacts and concrete effects had a number of policy discussions and events, which all are related to one of the largest issue area for space applications: natural disasters, where space plays a crucial role in their mitigation and related global discussions, as the Summit in Copenhagen, epitomising the problem of climate change. Through this, space received a large visibility and demonstrated its impact. It is for this reason that the thematic title of this Yearbook reflects on "Space for Society", since the application issues – not only for disaster management but also for other areas such as telecommunications, navigation and Earth observation – are highlighted throughout this volume.

As usual, the Yearbook on Space Policy comprises three parts. The first part shows an overview on the global space endeavours. It is prepared in-house in ESPI and it contains the whole spectrum of actors, issues, policies and economic

developments. While its perspective is European, is provides an analytical whole of space around the world. The second part again contains contributions from highly distinguished experts in the field. We have been able to assemble personalities mainly from the academic sector, adding also views from agencies and users. Issues which are covered have been highlights during the period of mid 2009 to mid 2010, of course reflecting on the new U.S. Space Policy and the Copenhagen summit, but also highlighting important European issues, like Galileo or the Lisbon Treaty, and in addition looking into international relations and benefits from space activities for societies world-wide. For this purpose, we have again invited contributors from within and outside Europe, thus showing that the network established by ESPI, the European Space Policy Research and Academic Network (ESPRAN) is getting more and more global. The third part of the Yearbook maintains the additional character of the Yearbook as an archive for space activities. Again prepared in-house in ESPI, a chronology, a bibliography and data about institutions is provided, where readers of the now four volumes of the Yearbook can identify statistical developments and trends.

An important milestone in the preparation of the Yearbook was again ESPI's Autumn Conference, where the authors met for an exchange on drafts of their contributions. Having taken place in Vienna in September 2010 and sponsored by the German Aerospace Center DLR, it provided the forum for a constructive exchange and coordination of the contributions. We appreciated very much the excellent discussion culture at that meeting, which lead to new insights and shared analyses. The discussions at the Autumn Conference were additionally supported by members of ESPI's Advisory Council (its Chairman Herbert Allgeier and its member Alfredo Roma), which also acts as the Editorial Advisory Board to ESPI's book series and the Chairman of its General Assembly (Harald Posch). Thanks also go to Johannes Pseiner, Conor Francois and Renaud Abram.

Kai-Uwe Schrogl, Spyros Pagkratis, Blandina Baranes
ESPI Editorial Team

Table of contents

Chapter 2. Developments in space policies, programmes and technologies throughout the world and in Europe.

Spyros Pagkratis

PART 2
Views and Insights

PART 3
Facts and Figures
Blandina Baranes and Spyros Pagkratis

List of acronyms

A
AATSR: Advanced Along Track Scanning Radiometer
ACI: Airports Council International
ADF: Australian Defence Force
ADM: Atmospheric Dynamics Mission
AEHS: Advanced Extremely High Frequency Satellite
AFRL: Air Force Research Laboratory
ALOS: Advanced Land Observing Satellite
APRSAF: Asia-Pacific Regional Space Agency Forum
APSCO: Asia-Pacific Space Cooperation Organisation
ARATS: Association for Relations Across the Taiwan Straits
ARMC: African Resource Management and Environmental Constellation
ARTA: Ariane 5 Research and Technology Accompaniment Programme
ARTES: Advanced Research in Telecommunications Systems
AR5: 5th Assessment Report
ASAT: Anti Satellite
ASI: Agenzia Spaziale Italiana (Italian Space Agency)
ATM: Air Traffic Management
ATV: Automated Transfer Vehicle
AVIC: Aviation Industries of China

B
BAE: British Aerospace
BGAN: Broadband Global Area Network
BRIC: Brazil Russia India China

C
CALT: China Academy of Launch Vehicle Technology
CASC: China Aerospace Corporation
CASTC: China Aerospace Science and Technology Corporation
CEO: Chief Executive Officer
CEOS: Committee on Earth Observation Satellites
CFSP: Common Foreign and Security Policy
CGWIC: China Great Wall Industry Corporation

CMA: China Meteorological Administration
CMSEO: China Manned Space Engineering Office
CNES: Centre National d'Etudes Spatiales (French Space Agency)
CNNC: China National Nuclear Corporation
CNSA: China National Space Administration
COF: Columbus Orbital Facility
COFUR: Cost Of Fulfilling User Requests
COPUOS: Committee on the Peaceful Uses of Outer Space
COSMO-Skymed: Constellation of small Satellites for the Mediterranean basin Observation
COTS: Commercial Orbital Transportation Services
CSA: Canadian Space Agency

D
DARPA: Defence Advanced Research Projects Agency
DBS: Direct Broadcast Services
DLR: Deutsches Zentrum für Luft- und Raumfahrt (German Space Agency)
DMSP: Defence Meteorological Satellite Program
DOC: Department of Commerce
DoD: Department of Defence
DSTO: Defence Science and Technology Organisation
DTH: Direct-to-Home

E
EADS: European Aeronautic Defence and Space Company
EarthCARE: Earth Clouds, Aerosol and Radiation Explorer
EC: European Commission
ECB: European Central Bank
e-CORCE: e-Constellation of Observation by Recurrent Cellular Environment
EDA: European Defence Agency
EDRS: European Data Relay Satellite
EELV: Evolved Expandable Launch Vehicle
EERP: European Economic Recovery Plan
EGNOS: European Geostationary Navigation Overlay Service
EISC: European Interparliamentary Space Conference
EJSM: Europa Jupiter System Mission
ELINT: Electronic signals Intelligence
ELV: Expandable Launch Vehicle
EMS: Electromagnetic Sciences
EO: Earth Observation

EPS: EUMETSAT Polar System
ERA: European Research Area
ERC: European Research Council
ERS: European Remote Sensing Satellite
ESA: European Space Agency
ESDP: European Security and Defence Policy
ESP: European Space Policy
ESPI: European Space Policy Institute
EU: European Union
EUMETSAT: European Organisation for the Exploitation of Meteorological Satellites
EUSC: European Union Satellite Centre
EVA: Extravehicular Activity

F
FAA: Federal Aviation Administration
FAO: Food and Agricultural Organisation
FCC: Federal Communications Commission
FLPP: Future Launcher Preparatory Programme
FOC: Full Operational Capability
FP7: Framework Programme for research and technological development 7
FSS: Fixed Satellite Services
FY: Fiscal Year

G
GAC: GMES Advisory Council
GAD: General Armaments Department
GAGAN: GPS-Aided Geosynchronous Augmented Navigation System
GAO: Government Accountability Office
GCM: GMES Contributing Missions
GDP: Gross Domestic Product
GEO: Geostationary Orbit
GEO: Group on Earth Observations
GEOSS: Global Earth Observation System of Systems
GERD: Gross Domestic Expenditure on R&D
GES: Global Exploration Strategy
GIANUS: Global Integrated Architecture for iNnovative Utilisation of space for Security
GIO: GMES Initial Operations
GIOVE: Galileo In-Orbit Validation Element

GIP: Galileo Inter-institutional Panel
GIS: Geographic Information System
GJU: Galileo Joint Undertaking
GLONASS: Global Navigation Satellite System
GMES: Global Monitoring for Environment and Security
G-MOSAIC: GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises
GOCE: Gravity field and steady-state Ocean Circulation Explorer
GOES: Geostationary Operational Environmental Satellite
GOSAT: Greenhouse Gases Observing Satellite
GPS: Global Positioning System
GSA: GNSS Supervisory Authority
GSC: GMES Space Component
GSC: Guyana Space Centre
GSLV: Geosynchronous Satellite Launch Vehicle
GTO: Geostationary Transfer Orbit
G8: Group of Eight
G20: Group of Twenty

H
HDTV: High Definition Television
HR: High Resolution
HSPG: High-Level Space Policy Group
HTV: H-2 Transfer Vehicle

I
IAEA: International Atomic Energy Agency
IBEX: Interstellar Boundary Explorer
ICAO: International Civil Aviation Organization
ICBM: Intercontinental Ballistic Missile
ICG: International Committee on Global Navigation Satellite Systems
ICT: Information and Communication Technologies
IEA: International Energy Agency
IFAD: International Fund for Agricultural Development
IGS: Integrated Geo Systems
IGT: Innovation Growth Team for Space
IGY: International Geophysical Year
IHY: International Heliophysical Year
ILS: International Launch Services
IMF: International Monetary Fund

IMINT: Imagery Intelligence
IMO: International Maritime Organisation
INMARSAT: International Maritime Satellite Organisation
INSPIRE: Infrastructure for Spatial Information in Europe
IOV: In-Orbit Validation
IP: Internet Protocol
IPCC: Intergovernmental Panel on Climate Change
IRIS: Interface Region Imaging Spectrograph
ISA: Israeli Space Agency
ISAF: International Security Assistance Force
ISC: International Space Company
ISECG: International Space Exploration Coordination Group
ISRO: Indian Space Research Organisation
ISS: International Space Station
ITAR: International Traffic in Arms Regulations
ITU: International Telecommunication Union
IXO: International X Ray Observatory

J
JAXA: Japan Aerospace Exploration Agency
JEM: Japanese Experiment Module

K
KSLV: Korea Space Launch Vehicle

L
LEO: Low Earth Orbit
LM: Long March
LMCLS: Lockheed Martin Commercial Launch Services
LRO: Lunar Reconnaissance Orbiter

M
MDA: Missile Defence Agency
MDG: Millennium Development Goals
MEJI: Mars Exploration Joint Initiative
MEO: Medium Earth Orbit
MERIS: Medium Resolution Imaging Spectrometer
MHI: Mitsubishi Heavy Industries
MoD: Ministry of Defence
MoU: Memorandum of Understanding

MPLM: Multipurpose Laboratory Module
MR: Medium Resolution
MSG: Meteosat Second Generation
MSI: Multi-Spectral Imager
MSL: Mars Science Laboratory
MSS: Mobile Satellite Services
MSV: Mobile Satellite Venture
MTCR: Missile Technology Control Regime
MTG: Meteosat Third Generation
MUOS: Mobile User Objective System
MUSIS: Multinational Satellite-based Imagery System

N
NASA: National Aeronautics and Space Administration
NATO: North Atlantic Treaty Organisation
NEO: Near-Earth Objects
NGO: Non-governmental Organisation
NOAA: National Oceanic and Atmospheric Administration
NORAD: North American Aerospace Defence Command
NPOESS: National Polar-orbiting Operational Environmental Satellite System
NRO: National Reconnaissance Office
NSSA: National Security Space Authority

O
OECD: Organisation for Economic Co-operation and Development
OHB: Orbitale Hochtechnologie Bremen
OPEC: Organisation of Petroleum Exporting Countries
ORFEO: Optical and Radar Federated Earth Observation
ORS: Operationally Responsive Space
OSTM: Ocean Surface Topography Mission

P
PBEO: Programme Board for Earth Observation
PLA: People's Liberation Army
PNT: Positioning, Navigation and Timing
POES: Polar Operational Environment Satellites
PPP: Public Private Partnership
PRS: Public-Regulated Service
PSA: Programme on Space Applications
PSLV: Polar Satellite Launch Vehicle

Q
QDR: Quadrennial Defence Review

R
R&D: Research & Development
RISAT: Radar Imaging Satellite
RLV-TD: Reusable Launch Vehicle Technology Demonstrator
RSCC: Russian Satellite Communications Company
RTD: Research and Technology Development

S
SA: Société Anonyme
SAFER: Services and Applications for Emergency Responses
SAR: Synthetic Aperture Radar
SBSS: Space Based Surveillance System
SDA: Satellite Data Association
SDI: Strategic Defence Initiative
SDO: Solar Dynamics Observatory
SELENE: SELenological and ENgineering Explorer
SES: Single European Sky
SES: Société Européenne des Satellites
SHF: Super High Frequency
SHSP: Strategic Headquarters for Space Policy
SIA: Satellite Industry Association
SICRAL: Sistema Italiano per Comunicazioni Riservate ed Allarmi
SIGINT: Signal Intelligence
SME: Small and Medium Enterprise
SMOS: Soil Moisture and Ocean Salinity
SOHO: Solar and Heliospheric Observatory
SPOT: Satellite pour l'Observation de la Terre (Earth Observation Satellite)
SS2: Space Ship 2
SSA: Space Situational Awareness
SSC: Swedish Space Corporation
SSL: Space Systems/Loral
SSN: Space Surveillance Network
SSOT: Sistema Satelital para Observacion de la Tierra (Satellite System for EO)
SSTL: Surrey Satellite Technology Ltd.
S&T: Science and Technology
START: Strategic Arms Reduction Treaty
STSS: Space Tracking Surveillance System

T
TCBM: Transparency and Confidence Building Measures
TSAT: Transformation Communications Satellite

U
UAE: United Arab Emirates
UHF: Ultra High Frequency
ULA: United Launch Alliances
UN: United Nations
UNCCC: United Nations Climate Change Conference
UNEP: United Nations Environment Programme
UNESCO: United Nations Educational, Scientific and Cultural Organization
UNFCCC: United Nations Framework Convention on Climate Change
UNGA: United Nations General Assembly
UNGIWG: United Nations Geographic Information Working Group
UNIDIR: United Nations Institute for Disarmament Research
UNISPACE: United Nations Conference on the Exploration and Peaceful Uses of Outer Space
UNOOSA: United Nations Office for Outer Space Affairs
UNSC: United Nations Security Council
UNSDI: United Nations Spatial Data Infrastructure
UN-SPIDER: UN Platform for Space-based Information for Disaster Management and Emergency Response
USAF: United States Air Force
USGS: United States Geological Survey
USSTRATCOM: United States Strategic Command
UV: Ultraviolet

V
VC: Venture Capital
VHR: Very High Resolution
VNIR: Visible and Near Infrared

W
WEU: Western European Union
WFP: World Food Programme
WGS: Wideband Global Satcom
WHO: World Health Organisation
WTSA: World Telecommunication Standardisation Assembly