

Yearbook on Space Policy

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Yearbook on Space Policy

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Yearbook on Space Policy 2014

The Governance of Space

 Springer

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Preface ESPI Yearbook 2014

“The Governance of Space”

The increasing number and diversity of players in space in recent years, and the onset of new technologies as well as the residue of past space activities, has brought the issue of space governance to the fore. While some aspects of space governance are specifically legal and technical, others raise broader questions about the entire current space regime. In order to clarify and shed additional light on these issues, ESPI has decided to focus on the topic of governance from a wide variety of angles in its Yearbook on Space Policy 2014.

Traditionally, the first part of the Yearbook sets out a comprehensive overview of the economic, political, technological and institutional trends that are affecting space activities. It is prepared in-house in ESPI, and while its perspective is European, it also provides a comparative analysis of space developments around the world.

The second part of the ESPI Yearbook approaches the overall theme from an analytical perspective. This year it includes nine external contributions that bring together the views of various eminent professionals in the space field. This part of the Yearbook opens with a contribution by Professor Stephan Krasner and ESPI Resident Fellow Marco Aliberti on the theoretical link between space and international relations theory. Thus, they analyse the two major paradigms of international relations theory, realism and liberalism, to describe and explain the different and often contending approaches followed by states in the governance of space activities. Thereafter, Professor Emeritus Jacques Blamont assesses the effects of globalisation on the governance of space activities in the USA and NASA in particular. The political and institutional aspects of governance are explored in a contribution by Xavier L.W. Liao from the Ghent Institute for International Studies, focusing on the impacts of regionalisation processes on space governance, and in a contribution by Hokkaido University Professor Kazuto Suzuki on how governance models affect geopolitics in Asia. Gérard Brachet, former President of CNES and former

Chairman of UNCOPUOS, contributes an article on the optimal role for governments in space, and Amy Kaminski, Senior Policy Advisor at the Office of the Chief Scientist of NASA, sets out some of the findings of her research on the roles of the public and NGOs in space governance and how this public engagement has been evolving over time. Rajeswari Rajagopalan, who is a Senior Fellow at the Observer Research Foundation, New Delhi, assesses the International Code of Conduct for Space Activities and describes its importance for the long-term sustainable use of the outer space environment. Finally, the hot topic of governance in the European setting is addressed. Professor Thomas Hoerber offers a historic perspective describing how the processes of European integration have shaped the creation and governance of ESA, while Professor Emmanuel Sigalas writes about the role of the European Parliament in the legitimisation of Europe's space policy.

The third part of the Yearbook continues the character of the Yearbook as an archive of space activities. Again prepared in-house by ESPI, a bibliography, chronology and data about institutions are provided where readers of the now eight volumes of the Yearbook can identify statistical developments and evolutions.

In closing, we would like to thank the contributors of the articles in Part Two for their engagement in this publication. Moreover, we are very grateful to Frances Brown, former editor-in-chief of Space Policy and current member of the ESPI Advisory Council, for her support and inspiration as we prepared the ESPI Autumn Conference 2014. The contributions in Part 2 of the Yearbook reflect the presentations made by the authors at the Autumn Conference.

Vienna, Austria

Cenan Al-Ekabi
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Arne Lahcen

List of Acronyms: Acronym Explanation

A

| | |
|------------|--|
| AARSE | African Association of Remote Sensing of the Environment |
| ABS | Asia Broadcast Satellite |
| ACE | Advanced Composition Explorer |
| ACS | Alcântara Cyclone Space |
| ADF | Aerospace Defence Forces |
| AEB | Agência Espacial Brasileira (Brazilian Space Agency) |
| AG | Aktiengesellschaft |
| AIA | Atmospheric Imaging Assembly |
| Airbus D&S | Airbus Defence and Space |
| ALASA | Airborne Launch Assist Space Access programme |
| ALOS | Advanced Land Observing Satellite |
| APSCO | Asia-Pacific Space Cooperation Organization |
| ARD | Atmospheric Re-entry Demonstrator |
| ARM | Asteroid Redirect Mission |
| ASAT | Anti-Satellite |
| ASI | Agenzia Spaziale Italiana (Italian Space Agency) |
| ATV | Automated Transfer Vehicle |

B

| | |
|-----|-------------------------------------|
| BDC | Business Development Bank of Canada |
| BMD | Ballistic Missile Defence |
| BMO | Bank of Montreal |

C

| | |
|---------|--|
| CAA | Civil Aviation Authority |
| CAGR | Compound Annual Growth Rate |
| CASBAA | Cable and Satellite Broadcasting Association of Asia |
| CASC | China Aerospace Science and Technology Co. |
| CASIC | China Aerospace Science and Industry Co. |
| CAST | China Aerospace Science and Technology Corp. |
| CBERS | China–Brazil Earth Resources Satellite |
| CCDev | Commercial Crew Development programme |
| CCP | Commercial Crew Programme |
| CCiCap | Commercial Crew integrated Capability initiative |
| CCtCap | Commercial Crew Transport Capability |
| CD | Conference on Disarmament |
| CEPT | European Conference of Postal and Telecommunications Administrations |
| CHF | Swiss franc |
| CHIRP | Commercially Hosted Infrared Payload |
| CLA | Alcântara Launch Center |
| CMB | Cosmic Microwave Background |
| CME | Coronal Mass Ejections |
| CNES | Centre National d'Études Spatiales (French Space Agency) |
| CNSA | China National Space Administration |
| COP | Conference of the Parties |
| COPUOS | Committee on the Peaceful Uses of Outer Space |
| COROT | COncvection, ROtation and planetary Transits space telescope |
| CPC | Certification Products Contract |
| CRS | Commercial Resupply Services |
| CSA | Canadian Space Agency |
| CST-100 | Commercial Space Transportation-100 |
| CSO | Czech Space Office |

D

| | |
|--------|---|
| DARPA | Defense Advanced Research Projects Agency |
| DARS | Digital Audio Radio Service |
| DBS | Direct Broadcast Services |
| Dextre | Special Purpose Dexterous Manipulator |
| DLR | Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center) |
| DND | Department of National Defence |
| DoD | Department of Defence |
| DoT | Department of Telecom |
| DRDO | Defence Research and Development Organisation |

DSCOVr Deep Space Climate ObserVatoRy
 DTH Direct To Home

E

EADS European Aeronautic Defence and Space
 EAP Environmental Action Programme
 EBITDA Earnings Before Interest, Taxes, Depreciation and Amortization
 ECA Evolution Cryotechnique type A
 EDA European Defence Agency
 EDM Entry, Descent and Landing Demonstrator Module
 EDRS European Data Relay Satellite System
 EELV Evolved Expendable Launch Vehicle
 EFT Exploration Flight Test
 EKV Exoatmospheric Kill Vehicle
 EO Earth Observation
 EPIC Earth Polychromatic Imaging Camera
 EPS-SG European Polar System Second Generation
 ERA European Research Area
 ESA European Space Agency
 ESM European Service Module
 EU European Union
 EUMETSAT The European Organisation for the Exploitation of
 Meteorological Satellites
 EUTELSAT European Telecommunications Satellite Organisation
 EVE EUV Variability Experiment

F

FAA Federal Aviation Administration
 FCC Federal Communications Commission
 FSS Fixed Satellite Services

G

GCF Green Climate Fund
 GCSP Global Collaborative Space Programme
 GDP Gross Domestic Product
 GEO Geostationary Earth Orbit
 GEOSS Group on Earth Observation System-of-Systems
 GERD Gross Domestic Expenditure on Research and Development
 GLONASS Globalnaya Navigatsionnaya Sputnikovaya Sistemya (Russian
 GNSS Constellation)

| | |
|------|--|
| GM | General Motors |
| GmbH | Gesellschaft mit beschränkter Haftung |
| GMD | Ground-based Midcourse Defence |
| GMES | Global Collaborative Space Programme Monitoring for Environment and Security |
| GNSS | Global Navigation Satellite Systems |
| GPIM | Green Propellant Infusion Mission |
| GPS | Global Positioning System |
| GSA | European GNSS Agency |
| GSLV | Geosynchronous Satellite Launch Vehicle |
| GTO | Geosynchronous Transfer Orbits |

H

| | |
|--------|--|
| HCN | Hydrogen Cyanide |
| HDTV | High-Definition Television |
| HFI | High-Frequency Instrument |
| HiRISE | High-Resolution Imaging Science Experiment |
| HMI | Helioseismic and Magnetic Imager |
| HTV | H-2 Transfer Vehicle |

I

| | |
|--------|--|
| IAC | International Astronautical Congress |
| IAG | International Association of Geodesy |
| ICG | International Committee on Global Navigation Satellite Systems |
| ICoC | International Space Code of Conduct for Outer Space Activities |
| ICS | Information and Communication Systems |
| ICT | Information and Communication Technology |
| IGS | International GNSS Service |
| IHMC | Institute for Human and Machine Cognition |
| ILN | International Lunar Network |
| ILS | International Launch Services |
| IMAAFS | Information for Meeting Africa's Agricultural Transformation and Food Security |
| IMF | International Monetary Fund |
| INDC | Intended Nationally Determined Contributions |
| IOV | In-Orbit Validation |
| IR | Infrared |
| IRGC | Islamic Revolution Guards Corps |
| IRIS | Interface Region Imaging Spectrograph |
| IS | Islamic State or ISIS |
| ISEF | International Space Exploration Forum |
| ISPS | Innovative Space Propulsion Systems |

| | |
|------|---------------------------------------|
| ISRO | Indian Space Research Organisation |
| ISS | International Space Station |
| ITU | International Telecommunication Union |
| IXV | Intermediate Experimental Vehicle |

J

| | |
|-------|--|
| JADE | Jovian Auroral Distributions Experiment |
| JAXA | Japan Aerospace Exploration Agency |
| JEDI | Jupiter Energetic Particle Detector Instrument |
| JIRAM | Jovian Infrared Auroral Mapper |
| JUICE | JUPiter ICy moon Explorer |

K

| | |
|------|----------------------------|
| K2 | Kepler 2 |
| KSLV | Korea Space Launch Vehicle |

L

| | |
|-------|--|
| LADEE | Lunar Atmosphere and Dust Environment Explorer |
| LDEX | Lunar Dust Experiment |
| LEO | Low Earth Orbit |
| LFI | Low Frequency Instrument |
| LIRIS | Laser InfraRed Imaging Sensors |
| LMC | Large Magellanic Cloud |
| LRO | Lunar Reconnaissance Orbiter |
| LWS | Living With a Star programme |

M

| | |
|------------|--|
| MAG | Magnetometer |
| MAVEN | Mars Atmosphere and Volatile Evolution |
| MDA | Missile Defense Agency |
| MDA Ltd. | MacDonald, Dettwiler and Associates Ltd. |
| MDIS | +Mercury Dual Imaging System |
| ME | Mid-life Evolution |
| Melco | Mitsubishi Electric Co. |
| MESSSENGER | MERCURY Surface, Space ENVIRONMENT, GEOchemistry and Ranging |
| Metop | Meteorological Operational Satellite |
| Metop-SG | Metop Second Generation |
| MEXT | Ministry of Education, Culture, Sports, Science and Technology |

| | |
|----------|--|
| MFF | Multiannual Financial Framework |
| MFG | Meteosat First Generation |
| MIRO | Microwave Instrument for Rosetta Orbiter |
| MLA | Mercury Laser Altimeter |
| MMO | Mercury Magnetospheric Orbiter |
| MOIRE | Membrane Optical Imager for Real-Time Exploitation |
| MOM | Mars Orbiter Mission |
| MPCV | Multi-Purpose Crew Vehicle |
| MPO | Mercury Planetary Orbiter |
| MRO | Mars Reconnaissance Orbiter |
| MSG | Meteosat Second Generation |
| MSL | Mars Science Laboratory |
| MTG | Meteosat Third Generation |
| MTM | Mercury Transfer Module |
| MWR | Microwave Radiometer |
| | |
| N | |
| NASA | National Aeronautics and Space Administration |
| NATO | North Atlantic Treaty Organisation |
| NDAA | National Defense Authorization Act |
| NEC | Nippon Electric Company |
| NEO | Near-Earth Object |
| NEOWISE | Reboot of the Wide-field Infrared Survey Explorer mission to find NEOs |
| NGA | National Geospatial-Intelligence Agency |
| NISTAR | National Institute of Standards and Technology Advanced Radiometer |
| NOAA | National Oceanic and Atmospheric Administration |
| NRO | National Reconnaissance Office |
| NSOAS | National Satellite Ocean Application Service |
| | |
| O | |
| OECD | Organisation for Economic Co-operation and Development |
| OHB | Orbitale Hochtechnologie Bremen |
| ONSP | Office of National Space Policy) |
| OPEC | Organization of the Petroleum Exporting Countries |
| OPSAT | Optical SATellite |
| OSIRIS | Optical, Spectroscopic and Infrared Remote Imaging System |

P

| | |
|-------|---|
| PCW | Polar Communications and Weather mission |
| PDV | Prithvi Defence Vehicle |
| PLA | People's Liberation Army |
| PND | Portable Navigation Devices |
| PNT | Positioning, Navigation and Timing |
| PPP | Public-Private Partnership |
| PPWT | Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects |
| PRIDE | Programme for Reusable In-orbit Demonstrator in Europe |
| PROBA | PRoject for OnBoard Autonomy |
| PRS | Public Regulated Service |
| PSLV | Polar Satellite Launch Vehicle |

Q

| | |
|------|-------------------------------|
| QZSS | Quasi-Zenith Satellite System |
|------|-------------------------------|

R

| | |
|------------|---|
| R2 | Robonaut 2 |
| Radio LANS | Radio wireless broadband devices |
| RCM | Radarsat Constellation Mission |
| RCS | Reaction Control System |
| RHESSI | Ramaty High Energy Solar Spectroscopic Imager |
| RLV | Reusable Launch Vehicle |
| ROSINA | Rosetta's Orbiter Spectrometer for Ion and Neutral Analysis |
| RRM | Robotic Refuelling Mission |
| RROxiTT | Robotic Oxidizer Transfer Test |

S

| | |
|-----------|---|
| SABRE | Synergistic Air-Breathing Rocket Engine |
| SAM | Sample Analysis at Mars instrument |
| SAP | Space Applications Programme |
| SAR | Synthetic Aperture Radar |
| SDO | Solar Dynamics Observatory |
| SE | Societas Europae |
| SecTelSat | Secure Telecom by Satellite |
| SES | Société Européenne des Satellites |
| SHEFEX | Sharp Edge Flight Experiments |

| | |
|--------|---|
| SIA | Satellite Industry Association |
| SIP | Swiss Innovation Park |
| SLATS | Super Low Altitude Test Satellite |
| SLS | Space Launch System |
| SLV | Satellite Launch Vehicle |
| SM | Standard Missile |
| SMEX | Small EXplorer |
| SNC | Sierra Nevada Corporation |
| SOHO | SOLar and Heliospheric Observatory |
| SpaceX | Space Exploration Technologies |
| SPC | Space Programme Committee |
| SS/L | Space Systems/Loral |
| SSA | Space Situational Awareness |
| SSCO | Satellite Servicing Capabilities |
| SSN | Space Surveillance Network |
| SST | SpaceShip Two |
| SSTO | Single-Stage-To-Orbit |
| STEREO | Solar TERrestrial RELations Observatory |
| STFC | Science and Technology Facilities Council |
| SUMER | SOHO's Solar Ultraviolet Measurements of Emitted Radiation instrument |

T

| | |
|--------|---|
| TAI | Turkish Aerospace Industries |
| TCBM | Transparency and Confidence Building Measures |
| TDM | Technology Demonstration Mission |
| TFEU | Treaty on the Functioning of the European Union |
| TGO | Trace Gas Orbiter |
| THEMIS | Thermal Emission Imaging System |

U

| | |
|--------|---|
| UAV | Unmanned Aerial Vehicle |
| UK | United Kingdom |
| UKSA | UK Space Agency |
| ULA | United Launch Alliance |
| UN | United Nations |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDSS | United Nations Department of Safety and Security |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNGA | United Nations General Assembly |
| UNGIWG | United Nations Graphic Information Working Group |

| | |
|----------|--|
| UNIDIR | United Nations Institute for Disarmament Research |
| UNREDD | United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries |
| UNOOSA | United Nations Office for Outer Space Affairs |
| UNSDI | United Nations Spatial Data Infrastructure |
| UNSPIDER | United Nations Platform for Space-based Information for Disaster Management and Emergency Response |
| URSC | United Rocket and Space Corporation |
| US | United States of America |
| USAF | US Air Force |
| USAT | Ultra Small Aperture Terminals |
| UVS | Ultraviolet Imaging Spectrograph |

V

| | |
|--------|--|
| VIPIR | Visual Inspection Poseable Invertebrate Robot |
| VIRTIS | Visible, Infrared and Thermal Imaging Spectrometer |
| VLM | Brazil's Microsat Launch Vehicle |
| VLS-1 | Brazil's Satellite Launch Vehicle |
| VSAT | Very Small Aperture Terminals |

W

| | |
|------|-------------------------------------|
| WGP | World Gross Product |
| WISE | Wide-field Infrared Survey Explorer |
| WRC | World Radiocommunication Conference |
| WRS | World Radiocommunication Seminar |
| WSF | Weather System Follow-on |

X

| | |
|----|---------------------|
| X1 | Robotic Exoskeleton |
|----|---------------------|

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