

Annex

Spaceflight – time line of key events

Hannes Mayer

904	Chinese Forces use fire arrows, primitive rockets, as weapons against their enemies.
1780	Battle of Guntur – Indian forces use rockets against the British.
1844	William Hale's inventions improve the accuracy of rockets.
1903	Konstantin Tsiolkovsky publishes a report suggesting the use of liquid propellants for rockets in order to achieve greater range.
1919	Robert H. Goddard publishes the book "A Method of Reaching Extreme Altitudes".
1923	Hermann Oberth publishes the book "Die Rakete zu den Planetenräumen".
1926	Goddard launches the world's first liquid fuelled rocket.
1942	First successful test-launch of the ballistic missile A4, more commonly known as V-2.
1945	Wernher von Braun and his team arrive in the United States.
1947	First flight of Bumper, the world's first two-stage rocket, using a V-2 as first and an (American developed) WAC Corporal as second stage.
1957	The Soviet Union launches Sputnik 1, the first artificial satellite, followed by Sputnik 2, the first spacecraft carrying a living being, one month later.
1958	The United States launches its first satellite, Explorer 1.
1958	Establishment of NASA.
1959	The United States launches Corona, the first spy satellite.
1961	Yuri Gagarin becomes the first man in space, followed by American Alan Shepard one month later.
1962	Telstar 1 – first transatlantic transmission of television signals.
1962	Mariner 2 passes Venus.
1966	Luna 9 – first soft landing on the Moon.
1967	Accidents of Apollo 1 and Soyuz 1.
1968	Apollo 8 becomes the first manned spacecraft to orbit the Moon.
1969	Apollo 11 lands on the Moon, making Neil Armstrong and Buzz Aldrin the first human beings to set foot on another celestial body. Several more manned missions to the Moon follow until 1972.

1971	Launch of space station Salyut 1.
1973	Launch of space station Skylab.
1975	Apollo-Soyuz Test Project.
1975	ESA is founded.
1976	Viking 1 and Viking 2 land on Mars.
1977	Launch of Voyager 1 and Voyager 2.
1979	First flight of an Ariane rocket.
1981	First flight of Space Shuttle Columbia.
1985	First flight of the ASM-135 anti-satellite missile (ASAT).
1986	Space Shuttle Challenger explodes after launch.
1986	Launch of space station MIR.
1990	Launch of Hubble Space Telescope.
1991	Persian Gulf War – U.S. and British satellites play an important role.
1993	The crew of the Space Shuttle Endeavour conducts several spacewalks to repair the Hubble Space Telescope.
1995	Space probe Galileo reaches Jupiter in 1995.
1998	In-orbit construction of the International Space Station begins.
1999	Sea Launch launches the first rocket from its Odyssey platform in the Pacific Ocean.
2001	U.S. entrepreneur Dennis Tito becomes the first paying space tourist visiting the International Space Station.
2003	The Space Shuttle Columbia disintegrates at re-entry, killing all seven astronauts onboard, including the first Israeli astronaut Colonel Ilan Ramon.
2003	Yang Liwei becomes the first Chinese Taikonaut, orbiting the Earth in the Chinese-built Shenzhou 5 spacecraft.
2004	The two Mars Exploration Rovers Spirit and Opportunity begin exploring the red planet. The same year, President George W. Bush outlines his “Vision for Space Exploration” – later to be known as the Constellation-Program – envisaging manned missions to the Moon and Mars.
2004	First flight of SpaceShipOne, the first privately-funded manned spacecraft.
2006	Launch of New Horizons, which is expected to reach Pluto in 2015.
2009	First launch of Ares 1.
2010	First flight of Dragon Space Capsule.
2011	Last Space Shuttle flight to the ISS.

Links

ECSL

<http://www.esa.int/SPECIALS/ECSL/>

ECSL – NPOC Austria

<http://www.spacelaw.at/>

ESA

<http://www.esa.int/esaCP/index.html>

<http://www.esa.int/SPECIALS/Education/>

<http://www.esa.int/esaCP/Austria.html>

<http://sci.esa.int/science-e/www/area/index.cfm?fareaid=1>

<http://www.esa.int/SPECIALS/ECSL/>

<http://www.espi.or.at/>

GALILEO

<http://www.esa.int/esaNA/galileo.html>

<http://www.gsa.europa.eu/>

<http://www.astrium.eads.net/de/programme/galileo.html>

George Washington University – Space Policy Institute

<http://www.gwu.edu/~spi/>

GMES

<http://www.gmes.info/>

Institut für Luft- und Weltraumrecht – Köln

<http://www.ilwr.de/>

International Academy for Astronautics

<http://iaaweb.org/content/view/43/90/>

International Astronautical Federation

http://www.iafastro.com/index.html?title=Main_Page

International Institute for Space Law

<http://www.iislweb.org/>

International Institute of Air & Space Law – Leiden

<http://www.law.leiden.edu/organisation/publiclaw/iiasl/>

International Space University

<http://www.isunet.edu/>

McGill University's Institute of Air and Space Law

<http://www.mcgill.ca/iasl/>

NASA

<http://www.nasa.gov/>

<http://www.nasa.gov/audience/foreducators/index.html>

<http://www.nasa.gov/audience/forstudents/index.html>

<http://www.nasa.gov/audience/forpolicymakers/index.html>

UK Space Agency

<http://www.ukspaceagency.bis.gov.uk/>

UNCOPUOS

<http://www.oosa.unvienna.org/oosa/COPUOS/copuos.html>

UNOOSA

<http://www.oosa.unvienna.org/>

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- Goh, Gérardine Meishan: Dispute Settlement in International Space Law – A Multi-Door Court-house for Outer Space, in the series: Studies in Space Law, Leiden-Boston (Nijhoff), 2007.
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Abbreviations

A

A4: Aggregat 4

ABAE: Agencia Bolivariana de Actividades Espaciales

ABM-Treaty: Anti-Ballistic Missile Treaty

AEB: Agência Espacial Brasileira

AECA: Arms Export Control Act

ANGELS: Autonomous Nanosatellite Guardian for Evaluating Local Space

APRSAF: Asia-Pacific Regional Space Agency Forum

APSCO: Asia-Pacific Space Cooperation Organization

ARMC: African Resource Management Satellite Constellation

ARTES: Advanced Research in Telecommunications Systems

ASA: Austrian Space Agency

ASAT: Anti-satellite weapon

ASE: Association of Space Explorers

ASI: Agenzia Spaziale Italiana

ASM: Austrian Society for Aerospace Medicine and Life Sciences in Space

ASTP: Advanced Systems and Technology Programme

ATCM: Antarctic Treaty Consultative Meetings

ATS: Antarctic Treaty Secretariat

AU: Astronomical Unit

B

BIS: Bureau of Industry and Security

BNSC: British National Space Centre

BSS: Broadcasting Satellite Service

C

CBERS: China Brazil Earth Resource Satellite

CCAMLR: Convention for the Conservation of Antarctic Marine Living Resources

CCAS: Convention for the Conservation of Antarctic Seals

CCL: Commerce Control List

CD: Conference on Disarmament

CEOS: Committee on Earth Observation Satellites

CERN: Organisation Européenne pour la Recherche Nucléaire

CFE: Conventional Armed Forces in Europe Treaty

CNES: Centre National d'Études Spatiales
CNSA: China National Space Administration
CoC: Code of Conduct
CoCOM: Coordinating Committee for Multilateral Export Controls
CoI: Co-Investigator
COMEST: UNESCO World Commission on the Ethics of Scientific Knowledge and Technology
CONAE: Comision Nacional de Actividades Espaciales
COPERS: European Preparatory Commission for Space Research
COSPAR: Committee on Space Research
COSPAS SARSAT: Cosmicheskaya Sistema Poiska Avariynyh Sudov (Space System for the Search of Vessels in Distress) Search And Rescue Satellite-Aided Tracking
COTS: Commercial off-the-shelf
COTS: Commercial Orbital Transportation Services
CPAR: Conference of Parliamentarians of the Arctic Region
CPOC: Central Point of Contact
CSA: Canadian Space Agency
CSIRO: Commonwealth Scientific and Industrial Research Organisation
CSIS: Center for Strategic and International Studies
CTBT: Comprehensive Nuclear-Test-Ban Treaty

D

DDTC: Directorate of Defense Trade Controls
DGA: Direction Générale de l'Armement
DLR: Deutsches Zentrum für Luft- und Raumfahrt
DNSS: Defense Navigation Satellite System
DoC: U.S. Department of Commerce
DoD: U.S. Department of Defense
DoS: U.S. Department of State
DSB: Direct Satellite Broadcasting

E

EAA: Export Administration Act
EADS: European Aeronautics Defence and Space Company
EAR: Export Administration Regulations
EASA: European Aviation Safety Agency
ECA: Export Control Act
EC JRC-IE: European Commission Joint Research Centre-Institute for Energy
ECSL: European Centre for Space Law

EDA: European Defence Agency
EEA: European Environment Agency
EEC: European Economic Community
EFTA: European Free Trade Association
EGNOS: European Geostationary Navigation Overlay Service
ELDO: European Space Vehicle Launcher Development Organisation
EMSA: European Maritime Safety Agency
EMU: Extravehicular Mobility Unit
EO: Earth Observation
EPIL: Encyclopedia of Public International Law
ESA: European Space Agency
ESC: European Space Conference
ESP: European Space Policy
ESPI: European Space Policy Institute
ESRO: European Space Research Organization
ESS: European Security Strategy
ESS: European Space Strategy
ESSP: European Satellite Services Provider
ESTEC: European Space Research and Technology Centre
ETSI: European Telecommunications Standards Institute
EU: European Union
EUMETSAT: European Organisation for the Exploitation of Meteorological Satellites
EURATOM: European Atomic Energy Community
EURISY: European Association for the International Space Year
EUSC: EU Satellite Centre

F

FAA: Federal Aviation Administration
FCC: Federal Communications Commission
FFG/ALR: Forschungsförderungsgesellschaft/Agentur für Luft- und Raumfahrt
FMCT: Fissile Material Control Treaty
FSP: (Russian) Federal Space Program

G

GAC: GMES Advisory Council
GEO: Geostationary Orbit
GEOSS: Global Earth Observation System of Systems
GIS: Geographic Information Systems
GJU: Galileo Joint Undertaking

GLONASS: A radio-based satellite navigation system operated for the Russian government
GMES: Global Monitoring for Environment and Security
GNSS: Global Navigation Satellite Systems
GOCE: Gravity field and steady-state Ocean Circulation Explorer
GPS: Global Positioning System
GSA: GNSS Supervisory Authority
GSC: GMES Space Component
GSO: Geo-Stationary Orbit

I

IAA: International Academy of Astronautics
IAASS: Association for the Advancement of Space Safety
IAC: International Astronautical Congress
IADC: Inter-Agency Space Debris Coordination Committee
IAEA: International Atomic Energy Agency
IAF: International Astronautical Federation
IAU: International Astronomical Union
ICAO: International Civil Aviation Organisation
ICBM: Intercontinental Ballistic Missile
ICSU: International Council for Science
ICTs: Information and Communication Technologies
IEPPA: International Economic Emergency Powers Act
IGA: Intergovernmental Agreement (ISS)
IGO: Intergovernmental Organisation
IGY: International Geophysical Year
IISL: International Institute of Space Law
IKI: space research institute of the Soviet Academy of Science
ILA: International Law Association
ILS: International Launch Services
IMSO: International Mobile Satellite Organization
INF: Intermediate Nuclear Forces Agreement
IOC: initial operational capability
IOV: in-orbit validation
IPR: Intellectual Property Rights
ISC: International Space Company
ISO: Infrared Space Observatory
ISPRS: International Society for Photogrammetry and Remote Sensing
ISRO: Indian Space Research Organisation
ISS: International Space Station

ISU: International Space University
 ITAR: International Traffic in Arms Regulations
 ITSO: International Telecommunications Satellite Organization
 ITU: International Telecommunications Union
 ITU-D: ITU Telecommunication Development
 ITU-R: ITU Radio communication Sector
 ITU-T: ITU Telecommunication Standardisation
 IUE: International Ultraviolet Explorer

J

JAA: Joint Aviation Authorities
 JAR: Joint Aviation Requirements
 JAXA: Japan Aerospace Exploration Agency
 JEM: Japanese Experiment Module (ISS)

K

KARI: Korea Aerospace Research Institute

L

LEO: Low Earth Orbit
 LEP: Large Electron-Positron Collider
 LIAB: Liability Convention
 LSC: UNCOPUOS Legal Subcommittee

M

MDG: Millennium Development Goal
 MEO: Medium Earth Orbit
 MER: Mars Exploration Rover mission
 MEX: Mars Express mission
 MMU: Manned Maneuvering Unit
 MR: Medium Resolution
 MTCR: Missile Technology Control Regime

N

NAS Act: National Aeronautics and Space Act
 NASA: National Aeronautics and Space Administration
 NASC: National Aeronautics and Space Council
 NATO: North Atlantic Treaty Organization
 NEA: Near Earth Asteroid
 NEO: Near Earth Object

NEC: Near Earth Comet
NFIRE: Near Field Infrared Experiment
NGA: National Geospatial-Intelligence Agency
NGO: Non-Governmental Organisation
NPOC: National Point of Contact
NRO: National Reconnaissance Office
NSAU: National Space Agency of Ukraine
NSS: National Security Strategy
NTM: National Technical Means

O

OECD: Organisation for Economic Co-operation and Development
OEEC: Organisation for European Economic Co-operation
OFAC: Office of Foreign Assets Control
ÖKG: Österreichische Klimatechnik GmbH
OLCI: Ocean and Land Colour Instrument
ORS: Österreichische Raumfahrt- und Systemtechnik GmbH
OS: Open Service
OST: Outer Space Treaty
ÖWF: Österreichisches Weltraum Forum

P

PAROS: Prevention of an Arms Race in Outer Space
PATM: ASE Panel on Asteroid Threat Mitigation
PDMA: Prevention of Dangerous Military Activities Agreement
PI: Principal Investigator
POW: Prisoner of war
PPP: Public-Private Partnership
PPWT: Treaty on the Prevention of the Placement of Weapons in Outer Space,
the Threat or Use of Force against Outer Space Objects
PSAC: Presidential Space Advisory Committee
PTBT: Partial Test-Ban Treaty

Q

QZSS: Quasi-Zenith Satellite System

R

R&D: Research and Development
REDD: Reducing Emissions from Deforestation and forest Degradation
RLF: Russian Longterm Flight Project

RLV: Reusable Launch Vehicle
ROSCOSMOS: Russian Space Agency
RTD: Research and Technological Development
RTG: Radioisotope Thermoelectric Generator

S

SALT: Strategic Arms Limitation Treaty
SAR: Synthetic Aperture Radar
SARP: Standards and Recommended Practices
SCAR: Scientific Committee on Antarctic Research
SDI: Strategic Defense Initiative
SFDAS: Société française de droit aérien et spatial
SLBM: Submarine-Launched Ballistic Missile
SMOS: Soil Moisture and Ocean Salinity
SOHO: Solar and Heliospheric Observatory
SoL: Safety of Life Service
SRB: Solid Rocket Booster
SSA: Space Situational Awareness
START: Strategic Arms Reduction Treaty
STM: Space Traffic Management
STRAW: Security Technology Active Watch
STS: Space Transportation System (Space Shuttle)
STSC: Scientific and Technical Subcommittee

T

TCBMs: Transparency and Confidence-Building Measures

U

UKSA: UK Space Agency
UNCBD: United Nations Convention on Biological Diversity
UNCLOS: United Nations Convention on the Law of the Sea
UNCOPUOS: United Nations Committee on the Peaceful Uses of Outer Space
UNCOPUOS-LSC: UNCOPUOS Legal Subcommittee
UNCOPUOS-STSC: UNCOPUOS Scientific and Technical Subcommittee
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
UNIDROIT: International Institute for the Unification of Private Law

UNISPACE: United Nations Conference on the Exploration and Peaceful
Uses of Outer Space

UNOOSA: United Nations Office for Outer Space Affairs

UN-SPIDER: United Nations Platform for Space-based Information
for Disaster Management and Emergency Response

URSI: Union Radio-Scientifique Internationale

USML: U.S. Munitions List

USSPACECOM: U.S. Space Command

UTC: Universal Time Coordinated

V

V-2: Vergeltungswaffe-2

VHR: Very High Resolution

VIRAC: Ventspils International Radio Astronomy Centre

VSAT: Very Small Aperture Terminal

W

WAAS: Wide Area Augmentation System

WIPO: World Intellectual Property Organization

WMD: Weapon of mass destruction

WMO: World Meteorological Organization

X

XSS: Experimental Spacecraft System

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