

SPACE EXPLORATION + UTILIZATION

This list is not exhaustive, but a launch pad for further reading and research for those interested in the topic.

TABLE OF CONTENTS

GOVERNMENTAL SPACE ORGANIZATIONS
OTHER GOVERNMENT RUN SPACE ENTITIES
ASTRONAUT TRAINING CENTERS
HUMAN SPACE EXPLORATION
ZERO-G FLIGHTS
SPACECRAFTS FOR FERRYING HUMANS AND CARGO
PRIVATE HUMAN SPACE EXPLORATION
SPACE TOURISM
REUSABLE LAUNCH SYSTEMS
SPACE ARCHITECTURE
ROBOTIC PLANETARY EXPLORATION
SELECTED MOON-RELATED SITES
SELECTED MARS-RELATED SITES
SPACE EDUCATION + INTERNSHIPS
SPACE ACTIVISM
SPACE IMAGES
ASTRONOMY
TECHNOLOGY TRANSFER [SPACE-2-EARTH]
OUTPOSTS IN EXTREME ENVIRONMENTS

GOVERNMENTAL SPACE ORGANIZATIONS [PARTIAL LIST]

ASIA [in alphabetical order]

Australian Space Research Institute - ASRI
www.asri.org.au/

China
China National Space Administration - CNSA
http://202.106.142.5/main_e.asp
China Academy of Launch Vehicle Technology – CALT
<http://www.calt.com.cn/new/english/>
China Aerospace Science and Technology Corporation - CASC

Indian Space Research Organization - ISRO
<http://www.isro.org>

Japanese Aerospace X-ploration Agency – JAXA
<http://www.jaxa.jp>
[JAXA was formerly known as NASDA]

AMERICAS [in alphabetical order]

Brazilian National Institute for Space Research - INPE
<http://www.inpe.br/english/>

Canadian Space Agency - CSA
<http://www.csa.gov>

National Aeronautics and Space Administration - NASA
<http://www.nasa.gov>

Jet Propulsion Laboratory [part of CalTech and NASA]
<http://www.jpl.nasa.gov/>

EUROPE [in alphabetical order]

British National Space Center – BNSC
<http://www.bnsc.gov.uk/>

European Space Agency – ESA [16 European countries are part of the ESA]
www.esa.int

French Space Agency – CNES
www.cnes.fr/

German Space Agency – DLR
www.dlr.de/

Italian Space Agency - ASI
www.asi.it/

Russia
<http://www.russianspaceweb.com/>

Russian Federal Space Agency
<http://www.roscosmos.ru/index.asp?Lang=ENG>

Russian Aviation and Space Agency – Rosaviacosmos (PKA)
www.federalspace.ru/
http://spaceinfo.jaxa.jp/note/kikan/e/kik9910_rsa_e.html

AFRICA

South Africa Space Portal
<http://www.space.gov.za/>

UNITED NATIONS
United Nations Office for Outer Space Affairs
www.unoosa.org

United Nations Committee on Peaceful Uses of Outer Space
<http://www.answers.com/topic/united-nations-committee-on-the-peaceful-uses-of-outer-space>
<http://www.unoosa.org/oosa/COPUOS/copuos.html>

OTHER GOVERNMENT RUN SPACE ENTITIES [PARTIAL LIST]

NASA Institute for Advanced Concepts – NIAC
www.niac.usra.edu/

National Space Biomedical Research Institute – NSBRI [USA]
www.nsbri.org/

Russian Institute for Biomedical Problems – IMBP
www.imbp.ru

ASTRONAUT TRAINING CENTERS

Yuri Gagarin Cosmonaut Training Center, Moscow [Russia]
<http://www.gctc.ru/eng/index.html>

NASA Astronaut Training based out of Johnson Space Center, Houston
<http://www.jsc.nasa.gov>

European Astronaut Center, Cologne, Germany
http://www.esa.int/esaHS/ESAJIE0VMOC_astronauts_0.html

HUMAN SPACE EXPLORATION

NASA human spaceflight portal
<http://www.spaceflight.nasa.gov>

ESA human spaceflight portal
<http://www.spaceflight.esa.int/>

Apollo Missions [USA]
<http://history.nasa.gov/apollo.html>

Russian human spaceflight overview
www.russianspaceweb.com/

Japanese manned space activities
http://iss.sfo.jaxa.jp/astro/history_e.html

China's manned space program
<http://www.china.org.cn/english/msf/75333.htm>

Indian Human Spaceflight Program
https://en.wikipedia.org/wiki/Indian_Human_Spaceflight_Programme

Indian Crew Capsule Tests
2007: <https://www.isro.gov.in/Spacecraft/sre-1-0> and
https://en.wikipedia.org/wiki/Space_Capsule_Recovery_Experiment
2014: <https://www.isro.gov.in/Spacecraft/crew-module-atmospheric-re-entry-experiment-care>
2018: <https://www.space.com/41113-india-crew-capsule-pad-abort-test.html>

ZERO-G FLIGHTS

NASA Vomit Comet
<https://www.space.com/37942-vomit-comet.html>

Commercial Zero-G Aircraft
<https://www.gozerog.com/>

Russian Ilyushin-76 Zero-G Flights
<http://zerogravitytour.com/>

European Zero-G flights
<http://www.novespace.fr/en/home.html>
<http://www.airzerog.com/en/>

SPACECRAFTS FOR FERRYING HUMANS AND/OR CARGO

YEAR	NAME	COUNTRY	TYPE	DESCRIPTION
1961-1963	Vostok	USSR	Orbital capsule	1-person spacecraft; 6 manned launches; Yuri Gagarin, the first human to orbit the earth in Vostok-1. For details: www.russianspaceweb.com/spacecraft_manned_first.html
1961-1963	Mercury	USA	Orbital capsule	1-person spacecraft; 6 manned flights; John Glen became the first American to orbit the earth in a Mercury spacecraft
1964	Vokshod	USSR	Orbital capsule	3-person spacecraft; 1 manned launch. www.russianspaceweb.com/spacecraft_manned_first.html
1965	Vokshod 2	USSR	Orbital capsule	2-person spacecraft for an EVA test; 1 manned launch; Alexei Leonov becomes first human to conduct an EVA in orbit. www.russianspaceweb.com/spacecraft_manned_first.html
1964-1966	Gemini	USA	Orbital capsule	2-person spacecraft; 2 unmanned flights in 1964; 10 manned missions from 1965-66; Two of these Gemini 6 and 7 were simultaneous so that capsules could rendezvous in space and orbit in close formation.
1967-1972	Apollo	USA	Earth and Lunar spacecraft	Earth and Lunar Orbital missions: Apollo 1 (exploded during pretest), 7, 8, 9, and 10. Lunar Landing missions: 11, 12, 13 (did not land), 14, 15, 16, and 17. www.nasa.gov/apollo/apollo.htm
1971-1985	Salyut	USSR	Orbital space station	3- person space station; 7 of them were built and launched – Salyut 1 through 7. www.russianspaceweb.com/spacecraft_manned_salyut.html
1973-1979	Skylab	USA	Orbital space station	First American space station; 1 unmanned mission and 3 manned missions between May and November of 1973; Crew visited Skylab and returned to Earth using Apollo spacecraft. http://science.ksc.nasa.gov/history/skylab/skylab.html http://samadhi.jpl.nasa.gov/msl/QuickLooks/skylabQL.html
1986-2001	Mir	USSR/Russia	Orbital space station	The first permanent base in space took 10 years to build and had a spectacular 15-year lifespan before being de-orbited in 2001. It was composed of 6 modules and was serviced by the Soyuz (crew transport) and Progress (supply ferry) spacecrafts. www.russianspaceweb.com/mir.html www.esa.int/export/esaCP/ESA28WTM5JC_Life_0.html
1971-current	Soyuz		Reusable crew transport	The longest serving manned spacecraft in the world; It has ferried Russian and international crews to the Salyut, Almaz and Mir orbital stations and is continuing to do so for the International Space Station (ISS). www.russianspaceweb.com/soyuz.html

1976-1992	Buran	USSR/Russia	Reusable space plane	Russia's version of the Space Shuttle; it was designed and developed, but never launched to space; in 1992 the Buran program was abandoned. www.russianspaceweb.com/buran.html
1978-current	Progress [unmanned re-supply and logistics spacecraft]	USSR/Russia	Cargo ship	First launched to Salyut orbital facilities, it has since then serviced the Mir and International Space Station. After it delivers fuel, food and other cargo, supplies to the host station, it is filled with trash and burnt on re-entry. www.russianspaceweb.com/progress.html
1981-current	Space Shuttle	USA	Reusable space plane	Built for a crew capacity of 7; In addition to crew compartments it has a cargo bay that can be used to house either cargo or a pressurized module for additional crew and lab space. www.spaceflight.nasa.gov/shuttle
1998-current	International Space Station or ISS	16 nations including USA, Russia	Orbital space station	6 laboratory modules, crew size 3 (current) or 6 (future). Intended mission duration: 3 months (currently). Comprises of Russian, American, Japanese and European built modules. Serviced by the Space Shuttle, Proton rocket, Soyuz and Progress spacecrafts. http://spaceflight.nasa.gov/station/
1995-2001	Crew Return Vehicle (CRV) or X-38	USA, Europe	Emergency Crew Transport Vehicle	The CRV was a 30-ft (9.1-m) long spacecraft that was to be moored on the ISS and could carry up to seven crewmembers safely back to Earth. Designed to replace the three-person Soyuz vehicle used in early space-station operations, it was completely autonomous, could carry the entire station crew, had significant cross-range capability, and could make ground-based, low-speed, soft landings at predefined sites around the world by use of a large parafoil. http://www.geocities.com/spacetransport/x38.html
2002-current	Shenzhou	China	Reusable crew transport	First unmanned launch in December 2002; First manned launch scheduled for October 2003. For details: http://news.bbc.co.uk/2/hi/science/nature/2613725.stm
2004 onward	Automated Transfer Vehicle or ATV [unmanned re-supply and logistics spacecraft]	Europe	Servicing and Logistics Vehicle for the ISS	The Automated Transfer Vehicle (ATV) is an unmanned vehicle, which is put in orbit by the European Ariane 5 launcher. It will provide the ISS with: pressurized cargo, water, air, Nitrogen, Oxygen and attitude control propellant. It also removes waste from the station and re-boosts the station to a higher altitude to compensate for atmospheric drag. http://www.esa.int/export/esaHS/ESA4ZJ0VMOC_iss_0.html
2007 onward	H-II Transfer Vehicle or HTV [unmanned re-supply and logistics spacecraft]	Japan	Servicing and Logistics Vehicle for the ISS	H-II Transfer Vehicle (HTV) is under development by NASDA. HTV is the one of the orbital transfer vehicles, which is designed to carry supplies to the International Space Station (ISS). It is designed to transport various cargo and equipments to the ISS in addition to dispose non-recoverable equipment devices, used clothing and wastes. http://www.nasda.go.jp/projects/rockets/htv/index_e.html

PRIVATE HUMAN SPACE EXPLORATION

Companies that are developing spacecraft that can fuel private access to space, both for humans and cargo.

Blue Origin

<https://www.blueorigin.com/>

Sierra Nevada Corporation

<https://www.sncorp.com/>

Space-X

<https://www.spacex.com/>

Burt Rutan's SpaceShipOne

<http://www.scaled.com/projects/tierone/>

Bigelow Aerospace

www.bigelow-aerospace.com/

http://en.wikipedia.org/wiki/Bigelow_Aerospace

SPACE TOURISM

Space Adventures

www.spaceadventures.com

Virgin Galactic

<http://www.virgingalactic.com/>

ESA to help Europe prepare for space tourism

http://www.esa.int/esaCP/SEMNYIBUQPE_index_0.html

REUSABLE LAUNCH SYSTEMS

Space-X

<https://www.spacex.com/reusability-key-making-human-life-multi-planetary>

https://en.wikipedia.org/wiki/SpaceX_reusable_launch_system_development_program

Indian Space Research Organization (ISRO)

<https://www.isro.gov.in/launcher/rlv-td>

<https://www.isro.gov.in/technology-development-programmes/reusable-launch-vehicle-technology-demonstration-program-rlv-td>

SPACE ARCHITECTURE

American Institute of Aeronautics & Astronautics [AIAA] Committee on Space Architecture

www.spacearchitect.org

There are departments [e.g. architecture, industrial design, aerospace, etc.] within universities in the Americas, Europe, and Asia that offer space architecture studios and curricula from time to time. Here is one such program based out of University of Houston.

Sasakawa International Center for Space Architecture [SICSA]

www.sicsa.uh.edu/

International Space University (ISU) also offers coursework in Space Architecture

www.isunet.edu

ROBOTIC PLANETARY EXPLORATION

Space Exploration Overview

<http://www.answers.com/topic/space-exploration>

For American Missions

Jet Propulsion Laboratory

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

For European Missions

ESA Planetary Science Missions

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

Search for Extra-terrestrial Intelligence

www.seti.org

Near Earth Object Program

<http://neo.jpl.nasa.gov/>

SELECTED MOON-RELATED SITES

Apollo Missions [USA]

<http://history.nasa.gov/apollo.html>

SMART-1 Mission [Europe]

<http://www.esa.int/SPECIALS/SMART-1/index.html>

Clementine Mission [USA]

<http://www.lpi.usra.edu/publications/slidesets/clem2nd/>

Lunar & Planetary Institute [Houston]

<http://www.lpi.usra.edu/>

Jet Propulsion Laboratory [Pasadena, Southern California]

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

Artemis Society International [International]

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

Lunar Explorers Society International [International]

<http://www.lunarexplorers.nl>

International Lunar Exploration Working Group [International]

<http://www.ilewg.org>

WIRED: What a little moon dust can do?

www.wired.com/news/space/0,2697,67110,00.html

NOVA: PBS: To the Moon

www.pbs.org/wgbh/nova/tothemoon/

Google: Moon

<http://moon.google.com/>

SELECTED MARS-RELATED SITES

NASA Missions to Mars
<http://mars.jpl.nasa.gov/>

ESA Missions to Mars
http://www.esa.int/SPECIALS/Mars_Express/index.html

Mars Society [International]
www.marssociety.org

NOVA: PBS: Mars
www.pbs.org/wgbh/nova/mars/

National Geographic | Mars
www.nationalgeographic.com/mars/

SPACE EDUCATION + INTERNSHIPS

In addition to many universities around the globe offering programs in aerospace and aeronautics, here are a couple of unique programs.

International Space University [France]
<http://www.isunet.edu/>

NASA Academy [USA]
<http://www.nasa-academy.nasa.gov/>

ESA Young Graduates Program [Europe]
<http://www.esa.int/hr/ygt.htm>
http://www.esa.int/SPECIALS/Careers_at_ESA/SEMRS5XO4HD_0.html

SPACE ACTIVISM

Space Generation Advisory Council [International]
<http://www.spacegeneration.org/>

Lunar Explorers Society [International]
<http://www.lunarexplorers.nl>

Mars Society [International]
<http://www.marssociety.org/>

Students for Exploration and Development of Space – SEDS [International]
<http://www.seds.org/>

Yuri's Night [International]
<http://www.yurisnight.net>

National Space Society [USA]
<http://www.nss.org/>

Space Frontier Foundation [USA]
<http://www.space-frontier.org/>

The Planetary Society [USA]
www.planetary.org

SPACE IMAGES

NIX: NASA Image Exchange
<http://nix.nasa.gov/>

GRIN: Great Images In NASA
<http://grin.hq.nasa.gov/>

Human Spaceflight Gallery
<http://spaceflight1.nasa.gov/gallery/>

ASTRONOMY

9 Planets
<http://www.seds.org/nineplanets/nineplanets/nineplanets.html>

Comets and Meteors
<http://comets.amsmeteors.org/>

Solar System Simulator
<http://space.jpl.nasa.gov/>

Heavens Above:
<http://www.heavens-above.com/main.asp?Loc=Reith+bei+Brixlegg&Lat=47.417&Lng=11.883&Alt=616&TZ=CET>

Journey through the Galaxy
<http://home.cwru.edu/~sjr16/advanced/index.html>

TECHNOLOGY TRANSFER [space-2-earth]

ESA SpaceHouse
http://www.esa.int/esaCP/SEMP3OW4QWD_index_0.html

Waste Management + Advanced Life Support Systems
ESA's MELISSA System [Micro-Ecological Life Support System Alternative]:
<http://www.estec.esa.nl/ecls/?p=aboutmelissa>
NASA's ALS System [Advanced Life Support]: <http://advlifesupport.jsc.nasa.gov/>
Water Treatment in Antarctic: <http://www.estec.esa.nl/ecls/?p=ttpantarctica>

ESA Technology Transfer Program
<http://www.esa.int/ttp>
http://www.esa.int/SPECIALS/Technology_Transfer/

Nuna Solar Car
<http://www.nuonsolarteam.com/>

OUTPOSTS IN EXTREME ENVIRONMENTS

British Antarctic Survey

<http://www.antarctica.ac.uk/>

HALLEY VI: Next Generation Antarctic Research Station Design Competition

http://www.antarctica.ac.uk/News_and_Information/Press_Releases/press_pix/10_2005/

New German Antarctic Station Neumayer-III

http://www.esa.int/esaCP/SEMP3OW4QWD_index_1.html#subhead3

http://www.esa.int/esaCP/SEMP3OW4QWD_index_1.html#subhead7

Concordia Antarctic Station: Run by French Polar Institute (IPEV) + Italian Antarctic Programme (PNRA)

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

http://www.esa.int/esaHS/SEMBZA8A9HE_research_1.html

Mars Society Analog Stations

Mars Desert Research Station in the Utah Desert: <http://www.marssociety.org/MDRS/>

Flashline Mars Arctic Research Station: <http://www.marssociety.org/arctic/index.asp>

Haughton Mars Project

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