

## ***List of Personalities of the Soviet Space Program***

by Slava Gerovitch, MIT <slava@mit.edu>

Online supplement to the book [Voices of the Soviet Space Program: Cosmonauts, Soldiers, and Engineers Who Took the USSR into Space](#) (Palgrave Macmillan, 2014)

**Afanasyev, Sergey** (1918-2001): head of the Ministry of General Machine Building (1965-1983), which oversaw a network of design bureaus and factories that designed and manufactured combat missiles, space launchers, and spacecraft. The design bureaus of Korolev, Glushko, and Chelomey were subordinated to the Ministry.

**Alekseyev, Vladimir** (b. 1933): military engineer, research cosmonaut. *Early career:* senior researcher at the Air Defense Scientific Research Institute No. 2. *Service in the cosmonaut corps:* 1967-1983. *Training:* Soyuz VI and Almaz programs. *Flights:* none. *Later career:* shift leader of the mission control group at the Cosmonaut Training Center; engineer at the flight test division of the Energia Corporation.

**Arefyev, Vyacheslav** (b. 1926): Chief Designer of control devices and gyroscopic systems for missiles and spacecraft. He worked at the Scientific Research Institute No. 49 (1949-1966) and headed the Scientific Research Institute of Control Devices since 1967.

**Barmin, Vladimir** (1909-1993): Chief Designer of rocket launch facilities in 1941-1991. He led the work on the design, construction, and operation of launch facilities for Soviet ICBMs and space rockets.

**Baturin, Yuriy** (b. 1949): engineer, jurist, diplomat, historian, research cosmonaut, test cosmonaut. *Early career:* senior engineer at the Energiya Scientific-Production Association, researcher at the Institute of State and Law of the Soviet Academy of Sciences, Secretary of the Defense Council of the President of the Russian Federation. *Service in the cosmonaut corps:* 1997-2009. *Training:* Mir and the International Space Station programs. *Flights:* research cosmonaut on Mir space station (Soyuz TM-28/Soyuz TM-27) (August 1998); engineer cosmonaut on the International Space Station (Soyuz TM-32) (April-May 2001). *Later career:* director of the Institute for the History of Natural Science and Technology of the Russian Academy of Sciences in Moscow.

**Belyayev, Pavel** (1925-1970): fighter pilot, pilot cosmonaut. *Early career:* fighter pilot during World War II, squadron commander at the 661st Fighter Aviation Regiment of the Black Sea Navy. *Service in the cosmonaut corps:* 1961-1970. *Training:* Voskhod 2 program. *Flights:* pilot of Voskhod 2 (March 1965). *Later career:* head of the First Division, senior cosmonaut instructor at the Scientific-Research Institute No. 1 of the Cosmonaut Training Center.

**Beregovoy, Georgiy** (1921-1995): fighter-bomber pilot, test pilot, pilot cosmonaut. *Early career:* fighter-bomber squadron commander during World War II, senior test pilot at the Air Force Scientific Research Institute. *Service in the cosmonaut corps:* 1964-1982. *Training:* Voskhod 3 and Soyuz 7K-OK programs. *Flights:* pilot of Soyuz 3 (October 1968). *Later career:* commander of the Cosmonaut Training Center (1972-1987).

**Berezovoy, Anatoliy** (b. 1942): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 48th Air Force Army in the Odessa Military District. *Service in the cosmonaut corps:* 1970-1992. *Training:* Spiral, Salyut, Almaz, and Mir programs. *Flights:* commander of the Expedition 1 on the Salyut 7 space station (May-December 1982). *Later career:* deputy commander of the cosmonaut group at the Cosmonaut Training Center.

**Burdayev, Mikhail** (b. 1932): military engineer, test cosmonaut. *Early career:* senior researcher at the Air Defense Scientific Research Institute No. 2. *Service in the cosmonaut corps:* 1967-1983. *Training:* Soyuz VI, Almaz, Salyut, Soyuz 7K-S, and Soyuz 7K-T programs. *Flights:* none. *Later career:* shift leader of the mission control group at the Cosmonaut Training Center; leading researcher at the research division of the Cosmonaut Training Center.

**Bushuyev, Konstantin** (1914-1978): Deputy Chief Designer at the Experimental Design Bureau No. 1, the chief designer of the N-1 lunar rocket, Technical Director of the Apollo Soyuz Test Project.

**Bykovskiy, Valeriy** (b. 1934): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 17th Fighter Aviation Division of the Moscow Military District. *Service in the cosmonaut corps:* 1960-1982. *Training:* Vostok, Soyuz 7K-OK, L-1, and Salyut programs. *Flights:* pilot of Vostok 5 (June 1963), commander of Soyuz 22 (September 1976), commander of the Visiting Expedition 4 on the Salyut 6 space station (August-September 1978). *Later career:* department head at the Cosmonaut Training Center.

**Chelomey, Vladimir** (1914-1984): Chief Designer/General Designer at the Experimental Design Bureau No. 52 (OKB-52) in 1955-1984. He led the work on the Almaz program, cruise missiles, and ICBMs.

**Chertok, Boris** (b. 1912): head of control systems department at the Experimental Design Bureau No. 1, Deputy General Designer for control systems at the Energia Association. He is the author of four volumes of memoirs, which are being translated into English by NASA History Division.

**Darevskiy, Sergey** (1920-2001): laboratory head at the Zhukovsky branch of the Flight Research Institute (1955-1967), Chief Designer at the Specialized Experimental Design Bureau (1967-1975). He led the work on aircraft and spacecraft control panels and simulators.

**Demin, Lev** (1926-1998): military engineer, engineer cosmonaut. *Early career:* radio engineer at the Zhukovsky Air Force Engineering Academy, senior researcher at Cosmonaut Training Center. *Service in the cosmonaut corps:* 1963-1982. *Training:* Voskhod-3 and Almaz programs.

*Flights:* flight engineer on the failed Soyuz 15 mission to the Salyut 3 (Almaz) space station (August 1974). *Later career:* division head at the Cosmonaut Training Center.

**Dobrovolskiy, Georgiy** (1928-1971): fighter pilot, pilot cosmonaut. *Early career:* deputy commander for political affairs of the 43rd fighter bomber squadron of the 30th Air Army in the Baltic Military District. *Service in the cosmonaut corps:* 1963-1971. *Training:* Soyuz 7K-OK, L-1, Almaz, and Salyut programs. *Flights:* commander of the Expedition 1 to the Salyut space station (June 1971). Dobrovolskiy was killed when his spacecraft, Soyuz 11, depressurized during preparations for reentry.

**Fatkullin, Mars** (1939-2003): scientist, cosmonaut candidate. *Early career:* researcher at the Institute of Earth Magnetism, Ionosphere, and Radio Wave Propagation (IZMIRAN) of the Soviet Academy of Sciences in Troitsk near Moscow. *Service in the cosmonaut corps:* 1967-1968. *Training:* general cosmonaut training. *Flights:* none. *Later career:* head of the Laboratory of the Heterogeneity of the Atmosphere in IZMIRAN.

**Feoktistov, Konstantin** (1926-2009): space engineer, test cosmonaut. *Early career:* deputy department head in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps:* 1964, 1967-1968, 1980. *Training:* Voskhod, Soyuz, Soyuz T, and Salyut programs. *Flights:* flight engineer on Voskhod (October 1964). *Later career:* lead designer at the Central Design Bureau of Experimental Machine-Building/Energia Association (formerly OKB-1), professor at the Bauman Moscow Highest Technical School.

**Filipchenko, Anatoliy** (b. 1928): fighter pilot, pilot cosmonaut. *Early career:* chief instructor pilot of the 48th Air Force Army in the Odessa Military District. *Service in the cosmonaut corps:* 1963-1982. *Training:* Soyuz 7K-OK program and the Apollo-Soyuz Test Project. *Flights:* commander of Soyuz 7 during the failed joint Soyuz 6-7-8 mission (October 1969), commander of Soyuz 16 (December 1974). *Later career:* division head at the Cosmonaut Training Center.

**Gagarin, Yuriy** (1934-1968): fighter pilot, pilot cosmonaut. *Early career:* fighter pilot at Luostari Airbase in the Murmansk region. *Service in the cosmonaut corps:* 1960-1968. *Training:* Vostok and Soyuz 7K-OK programs. *Flights:* pilot of Vostok (April 1961). *Later career:* commander of the cosmonaut group, deputy commander of the Cosmonaut Training Center.

**Gallay, Mark** (1914-1998): test pilot, senior researcher at the Flight Research Institute of the Ministry of Aviation Industry; piloting instructor for the cosmonauts (1960-1961).

**Garnaev, Yuriy** (1917-1967): test pilot, test pilot instructor, pilot group commander at the Flight Research Institute in Zhukovsky near Moscow. He trained cosmonauts in microgravity flights on a specially equipped Tu-104 aircraft. Garnaev was killed in a helicopter crash on a forest fire fighting mission in France.

**Glazkov, Yuriy** (1939-2008): military engineer, pilot cosmonaut. *Early career:* officer at the Chief Administration for Rocket Armaments of the Strategic Missile Forces. *Service in the cosmonaut corps:* 1965-1982. *Training:* Soyuz VI and Almaz programs. *Flights:* flight engineer on the Expedition 2 crew on the Salyut 5 (Almaz) space station (February 1977). *Later career:*

leading test engineer, research director, first deputy commander of the Cosmonaut Training Center.

**Glushko, Valentin** (1908-1989): Chief Designer/General Designer at the Experimental Design Bureau No. 456 (OKB-456) in 1946-1989. He led the work on liquid propellant rocket engines for ICBMs and launch vehicles. In 1974-1989, he also headed the Energia Association, which led the work on Soyuz, Salyut, Mir, and the Energia launch vehicle.

**Gorbatko, Viktor** (b. 1934): fighter pilot, pilot cosmonaut. *Early career*: senior pilot in the 48th Air Force Army in the Odessa Military District. *Service in the cosmonaut corps*: 1960-1982. *Training*: Voskhod, Soyuz, Almaz, and Salyut programs. *Flights*: research cosmonaut on Soyuz 7 (October 1969), commander of the Expedition 2 crew on the Salyut 5 (Almaz) space station (February 1977), commander of the Soyuz 37 mission to Salyut 6 (July-October 1980). *Later career*: commander of the cosmonaut group, deputy chairman of the Ministry of Defense Sports Committee, dean at the Air Force Engineering Academy.

**Grechko, Georgiy** (b. 1931): space engineer, test cosmonaut. *Early career*: group leader in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps*: 1968-1992. *Training*: Soyuz, L-1, and Salyut programs. *Flights*: flight engineer on the Expedition 1 crew on the Salyut 4 space station (January-February 1975), flight engineer on the Expedition 1 crew on Salyut 6 (December 1977 – March 1978), flight engineer on the Soyuz T-14 mission to Salyut 7 (September 1985). *Later career*: laboratory head at the Institute of Physics of the Atmosphere.

**Gulyayev, Rudolf** (b. 1934): scientist, cosmonaut candidate. *Early career*: researcher at the Institute of Earth Magnetism, Ionosphere, and Radio Wave Propagation (IZMIRAN) of the Soviet Academy of Sciences in Troitsk near Moscow. *Service in the cosmonaut corps*: 1967-1968. *Training*: general cosmonaut training. *Flights*: none. *Later career*: division head at the Laboratory of Solar Activity in IZMIRAN.

**Kamanin, Nikolay** (1908-1982): famous aviator, the Assistant Chief of the Air Force for combat training for spaceflight (1960-1971). The highest-ranking Air Force official responsible for cosmonaut selection and training, crew assignments, and mission programming. He supervised the establishment and operation of the Cosmonaut Training Center.

**Keldysh, Mstislav** (1911-1978): leading scientist in mathematics and mechanics, President of the USSR Academy of Sciences (1961-1975), chairman of the Academy's Satellite Committee. He explained the flutter and shimmy effects and did extensive research on jet propulsion. Keldysh led the Scientific Research Institute No. 1 of the Ministry of Aviation Industry (1946-1978), which conducted research on liquid propellant rocket engines, and the Institute for Applied Mathematics (1953-1978), which performed trajectory calculations for the Soviet space program. During his lifetime his association with Soviet rocketry and the space program remained secret, and he was designated in the press only as the "Chief Theoretician" of the Soviet space program.

**Khrunov, Yevgeny** (1933-2000): fighter pilot, pilot cosmonaut. *Early career*: senior pilot in the 48th Air Force Army in the Odessa Military District. *Service in the cosmonaut corps*: 1960-

1980. Training: Voskhod, Soyuz, Almaz, and Salyut programs. *Flights*: research cosmonaut on Soyuz 7 (October 1969), commander of the Expedition 2 crew on the Salyut 5 (Almaz) space station (February 1977), commander of the Soyuz 37 mission to Salyut 6 (July-October 1980). *Later career*: division head at the Cosmonaut Training Center, arms trade official at the Ministry of Foreign Trade.

**Klimuk, Pyotr** (b. 1942): fighter pilot, pilot cosmonaut. *Early career*: senior pilot in the 57th Air Force Fighter Guard Regiment in the Leningrad Military District. *Service in the cosmonaut corps*: 1965-1982. *Training*: L-1, Soyuz, and Salyut programs. *Flights*: commander of Soyuz 12 (December 1973), commander of the Expedition 2 crew on the Salyut 4 space station (May-July 1975), commander of the Soyuz 30 mission to Salyut 6 (June-July 1978). *Later career*: deputy commander, commander of the Cosmonaut Training Center.

**Kolodin, Petr** (b. 1930): military engineer, test cosmonaut. *Early career*: military representative at a missile industry facility in Khar'kov. *Service in the cosmonaut corps*: 1963-1983. *Training*: Voskhod, Soyuz, and Salyut programs. *Flights*: none. *Later career*: shift leader of the mission control group at the Cosmonaut Training Center.

**Kolomiytsev, Ordinard** (b. 1933): scientist, cosmonaut candidate. *Early career*: researcher at the Institute of Earth Magnetism, Ionosphere, and Radio Wave Propagation (IZMIRAN) of the Soviet Academy of Sciences in Troitsk near Moscow. *Service in the cosmonaut corps*: 1967-1968. *Training*: general cosmonaut training. *Flights*: none. *Later career*: chief researcher at the Laboratory of the Diffraction of Radio Waves in the Ionosphere in IZMIRAN.

**Komarov, Vladimir** (1927-1967): test pilot, pilot cosmonaut. *Early career*: test pilot at the Air Force Research Institute. *Service in the cosmonaut corps*: 1960-1967. *Training*: Vostok, Voskhod, and Soyuz programs. *Flights*: commander of Voskhod (October 1964), pilot of Soyuz-1 (April 1967). Komarov was killed when his spacecraft crashed because of a parachute malfunction.

**Korolev, Sergey** (1907-1966): Chief Designer at the Experimental Design Bureau No. 1 (OKB-1) in 1946-1966. He led the work on the first Soviet ICBMs, Sputnik, and the Vostok, Voskhod, Soyuz, and Salyut programs. During his lifetime his name remained secret, and he was designated in the press only as the "Chief Designer" of the Soviet space program.

**Kosberg, Semyon** (1903-1965): Chief Designer of aircraft engines at the Experimental Design Bureau No. 154 (later the Design Bureau of Chemical Automatics, or Design Bureau Khimavtomatika) in Voronezh, specializing in liquid propellant rocket engines for high performance aircraft.

**Kosmodemyanskiy, Arkadiy** (1909-1988): Professor of mechanics at Moscow State University; historian of astronautics at the Institute for the History of Natural Sciences and Technology of the USSR Academy of Sciences in Moscow.

**Kovalyonok, Vladimir** (b. 1942): military transport pilot, pilot cosmonaut. *Early career*: crew commander in the 12th Military Transport Aviation Division. *Service in the cosmonaut corps*:

1967-1984. *Training*: Soyuz and Salyut programs. *Flights*: commander of the failed Soyuz 25 mission to the Salyut 6 space station (October 1977), commander of the Expedition 2 on Salyut 6 (June-November 1978), commander of the Expedition 5 on Salyut 6 (March-May 1981). *Later career*: deputy commander of the 37th Air Force Strategic Army, commander of the Zhukovsky Air Force Engineering Academy.

**Kozlov, Dmitriy** (1919-2009): Lead designer of the R-7 ICBM, Director of the Kuybyshev branch of the Experimental Design Bureau No. 1 (1959-1974), Director and Chief Designer of the Central Specialized Design Bureau in Kuybyshev (now Samara) (1974-2003). He supervised the design of reconnaissance satellites and the production of booster rockets Vostok, Molniya, and Soyuz.

**Krikalev, Sergey** (b. 1958): space engineer, test cosmonaut. *Early career*: senior engineer at the Energia Corporation. *Service in the cosmonaut corps*: 1985-2009. *Training*: Soyuz TM, Mir, the U.S. Space Shuttle, and the International Space Station programs. *Flights*: flight engineer on the Expedition 4 crew on the Mir space station (November 1988 – April 1989), flight engineer on the Expeditions 9 and 10 crews on Mir (May 1991 – March 1992), mission specialist 4 on STS-60 Discovery (February 1994), mission specialist 4 on the STS-88 Endeavour mission to the ISS (December 1998), commander of the Expedition 1 crew on the ISS (October 2000 – March 2001), commander of the Expedition 11 crew on the ISS (April-October 2005). *Later career*: vice president, Deputy Chief Designer at the Energia Corporation; commander of the Cosmonaut Training Center.

**Kubasov, Valeriy** (b. 1935): space engineer, test cosmonaut. *Early career*: group leader in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps*: 1966-1993. *Training*: Soyuz 7K-OK and Salyut programs and the Apollo Soyuz Test Project. *Flights*: flight engineer on Soyuz 6 (October 1969), flight engineer on Soyuz 19 under the Apollo Soyuz Test Project (July 1975), commander of the Visiting Expedition 5 to the Salyut 6 space station (May 1980). *Later career*: deputy division head at the Energia Corporation.

**Kugno, Eduard** (1935-1994): aviation engineer, cosmonaut trainee. *Early career*: head of the aircraft servicing group in a fighter aviation regiment of the Air Force of the Northern Fleet. *Service in the cosmonaut corps*: 1963-1964. *Training*: initial phase of the general cosmonaut training. *Flights*: none. *Later career*: aviation engineer, flight instructor, instructor at aviation engineering schools.

**Kuklin, Anatoliy** (1932-2005): fighter pilot, test cosmonaut. *Early career*: senior pilot in the 9th Fighter Aviation Division of the Moscow Military District. *Service in the cosmonaut corps*: 1963-1975. *Training*: Spiral, L-1, and Soyuz 7K-OK programs. *Flights*: none. *Later career*: deputy commander of the cosmonaut group at the Cosmonaut Training Center.

**Kutakhov, Pavel** (1914-1984): Commander of the 48th Air Army, First Deputy Chief of the Air Force (1967), Chief of the Air Force (1969), Chief Marshal of Aviation (1972).

**Kuznetsov, Nikolay D.** (1911-1995): Chief Designer/General Designer of aircraft and rocket engines, the head of the Experimental Design Bureau No. 276 (OKB-276) in Kuybyshev (now

Samara) in 1953-1967, later designated as the Design Bureau Trud (1967-1981), the Scientific-Production Association Trud (1981-1991), and the State Scientific-Production Company Trud (1991-1994). He led the work on the engines for the N1 lunar rocket.

**Kuznetsov, Viktor** (1913-1991): Chief Designer of gyroscopic devices for missiles and spacecraft at the Scientific Research Institute No. 10 and the Scientific Research Institute No. 944 in 1946-1989.

**Lebedev, Valentin** (b. 1942): space engineer, test cosmonaut, Academy of Sciences cosmonaut. *Early career:* senior engineer at the Central Design Bureau of Experimental Machine-Building. *Service in the cosmonaut corps:* 1972-1993. *Training:* Soyuz, Salyut 6, and Salyut 7 programs. *Flights:* flight engineer on Soyuz 13 (December 1973), flight engineer of the Expedition 1 to the Salyut 7 space station (May-December 1982). *Later career:* director of the Geo-information Center of the Russian Academy of Sciences.

**Leonov, Aleksey** (b. 1934): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 24th Air Force Army in East Germany. *Service in the cosmonaut corps:* 1960-1982. *Training:* Voskhod-2, L-1, L-3, Soyuz 7K-OK, Soyuz 7K-T, and Salyut programs. *Flights:* second pilot on Voskhod 2 (March 1965), commander of the Soyuz 19 mission under the Apollo Soyuz Test Project (July 1975). *Later career:* deputy commander of the Cosmonaut Training Center for flight and space training, vice president of Alfa Bank.

**List, Grigoriy** (1901-1993): head of the group designing thrust chambers for liquid propellant rocket engines, Deputy Chief Designer at the Energomash Research and Production Association.

**Lozino-Lozinskiy, Gleb** (1909-2001): Aircraft designer, Chief Designer (1971) at the Mikoyan Separate Design Bureau No. 155, he designed MiG fighters and led the work on the Spiral program. Chief Designer/General Designer at the Molniya Research and Production Association (1976), he led the work on the Soviet Shuttle Buran.

**Lyakhov, Vladimir** (b. 1941): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 11th Air Defense Army in the Khabarovsk Region. *Service in the cosmonaut corps:* 1967-1994. *Training:* Spiral, Soyuz, Salyut, and Mir programs. *Flights:* commander of the Expedition 3 crew on the Salyut 6 space station (February-August 1979), commander of the Expedition 2 crew on Salyut 7 (June-November 1983), commander of the Soyuz TM-6 mission to the Mir space station (August-September 1988). *Later career:* deputy commander of the cosmonaut group at the Cosmonaut Training Center.

**Malyshev, Yuriy** (1941-1999): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 34th Air Force Army in the Trans-Caucasus Military District. *Service in the cosmonaut corps:* 1967-1988. *Training:* Spiral, Soyuz 7K-S, Soyuz T, Soyuz TM, and Salyut programs. *Flights:* commander of the Soyuz T-2 mission to the Salyut 7 space station (June 1980), commander of the Soyuz T-11 mission to the Salyut 7 space station (April 1984). *Later career:* deputy division head at the Cosmonaut Training Center.

**Melnikov, Mikhail** (1919-1996): Deputy Chief Designer at the Experimental Design Bureau No. 1 (later the Central Design Bureau of Experimental Machine-Building) in 1960-1974.

**Mishin, Vasiliy** (1917-2001): Deputy Chief Designer at the Experimental Design Bureau No. 1 under Sergey Korolev; Chief Designer at the Bureau, renamed the Central Design Bureau of Experimental Machine-Building, in 1966-1974; department head at the Moscow Aviation Institute. He led the work on the Soviet lunar program.

**Mnatsakanyan, Armen** (1918-1991): the head of the Scientific Research Institute for Precision Instruments (NII-648) in 1961-1976. He led the work on telemetry and radar systems for ballistic and cruise missiles and spacecraft. The chief designer of the Igla rendezvous control system.

**Nikolayev, Andrian** (1929-2004): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 401st Fighter Aviation Regiment of the Air Defense of the Moscow Military District. *Service in the cosmonaut corps:* 1960-1982. *Training:* Vostok and Soyuz 7K-OK programs. *Flights:* pilot of Vostok 3 (August 1962), commander of the Soyuz 9 mission (June 1970). *Later career:* first deputy commander of the Cosmonaut Training Center

**Nudelman, Aleksandr** (1912-1996): Chief Designer at the Experimental Design Bureau No. 16 (OKB-16) in 1965-1987. He led the work on a space cannon for spacecraft designed by Vladimir Chelomey and Dmitrii Kozlov.

**Patsayev, Viktor** (1933-1971): space engineer, test cosmonaut. *Early career:* group leader in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps:* 1968-1971. *Training:* Soyuz 7K-OK and Salyut programs. *Flights:* engineer researcher on the Expedition 1 to the Salyut space station (June 1971). Patsayev was killed when his spacecraft, Soyuz 11, depressurized during preparations for reentry.

**Petrov, Boris** (1913-1980): Department Chief at the Institute of Control Problems of the Soviet Academy of Sciences (1951-1980), head of the Academy's Intercosmos Council for international cooperation in space (1966-1980). He led fundamental research on automatic control theory, with applications to rocketry and space exploration.

**Pilyugin, Nikolay** (1908-1982): Chief Designer of autonomous guidance systems for missiles and space vehicles (1946-1982), head of the Scientific-Research Institute of Automatics and Instrument Building (NII AP) (1963-1982). He developed guidance systems for the R-1 and R-7 missiles, interplanetary probes, the Proton rocket, and the Buran space shuttle.

**Pobedonostsev, Yuriy** (1907-1973): a rocketry designer. He worked at the Central Aerohydrodynamic Institute (1925-1932), the Group for the Study of Reactive Motion (1932), and the Reactive Scientific-Research Institute (since 1933). He made a major contribution in the development of the *Katyusha* mortar. The recipient of the Stalin Prize (1941). In 1941-1950 he taught at the Moscow Higher Technical School, serving as the chair of the Ballistic Rockets Department in 1948-1950.



**Popovich, Pavel** (1930-2009): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 9th Fighter Aviation Division of the Moscow Military District. *Service in the cosmonaut corps:* 1960-1982. *Training:* Vostok, Soyuz 7K-VI, L-1, and Almaz programs. *Flights:* pilot of Vostok 4 (August 1962), commander of the Expedition 1 on the Salyut 3 (Almaz) space station (July 1974). *Later career:* deputy commander of the Cosmonaut Training Center for research and testing, director of the Russian Institute of Land and Ecosystem Monitoring.

**Ponomareva, Valentina** (b. 1933): aviation engineer, pilot engineer cosmonaut. *Early career:* engineer at the Applied Mathematics Division of the Mathematical Institute of the USSR Academy of Sciences in Moscow. *Service in the cosmonaut corps:* 1962-1969. *Training:* Vostok and Voskhod programs. *Flights:* none. *Later career:* senior researcher at the Scientific Research Department of the Cosmonaut Training Center; researcher, group leader at the Institute for the History of Natural Science and Technology of the Academy of Sciences in Moscow.

**Porvatkin, Nikolay** (1932-2009): military engineer, research cosmonaut. *Early career:* junior researcher at the Air Defense Scientific Research Institute No. 2. *Service in the cosmonaut corps:* 1967-1983. *Training:* Soyuz VI and Almaz programs. *Flights:* none. *Later career:* shift leader of the mission control group at the Cosmonaut Training Center; researcher at the mission control department of the Energia Corporation.

**Rozhdestvenskiy, Valeriy** (1939-2011): navy officer, pilot cosmonaut. *Early career:* commander of a rescue group of divers at the Liepaja Navy Base. *Service in the cosmonaut corps:* 1965-1986. *Training:* Almaz program. *Flights:* flight engineer of the failed Soyuz 23 mission to the Salyut 5 (Almaz) space station (October 1976). *Later career:* department head at the Cosmonaut Training Center.

**Ryazanskiy, Mikhail** (1909-1987): Chief Designer of radio controlled guidance systems for missiles and space vehicles (1946-1951, 1955-1987). Head of the Scientific-Research Institute No. 885. He developed guidance systems for ballistic missiles, space booster rockets, satellites, and interplanetary probes.

**Ryumin, Valeriy** (b. 1939): space engineer, test cosmonaut. *Early career:* senior engineer, deputy lead designer at the Central Design Bureau of Experimental Machine-Building. *Service in the cosmonaut corps:* 1973-1987. *Training:* Soyuz, Salyut, Mir, and the U.S. Space Shuttle programs. *Flights:* flight engineer on the failed Soyuz 25 mission to the Salyut 6 space station (October 1977), flight engineer on the Expedition 3 crew on Salyut 6 (February-August 1979), flight engineer on the Expedition 4 crew on Salyut 6 (April-October 1980), mission specialist on the STS-91 Discovery mission to the Mir space station (June 1998). *Later career:* Deputy Chief Designer at the Energia Association/Energia Corporation.

**Sarafanov, Gennadiy** (1942-2005): military transport pilot, pilot cosmonaut. *Early career:* pilot in the 11th Military Transport Aviation Division of the Baltic Military District. *Service in the cosmonaut corps:* 1965-1986. *Training:* Almaz program. *Flights:* commander of the failed Soyuz 15 mission to the Salyut 3 (Almaz) space station (August 1974). *Later career:* deputy chairman of the board of the Znanie Society for public science.

**Savitskaya, Svetlana** (b. 1948): test pilot, test cosmonaut. *Early career:* test pilot at the Yakovlev Design Bureau. *Service in the cosmonaut corps:* 1981-1993. *Training:* Salyut 7 and Mir programs. *Flights:* research cosmonaut on the Visiting Expedition 2 to the Salyut 7 space station (August 1982), flight engineer on the Visiting Expedition 4 to the Salyut 7 space station (July 1984). *Later career:* deputy department head at the Energia Association (1993-1994), member of the Communist Party faction of the Russian parliament (the State Duma) since 1995.

**Semenov, Yuriy** (b. 1935): the General Designer and General Director/President of the Energia Association/Corporation in 1989-2005. He led the work on Soyuz-TM, Progress, Salyut-4/6/7 space stations, Mir, and the International Space Station.

**Sevastyanov, Vitaliy** (1935-2010): space engineer, test cosmonaut. *Early career:* section head at the Central Design Bureau of Experimental Machine-Building. *Service in the cosmonaut corps:* 1968-1993. *Training:* L-1, L-3, Soyuz, Salyut, and Mir programs. *Flights:* flight engineer on the failed Soyuz 25 mission to the Salyut 6 space station (October 1977), flight engineer on Soyuz 9 (July 1970), flight engineer on the Expedition 2 crew on Salyut 4 (May-July 1975). *Later career:* member of the Communist Party faction of the Russian parliament (the State Duma) (1993-2007).

**Shatalov, Vladimir** (b. 1927): fighter pilot, pilot cosmonaut. *Early career:* chief inspector pilot of the 48th Air Force Army in the Odessa Military District. *Service in the cosmonaut corps:* 1963-1971. *Training:* Voskhod, Soyuz, and Salyut programs. *Flights:* commander of Soyuz 4 and of the joint Soyuz 4/5 mission (January 1969), commander of Soyuz 8 and of the failed joint Soyuz 6/7/8 mission (October 1969), commander of the failed Soyuz 10 mission to the Salyut space station (April 1971). *Later career:* deputy chief of the Air Force for preparation and support of space flights, commander of the Cosmonaut Training Center.

**Shonin, Georgiy** (1935-1997): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 112th Fighter Aviation Division of the Air Force of the Northern Fleet. *Service in the cosmonaut corps:* 1961-1979. *Training:* Vostok, Soyuz, and Salyut programs. *Flights:* commander of Soyuz 6 (October 1969). *Later career:* division head at the Cosmonaut Training Center, deputy commander of the Air Force of the Odessa Military District.

**Smirnov, Leonid** (1916-2001): Chairman of the State Committee for Defense Technology (1961-1963); Deputy Chairman of the USSR Council of Ministers, Chairman of the Military Industrial Commission (1963-1985); Chairman of the State Commission for Piloted Flights.

**Sokolov, Boris** (b. 1923): Deputy General Designer at the Energia Rocket and Space Corporation.

**Solovyev, Yuriy** (b. 1917): Lead designer for the production of the engines for the R-7 rocket, director of an experimental plant and first deputy head of the Experimental Design Bureau No. 456 (later the Energomash Design Bureau) in 1960-1968.

**Solovyeva, Irina** (b. 1937): construction engineer, psychologist, pilot engineer cosmonaut. *Early career:* construction engineer in Sverdlovsk, member of the national team in parachute jumping.

*Service in the cosmonaut corps:* 1962-1969. *Training:* Vostok and Voskhod programs. *Flights:* none. *Later career:* cosmonaut instructor, psychology researcher at the Scientific Research Department of the Cosmonaut Training Center.

**Tereshkova, Valentina** (b. 1937): textile worker, pilot cosmonaut. *Early career:* worker at a textile factory in Yaroslavl. *Service in the cosmonaut corps:* 1962-1997. *Training:* Vostok and Voskhod programs. *Flights:* pilot of Vostok 6 (June 1963). *Later career:* member of the Supreme Soviet of the Soviet Union (1966-1974), member of the Presidium of the Supreme Soviet (1974-1989), member of the Central Committee of the Communist Party (1969-1991), head of the Soviet Women's Committee (1968-1987), head of Russian Center for International Scientific and Cultural Cooperation (1994-2004).

**Tikhonravov, Mikhail** (1900-1974): rocket and spacecraft designer, worked at the Group for the Study of Reactive Motion, the Reactive Scientific-Research Institute, and the Scientific-Research Institute No. 4; after 1956 department head at Korolev's OKB-1. He played a key role in the design of Sputnik, Vostok, and a piloted spacecraft for a flight to Mars.

**Titov, German** (1935-2000): fighter pilot, pilot cosmonaut. *Early career:* senior pilot in the 76th Air Force Army in the Leningrad Military District. *Service in the cosmonaut corps:* 1960-1970. *Training:* Vostok and Spiral programs. *Flights:* pilot of Vostok 2 (August 1961). *Later career:* deputy head of the Chief Directorate of Space Assets of the Ministry of Defense.

**Tupolev, Andrei** (1888-1972): aircraft designer, Chief Designer/General Designer at the Experimental Design Bureau No. 156 (OKB-156) in 1943-1972. He led the work on military and commercial aircraft and on a spaceplane carrier aircraft.

**Tyapchenko, Yuriy** (b. 1938): Deputy General Director/Deputy Chief Designer (1997-2002) at the Specialized Experimental Design Bureau of Space Technology of the Flight Research Institute in Zhukovsky near Moscow. He led the work on information display systems for spacecraft.

**Ustinov, Dmitriy** (1908-1984): Deputy Chairman of the USSR Council of Ministers, Chairman of the Military Industrial Commission (1957-1963); First Deputy Chairman of the USSR Council of Ministers, Chairman of the Highest Council for the National Economy (1963-1965); Secretary of the Central Committee of the Communist Party for defense industry (1965-1976); member of the Politburo, USSR Minister of Defense (1976-1984).

**Vershinin, Konstantin** (1900-1973): Chief of the Air Force, Deputy Minister of Defense (1946-1949, 1957-1969), Chief Marshal of Aviation (1959).

**Vitka, Vladimir** (1900-1989): Deputy Chief Designer at the Experimental Design Bureau No. 456 (1947-1954), First Deputy Chief Designer (1954-1961). He led design work on liquid propellant rocket engines.

**Volkov, Vladislav (Vadim)** (1935-1971): space engineer, test cosmonaut. *Early career:* deputy lead designer of the Vostok and Voskhod spacecraft in the Experimental Design Bureau No. 1

(OKB-1). *Service in the cosmonaut corps*: 1968-1971. *Training*: Soyuz 7K-OK and Salyut programs. *Flights*: flight engineer on Soyuz 7 (October 1969), flight engineer on the Expedition 1 to the Salyut space station (June 1971). Volkov was killed when his spacecraft, Soyuz 11, depressurized during preparations for reentry.

**Volynov, Boris** (b. 1934): fighter pilot, pilot cosmonaut. *Early career*: senior pilot in the 133rd Fighter Aviation Division in the Moscow Air Defense District. *Service in the cosmonaut corps*: 1960-1990. *Training*: Vostok, Voskhod, Soyuz, and Almaz programs. *Flights*: commander of Soyuz 5 (January 1969), commander of the Expedition 1 on the Salyut 5 (Almaz) space station (July-August 1976). *Later career*: deputy commander (1976-1983), commander (1983-1990) of the cosmonaut group at the Cosmonaut Training Center.

**Vorobyev, Lev** (1931-2010): fighter pilot, test cosmonaut. *Early career*: senior pilot in the 27th Fighter Aviation Division of the Air Defense on Sakhalin. *Service in the cosmonaut corps*: 1963-1974. *Training*: Soyuz and Almaz programs. *Flights*: none. *Later career*: head of the department of life support systems at the Cosmonaut Training Center.

**Voskresenskiy, Leonid** (1913-1965): rocket testing specialist, Laboratory head at NII-1 (1944-1947), since 1947 at Korolev's OKB-1: head of the Lead Design-Testing Department (1951-1954), Deputy Chief Designer for flight testing (1954-1963), Research Director of the Testing Division (1963-1965).

**Yazdovskiy, Valeriy** (b. 1930): space engineer, test cosmonaut. *Early career*: group leader in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps*: 1967-1971. *Training*: L-3, Soyuz 7K-OK, Soyuz T, and Salyut programs. *Flights*: none. *Later career*: lead engineer at the Energia Association.

**Yangel, Mikhail** (1911-1971): Director, chief engineer at the Scientific Research Institute No. 88 (1950-1954), Chief Designer at the Experimental Design Bureau No. 586 (later the Yuzhnoe Design Bureau) in Dnepropetrovsk (1954-1971). He led the work on ICBMs, space launchers, and automatic spacecraft.

**Yeliseev, Aleksey** (b.1934): space engineer, test cosmonaut. *Early career*: senior engineer in the Experimental Design Bureau No. 1 (OKB-1). *Service in the cosmonaut corps*: 1966-1985. *Training*: Soyuz and Salyut programs. *Flights*: flight engineer on the joint Soyuz 4 – Soyuz 5 mission (January 1969), flight engineer on Soyuz 8 (October 1969), flight engineer on the failed Soyuz 10 mission to the Salyut space station (April 1971). *Later career*: Deputy General Designer at the Energia Association (formerly OKB-1), rector of the Bauman Moscow Highest Technical School.

**Zholobov, Vitaliy** (b. 1937): military engineer, pilot cosmonaut. *Early career*: test engineer at the missile test range in Kapustin Yar. *Service in the cosmonaut corps*: 1963-1981. *Training*: Almaz program. *Flights*: flight engineer of the Expedition 1 on the Salyut 5 (Almaz) space station (July-August 1976). *Later career*: civil defense official, participant in the disaster response effort after the 1986 nuclear accident at the Chernobyl Nuclear Power Plant, professor of geodesy, deputy General Director of the Ukrainian National Space Agency.

**Zudov, Vyacheslav** (b. 1942): military transport pilot, pilot cosmonaut. *Early career:* crew pilot in the 12th Military Transport Aviation Division. *Service in the cosmonaut corps:* 1965-1987. *Training:* 7K-VI, Soyuz, Almaz, and Salyut 6 programs. *Flights:* commander of the failed Soyuz 23 mission to the Salyut 5 (Almaz) space station (October 1976). *Later career:* deputy head of the political department at the Cosmonaut Training Center.