

SPACEFLIGHT BIOMEDICAL DATABASE

SOVIET SPACE FLIGHT EXPERIMENTS

**MISSION SCIENCE OFFICE
GE GOVERNMENT SERVICES
HOUSTON, TEXAS**



GE Government Services

YEAR	FLIGHT	DAYS	INFLIGHT	POSTFLIGHT	REMARKS
1964	Voskhod-1	1	EKG Pneumogram Seismocardiogram Sphygmogram Vital capacity Pulmonary ventilation Hand dynamometry Coordination test Vestibulometry Blood study		First space crew, including first physician in space.
1965	Voskhod-2	1	EKG Pneumogram Seismocardiogram Vital capacity Pulmonary ventilation Respiratory metabolism Body temperature Sensory & stereognosia test EOG Eye-hand tracking Reaction time	EKG Pneumogram Body mass measurement EEG	First EVA.
1967	Soyuz-1	1	EKG Pneumogram Seismocardiogram		First spaceflight fatality, pilot died of massive crush injuries when capsule crashed.
1968	Soyuz-3	4	EKG Pneumogram Seismocardiogram Sleep monitoring Urine collection	EKG Sleep monitoring Blood/urine chemistry EEG	

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1969	Soyuz-4	3	EKG Pneumogram Seismocardiogram Sleep monitoring Sphygmomanometry Vital capacity Pulmonary ventilation Respiratory metabolism	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring	
1969	Soyuz-5	3	EKG Pneumogram Seismocardiogram Sleep monitoring Sphygmomanometry Vital capacity Pulmonary ventilation Respiratory metabolism	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring	
1969	Soyuz-6	5	EKG Pneumogram Seismocardiogram Sleep monitoring Sphygmomanometry Vital capacity Pulmonary ventilation Respiratory metabolism	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring Whole blood analysis 24-hour urine collection Fluid loading	

YEAR	FLIGHT	DAYS	INFLIGHT	POSTFLIGHT	REMARKS
1969	Soyuz-7	5	EKG Pneumogram Seismocardiogram Sleep monitoring Sphygmomanometry Vital capacity Pulmonary ventilation Respiratory metabolism	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring Whole blood analysis 24-hour urine collection Fluid loading	
1969	Soyuz-8	5	EKG Pneumogram Seismocardiogram Sleep monitoring	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring Whole blood analysis 24-hour urine collection Fluid loading	
1970	Soyuz-9	18	EKG Pneumogram Seismocardiogram Sleep monitoring Sphygmomanometry Vital capacity Pulmonary ventilation Respiratory metabolism Hand dynamometry Kinesthetic sensitivity	EKG Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic EEG Sleep monitoring Body mass measurement Stabilogram Back extensor muscle strength Microbiological studies Immunological studies	Significant postflight orthostatic intolerance; minimal inflight counter- measures

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1971	Soyuz-10	2	EKG Pneumogram Seismocardiogram		First docking with Salyut-1, no transfer
1971	Salyut-1 - Soyuz-11	24	EKG Pneumogram Seismocardiogram Kinetocardiogram Brachial tachooscillogram Distal-perimetric oscillogram Sphygmomanometry Vital capacity Respiratory metabolism Kinesthetic sensitivity Hand dynamometry LBNP test Treadmill, squatting and bicycle exercise	Bone histology (autopsy)	First inflight use of Chibis LBNP unit, Penguin suit, and treadmill and bicycle ergometer. crew died due to sudden loss of cabin pressure just prior to reentry.
1973	Soyuz-12	2	EKG Pneumogram Seismocardiogram	EKG Pneumogram Seismocardiogram Phonocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Active & passive orthostatic Body mass measurement Blood & urine chemistry Hematological studies LBNP & exercise tests	

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1973	Soyuz-13	8	EKG Pneumogram Seismocardiogram	EKG Pneumogram Seismocardiogram Phonocardiogram Kinetocardiogram Rheoencephalogram Lung & limb rheograms Sphygmogram Brachial tachooscillogram Vital capacity Active & passive orthostatic Body mass measurement Blood & urine chemistry Hematological studies LBNP & exercise tests	
1974	Salyut-3 - Soyuz-14	16	EKG Pneumogram Seismocardiogram Jugular vein phlebogram	EKG Pneumogram Seismocardiogram Kinetocardiogram Sphygmogram Brachial tachooscillogram Vital capacity Active & passive orthostatic Body mass measurement Blood & urine chemistry Hematological studies LBNP & exercise tests Neuromuscular testing	

YEAR	FLIGHT	DAYS	INFLIGHT	POSTFLIGHT	REMARKS
1974	Soyuz-15	2	EKG Pneumogram Seismocardiogram	EKG Pneumogram Seismocardiogram Kinetocardiogram Sphygmogram Brachial tachooscillogram Vital capacity Active & passive orthostatic Body mass measurement Blood & urine chemistry LBNP & exercise tests Neuromuscular testing	Salyut docking failure.
1974	Soyuz-16 (pre-ASTP)	6		EKG Sphygmomanometry Orthostatic test Blood chemistry (amino acids)	
1975	Salyut-4 - Soyuz-17	30	EKG Rheoencephalogram LBNP test	EKG Brachial tachooscillogram Rheoencephalogram Plethysmography Orthostatic test Blood & urine chemistry Hematological studies Bicycle exercise & LBNP tests	
1975	Soyuz-18A (abort)	0			Suborbital abort, crew subjected to ~20 Gs during ballistic reentry.

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1975	Salyut-4 - Soyuz-18	63	12-lead EKG Kinetocardiogram Seismocardiogram Brachial tachooscillogram Distal perimetric oscillogram Sphygmograms AV pulsogram Leg volume measurement Fluid loading LBNP & exercise tests Blood chemistry	12-lead EKG Kinetocardiogram Seismocardiogram Brachial tachooscillogram Distal perimetric oscillogram Sphygmograms AV pulsogram Leg volume measurement LBNP & exercise tests Blood chemistry Hematological studies Urine chemistry Orthostatic test Rheoencephalogram Peripheral rheogram Photoplethysmography Vestibular testing	Inflight LBNP/fluid loading protocol elaborated.
1975	Soyuz-19 (ASTP)	6	EKG Pneumogram Seismogram Spatial perception Vestibular thresholds	EKG LBNP & exercise tests Blood chemistry Hematological studies Immunological studies	
1976	Salyut-5 - Soyuz-21	49	12-lead & DS EKG Pneumogram Kinetocardiogram Seismocardiogram Brachial tachooscillogram Distal perimetric oscillogram Sphygmograms AV pulsogram Jugular vein phlebogram Vital capacity Body mass measurement Capillary blood chemistry LBNP & exercise tests	Kinetocardiogram Brachial tachooscillogram Sphygmograms Blood & urine chemistry Hematological studies Immunological studies	First inflight body mass measurement; flight terminated early due to build-up of toxic substance.

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1976	Soyuz-22	8	EKG	EKG Otolith reflex	Salyut docking failure.
1976	Soyuz-23	2		EKG	
1977	Salyut-5 - Soyuz-24	18	12-lead & DS EKG Pneumogram Kinetocardiogram Seismocardiogram Brachial tachooscillogram Distal perimetric oscillogram Sphygmograms AV pulsogram Jugular vein phlebogram Vital capacity Body mass measurement Capillary blood chemistry LBNP & exercise tests	AV pulsogram Sphygmograms Blood & urine chemistry Hematological studies Immunological studies Orthostatic test	
1977	Soyuz-25	2		EKG Orthostatic test	Salyut docking failure.
1977	Salyut-6 - Soyuz-26	96	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Impedance plethysmography Jugular vein phlebogram Rheoencephalogram Leg volume measurement LBNP & exercise tests LBNP training Fluid loading ?Holter monitor Blood & urine chemistry Microbiological studies	12-lead & DS EKG Jugular vein phlebogram Rheoencephalogram LBNP & exercise tests Orthostatic test Blood & urine chemistry Microbiological studies Body mass measurement Echocardiography Hematological studies Immunological studies Otolith reflex Spatial perception Neuromuscular testing Bone densitometry	

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1978	Salyut-6 - Soyuz-27	6		EKG Hematological studies	
1978	Salyut-6 - Soyuz-28	8	Intracutaneous O2 tension	EKG Hematological studies	
1978	Salyut-6 - Soyuz-29	140	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Peripheral rheograms Jugular vein phlebogram Rheoencephalogram Plethysmography Body mass measurement Leg volume measurement LBNP & exercise tests LBNP training Fluid loading Holter monitor Microbiological studies	12-lead & DS EKG Jugular vein phlebogram Rheoencephalogram Plethysmography LBNP & exercise tests Orthostatic test Echocardiography Holter monitor Blood & urine chemistry Hematological studies Immunological studies Neuromuscular testing Bone densitometry	
1978	Salyut-6 - Soyuz-30	8	EKG (Cardiolider) LBNP & exercise tests Body temperature Intracutaneous O2 tension	EKG Hematological studies	
1978	Salyut-6 - Soyuz-31	8	Intracutaneous O2 tension	EKG Hematological studies Otolith reflex Endocrine studies	

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1979	Salyut-6 - Soyuz-32	175	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms Rheoencephalogram Plethysmography Blood & urine chemistry Body mass measurement Leg volume measurement LBNP & exercise tests LBNP training Fluid loading Holter monitor Microbiological studies	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms LBNP & exercise tests Orthostatic test Holter monitor Echocardiography Neuromuscular testing Bone densitometry Blood & urine chemistry Hematological studies Immunological studies Microbiological studies	
1979	Soyuz-33	2		EKG Orthostatic test	Salyut docking failure.
1980	Salyut-6 - Soyuz-35	185	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms Rheoencephalogram Plethysmography Ballistocardiogram Blood & urine chemistry Body mass measurement Leg volume measurement LBNP & exercise tests LBNP training Fluid loading Holter monitor Microbiological studies	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms Rheoencephalogram Plethysmography Blood & urine chemistry LBNP & exercise tests Orthostatic test Holter monitor Echocardiography Hematological studies Immunological studies Bone densitometry Posturogram Neuromuscular testing Microbiological studies	

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1980	Salyut-6 - Soyuz-36	8		EKG Blood chemistry	
1980	Salyut-6 - Soyuz-T2	4		EKG Blood chemistry	
1980	Salyut-6 - Soyuz-37	8	Pneumotest-78 LBNP & exercise tests	EKG	
1980	Salyut-6 - Soyuz-38	8	Pneumotest-78 LBNP & exercise tests Cuban boot	EKG Orthostatic test Posturogram	
1980	Salyut-6 - Soyuz-T3	13		EKG Orthostatic test	Use of Matsnev cap as SMS countermeasure.
1981	Salyut-6 - Soyuz-T4	75	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms Rheoencephalogram Plethysmography Ballistocardiogram Blood & urine chemistry Body mass measurement Leg volume measurement LBNP & exercise tests LBNP training Fluid loading Holter monitor Microbiological studies	12-lead & DS EKG Kinetocardiogram Brachial tachooscillogram Sphygmograms Jugular vein phlebogram Peripheral rheograms Rheoencephalogram Plethysmography Blood & urine chemistry Body mass measurement Leg volume measurement LBNP & exercise tests Orthostatic test Holter monitor Echocardiography Hematological studies Immunological studies Neuromuscular testing Bone densitometry Microbiological studies	Significant postflight vestibular symptoms in flight engineer.

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1981	Salyut-6 - Soyuz-39	8	Body temperature	EKG	First inflight echocardiogram.
1981	Salyut-6 - Soyuz-40	8		EKG Orthostatic test Ear photodensitometry Exercise test	
1982	Salyut-7 - Soyuz-T5	211	EKG Echocardiogram Rheoencephalogram Body mass measurement Leg volume measurement Blood chemistry LBNP & exercise testing	EKG Echocardiogram Blood chemistry LBNP & exercise testing Urine chemistry Neuromuscular testing	
1982	Salyut-7 - Soyuz-T6	8	Echocardiogram Posturogram	EKG Orthostatic test	
1982	Salyut-7 - Soyuz-T7	8		EKG Orthostatic test	Salyut docking failure.
1983	Soyuz-T8	2		EKG Orthostatic test	
1983	Salyut-7 - Soyuz-T9	150	EKG Rheoencephalogram Body mass measurement Leg volume measurement Blood chemistry LBNP & exercise testing Glucose tolerance test	EKG Rheoencephalogram Blood & urine chemistry Glucose tolerance test Hematological studies Vestibular testing	
1983	Soyuz-T10A (abort)	0			Launch abort, crew subjected to 17 Gs.

YEAR	FLIGHT	DAYS	INFLIGHT	POSTFLIGHT	REMARKS
1984	Salyut-7 - Soyuz-T10	237	EKG Echocardiogram Body mass measurement Leg volume measurement Blood chemistry LBNP & exercise testing Oking optokinetic stimulator	EKG Echocardiogram Blood chemistry LBNP & exercise testing	First physician on long-duration crew.
1984	Salyut-7 - Soyuz-T11	8	Ballistocardiogram Yoga	EKG Orthostatic test Ballistocardiogram	
1984	Salyut-7 - Soyuz-T12	12		EKG	
1985	Salyut-7 - Soyuz-T13	112	EKG Rheoencephalogram AV pulsogram Tachoscillogram Body mass measurement Leg volume measurement LBNP & bicycle exercise		First EVA by a woman.
1985	Salyut-7 - Soyuz-T14	65	EKG Rheoencephalogram AV pulsogram Tachoscillogram Body mass measurement Leg volume measurement LBNP & bicycle exercise	EKG Orthostatic test	

YEAR	FLIGHT	DAYS	INFLIGHT	POSTFLIGHT	REMARKS
1986	Mir/Salyut-7 Soyuz-T15	125	12-lead EKG Rheogram AV pulsogram Brachial tachooscillogram Body mass measurement Leg volume measurement LBNP & exercise tests		
1987	Mir - Soyuz-TM2	326	12-lead EKG Kinetocardiogram Seismocardiogram Ballistocardiogram Impedance plethysmogram Brachial tachooscillogram Jugular vein phlebogram Rheograms Holter monitor Echocardiogram Body mass measurement Leg volume measurement LBNP & exercise tests	EKG Orthostatic test Blood & urine chemistry Hematological studies Immunological studies Abdominal ultrasound Single-photon absorptiometry EOG Audiometry Microbiological studies	Flight engineer returned early due to asymptomatic cardiac arrhythmia.
1987	Mir - Soyuz-TM3	8		EKG Orthostatic test	
1987	Mir - Soyuz-TM4	366	12-lead and DS EKG Holter monitoring Kinetocardiogram Tetrapolar plethysmogram Brachial tachooscillogram Temporal sphygmogram Jugular phlebogram Blood & urine chemistry Body mass measurement Leg volume measurement LBNP & exercise tests	EKG Body mass measurement Leg volume measurement Echocardiogram Rheoplethysmogram Abdominal ultrasound LBNP & exercise tests Orthostatic test Blood & urine chemistry Hematological studies Neuromuscular studies Dual-photon absorptiometry Computer tomography Microbiological studies Vestibular studies	

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1988	Mir - Soyuz-TM5	10		EKG Orthostatic test	Physician launched to join long-duration crew.
1988	Mir - Soyuz-TM6	9		EKG Orthostatic test	
1988	Mir - Soyuz-TM7	152	Echocardiogram 12-lead & DS EKG Kinetocardiogram Tetrapolar plethysmograph Brachial tachoscillogram Temporal sphygmogram Jugular phlebogram Dynamometry Electrooculography Blood & urine chemistry Coordination test Neurosensory testing Anthropometrics LBNP & exercise tests Visceral ultrasound	EKG Orthostatic test Body mass measurement Echocardiography Visceral ultrasound Vibration threshold Otolith reflex Stabilogram Blood & urine chemistry Hematological studies Immunological studies Microbiological studies Bone marrow biopsy Dynamometry Dual photon absorptiometry	
1989	Mir - Soyuz-TM8	166			Flight recently completed.
1990	Mir - Soyuz-TM9		Holter monitor		Flight in progress.