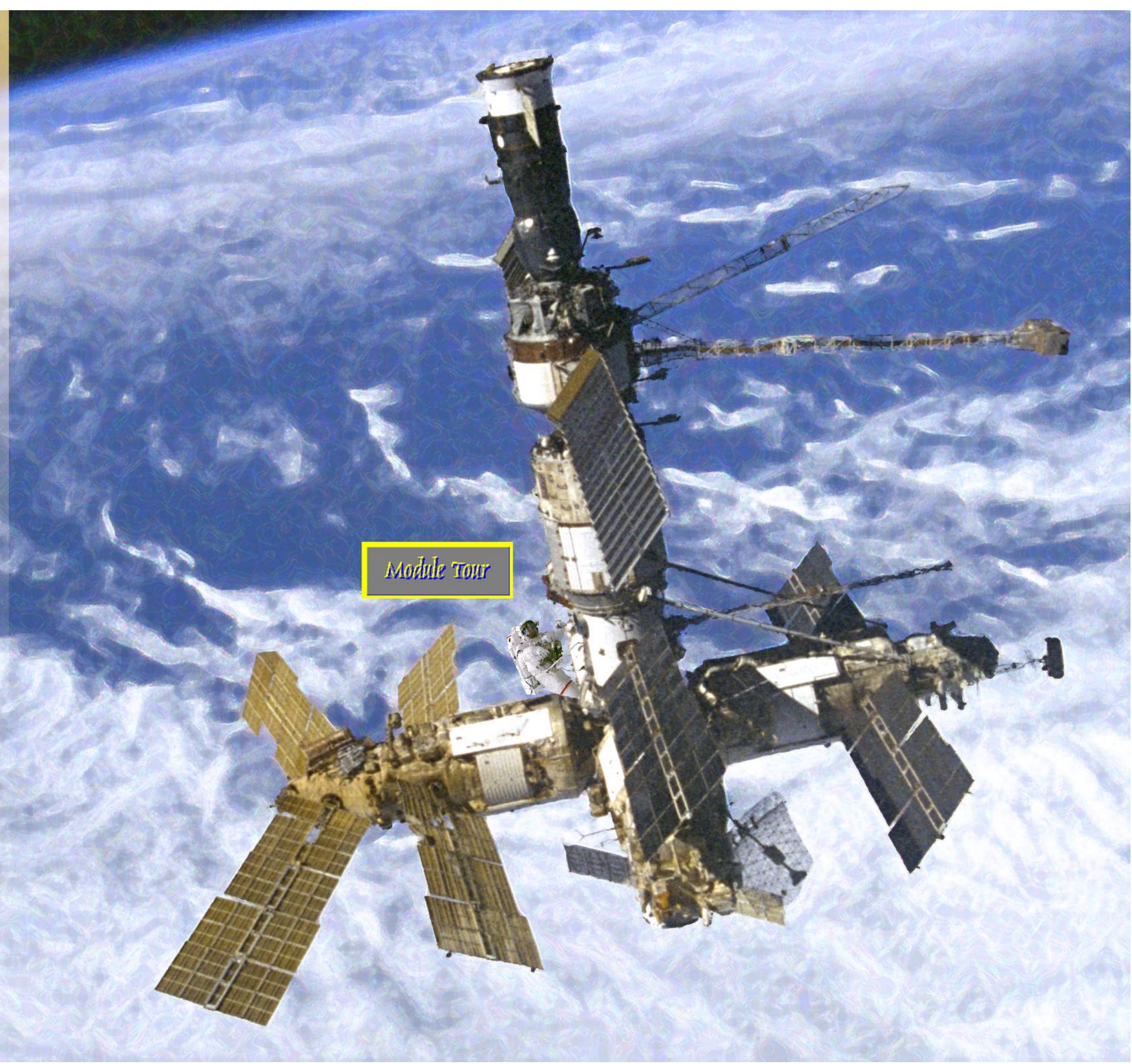
Phase 1:
A Journey to Mir
1994-1998



Module Tour

List of Experiments

List of Experiments by Increment

Space Medicine Program - U.S. Medical Operations (SMP-US)

MIR SUPPLEMENTAL MEDICATION KIT (MSMK) OVERVIEW

A description of each piece of flight hardware is given below. A list of the hardware is in Table SMP.1

EMERGENCY MEDICAL KIT (EMK) HARDWARE DESCRIPTION

The EMK contains medications and medical equipment for emergency situations. The equipment is packed in a light blue square "rucksack" constructed of fire-retardant cotton fabric. It can be distinguished from the other kits by the red Velcro handle, closure tabs, and Velcro patch on the base of the kit. The Velcro patch on the base of the kit is used to secure the pack to a fixed surface near the patient while medical procedures are being completed.

Medication and medical items are stowed according to function in four "pallets" inside the kit. Each pallet has a letter identifier (A through D). The pallets have the following generalized contents:

Pallet A — Injectable medications, primarily "Tubex" brand configuration and pre-filled syringes
Pallet B — Intravenous (I.V.) and emergency equipment, stethoscope
Pallet C — Diagnostic equipment, injectable medications, blood pressure cuff
Pallet D — Dental items

Each pallet has multiple pockets with closure flaps in which medications and medical items are stowed. Each pocket is assigned a number. On the closure flap of each pocket, the pallet letter and pocket number are printed. The contents of each pocket are displayed in Russian and English.

There are four external pockets on the EMK rucksack made from clear Teflon in which the kit name, part number, mission designation, flight article designation, date of manufacture, pallet names, and crew allergies are displayed in both English and Russian. Inside the lid of the EMK, a detailed contents listing is displayed.

The EMK (Figure SMP-1) contains injectables, dental items, IV fluid administration equipment, a blood pressure cuff, stethoscope, and other diagnostic and therapeutic hardware. Injectable medications are stored in Tubex cartridges and pre-filled syringes.

TABLE SMP.1
MSMK FLIGHT HARDWARE

Item	Qty	P/N
1. MSMK — FA-1		
- EMK	1	SKD42101806-301
- MBK	1	SKD42101806-302
- MEDOP	1	SKD42101806-303
- MSMK Medical Checklist	1	MSMKCL007
2. MRK	1	SKD42101856-301
3. PCBA Cartridge Kit	1	SEM46111311-304

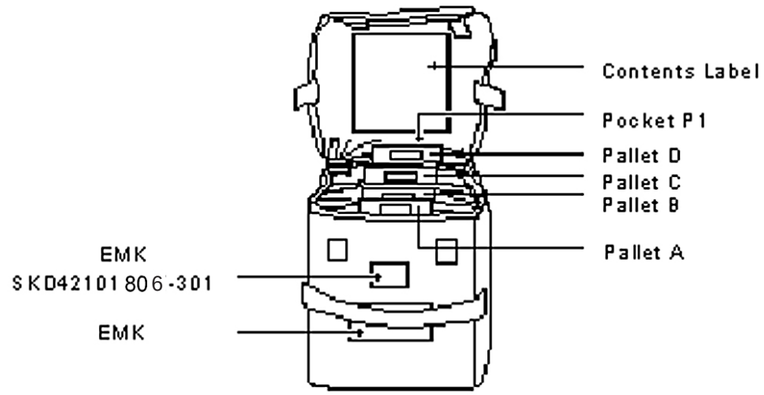
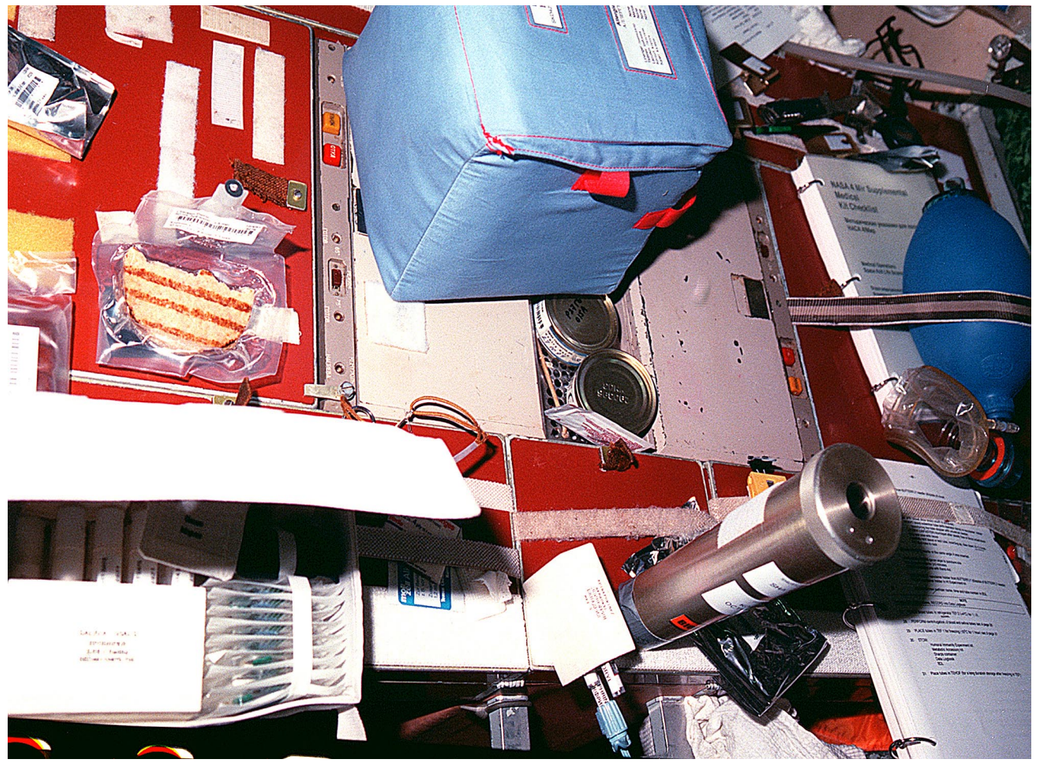


Figure SMP-1 Emergency Medical Kit (EMK)



NM23-006-31

Figure SMP-2 EMK and Sharps Container in the Core Module

D.I.D.

MSMK Emergency Medical Kit

EMERGENCY MEDICAL KIT (EMK)

P/N: SKD42101806-301
Qty: 1
Mass: 3.10 kg
Power: N/A
x,y,z: 22 x 23 x 21 cm
Loc: Priroda
DID#: SLM46112044

S96-08415

Figure SMP-3 Pallet A1

S96-08417

Figure SMP-5 EMK Pallet B1

S96-08416

Figure SMP-4 EMK Pallet A2

S96-08418

Figure SMP-6 EMK Pallet B2

S96-08419

Figure SMP-7 EMK Pallet C1

S96-08398

Figure SMP-8 EMK Pallet C2

S96-08399

Figure SMP-9 EMK Pallet D1

S96-08400

Figure SMP-10 EMK Pallet D2

MEDICATIONS AND BANDAGES KIT (MBK)

The MBK contains bandage materials and medications. Externally, the MBK is identical to the EMK except that the handle, closure tabs, and Velcro patch on the base of the kit are blue.

The MBK contains pallets E, F, and G and has the following generalized contents:

Pallet E — Oral medications in push-up dispenser plastic pill bottles
Pallet F — Bandages, thoracotomy and urinary catheterization equipment
Pallet G — Topical and ophthalmic medications

The MBK is labeled in the same manner as the EMK.

The MBK (Figure SMP-11) contains oral and topical medications, and bandages. Oral medications are contained in shrink-wrapped, plastic pill bottles with attached tops and push up dispenser (Figure SMP-12). Extended Medical Data Logs, stowed in pocket 2 of the MBK, are used with the Bar Code Data Reader to log the use of medication.

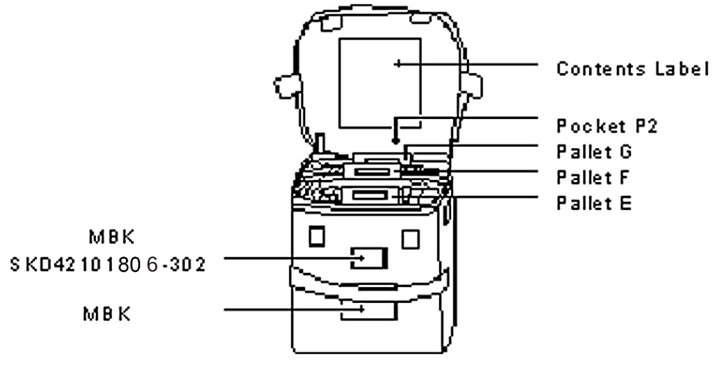


Figure SMP-11 Medications and Bandage Kit

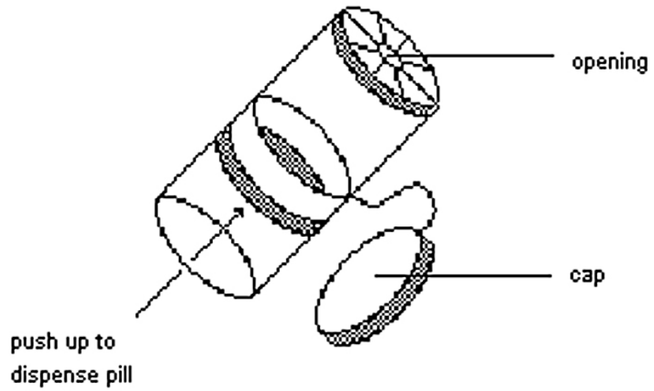


Figure SMP-12 Pill bottle

S96-08408

Figure SMP-13 MBK Kit Interior

S96-08371

Figure SMP-14 MBK Pallet E1

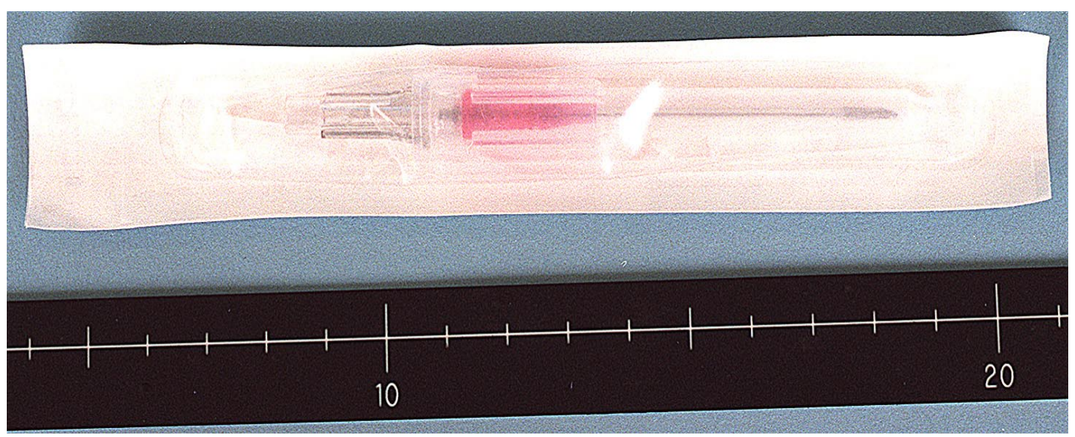
S96-08372

Figure SMP-15 MBK Pallet E2

MEDICATIONS AND BANDAGES KIT (MBK)

P/N: SKD42101806-302
Qty: 1
Mass: 2.61 kg
Power: N/A
x,y,z: 21.50 x 20.50 x 23.5 cm
Loc: Priroda
DID#: SLM46112124

Figure SMP-16 MBK Pallet G1

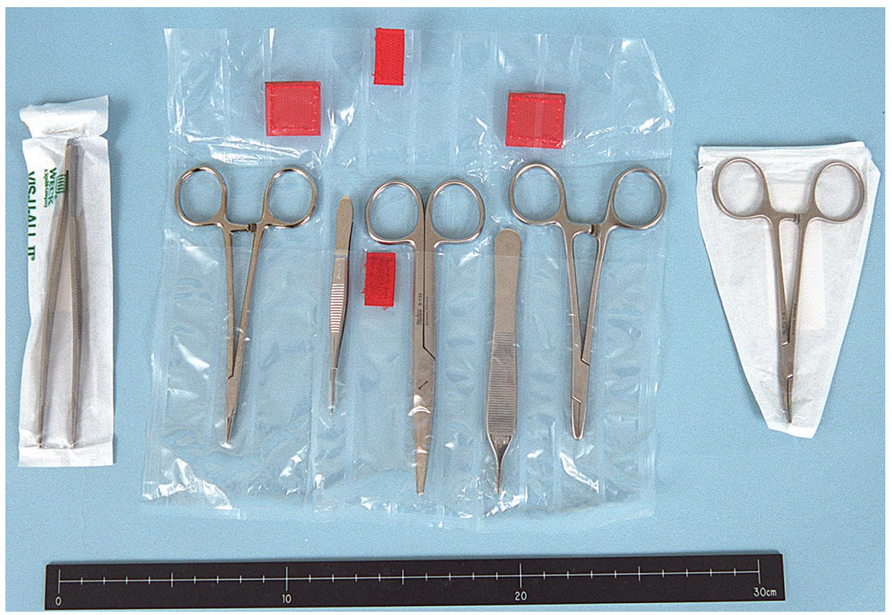


S97-06939

Figure SMP-17 Needle

S96-08374

Figure SMP-18 MBK Pallet G2

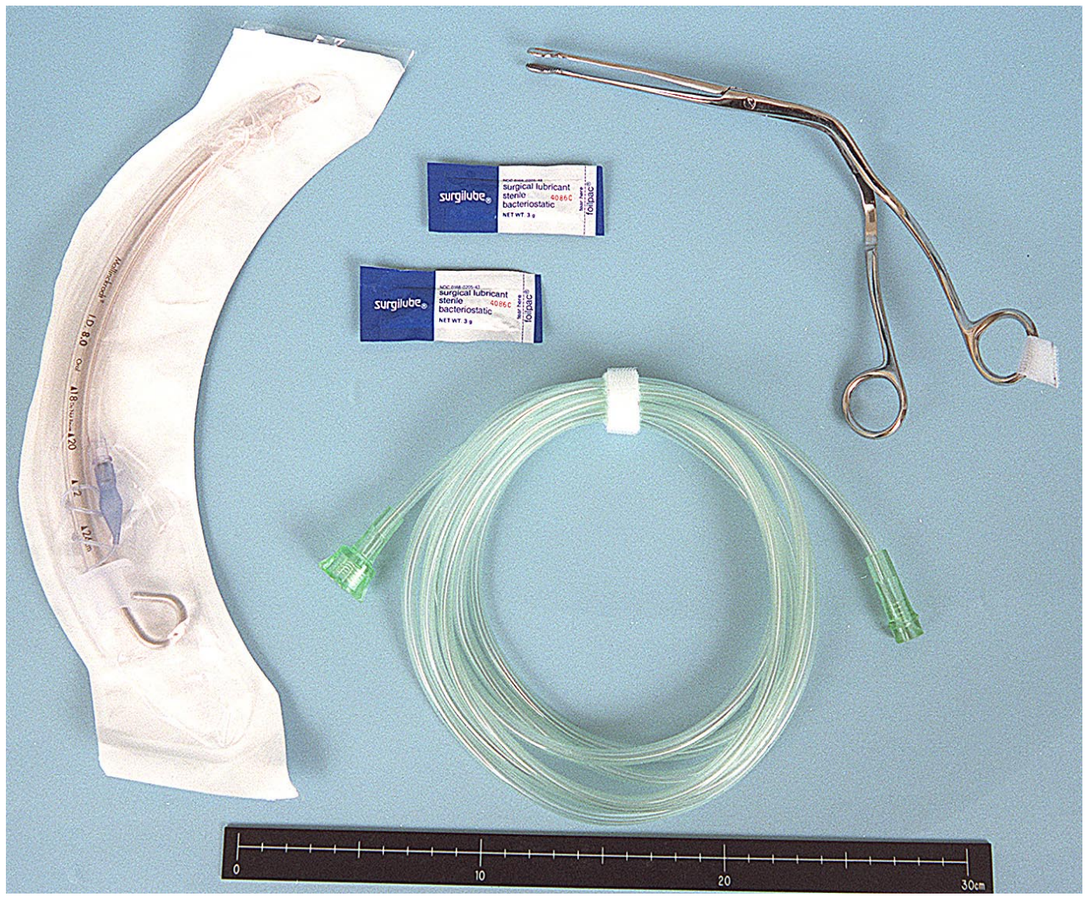


S97-06937

Figure SMP-19 Scissors

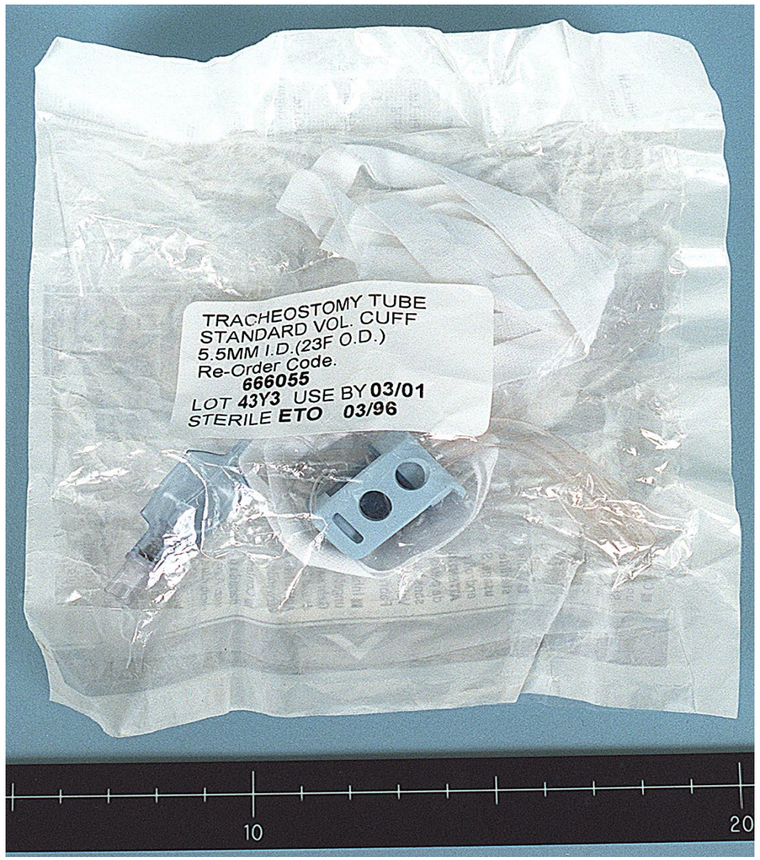
S97-06938

Figure SMP-20 Airway Tube



S97-06936

Figure SMP-21 Tracheostomy Tools



S97-06940

Figure SMP-22 Tracheostomy Tube

MEDICAL EXTENDED DURATION ORBITER PACK (MEDOP) HARDWARE DESCRIPTION

The MEDOP contains airway management capability and additional consumables for extended-duration missions. It is a rucksack constructed from dark blue fire-retardant cotton with a white handle and white Velcro closure tabs.

The contents are stowed in the same manner as the EMK and MBK. Pallets H, I, J, and K have the following general contents:

Pallet H — Injectable medications, I.V. equipment, diagnostic equipment, and bandage materials
Pallet I — Injectable medications, primarily in the "Tubex" brand packaging configuration
Pallet J — Airway equipment
Pallet K — Oral medications

The MEDOP provides airway management capability and additional medications and medical items, supplementing the EMK and MBK.

The MEDOP contains the following airway management equipment:

1. Oral airway — A curved, hollow plastic tube inserted through the mouth to maintain an open airway. To be used only on an unconscious victim, the oral airway holds the tongue down to prevent airway obstruction.

2. Laryngoscope — Used for tracheal tube insertion. Exposes the larynx, trachea, and vocal cords by moving the tongue and epiglottis.

3. Tracheal tube — Used to maintain a patient's airway during prolonged assisted ventilation. Inserted through the mouth into the trachea. Two sizes are flown including 7.5 mm and 8.0 mm.

4. Cricothyrotomy equipment — Equipment necessary to perform an emergency cricothyrotomy procedure, which provides an open airway in the case of an obstructed upper airway. The cricothyrotomy procedure calls for insertion of a tube, directly through the neck, into the trachea. Equipment includes a scalpel and a tracheostomy tube.

5. Ambu Bag and Mask — Used to deliver supplemental oxygen. The bag may be attached to the mask which is placed over the mouth and nose of injured crewmember, or directly to a tracheal or cricothyrotomy tube. Oxygen is delivered by squeezing the bag once it is in place.

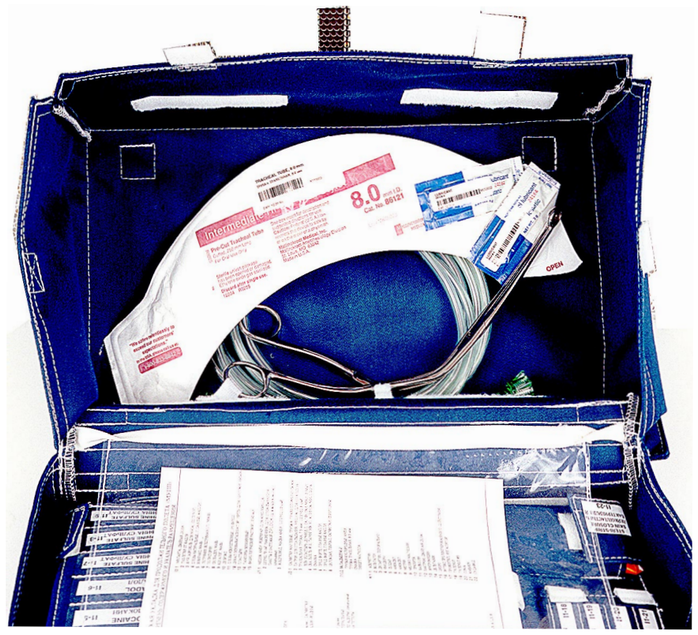
6. Suction device — Used to suction vomit or mucus from the mouth and throat of an unconscious crewmember in order to maintain a clear airway.

S97-06934

Figure SMP-23 MEDOP Kit (Open)

S96-08375

Figure SMP-24 MEDOP Kit (Closed)



S96-08386

Figure SMP-25 MEDOP Kit Bottom

D.I.D

MSMK Medical Extended Duration Orbiter Pack

MEDICAL EXTENDED DURATION ORBITER PACK (MEDOP)

P/N: SKD42101806-303
Qty: 1
Mass: 6.25 kg
Power: N/A
x,y,z: 22.8 x 24.4 x 36 cm
Loc: Priroda
DID#: SLM46112125

S96-08379

Figure SMP-26 MEDOP Pallet H1

S96-08380

Figure SMP-27 MEDOP Pallet H2

S96-08381

Figure SMP-28 MEDOP Pallet I1

S96-08382

Figure SMP-29 MEDOP Pallet I2

Figure SMP-30 MEDOP Pallet K1

S96-08385

Figure SMP-31 MEDOP Pallet J2

S96-08384

Figure SMP-32 MEDOP Pallet J1

S96-08383

MSMK RESUPPLY KIT (MRK) HARDWARE DESCRIPTION

The MRK contains medical equipment for use in blood analysis (PCBA), pulse oximetry, I.V. solution administration, and MSMK resupply. The MRK is a blue rectangular rucksack constructed of fire-retardant Nomex fabric. A Velcro patch on the base of the kit is used to secure the pack to a fixed surface near the patient while medical procedures are being completed.

There are two external clear pockets on the MRK rucksack made from clear Teflon in which the kit name, part number, and mission are displayed in both Russian and English. Inside the MRK, two pockets are sewn to the lid. The first is a clear pocket where a detailed contents listing is displayed. The second is a Nomex pocket and is underneath the contents list pocket.

Medical items are stowed in kits and Ziploc enclosures inside the MRK. Each kit and Ziploc enclosure is clearly labeled and is displayed in Russian and English.

S96-08389

Figure SMP-33 MRK Kit Interior

S96-08391

Figure SMP-34 MRK

The MRK provides stowage for the pulse oximeter, the Portable Clinical Blood Analyzer (PCBA), and all associated supplies. Additional intravenous fluids and supplies are also located in the MRK.

S96-08387

Figure SMP-35 MRK Kit

S96-08396

Figure SMP-37 Pulse Oximeter Kit

S96-08392

Figure SMP-38 MRK Finger Needles

S96-08393

Figure SMP-36 MRK Kit Contents

S96-08368

Figure SMP-39 MRK Kit Contents

D.I.D.

Mir Supplemental Medical Kit Resupply Kit

MSMK RESUPPLY KIT (MRK)

P/N: SKD42101856-301
Qty: 1
Mass: 4.82 g
Power: None
x,y,z: 24.4 x 17 x 19.3 cm
Loc: Priroda
DID#: SLM42103672

PORTABLE CLINICAL BLOOD ANALYZER (PCBA) SYSTEM HARDWARE DESCRIPTION

The PCBA is a system for in vitro analysis of fresh whole blood. This system is designed to deliver quantitative results in approximately 90 seconds from a panel of tests on a single, small sample (approximately 65 uL). The system consists of the following components:

1. Cartridges (EC6+) capable of analyzing:
   - Sodium, Potassium, Ionized Calcium, Hematocrit, Hemoglobin, Glucose and pH.

2. Portable Clinical Blood Analyzer and accessories

3. Quality Control Materials
   - Electronic Simulator
   - Control Solutions

4. Finger Stick Supplies

PCBA CARTRIDGE KIT

The PCBA Cartridge Kit is a part of the MRK in the MSMK but is listed separately because it must be refrigerated aboard the Mir Station to maintain proper stowage temperature for the cartridges. The MRK does not require refrigeration.

The PCBA Cartridge Kit is a white rectangular pack constructed of a fire-retardant Nomex fabric. Small circular holes are punched in the walls of the kit. Two straps are attached to the base so that the kit can be pulled out of the refrigerator. On one of the straps, two clear Teflon window pockets are provided for a Russian label and an English label.

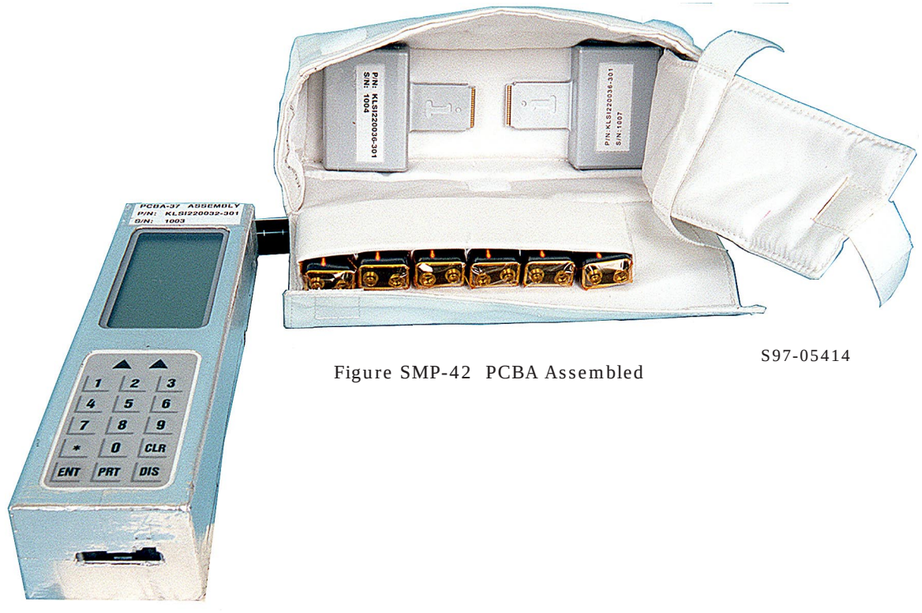
The kit contains 27 EC6+ and 9 EC8+ cartridges. The cartridges are used to contain the blood samples that are placed into the PCBA. The blood sample or control solution is dispensed into the sample port and the sample is automatically drawn into the sample chamber. The calibrant solution is contained in the cartridge with a foil pouch that is ruptured by the gear pump mechanism of the PCBA.

S97-05415

Figure SMP-40 PCBA Kit

The cartridge kit is stowed with the MSMK in a Shuttle middeck locker for launch and delivery to the Mir station. After arrival and subsequent docking with Mir, the MSMK is transferred by the U.S. crewmember from the Shuttle middeck locker to the Mir Main module. The PCBA cartridge kit is then stowed inside the Mir Refrigerator.

Figure SMP-41 PCBA Kit



S97-05414

Figure SMP-42 PCBA Assembled

D.I.D.

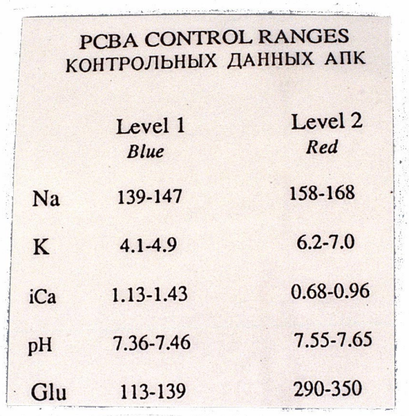
Portable Clinical Blood Analyzer Cartridge Kit

PCBA CARTRIDGE KIT

P/N: SEM46111311-304
Qty: 1
Mass: 0.26 kg
Power: None
x,y,z: 12.5 x 12 x 5.5 cm
Loc: Kristall, Mir Ref.
DID#: SLM46114368

S97-10775

Figure SMP-43 PCBA Kit Displayed



S97-10776

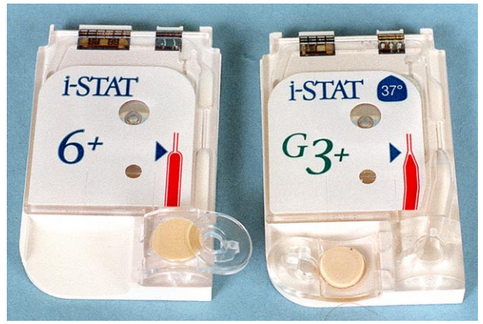
Figure SMP-44 PCBA Kit Card

S97-10773

Figure SMP-45 PCBA Kit

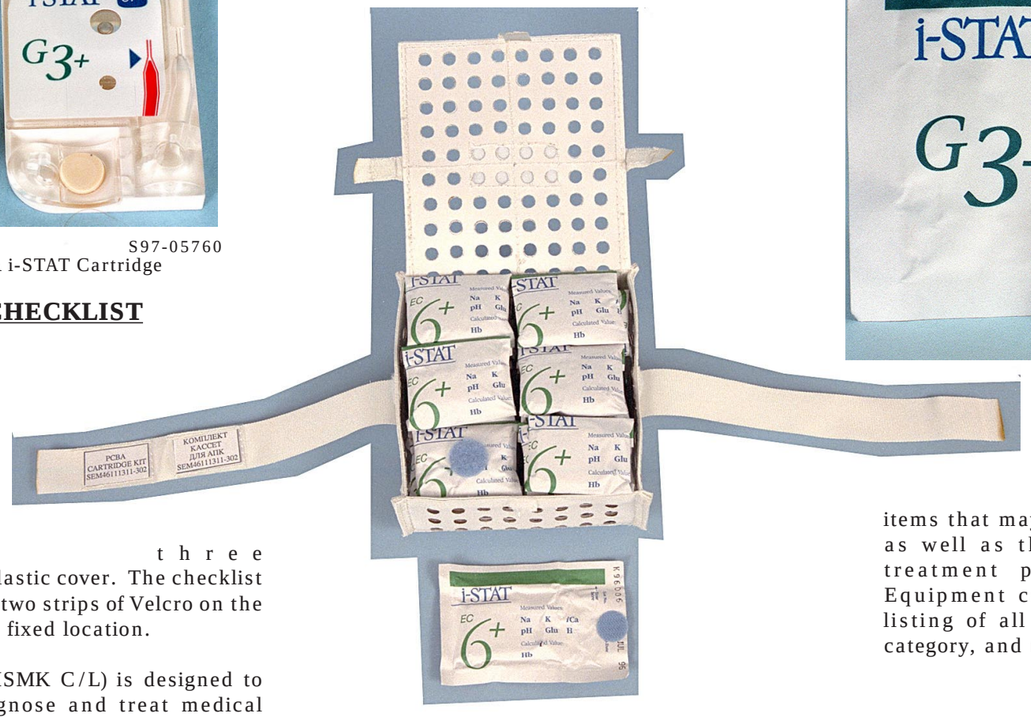
S97-10774

Figure SMP-46 PCBA Kit Opened



S97-05760

Figure SMP-47 PCBA i-STAT Cartridge



S97-10773

Figure SMP-48 PCBA Cartridge Kit

MSMK MEDICAL CHECKLIST DESCRIPTION

The MSMK Medical Checklist provides detailed inflight procedures for use of the Mir medical hardware. It is a flight data file manual with three metal rings and a hard plastic cover. The checklist has a Velcro closure and two strips of Velcro on the back for attachment to a fixed location.

The MSMK Checklist (MSMK C/L) is designed to help crewmembers diagnose and treat medical conditions on orbit. Crewmembers receive specialized training in basic diagnostic and therapeutic procedures, which are also outlined in the MSMK C/L. The MSMK C/L will assist the crewmember in treating illnesses and injuries considered most likely to occur on-orbit.

The MSMK C/L contains the following sections:

A. Table of Contents

Includes an alphabetical list of the medical problems considered most likely to be encountered during flight and the page on which the appropriate treatment procedure is described.

B. Stowage List (Section 1)

An alphabetical list of all medications and equipment contained in the MSMK, including location within the MSMK. It is to be used as a quick reference for locating specific items. Certain medications, indicated in the alphabetical list by an asterisk (*), require surgeon approval for use.

C. Usage List (Section 1)

An alphabetical list of medical problems and equipment categories (antibiotics, cleanup supplies, etc.). Medical problem entries include a listing and location of all MSMK items that may be required for treatment, as well as the page(s) on which the treatment procedure is described. Equipment category entries include a listing of all MSMK items under that category, and their location.

D. Medical Procedures (Sections 2, 3, 4, 5)

Procedures for treatment of specific medical problems.

E. Side Effects (Section 6)

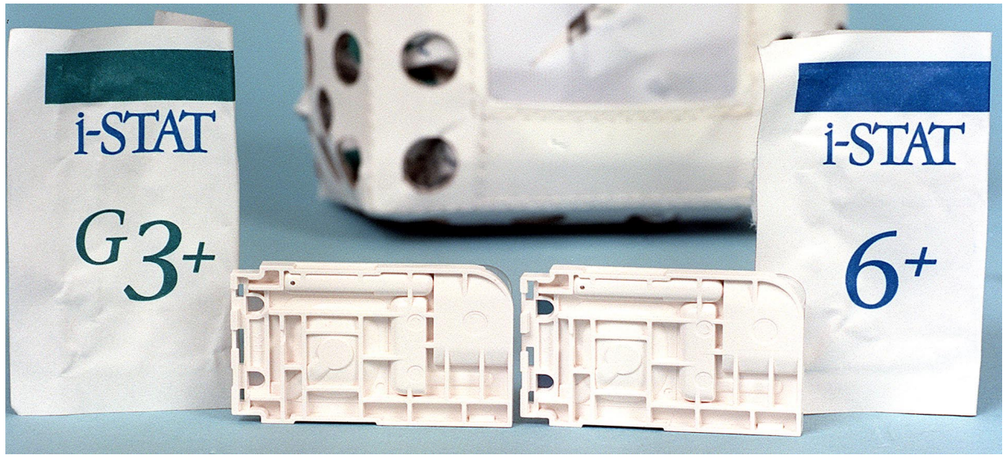
An alphabetical list of all MSMK medications, with a brief description of each drug and a list of its possible side effects.

F. Toxicology (Section 7)

Contains treatment procedures for exposure to hazardous items.

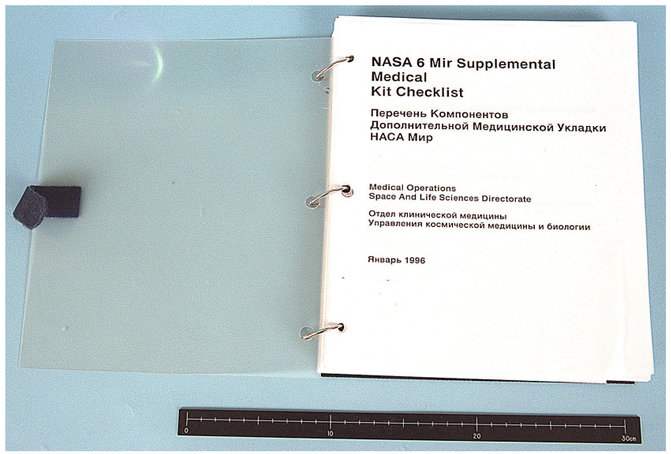
G. Charts (Section 8)

Anterior and posterior Dermatome charts.



S97-05761

Figure SMP-49 PCBA i-STAT Cartridges



S97-06942

Figure SMP-50 MSMK Medical Checklist

MSMK MEDICAL OPS CHECKLIST

P/N:	MSMKCL007
Qty:	1
Mass:	0.70 kg
Power:	N/A
x,y,z:	28 x 21.6 x 3 cm
Loc:	Priroda

MIR SUPPLEMENTAL MEDICAL KIT
CONTENTS LIST
ALPHABETICAL STOWAGE LIST

WARNING: * Indicates item to be used only after Surgeon approval or as directed in C/L

NOTE: When using items without barcode labels, scan the appropriate barcode label on the Barcode Reader Index Card. One card is located in each of the following: EMK, MBK, MEDOP.

Name	Location	Description	Amount
Ace Bandage	MBK F2-5 EMK B1-8	3” wide	1 1
acetaminophen (Tylenol)	MBK E1-1 MBK E1-2 MEDOP K1-18	325 mg	30 tabs 30 tabs 30 tabs
*acetaminophen w/Codeine (Tylenol #3)	MBK E1-4 MEDOP K1-19	30 mg of Codeine & 300 mg of acetaminophen	20 tabs 20 tabs
*acetazolamide (Diamox)	MBK E1-3	500 mg	15 caps
*acyclovir (Zovirax) ointment	MEDOP I2-5	15-gm tube	1
Adaptic Bandages	MBK F2-3 MEDOP H2-11	3” x 3” non-adherent dressing	3 3
Afrin (nasal spray)	MBK G1-1, 2	3-ml bottle	6
Air temperature monitors	EMK C2-5	32-49°C, (90-120°F) 14-31 °C, (58-88 °F)	2 2
Airway	MEDOP J1-3	oral	1
albuterol (Proventil Inhaler)	MEDOP K1-17	17-gm container	1
Alcohol wipes	MBK F1-7 MBK F1-9 EMK B1-5 EMK B1-8 MEDOP H2-5 MEDOP J2-8 MRK	Ethyl Alcohol	20 10 20 10 10 20 20
*Alupent (metaproterenol)	MBK E1-11	20 mg	30 tabs
Ambien (zolpidem tartrate)	MEDOP K1-21	10 mg	75 tabs
Ambu Bag, O_2 Reservoir	MEDOP J1-1		1
Ambu Mask	MEDOP J1-3		1
Ambu O_2 Tubing	Below J-pallet		1

Name	Location	Description	Amount
Ambulatory leg-bag	MBK F1-5	600-ml bag	1
*amikacin (Amikin)	EMK A1-16	250 mg/cc, 2-cc unit	1
*Amikin (amikacin)	EMK A1-16 MEDOP I1-1	250 mg/cc, 2-cc unit	1 1
*amoxicillin (Amoxil)	MBK E1-7 MEDOP K1-6, 7	500 mg	24 caps 60 tabs
*Amoxil (amoxicillin)	MBK E1-7 MEDOP K1-6, 7	500 mg	24 caps 60 tabs
Anusol-HC suppositories	MBK G1-6		6
Artifical tears (eye drops, Refresh)	MBK G1-11, 12 MEDOP I2-11	0.3 cc	12 8
Ascriptin (aspirin)	MBK E2-1 MEDOP K1-1	5 grain	25 tabs 25 tabs
aspirin (Ascriptin)	MBK E2-1 MEDOP K1-1	5 grain	25 tabs 25 tabs
*Atropine	EMK A1-14, 15	1 mg/cc, 2-cc unit	2
AYR (saline nasal mist)	MEDOP I2-3	8-ml bottle	3
*azithromyrin (Zithromax)	MBK E1-8	250 mg	18 caps
*Bactrim DS (trimethoprim/ sulfamethoxasole)	MBK E1-6 MEDOP K1-12		28 tabs 28 tabs
*Bactroban (mupirocin) ointment	MEDOP H2-3	2% 30-gm tube	1
Bags:			
Ziploc	EMK Pkt 1	Injectable Disposal (12” x 12”)	1
	MEDOP J1-2	Airway Suction Disposal (12” x 12”)	1
Biohazard	MRK Pkt	Biohazard Bags (6” x 6”)	10
Bandages:			
Ace	MBK F2-5 EMK B1-8	3” wide	1 1
Adaptic	MBK F2-3 MEDOP H2-11	3” x 3” non-adherent dressing	3 3
Bandaids	EMK C1-4 MEDOP I2-13 MRK	1” x 3”	15 10 26
Tegaderm	MBK G2-3 MEDOP H2-11	10 x 12 cm	5 5
Telfa Pads	MBK G2-3 MEDOP H2-11	6 x 7 cm	5 3

Name	Location	Description	Amount
Bandaids	EMK C1-4	1” x 3”	15
	MEDOP I2-13		10
	MRK		26
Bar Code Index Card	EMK Pkt 1		1
	MBK Pkt 2		1
	MEDOP Contents List Sleeve		1
Batteries	EMK C2-8	type AA	2
	MRK	Alkaline, 9V	4
*Benadryl, injectable (diphenhydramine)	EMK A1-5, 6	50 mg/cc, 1-cc unit	2
	MEDOP I1-2		1
	MEDOP I1-20, 21		2
Benadryl, oral (diphenhydramine)	MBK E2-11	25 mg	50 caps
benzoin swabs	MBK F1-9		5
	MEDOP I2-14		6
bisacodyl, oral (Dulcolax)	MBK E1-14	5 mg	30 tabs
bisacodyl, suppository (Dulcolax)	MBK F1-8	10 mg	6
Blistex lip balm	MBK G1-8		1
Blood Analysis Items:			
Alcohol Wipes	MRK	Ethyl Alcohol	20
Bandaids	MRK	1” x 3”	26
Battery	MRK	Alkaline, 9V	4
Biohazard Bags	MRK Pkt	6” x 6”	10
Capillary Tube Kit:	MRK		1 kit
Capillary Bulb	MRK		3
Capillary Tube	MRK		26
Cartridges	PCBA Cartridge Kit		
EC6+			27
EC8+			9
Gauze pads	MRK	2” x 2”	15
Gloves	MRK	nonsterile	10 pair
Lancet	MRK	finger	26
Portable Clinical Blood Analyzer (PCBA)	MRK		1
PCBA Data Card	MRK Pkt		1
PCBA Control Solutions			
Level I	MRK	blue	3
Level II	MRK	red	3
Tubex Injector	MRK	1 ml	2
Blood pressure cuff	EMK C1-1		1
*bupivacaine (Marcaine)	EMK D2-1	0.5% w/Epinephrine 1:200,000 carpules	6 dental
Butterfly INT Sets	EMK B1-8	19 G	2
	MEDOP H2-5	21 G	3

Name	Location	Description	Amount
*carisoprodol (Soma)	MEDOP K1-20	350 mg	25 tabs
Catheters			
I.V. Intracatheters	MBK F1-1	14 G	2
	EMK B2-4	18 G	3
	MRK	18 G	2
	MEDOP H2-10, 11	20 G	6
	MRK	20 G	2
Foley	MBK F1-2, 6	16 Fr, 5-ml balloon	2
*cefadroxil (Duricef)	MBK E1-9	500 mg	20 caps
Chemstrip 10-SG	EMK B2-2	Urine Test Package	13 strips
*Ciloxan (ciprofloxacin) ophthalmic solution	MBK G1-3	0.3% 2.5-ml bottle	3
	MEDOP J2-8	0.3% 5-ml bottle	1
*Cipro (ciprofloxacin), oral	MEDOP K1-15	500 mg	48 tabs
*ciprofloxacin, ophthalmic solution (Ciloxan)	MBK G1-3	0.3% 2.5-ml bottle	3
	MEDOP J2-8	0.3% 5-ml bottle	1
*ciprofloxacin, oral (Cipro)	MEDOP K1-15	500 mg	48 tabs
clotrimazole cream (Lotrimin)	MBK G1-6	15-gm tube	1
	MEDOP I2-6		1
Cotton balls	EMK C1-2	5 per pack	15
Cotton swabs	MEDOP H2-2	2 per pack	12
Cough lozenges	MBK E2-7		15 tabs
	MEDOP I2-2		24 tabs
*Cyclogyl (cyclopentolate)	MBK G2-2	1% 15-ml bottle	1
*cyclopentolate (Cyclogyl)	MBK G2-2	1% 15-ml bottle	1
Dalmane (flurazepam)	MBK E2-4	15 mg	30 caps
Debrox	MEDOP I2-10	15-ml bottle	1
*Deltasone (prednisone)	MEDOP K1-14	10 mg	100 tabs
*Demerol (meperidine)	EMK A1-7, 8, 9, 10	50 mg/cc, 1-cc unit	4
	MEDOP I1-3	50 mg/cc, 1-cc unit	1
Dental Items:	EMK D2		
Carver/File	EMK D2-5		1
Mirror	EMK D2-6		1
Needles	EMK D2-2	long, 27 G	6
	EMK D2-3	short, 27 G	6
Orangewood Sticks	EMK D2-4		2
Syringe	EMK D2-8		1
Temporary Filling	EMK D2-9		1
Toothache Kit:	EMK D2-7		1 kit
Eugenol Anesthetic Drips			

Name	Location	Description	Amount
Tweezers			
Cotton Pellets			
*Marcaine (bupivacaine)	EMK D2-1	0.5% w/Epinephrine 1:200,000	6 dental carpules
Dental Floss	MEDOP I2-12	Single Use Packet	1
Dycal (Base)	MEDOP I2-12	13-g tube	1
Dycal (Catalyst)	MEDOP I2-12	11-g tube	1
Dermicel Tape	MBK F1-4	1” wide	1 roll
	EMK B1-8	1/2” wide	1 roll
	MEDOP J2-3	1/2” wide	1 roll
	MRK	1/2” wide	1 roll
*dexamethasone (Hexadrol) w/plunger	EMK D1-1, 2	1- mg/cc, 1-cc unit	2
*Dexedrine (dextroamphetamine)	MBK E1-12	5 mg	30 tabs
*dextroamphetamine (Dexedrine)	MBK E1-12	5 mg	30 tabs
*Diamox (acetazolamide)	MBK E1-3	500 mg	15 caps
*diazepam, injectable (Valium)	EMK A2-9, 10	5 mg/cc, 2-cc unit	2
*diazepam, oral (Valium)	MBK E1-10	5 mg	30 tabs
diclofenac sodium (Voltaren)	MEDOP K1-2	50 mg	60 tabs
*Dilantin, injectable (phenytoin sodium)	MEDOP H1-1,2,3, 4,5,6,7,8,9,10	50 mg/cc, 2-cc unit	10
*Dilantin, oral (phenytoin sodium)	MEDOP K1-3	100 mg	35 caps
*diphenhydramine, injectable (Benadryl)	EMK A1-5, 6	50 mg/cc, 1-cc unit	2
	MEDOP I1-2		1
	MEDOP I1-20, 21		2
diphenhydramine, oral (Benadryl)	MBK E2-11	25 mg	50 caps
Drapes, sterile	EMK B2-3	40 x 40 cm	1
	MEDOP H2-11		1
Dulcolax, oral (bisacodyl)	MBK E1-14	5 mg	30 tabs
Dulcolax, suppository (bisacodyl)	MBK F1-8	10 mg	6
*Duricef (cefadroxil)	MBK E1-9	500 mg	20 caps
Ear loop	MEDOP I2-Velcro sleeve	for ear wax removal	1
Ear viewer (Otoscope)	EMK C2-4		1

Name	Location	Description	Amount
Elastoplast tape	MBK G2-3	4” wide	1 roll
Entex LA (phenylpropanolamine/ guaifenesin)	MBK E2-8	75 mg of phenylpropanolamine hydrochloride, 400 mg of guaifenesin	40 tabs 40 tabs
*Epinephrine	EMK A1-3, 4	1:1000, 1-cc unit	2
	EMK A2-1, 2, 3, 4, 5		5
	EMK Pkt 1		1
*Erythromycin	MEDOP K1-3	250 mg	48 tabs
*Eye drops (Proparacaine)	MBK G1-10	15-ml bottle	1
Eye Drops:			
artificial tears, Refresh	MBK G1-11, 12	0.3 cc	12
	MEDOP I2-11		8
Tears Naturale	MEDOP I2-4	30-ml dropper bottle	1
Eye pads	MBK F2-3		6
Eye viewer (ophthalmoscope head)	EMK C2-8		1
*Flagyl (metronidazole)	MBK E2-10	25 mg	28 tabs
Fluorescein strips	EMK C2-8		8
flurazepam (Dalmane)	MBK E2-4	15 mg	30 caps
Foley catheter	MBK F1-2, 6	16 Fr, 5-ml ballon	2
Forceps:			
(small point)	EMK B2-3	Surgical Instrument Assembly	1
(blunt)	EMK B2-3		1
	MEDOP H1-14		1
Fox Sheild	MBK F2-3	metallic eyepatch	1
*furosemide (Lasix)	MEDOP H1-15, 16, 17, 18, 19	10 mg/cc, 2-cc unit	5
Gauze Pads	MBK F2-1	4” x 4”	9
	MBK F2-2		9
	MBK G1-4		2
	EMK Pkt 1		5
	MEDOP J2-1		1
	MEDOP J2-3		1
	MRK	2” x 2”	15
Gloves	EMK C2-26	sterile, surgical	2 pair
	MEDOP H2-9	sterile, surgical	2 pair
	MBK G2-2	nonsterile	6 pair
	MRK	nonsterile	10 pair

Name	Location	Description	Amount
*Haldol (haloperidol)	EMK A2-11, 12	5 mg/cc, 1-cc unit	2
*haloperidol (Haldol)	EMK A2-11,12	5 mg/cc, 1-cc unit	2
Hemostat			
(small)	EMK B2-3	Surgical Instrument	1
(curved)	EMK B2-3	Assembly	1
*Heparin	EMK A2-6, 7, 8	100 units/cc, 1-cc unit	3
	MEDOP I1-10,11 12,13,14,15,16		7
*Hexadrol (dexamethasone)	EMK D1-1, 2	10 mg/cc, 1-cc unit	2
w/plunger	EMK D1-1, 2		2
ibuprofen (Motrin)	MBK E2-6	400 mg	50 tabs
	MEDOP K1-8		50 tabs
Imodium (loperamide HCI)	MBK E1-13	2 mg	32 caps
	MEDOP K1-4		32 caps
Injector (Tubex)	EMK B1-2	2 ml	1
	MEDOP H1-11, 12	2 ml	2
	MRK	1 ml	2
Irrigation Assembley, Roller Clamp	EMK B1-7		1
*Isoptin (verapamil),	EMK D1-5, 6	2.5 mg/cc, 2-cc unit	2
plunger	EMK D1-7		1
I.V. Administration Set	EMK D1-8		1
	MRK		2
I.V. Intracatheters	EMK B2-4	18 G	3
	MBK F1-1	14 G	2
	MEDOP H2-10, 11	20 G	6
	MRK	18 G	2
	MRK	20 G	2
Kenalog Cream (triamcinolone)	MBK G1-8	15-gm tube	1
	MEDOP I2-9		1
*ketorolac tromethamine (Toradol)	MEDOP I1-4, 6	30 mg/cc, 2-cc unit	2
Kling MBK G1-4	3" wide	2 rolls	
	MBL G2-1		2 rolls
Laryngoscope	MEDOP J2-4	Handle w/Miller blade	1
*Lasix (furosemide)	MEDOP H1-15 16, 17, 18, 19	10 mg/cc, 2-cc unit	5
*lidocaine (Xylocaine) with Epinephrine	EMK D1-3	2% w/Epinephrine 1:100,000	1
	EMK Pkt 1	2-cc unit	1

Name	Location	Description	Amount
*lidocaine (Xylocaine)	EMK D1-4	2%, 2-cc unit	1
	MEDOP I1-5		1
*lidocaine/cardiac (Xylocaine/Cardiac)	EMK A2-14, 15	20 mg/cc, 5-cc unit	2
and Plunger	EMK A2-16		1
loperamide HCI (Imodium)	MBK E1-13	2 mg	32 caps
	MEDOP K1-4		32 caps
Lotrimin Cream (clotrimazole)	MBK G1-6	15-gm tube	1
	MEDOP I2-6		1
Lubricant (water-soluble)	MEDOP J2-5	3 gm	3
	MBK F1-2		2
	MBK F1-6		2
	Below J Pallet		2
Magill Forceps	Below J Pallet		1
Magnifying glass	MBK G2-3	Magnification 4x	1
*Marcaine (bupivacaine)	EMK D2-1	0.5% w/Epinephrine	6 dental
	1:200,000		carpules
Medical Data Logs	MBK Pkt 2		6 expanded
*meperidine (Demerol)	EMK A1-7,8,9,10	50 mg/cc, 1-cc unit	4
	MEDOP I1-3	50 mg/cc, 1-cc unit	1
Merocel Pope (posterior nasal packing)	EMK C1-3	10 cm	3
*metaproterenol (Alupent)	MBK E1-11	20 mg	30 tabs
*metronidazole (Flagyl)	MBK E2-10	250 mg	28 tabs
Milk of Magnesia	MEDOP K1-9		60 tabs
*Morphine Sulfate	EMK A1-11,12,13	10 mg/cc, 1-cc unit	3
	MEDOP I1-7,8,9		3
Motrin (ibuprofen)	MBK E2-6	400 mg	50 tabs
	MEDOP K1-8		50 tabs
*mupirocin (Bactroban) ointment	MEDOP H2-3	2% 30-gm tube	1
Mylanta Double Strength	MEDOP I2-1		24 tabs
*naloxone (Narcan)	EMK A1-1,2	0.4 mg/cc, 1-cc unit	2
*Narcan (naloxone)	EMK A1-1, 2	0.4 mg/cc, 1-cc unit	2
nasal spray (Afrin)	MBK G1-1, 2	3-ml bottle	6
nasal packing (Merocel Pope, posterior)	EMK C1-3	10 cm	3

Name	Location	Description	Amount
nasal saline mist (AYR)	MEDOP I2-3	8-ml bottle	3
Nasostats	EMK C1-3		2
Needles	EMK B1-1	22 G, 1.5”	2
	MEDOP H2-8	22 G, 1.5”	2
	EMK B1-3	18 G, 1.5”	2
	MEDOP H2-7	18 G, 1.5”	2
	MEDOP H2-6	16 G, 1.5”	2
Needle Holder	EMK B2-3	Surgical Instrument	1
	Assembly		
Neosporin Plus Cream w/lidocaine	EMK C1-3	0.5-oz tube 40 mg Lidocaine	1
*nitroglycerin patch	EMK Pkt 1	15 mg/24 hrs	1
*nitroglycerin, sublingual (Nitrostat)	MBK E2-13	0.4 mg (1/150)	25 tabs
*Nitrostat, syblingual (nitroglycerin)	MBK E2-13	0.4 mg (1/150)	25 tabs
*Omeprazole (Prilosec)	MEDOP K1-10	20 mg	60 tabs
One-way valve & connecting tube	MBK F1-3		1
Ophthalmoscope head	EMK C2-8		1
Oral airway	MEDOP J1-3		1
Otoscope	EMK C2-4		1
Otoscope speculum	EMK C2-3	Disposable	10
PCBA and supplies	MRK		1 set
Penrose Tubing (tourniquet)	EMK C1-2		1
	MRK		1
Pepto-Bismol	MBK F2-4		24 tabs
	MEDOP I1-22		24 tabs
Phazyme-125 (simethicone)	MBK E2-2	125 mg	20 caps
phenazopyridine (Pyridium)	MBK E2-12	200 mg	35 tabs
*Phenergan, injectable (promethazine)	EMK A1-17	50 mg/cc, 1-cc unit	1
	MEDOP I1-17, 18, 19		3
Phenergan, oral (promethazine)	MBK E2-3	25 mg	30 tabs
Phenergan, suppository (promethazine)	MBK E2-9	25 mg	14

Name	Location	Description	Amount
phenylpropanolamine/ guaifenesin (Entex LA)	MBK E2-8	75 mg of phenylpropanolamine hydrochloride, 400 mg of guaifenesin	40 tabs
	MEDOP K1-16		40 tabs
*phenytoin sodium, injectable (Dilantin)	MEDOP H1-1,2,3 4,5,6,7,8,9,10	50 mg/cc, 2-cc unit	10
*phenytion sodium, oral (Dilantin)	MEDOP K1-3	100 mg	35 caps
polymyxin/bacitracin (Polysporin)	MBK G1-7	1-oz tube	1
	MEDOP I2-7		1
Polysporin (polymyzin/bacitracin)	MBK G1-7	1-oz tube	1
	MEDOP I2-7		1
Pope Otowicks	MBK G1-9		6
Povidone-iodine swabs (PVP iodine)	EMK B1-5		10
	MBK F1-7		10
	MEDOP H2-5		5
	MRK		10
*Pred Forte (prednisone acetate) opthalmic solution	MEDOP J2-6, 7	1%, 5-ml bottle	2
*prednisone acetate (Pred Forte) opthalmic solution	MEDOP J2-6, 7	1%, 5-ml bottle	2
*prednisone (Deltasone)	MEDOP K1-14	10 mg	100 tabs
*Prilosec (omeprazole)	MEDOP K1-10	20 mg	60 tabs
*promethazine, injectable (Phenergan)	EMK A1-17	50 mg/cc, 1-cc unit	1
	MEDOP I1-17, 18, 19		3
promethazine, oral (Phenergan)	MBK E2-3	25 mg	30 tabs
promethazine, suppositories (Phenergan)	MBK E2-9	25 mg	14
*Proparacaine eye drops	MBK G1-10	5%, 15-ml bottle	1
Proventil Inhaler (albuterol)	MEDOP K1-17	17-gm container	1
pseudoephedrine (Sudafed)	MBK E2-14	30 mg	100 tabs
	MEDOP K1-22		80 tabs
Pulse Oximeter Kit:	MRK		1 kit
Adhesive Finger Sensor	MRK		2
POx Instruction Card	MRK		1
POx Data Card	MRK		1
Reusable Finger Sensor	MRK		1
Pulse Oximeter	MRK		1

Name	Location	Description	Amount
Pyridium (phenazopyridine)	MBK E2-12	200 mg	35 tabs
Refresh (artifical tears, eye drops)	MBK G1-11, 12 MEDOP I2-11	0.3 ml	12 8
Restoril (temazepam)	MBK E1-5	15 mg	40 caps
Roller clamp irrigation assembly	EMK B1-7		1
Saline	EMK B1-7	100 ml EMK D1-8 MEDOP I2-15 MRK	1 250 ml 1 250 ml 1 500 ml 3
Salt tablets (NaCI)	MBK Pkt 2	1 gm	20 tabs
Scalpels	EMK B2-4 MEDOP H2-4 MEDOP J2-4	#10 #11 #10	2 2 1
Scissors (curved)	EMK B2-3 MEDOP H1-13	Surgical Instrument Assembly	1 pair 1 pair
Seldane (terfenadine)	MBK E2-5 MEDOP K1-5	60 mg	28 tabs 28 tabs
Silvadene Cream (silver sulfadiazine)	MBK G1-5 MEDOP I2-8	20-gm tube	1 1
Silver Nitrate Sticks	MEDOP H2-2		5
Silver sulfadiazine (Silvadene Cream)	MBK G1-5 MEDOP I2-8	20-gm tube	1 1
Simethicone (Phazyme-125)	MBK E2-2	125 mg	20 caps
Skin temperature monitors	EMK C2-7	29-41°C (84-106°F)	15
*Soma (carisoprodol)	MEDOP K1-20	350 mg	25 tabs
Specula	EMK C2-3	disposable otoscope speculum	10
Sponges	MBK F2-1 MBK F2-2 MBK G1-4 EMK Pkt 1 MEDOP J2-1 MEDOP J2-3 MRK	4" x 4" 2" x 2"	9 9 2 5 1 1 15
Steri-Strip skin closures	MBK F1-9 MEDOP I1-23		3 1
Sterile Drapes	EMK B2-3 MEDOP H2-11	40 x 40 cm 40 X 40cm	1 1

Name	Location	Description	Amount
Sterile Gloves	EMK C2-6 MEDOP H2-9	sterile sterile	2 pair 2 pair
Stethoscope	EMK C1-1	sterile	1
Suction Items: Suction Cartridge Suction Collection Bag 70cc Syringe Suction Tip	 MEDOP J2-2 MEDOP J2-2 MEDOP J1-2 MEDOP J1-2	 7" x 6" 	 1 2 1 2
Sudafed (pseudoephedrine)	MBK E2-14 MEDOP K1-22	30 mg	100 tabs 80 tabs
Surgical Instrument Assembly: Forceps (small point) Needle Holder Hemostat (small) Tweezers (fine point) Scissors (curved)	EMK B2-3		1 kit
Suture	EMK B2-1	4-0 Dexon, w/needle 5-0 Ethilon, w/needle 4-0 Ethilon, w/needle 3-0 Ethilon, w/needle 2-0 Vicryl w/CT-1 needle	1 1 2 2 1
Syringes	EMK B1-4, 6 MEDOP J1-3 MEDOP J2-3 MEDOP J1-2	10 cc 10 cc 3 cc 70 cc	2 1 1 1
Tape, Dermicel	MBK F1-4 EMK B1-8 MEDOP J2-3 MRK	1" wide 1/2" wide 1/2" wide 1/2" wide	1 roll 1 roll 1 roll 1 roll
Tears Naturale (eye drops)	MEDOP I2-4	30-ml dropper bottle	1
Tegaderm (transparent dressing)	MBK G2-3 MEDOP H2-11	10 x 12 cm 6 x 7	5 5
Telfa pads	MBK G2-3 MEDOP H2-11	3" x 4"	5 3
temazepam (Restoril)	MBK E1-5	15 mg	40 caps
terfenadine (Seldane)	MBK E2-5 MEDOP K1-5	60 mg	28 tabs 28 tabs
Thermometers, air	EMK C2-5	32-49°C (90-120°F) 14-31°C (58-88°F)	2 2
Thermometers, disposable, oral	EMK C2-1	35.5-40.4°C (96-104°F)	18
Thermometers, skin	EMK C2-7	29-41°C (84-106°F)	15

Name	Location	Description	Amount
*tobramycin (Tobrex) ophthalmic solution	MEDOP J2-8	0.3%, 5-ml bottle	1
*Tobrex (tobramycin) ophthalmic solution	MEDOP J2-8	0.3%, 5-ml bottle	1
Tongue depressors	EMK C2-2 MEDOP H2-1	sterile	5 5
Toothache Kit: Eugenol dental anesthetic drops Tweezers Cotton pellets	EMK D2-7		1 kit
*Toradol (ketorolac tromethamine)	MEDOP I1-4, 6	30 mg/cc, 2-cc unit	2
Tourniquet (Penrose Tubing)	EMK C1-2 MRK		1 1
Tracheal tube	MEDOP J2-3 Below J Pallet	7.5 mm w/stylet 8.0 mm w/stylet	1 1
Tracheostomy Tube	MEDOP J2-1	5.5 mm cuffed tracheostomy tube	1
transparent dressing (Tegaderm)	MBK G2-3 MEDOP H2-11	10 x 12 cm 6 x 7 cm	5 5
triamcinolone cream (Kenalog)	MBK G1-8 MEDOP I2-9	15-gm tube	1 1
*trimethoprim/sulfa-methoxasole (Bactrim DS)	MBK E1-6 MEDOP K1-12		28 tabs 28 tabs
Tubex Injector	EMK B1-2 MEDOP H1-11, 12 MRK	2 ml 2 ml 1 ml	1 2 2
Tweezers (fine point)	EMK B2-3	Surgical Instrument Assembly	1
Tylenol (acetaminophen)	MBK E1-1 MBK E1-2 MEDOP K1-18	325 mg	30 tabs 30 tabs 30 tabs
*Tylenol #3 (acetaminophen w/Codeine)	MBK E1-4 MEDOP K1-19	30 mg of Codeine & 300 mg of acetaminophen	20 tabs 20 tabs
Urine Test Package Chemstrip 10-SG Color Chart	EMK B2-2		1 kit 13 strips 1
*Valium injectable (diazepam)	EMK A2-9, 10	5 mg/cc, 2-cc unit	2
*Valium, oral (diazepam)	MBK E1-10	5 mg	30 tabs

Name	Location	Description	Amount
Valve, one-way & connecting tube	MBK F1-3		1
*Vancocin (vancomycin)	MEDOP K1-11	250 mg	28 caps
*vancomycin (Vancocin)	MEDOP K1-11	250 mg	28 caps
*verapamil (Isoptin), plunger	EMK D1-5, 6 EMK D1-7	2.5 mg/cc, 2-cc unit	2 1
*vidarabine ophthalmic ointment (VIRA-A)	MBK G2-2	3% 3.5-gm tube	1
*VIRA-A (vidarabine ophthalmic ointment	MBK G2-2	3% 3.5-gm tube	1
Voltaren (diclofenac sodium)	MEDOP K1-2	50 mg	60 tabs
VoSol HC Otic Solution	MBK G1-9	10-ml bottle	1
*Xylocaine (lidocaine w/Epinephrine	EMK D1-3 EMK Pkt 1	2% w/Epinephrine 1:1000, 000, 2-cc unit	1
*Xylocaine (lidocaine)	EMK D1-4 MEDOP I1-5	2%, 2-cc unit	1 1
*Xylocaine /cardiac (lidocaine/cardiac), plunger	EMK A2-14, 15 EMK A2-16	20 mg/cc, 5-cc unit	2 1
Ziploc Bag	EMK Pkt 1 MEDOP J1-2 MRK Pkt	Injectable Disposal (12” x 12”) Airway Suction Disposal (12” x 12”) Biohazard Bags (6” x 6”)	1 1 10
*Zithromax (azithromyrin)	MBK E1-8	250 mg	18 caps
*zolpidem tartrate (Ambien)	MEDOP K1-21	10 mg	75 tabs

Acoustic Noise Measurement of the Mir Environment

HARDWARE DESCRIPTIONS

Measurable hearing loss has been detected after long-duration missions aboard Mir. An assessment of the acoustic properties of the Mir environment will assist in the implementation of countermeasures.

MIR AUDIO DOSIMETER (MAD)

The Mir Audio Dosimeter is a microprocessor-controlled personal monitor that measures noise exposure. It can be worn in a shirt pocket or on a belt with the microphone cable threaded beneath the outer layer of clothing and clipped to the shirt collar or shoulder.

A Light-Emitting Diode (LED) indicates the instrument is ON. When the dosimeter is turned on, the display is blank for ten seconds, then switches to the TIME mode as the unit begins to accumulate dose. Each time the select switch is depressed, the display moves to the next function. After STBY (standby), the display returns to dose and starts over. The data starts to record as soon as the mode switch is placed in DOSE %, and will continue to record data until the unit is turned OFF or placed in STDBY mode for over 2 seconds. DO NOT PLACE THE MODE SWITCH TO OFF OR STDBY DURING RECORDING TIME PERIOD.

The MAD collects the following data and reads it out on a Liquid Crystal Display (LCD):

Time

The dosimeter operates a clock. The appearance of a flashing colon (:) in the display indicates that this is a time display and that data are being collected. The maximum time display is nineteen hours fifty-nine minutes (19:59). After this, the clock "rolls over," the display starts again at 0:00, and data collection continues.

Dose %

The dosimeter continuously calculates accumulated dosage and displays it to one tenth of one percent for accumulations up to 199.9 percent. For doses over 200 percent, the decimal point and the tenths place are eliminated. Carefully note the decimal point when reading dose percent. The maximum dose that can be displayed is 1999 percent. Any dose greater than this will be indicated as an overflow (OFL). The dose is calculated based on the threshold level set by the option switches. (These switches are preset prior to flight at a threshold level of ___dB).

- L_{avg}dB

  The dosimeter calculates and displays the average decibel level based on dose and time of exposure. For a period of eight hours, L_{avg} relates to dose. This number reaches its proper value about one minute after the dosimeter has been turned on or when a dose of one percent or more has been monitored.

- SLM dB

  This mode allows the dosimeter to be used as a sound level meter (SLM). This mode is selected both when the audio dosimeter is being calibrated and when it is being used as a sound level meter. The display is updated once per second.

- L_{max}dB

  The dosimeter stores the value of the highest sound level, averaged over a one second time period. This maximum sound level is indicated on the display by a soled L_{max}dB annunciator. This value cannot be reset without turning the unit off, which also resets the dose.

- OFL

  This display indicates an accumulated dose or projected dose of more than 1999 percent. In the SLM, L_{max}, or Fast L_{max} modes, OFL indicates noise levels in excess of 141 dB.

- UFL

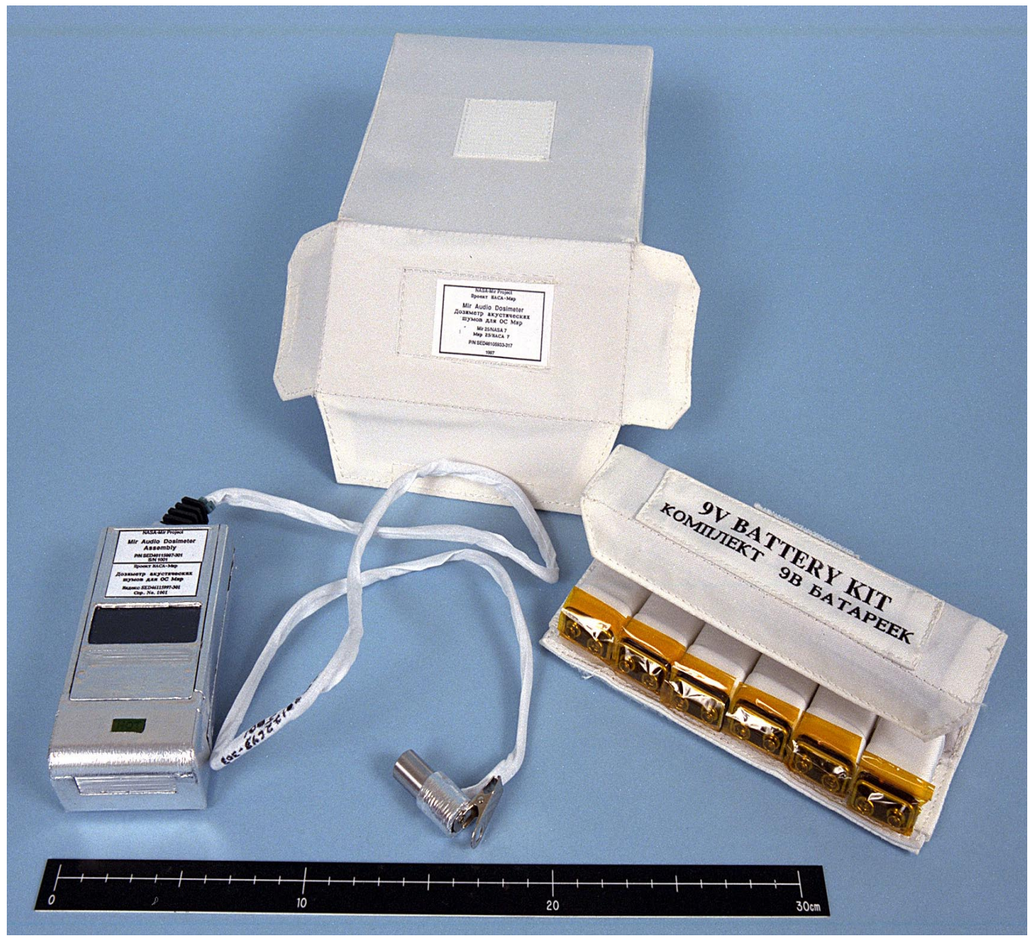
  Underflow (UFL) indicates that the noise level to be measured is less than the lower operating limit of the dosimeter.

The standby mode (STBY) stops data collection after two seconds. Accumulated data are saved when the unit is in standby. Standby is normally used at the end of a shift or for other brief storage periods when dose accumulation is to be stopped and when data cannot be read and recorded immediately. The microprocessor remains on and battery drain continues.

Note that the selection of any display mode except "STBY" allows data to be collected and calculations to be performed continuously. Selection of STBY for two seconds or more interrupts data collection, stops all monitoring functions, and stores data for later readout. All data are erased when the unit is turned off.

MICROPHONE CABLE AND MICROPHONE

The unit includes a microphone cable and a microphone. The microphone cable is connected to the instrument with the microphone attached.



97-10783

Figure SMP-1 Mir Audio Dosimeter and 9V Battery Kit

D.I.D.

Mir Audio Dosimeter

BATTERY

The MAD is powered by a standard alkaline V DC battery. The battery has a temperature sensing decal to warn crewmembers if a short circuit results in excessive temperature.

A fresh 9V DC alkaline battery will operate the dosimeter for 40 to 50 hours under normal operating conditions. The unit will operate on a weak battery but will give less than eight hours of service. It is better to install a new battery and recheck the battery operation after each session use of 24 hours. The OPS procedure will say to identify each battery removed with the test number shown on the data sheet.

- Battery Check:

  Open Audio Dosimeter by sliding the tamper-proof cover up about one inch. If the cover is locked, unlock it by turning the lock screw two or three turns clockwise with an Allen key. Be sure the main switch is positioned to the right toward the "O," which is the off position. Turn the main switch to the left toward the "I" or ON position. The LED will light for 10 seconds while the circuit tests the battery and will then flash at internals of two seconds to show the circuit is functioning and the power from the battery is adequate to operate the instrument for a minimum of eight hours. When the battery check is complete, the unit automatically switches to the TIME display and begins to accumulate data. A weak battery (less than 7.5 Vdc) is indicated when the BATT OK indictor fails to light and the LED lights for less than 10 seconds before beginning to flash.

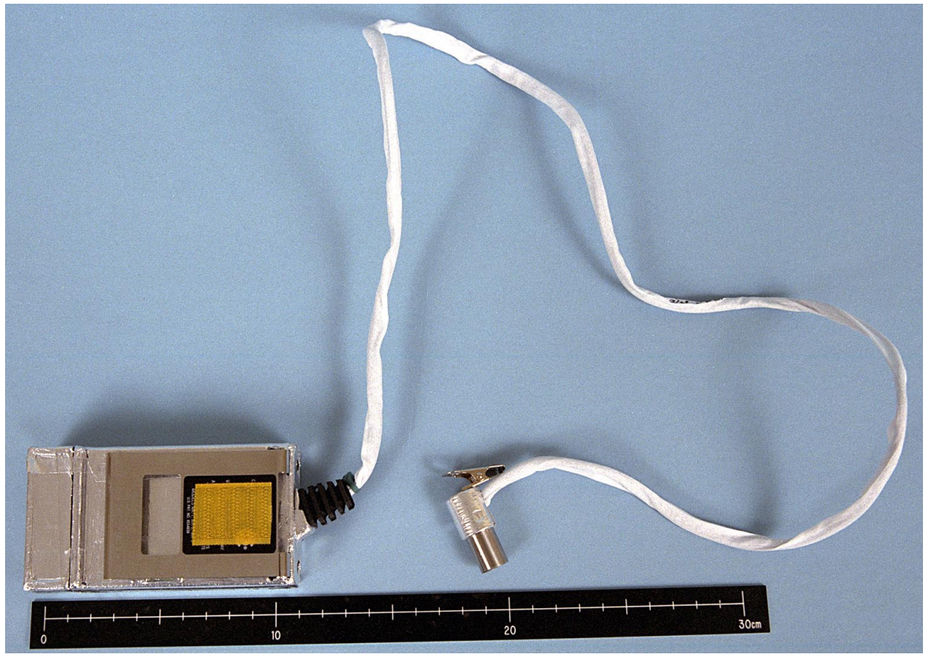
- Battery Replacement:

  Remove the battery cover and disconnect the battery connector snap from the old battery. Remove the old battery. Place the new battery into its compartment, connect battery connnector snap, and replace the cover. Recheck the battery per the above procedure.

HARDWARE INTERFACE WITH SYSTEMS

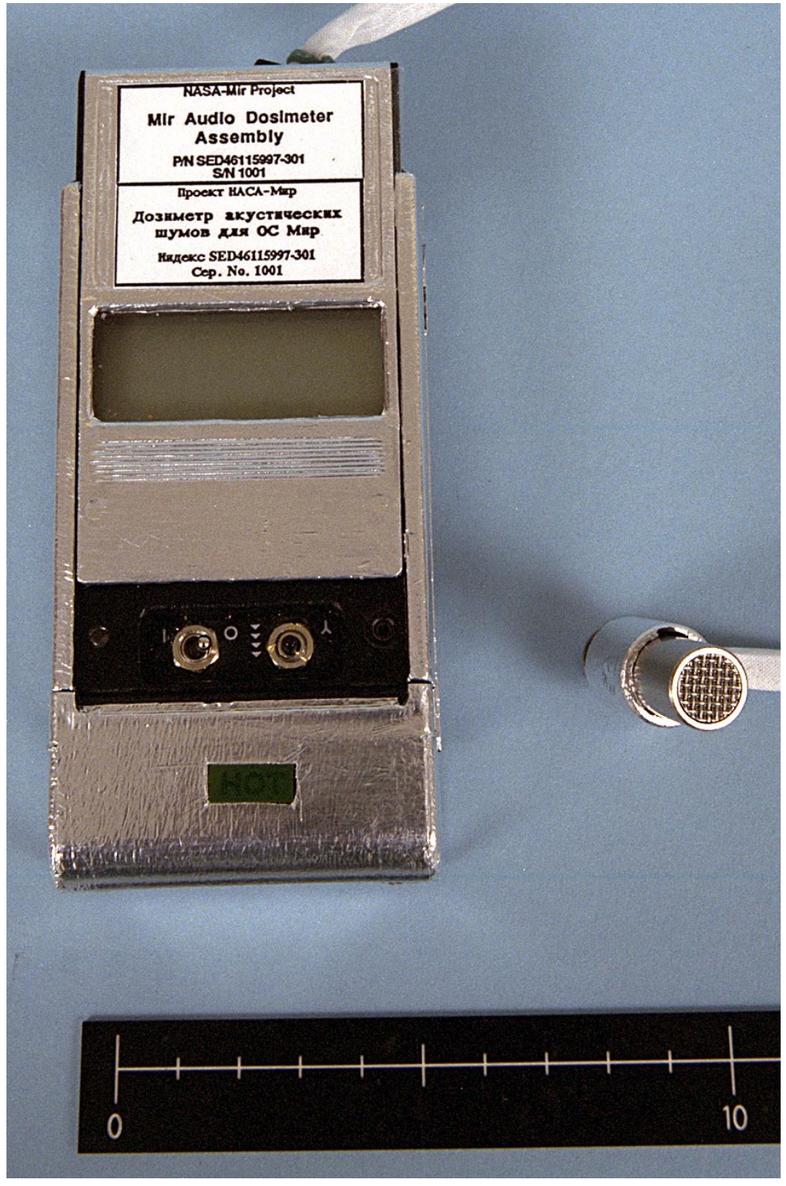
The MAD is powered by a standard 9V DC battery. There are no Mir data interfaces to the MAD.

The Mir Audio Dosimeter will contain:
- 1 Acoustic Dosimeter with one battery installed
- 10 9V DC alkaline batteries ✵



S97-10786

Figure SMP-2 Back of Mir Audio Dosimeter



S97-10785

Figure SMP-3 Front of Mir Audio Dosimeter

MIR ACOUSTIC DOSIMETER (MAD)

P/N:	SED39122643-303
Qty:	1
Mass:	.45 kg
Power:	N/A
x,y,z:	11.43 x 5.71 x 3.17 cm
DID#:	SLM46114828

Crew Status And Support Tracker (CSST) Software

EXPERIMENT DESCRIPTION

The purpose of this inflight monitoring activity is to provide the Medical Operations (MO) psychological support team with near real-time information on individual and crew psychological health and well-being. The information provided once a week by the United States (U.S.) crewmember via the computer-based questionnaire will be downlinked to the Russian Flight Control Center (TsUP) and will be used, in part, to provide early detection of event impacts or degrading conditions that precede health and performance problems, which may impact overall mission success. Support provided as a result of the inflight monitoring activities will be determined on an individual basis, appropriate to each situation.

MEDICAL OBJECTIVES

For the duration of the mission, the U.S. crewmember is to complete the computer-based CSST once per week and downlink the response file near real-time.

HARDWARE DESCRIPTION

The CSST software will be pre-loaded onto the Mir Interface to Payload Systems Laptop (MIPS-2L) hard drives prior to the mission. The software is Microsoft (MS) Windows-based and will be launched using the MIPS menu interface. Response files will be transferred to the Magneto-Optical Drive (MOD) of the MIPS Controller (MIPS-2C) from which the files will be telmetered to the TsUP at the earliest convenience. Because they are loaded onto the MIPS system, all drawings, acceptance testing and certifications are the responsibility of the MIPS system managers.

The P/N for the CSST is: SKD46114424-603.

HARDWARE EXPERIMENT RESUPPLY

The CSST software will be pre-loaded to the MIPS-2L hard drives, which are launched via the Shuttle. Resupply is not necessary. ✵

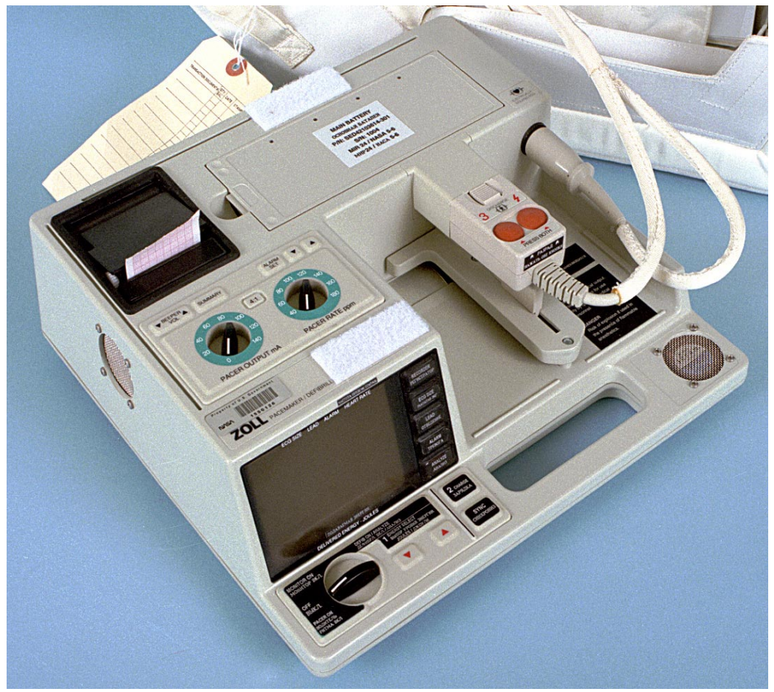
MIR DEFIBRILLATOR (DEFIB) / CREW MEDICAL RESTRAINT SYSTEM (CMRS)

HARDWARE DESCRIPTIONS

The flight hardware is listed in Table SMP.1 with a description of the hardware following the table.

S96-19430

Figure SMP-5 Defibrillator Screen



S96-19428

Figure SMP-4 Mir Defibrillator

MIR DEFIBRILLATOR

The Mir defibrillator is a commercial off-the-shelf device being modified for operation in a microgravity environment. The medical functions provided by the defibrillator are 1) external defibrillation, 2) monitoring of patient electrocardiogram (ECG) and heart rate, 3) ECG rhythm interpretation, and 4) transcutaneous pacing.

S96-19432

Figure SMP-6 Defibrillator Dials

Energy from the defibrillator is provided to the patient via a pair of multi-function adhesive electrode pads. The Mir defibrillator is battery powered and does not interface with Mir power. Two spare batteries are included with the Mir defibrillator, one of which is dedicated to performing an on-orbit checkout every 45 days. The Mir defibrillator and accessories (cables, batteries, electrodes) are enclosed within a Nomex soft pack.

S96-19437

Figure SMP-7 Mir Defibrillator Kit

D.I.D.

Mir Defibrillator

MIR DEFBRILLATOR

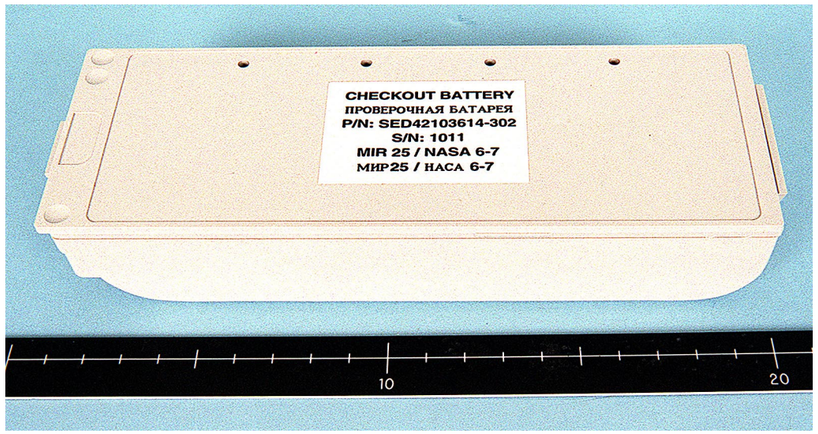
P/N: SED42103578-301
Qty: 1
Mass: 10.70 kg
Power: None
x,y,z: 34 x 36.5 x 20 cm
Loc: Priroda
DID#: SLM42103587

S96-19426

Figure SMP-8 Test Module

TABLE SMP.1
HARDWARE COMPONENTS

Item	Qty	P/N
Mir Defibrillator	1	SED42103578-301
Mir CMRS	1	SED42103638-301
Defibrillator Resupply Kit	1	SED42103593-301



S97-04698

Figure SMP-9 Mir Defibrillator Battery

S97-04736

Figure SMP-11 Defibrillator Resupply Items

S96-19427

Figure SMP-10 Defibrillator Logbook and Pad

S97-04699

Figure SMP-12 Defib Resupply Kit

DEFIBRILLATOR RESUPPLY KIT (DRK)

The Defibrillator Resupply Kit houses 3 Defibrillator battery packs, 3 multifunction electrode packs, and 4 sets of ECG electrodes. These items are used to resupply the Mir Defibrillator for each Shuttle/Mir mission. The electrodes are stowed in a pocket on the inside lid of the DRK and the battery packs are stowed in the base of the kit secured by straps with Velcro attachments on each end. The DRK softpack is made of white fire-retardant Nomex..

DEFIBRILLATOR RESUPPLY KIT

P/N: SED42103593-301
Qty: 1
Mass: 3.5 kg
Power: 0
x,y,z: 23 x 20 x 11 cm
Loc: Priroda
DID#: SLM46115569

MIR CMRS

The CMRS provides the capability to restrain and electrically isolate an ill or injured crewmember. The CMRS is a simple soft pallet design that must be deployed on the Mir Core Module's galley table. Four flaps with Velcro fastener will be used to secure the CMRS to the galley table handrails. There are two waste pouches in the center of each side of the CMRS with 1" straps that will be fixed around the galley table handrails to prevent the center of the pallet from rising. Four 2" straps with Delrin side release buckles are used to restrain the ill or injured crewmember to the pallet. Electrical insulation is provided by two layers of Ethylene-Chlorotrifloroethylene (ECTFE) film 0.002 inches (0.051mm) thick. In this configuration, the ECTFE film can withstand approximately 20 kV. Elastic along the head and the foot of the CMRS can be used to secure small medical supplies as needed.

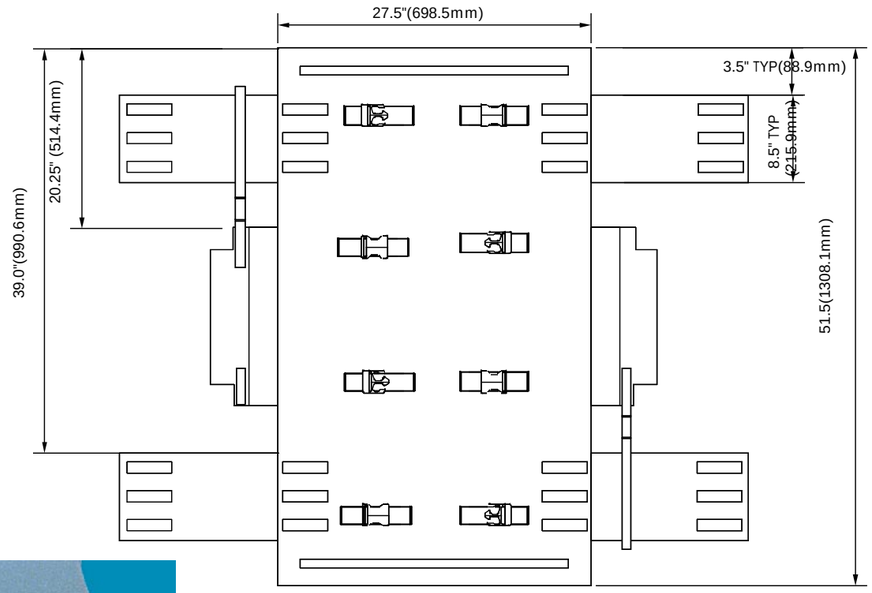
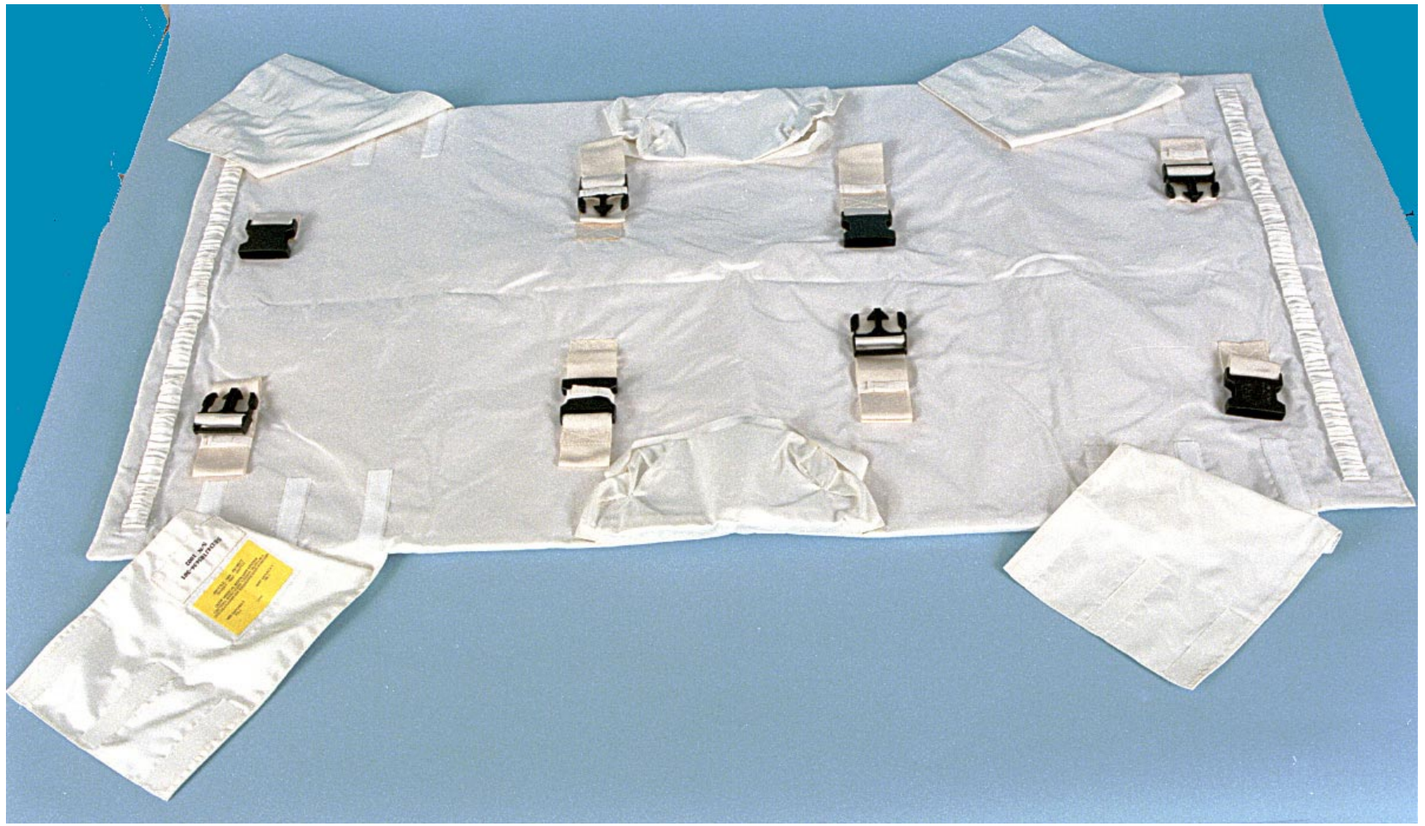


Figure SMP-14 Mir CMRS - Deployed



S96-19422

Figure SMP-13 CMRS Deployed

S96-19424

Figure SMP-15 CMRS Stowed

D.I.D.

Crew Medical Restraint System

MIR CREW MEDICAL RESTRAINT SYSTEM

P/N:	SED42103638-301
Qty:	1
Mass:	2.07 kg
Power:	0
x,y,z:	13 x 33.3 x 36.1cm
Loc:	Priroda
DID#:	SLM42103647

SPECIAL ENVIRONMENTAL ASSESSMENT OF MIR (ENV)

HARDWARE KITS DESCRIPTIONS

Table SMP.2 shows a list of hardware associated with the Special Environmental Assessment activity on Mir during docking of STS-86 and STS-89 and during long-duration.

HARDWARE INTERFACE WITH SYSTEMS

The Mir Combustion Products Analyzer (CPA) will require battery recharge approximately every 3 weeks, depending on the frequency of use. The Mir CPA power cable is connected to a panel in the Mir utilizing 28V DC power.

HARDWARE TRANSFER AND EXPERIMENT RESUPPLY

The Ethylene Glycol Real Time Sampling (EGRTS) Resupply Kit and Water Sampling Accessories Bag (WSAB) will be transferred to the Mir.

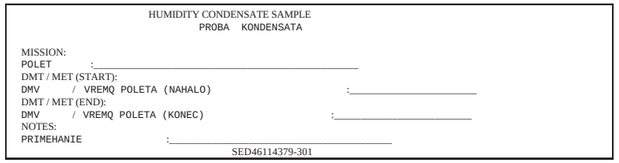
The Mir CPA is also used for Shuttle sampling and cannot be transferred to the Mir until sampling is complete.

The Condensate Interface Assembly and the Teflon Sample Bag Assy will be utilized during docking. After sampling is complete, hardware may be transferred to the Mir. Filled bags will be returned on Shuttle.

TABLE SMP.2
FLIGHT HARDWARE

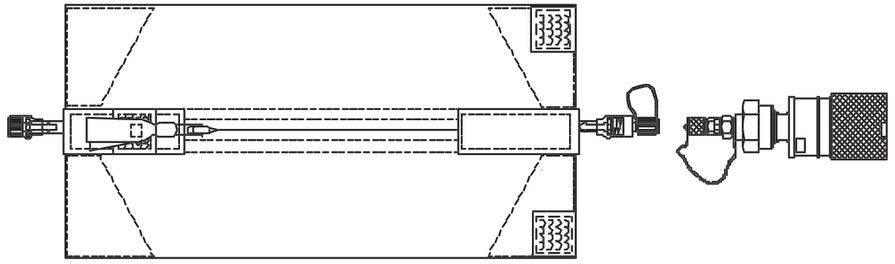
HARDWARE TITLE	QTY	PART# / SERIAL#
Condensate Sampling Interface Assy	1	SED46114380-301
ENV MEAS Logbook Part 1	1	KLSF340008-301/701
ENV MEAS Logbook Part 1 and 2	1	KLSF340008-302/702
Ethylene Glycol Archived Samples (EGAS I & II)		
Ethylene Glycol Real Time Sampling (EGRTS) Kit (Resupply)	1	SED46115809-304
Ethylene Glycol Real Time Sampling (EGRTS) Kit	1	SED46115809-304
Formaldehyde Active Sampler Assembly		
Mir Combustion Products Analyzer (CPA)	1	SED46114377-302
Mir CPA Power Cable	1	SEM46111035-303
Mir Humidity Analyzer		SED39127756-301
Mir Humidity Analyzer Accessories Bag		SED46105933-315
Teflon Sample Bag Assembly	4	SED46114379-301
Water Sampling Accessories Bag (WSAB)	1	SED46105933-316

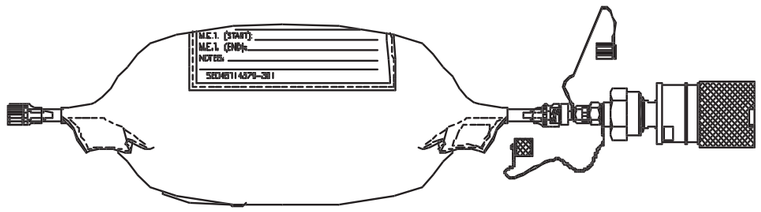
Sample Bag Label:



Sample Bag (empty)

Condensate Collection Interface
(SED46114380-301)





Mated Configuration with Full Sample Bag

Figure SMP-16 Humidity Condensate Sampling Assembly

D.I.D.

Condensate Sampling Interface Assembly

D.I.D.

Teflon Bag Assembly

TEFLON SAMPLE BAG ASSEMBLY

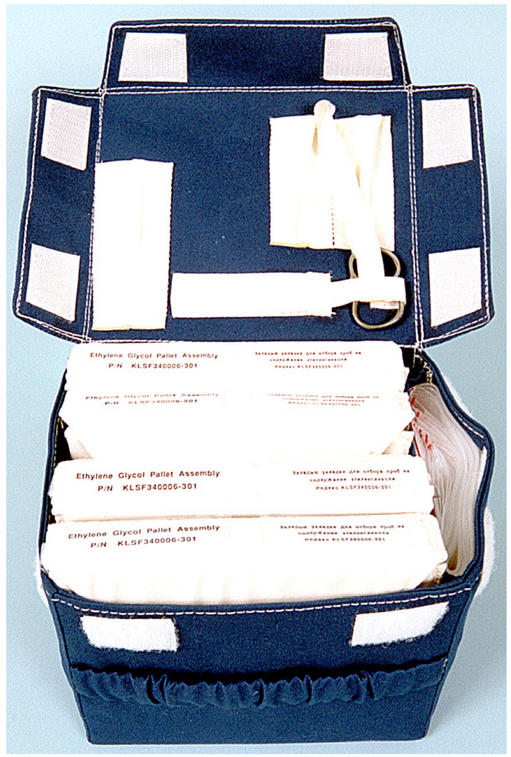
P/N: SED46114379-301
Qty: 4
Mass: .48 kg (ea)
Power: N/A
x,y,z: 27.94 x 8.89 x 5.08 cm
DID#: SED46114379

CONDENSATE SAMPLING INTERFACE ASSEMBLY

P/N: SED46114380-301
Qty: 1
Mass: .29 kg
Power: N/A
x,y,z: 3.56 x 12.7 x 3.56 cm
DID#: SED46114380

S97-11659

Figure SMP-17 Ethylene Glycol Sampling Kit

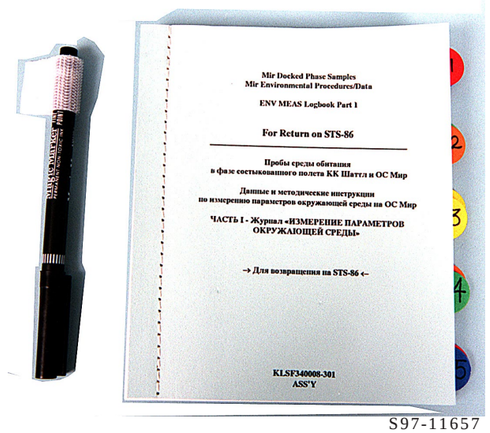


S97-11660

Figure SMP-18 Ethylene Glycol Sampling Kit

S9711655

Figure SMP-19 Water Sampling Kit



S97-11657

Figure SMP-20 Environmental Logbook

S97-11661

Figure SMP-21 Ethylene Glycol Kit

D.I.D.

Carbon Monoxide-Real Time and Ethylene Glycol- Real Time Sampling Kit Assy.

D.I.D.

Mir Humidity Analyzer

ENV MEAS LOGBOOK PART 2

P/N: KLSF340008-302/702
Qty: 1
Mass: .04 kg
Power: N/A
x,y,z: 13.97 x 1.26 x 16.51 cm

MIR HUMIDITY ANALYZER

P/N: SED39127756-301
Qty: 1
Mass: 1.59 kg
Power: N/A
x,y,z: 35.56 x 12.7 x 15.24 cm
DID#: SED39127756

HUMIDITY ANALYZER ACCESSORIES BAG

P/N: SED46105933-315
Qty: 1
Mass: 1.81 kg
Power: N/A
x,y,z: 15.24 x 8.89 x 17.78 cm

ETHYLENE GLYCOL REAL TIME SAMPLING (EGRTS) RESUPPLY KIT

P/N: SED46115809-304
Qty: 1
Mass: 1.70 kg
Power: N/A
x,y,z: 15 x 17 x 15 cm
DID#: SED46115809

S97-16444

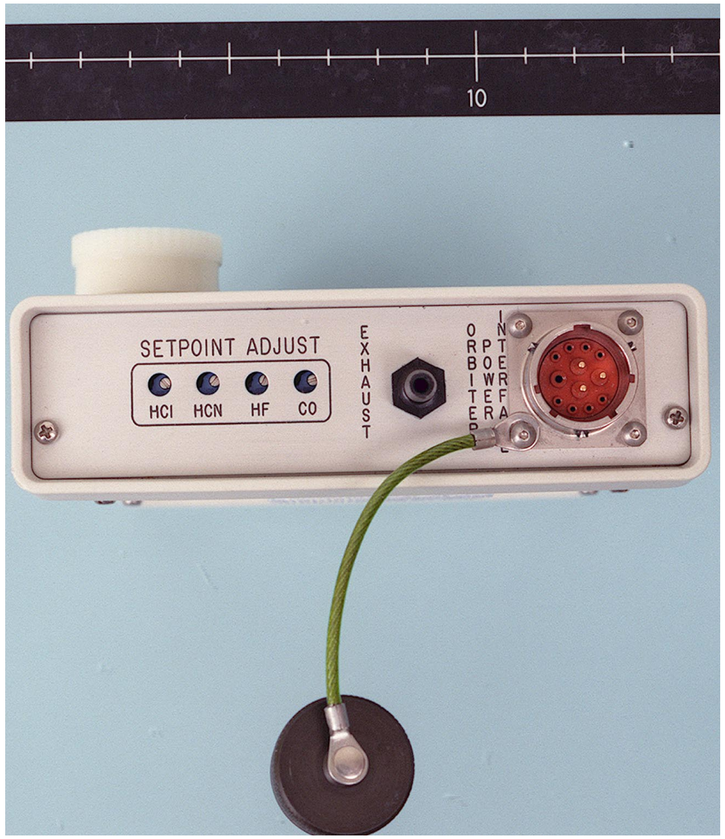
Figure SMP-22 Bottom Panel of CPA

S97-06300

Figure SMP-24 Front Panel of CPA

S97-08294

Figure SMP-23 Bottom Panel of CPA



S97-1643

Figure SMP-25 Top Panel of CPA

D.I.D.

Combustion Products Analyzer Assy.

MIR CPA POWER CABLE

P/N: SEM46111035-303
Qty: 1
Mass: 1.36 kg
Power: N/A
x,y,z: 30.48 x 7.62 x 30.48 cm

COMBUSTION PRODUCTS ANALYZER (CPA)

P/N: SED46114377-302
Qty: 1
Mass: 1.36 kg
Power: N/A
x,y,z: 20.32 x 14.22 x 3.81 cm
DID#: SED46114377

S97-16442

Figure SMP-26 Back Side of CPA

S97-11662

Figure SMP-27 Ethylene Glycol Packet (Opened)

S97-19664

Figure SMP-28 Humidity Condensate Sampling Bags

INFLIGHT STAND-TEST (LBNP)

HARDWARE DESCRIPTION

CARDIOVASCULAR ASSESSMENT KIT (CAK)

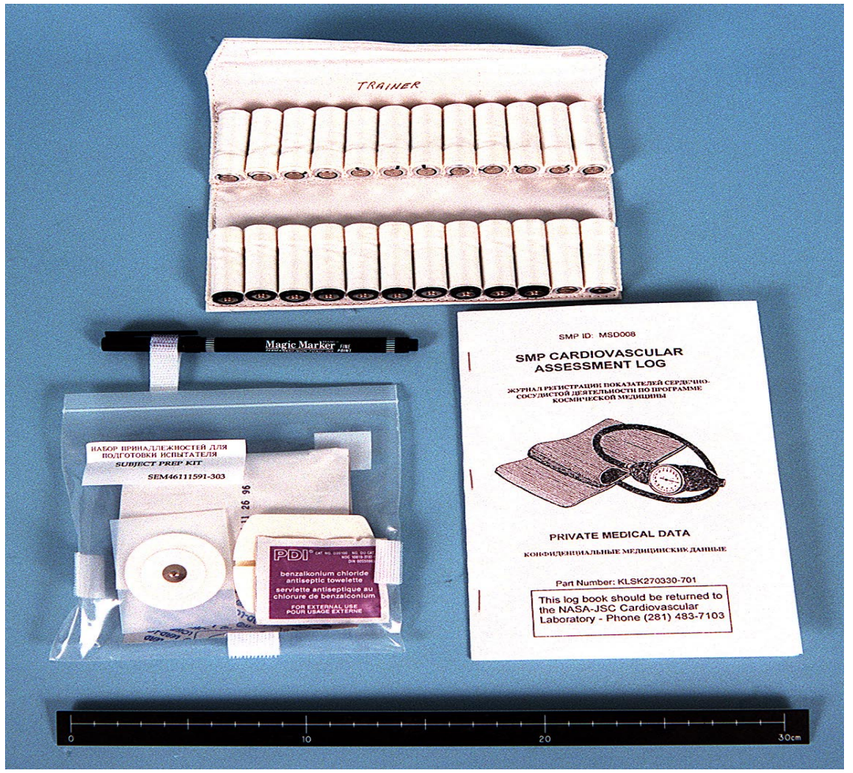
SMP CAK is made up of the components listed in Table SMP.3. The kit provides the tools to monitor and record a subject's heart rate and blood pressure. The tools process information obtained from the use of a blood pressure cuff, a Korotkoff Sound (K-Sound) microphone, and three electrodes. The SMP CAK is packed in a Nomex pouch. This kit includes two Automatic Blood Pressure Monitor (ABPM) Assemblies, an ABPM Download Cable for transfer of data to the MIPS laptop, and an SMP Cardiovascular Assessment Resupply Kit (CARK). The resupply kit contains necessary consumables which include Subject Prep Kits, batteries (AA), a sharpie pen, and a logbook.

CAK Pouch

The kit construction includes an outer covering of Nomex with a Teflon-coated fiberglass material sewn in to provide stiffness to the kit. A paper label is displayed through a clear Teflon pocket. Two ABPM assemblies and one SMP CARK is stowed in the base of the pack. The ABPM Download Cable is stowed in a pocket under the lid. The ABPM assemblies are stowed in foam (covered in Nomex) pockets to provide protection for the units. The CAK has a 5 x 5 cm Velcro pad on the bottom of the kit to provide an attachment point during use.

TABLE SMP.3
SMP CAK HARDWARE COMPONENTS
TRANSFERRED TO MIR

Hardware Item	Part Number (P/N)	Qty	Operation Category
SMP CAK	SED46115082-301	1	2
SMP CAK Pouch	KLSK270329-701	1	1
Foam Assembly	KLSK270332-701	1	1
ABPM Assembly	SED46104770-309	2	2
ABPM Download Cable	KLSK270040-701	1	1
SMP CARK	SED46115083-301	1	2
SMP CARK Pouch	KLSK270328-701	1	1
Subject Prep Kit	SEM46111591-303	10	1
6 in. x 6 in. Ziploc Bag	90042	10	1
K-Sound Microphone Pad	750014AMB-50	10	1
Benzalkonium Chloride Wipe	NDC10819-3737-1	10	1
Anchor Pad	NDC19154-1245-4	10	1
24-hr Electrode (Package of 3)	LL310	10	1
AA Battery Kit	SED46107212-301	1	2
AA Battery Pouch	SDD46106990-701	1	1
AA Batteries	EVE-E91B9-4	24	2
Logbook	KLSK270330-701	1	1
Sharpie Pen	KLSJ320077-301	1	1



S97-06461

Figure SMP-29 Cardiovascular Assessment Kit Contents

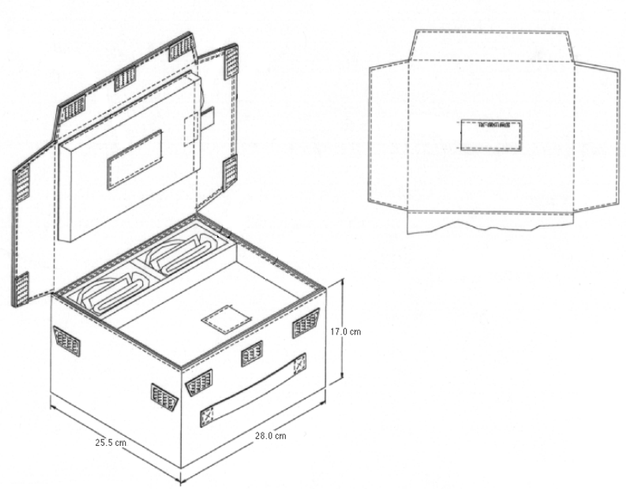


Figure SMP-30 Cardiovascular Assessment Kit

D.I.D.

Cardiovascular Assessment Kit

SMP CARDIOVASCULAR ASSESSMENT KIT

P/N: SED46115082-301
Qty: 1
Mass: 3.45 kg
Power: N/A
x,y,z: 28 x 25.5 x 17 cm
DID#: SLM46114825

CAK POUCH

P/N: KLSK270329-701
Qty: 1
Mass: .75 kg
Power: N/A
x,y,z: 28 x 25.5 x 17 cm

ABPM Assembly

The ABPM assembly is an Accutracker II made by Suntech Corporation. The ABPM is a commercially available, off-the-shelf item used clinically for the purpose of determining blood pressure under ambulatory or remote conditions. The ABPM measures a blood pressure range of 10 to 250 mmHg (± 2 mmHg) and a heart rate range of 10 beats per minute (BPM) to 200 BPM. Minor modifications have been made to the device to qualify it for space flight. These modifications include: 1) Covering the external case with aluminum tape for fire and Electromagnetic Interference (EMI) protection and 2) adding ferrite beads internally to improve EMI and noise emissions. A Velcro pad has been added to the base of the unit to provide an attachment point. This device is identical to the ABPM that previously flew on the Mir Station as part of the Cardiovascular Monitoring Assembly (CMA) for Mir-18.

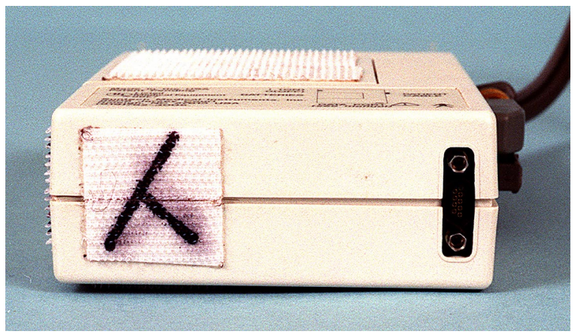
On the face of the ABPM are five buttons which are used to move forward and backward through the various menu items displayed on a Liquid Crystal Display (LCD). The keys are defined as follows:

NEXT:	Moves the user forward to the next menu item.
LAST:	Moves the user backward to the previous menu item.
YES/INCR:	Allows either an affirmative response to a question posed or an increase in a number value displayed on the LCD.
NO/DECR:	Allows either a negative response to a question posed or a decrease in a number value displayed on the LCD.
START/STOP:	Allows the user to either start or stop a reading.

An RS-232 port (9 pin mini-D connector) is on the rear of the unit. This port allows for transfer of data to a computer. The ECG, K-Sound microphone, and the blood pressure cuff connectors are on the side of the unit. The patient is connected to the ABPM through three standard lead ECG electrodes. All patient connections are electrically isolated inside the ABPM.

S97-06454

Figure SMP-31 ABPM Face



S97-06453

Figure SMP-32 ABPM Top View

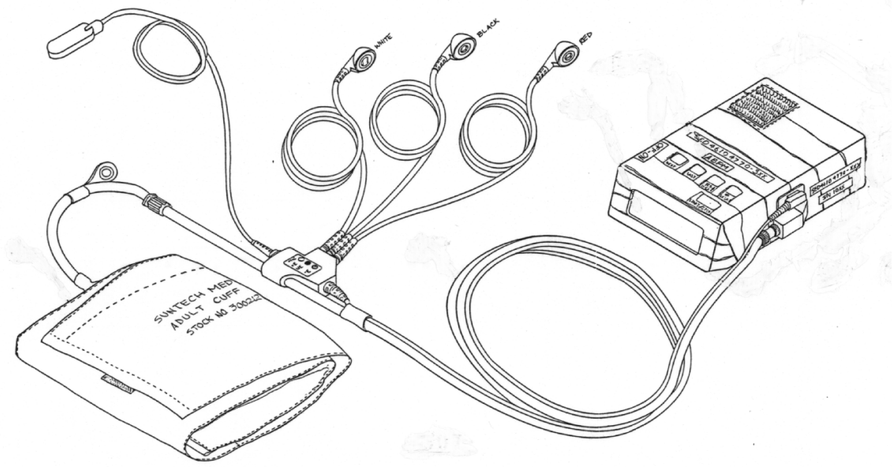
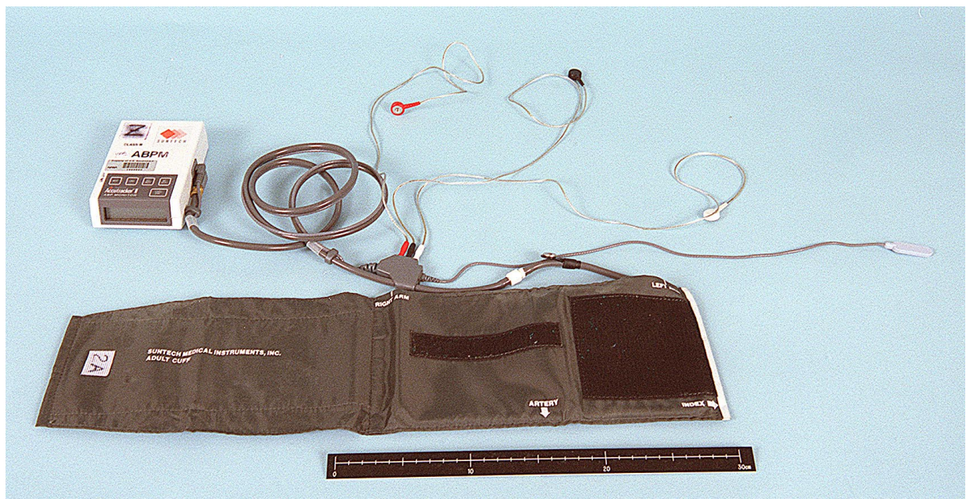


Figure SMP-33 ABPM Assembly



S97-06455

Figure SMP-34 ABPM Assembly

ABPM ASSEMBLY

P/N: SED46104770-309
Qty: 2
Mass: .59 kg (ea)
Power: N/A
x,y,z: 28 x 25.5 x 17 cm

ABPM assembly's component dimensions are:

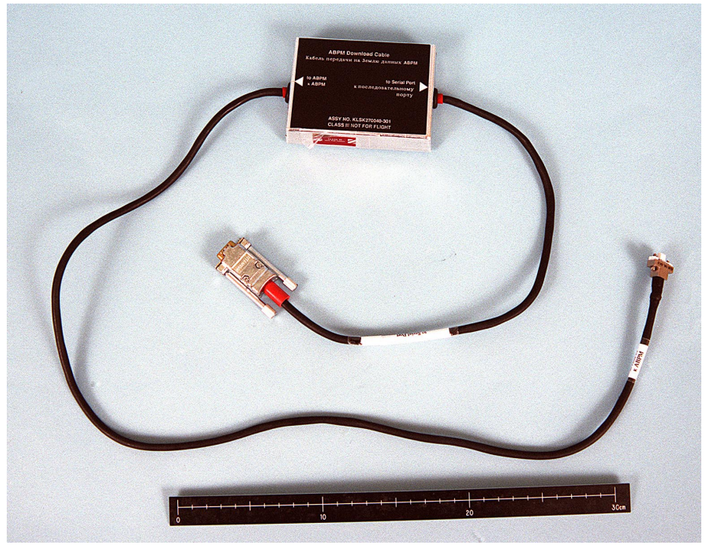
ABPM - 12 x 9 x 3.3 cm
Cuff - 13.5 x 13 x 2 cm
Cuff Hose Length - 152 cm
Cable Length - 122 cm

The ABPM is powered by four AA alkaline batteries (1.5V per battery). Battery access is provided via a removable cover on the bottom of the ABPM.

Data is communicated to the user on the LCD (16 character x 2 lines). Data is then recorded in the logbook with the sharpie pen. For data transfer of the ABPM's memory, the ABPM Download Cable is connected to the (9 pin mini-D connector) port on the back of the ABPM. The other end (9 pin serial) is then connected to the MIPS. Software resident on the MIPS then provides the interface for data transfer using an RS-232 protocol.

ABPM Download Cable

The ABPM Download Cable is constructed from PVC. It has a 9 pin mini-D connector on one end and a 9 pin serial connector on the other. The two cable ends are connected by a converter box. This cable is identical to the ABPM Download Cable that was flown in the Cardiovascular Service Kit (CSK) on Mir-18.



S97-06457

Figure SMP-35 RS-232 Data Cable

CARDIOVASCULAR ASSESSMENT RESUPPLY KIT (CARK)

CARK Pouch

The CARK has an outer covering of Nomex with a Teflon-coated fiberglass material sewn in to provide stiffness to the kit. A paper label is displayed through a clear Teflon pocket. Ten Subject Prep Kits and one AA Battery Kit are held into the base of the pack with Velcro. The SMP Cardiovascular Assessment Logbook is stowed in a pocket under the lid. The sharpie pen is also stowed under the lid, attached with a piece of Velcro.

Subject Prep Kit

The Subject Prep Kit includes a Ziploc bag, K-Sound Microphone Pad, Benzalkonium Chloride Wipe, Anchor Pad, and ECG Electrode Pack. All of these items have flown routinely in U.S. hardware on the Mir Station (CSK, CMK, SSK, WEK).

- Ziploc Bag — The ziploc bag is 166 x 154 mm and is made of polypropylene. A piece of hook Velcro is attached to the bottom of the bag to provide attachment to the base of the CARK. The ziploc bag holds the contents of the Subject Prep Kit.

- K-Sound Microphone Pad — The K-Sound microphone pad is a 63 x 57 x 4 mm piece of polystyrene with an adhesive back used to hold the K-Sound microphone against the skin. The pad has a small cut-out in which the K-Sound microphone can be inserted to hold it against the skin. The microphone does not penetrate the skin.

- Benzalkonium Chloride Wipe — The benzalkonium chloride wipe is 60 x 60 x 2 mm and is used to clean the skin surface before applying the ECG electrodes. The pad is a cellulose cloth saturated with 0.4 percent benzalkonium chloride solution.

- Anchor Pad — The anchor pad is a 45 mm diameter circle x 5 mm piece of polystyrene. It has a snap to which the blood pressure cuff cable connects and an adhesive surface which holds it against the skin. It is used to provide strain relief and guide the cable along the arm.

- ECG Electrode Pack — The disposable electrode pack is 200 x 102 x 4 mm. Each pack contains three pre-gelled electrodes. The electrodes contain a silver/silver chloride electrolyte and are made from polystyrene. An adhesive backing holds the electrodes to the skin.

S97-06462

Figure SMP-36 Cardiovascular Assessment Resupply Kit

AA Battery Kit

The AA Battery Kit is made of Nomex and a Teflon-coated fiberglass material is sewn in to provide stiffness. It folds in two, to hold 24 AA alkaline batteries in two rows of twelve. Twenty-four (24) Nomex loops hold the batteries in place.

A Velcro strip holds the kit closed. A paper label is inserted in a clear Teflon window pocket on the outside fold. The battery terminals are covered with Kapton tape before launch to prevent shorting.

SMP Cardiovascular Assessment Logbook and Sharpie Pen

The SMP Cardiovascular Assessment Logbook is constructed from bond white paper with metal staples holding the book together at the binding. The sharpie pen is a standard permanent marker with a Velcro tab to provide an attachment point for stowage and during use. ❋

ABPM DOWNLOAD CABLE

P/N: KLSK270040-701
Qty: 1
Mass: 0.235 kg
Power: N/A
x,y,z: Cable Length - 130 cm
Converter Box - 11 x 8 x 2.5 cm

SMP CARDIOVASCULAR ASSESSMENT RESUPPLY KIT

P/N: SED46115083-301
Qty: 1
Mass: 1.18 kg
Power: N/A
x,y,z: 27.5 x 16 x 13 cm
DID#: SLM46114825

SMP CARK POUCH

P/N: KLSK270328-701
Qty: 1
Mass: .287 kg
Power: N/A
x,y,z: 27.5 x 16.0 x 13.0 cm

SUBJECT PREP KIT

P/N: SEM46111591-303
Qty: 10
Mass: .021 kg
Power: N/A
x,y,z: 16.6 x 15.4 x 2.0 cm

AA BATTERY KIT

P/N: SED46107212-301
Qty: 1
Mass: .622 kg
Power: N/A
x,y,z: 20 x 5.5 x 3.6 cm

SMP CARDIOVASCULAR ASSESSMENT LOGBOOK

P/N: KLSK270330-701
Qty: 1
Mass: .0371 kg
Power: N/A
x,y,z: 21.6 x 14 x .6 cm

SHARPIE PEN

P/N: KLSJ320077-301
Qty: 1
Mass: 0.0093 kg
x,y,z: 13.7 x 1.6 cm (round)

MSD007: Toxicological Assessment of Airborne Volatile Organic Compounds And MO-14 Environmental Health Anomalies / Air Pollutants (SSAS and GSC)

EXPERIMENT DESCRIPTION

The aim of this is experiment is to characterize the volatile organic compounds (VOCs) in air samples collected on the Mir during the NASA/ Mir program and to perform a toxicological assessment of the Mir air quality. Additionally, samples will be collected onto cartridges using the U.S. Solid Sorbent Air Sampler (SSAS).

Alternately, grab samples will be collected using U.S. Grab Samples Containers. The results of the analyses will include detailed information on the types and concentration of VOCs on the Mir environment and a toxicological evaluation of the Mir air.

SCIENCE OBJECTIVES

- Provide instrumental resources and analytical expertise for the characterization of the volatile organic compounds (VOCs) in the atmosphere and support of environmental science research on Mir station.
- Characterize VOCs on the Mir Station through appropriate sampling and analysis strategies.

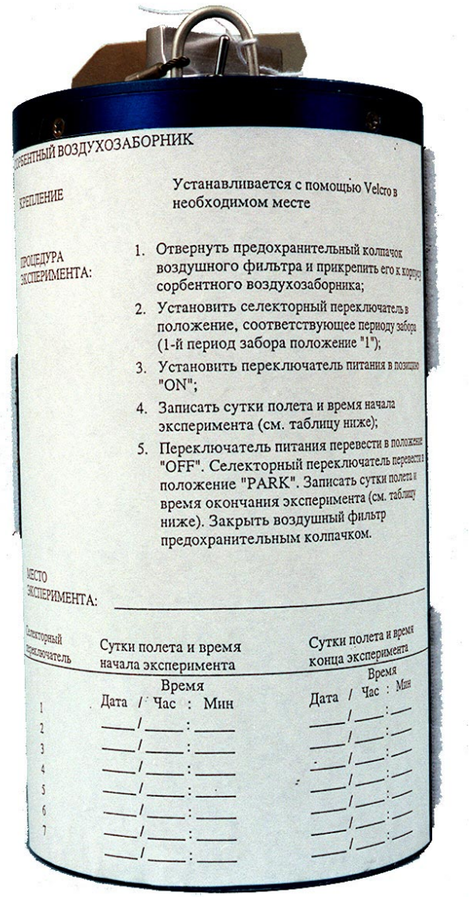
FUNCTIONAL OBJECTIVE

Collect air samples using Solid Sorbent Air Samplers and Grab Sample Containers.

SSAS HARDWARE DESCRIPTION

The SSAS consists of a cylindrical anodized aluminum enclosure encasing the gas flow subassembly and the electronic subassembly. The gas flow subassembly consists of eight glass-lined stainless steel tubes that contain TENAX for sample adsorption.

- SSAS Important Notes and Considerations:
  - The valve can be turned in a clockwise or counterclockwise direction.
  - The inlet contains filter screens which should not be obstructed in any manner.
  - The deployment location is selected to obtain a representative sample of Mir cabin air (it must not be located near an air supply discharge duct).
  - It may not be possible to hear the pump pulsing; however, it can be felt.
  - The pump must be turned off and valve switched to the “PARK” position after each sampling session. If the pump is turned off, but the valve is not turned to the “PARK” position, sampling continues by diffusion processes. If this occurs, the sample is likely compromised.
  - The dust cap must be replaced at the end of each sampling session.
  - Air concentrations of contaminants cannot be accurately calculated without the exact start and stop times for each tube.
  - Turning off the SSAS at the end of each sampling session is essential to conserve battery life. There are no provisions for maintenance work on the SSAS during the mission. Fresh batteries are placed in the SSAS prior to launch.
- SSAS Displays and Controls:
  - On / Off Switch
  - Valve handle for adjusting valve to proper sampling position
- The Electronic Subassembly:
  - The electronic subassembly consists of a pulse pump, battery clip, and four disposable C-sized drycell batteries. A single-diaphragm pump draws air at an adjustable rate. The timer printed circuit board is used to deliver a timed power pulse to the motor that allows slow sampling of air.



S96-18958

Figure SMP-38 SSAS with Russian Label

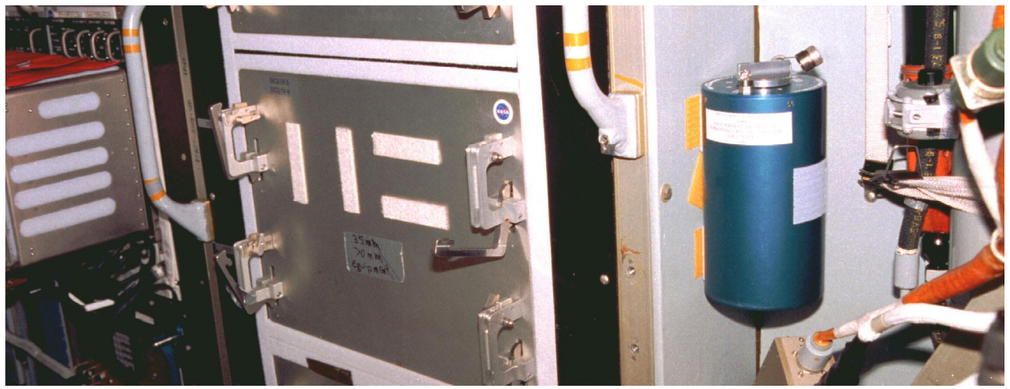


Figure SMP-37 SSAS in Priroda Near MGBX

D.I.D.

Solid Sorbent Air Sampler Kit

SOLID SORBENT AIR SAMPLER (SSAS)

P/N: SED39117010-306
Qty: 2
Mass: 3.64 kg
Power: N/A
x,y,z: 11.6 x 11.6 x 22.8 cm
DID#: SLM46112041
SLM46112028

SOLID SORBENT AIR SAMPLER

Designated Location: _____

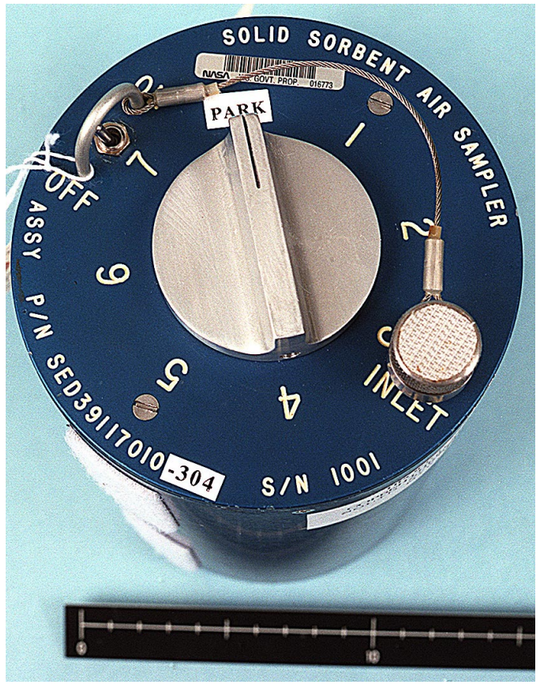
Mounting Method — Mount with Velcro at designated location

EXPERIMENT PROCEDURE

1. Unscrew dust cap and attach to Velcro on SSAS case
2. Selector switch to position corresponding to sampling period (1st sampling period-turn to position "1")
3. Power switch to ON
4. Record day/month/time (start) below
5. At end of sampling period:
   Power switch to "OFF"
   Selector switch to "PARK"
   Record day/month/time (stop) below
   Replace dust cap

SELECTOR SWITCH	Day/Month/Time Start	Day/Month/Time Stop
1	___/___/___	___/___/___
2	___/___/___	___/___/___
3	___/___/___	___/___/___
4	___/___/___	___/___/___
5	___/___/___	___/___/___
6	___/___/___	___/___/___
7	___/___/___	___/___/___

Figure SMP-39 SSAS Label



S96-18957

Figure SMP-40 SSAS Top

NM22-190-06

Figure SMP-41 SSAS in Location

GRAB SAMPLE CONTAINERS (GSC) HARDWARE DESCRIPTION

The GSCs are stainless steel canisters having a capacity of approximately 350 cubic centimeters. The containers have highly-polished internal surfaces using the Summa-treatment process.

A label on the GSCs lists the stepwise procedures to be followed by the operator during the mission. The sample collection location for the scheduled (routine) samples are the same as the SSAS.

- Important Notes And Considerations:
  - The container should be held away from the body during sample collection.
  - Only 1/4 turn counterclockwise is required to open the valve.
  - To seal the container properly, the valve closure should be turned clockwise until it slips and locks.
  - Four grab air samples are collected near the SSAS in the Mir core command station. A spatial distribution study will be conducted using four additional GSCs. A dynamic effects study will also be conducted during the STS-89 docking period utilizing the remaining four GSCs.
  - Grab air samples (except those collected during the dynamic effects study) should be collected in conjunction with the IBMP AK-1 samples.

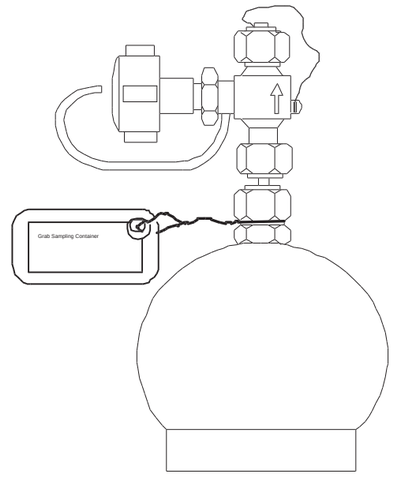


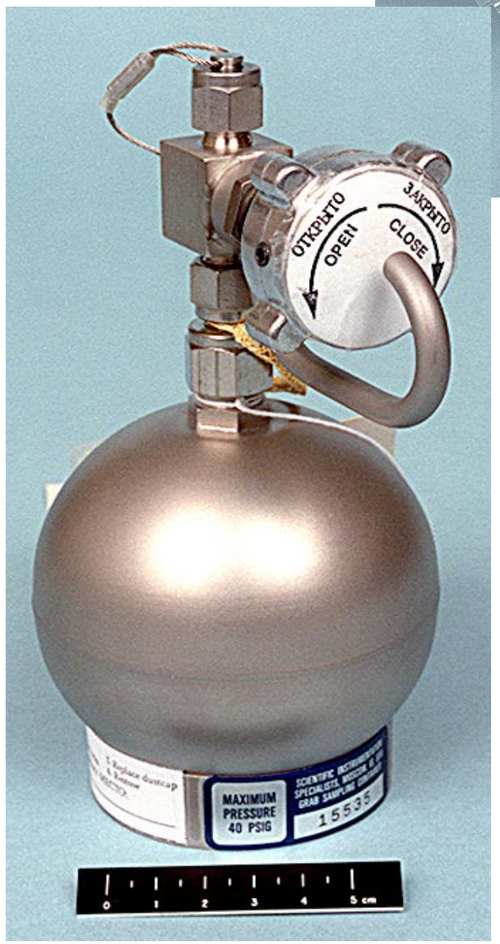
Figure SMP-42 GSC Drawing

D.I.D.

Grab Sample Container

S96-18994

Figure SMP-44 GSC Side View



S96-18993

Figure SMP-43 GSC Showing Dial

Procedure

1. Record sampling data
2. Unscrew dustcap
3. Open valve for 10 seconds
4. Close valve until it slips and locks with familiar "click"
5. Replace dustcap
6. Restow

Day / Month / Time:

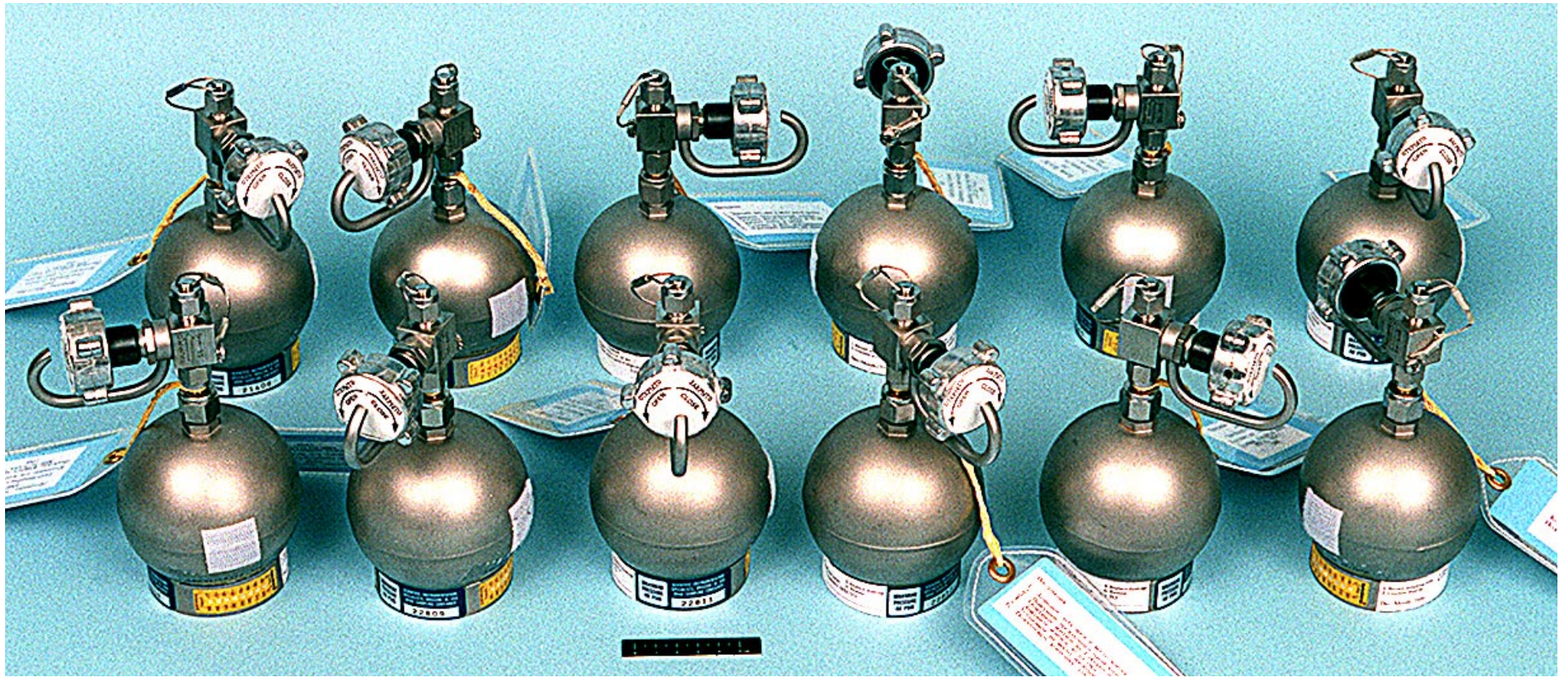
____ / ____ / ____

Location (Mecto):

_____

_____

Figure SMP-45 GSC Label



S97-09497

Figure SMP-46 NASA 7 Grab Sampling Containers

VALVE ASSEMBLY, GRAB SAMPLE

P/N: SDD46108778-305
Qty.: 12
Mass: 6.00 kg
Power: N/A
x,y,z: 17.8 x 8.9 x 12.2 cm
DID#: SLM46112027

FORMALDEHYDE MONITOR KIT (FMK) HARDWARE DESCRIPTION

There will be 2 FMK assemblies, P/N SDD46108168-305. Each kit consists of the following major components:

TABLE SMP.4
FMK ASSEMBLY MAJOR COMPONENTS

HARDWARE	Part Number/Serial Number	Qty
Formaldehyde Monitors	SDD46108168-306	10
Control Assembly	SDD46108168-307	1
Negative Control	SDD46108168-304	1
Positive Control	SDD46108168-304	1
Return "Used" plastic bag		1
Marker		1

The FMK contains 12 formaldehyde monitors — 10 units available for exposure and 2 control monitors contained in a large plastic Ziploc bag. These monitors have been used extensively in air quality studies. Sampling begins by removing a "start" label, exposing the sampling orifice and a thick polyethylene disk. Formaldehyde in the air diffuses through this disk and a thin polypropylene disk, and reacts with sodium bisulfite coated on a glass microfiber filter. A second thin polypropylene disk is located behind the glass fiber filter. The reaction product is a stable compound, sodium formaldehyde bisulfite. To discontinue sampling, a "stop" label is placed over the orifice, and pressed firmly to obtain a tight seal. Locations for recording sampling start/stop times, sampling location, and personal or area sampling designation are found on the face of the formaldehyde monitor. The samplers are analyzed in the JSC Toxicology Laboratory by cutting away the sampler body exposing the disks described above. The glass fiber filter is placed in a test tube and desorbed with deionized water. The water, in turn, is analyzed for formaldehyde content.

In addition to the monitors exposed during the mission, there are two control samples — 1 positive and 1 negative control contained in a sealed control subassembly. The negative control is considered a "blank" sample and will remain unexposed. Likewise, the positive control is not opened during the mission; however, it is vapor-dosed with formaldehyde in the Toxicology Laboratory several weeks prior to launch. The positive control contains approximately 10 micrograms of formaldehyde in the form of sodium formaldehyde bisulfite. The controls are analyzed after the mission at the same time as the samples. The positive control is evaluated for recovery of the formaldehyde dosed onto it during preflight preparation.

S97-17389

Figure SMP-47 Formaldehyde Monitor Kits

HARDWARE INTERFACE WITH SYSTEMS

The FMK may be stowed in a transfer bag, locker or attached to a surface using a Velcro patch on the bag. Individual monitors include Velcro strips for attachment to designated sampling locations, worn either as personal monitors (attached to clothing) or as area monitors (attached on a convenient surface in the command station area of the core module).

D.I.D.

Formaldehyde Active Sampler

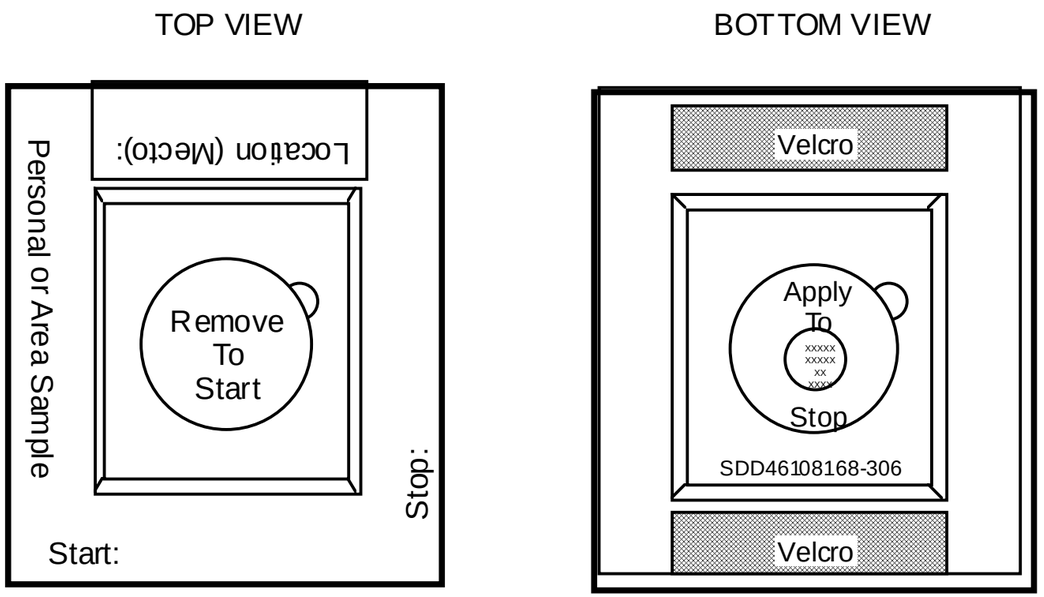
FORMALDEHYDE MONITOR KIT ASSY

P/N: SDD46108168-305
Qty: 2
Mass: 0.20 kg.
Power: N/A
x,y,z: 22 x 12 x 3 cm
Loc: Priroda
DID#: SLM4612041

FORMALDEHYDE MONITOR ASSEMBLY (FMA) HARDWARE DESCRIPTION

The Formaldehyde Monitor Assembly contains passive badges used for collection of atmospheric formaldehyde. The badges are 65 mm by 70 mm by 8 mm in size and have velcro strips to keep them in place. The badges are stowed in a ziploc bag for launch, stowage, and return. The outer case of the monitor is composed of polystyrene. Inside this case are a polyethylene disk and polypropylene disk, glass fiber membrane and 0.03 grams of sodium bisulfite. Most of the bisulfite is imbedded in the glass fiber membrane with only trace quantities present on the surface of the filter. The glass filter is contained between two thin polypropylene sheets, which lie between a thick polyethylene disk on the sampling side and the polystyrene sampling case. The control assembly is a sealed plastic bag containing the negative and positive control monitors.

The negative control monitors are considered "blank" samples to obtain background exposure and will remain unexposed during the mission. Likewise, the positive controls will not be opened. However, at NASA Johnson Space Center, they will be vapor dosed with formaldehyde, which provides a predetermined dosage. ❋

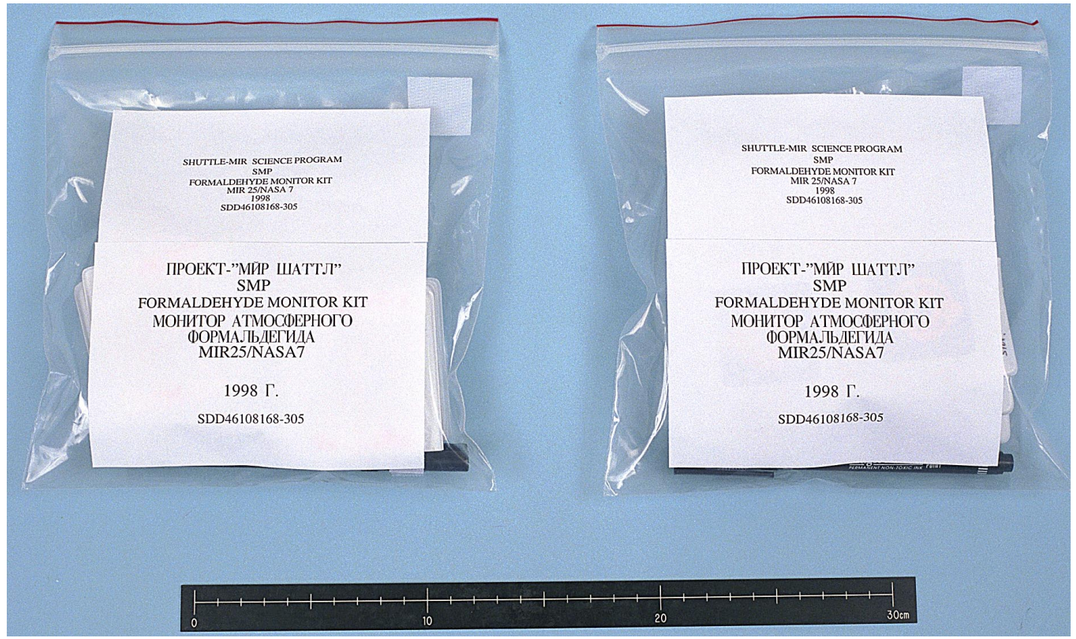


OPS-121

Figure SMP-49 Formaldehyde Badge Sampler

S96-18282

Figure SMP-48 Formaldehyde Kits



S97-17390

Figure SMP-50 Formaldehyde Monitor Kits Labels

D.I.D.

Formaldehyde Active Sampler Assy.

D.I.D.

Formaldehyde Monitor Kit

ENVIRONMENTAL PARAMETERS

Temperature Range Limits
Operating: 0° to 40°C
Non-operating: 0° to 40°C

Humidity Limits
Transportation: 30% to 80%
Stowage: 30% to 80%

ELECTRICAL CHARACTERISTICS

Not Available.

MSDO22/ MSD021: MICROBIAL INVESTIGATIONS OF MIR AND CREW (MAS, SSK, CMK)

EXPERIMENT DESCRIPTION

The microbial ecology of the Mir station has undergone quantitative and qualitative changes during long- duration (3 to 6 months) space missions. This monitoring activity is expected to provide information about the incidence and mechanisms of microbial transmission in the environment. A better understanding of microbial transfer during space flight allows us to predict which areas or situations allow microbial transfer and to direct contamination-control efforts accordingly. Information gained from this monitoring activity can be helpful in designing future spacecraft and in developing monitoring requirements that will minimize the risks of microbial cross-contamination and infectious disease.

SCIENCE OBJECTIVES

The objective of this activity is to thoroughly define the microbial ecology of the Mir Space Station. The specific aims are to:

- Study the dynamics of the microbial load in the Mir environment (air, water, surfaces).
- Use the information gained from this project to contribute to defining the microbial limits required for spacecraft internal environments during long-duration space flights.

FUNCTIONAL OBJECTIVES

Samples of air, water, and interior surfaces were collected from the Mir before, during, and after flight and analyzed for their microbiological composition. Microbial samples were also taken from the interior surfaces and air systems of the launch and return spacecraft used to support each mission. Additional water samples were taken from the Russian potable water ground supply tank, (MITISCHI), each flight. Selected air, water, and surface samples were taken at specified intervals during the flight and archived for ground-based analysis. All samples are to be analyzed for bacteria and fungi. Water samples are to be analyzed for selected viruses. All target microbes isolated from any environmental or clinical sample are to be analyzed genetically in order to associate the microbe with a primary source.

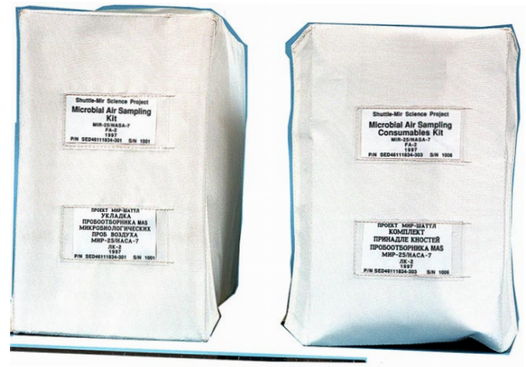
MICROBIAL AIR SAMPLER (MAS) AND THE MAS KIT HARDWARE DESCRIPTION

Microbial air samples are collected from Mir using the MAS. Media plates (Petri dishes) were supplied in the MAS Kit. A new supply of media plates was launched with each Space Shuttle flight. Bacteria colonies are to be counted and photographed after 2 and 5 days of incubation. Fungal colonies are to be counted and photographed after 5 days of incubation.

- Kit Contents:
  - MAS Transfer Case Assembly containing:
    - — MAS
    - — MAS / Universal Battery Charger (UBC) Cable Assembly
  - Media Plates (white and red dots)

S97-10392

Figure SMP-51 MAS Consumables Kit



S97-10391

Figure SMP-52 Microbial Air Sampling Kits

- Growth Tables 1 and 2
- Scissors
- Sharpie pen
- Biohazard bags
- Disinfectant wipes

- Sampling locations on Mir are as follows:
  - Location 1: in the area of Commander Seat in Basic Module
  - Location 2: in the area of the dining table
  - Location 3: in the area of the Commander's cabin
  - Location 4: in the area of Module T (Kristall)

The MAS batteries can be recharged using UBC for 24 hours prior to sampling.

- To Insert Media Plate:
  The MAS is secured in Location 1, and the outer ring from the MAS is removed. Media plates have been color-coded white (for bacterial growth) and red (for fungal growth). Each media plate is removed from the kit and the lid removed. The media plate should be placed into the MAS with the agar surface facing upward. Replacement of the lid with holes and the outer ring is then performed.

- Air Collection:

  A check is made that the "OFF" end of the sliding valve on the side of the unit is pushed in. The switch on the underside of the MAS is turned to the green dot.

D.I.D.

Microbial Air Sampling and Case Transfer Kit

MICROBIAL AIR SAMPLER KIT ASSEMBLY

P/N: SED46111834-303
Qty: 1
Mass: 2.60 kg
Power: 0
x,y,z: 30.48 x 19.05 x 25.4 cm
Loc: Spektr
DID#: SLM46111861

MICROBIAL AIR SAMPLING KIT

P/N: SED46111834-301
Qty: 1
Mass: 2.80 kg
Power: N/A
x,y,z: 24.64 x 18.29 x 29.46cm
DID#: SLM46111861

The "ON" end of the sliding valve on the side of the unit is pushed in, and the sampler is allowed to continue for a timed period (3 minutes). The "OFF" end of the sliding valve on the side of the unit is pushed to complete sampling. The switch on the underside is turned away from the green dot. The outer ring is removed and the lid with holes is set aside. The media plate is removed from the MAS unit; the lid is replaced and plates are stored in biohazard bags. MAS operations are identical at each sampling location, with two media plates (white and red dots) collected at each location.

- Colony Count and Photography of Air Samples:

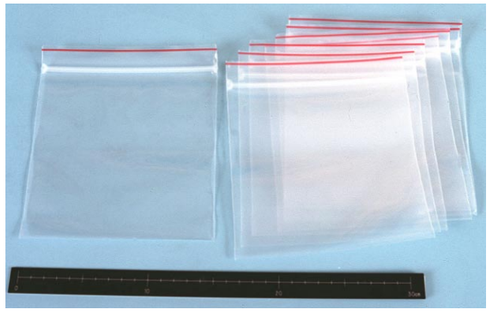
  The media plates with white dots (bacterial) will be visually examined after 2 and 5 days of incubation in a 37°C incubator or in a warm place (+25 to 30°C).

S97-10394

Figure SMP-53 MAS Transfer Case

S97-10393

Figure SMP-54 Microbial Air Sampling Kit



S96-19756

Figure SMP-55 Empty Bags

S96-19768

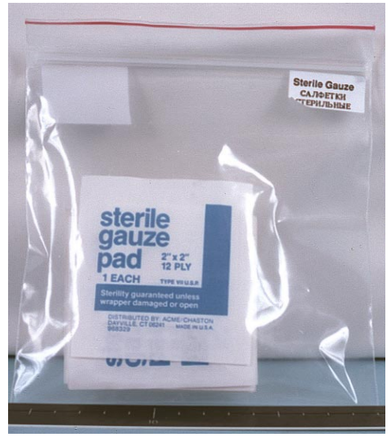
Figure SMP-56 UBC/MAS Cable

S96-19744

Figure SMP-57 Petri Dish Packets in Kit

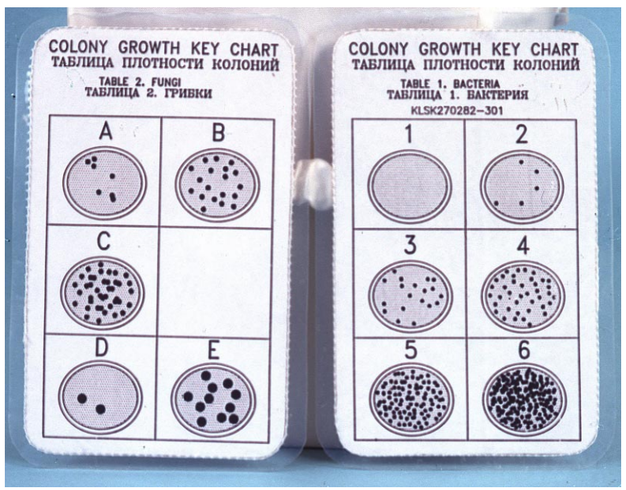
S96-19746

Figure SMP-59 Petri Packet



S96-19753

Figure SMP-58 Sterile Gauze Pad



S96-19750

Figure SMP-60 Colony Count Charts

MAS TRANSFER CASE

P/N: SED46111881-301
Qty: 1
Mass: 1.8 kg
Power: N/A
x,y,z: 15 x 16.2 x 13.6 cm
Loc: Mounted

The media plates with red dots (fungal) are visually examined after 5 days of incubation at ambient (+25 to 30°C) temperature. The amount of growth is to be compared to the growth tables that are provided in the kit.

The number/letter of the diagram that best depicts the amount of growth observed is recorded. Still photography is to be used for documentation. Data downlink is conducted. ✵

S96-19772

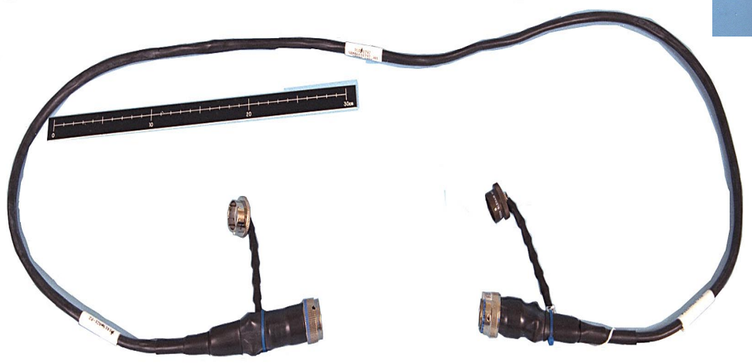
Figure SMP-61 MAS Canister Top (lid with holes)

S96-19771

Figure SMP-62 MAS Canister

S96-19757

Figure SMP-64 Red Dot Bag



S97-10766

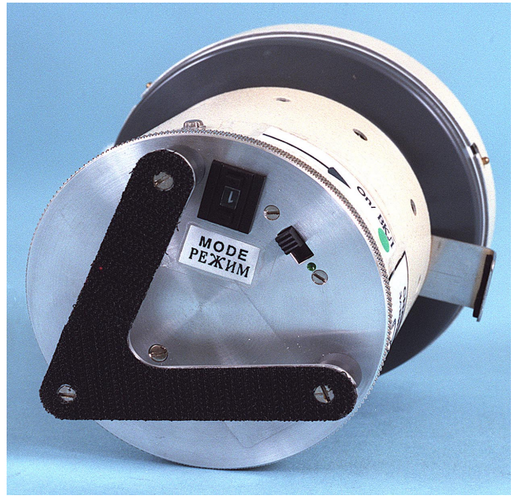
Figure SMP-63 UBC/MAS Cable

S96-19758

Figure SMP-65 White Dot Bags

S96-19746

Figure SMP-66 Biohazard Bags



S96-19770

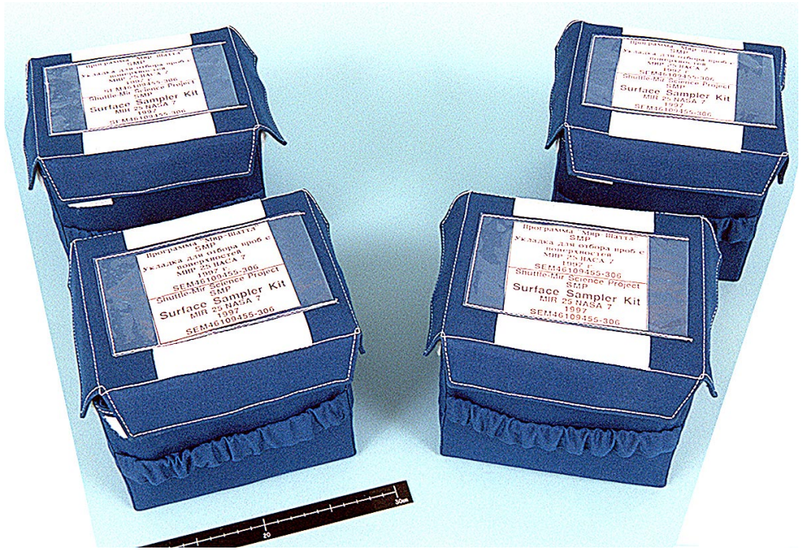
Figure SMP-67 Bottom of MAS

S96-19773

Figure SMP-68 MAS Canister

UBC POWER CABLE ASSY W1

P/N: SLM46110383-301
Qty: 1
Mass: 1 kg
Power: N/A
Loc: Mounted



S97-10396

Figure SMP-69 Surface Sampling Kits

S97-19397

Figure SMP-70 Surface Sampling Kit Opened

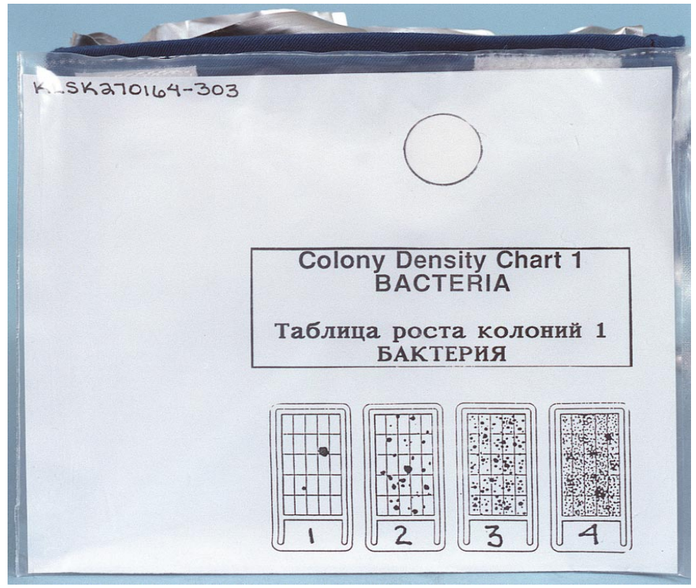
SURFACE SAMPLER KIT (SSK) HARDWARE DESCRIPTION

Surface samples are collected from Mir with the SSK. Either slides with media are pressed directly onto the surface to be sampled or a swab is passed over the surface to be sampled and slides with media are inoculated with the swab. Each kit will include slides containing microbial growth medium for surface sampling. Swabs for inoculation of the slides with media are also provided. Bacteria and fungi colonies are to be counted and photographed after 2 and/or 5 days of incubation. Surface swabs for collection of archival samples are also provided and must be frozen.

- Kit Contents:
  - Marker pen
  - Scissors
  - Tubes with swabs (white and red dots)
  - Media tubes with swabs (blue dot) in Outer Tubes (unlabeled)
  - Slides with media (white and red dots)
  - Disinfectant wipes
  - Biohazard bags
  - Growth Tables 1 and 2

- Sample Collection Sites:
  - Site 1: Commander Seat (Post#N1 in Base Block
  - Site 2: Dining Table
  - Site 3: Commander's Cabin Wall
  - Site 4: Right Treadmill Handle
  - Site 5: Just Inside Module T (Kristall) Hatch

The SSK contains 10 packets, each of which includes two tubes and two slides with media. Tubes with swabs have been color coded: one tube with a blue dot, the other with white and red dots. Media plates are color-coded: one white, the other red.



S96-19729

Figure SMP-71 Bacteria Colony Count Sheet

S96-19730

Figure SMP-72 Fungi Colony Count Sheet

D.I.D.

Surface Sampler Kit

SURFACE SAMPLER KIT

P/N: SEM46109455-306
Qty: 4
Mass: 1.0 kg ea.
Power: N/A
x,y,z: 14.5 x 17.2 x 14.8 cm
DID#: SLM46112029

For Sites 1, 2, 3, and 5, two slides with media (one with white dot, one with red dot) are pressed onto the sample site (pressed directly adjacent to each other). For Site 4, a swab is removed from the tube (white and red dots), and a surface area of 25 cm^2 is swabbed. The swab is then rubbed carefully on to a media plate (white dot). The same swab is rubbed carefully onto the next media plate (red dot). The swab is then returned to the tube, and the media plates are returned to their protective covering, making sure that the agar surface faces the labeled side of the protective covering. The tube holding the swab used for sampling (red and white dots) is discarded. The disinfectant wipes are used to clean the area after sampling.

Date and location of sample collection was recorded on all slides with media.

Biohazard bags are provided for storage. The white media plate is stored in one bag and the red media plate is stored in another.

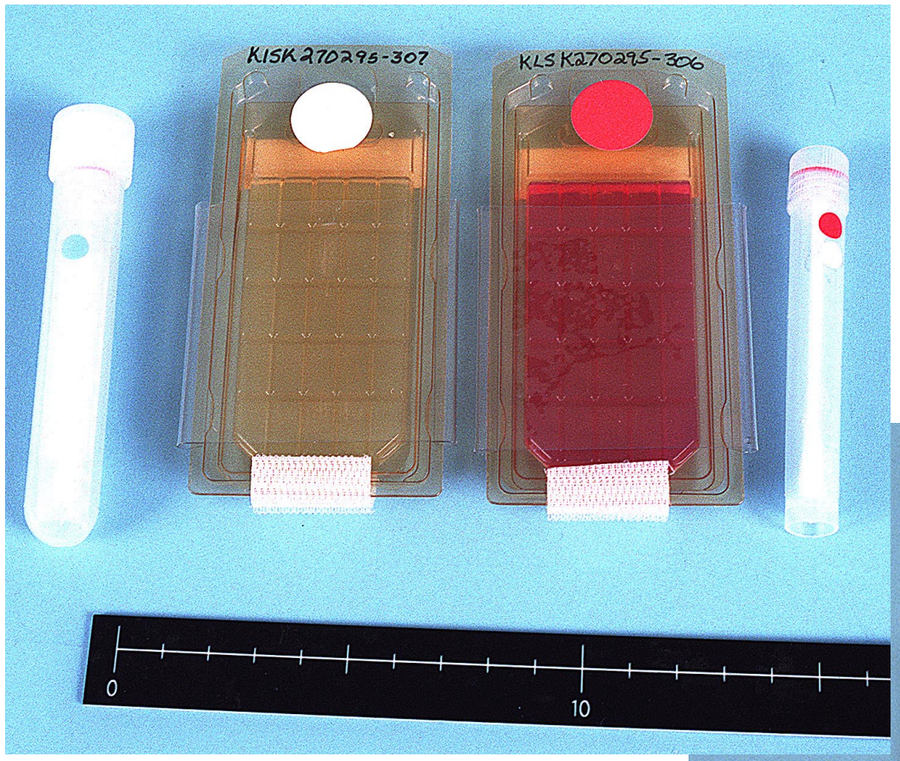
The media tube labeled with the blue dot is used to swab a surface area of 25 cm^2 adjacent to each area sampled previously. After sampling, the swab is returned to the tube, and date and location are recorded.

The biohazard bags containing the slides with white dots will be placed in a 37°C incubator if available or a warm place (+25 to 37°C). The bags containing the slides with red dots will be placed in the kit for incubation at ambient temperature (+25 to 30°C). Slides with white dots are incubated for 2 and 5 days before sample analysis. Red dot slides are incubated for 5 days before sample analysis. All tubes with the blue dots will be frozen through return for ground-based analysis.

- Colony Count and Photography of Surface Samples:

  The media plates will be visually examined through the clear side of the protective covering after designated days of incubation. The amount of growth appearing on the agar surface will be compared to the tables that are provided in the kit.

  The number/letter of the diagram that best depicts the amount of growth observed is recorded. Still photography will be used for documentation. Data downlink is conducted. ❋



S96-19732

Figure SMP-73 Sampling Items

S96-19731

Figure SMP-74 Surface Sampling Kit Contents

S96-19752
Figure SMP-75 Surface Sampling Kit 2

S96-19742
Figure SMP-76 Surface Sampling Kit 1

CREW MICROBIOLOGY KIT (CMK) HARDWARE DESCRIPTION

The CMK contains swabs for sample collection of the throat, nose, ear, axilla, groin, scapula, and hand. Swabs will be placed into tube assemblies containing freezer media, which are also contained in the CMK. The tubes will then be stored frozen and returned frozen for ground-based analysis.

- Kit Contents:
  - Tubes with Swabs (white dots)
  - Tubes with Medium for Freezing (blue dots)
  - Culturette Swabs
  - Outer Tubes (unlabeled)
  - Tongue Depressors

- Culturette Swabs (white dot) and Tube with Medium for Freezing (blue dot):

  Culturette swabs (white dot) will be used to swab the throat. After the throat sample is collected, the stick is broken to allow the swab to fall into the tube with medium for freezing (blue dot).

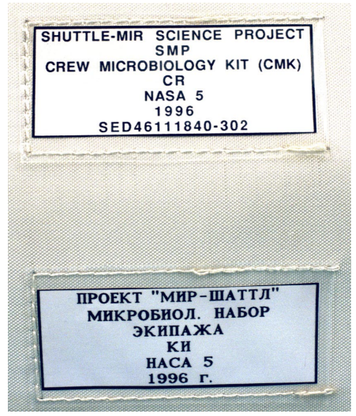
- Tubes with Swabs (white dot)

  Tubes with swabs (white dot) are used to collect samples from the nose, ear, hand, scapula, axilla, and groin. After samples are collected, the swab is placed into the tube with medium for freezing (blue dot).

All samples are placed in the freezer for storage and returned frozen for ground-based analysis.

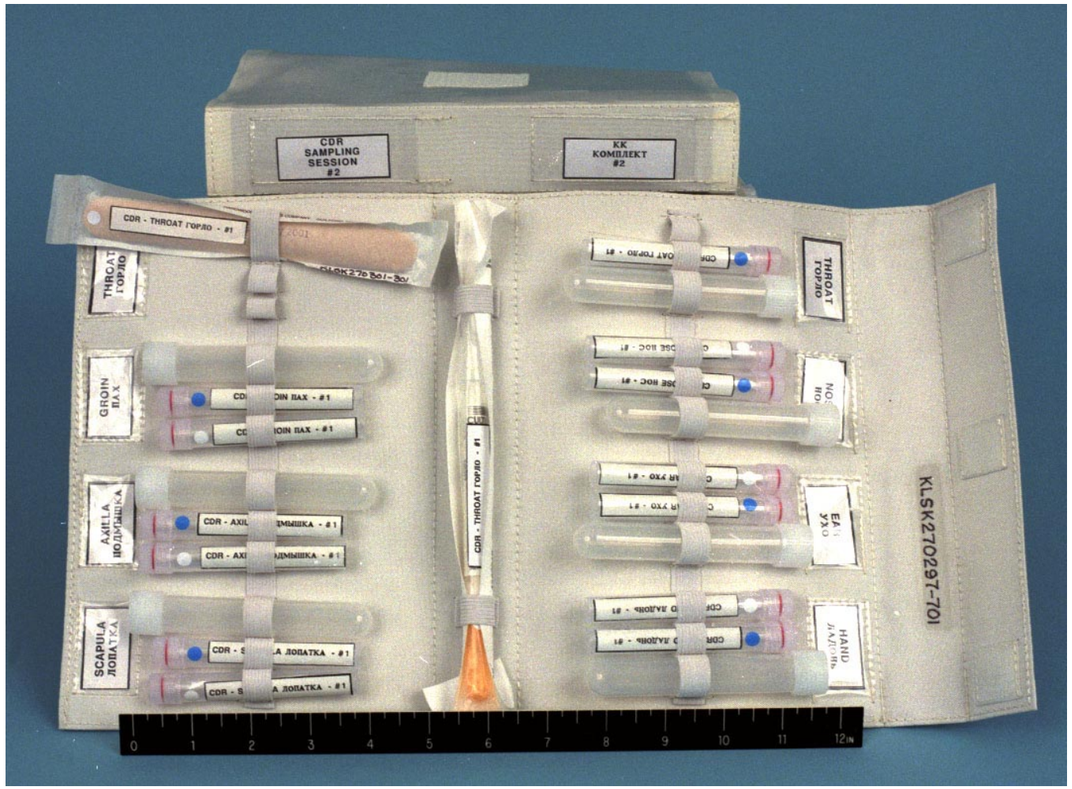
S96-18311
Figure SMP-77 Crew Microbiological Kits

S96-18312
Figure SMP-78 CDR Label



S96-18313
Figure SMP-79 CR Label

S96-18313
Figure SMP-80 FE Label



S96-18315
Figure SMP-81 Crew Microbiological Kit Contents

D.I.D

Crew Microbiology Kit

KIT ASSEMBLY, CREW MICROBIOLOGY

P/N:	SED46111840-302
Qty:	3
Mass:	5.04 Kg.
Power:	None
x,y,z:	25.40 x 20.90 x 18.03 cm
Loc:	Spektr

MSD053: Analysis of Mir Archival Water Samples (WEK VI, HCS)

EXPERIMENT DESCRIPTION

Detailed analysis of source and finished waters confirm that the design of the Mir purification system is adequate to maintain concentrations of potentially harmful contaminants at acceptable, safe levels. The information gathered by this effort supports the development and evaluation of water purification units, water quality standards, and inflight water sampling hardware for the International Space Station.

MEDICAL OBJECTIVES

The medical objectives of Analysis of Mir Archival Water Samples are to characterize the chemical composition of Mir source (humidity condensate) and finished waters to support the design and operation of water purification and monitoring units and the establishment of water quality standards for the Internation Space Station.

Condenstate measured on Mir is expected to be of similar compostion as to the Space Shuttle condensate in terms of major componets (alcohols, organic acids).

Variation in the compostion as a variable of time are expected. Analysis of Mir potable water is expected to show that the quality of water meets established specifications set by the Russians.

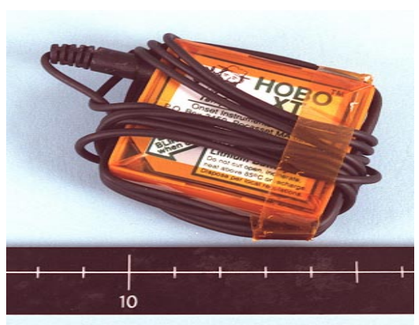
FUNCTIONAL OBJECTIVES

Samples of air, water, and interior surfaces wll be collected from the Mir before, during, and after flight and analyzed for their microbiological composition. Microbial samples will also be taken from the interior surfaces and air systems of the launch and return spacecraft used to support each mission. Additional water samples will be taken from the Russian potable water ground supply tank (MITISCHI), each flight. Selected air, water,and surface samples will be taken at specified intervals during the flight and archived for ground-based analysis. All samples will be analyzed for bacteria and fungi. Water samples will be analyzed for selected viruses. All target microbes isolated from any environmental or clinical sample will be analyzed genetically in order to associate the microbe with a primary source.

WATER EXPERIMENT KIT VI (WEK VI) HARDWARE DESCRIPTION

Investigations MSD053: Analysis of Mir Archival Water Samples and MSD022: Mir Microbial Investigations have been combined in the WEK VI.

- The WEK VI will consist of the following items for MSD022 water collection and processing:
  - Syringe Pump Assembly
  - Backup Syringe
  - Microbial Capture Devices (MCDs)
  - Air Filter Adapters (AFA)
  - Micro Sample Inflight Analysis Bags
  - Micro Sample Postflight Analysis Bags
  - Large Waste Water Bags (must be refrigerated)
  - Media Syringe case
  - Biohazard Bags (must be refrigerated)



S96-19722

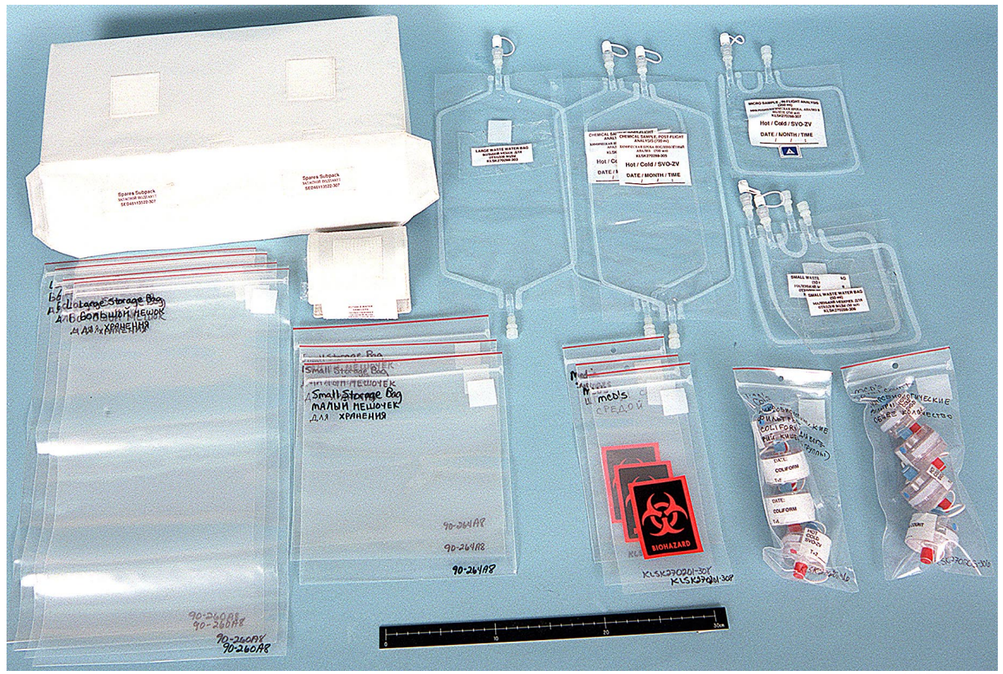
Figure SMP-82 WEK HOBO

S9709540

Figure SMP-83 WEK VI Kit

S97-09538

Figure SMP-84 WEK VI Kit Subpack



S97-04701

Figure SMP-85 WEK VI Subpack and Contents

D.I.D.

Water Experiment Kit Mir

D.I.D.

Water Experiment Kit

WATER SAMPLING ACCESSORIES BAG (WSAB)

P/N: SED46105933-316
Qty: 1
Mass: .68 kg
Power: N/A
x,y,z: 15.24 x 8.89 x 17.78 cm

WATER EXPERIMENT KIT VI

P/N: SED46111868-304
Qty: 1
Mass: 4.4 kg
Power: N/A
x,y,z: 23.25 x 38.91 x 20.04 cm
DID#: SLM46111871

S96-19714

Figure SMP-86 Micro Sample Inflight Analysis Bags

S96-19716

Figure SMP-87 Small Waste Water Bags

S96-19735

Figure SMP-88 Large Waste Water Bags

S96-19733

Figure SMP-89 Micro Sample Post Flight Analysis Bags

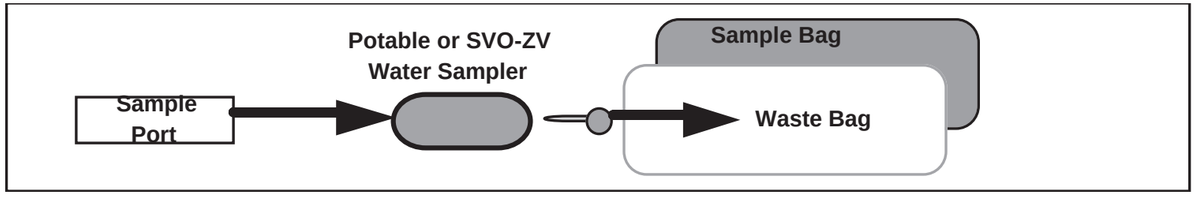
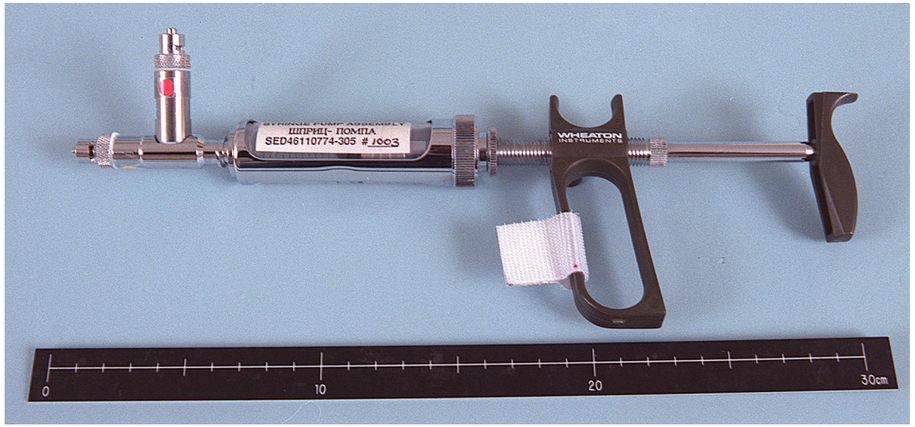
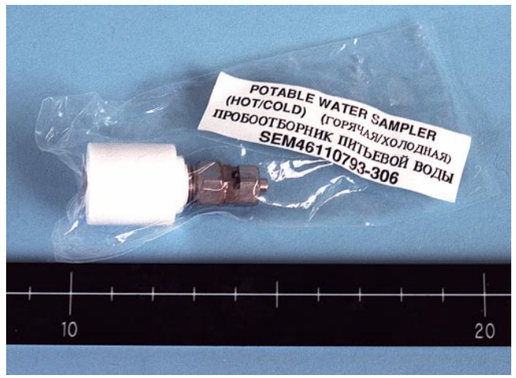


Figure SMP-90 Collection of water sample (2 sites [Galley hot and SVO-ZV])



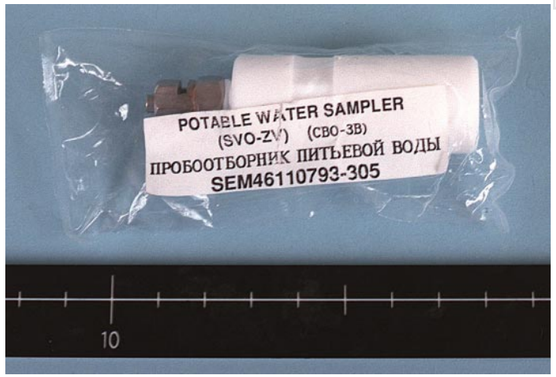
S96-19726

Figure SMP-91 Syringe Pump



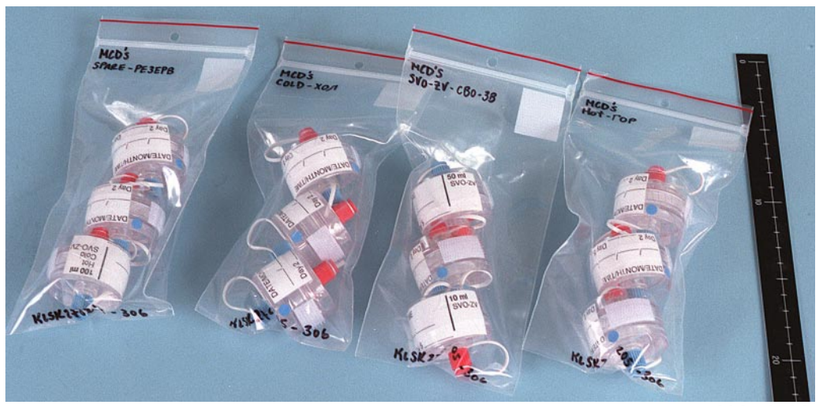
S96-19723

Figure SMP-92 Galley Potable Water Sampler



S96-19724

Figure SMP-93 SVO-ZV Potable Water Sampler



S96-19736

Figure SMP-94 Microbial Capture Devices (MCDs)

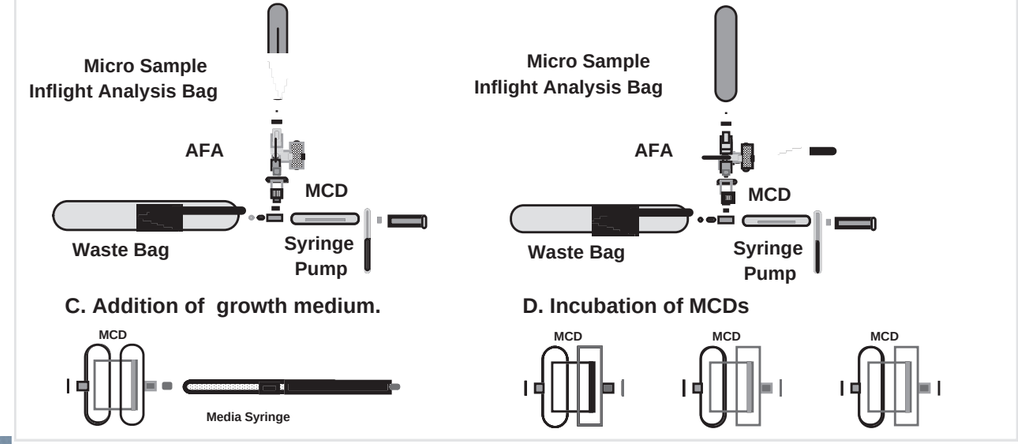


Figure SMP-95 Processing of Microbiology Samples

S96-19725

Figure SMP-96 Air Filter Adapter

S96-19719

Figure SMP-97 Media Syringe Case

MEDIA SYRINGE CASE

P/N: SED46113521-302
Qty: 1
Mass: .15 kg
Power: N/A
x,y,z: 16.45 x 15.30 x 2.44 cm
Loc: Mir Refrigerator
DID#: SLM46111871

- The WEK VI will consist of the following items for MSD053 water collection:
  - Chemical Sample Postflight Analysis Bags

- Shared hardware will consist of:
  - Small Waste Water Bags
  - Potable Water Samplers
  - SVO-ZV Water Samplers
  - Marking pen, disinfectant wipes, and storage bags

- Location of Sampling:
  - Mir galley hot water dispenser
  - Mir SVO-ZV water dispenser

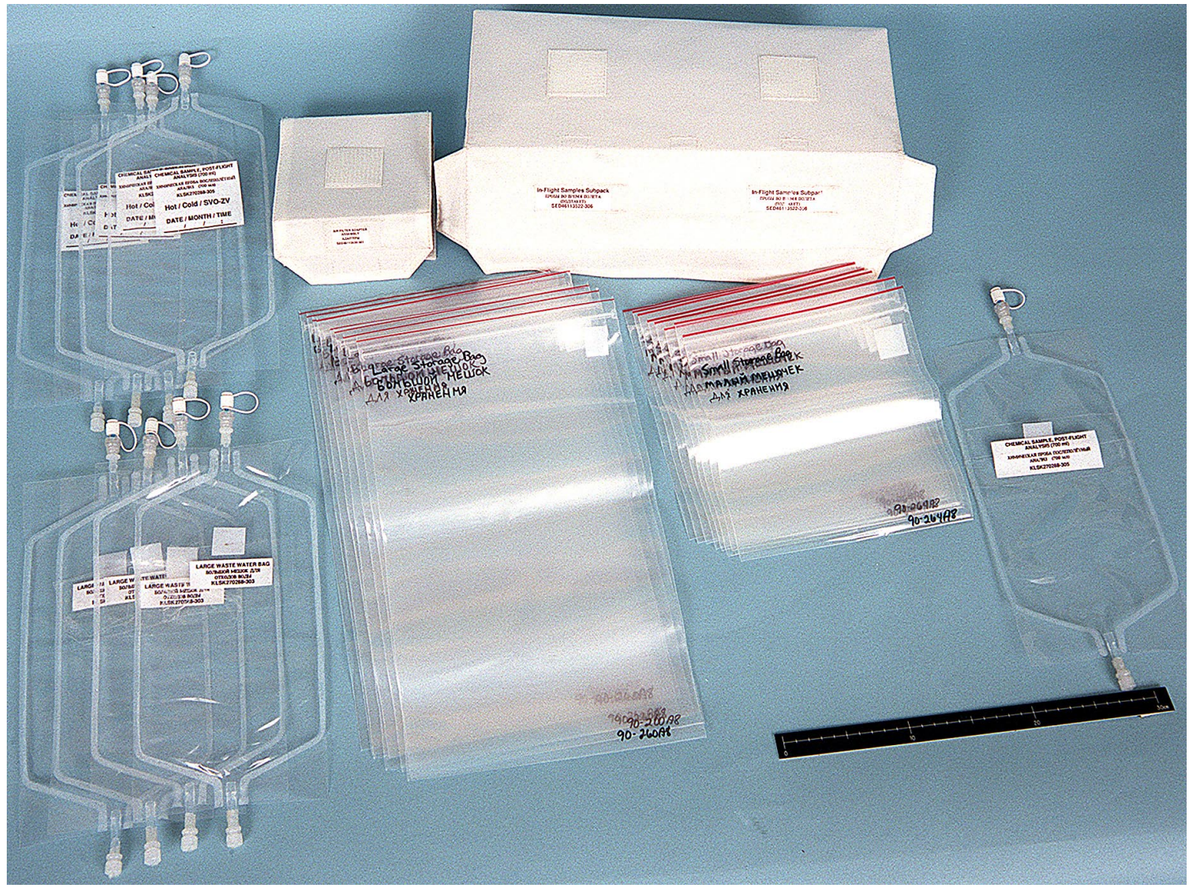
- Visual Analysis of Microbial Capture Devices (MCDs):

  Visual analysis of MCDs is performed after 2 and 5 days of incubation in a 37°C incubator or in a warm place (+25 to 37°C), one by one, comparing them to the reference chart provided in the procedure. Results are recorded on filter and results chart. Photography will also be used for documentation. Data downlink is conducted.

HUMIDITY CONDENSATE SAMPLER (HSC) HARDWARE DESCRIPTION

The humidity condensate sampler is Russian hardware launched on Progress and is used to collect humidity condensate samples on board Mir. ❋

Figure SMP-100 Humidity Condensate Sampler [S95-99]



S97-04703

Figure SMP-98 WEK Subpack and Contents

S96-19712

Figure SMP-99 Chemical Sample Postflight Analysis Bags

NUTRITIONAL ASSESSMENT

HARDWARE DESCRIPTIONS

TABLE SMP.5
HARDWARE COMPONENTS

Hardware Title	Hardware ID #
Body Mass Measurement Device	840373
Barcode Reader	852241

FOOD FREQUENCY QUESTIONNAIRE (FFQ)

Typical food intake will be determined using a food frequency questionnaire. This computer-driven package will be housed on an existing laptop computer. Each crewmember will be prompted to answer approximately 50 questions regarding frequency of intake of specified types of foods on a weekly basis (approximately 10 minutes in duration). Results of this questionnaire will be down-linked real-time to medical personnel ground for interpretation. Modifications to food intake patterns will be conveyed real-time to crewmembers as required.

BODY MASS MEASURING DEVICE (BMMD)

BAR CODE READER (BCR) (SEE OPS)

Dietary Monitoring

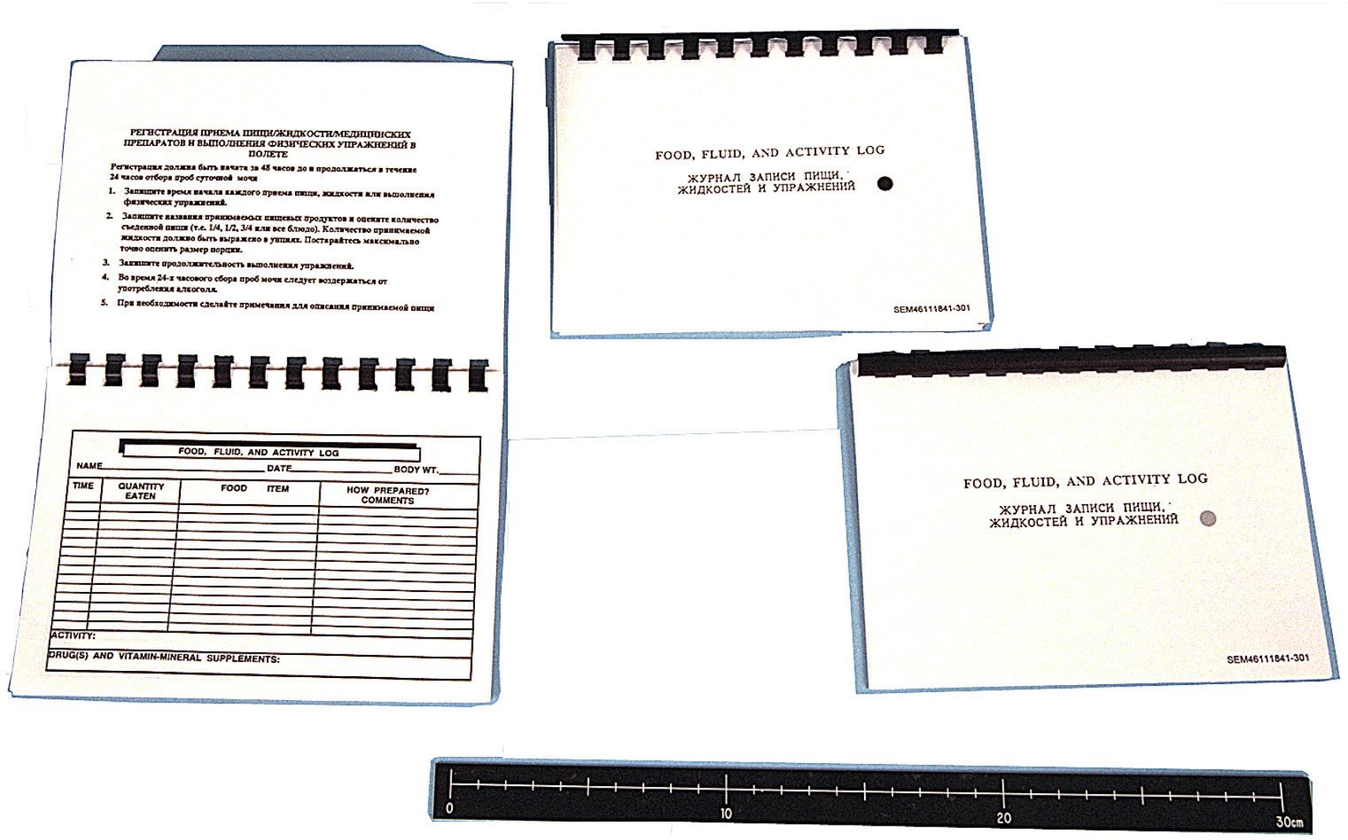
The BCR will be used to obtain detailed dietary information when nutritional inadequacies are documented by the weekly completion of the FFQS and scheduled body mass measurements. Crewmembers so affected will be instructed to complete daily intake records of all foods and fluids consumed each day as directed by medical personnel. This data will be downlinked to medical personnel on the ground for further evaluation as needed.

HARDWARE INTERFACE WITH SYSTEMS

BMMD: Data from the BMMD is to be provided to the ground for evaluation.

FFQ: The FFQ will be housed on an existing laptop. Data obtained from the FFQ is to be downlinked to the ground.

BCR: Utilizes the universal battery charger. Dietary data on the BCR (when required) is to be downlinked to the ground for evaluation per instructions from the flight surgeon. ✵



S97-10771

Figure SMP-101 Nutrition Log Book

FOOD, DRINK, & EXERCISE: LOG BOOK METABOLIC (DIETARY)

P/N: SEM46111841-301
Qty: 3
Mass: 0.45 kg (ea)
Power: N/A
x,y,z: 12.8 x 17. x .5 cm

PHOTO-DOCUMENTATION OF SKIN INJURIES AND ALLERGIC REACTIONS (MSD076)

EXPERIMENT DESCRIPTION

Spaceflight causes alterations in several functions of the immune system. Some of the major changes involve altered lymphocyte blastogenesis, decreased ability of colony stimulating factors, and changes in natural killer cells, cytokine production, and leukocyte subset population distribution. These changes may have a potentially significant influence on infectious disease risk, allergic reactions, autoimmune disease, and a long-term response to radiation. While immune function changes have not produced any overt medical emergencies, they pose potentially serious risks for crewmembers and may evolve into more serious problems during long-term spaceflights.

Russian data show similar immunological occurrences in cosmonauts after spaceflight but the information is not comprehensive. U.S. crews have reported clinical symptoms such as delayed healing of minor wounds, skin reactions, and recurrent nasal congestion inflight. Russian data on Mir is unavailable.

The operationally relevant issues for immunology and infectious disease risk will be conducted by this task.

MEDICAL OBJECTIVES

The medical objectives of this task are:

- Determine changes in immune function, if any should occur during spaceflight.
- Understand immunological changes in order to minimize the incidence of infectious and hypersensitivity disease.
- Report and document any incidence of infectious, allergic, or delayed wound healing experiences that might occur inflight.
- Support the application of appropriate countermeasures.

FUNCTIONAL OBJECTIVES

- Ensure operators can collect inflight blood samples.
- Preserve inflight samples properly for further ground-based analysis upon return.
- Photograph any reported cases of poorly healing cuts, infections, allergies, hypersensitivities, or any complaint, and to continue to photograph the subject daily to document the healing/recovery process.

HARDWARE DESCRIPTIONS

The SMP Immunology Kit (SMPIK) will be used to collect blood for the ground-based analysis of cellular components and serum immunological levels. The components of the kit are identified in Table SMP.7.

HARDWARE INTERFACE WITH SYSTEMS

The SMP Immunology Kit requires no power or other system support. However, blood samples must be centrifuged to separate the serum from the blood cellular components and then placed in frozen storage (TEHOF).

On-board photo/video system may be needed to photo-document any reported occurrences of skin injuries, allergies, inflammations, etc. If the Russian video system is used, images may be downlinked to medical personnel.

HARDWARE TRANSFER AND EXPERIMENT RESUPPLY

Additional kits are not resupplied during flight; instead, they are returned after each mission for replenishment.

Samples, hardware, and film must be transferred at mission termination for follow-up examination and analysis. Table SMP.8 shows the list of items to be transferred from the Mir to the Shuttle for return. ❋

TABLE SMP.6
EXPERIMENT FLIGHT HARDWARE

HARDWARE TITLE	Qty	FIDELITY	PART#/SERIAL#
SMP Immunology Kit (SMPIK)	1	Qual	SED46114085-301/ #1001

TABLE SMP.7
IMMUNOLOGY KIT HARDWARE COMPONENTS

ITEM	Qty	NOTES
Blood Collection Components		
Butterfly needles	6	Items needed to collect blood samples
Blood tubes (5 ml)	7	
Blood tube-blank	1	
Alcohol wipes	10	
Vacutainer holder	1	
Gauze Pads	10	
Band-Aids	10	
Tourniquet	1	
Micropore tape	1	
Sharpie Pen	1	
Container		Kit materials to process and separate components
Nomex pouch		
Foam blocks		
Kit Label	1	

TABLE SMP.8
HARDWARE AND SAMPLE TRANSFER

ITEM	Qty	NOTES
SMP Immunology Kit	1	Ambient storage on Shuttle.
Blood Samples	4-6 tubes	Samples must be kept frozen during return.
35mm Camera Film	1-2 rolls	Contingency; if there are no reported occurrences, then no film will be returned.

The Principal Investigator:
Clarence Sams, Ph.D.

PHYSICAL FITNESS ASSESSMENT

EXPERIMENT DESCRIPTION

MUSCULAR FITNESS

Skylab crewmembers exhibited significant decrements in leg strength performance when tested 5 days postflight, even though daily exercise was logged on the missions of 28, 56, and 84 days in duration. However, the Skylab 4 crew showed less strength loss than on the previous two flights; this was attributed to the addition of increased exercise intensity and inflight countermeasures. Similarly, the overall results of skeletal muscle performance tests on Shuttle astronauts identified losses in strength in the antigravity musculature.

Primarily, the operationally significant performance changes were observed in the back, abdomen, and quadriceps on R+0. Individual losses in some muscle groups for some astronauts exceeded 50%. On the Shuttle missions, subjects that participated in inflight treadmill exercise (with the original Shuttle treadmill) still demonstrated decrements in trunk performance while leg strength losses decreased. Interestingly, the tibialis anterior did not show a significant decrease on R+0 but showed a gradual decline and a significant strength loss 7-10 days postflight. This may be evidence of an acute anterior compartment syndrome developing upon re-ambulation in one-gravity.

Similarly, the torque-velocity relationship of the lower legs tested on 12 Salyut-6 crewmembers showed significant losses in the gastrocnemius/soleus and anterior tibialis after 7 days of spaceflight. The Soviets exhibited a loss of up to 18% in the ankle extensors following just 1 week of microgravity exposure. Additionally, crewmembers on Salyut missions, durations of 110 to 235 days, demonstrated losses in the sural triceps ranging from 20 to 50%.

AEROBIC FITNESS

Graded exercise testing was performed on the cycle ergometer before, during, and after all Skylab flights. The inflight findings indicate that the Heart Rate (HR) response to exercise at 75% preflight Maximum Oxygen Consumption (VO_2max) was not significantly altered; however, the postflight findings showed an increased HR response to exercise and a concomitant decrease in cardiac output and stroke volume. These changes are consistent with a maintenance of exercise capacity during flight and a postflight decrease in aerobic capacity.

During Spacelab flights, the HR increase per given level of oxygen consumption was elevated during flight, and stroke volume fell with increasing Oxygen Consumption (VO_2). VO_2max was not significantly altered during flight.

Following flight, 2 of 6 subjects were unable to complete a workload equivalent to 60% of their preflight VO_2max, and VO_2max was lowered significantly from preflight. It appears that exercise capacity during flight, as quantified by maximal oxygen uptake, is maintained; however, postflight it is reduced.

Observations of the submaximal heart rate and oxygen consumption responses in crewmembers before and after Space Shuttle flights were conducted during Extended Duration Orbiter Medical Program (EDOMP). The findings of this study were consistent with previous reports, the HR response to exercise was elevated following flight. Those crewmembers who performed the most exercise during flight showed the smallest changes on landing day. Thus, it appears that a properly prescribed and monitored exercise program may minimize the effect of spaceflight on the cardiovascular responses to physical activity following flight.

MEDICAL OBJECTIVES

The test battery will consist of several objective and functional tests which could serve two functions. The main purpose of this test is to be a clinical aid to the trainer and flight surgeons. In addition, this information will form a database characterizing the responses of astronauts in general. All the tests will guide the astronauts in physical training for a specific space mission. The battery of tests will also guide medical rehabilitation efforts and facilitate medical referral to consulting clinicians if needed. The database will provide a quantifiable assessment of aerobic performance at specific intervals, before, during, and after flight. For example, it will quantify changes during spaceflight, the rate of recovery postflight, and the effect of possible differences due to preflight characteristics (e.g., gender, age, fitness) or inflight conditions (e.g., flight length, inflight exercise protocols, nutritional status). All of these factors will help the trainer, flight surgeons, and physiologists provide a better preflight, inflight and postflight physical training program for spaceflight crewmembers.

D.I.D.

Exercise Countermeasure Assessment Kit

Figure SMP-102 ECAK Displayed

S97-09901

FUNCTIONAL OBJECTIVES

Submaximal Cycle GXTs

A submaximal exercise test protocol, individualized based on the data obtained during the maximum test, will be used for all subsequent assessments (preflight baseline data collection, inflight periodic fitness evaluations, and postflight tests to assess recovery). Measurements obtained during the operational cycle test are similar to the maximum test; however, heart rate will be measured with a Polar HR monitor - ECG and blood pressure data will not be required during the inflight tests.

During these tests, if the crewmember exceeds the HR corresponding to 85% of their preflight VO_2max for ≥ 60 sec., the protocol shall be terminated and the subject is instructed to progress immediately to the cool down stage.

HARDWARE DESCRIPTIONS

Exercise Countermeasure Assessment Kit (ECAK) contains:

1) Heart Rate Monitor (Quantity 2): A chest strap transmitter/wrist watch receiver assembly for accurate measurement of heart rate during exercise. This system records exercise duration and real-time heart rates with pre-programmable upper and lower limits for prescribed target heart rate zones. The watch has file storage and download capability to a PC for delayed downlink.

2) Heart Rate Monitor Download Device: The Heart Rate Monitor requires a downloader to the MIPS for later downlink of the heart rate data.

3) Exercise Log: The log will be used to record inflight physical fitness assessment data (i.e., duration, modality, workload, circumferences, weight, etc.)

4) Shoes

5) Measuring Tape: For measuring designated body circumferences in inches or centimeters.

6) Space Linear Mass Measuring Device (SLMMD): The SLMMD will be used to measure body mass on a periodic basis. ❋

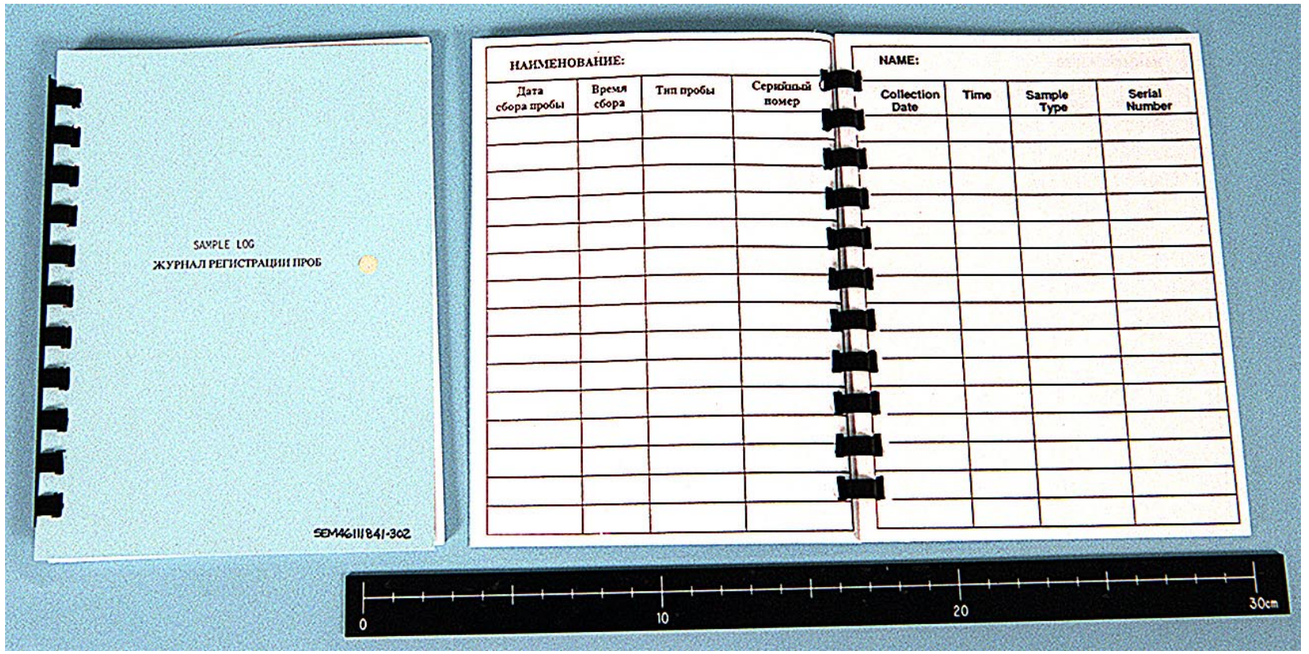
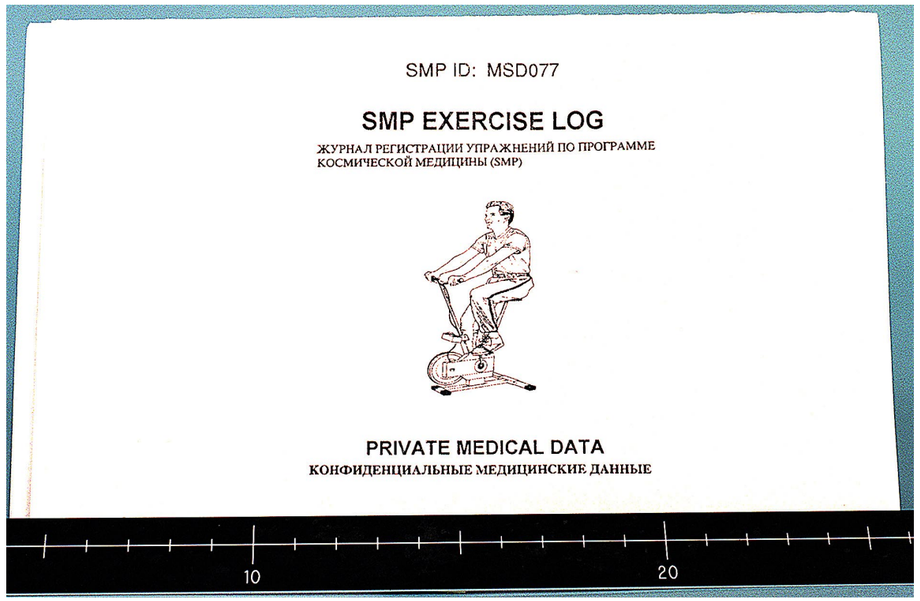


Figure SMP-103 Sample Logbook

S97-09904



S97-05811

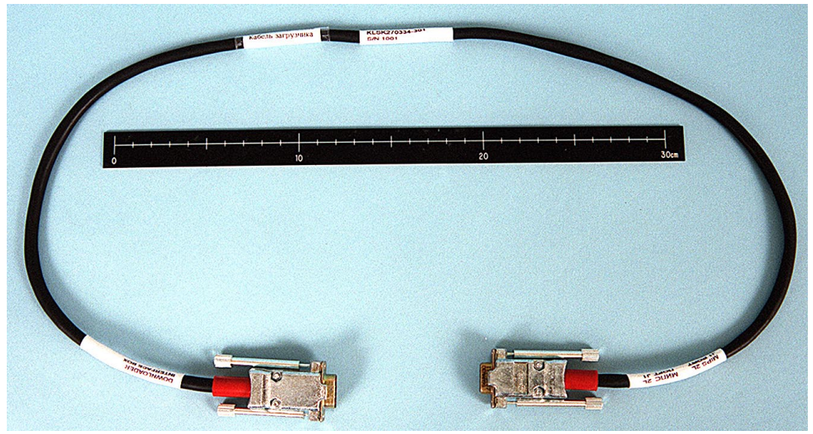
Figure SMP-104 Cardiovascular Assessment Logbook

D.I.D.

Logbooks

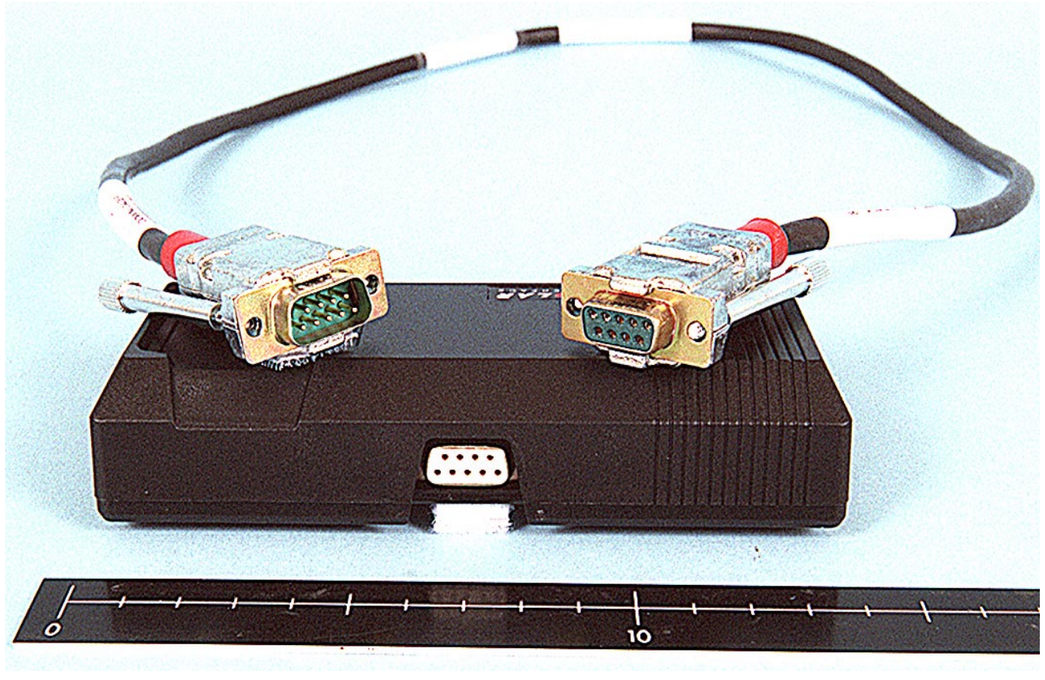
EXERCISE COUNTERMEASURE ASSESSMENT KIT

P/N: SED46115084-301
Qty: 1
Mass: 3.63 kg
Power: N/A
x,y,z: 30.48 x 22.86 x 16.51 cm
DID#: SLM46111871



S97-09903

Figure SMP-105 ECAK Downloader Cable



S97-09902

Figure SMP-106 ECAK Heart Rate Monitor Download Device

S97-05809

Figure SMP-107 ABPM Wrist Band

S97-05810

Figure SMP-108 ABPM Shoes

S97-09900

Figure SMP-109 Exercise Countermeasure Assessment Kit

RADIATION MONITORING (DOSIMETERS)

HARDWARE OVERVIEW

Radiation monitoring is accomplished using three kinds of hardware: Crew Passive Dosimeters (CPDs), Dosimeters for Station or Passive Radiation Detectors (PRDs), and the Tissue Equivalent Proportional Counter (TEPC).

CPD HARDWARE DESCRIPTION

CPDs are identical to the standard shuttle CPDs with the exception of an additional English-Russian Space Medicine Program (SMP) label.

CPDs are composed of a Lexan housing which contains several thermoluminescent dosimeters (TLDs). The TLDs are radiation-sensitive crystals which store some of the energy received from the radiation. After returning the dosimeters to the ground, they are processed by heating. The resulting luminescence is proportional to the radiation exposure. In addition, the CPD uses plastic nuclear track detectors (PNTDs) which are sensitive to radiation. Postflight analysis is also required in order to determine the exposure results.

EFFECTIVE DOSE MEASUREMENT AT EVA (E704)

TLD HARDWARE DESCRIPTION

TLD KIT

The TLD kit consists of the items listed below. They are packaged inside a Nomex bag which will be stored aboard Mir while the experiment is deployed and used to return the kit aboard the Space Shuttle.

- TLD reader
- TLD dosimeters (9)
- TLD plate
- Memory cards (2)
- Power cable

TLD READER

The on-board TLD reader will be installed in the Priroda module, near the Payload Utility Panel (PUP)-B. The reader is a digitally controlled thermoluminescence dosimeter evaluating unit for measuring radiation dose in space applications. The main components include:

- Microcontroller
- High voltage (HV) supply
- Photoelectron multiplier tube (PMT)
- Heating power supply
- Wide-range digital voltmeter (DVM)
- Memory card driver—stores all measured data onto memory cards

The microcontroller regulates all components and provides a preliminary evaluation of the measurement, after which the TLD reader displays and stores the measured data.

Front Panel

The front panel has a four-character-wide LED display, power switch, memory card slot, hole for the dosimeter, and six push buttons for controlling the measuring program. The push buttons are explained below.

REP	Recalls the dose last measured and any error messages
MDE	Toggles automatic periodic and manual measurement mode
MNU	Toggles main menu selection
SUB	Toggles sub menu selection
SET	Increments the displayed value at setup (date, time, etc.)
ENT	Confirms a selection or enters a value or function

Data Interface

The TLD reader is loaded with a parameter table to correct the measured value for each dosimeter (for each serial number). Each dosimeter serial number is automatically identified.

Data from each measurement is stored in a memory card for further evaluation at a later time. A memory card can store data for over a year, or up to 7,000 sets of measurements.

The second memory card is a spare one. Both cards are stowed in pockets in the soft stowage bag.

Each set of measurements includes:

- digital glow-curve data
- date/time
- dosimeter identification number
- environmental temperature measured dose
- any error messages

Electrical Interface

A power cable connects to the "ONBOARD POWER" socket on the side of the TLD reader and to the J-10 connector on PUP B in Priroda, which provides a 28V DC power supply. The cable is stowed in a pocket inside the soft stowage bag.

TLD DOSIMETERS

The set of TL dosimeters consists of six $CaSO_4$:Dy (calcium sulfate, dysprosium activated) and three LiF: Mg, Ti (lithium fluoride, magnesium and titanium activated) dosimeters. The TL material is laminated to a surface that is heated electrically. Each TL dosimeter has a common case with a memory chip containing the identification number of the dosimeter. The calcium sulfate dosimeters are labelled: 1A, 2A, 3A, 4A, 5A, and 5A-K2. The lithium fluoride dosimeters are labeled: 1B, 2B, 3B. Characteristics of the dosimeters are:

- Measuring dose range: 3 mGy to 10 Gy
- Measured gamma-energy range with compensating case: 80 keV to 2 MeV
- Dimensions: 20-mm diameter; 122-mm length
- Mass: 50g

PLATE OF TLD READER

The encased TL dosimeters are attached with Velcro to the TLD plate which is itself attached with Velcro to the top of the TLD reader.

SYSTEM OPERATION DESCRIPTION

The TLD reader has two main modes of operation, manual and automatic. In manual mode, the user can read out the dosimeters, check or set the real time clock, check or set the parameters of the automatic mode, control the status of the memory card, and initiate the automatic mode. In automatic mode, the unit will read out the inserted dosimeter periodically using parameters set in the manual mode.

The reader must be connected to the power supply system and switched on. For onboard manual readings, the bulb dosimeter is placed into the light-proof compartment of the reader. Twisting the bulb in a clockwise direction turns the reader on. The light intensity of the bulb is automatically monitored according to a preset program. Following the start signal, only the high voltage unit operates for a given time (approximately 10 seconds) to allow the photo multiplier tube to stabilize, after which the heating current is turned on. After the preheating phase, which eliminates low-temperature glow peaks of the TLD material, the light quantity from the main glow peak is recorded. After this measuring phase, the TLD reader continues to heat the bulb to minimize the residual thermoluminescence of the bulb.

After a measurement, the TL dose is displayed in units of micrograys (mGy) for 5 seconds; this

Dosimeter for Crew Kit Assembly

Dosimeter for Station Kit

Dosimeter for Station Dosimeter

DOSIMETER FOR CREW

P/N:	SEM46111842-601
Qty:	1
Mass:	0.02 kg
Power:	N/A
x,y,z:	11.40 x 5.30 x 0.80 cm
DID#:	SLM46114362

DOSIMETER FOR STATION

P/N:	SEM46111843-301
Mass:	.06 kg
Power:	N/A
x,y,z:	15.3 x 15.3 x .18 cm

data can be recalled at any time before the next measurement is begun. The measured data (date and time of measurement, dosimeter number, and glow curve) is stored on the ROM card. The dosimeters can be used subsequently for further measurements. To save time when reading multiple dosimeters, the high voltage is maintained for a fixed period of time (e.g., 1 minute) so that the photomultiplier tube does not have to restabilize.

The reader can operate in automatic data acquisition mode by using a bulb dosimeter left in the reader and setting the parameters for the readout.

Error messages are listed below.

NOTE: In case of error, message on display alternates: dose and ERR_

1. By pressing <REP> first error code appears on display (10 sec)
2. By pressing <REP> again, next error code appears on display
3. After last error code <RDY> appears on display next measurement can be performed

Possible error messages:

E_NO - a permitted code number has not been found
E_AB - type of dosimeter could not be identified
E_CA - no card or card is damaged
E_SE - sensitivity out of range
E_BG - background exceeds the permitted value
E_OV - overflow error
E_HE - heating current error
E_ST - measurement/computation interrupt (early stop)

(Increment 4)

EXPERIMENT DESCRIPTION

The purpose of the FBI4 experiment is to measure total absorbed dose and LET spectra external to Mir Station. Depth-dose profiles under this shielding outside the Mir Station will be measured with Thermoluminescent Detector (TLD) stacks. LET spectra will be measured using CR-39 plastic nuclear track detector (PNTD). The main contribution to the LET spectra will be from trapped protons and their secondary particles. Comparisons of internal and external radiation measurements will yield information on the effects of shielding in the Mir orbit. Comparisons will be made between the LET spectra and depth dose profiles measured by U.S. and Russian detectors outside Mir Station with corresponding calculations based on environmental models.

EXTERNAL DOSIMETER ARRAY HARDWARE DESCRIPTION

The External Dosimeter Array (EDA) consists of one U.S. and one Russian dosimeter package mounted in aluminum containers on a removable aluminum platform. The EDA assembly measures 34 x 16 x 12 cm and has a mass of 1.730 kg. The EDA interfaces with the STD platform currently mounted on the exterior of the Kvant 2 module.

U.S. DOSIMETER PACKAGE

The U.S. dosimeter set supplied by University of San Francisco consists of two aluminum canisters (5 cm diameter, 0.95 cm thick) containing CR-39 PNTDs and a TLD block (60 x 3.5 x 2.0 cm). The CR-39 canisters have 2 cm diameter Kapton thin-shielding windows on top. The TLD block contains two stacks of TLDs mounted inside 1 cm diameter holes and covered by thin-shielding Kapton windows. The PNTD capsules and TLD block are mounted on a hollow Al plate (12.0 x 10.0 x 3.0 cm) which in turn is mounted on the front of the EDA base.

A 12.0 x 10.0 x 4.0 cm protective cover is mounted on top of the Al plate and cover the PNTD canisters and TLD block while the EDA is stowed on the inside of Mir Station. The protective cover is held in place by means of clips.

RUSSIAN DOSIMETER PACKAGE

The Russian dosimeter package consists of 2 aluminum containers assembled as one unit. One container (72 x 20 x 23 mm) contains 6 stacks of TLDs to measure depth-dose distribution. TLD stacks are 8 mm in diameter and 20 mm thick. The 2nd container (100 x 65 x 42 mm) contains CR-39 PNTDs together with holders containing TLDs (Sandwich Assembly). Polyethylene layers are used as absorbers. The tops of each container are covered by thin Kapton layers. The Russian package mass is 350 ± 50 g.

The STD platform was developed by the Russians and previously deployed and retrieved via EVA by Russian cosmonauts on one occasion (June 1991).

EDA TECHNICAL DESCRIPTION

The EDA consists of an Al base, two passive dosimeter packages, an aluminum handle and a spring loaded slide. The handle allows the EDA to be installed and removed from the STD platform. The spring-loaded slider on the bottom of the EDA holds the EDA in place between two angled stops on the STD platform.

The EDA contains no electrical systems and is completely passive in mode of operation.

The EDA contains no data systems and is completely passive in mode of operation.

SOFT STOWAGE BAG

The EDA will be transported to and from Mir Station and stored inside Mir Station inside a soft stowage bag (SSB). The SSB will be made of Nomex with Velcro fasteners. A Velcro fastener on the bottom of the SSB will allow the SSB to be stowed on a wall on the inside of Mir.

The SSB uses Velcro fasteners to contain the EDA and Protective Cover and to attach to the wall of Mir Station for stowage.

The SSB contains no electrical systems and is completely passive in mode of operation.

The SSB contains no data systems and is completely passive in mode of operation.

PROTECTIVE COVER

The Protective cover is attached to the EDA while being stowed inside Mir Station. The protective cover is removed prior to deployment by EVA and reattached after retrieval by EVA.

The protective cover attaches to the top of the U.S. dosimeter package on the EDA by means of clips.

The protective cover contains no electrical systems and is completely passive in mode of operation.

The protective cover contains no data systems and is completely passive in mode of operation. ✵

AREA PASSIVE DOSIMETER (APD) KIT

HARDWARE DESCRIPTION

The Area Passive Dosimeter (APD) Kit consists of three parts: 1) the APD, 2) the Pouch Assembly, and 3) the Belt Assembly. The APD Kit measures 21.5 x 19.0 x 11.0 cm and has a mass of ~1.65 ±0.05 kg.

APD

The APD consists of a 9.8 x 9.8 x 5.2 cm Lexan box which contains two types of passive radiation detector: 1) CR-39 plastic nuclear track detectors (PNTDs) to measure Linear Energy Transfer (LET) spectra, and 2) thermoluminescent detectors (TLDs). Detectors of both types were provided by USF and Institute of Biomedical Problems (IBMP). CR-39 PNTDs are sensitive to ionizing radiation of LET ³5 keV/µm including <10 MeV protons and heavy ions. TLDs are sensitive to ionizing radiation including high energy protons and electrons and gamma radiation. CR-39 PNTDs are used to measure the LET spectra above 5 keV/µm. TLDs are used to measure total absorbed dose. Combined PNTD and TLD measurements are used to determine dose equivalent and average radiobiological quality factor. The total mass of the APD is ~0.23 ± 0.05 kg. There are six APDs in the APD Kit.

POUCH ASSEMBLY

The Pouch Assembly is a soft stowage pouch made of Nomex. Each APD fits into an individual pouch. Six of the pouches are then attached to each

620 EXTERNAL DOSIMETER ARRAY KIT

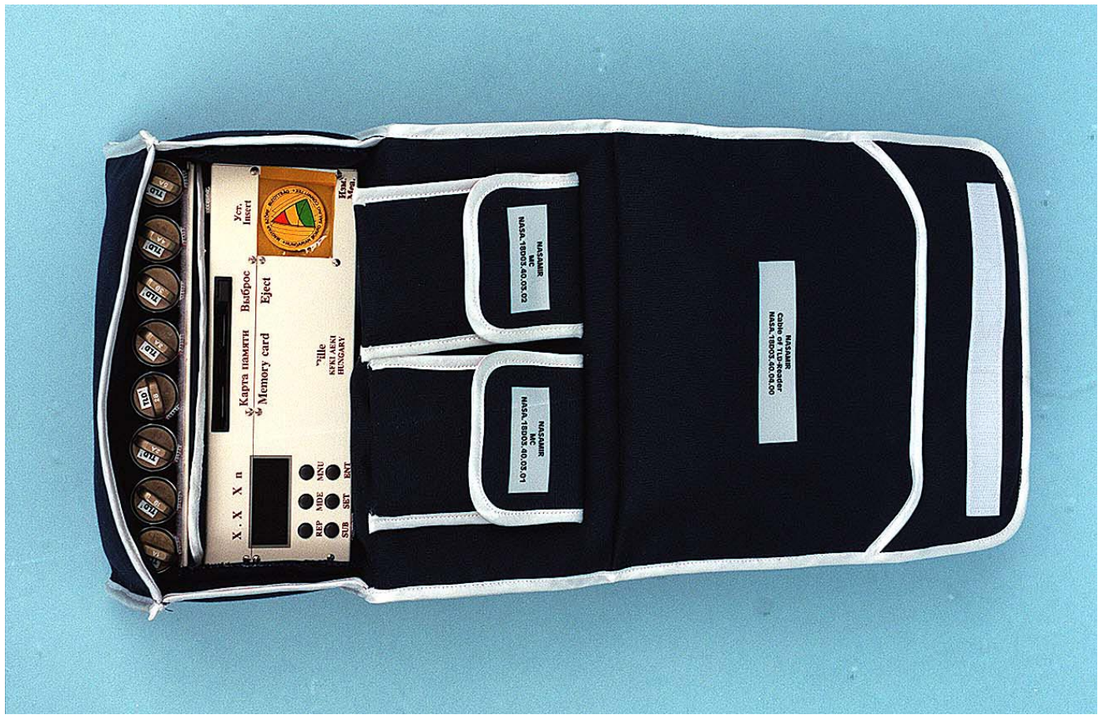
P/N: SED39128677-301
Qty: 1
Mass: 2.53 kg
Power: N/A
x,y,z: 1.90 x 5.99 x 8.99 cm

S96-12128

Figure SMP-110 TLD Bulb

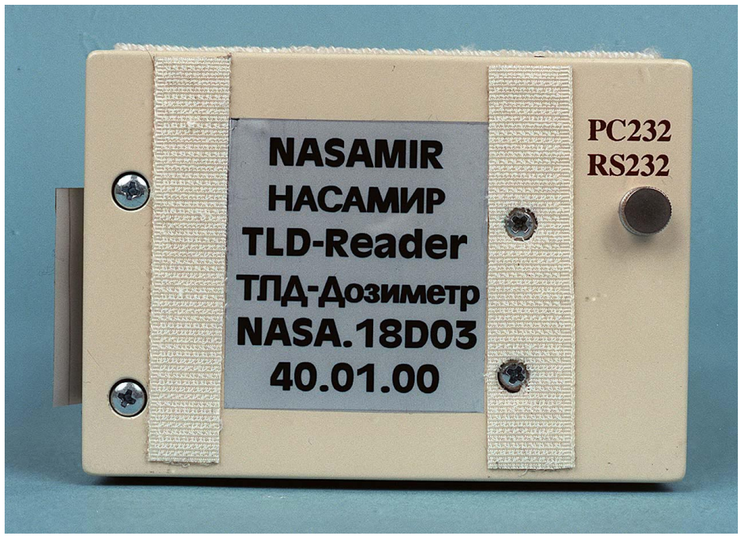
S96-12126

Figure SMP-111 TLD Reader with Bulbs



S96-12155

Figure SMP-112 TLD Kit

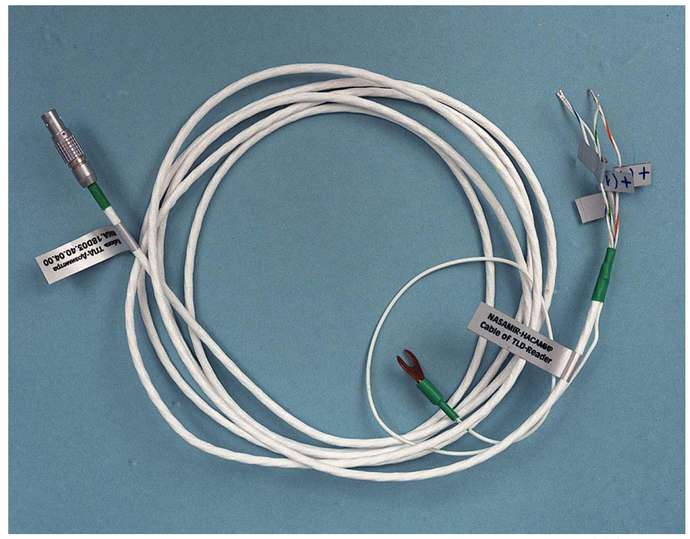


S96-12149

Figure SMP-113 TLD Bottom

S96-12150

Figure SMP-114 TLD Front



S96-12151

Figure SMP-115 Cable of TLD-Reader

other in a 2 x 3 array. Attachment is achieved through the use of Velcro on the pouch sides. The Pouch Assembly is used to transport the APDs to and from their mounting locations in the inside of Mir Station, via the Space Shuttle.

BELT ASSEMBLY

The Belt Assembly is a fabric belt that surrounds the six pouches of the Pouch Assembly. The purpose of the Belt Assembly is to keep the six pouches together and to provide a handle by which to transport the APD Kit. The Belt Assembly attaches to the Pouch Assembly by means of Velcro.

FBI(3) PASSIVE DOSIMETRY IN KVANT 2

The six APDs will be deployed in the Mir Core Module and Kvant-2 Module according to the procedures in the Flight Data File (FDF). The dosimeters will be attached by Velcro. At the end of the mission, the APDs will be retrieved for return to Earth.

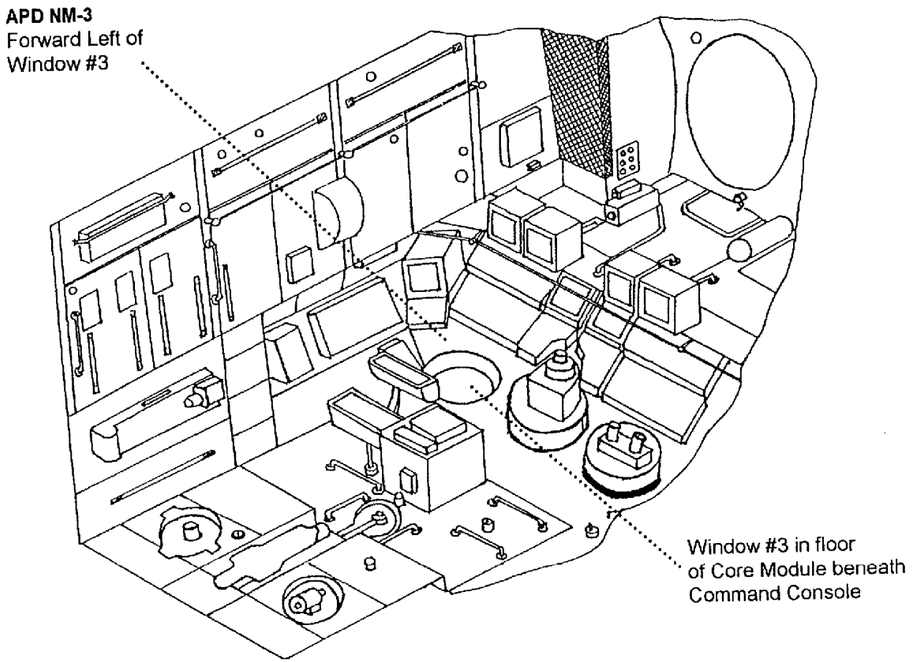


Figure SMP-116 Additional Detail of Location of APS NM-3 in Core Module

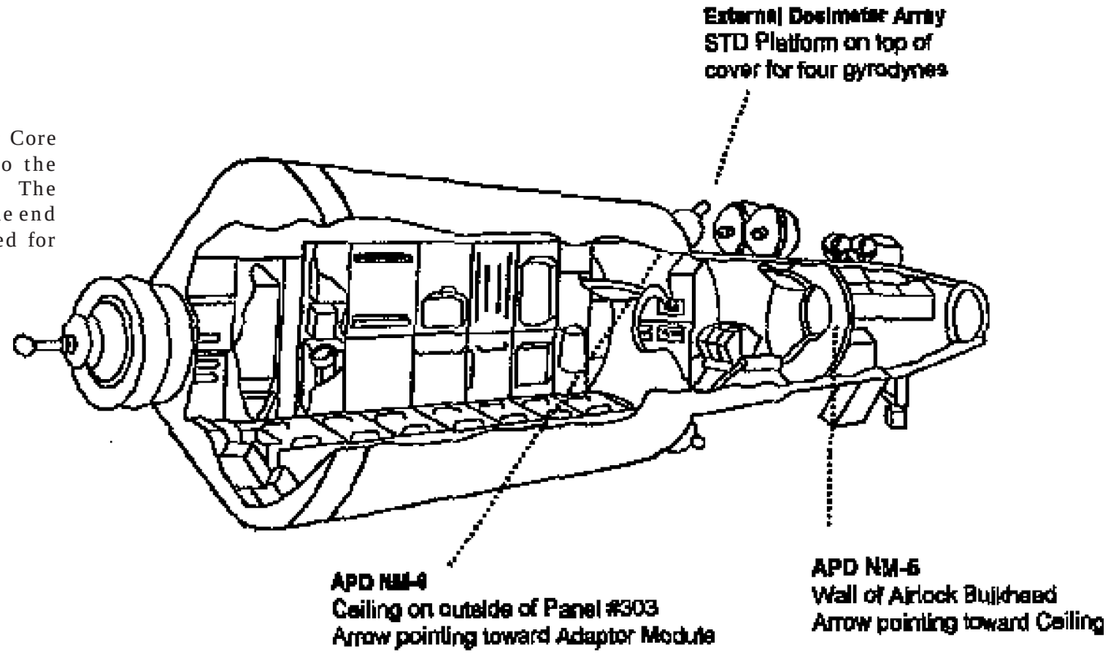


Figure SMP-117 Picture of Passive Dosimeter for Station

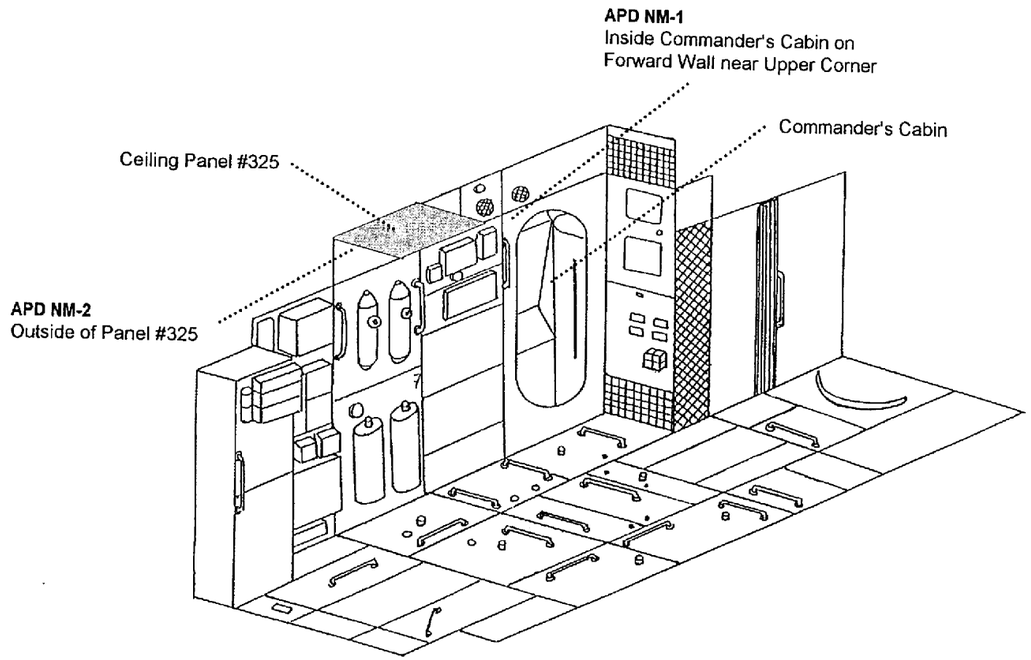


Figure SMP-118 Additional Detail of Locations of APD NM-1 and APD NM-2 in Core Module

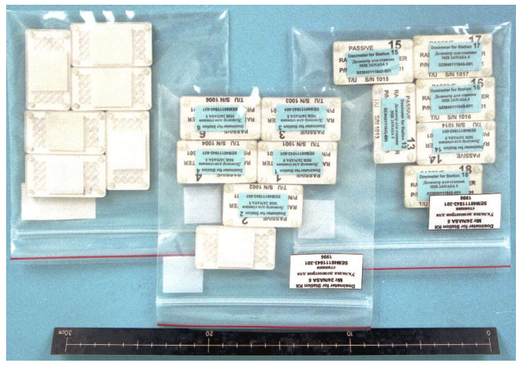
620 AREA PASSIVE DOSIMETRY KIT

P/N: SED39128654-301
Qty: 1
Mass: 3.00 kg
Power: N/A
x,y,z: 20 x 20 x 24.80 cm

PRDS, OR DOSIMETERS FOR STATION (DFS) HARDWARE DESCRIPTION

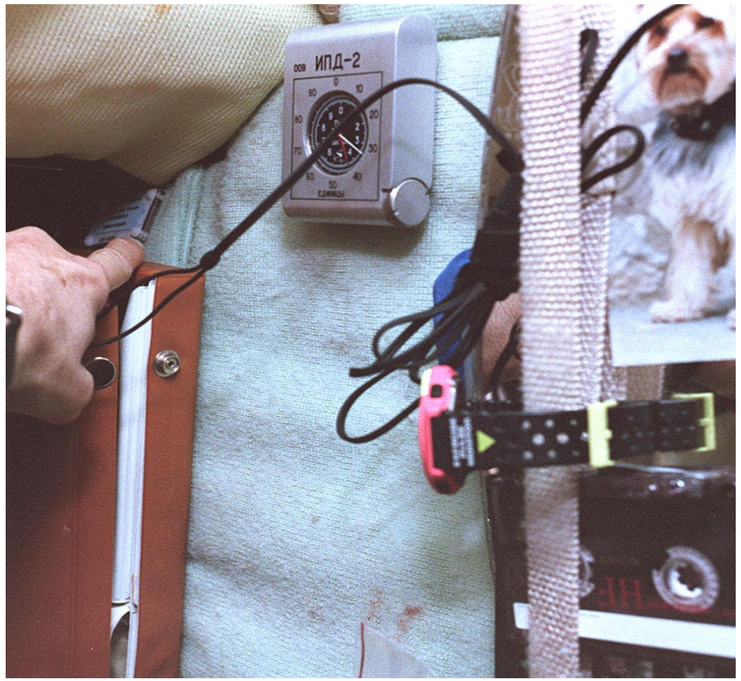
PRDs, also known as Dosimeters for Station (DFS), are identical to the standard shuttle PRDs with the exception of an additional English-Russian SMP label. PRDs are flown in designated locations to document the dose rates throughout the station.

The PRDs are smaller versions of the CPDs, but do not contain the PNTDs.

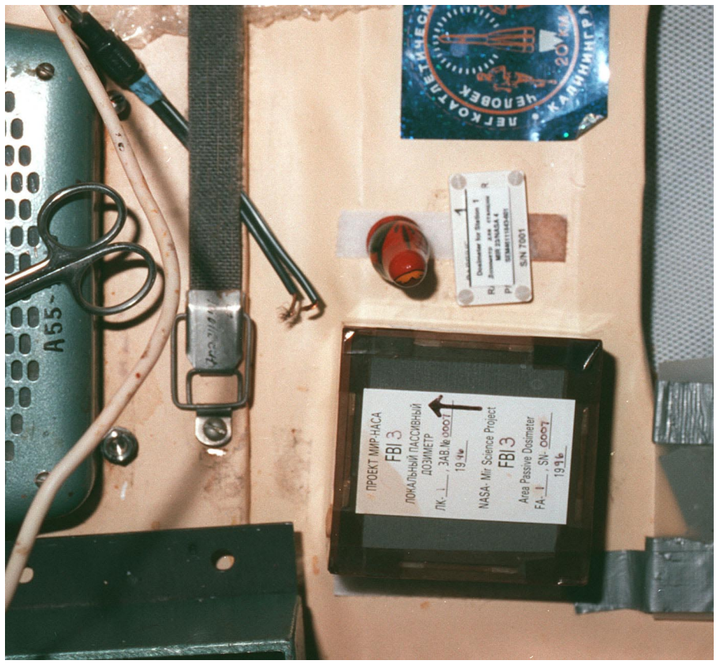


S96-18323
Figure SMP-119 NASA 5 Dosimeter for Station Kits

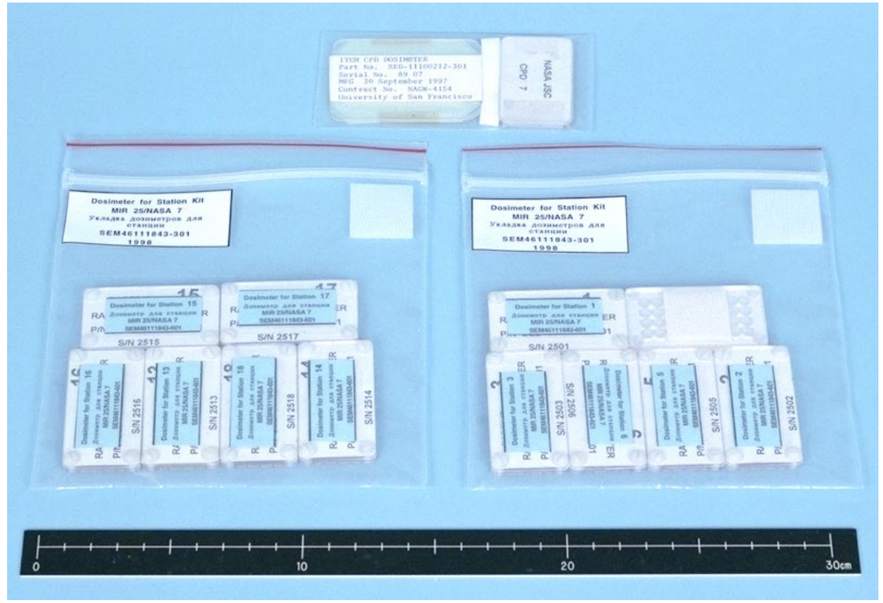
S96-18322
Figure SMP-120 Dosimeter for Station



STS79-347-26
Figure SMP-121 Dosimeter#1 In Cabin Near the Window in the Base Block



NM22-220-11
Figure SMP-123 Dosimeter #4 in the Commander's Cabin Near the Window in the Base Block



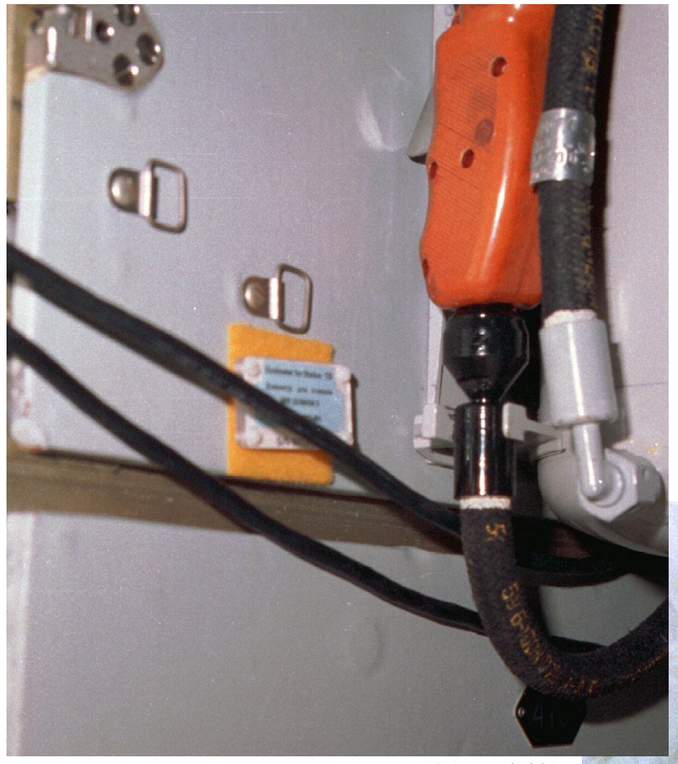
S97-17590
Figure SMP-122 NASA 7 Area Passive Dosimeters

DOSIMETER FOR STATION KIT

P/N: SEM46111843-301
Qty.: 1
Mass: 0.06 kg
Power: N/A
x,y,z: 15.3 x 15.3 x 0.8 cm
Loc: Core, PR
DID#: SLM46114361

INDIVIDUAL PRD

Mass: .01 kg
Power: N/A
x,y,z: 30 x 55 x 0.18 cm

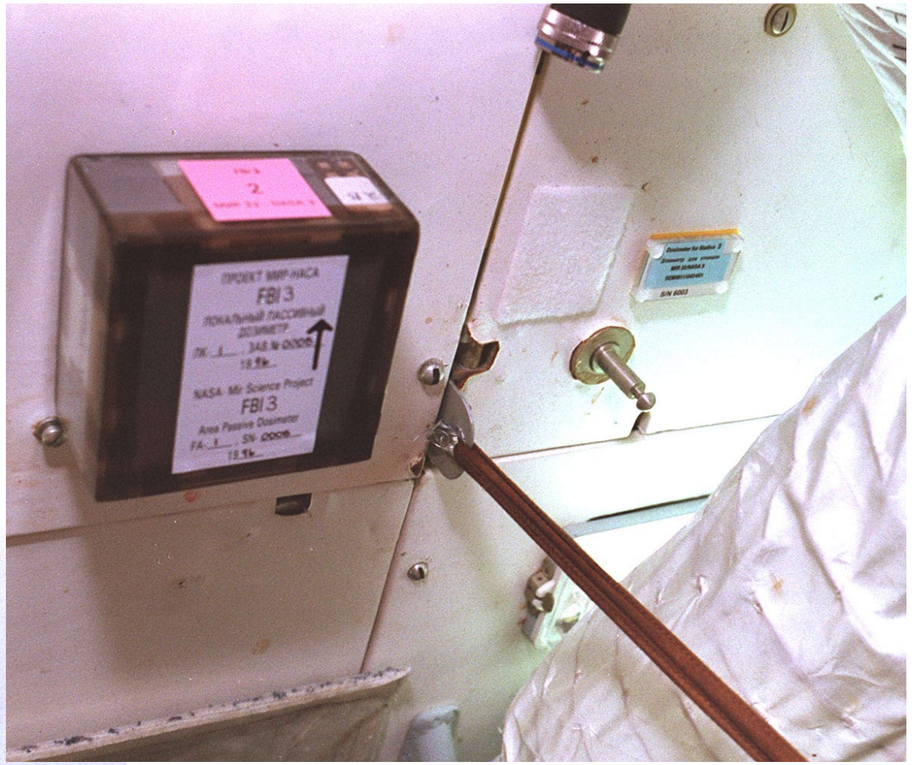


NM22-229-005

Figure SMP-124 Dosimeter by Fire Extinguisher

STS79-347-28

Figure SMP-125 Dosimeter #5 Above Central Post, Panel 307



STS79-347-27

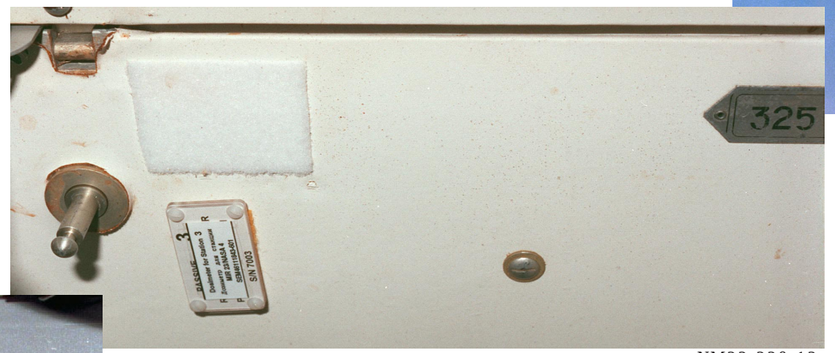
Figure SMP-126 Dosimeter in Mir

NM22-229-007

Figure SMP-128 Dosimeter #16 on Priroda on Panel 218 Symmetrical to the DFS #15

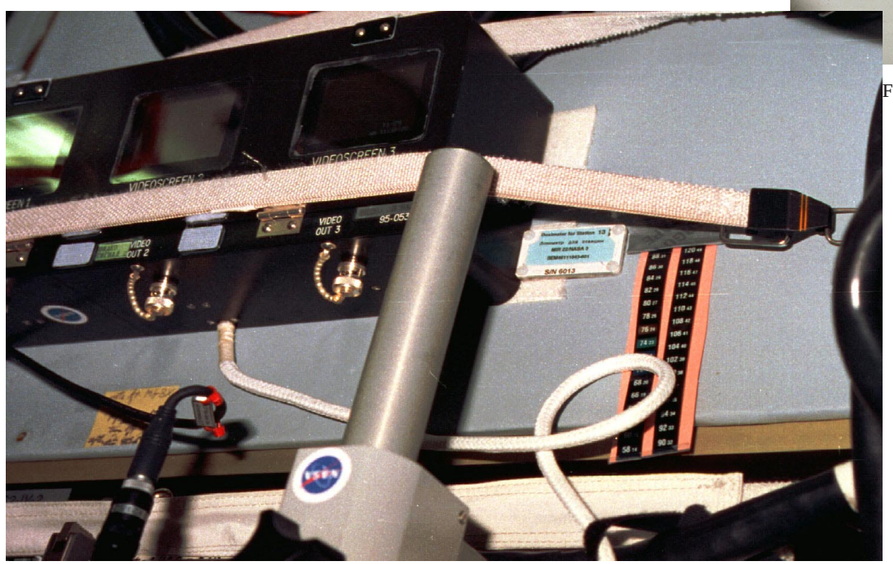
NM22-229-010

Figure SMP-131 Dosimeter #7 on Panel 403 in Spektr Near TEF-2



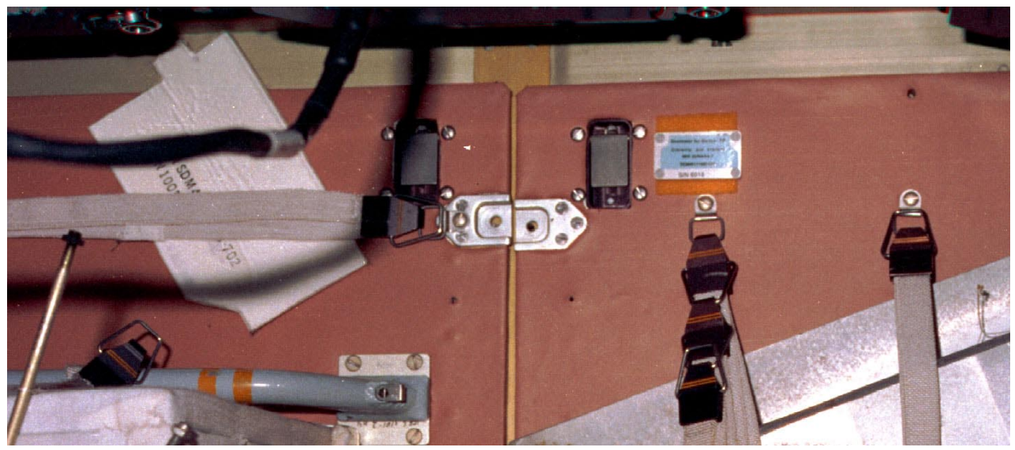
NM22-220-12

Figure SMP-129 Dosimeter #3 in Core Natula Near P-16 on Panel 325



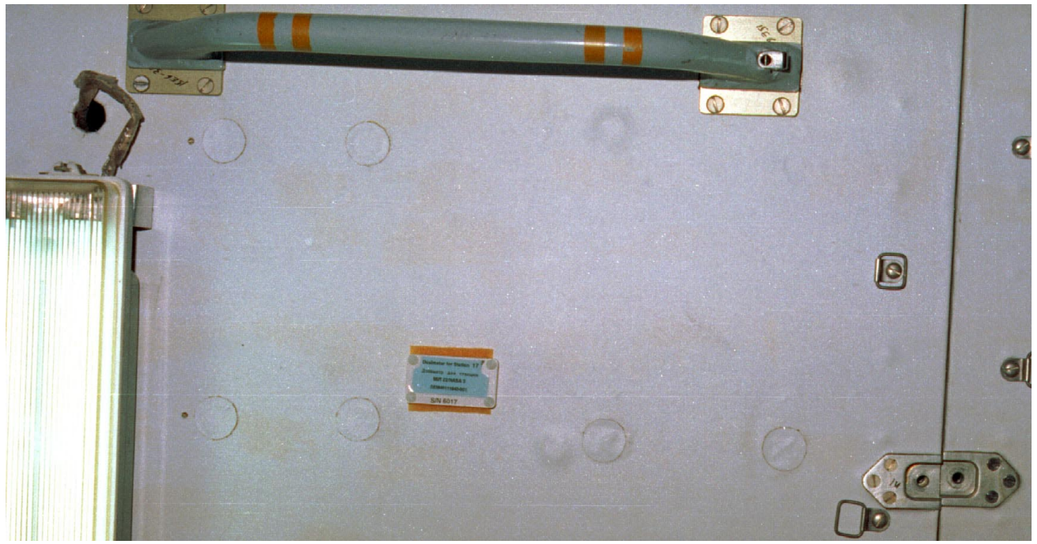
NM22-229-004

Figure SMP-127 Dosimeter #43 Above MGBx Panel 409



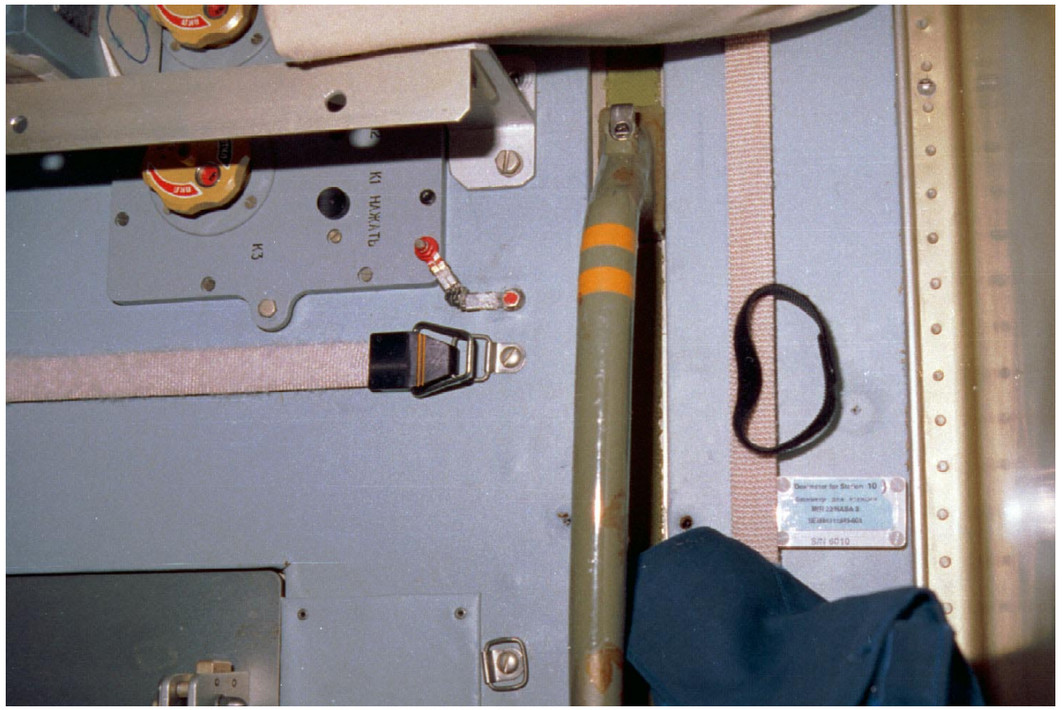
NM22-229-009

Figure SMP-130 Dosimeter #18 on Panel 234 in Upper Left Corner



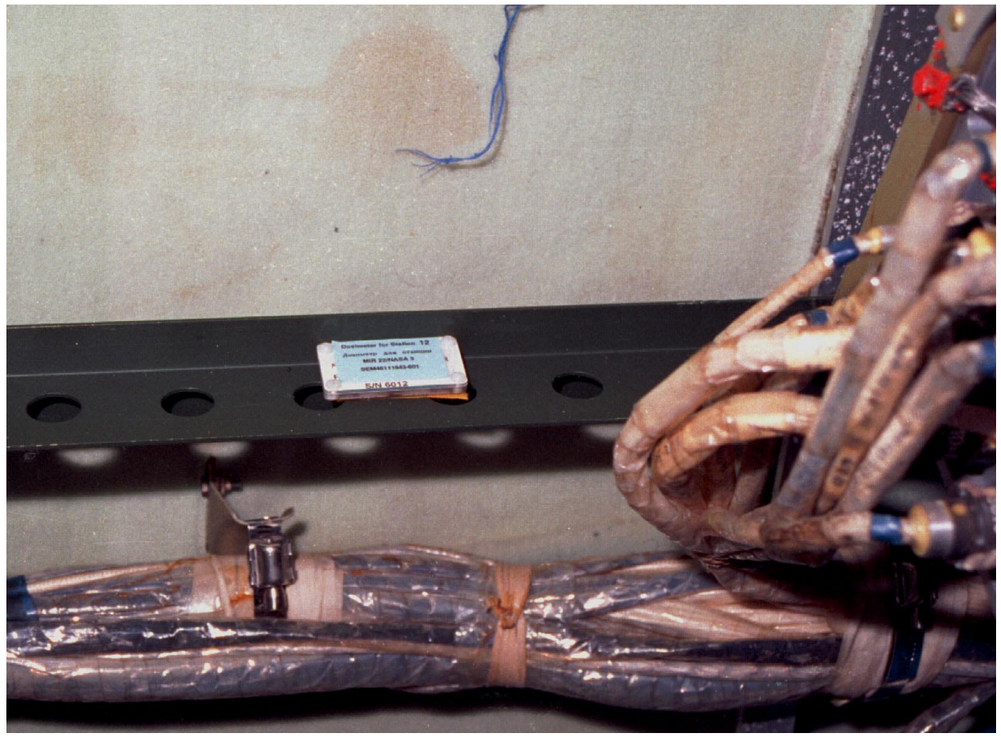
NM22-229-008

Figure SMP-133 Dosimeter #17



NM22-229-014

Figure SMP-132 Dosimeter #10



NM22-229-016

Figure SMP-134 Dosimeter #12

TEPC HARDWARE DESCRIPTION

The TEPC is a tissue equivalent gas proportional radiation detector. It is composed of several subassemblies. The detector unit houses a small right cylindrical volume to house a low pressure hydrocarbon gas (propane) to simulate the mass of a cell. The detector unit also houses signal preamp and conditioning circuits. A six foot cable connects the TEPC detector to the TEPC spectrometer (TEPC-01 #393). The Spectrometer houses the central processing unit, memory cards and communications interface cards. A power cable with an integral power switch connects to the spectrometer (TEPC-02 #5995). (See NASA 7 FDF for drawing.) For downloads to the MIPS-2L, a MIPS "Y" cable (MIPS-2 #1035) is used to provide power to the TEPC and the laptop simultaneously. Finally, an RS-232 cable (TEPC-03 #0489) with an integral optical isolator is used to connect the TEPC spectrometer communication port with the MIPS laptop.

A liquid crystal display (LCD) is used to display TEPC parameters to the operators. During start-up, several screens are shown to inform the operator of key parameters during start-up (e.g., voltages, currents, pulser counts, etc.). Once the start-up is complete, the display will sequentially toggle between 4 displays, as shown in the procedure. These displays indicate current day, time accumulated (or total) dose, dose rate, elapsed time, error flags and errors.

When radiation enters the detector, an electrical pulse is produced that is proportional to the energy loss rate of the particle. The absorbed dose represents the value of the sum of all of the events that have occurred since it was turned on. The spectrometer, however, will classify the radiation energy loss rate or Linear Energy Transfer (LET) required to calculate the appropriate weighting factor to assess the dose equivalent. While the absorbed dose is available from the display, dose equivalent values are obtained from the TEPC data and are available only postflight after processing of the data. Data is ultimately stored on a laptop hard disk or optical disk for return to the ground for final processing. ✵

NM22-190-20

Figure SMP-135 TEPC Cable Connected to the MIPS-2L Near an RBS

NM22-190-18

Figure SMP-136 TEPC in Spektr

NOTE: The old TEPC was lost in Spektr. The new one went up with STS-86.

TEPC KIT

Mass: 3.5 kg
Power: 1.7 W
x,y,z: 29 x 29 x 14.2 cm

CONTINGENCY SPACEFLIGHT-COGNITIVE ASSESSMENT TOOL (S-CAT)

EXPERIMENT DESCRIPTION

S-CAT consists of a series of tests that the crewmember will perform on the MIPS Laptop to determine if there is any decrease in cognitive functioning due to exposure to toxic chemicals (e.g., ethylene glycol) in the Mir environment. It will be used in contingency situations only (at SMP discretion). It is not performed as part of nominal operations.

HARDWARE DESCRIPTIONS

The S-CAT software package will be pre-loaded onto the Mir Interface to Payload Systems Laptop (MIPS-2L) hard drives prior to the mission. Both packages are custom Disk Operating System (DOS) based programs and will be launched using the MIPS menu interface. S-CAT response files will be transferred to the Magneto-Optical Drive (MOD) of the MIPS Controller plus Optical Drive (MIPS-2C). Files will then be set for telemetry to TsUP at the earliest opportunity.

HARDWARE INTERFACE WITH SYSTEMS

To properly run the S-CAT software, the MIPS-2L must be connected to Mir power during each session. For response file transfer to the MOD, the MIPS-2L and MIPS-2C must be connected. ❋