

NASA Facts

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center



NP-1996-07-007JSC
July 1996

Food for Space Flight

The food that NASA's early astronauts had to eat in space is a testament to their fortitude. John Glenn, America's first man to eat anything in the near-weightless environment of Earth's orbit, found the menu to be limited. Other Mercury astronauts had to endure bite-sized cubes, freeze-dried powders, and semi-liquids stuffed in aluminum tubes. Most agreed the foods were unappetizing and disliked squeezing the tubes. Moreover, freeze-dried foods were hard to rehydrate, and crumbs had to be prevented from fouling instruments.

The astronauts complained, and on the Gemini missions eating improved somewhat. The first things to go were the squeeze tubes. Bite-sized cubes were coated with gelatin to reduce crumbling, and the freeze-dried foods were encased in a special plastic container to make reconstituting easier. With improved packaging came improved food quality and menus. Gemini astronauts had such food choices as shrimp cocktail, chicken and vegetables, butterscotch pudding, and applesauce, and were able to select menus themselves.

By the time of the Apollo program, the quality and variety of food increased even further. Apollo astronauts were first to have hot water, which made rehydrating foods easier and improved the food's taste. These astronauts also were the first to use the "spoon bowl," a plastic container that could be opened and its contents eaten with a spoon.

The task of eating in space got a big boost in Skylab. Unlike previous space vehicles for astronauts, Skylab featured a large interior area where space was available for a dining room and table. Eating for Skylab's three-member teams was a fairly normal operation: footholds allowed them to situate themselves around the table and "sit" to eat. Added to the conventional knife, fork, and spoon was a pair



Mission Specialist James Adamson watches as open jars of peanut butter and jelly and a jar lid freefloat in front of mid-deck lockers. Adamson holds a tortilla covered with the two ingredients.

of scissors for cutting open plastic seals. Because Skylab was relatively large and had ample storage area, it could feature an extensive menu: 72 different food items. It also had a freezer and refrigerator, a convenience no other vehicle offered.

Shuttle Food System: The kinds of foods the space shuttle astronauts eat are not mysterious concoctions, but foods prepared here on Earth, many commercially available on grocery store shelves. Diets are designed to supply each shuttle crew member with all the Recommended Dietary Allowances (RDA) of vitamins and minerals necessary to perform in the environment of space. Energy requirements are determined by using a formula provided by the World Health Organization (WHO).



This food kit used by Mercury astronauts includes packets of mushroom soup, juice, cocoa, chicken with gravy, pears, strawberries, beef and vegetables, and other assorted foods.

Shuttle astronauts have an astonishing array of food items from which to choose. They may eat from a standard menu designed around a typical shuttle mission of 8 days, or may substitute items to accommodate their own tastes. Astronauts may even design their own menus. But those astronaut-designed menus must be checked by a dietitian to ensure the astronauts consume a balanced supply of nutrients.

The standard shuttle menu repeats after 7 days. It supplies each crew member with three balanced meals, plus snacks. Each astronaut's food is stored aboard the shuttle and is identified by a colored dot affixed to each package.

Phase I Missions: The food system for the International Space Station (ISS) was initiated with the joint U.S./Russian Mir-18 mission in 1995. The Shuttle-Mir food system consists of one-half Russian and one-half shuttle food. The Russian menu plan, which provides four meals per day, is used. With this plan, three of the meals are designed to be eaten as a planned meal. The fourth "meal" is made up of miscellaneous foods that can be eaten anytime. In this way, the fourth meal of the Russian menu plan is similar to the U.S. pantry on the shuttle. The U.S. provides two meals per day, and Russia provides two. A modified shuttle food warmer is used to heat U.S. foods, since shuttle foods are not compatible with the Russian food heater.

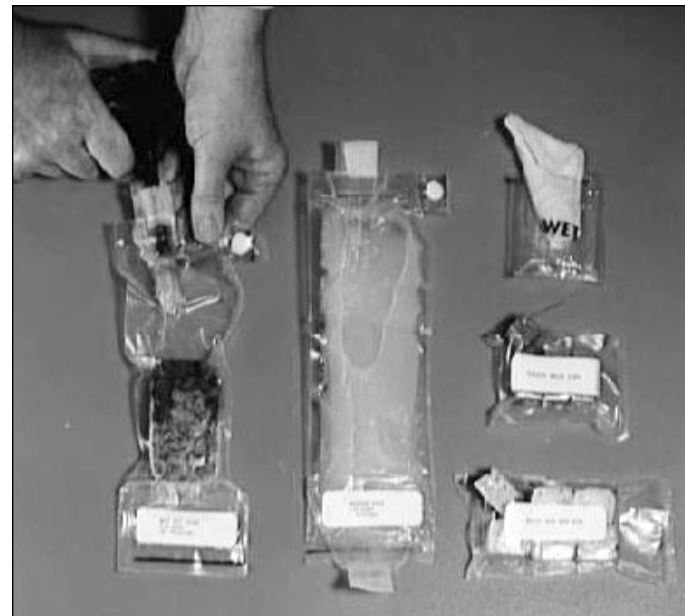
The joint food system was chosen in order to meet nutritional requirements established by technical meetings between Russian and U.S. food specialists.

These nutritional requirements specify lower sodium (3,500 mg) and iron (10 mg) intakes for long duration missions. Russian and shuttle foods complement each other. Russian bread products are very palatable and have a long shelf life. Russian fruit beverages are high in natural fiber. Shuttle foods offer more varieties of vegetables, puddings, and irradiated meats and are lower in sodium and iron. Additional shuttle and Russian foods that are lower in iron and sodium are being developed.

International Space Station Food System:

A comparable joint food system is planned for ISS during the buildup phase until the habitation module is outfitted. Most of the food will be delivered by Russian Progress Supply Ships during the buildup phase. Fresh fruits and vegetables will be delivered with each Progress shipment. After the habitation module galley is outfitted with refrigerators, freezers, and the microwave/convection oven, the operational food system will be established.

The operational food system for ISS will be considerably different from the shuttle food system. Since the electrical power for ISS will be from solar panels, there is no extra water generated onboard. Water will be recycled from the cabin air, but that will not be enough for use in the food system. Most of the food planned for ISS will be frozen, refrigerated, or thermostabilized and will not require the addition of water before consumption. Many of the



Food packets for use on the Gemini 3 flight includes dehydrated beef pot roast, bacon and egg bites, toasted bread cubes, orange juice and a wet wipe. Water is being inserted into the pouch of dehydrated food.



This display shows a portion of Apollo spacesuit helmet, boot, and outer glove. Front row consists of various types of space food in different types of containers.

beverages will be in the dehydrated form. Food will be heated to serving temperature in a microwave/forced air convection oven.

The ISS food system will consist of three different supplies of food: Daily Menu, Missed Resupply, and Extra Vehicular Activity (EVA) food.

Shuttle Food: Weight and volume have always been primary design factors for every piece of hardware launched into space. The shuttle is no exception. Weight allowed for food is limited to 3.8 pounds per person per day which includes the one pound of packaging for each person each day.

Foods are individually packaged and stowed for easy handling in microgravity. All food is precooked or processed so it requires no refrigeration and is either ready to eat or can be prepared simply by adding water or by heating. The only exceptions are the fresh fruit and vegetables stowed in the fresh food locker. Since there is no refrigeration, rehydratable food and beverages require the addition of water before consumption. Fresh foods such as carrots and celery must be eaten within the first two days of the flight or they will spoil.

Rehydratable (R) Food: Rehydratable items include both foods and beverages. One way weight can be conserved during launch is to remove water in the food system. During the flight, water is added back to the food just before it is eaten. The shuttle orbiter fuel cells, which produce electricity by combining hydrogen and oxygen, provide ample water for rehydrating foods as well as drinking and a host of other uses.

Foods packaged in rehydratable containers include soups like chicken consommé and cream of mushroom; casseroles like macaroni and cheese and rice and chicken; appetizers like shrimp cocktail; and breakfast foods like scrambled eggs and cereals. Breakfast cereals are prepared by packaging the cereal in a rehydratable package with nonfat dry milk and sugar, if needed. Water is added to the package just before the cereal is eaten.

Thermostabilized (T) Food: Thermostabilized foods are heat processed to destroy harmful microorganisms and enzymes. Individual servings of thermostabilized foods are commercially available in aluminum or bimetallic cans, plastic cups, or in flexible retort pouches. Most of the fruits, and fish such as tuna and salmon, are thermostabilized in cans. The cans have easy-open, full-panel, pull-out lids. Puddings are packaged in plastic cups. Most of the entrees are packaged in flexible retort packages. This includes products such as beef tips with mushrooms, tomatoes and eggplant, grilled chicken and ham. After the pouches are heated, they are cut open with scissors. The food is eaten directly from the containers with conventional eating utensils.

Intermediate Moisture (M) Foods: Intermediate moisture foods are preserved by restricting the amount of water available for microbial growth, while retaining sufficient water to give the food a soft texture and let it be eaten without further preparation. Water is removed or its activity restricted with a water-binding substance such as sugar or salt. Intermediate moisture foods usually range from 15 to 30 percent moisture, but the water present is chemically bound with the sugar or salt and is not available to support microbial growth. Dried peaches, pears, and apricots, and dried beef are examples of this type of shuttle food.

Natural Form (NF) Foods: Foods such as nuts, granola bars, and cookies are classified as natural form foods. They are ready to eat, packaged in flexible pouches, and require no further processing for consumption in flight. Both natural form and intermediate moisture foods are packaged in clear, flexible packages that are cut open with scissors.

Irradiated (I) Meat: Beef steak and smoked turkey are the only irradiated products currently used on the shuttle. The food is cooked, packaged in flexible, foil-laminated pouches, and sterilized by exposure to ionizing radiation so they are stable at ambient temperature.



STS-38 Pilot Frank Culbertson, holding spoon to his mouth, prepares to take a bite of food. Mission Specialist Charles Gemar licks his upper lip in anticipation of his next bite of space shuttle cuisine.

Condiments: Condiments include commercially packaged individual pouches of catsup, mustard, mayonnaise, taco sauce, and hot pepper sauce. Polyethylene dropper bottles contain bulk supplies of liquid pepper and liquid salt. The pepper is suspended in oil, and the salt is dissolved in water.

Shelf Stable Tortillas: Flour tortillas are a favorite bread item of the shuttle astronauts. Tortillas provide an easy and acceptable solution to the bread crumb and microgravity handling problem, and have been used on most shuttle missions since 1985. However, mold is a problem with commercially packaged tortillas on missions.

A shelf-stable tortilla was developed for use on the shuttle with extended mission lengths. The tortillas are stabilized by a combination of modified atmosphere packaging, pH (acidity), and water activity. Mold growth is inhibited by removing the oxygen from the package. This is accomplished by packaging in a high-barrier container in a nitrogen atmosphere with an oxygen scavenger.

Astronaut Menu Selection: Food evaluations are conducted approximately eight to nine months before flight. During the food evaluation sessions, the astronaut is given the opportunity to sample a variety of foods and beverages available for flight. A packet of information is given to each astronaut to use in planning their personal preference menus. Included in the packet is a standard menu, training

menu, past flight menus the astronaut has chosen, and the baseline shuttle food and beverage list.

Shuttle astronauts select their menu approximately five months before flight. The menus are analyzed for nutritional content by the shuttle dietitian, and recommendations are made to correct any nutrient deficiencies based on the RDA. The menus are then finalized and provided to the Flight Equipment Processing Contractor (FEPC) in Houston three months before launch. The FEPC processes, packages, and stows the food in shuttle lockers before it is transferred to Kennedy Space Center.

Station Food: Foods chosen for the daily menus were selected based on their commonality to everyday eating, the nutritional content, and their applicability to use in space. The daily menu food supply is based on the use of frozen, refrigerated, and ambient foods. Frozen food includes most entrees, vegetable, and dessert items. Refrigerated food includes fresh and fresh-treated fruits and vegetables, extended shelf-life refrigerated foods, and dairy products. Ambient food includes thermostabilized, aseptic-fill, shelf-stable natural form foods, and rehydratable beverages.

Astronauts will choose 28-day flight menus approximately six months prelaunch. Additions, deletions, or substitutions to a standard ISS menu will be made using an ISS food list.

The packaging system for the Daily Menu food is based on single-service, disposable containers. Food items will be packaged as individual servings to facilitate inflight changes and substitutions to preselected



Enjoying a meal on the shuttle middeck are astronauts Robert Parker (foreground), Ronald Parise and Vance Brand. Parker spoons up a bite from his food container as Parise lets a spoonful freefloat into his open mouth and Brand balances his meal tray assembly.



Astronaut James Wetherbee prepares to open a can while a packet of whole wheat tortillas floats in front of him.

menus. Single service containers also eliminate the need for a dishwasher. A modular concept that maintains a constant width dimension is utilized in the package design. This design permits common interface of food packages with restraint mechanisms (stowage compartments, oven, etc.) and other food system hardware such as the meal tray. Five package sizes were designed to accommodate common serving sizes of entrees, salads, soups, and dessert items. Several fresh fruits, bread, and condiments will be provided in bulk packages.

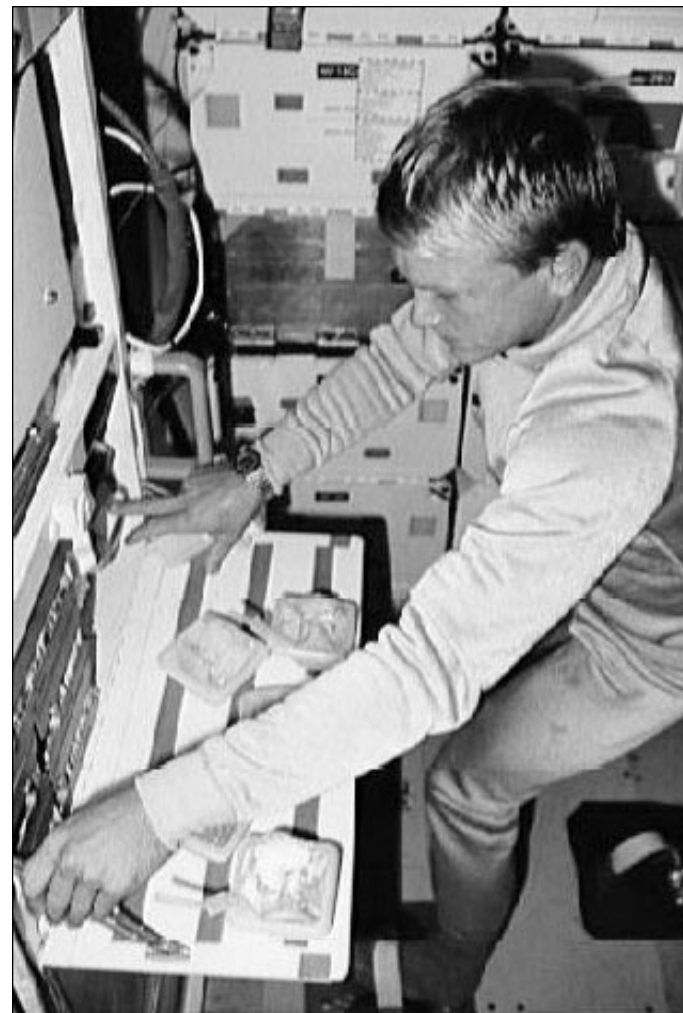
Food will be delivered to the ISS by the Mini-Pressurized Logistics Module (MPLM). The MPLM will have ambient, refrigerated, and frozen food storage capabilities. Food will be transferred from the MPLM to the Habitation Module at 90-day intervals.

Meal preparation and consumption will involve a series of steps. A general meal scenario is as follows:

1. Collect meal tray and utensils.
2. Display preselected meal on the computer.
3. Locate food using location display function.
4. Prepare food items for heating.
5. Place items to be heated in oven.
6. Enter cook control codes and press "start."
7. Rehydrate beverages.
8. Place beverages on meal tray.
9. Retrieve refrigerated foods.
10. Place refrigerated food in meal tray.
11. Retrieve items from oven.
12. Place heated foods in meal tray.

13. Eat.
14. Place used containers in trash compactor.
15. Clean and stow meal tray and utensils.

Missed Resupply Food: The missed resupply food system is provided to sustain crew members for 45 days under emergency operating conditions resulting from a missed resupply or an on-board failure. A goal of the system is to utilize a minimal amount of volume and weight. The missed resupply food system is independent of the daily menu food and will provide at least 2000 calories daily per person. The missed resupply food system will be stored at ambient temperatures which range from 60 to 85 degrees Fahrenheit. Therefore, the food must be shelf-stable. Thermostabilized entrees and fruits, intermediate moisture foods, and dehydrated foods and beverages will be used to meet the shelf-stable requirement. The shelf life of each food item will be a minimum of two years.



Astronaut George Nelson positions himself in front of the orbiter galley to prepare a meal. Beverage containers are velcroed to the galley shelf as he rehydrates a food package.



Astronaut Rhea Seddon “sits” down to a meal in the mid-deck. The tray, containing packets of food and portions of an orange, rests on her knee.

EVA Food: EVA food consisting of food and drink for eight hours (500 calories of food and 38 ounces of water) will be available for use by crew members during each EVA activity. EVA water and food containers will be cleaned and refilled with galley subsystems.

Food Research and Development: Foods flown on space missions are researched and developed at the Food Systems Engineering Facility (FSEF) at the NASA Johnson Space Center. The FSEF is staffed by food scientists, dietitians, and engineers who support both the shuttle and ISS food systems. Foods are analyzed for use on the shuttle through nutritional analysis, sensory evaluation,

freeze drying, rehydration, storage studies, packaging evaluations, and many other methods. A food item is added to the menu only after it has undergone all the necessary research and development and is approved for flight.

Shuttle Food Lockers: Meals are stowed aboard the orbiter in locker trays with food packages arranged in the order they will be used. A label on the front of the locker tray lists the locker contents. A five-section net restraint keeps food packages from floating out of the tray in microgravity while still allowing items inside to be seen. Velcro strips secure sections of the net, making it easily opened and the food items readily accessible to the astronauts.

Food is packaged and stowed in the locker trays in Houston about a month before each launch. Stowed food lockers and shipping containers are kept under refrigeration. About three weeks before the launch, the food lockers are shipped to KSC in Florida. There they are refrigerated until they are installed in the shuttle two to three days before launch. Besides the meal and pantry food lockers, a fresh food locker is packed at KSC and installed on the shuttle 18 to 24 hours before launch. The fresh food locker may contain tortillas, fresh bread, breakfast rolls, and fresh fruits and vegetables such as apples, bananas, oranges, and carrot and celery sticks.

Pantry: A supplementary food supply that provides approximately 2100 Kilocalories per person for two extra days is stowed aboard the shuttle for each flight. Pantry items are flown in addition to the menu in case the flight is unexpectedly extended because of bad weather at the landing site or some other unforeseen reason. During the flight, this food supply provides extra beverages and snacks. The pantry items also can be exchanged for menu items in flight, but all unopened food packages are retained in the pantry so they will be available in case they are needed later.

The length of shuttle missions has steadily increased from the first mission in 1981 of 2 days to 16 days for STS-78 in July 1996. In order to accommodate the weight and volume of trash generated by the food system on longer missions, it was necessary to develop new food and beverage packages. A trash compactor also was developed to reduce the volume of the trash, and the new packages were designed to be compatible with the compactor.

The beverage package is made from a foil laminate to provide maximum barrier properties for a



Astronaut Thomas Akers rehydrates a grapefruit drink using the galley on the middeck of the shuttle.

longer product shelf life. A septum adapter is sealed in the package after the beverage powder has been added. The septum adapter holds a septum that interfaces with the galley water dispenser for the addition of water, and with a straw for drinking the beverage. Although the beverage package was designed for use on Extended Duration Orbiter (EDO) missions, it has replaced the square polyethylene beverage package on all shuttle missions.

The EDO rehydratable food package also is made from flexible material to aid in trash compression. The rehydratable package consists of a flexible bowl and lid with the septum adapter for adding water from the galley. Velcro on the bottom of the package holds it in the meal tray. After adding the required amount of water to the package, it is placed in the oven if the food is to be served hot, or directly onto the serving tray if it is to be served cold. The top of the package is cut off with a knife or scissors and the contents eaten with a fork or spoon. The EDO rehydratable food package was tested on STS-44 and used for all of the rehydratable foods on STS-49 and 50. It has now permanently replaced the rigid square rehydratable package.

Food Preparation: On the space shuttle, food is prepared at a galley installed on the orbiter's mid-deck. The galley is a modular unit that contains a water dispenser and an oven. The water dispenser is used for rehydrating foods, and the galley oven is for warming foods to the proper serving temperature.

The shuttle galley was redesigned in 1991 to reduce the weight and volume and to update the

electronics. The redesigned galley weighs one-third less and occupies one-half the volume of the original galley. The new galley delivers hot or cold water from the rehydration station. The hot water temperature is between 155 and 165 degrees Fahrenheit. The hot and cold dispense quantities can be selected in one-half ounce increments up to eight ounces.

The forced air convection oven heats food and beverages by conduction with a hot plate or by forced convection. The temperature of the oven is maintained at 160 to 170 degrees Fahrenheit. The oven holds 14 rehydratable packages plus several thermostabilized pouches and beverages.

ALMOST LIKE EATING AT HOME

During a typical meal in space, a meal tray is used to hold the food containers. The tray can be attached to an astronaut's lap by a strap or attached to a wall. The meal tray becomes the astronaut's dinner plate and enables him or her to choose from several foods at once, just like a meal at home. Without the tray, the contents of one container must be completely consumed before opening another. The tray also holds the food packages in place and keeps them from floating away in the microgravity of space.

Conventional eating utensils are used in space. Astronauts use knife, fork, and spoon. The only unusual eating utensil is a pair of scissors used for cutting open the packages. Following the meal, food containers are discarded in the trash compartment below the mid-deck floor. Eating utensils and food trays are cleaned at the hygiene station with pre-moistened towelettes.



Astronaut Jeffrey Hoffman, wearing microphone, briefs representatives from the Italian Space Agency on the galley area of the space station mockup habitation module.

Crews have reported that the shuttle food system functions well in space. It consists of familiar, appetizing, well-accepted food items that can be prepared quickly and easily. A full meal for a crew of four can

be set up in about five minutes. Reconstituting and heating the food takes an additional 20 to 30 minutes—about the time it takes to fix a snack at home, and far less than it takes to cook a complete meal.

TYPICAL SHUTTLE MENU SELECTION

DAY ONE

Meal A

Dried Peaches (IM)
Cornflakes (R)
Orange-Pineapple Drink (B)
Cocoa (B)

Meal B

Ham (T)
Cheese Spread (T)
Tortilla (FF) X2
Pineapple (T)
Cashews (NF)
Strawberry Drink (B) X2

Meal C

Chicken ala King (T)
Turkey Tetrazzini (R)
Cauliflower w/cheese (R)
Brownie (NF)
Grape Drink (B)

DAY FIVE

Meal A

Dried Pears (IM)
Sausage Pattie (R)
Mexican Scrambled Eggs (R)
Grits w/Butter (R)
Orange Juice (B)

Meal B

Meal B
Salmon (T)
Tortilla (FF) X2
Pears (T)
Chocolate Covered Cookies (NF)
Lemonade (B) X2

Meal C

Meal C
Beef Tips w/Mushrooms (T)
Noodles & Chicken (R)
Creamed Spinach (R)
Peaches (T)
Granola Bar (NF)
Tea w/Lemon (B)

DAY TWO

Meal A

Dried Pears (IM)
Beef Patties (R)
Scrambled Eggs (R)
Vanilla Instant Breakfast (B)
Orange Juice (B)

Meal B

Peanut Butter (T)
Apple or Grape Jelly (T)
Tortilla (FF) X2
Fruit Cocktail (T)
Trail Mix (IM)
Peach-Apricot Drink (B)

Meal C

Frankfurters (T)
Macaroni and Cheese (R)
Gr. Beans w/Mushrooms (R)
Peach Ambrosia (R)
Tropical Punch (B)

DAY SIX

Meal A

Dried Apricots (IM)
Granola w/Blueberries (R)
Orange-Grapefruit Drink (B)

Meal B

Chicken Salad Spread (T)
Crackers (NF) X2
Chocolate Pudding (T)
Butter Cookies (NF)
Lemonade (B) X2

Meal C

Sweet 'n Sour Beef (T)
Rice Pilaf (R)
Broccoli au Gratin (R)
Vanilla Pudding (T)
Apple Cider (B)

DAY THREE

Meal A

Dried Apricots (IM)
Breakfast Roll (FF)
Chocolate Instant Breakfast
Drink (B)
Grapefruit Juice (B)

Meal B

Turkey Salad Spread (T)
Tortilla (FF) X2
Peaches (T)
Granola Bar (NF)
Lemonade (B) X2

Meal C

Spaghetti w/Meat Sauce (R)
Italian Vegetables (R)
Butterscotch Pudding (T)
Orange Drink (B)

DAY SEVEN

Meal A

Dried Pears (IM)
Beef Pattie (R)
Seasoned Scrambled Eggs (R)
Oatmeal w/Brown Sugar (R)
Orange Juice (B)

Meal B

Tuna (T)
Tortilla (FF) X2
Banana Pudding (T)
Shortbread Cookies (NF)
Almonds (NF)
Grape Drink (B) X2

Meal C

Shrimp Cocktail (R)
Beef Steak (I)
Potatoes au Gratin (R)
Asparagus (R)
Strawberries (R)
Lemonade (B)

DAY FOUR

Meal A

Dried Peaches (MI)
Bran Chex (R)
Orange-Mango Drink (B)
Cocoa (B)

Meal B

Dried Beef (IM)
Cheese Spread (T)
Applesauce (T)
Peanuts (NF)
Tropical Punch (B) X2

Meal C

Teriyaki Chicken (R)
Rice and Chicken (R)
Green Beans & Broccoli (R)

Abbreviations

(B) Beverages
(Rehydratable)
(FF) Fresh Food
(I) Irradiated
(IM) Intermediate
Moisture
(NF) Natural Form
(R) Rehydratable
(T) Thermostablized

BASELINE SHUTTLE FOOD AND BEVERAGE LIST

Beef,

Beef Pattie (R)
Beef Steak (I)
Beef Stroganoff w/Noodles (R)
Beef Tips w/Mushrooms (T)

Bread (FF)

Breakfast Roll (FF)

Brownies (NF)

Candy

Coated Chocolates (NF)
Coated Peanuts (NF)
Gum (NF)
Life Savers (NF)

Cereal

Bran Chex (R)
Cornflakes (R)
Granola (R)
Granola w/Blueberries (R)
Granola w/Raisins (R)
Grits w/Butter (R)
Oatmeal w/Brown Sugar (R)
Oatmeal w/Raisins (R)
Rice Krispies (R)

Cheddar Cheese Spread (T)

Chicken,

Chicken Pattie (R)
Chicken Salad Spread (T)
Chicken, Sweet 'n Sour (R)
Chicken, Teriyaki (R)

Cookies,

Butter (NF)
Chocolate Covered (NF)
Shortbread (NF)

Crackers, Butter (NF)

Eggs,

Scrambled (R)
Mexican Scrambled (R)
Seasoned Scrambled (R)

Frankfurters (T)

Fruit,

Apple, Granny Smith (FF)
Apple, Red Delicious (FF)
Applesauce (T)
Apricots, Dried (M)
Banana (FF)
Cocktail (T)
Orange (FF)
Peach Ambrosia (R)
Peaches, Diced (T)

Peaches, Dried (M)

Pears, Diced (T)
Pears, Dried (IM)
Pineapple (T)
Strawberries (R)

Granola Bar (NF)

Ham,

Ham Salad Spread (T)

Jelly,

Apple (T)
Grape (T)

Macaroni & Cheese (R)

Noodles and Chicken (R)

Nuts,

Almonds (NF)
Cashews (NF)
Macadamia (NF)
Peanuts (NF)
Trail Mix (IM)

Peanut Butter (T)

Potatoes au Gratin (R)

Puddings,

Banana (T)
Butterscotch (T)
Chocolate (T)
Tapioca (T)
Vanilla (T)

Rice,

Rice and Chicken (R)
Rice Pilaf (R)

Salmon (T)

Sausage Pattie (R)

Shrimp Cocktail (R)

Soups,

Chicken Consommé (R)
Mushroom (R)
Rice & Chicken (R)

Spaghetti w/Meat Sauce (R)

Tortillas (FF)

Tuna,

Tuna (T)
Tuna Salad Spread (T)

Turkey,

Turkey Salad Spread (T)
Turkey Tetrazzini (R)

Vegetables,

Asparagus (R)
Broccoli au Gratin (R)
Carrot Sticks (FF)
Cauliflower w/Cheese (R)
Celery Sticks (FF)
Green Beans & Broccoli (R)
Gr. Beans w/Mushrooms (R)
Italian (R)
Spinach, Creamed (R)
Tomatoes & Eggplant (T)

Condiments

Catsup (T)
Mayonnaise (T)
Mustard (T)
Pepper (Liquid)
Salt (Liquid)
Tabasco Sauce (T)
Taco Sauce (T)

Abbreviations

(FF) Fresh Food
(I) Irradiated
(IM) Intermediate Moisture
(NF) Natural Form
(R) Rehydratable
(T) Thermostabilized

BASELINE SHUTTLE FOOD AND BEVERAGE LIST (continued)

Beverages (B)

Apple Cider

Cherry Drink w/A/S

Cocoa

Coffee

Black

w/A/S

w/Cream

w/Cream & A/S

w/Cream & Sugar

w/Sugar

Coffee (Decaffeinated)

Black

w/A/S

w/Cream

w/Cream & A/S

w/Cream & Sugar

w/Sugar

Coffee (Kona)

Black

w/A/S

w/Cream

w/Cream & A/S

w/Cream & Sugar

w/Sugar

Grape Drink

Grape Drink w/A/S

Grapefruit Drink

Instant Breakfast,

Chocolate

Strawberry

Vanilla

Lemonade

Lemonade w/A/S

Lemon-Lime Drink

Orange Drink

Orange Drink w/A/S

Orange-Grapefruit Drink

Orange Juice

Orange-Mango Drink

Peach-Apricot Drink

Pineapple Drink

Strawberry Drink

Tea,

Plain

w/A/S

w/Cream

w/Lemon

w/Lemon & A/S

w/Lemon & Sugar

w/Sugar

Tropical Punch

Tropical Punch w/A/S

Abbreviations

A/S Artificial Sweetener

(B) Rehydratable Beverage

(T) Thermostabilized