International Space Station Essay, Research Paper

International Space Station

A Research Paper By S. Francisco

The ISS is a joint effort between fifteen countries, including the US, Russia, Japan, Canada and many others. This station represents a putting aside of differences in the interests of peace and knowledge, a true step toward a more perfect world.

The Canadian addition to the International Space Station (ISS) is the Mobile Servicing System (MSS). The purpose of the MSS is service and repair by means of robotics. There are three main parts to the system, the Space Station Robotic Manipulator System (SSRMS), the Mobile Base System (MBS), and the Special Purpose Dexterous Manipulator (SPDM). The SSRMS is like the robotic arm on the space shuttle Endeavor, only bigger and better. It is seventeen feet long and has a total of seven joints. The SSRMS is self-relocatable via the MBS. The MBS is a work platform on rails that provides lateral mobility along the length of the station. The SPDM is a small two armed robot that has been nick-named the Canada Hand. The Hand is specially designed for delicate assembly and repair of the space station. It s purpose is to take the place of astronauts on space walks, and in doing so reduce risk to the astronauts.

The United States major contribution will be the laboratory. Our lab will be the centerpiece of the station where zero-g experiments will help to enhance our understanding of our universe. The lab will be twenty-eight feet long and fourteen feet in diameter. It will be in three segments with two cones on the ends that will serve as docks for the other modules. A window with a twenty inch diameter will be placed on one side of the center segment. The lab will have thirteen places designed for holding experiments with a total of a twenty-four rack capacity. This module will be able to accommodate pressurized payloads. The lab is set to be launched on flight 5A aboard the Endeavor no earlier than August, 2000.

The Unity node, which is also a US contribution, will be a crossroads for many people as the main passageway. The node will have connections for the US Lab, the Zarya Control Module, the TransHab Module and an airlock. It will have six docks for modules in addition to the aforementioned airlock. It will be delivered with a Prefit Mating Adapter (PMA1). The PMA1 will be attached to the Zarya Control Module which will already be in orbit when the Unity node is launched.

The X-38, another US development, is our replacement for the outdated Soyuz capsules. It will be a temporary measure, only being there for a few years, but will serve the capacity of an evacuation vessel. There are two reasons for building the X-38. The first is simply to prove that we can build a low cost, reusable return vessel; the second reason is to prove we can cut back prices. For example, the X- series originally cost around 2 billion dollars, but recent methods of cutting back have reduced it to under 90 million. This is achieved by: one, the X-38 uses the body designs from other craft, and two, the parts are being obtained over the counter, from other projects, so we don t have to create the technology from scratch. The X-38 has been termed the pick-up truck of the ISS. Until we finish the X-38, a Russian Soyuz capsule will be on the space station.

The Russian component of the ISS is the Zarya Control Module, also known as the FGB. The reason it is FGB and not ZCM is that FGB stands for something in Russian, not English. The purpose of the FGB will be to provide power and propulsion for the station. More specifically, it will provide orientational control, communications and electrical power to the other modules. It was launched in November of 1998. Later, the Russians will send up a better station core and the Zarya will be used for storage space and external fuel tanks. Zarya is to be forty-one point two feet long and thirteen point five feet wide with a lifespan of approximately fifteen years. The module will average about three kilowatts of power per hour and can perform remote or automated piloting. The module also has side docks for the Soyuz capsule and for the Progress, an unpiloted resupply craft. The solar panels will be thirty-five feet long and eleven feet wide; the Zarya will also carry six tons of propellant in sixteen tanks. The propulsion system consists of twenty-four large and twelve small jets for orientation and two engines for boosting and major orbital changes. Construction of the FGB began in December of 1994 and it was ready for launch preparation in January of 1998. It was lifted by a three stage proton rocket and was put into an elliptical orbit. Upon achieving orbit, the embedded commands activated and deployed the solar panels and the communications array. After several days of testing, the rockets were fired and it settled into a circular orbit. Later the Endeavor brought the Unity node to be connected.

The last section of this report is about a proposal for a new habitation module. The idea for the TransHab Module came from the Lyndon B. Johnson Space Center in Houston, Texas. The TransHab would be a large capacity, inflatable crew area. This module would replace the aluminum modules currently in use by NASA. The idea was originally intended for the Mars crafts, but is under consideration for use on the ISS. If it is added, it would be launched in 2004 on flight 16A. This would be the completion of the ISS.

This has been a report on the major contributions to the ISS. Although there are at least fifteen countries collaborating on this project, not all of them made major contributions. Consequently, not all of them are included in this report. For more information, please consult the time line associated with this report.