

## **ARISSat-1Final Project**

**The advancements in science and technology made in the last four to five hundred years have been due to people's persistent curiosity and drive to explore and experiment. Along the way we experienced many failures balanced by amazing discoveries and advancements. Many individuals have brought us to the point we are today...to the world we live in and enjoy. But what about tomorrow? Where are the individuals who are willing to take a chance, to try something different, to explore, to experiment to lead us to tomorrow?**

**Some of those creative and forward looking individuals are busy designing and building ARISSat-1! What was SuitSat1? Well, it's a spacesuit that is a satellite (SuitSat). Basically, it consists of a Russian orlan spacesuit that has been fitted with a variety of technological equipment that will have the capability of sending radio signals to earth, be able to transmit slow scan TV, pre-recorded messages in many languages, and telemetry information such as temperature, battery power, and mission elapsed time.**

### **Research Project A**

**Suggested web sites: [www.nasa.gov](http://www.nasa.gov)  
[www.spaceflight.nasa.gov](http://www.spaceflight.nasa.gov)  
[www.science.nasa.gov](http://www.science.nasa.gov)**

**Procedure: Students will use the computer to find the answers to the following questions about ARISSat-1. Using the information they will write a short essay about ARISSat-1 .**

## **ARISSat-1 Information Sheet**

**Using the computer find the answers to the following questions about SuitSat2.**

### **Questions:**

- 1. Identify the individual(s) who created the idea and worked to produce the first SuitSat.**
- 2. Describe ARISSat-1. What will it look like?**
- 3. How will ARISSat-1 be launched?**
- 4. How will we communicate with ARISSat-1?**
- 5. Describe how students will be able to track ARISSat-1's journey around Earth.**
- 6. What equipment will ARISSat-1 carry that will enable it to:**
  - a. provide communication**
  - b. protect equipment**
  - c. provide energy**
- 7. Can you think of a way this type of technology might be used for further space exploration?**

**Take the information you have collected and write a short essay describing this new project. Include your ideas about how this type of project might be used in further space exploration. Also tell if you would be interested in working on a project like this. If so, what would your ideas include?**

## **Project B**

Using the computer, track the orbit of the International Space Station for one week. Tracking of the ISS can be found at:

<http://www.spaceflight.nasa.gov> .

Collect the following data information. Answer all of the following questions.

### **Tracking Data:**

**Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_

**Latitude:** \_\_\_\_\_ **Longitude:** \_\_\_\_\_

**Where is the ISS? Over a country? Name it:** \_\_\_\_\_

**Over a body of water? Name it:** \_\_\_\_\_

**Altitude:** \_\_\_\_\_

**Temperature:** \_\_\_\_\_

**Speed** \_\_\_\_\_

**Humidity:** \_\_\_\_\_

**Air Pressure:** \_\_\_\_\_

**Weight of ISS:** \_\_\_\_\_

**Volume of ISS:** \_\_\_\_\_

**Dimension of solar arrays** \_\_\_\_\_

1. After collecting data for one week, try predicting where the station would be 4 hours later.

Position of ISS at \_\_\_\_\_ o'clock. I predict it will be at \_\_\_\_\_ 4 hours later. Four hours later it was at \_\_\_\_\_.

2. On the following day check the orbit of the ISS. Is it still on the same path? If not, how has it changed? Why?

3. Why would knowing the location of the ISS help us in tracking SuitSat2?

4. Calculate the distance the space station travels in 10 minutes. What is its orbital speed?

5. Does the altitude of the space station change as it orbits Earth? What is the lowest altitude you recorded? The highest? Look up the words perigee and apogee. During the

time of your record keeping what was the perigee and apogee you recorded?

6. Describe the orbital path of the space station.

## **Project C**

**Invite a Ham Radio Operator to your school.**

Students and teachers who want to participate in this exciting adventure of ARISSat-1 should invite a Ham Radio Operator to their school to demonstrate how they could listen in to ARISSat-1's messages. If they do not know an operator they can look for Ham Radio Clubs in their area. Still can't find anyone? Go to this web site:

<http://www.arrl.org/FandES/field/club/clubsearch.phtml>

to look up the ham radio clubs in your area that are affiliated with ARRL, the national organization for Amateur Radio.

Then be prepared to listen to ARISSat-1 as it journeys around planet Earth. Use the tracking information found for the ISS to track ARISSat-1.

## **Project D**

Some of the following projects can be done prior to the launch of ARISSat-1. Other projects can be done during the space of time that ARISSat-1 is in orbit. The projects can be assigned to teams in a single class or teams across grade levels. The best scenario would be an all school participation in the event. Students in upper grades can help guide and supervise children in lower grades. Students across grade levels can share their experiences with each other.

**Art Team:** ARISSat-1 is orbiting planet Earth. As she travels she tumbles and rolls. If ARISSat-1 were equipped with a camera containing a powerful lens, what scenes would the camera capture? Use your imagination! Create a drawing illustrating what ARISSat-1's camera captures.

**News Team:** This team of students will be responsible for broadcasting the latest news concerning the ARISSat-1 project. This could be accomplished through writing in a school or local newspaper or by making daily announcements over the school's intercom system. Children in the lower grades might present the story of Valesare either as part of a school program or sharing it over the school's intercom system. Middle grade students could share their knowledge of radio communication by doing a demonstration of their skill with Morse code. Sending messages to ARISSat-1 and receiving them from a "ARISSat-1" placed in another room or off-stage students can illustrate the communication that will occur between people on Earth and SuitSat2.

**Music/Video/Power Point Team:**

Hopefully during the launching of ARISSat-1 and the period of her orbits, students will be participating in a variety of activities linked to ARISSat-1. The Art team should be producing pictures, the News team articles, programs might be presented by lower grade and middle grade students involving Valesare and Morse code. The Music/Video/ Power Point Team will be busy recording all of the activities on tape or in a power point presentation. The Music part of the team might work on creating lyrics to some popular music that would reflect ARISSat-1's journey. Lyrics might be taken from poems written by students during literature classes. Other school activities reflecting ARISSat-1 should also be included such as the Kite Fly Off by lower grade students and their

**“Now I am an Astronaut” drawings. Don’t forget to include the presentation by the Ham Radio club and their work during the contact with ARISSat-1. All of this could be then shown during the next school open house or parent conference.**

### **Design/Building Team:**

**Students should be challenged to design and build their own free falling orbiting satellite. Decisions as to size and materials should be up to either the teacher or students. If the students participated in creating a bubble rocket and/or building a solar racing car then they have already had some experience with designing and building. Since they will be designing a satellite that will have to be launched and eventually be tumbling around planet Earth in a free fall they will have to address those problems in their design. Since we are dealing with junior high students they will need some guidance with these problems and solutions. Remind them of the usefulness of solar energy and review the role a space suit plays in protecting an astronaut. You might encourage them to add robotic devices for control of their satellite. There are many cheap robotic toys out there that can be cannibalized to get the devices necessary for a robotic. What about ARISSat-1? Ask students what robotic devices ARISSat-1 could have used?**

**Upon completion of their projects, students should do a class presentation showing/demonstrating their potential satellite and answering questions pertaining to the building and workings of the satellite. The event should be added to the video/ power point presentation being put together by the Music, Video, and Power point Team.**

**Make this event a memorable one. Be a part of history! Most importantly enjoy and learn!**