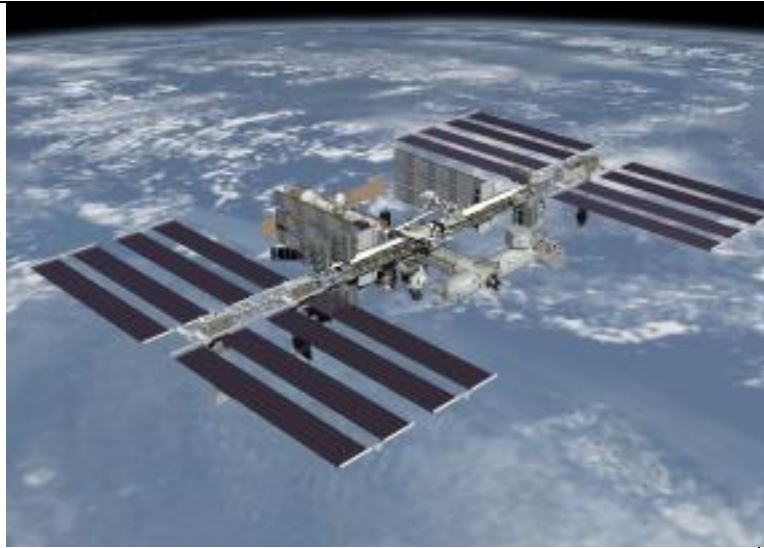


## Slow Scan TV Transmissions (SSTV) from the International Space Station



### The Event:

SSTV image transmissions by Russian Cosmonauts onboard the International Space Station. SSTV images of this series commemorate cosmonauts Alexei Leonov, Valery Bykovsky and Sigmunt Jähn.

### Awareness / Notification Process:

Events such as this typically take place during otherwise quiet times in the astronaut's schedule. In other words, there may not be very much advance notice of the event, and no guarantee that the astronauts will be able to conduct the event. Go with the flow. ARRL posted this announcement on their web page [www.arrl.org](http://www.arrl.org).

### Commemorative ARISS Slow-Scan TV Transmissions Set

12/24/2019

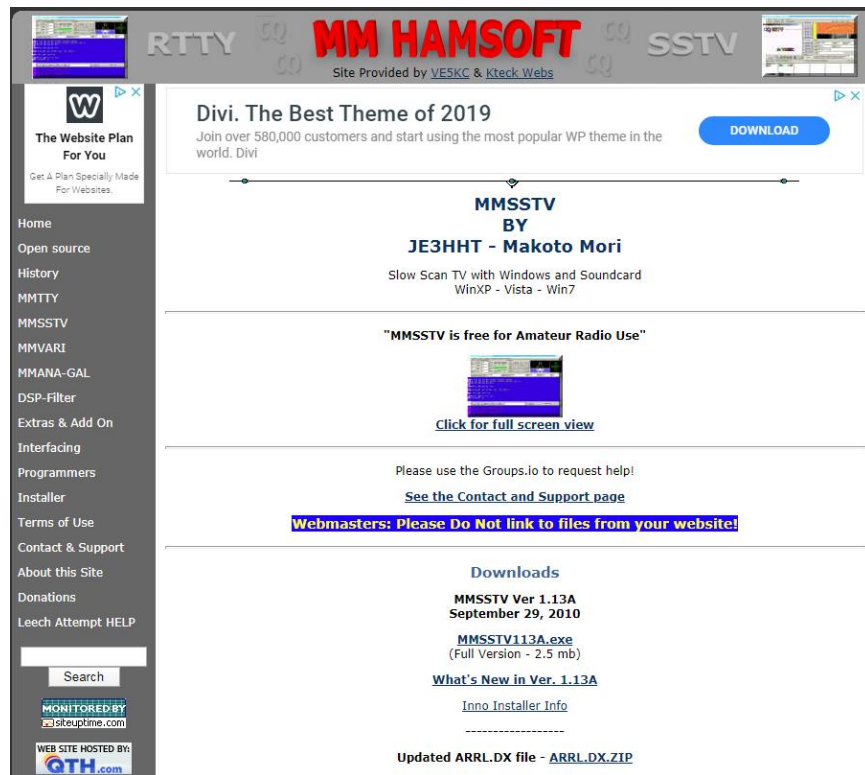
Amateur Radio on the International Space Station (**ARISS**) will support slow-scan television (SSTV) transmissions worldwide in memory of cosmonauts Alexei Leonov, Valery Bykovsky, and Sigmund Jaehn. Transmissions are scheduled to start at 1100 UTC on December 28 and continuing until 1820 on January 1. Transmissions will take place on 145.800 MHz and in the PD 120 format, using the call sign RS0ISS. The Polish ARISS Team has prepared an **award** for participants in the SSTV experiment. — *Thanks to Gaston Bertels, ON4WF*

### One-Time Setup:

You will need a suitable radio receiver, receiving antenna, sound card interface, and PC software.

- **Radio Receiver:** Your transceiver will be used in receive-mode only. The recent event used Two Meters 145.800 MHz FM. Be sure you can get access to an Audio-Output connector on the radio. Open the Squelch. You want to hear the static hiss while waiting for the pass to begin. This helps reduce the possibility of missing portions of the SSTV audio.
- **Receiving Antenna:** I used a Ringo type of vertical antenna in a fixed-position for the entire pass. If you have an antenna that can be pointed to track the satellite you may achieve better results. For example, an Arrow or Elk hand-held yagi.

- Sound Card Interface: You need the ability to get audio sounds out of the receiver and into the PC. Some people simply hold the receiver speaker up to the PC microphone. Others use a SignalLink or similar interface and its rig-specific cables to provide direct, wired connections between radio and PC.
- PC Software: MMSSTV is very popular. The website offers HELP links and test files.  
URL: <http://hamsoft.ca/pages/mmsstv.php> The version has not changed in years: 1.13A
- There are some MMSSTV setup requirements:  
PC Sound Card Bit Depth & Sampling Rate . Properties, Advanced. Set to 16 bit, 48000 Hz  
The MMSSTV Sampling Clock Rate 48000 Hz. Options, Setup MMSSTV, Misc, Clock  
Your Sound Card needs to be specified . Options Setup MMSSTV, RX, Sound Card  
The RX MODE must be PD120. You may need to bump out an existing setting to add PD120  
Always show RX viewer+. View, put a checkmark on that question.  
You may wish to tinker with other RX and MISC settings. TX doesn't matter at this time.
- I recommend you obtain an audio test file so that you can exercise and troubleshoot your configuration prior to the satellite arrival. Play this file: <https://amsat-uk.org/beginners/iss-sstv/>  
Or, I can provide you an audio file I recorded.



### Helpful Tools:

You may wish to PIN the Windows Sound Recorder application to your Task Bar. If you record the audio during transmission, in effect you have bought insurance+which could let you modify your MMSSTV configuration and retry the decode in case the first attempt was not successful.

You may wish to PIN the Windows Snipping Tool application to your Task Bar. This is how I save certain images. You may have other techniques up your sleeve.

## Pass Predictions:

AMSAT provides a Pass Prediction tool on their website [www.amsat.org](http://www.amsat.org).

Click on **Satellite Info** and then click on **Pass Predictions**.

You will be asked provide your six-character Grid Square, and the elevation of your antenna above sea level (in meters). If you don't know the elevation you can guess. The effect of any modest inaccuracy will be minimal.

Look for passes that meet certain technical goals as well as your personal preferences.

- **Maximum Elevation:** The horizon is 0°. Your zenith (straight up overhead) is 90°. The greater the elevation, the more likely you are to have a clear view of the satellite. I did pretty good with a pass having 29° elevation.
- **Duration:** This is the amount of time the satellite can be seen above the horizon, and therefore the amount of time the satellite signal can be received. Duration goes hand-in-hand with the Maximum Elevation. Think of a PD120 image transmission as using two minutes of key-down followed by two minutes of quiet time, then the next image will be transmitted using two minutes, and so on.
- **AOS (UTC):** Acquisition Of Signal. You may wish to exclude any passes that take place at Zero Dark Thirty.
- **AOS Azimuth and LOS Azimuth:** Acquisition Of Signal and Loss Of Signal. The compass point along the horizon where the satellite will rise, and where it will set. Your best results will be obtained if the view toward those low-elevation points is unobstructed by terrain or structures. If low elevation obstructions exist the duration of your Clear Sky View will be shortened.

AMSAT Online Satellite Pass Predictions - ISS							
<a href="#">View the current location of ISS</a>							
Date (UTC)	AOS (UTC)	Duration	AOS Azimuth	Maximum Elevation	Max El Azimuth	LOS Azimuth	LOS (UTC)
04 Jan 20	05:05:27	00:08:51	183	11	123	73	05:14:18
04 Jan 20	06:40:47	00:10:52	235	77	323	52	06:51:39
04 Jan 20	08:18:31	00:09:50	277	17	337	47	08:28:21
04 Jan 20	09:56:44	00:09:05	306	12	6	60	10:05:49
04 Jan 20	11:33:56	00:10:10	313	21	11	92	11:44:06
04 Jan 20	13:10:38	00:10:47	304	62	213	136	13:21:25
04 Jan 20	14:48:35	00:07:03	277	6	235	194	14:55:38
05 Jan 20	04:18:41	00:07:03	166	5	141	84	04:25:44
05 Jan 20	05:52:54	00:10:48	223	60	131	56	06:03:42
05 Jan 20	07:30:12	00:10:12	267	21	325	47	07:40:24

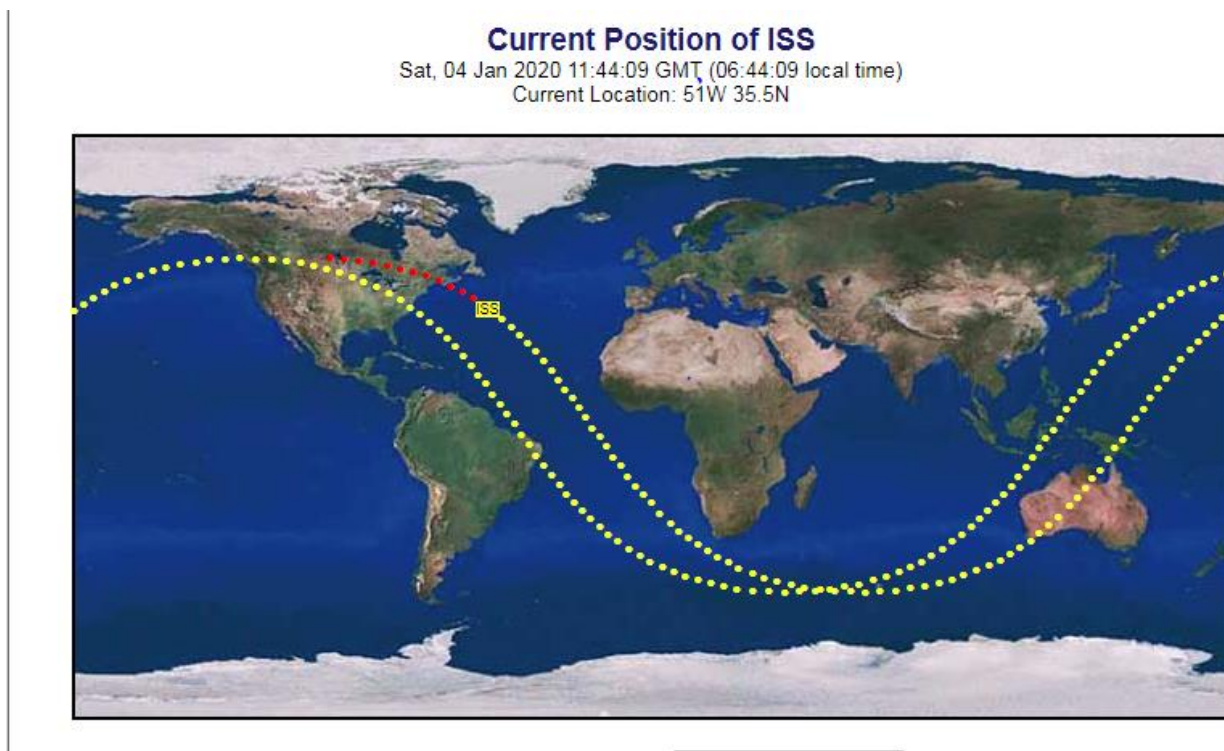
You may find that a visual representation of the satellite ground-track improves your understanding of how and where the satellite will be located during the pass. (The 04 Jan 2020 pass shown above at 11:33:56 flies to the north of our location and looks good. The 13:10:38 pass flies to the south of our location and looks even better.)



The satellite and its two-meter signal first appear on the horizon at the AOS Azimuth compass point. The time milestone for this event is shown in the AOS (UTC) column. There may be some lag time as the satellite rises above the horizon prior to the signal strength becoming adequate.

The satellite gradually climbs to its Maximum Elevation which occurs at the Maximum El Azimuth compass point. Presumably the satellite reaches this point when it has consumed half of the Duration.

For the remainder of the Duration, the satellite gradually sinks down toward the horizon with loss of signal occurring at the LOS Azimuth compass point. The time milestone for this event is shown in the LOS (UTC) column. Your actual loss of signal may occur shortly before the listed time as a result of local conditions.



The satellite ground-tracks shown above correspond to the Pass Predictions presented on Lines 5 and 6 of the matrix. The track to the right is the current pass (Line 5). The track to the left will be the next pass. The first red dot (on the upper left) represents the satellite location at AOS. The last red dot and the ISS tag (on the lower right) represents the satellite location at LOS.

The ISS satellite passed north of my location with Maximum Elevation 21°. Observers in Maine and Nova Scotia probably had a perfect view with the satellite high overhead. The next orbit, one hour and 37 minutes later, will pass slightly to the south of my location with Maximum Elevation 62°. Observers in Virginia and North Carolina probably will have a perfect view.

#### **Image Capture:**

Have your MMSSTV software running well in advance of the expected Acquisition Of Signal. You may wish to have your Windows Sound Recorder running shortly before the expected AOS. Verify that MMSSTV is using the PD120 Receive Type setting. I found that I lost this setting as a result of moving through other MMSSTV menus. Click again if necessary.

There is a correlation between what you hear coming from the radio speaker and what you see after the audio has been decoded by MMSSTV. A nice audio signal will produce a nice visual image. Weak or fading signals, or noise on the frequency, will result in a %snowy+image.

With experience you will soon recognize when the image transmission is nearing the end. The photos that I have observed typically end with a dark stripe containing the space station call sign. The audio modulation generated by this dark stripe is noticeably different than the audio modulation generated by the photographic content. You will know the difference when you hear it.

### Entry:

Upload your image to an ARISS SSTV website, according to the instructions.

Prepare and submit your application according to the instructions.

Instructions were found at: <https://ariss.pzk.org.pl/sstv/>

### Rewards:

Assuming your application and upload are accepted by the award administrator you will receive, via eMail, an Award Certificate in an electronic format (PNG photo). You can print your certificate locally.





## Compare Results:

Your images, as well as other participants image uploads, are viewable at the website:

[https://www.spaceflightsoftware.com/ARISS\\_SSTV/](https://www.spaceflightsoftware.com/ARISS_SSTV/)

The data is searchable by Call Sign. Or you can browse all uploads.

You may wish to check N3FWE and KB3PQT who are known to have participated.



A top quality reception and decode.



Actual reception and decode by AF3I.  
Loss Of Signal occurred before the image had been completely received.



A top quality reception and decode.



Actual reception and decode by AF3I.  
Notice some noise near the beginning.



KB3PQT Reception



N3FWE Reception



N3FWE Reception