Minnesota Mission Log



Newsletter: Spring 2016

Attention Kid Scientists! — The President is Looking For Kid Science Advisors!

The White House hosted it's sixth annual Science Fair in April to encourage and inspire students in STEM (Science, Technology, Engineering and Math) education and Computer Science. Over 130 students participated from over 30 states around the country— with some students even getting to present their ideas to the President himself! Participants included elementary, middle and high school students. This years exhibits included everything from 3D-printed toys and balloon spacecraft to prosthetic limb inventions and robots.

President Obama blows bubbles from a 3D-printed bubble wand at the 6th Annual White House Science Fair.
Credit: White House

During the Science Fair, an elementary student recommended to the President that he needed kid science advisors—and the President loved the idea! Now the President is looking for a group of kids to share their thoughts on science and technology - what can be done to help engage more kids in STEM education and what can be done to help shape the future using science, technology and innovation.

You will need to submit the form by Friday, June 17, 2016 at 11:59 pm ET. **Click here** to view the form on the White House website. Good luck students!!

We at the Challenger Learning Center of Minnesota echo these sentiments—we can energize and inspire a whole new generation scientists, engineers and innovators by inspiring student's today in STEM education! Challenger Centers around the world have a proven track record of doing just that for almost 30 years.

Coming This Summer

Watch our **Facebook** page and **website** for more information on upcoming events this summer:

- Challenger Learning Center of Minnesota will be at the **AirExpo**—July 16th and 17th at Flying Cloud Airport. Come meet our team and the kids can participate in some fun STEM activities!
- Challenger Learning Center of Minnesota's STAR PARTY—Dr. Terry Flower will show you the night sky like you've never seen it before. Telescopes will be available for viewing and will provide an opportunity to see what spectacular views are available in the Minnesota summer night sky. Date TBD.

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Tech Bits

Headlights in from Space!?!?!

If you recall, in our Fall 2015 newsletter we introduced an amazing app called SkyGuide for iOS devices. To recap, it is an amazing tool for amateur star gazing anywhere—anytime. It's like having your own personal tour of the night sky - from discovering planets and galaxies to finding the International Space Station! But one of the most exciting things to use the app for has to be using it to view Iridium Flares! What is that?!?

What is an Iridium Flare??

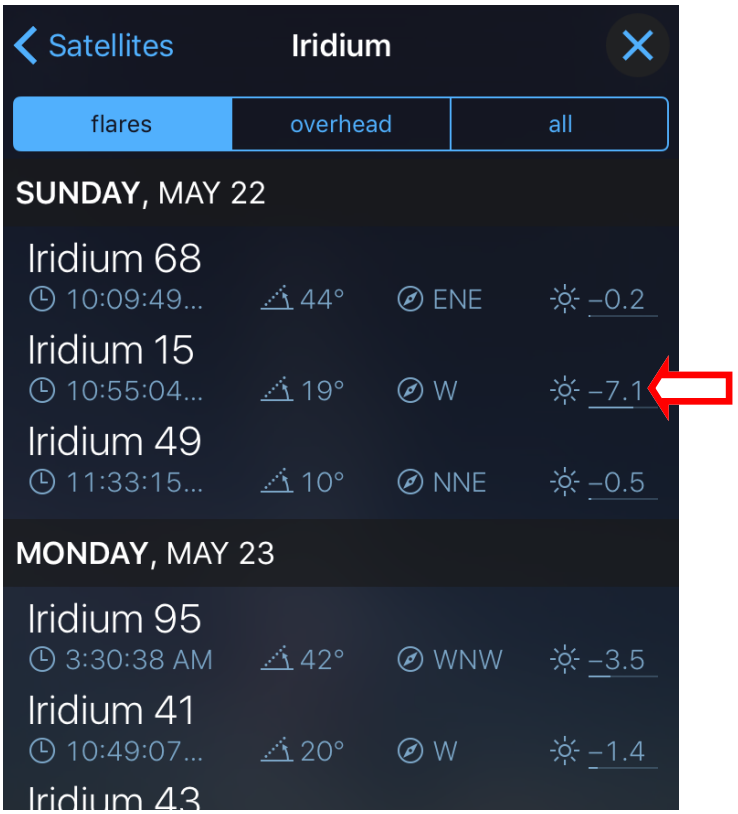
Orbiting the Earth is a constellation of 66 satellites that provide voice and data coverage for the entire planet. Relatively small in size but they have uniquely oriented antennas that look like solar panels. But unlike actual solar panels, these antennas are tilted at an angle—they act like huge mirrors and focus the Sun's light down on to Earth. In fact, this light is focused on an area of the Earth only 6 miles in diameter! This means if an Iridium Satellite projecting a flare on Minneapolis—your friends in St. Paul won't likely see the same event! The other thing to consider is these satellites are moving pretty quickly at 17,000 mph so even if you are lucky enough to be in the 6 mile wide "headlight", it won't be there very long—most flares only last around 20 seconds total with the peak intensity only last for a few seconds. Kids love the sudden flash of light in the sky!

How to Spot a Flare

The good news regarding flares is that generally you can count on one or two good opportunities per week to see one just after sunset (Of course, clear night required!!). Here is how to use your SkyGuide app to look for a chance to spot one!

- Open SkyGuide App
- Touch the "Search" Magnifying Glass
- Touch "Satellites", then touch "Iridium"

You should then see a list of upcoming flares that should look something like this:

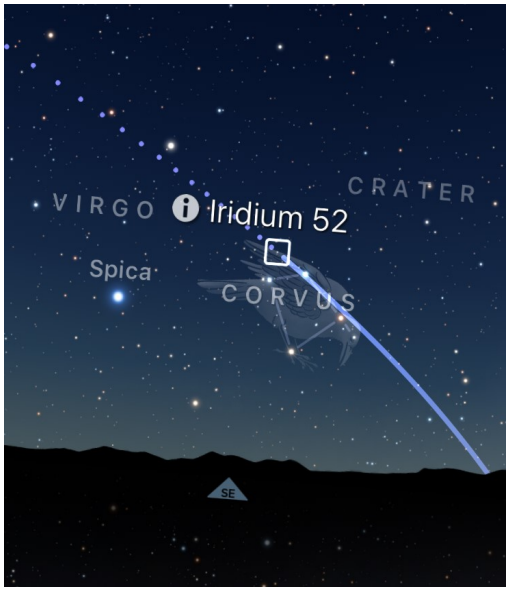


The Best Flares

Picking the best flare to watch for is pretty easy—generally you are looking for the flare that will be the brightest—those are the most exciting! Scan down the list of Iridium Flares presented… Each row indicates a flare. We want to look for the Brightness or "magnitude" of each flare which is indicated by the number on the far right hand side of the row. The larger the Negative number, the brighter the Flare. Easy! For reference, the International Space Station is typically around a –2. And other than these Iridium flares, the ISS is typically the brightest object in the night sky besides the Moon. We typically like to watch for Flares –3.0 and higher to make them really neat events. A –7.1 (like Iridium 15 indicated by the arrow in the screen capture on the prior page) should be spectacular! When you find a nice bright flare, take note of the date and exact time indicated. If it is not past your bedtime—check it out!

It's go Time!

Once you've picked a Iridium Flare to look for start preparing a good 15 minutes ahead of time. Head outside with an iPhone with the SkyGuide app and ideally a second phone displaying exact time to the second. Find the flare on your list again and touch the row for that flare. It should return you to the sky view:



Note the arc and path the satellite is headed—as you move your phone to track the path of the satellite make sure the path is clear of trees, houses, and other obstacles. Keep following that satellite so you know exactly where to look! Next, keep an eye on that other phone for the exact time. We've found that flares can start generally within 10 seconds of the listed time on the app. It helps to have couple sets of eyes to help spot it so grab your parents and friends! Remember—the event happens quickly so keep a sharp eye! At its peak it will look like a very, very bright moving star—and it will slowly fade out from sight—generally in about 10 seconds. If this is what you saw—Congratulations!! Very few folks know how to hunt down an Iridium Flare—You are on your way to becoming a Night Sky Expert!!

This long exposure captures an actual Iridium Flare as it moves across the starry sky—Not how much Brighter it is at its peak than all the other stars around.
Credit: Rudiphoto.net

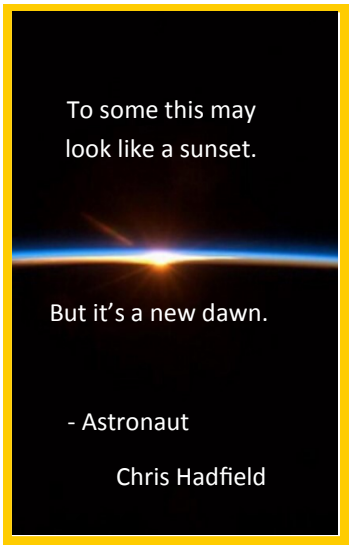
Seen through the lens of a 20 second long camera exposure (above) we get a feel for the total event and the magnitude of it's peak brightness relative to the rest of the sky. We've found these flares a little addicting as you they keep you coming back to try to find brighter and brighter flares. They can flare up to a magnitude as high as –9.0! We haven't see one that high yet but are looking forward to the chance!

Enjoy the night sky this summer!!

How Can You Help?

- Visit our website for more information and contact us to learn how you can get involved.
- Sign up for an individual or Family Membership, or consider a donation - information on the website: www.challengermn.org/membership.html
- Help us get the word out!

Challenger® LEARNING CENTER MINNESOTA



Out to Launch!!

Who doesn't love the excitement of a live rocket launch!! Luckily for us, the NASA channel typically broadcasts most launches. Additionally, for SpaceX launches, checkout SpaceX.com for live hosted telecasts of the entire event. They do an amazing job keeping the launch exciting with amazing real-time camera angles from land, onboard the rocket, and on the recovery ships! And with SpaceX launches the excitement continues from liftoff to attempted landing on shore or on a ship in the ocean! – Tune in for the excitement of launch! ***3….2…1…LiftOff!!!!***

SpaceX Falcon 9 • Thaicom 8

Launch window: May 26th, 4:40pm Central Time
Launch site: SLC-40, Cape Canaveral Air Force Station, Florida

Launch Vehicle: A SpaceX Falcon 9 rocket

Payload: Thiacom 8 communication satellite for data services from Africa to the Asia.

ULA Delta 4 Heavy • NROL-37

Launch window: June 4th, 1:00-6:00 p.m.
Launch site: SLC-37B, Cape Canaveral Air Force Station, Florida

Launch Vehicle: A United Launch Alliance Delta 4 Heavy Rocket!

Payload: Classified spy satellite for the U.S. National Reconnaissance Office.

Family Science Experiment: Rain in a Jar!

Spring is here! Which means we see changing weather and a lot of rain to wash away the gloom of winter. Rain clouds are called Nimbus Clouds—these kinds of clouds are made of tiny water droplets that produce precipitation. These water droplets scatter all colors of light that pass through the cloud from the sun, making the clouds appear white. When clouds get too thick with water droplets, the light from the sun cannot make it through the cloud and the cloud looks grey or dark.

We can teach our kids about how rain clouds work by making a model of a rain cloud using water, shaving cream and food coloring.

You will need:

- Glass jar
- Tap water
- Shaving cream
- Food coloring

Mixology: Fill your jar about three quarters full with water from the tap. Use the shaving cream to create a cloud on top of the water. Let the foam settle a bit while you talk to your child about the following:

- Hypothesis: What do they think is going to happen when they add a couple drops of food coloring to the 'cloud'?

Watch the magic happen! Now drop food coloring into the 'cloud'. As your cloud fills up, the food coloring will fall down into the water creating a rain-like effect. Use different colors to create colorful rain!

What's really happening? Clouds are formed when warm air rises into the air and forms water vapor. When the vapor hits cold air, it turns back into droplets of water. Those tiny drops of water floating in the air "stick" together to form clouds. If the clouds are big enough and have enough water droplets, the droplets bang together and form even bigger drops. When the drops get heavy, gravity causes them to fall out of the cloud. That is when we see and feel rain!

Cool Fact: ***How fast do raindrops fall?*** Raindrops fall between 7 and 18 miles per hour in still air! Good thing rain drops are little or that could hurt!