

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

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*(Moderator Bill)*: Hi everyone! We'll get started here in just a few minutes. Welcome.

Micky: How is it different from last years?

*(Moderator Bill)*: The presence of the bright moon will wash out the fainter Geminids, so you'll see fewer per hour.

GreGhost: Hi :)

*(Moderator Rhiannon)*: Hello! And welcome, everyone! We are ready to answer your questions :)

leo\_toni: were are the meteors?

*(Moderator Bill)*: Watch the feed on this page, and you'll eventually see meteors!

FilipiSiQ: hi all

*(Moderator Bill)*: Welcome!

zac: Do you know of a free sattalite or star tracking software i can download

*(Moderator Rhiannon)*: <http://www.heavens-above.com/> is a great website you can go to, to determine what satellites pass over you. There is Celestia and Stellarium as well that you can check out.

FilipiSiQ: what is number of commets for yours?

*(Moderator Bill)*: Expect about 40 Geminids per hour around 2 a.m. your local time tonight.

Valesca\_Harker: Is Geminids clearly visible from south hemisphere/brazil?

*(Moderator Bill)*: Yes, they are.

jessicaopp: Am I suppose to look between Gemini and the moon?

*(Moderator Rhiannon)*: Just look straight up and give it some time. You can start to see them as soon as it gets dark, but the best rates will be highest between 2am and dawn (local time).

Deh: When meteor shower will begin?

*(Moderator Danielle)*: The Geminid radiant is already up for North American observers, so it's already begun. The shower should peak around 2 am local time tonight.

felipe: hi, i'm brasilian and i can't see the storm, when will start?

*(Moderator Bill)*: Going on already -- will see most meteors around 2 a.m. local time tonight.

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soulWRITER: I live in central Connecticut, in New England. When is the expected best time to see the meteor shower?

*(Moderator Rhiannon):* Welcome! The best time to look will be 2am local time. You can start to enjoy them right now if your skies are clear. Just go outside, lie on your back, and give it time.

John\_M.: About only way I'm going to see a comet tonight is through this site.

*(Moderator Danielle):* We hope to see some Geminid meteors tonight via our meteor cameras!

me: is possible to see meteors with the naked eye, this time in Brazil?

*(Moderator Bill):* Yes, use your eyes. Lie flat on your back and look straight up -- the Geminids ARE visible in Brazil.

Loren: in rio de janeiro can not see , the sky is cloudy

*(Moderator Danielle):* We've got some clouds and fog here, too. ☹

BrunnaZamorano: Heloo

*(Moderator Danielle):* Hello there! Welcome to the chat!

Andii14: My question is.. in what directions .. it will go?

*(Moderator Rhiannon):* Geminids will be all over the sky, though the trails will point to the same point, which is known as the radiant. The radiant is in the constellation Gemini, which is how the Geminids get their name! But don't look towards the radiant, just look up. That is your best bet to see the most meteors.

*(Moderator Bill):* Hi everyone -- looks like we have a lot of people logging in from Brazil tonight, and Central America. The Geminids are visible throughout the evening with the best rates (40/hour) around 2 a.m. local time.

Vini\_Tavares: From sao paulo (at least my location) i can't see any clear star, just 1, and the moon, and no shower

*(Moderator Danielle):* I'm sorry to hear that -- maybe the weather will clear later?

Mauro1721: Can I see this in colombia's sky?

*(Moderator Bill):* Yes, you can.

JP: When is the peak times for eastern US standard time?

*(Moderator Bill):* 2 a.m. local time

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BCstargazer: good evening all from BC Canada

*(Moderator Danielle):* Good evening BCstargazer!

Xman: Can you see the meteor shower from the space station?

*(Moderator Rhiannon):* You can! Astronauts currently on the ISS (International Space Station) can look down instead of up to see meteors!

soulWRITER: Where is Gemini located in the sky tonight?

*(Moderator Bill):* It's to the north and east of the constellation Orion.

Klindar: what object produces these meteors?

*(Moderator Rhiannon):* These meteors come from the asteroid 3200 Phaethon. Most meteor showers come from comets but this one is unique in that it comes from an asteroid!

GreGhost: And the following year, in what month there will be an event like this?

*(Moderator Bill):* January 3, the Quadrantid meteor shower rates can be as high as 80 per hour. The moon will be favorable, but they're small and faint.

simcore: :-) Greetings, is there music over the audio of the video feed and if so how will we discern the meteor sounds over it

*(Moderator Danielle):* We don't have our forward scatter hooked up to the audio feed tonight (unlike other meteor chats we've done) so you won't hear any meteor sounds. We're just listening to radio. ☺

GibaM: In my city (Brazil), is raining right now; I'll see the storm?

*(Moderator Bill):* No, is you can't see stars, you can't see meteors.

soulWRITER: Are there expected to be lots of large, bright meteors, or mostly smaller, less bright ones?

*(Moderator Rhiannon):* The bright moon will wash out most of the smaller, less bright ones. So tonight you will mostly see the large, bright Geminids.

John\_M.: fog is dense enough here that they'd have to almost hit our house to see them.

*(Moderator Danielle):* I drove through fog to get to the chat tonight... almost hit a coyote, too! I feel your pain. Maybe it will clear up for you later?

John\_M.: Is activity to be good tonight?

*(Moderator Bill):* About 40/hour around 2 a.m. local.

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**December 13, 2011**

---

KRYPT: hi from Brazil. is necessary to look at some particular direction?

*(Moderator Rhiannon):* It is best to look straight up. Just lie on your back and give yourself some time and enjoy! ☺

leo\_toni: when will be the maximum of the rain? tonight or tomorrow?

*(Moderator Bill):* Tonight is the peak of the shower. Tomorrow rates are about 1/2 to 1/3 of what you can see tonight.

leo\_toni: which constellation is visible in the video right now?

*(Moderator Danielle):* The camera is pointed north, above Polaris. I'm not sure what stars we are seeing though.

yagop23: Here in my city is raining right now too will i see?

*(Moderator Rhiannon):* No, however keep an eye on our live stream and hopefully you will see some Geminids through that!

superflutist: Exactly what materials in the meteorites burn to make what colors?

*(Moderator Bill):* Colors are produced by the atoms in the atmosphere being excited or energized by the meteor moving quickly through the air. For example, a green color is due to oxygen gas in the atmosphere.

Imamar: Can I see this in Finland's sky?

*(Moderator Bill):* Yes, you can. Peak time is around 2 a.m. local time, and you can see them until dawn.

lili098: How many meteors or there?

*(Moderator Danielle):* Under ideal sky conditions, visual rates for the Geminids would be around 100 meteors/hour at its peak. BUT the waning gibbous moon will wash out all but the brightest meteors, so at maximum (close to 2 am local time) we may see 40 meteors/hour. Darn moon!

lu: Even though the sky is cloudy, am I able to see the meteor shower from Brazil?

*(Moderator Bill):* No, you can't see the meteors if the sky is cloudy.

superflutist: Has there ever been meteor storms in relation to the Geminids meteor shower?

*(Moderator Rhiannon):* No. Meteor storms are when you can see 1,000 meteors per hour or more. The Geminids are very consistent and give rates of about 100-120 per hour on a clear Moonless night. Tonight you can see about 40 Geminids per hour because of the bright Moon.

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---

marianarego: This "Question" is not related to meteors but I just want to say that I love NASA

*(Moderator Bill):* I love NASA, too. ☺ Thanks.

swatcats: whats going to be the best time for KY/USA?

*(Moderator Danielle):* The Geminid radiant reaches its maximum altitude around 2 am locally, so that's when you'll see the most meteors. But you can go out observing now and still see Geminids.

lolitos: Sky is clear here but i cant see a single one, why?

*(Moderator Rhiannon):* Depending on where you are, the peak may not have occurred. Around 2am local time is when you should see the most meteors. If it is hazy or cloudy where you are, you will see less. I hope you get to see some with your own eyes!

Alessandra\_Gallon: Hello, It's a pleasure talking to you! Here in Rio Grande do Sul, Brazil is raining :( how sad

*(Moderator Danielle):* Welcome Alessandra! Sorry to hear about the weather. ☹

tkl106: where,s thevideo feed

*(Moderator Bill):* Embedded on this page, just above this chat window.

MME: it's possible hear meteors from NAVSPASUR's meteor radar??

*(Moderator Danielle):* You can hear meteors using a radio tuned to the NAVSPASUR's frequency.

lili098: LOVE NASA!!!! <3 WHEN I'M OLDER I WANT TO BE A SPACE SCIENTIST!!! btw...why is there onlt a mereor shower today??

*(Moderator Rhiannon):* We love NASA too. ☺ And follow your dreams, we love that you are interested in Space! The meteor shower tonight is not just tonight. We have been seeing Geminids for the last couple weeks and probably will continue to see them for another couple weeks. However the rates are significantly less on the nights before and after the 13th/14th of December.

superflutist: Why is 3200 Phaethon a "extinct?"

*(Moderator Bill):* 3200 Phaethon is thought by some astronomers to be an extinct comet, which happens when a comet makes so many orbits around the sun it loses all of its ice, leaving just a rocky core.

alliepants: i'm right outside of Philadelphia, PA. when will it peak in this area

*(Moderator Bill):* 2:00 a.m. local time.

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---

Delonix: Can the astronauts in the ISS see the shooting stars?

*(Moderator Danielle):* Indeed they can see meteors, and they have in the past! A Perseid meteor picture taken from ISS was recently an Astronomy Picture of the Day (APOD).

bel: have you guys seen it?

*(Moderator Rhiannon):* We have already seen several Geminids this year! Tonight we are inside answering your questions. ☺

Derek: How this geminids looks like?

*(Moderator Danielle):* A Geminid meteor will look like a quick streak of light. If you are patient, and our weather here in Huntsville cooperates, you may see one in our streaming camera feed.

*(Moderator Bill):* Hi everyone -- getting lots of questions about peak times. Peak times will be 2:00 a.m. local time, which will depend on where you're viewing the shower. If the skies are clear, lie on your back and look straight up. You can see meteors up until dawn. Tonight is the peak of the Geminids -- you can see meteors tomorrow night, but rates will be about 1/2 to 1/3 of what you can see tonight.

yagop23: Well guys, how much is the chance to see a meteor at the NASA cam?

*(Moderator Rhiannon):* That is hard to say. It is a bit hazy here and the Moon is bright (which washes away the fainter meteors), but we are hoping to see many meteors on our camera throughout the course of the night.

lili098: what is a meteor? is it a ball of gas,dust and rocks?? is it similar to a comet?

*(Moderator Rhiannon):* A meteor is an icy/rocky piece of debris. The meteors you can see are likely only the size of a pebble or small rock (millimeter to centimeter size).

Vanessa: I'm from Brazil, Will I can see??? Isn't raining, I can see stars...

*(Moderator Danielle):* If you can see stars you should be able to see meteors. In the southern hemisphere, the Geminid radiant doesn't rise very high above the horizon, so you'll see lower rates of meteors than those in the northern hemisphere, unfortunately.

Klindar: I read that Apollo 17 was on the Moon 39 years ago today. Were they in danger of being hit by Geminids?

*(Moderator Bill):* The odds of an astronaut on the moon being struck by a Geminid are extremely small. However, astronaut Harrison Schmidt did see a Geminid strike the moon while orbiting the moon in the Apollo capsule. 39 years ago was the first documented human sighting of a meteor striking the moon's surface.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
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---

Timbuk: Hello (*Moderator Bill*), i want to ask u what's phaenon made of?

(*Moderator Danielle*): Phaethon probably has a rocky surface. Its volatile elements have been burned off by its close approaches to the Sun.

NeonValley: Can you provide any insight as to the best way to photograph the meteor shower (exposure settings, etc...)?

(*Moderator Bill*): Time exposures of about 1 minute with shutter wide open works well for most cameras, unless you're in a city.

Anthony: recently i could see a small flesh across the sky, any chance to be the meteor?

(*Moderator Danielle*): Definitely a chance it was. 😊

R2TJLFDNY: Hello all. I live in eastern Long Island. Which direction should I face for best viewing?

(*Moderator Bill*): Lie on your back and look straight up.

GoreShinn: I'm sad D< I don't see any meteor .. why here in brazil nobody see the meteors ?

(*Moderator Danielle*): In the southern hemisphere you'll see less than in the northern hemisphere because the radiant doesn't rise very high above the horizon. But if you are going outside to try to see meteors, you really need to let your eyes get adjusted to the dark before you will see anything.

leo\_toni: in the rare case of a meteor reach the ground, what should be done?

(*Moderator Bill*): If you find a meteorite, you should contact the property owner where it was found and inform them of your find. They can decide what to do with the meteorite as by law, they own it.

Bruno\_-\_Brasil: Some meteor might collide with the earth ?

(*Moderator Rhiannon*): All the meteors you are seeing tonight are pieces of debris that have collided with Earth's atmosphere. Most of the meteors you see will not reach the Earth's surface. However occasionally they do, and then they become meteorites.

simcore: :-? How many meteors make it to the ground, on average

(*Moderator Danielle*): Less than a tenth of a percent.

MME: what is the altitude that meteors burns up?

(*Moderator Bill*): Geminids burn up at about 80/km altitude.

selfi: just saw one on the cam !

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
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**December 13, 2011**

---

*(Moderator Bill)*: We saw that, too!

rafaelbmarques: Hello, I'm speaking of Ceara in Brazil and was wondering if you answer me, whats is a best time to see meteors in Brazil ?

*(Moderator Bill)*: 2 a.m. local time.

alliepants: how about the ISS? where can i find that in the sky?

*(Moderator Rhiannon)*: <http://www.heavens-above.com/> is a great site in which you can input your location and time zone and it will tell you when and where to look for the ISS. It is so awesome that we can see it from Earth!

juju: Wow I saw one in your ustream, but just one, it's amazing

*(Moderator Danielle)*: Great!!! I'm a little jealous!! ☺

superflutist: The impact of a Geminid or any meteor hitting the Moon is small, correct?

*(Moderator Bill)*: Yes.

gover: Hey *(Moderator Bill)*, any sign of the owl tonight? ☺

*(Moderator Bill)*: No sign of the owl -- but we know he's out there!

sorpk: hey im from mexico, do you know at what time would be it peak?

*(Moderator Rhiannon)*: The peak will be 2am local time. You can already see meteors if it is dark and your skies are clear! Just look up and give it some time.

Raphael\_Brazil: i saw 3 in 5 minutes on NASA Ustream

*(Moderator Bill)*: We're getting some good results on the Ustream.

*(Moderator Bill)*: Hi everyone -- getting lots of questions about peak times. Peak times will be 2:00 a.m. local time, which will depend on where you're viewing the shower. If the skies are clear, lie on your back and look straight up. You can see meteors up until dawn. Tonight is the peak of the Geminids -- you can see meteors tomorrow night, but rates will be about 1/2 to 1/3 of what you can see tonight.

superflutist: I just want to say that I have been looking forward to this for months, and the fact that you guys are doing this has made my week!! Thank you!

*(Moderator Rhiannon)*: Thank you for the feedback! We love our jobs and love that we get to share it with you all!

lili098: are you guys astronauts?? or space scientists??

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
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December 13, 2011**

---

*(Moderator Danielle):* We're meteor physicists and astronomers by training. ☺

Brad: Greetings for Kentucky! Sky is hazy tonight here so hoping for some good views via the NASA feed.

*(Moderator Rhiannon):* We just saw a bright one in the feed! Hope you saw it too!

leo\_toni: yesterday, looking to the orion nebula with my 60mm telescope i saw a strange lighth in slow constant velocity far far away , i researched all the routes of satellites and isn't anyone, what could it be?

*(Moderator Bill):* It probably was a satellite -- not all of them are catalogued.

Carol: Hi , I'm from Brazil , so I'm sorry if I make a mistake with my english . I saw what looked a bright smoke . It was ... "breaking" . It can be a meteore falling apart ?

*(Moderator Danielle):* It could have been a fireball fragmenting, yes.

random: did one just go by? or was that my imagination?

*(Moderator Danielle):* We've had a couple of reports of meteors in the feed so far!

Raphael\_Brazil: why cam color is just black and white?

*(Moderator Bill):* Because b/w cameras are more sensitive than color ones, enabling us to see fainter meteors.

Xman: Can you see the shower from an airplane window?

*(Moderator Bill):* Not easily -- these windows are very dirty.

unpluggedtech: would I get a better view if I was looking up through a long cardboard tube

*(Moderator Rhiannon):* No. It is best to view meteors with your naked eye. You want to see the largest area of the sky possible.

Vanessa: Is a pleasure to be in NASA's chat.I have a question, last night I saw a ball of light with a 'tail' in the sky, li it and disappears quickly. it was wonderful!!! I wonder if by chance was one of the Geminids meteor I've ever seen?Thank you!!!WE LOVE NASA :D

*(Moderator Bill):* That was probably a Geminid meteor.

superflutist: How do you learn the altitude in which they burn in the atmosphere? Is there an equation of sorts?

*(Moderator Bill):* We can measure the altitude on our meteor cameras -- that's how we know.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
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December 13, 2011**

---

Ferdinandu: It's a anual event, right?

*(Moderator Rhiannon):* Yes. The Geminids are one of the most consistently impressive meteor showers. We see the Geminids because every year we pass through the same debris trail left by asteroid 3200 Phaethon.

respoto: my city has a lot lighting.... its a problem to view?

*(Moderator Danielle):* It's best to get away from bright city lights. But you are also contending with light from the bright waning gibbous moon, so city lights might not make too much of an impact. If you can see the stars in the Big Dipper you should be able to see Geminids.

Marcos\_Romanov: When this will happen again?

*(Moderator Bill):* The Geminids will happen again next December. In January, there will be the Quadrantids shower.

Luan\_Martins: why I am trying several minutes and I can't see?

*(Moderator Bill):* Let your eyes adjust -- usually takes about 30 minutes after you go outside.

lili098: how often does this occur?

*(Moderator Rhiannon):* The Geminids occur every year mid-December! There are many meteor showers though, the Geminids aren't the only one! For example, the Quadrantids are a meteor shower that peak at the beginning of January.

random: What are you looking for in a meteor shower?

*(Moderator Danielle):* NASA is interested in the size, density, and flux of the shower in order to help calculate the risk to spacecraft.

Kurt: Can I expect tonight's meteor shower to affect radio reception via meteor scatter?

*(Moderator Bill):* No.

guare: Also, since i'm in Brazil, wich direction should I be facing? North?

*(Moderator Bill):* Lie back and look straight up.

leo: which the approximate size of these meteors?

*(Moderator Bill):* The meteors you see on Ustream are about 1/2 mm in size.

Dony\_Jöishi: Are they running the same or in all directions?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
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**December 13, 2011**

---

*(Moderator Bill):* Geminids all appear to come from the constellation Gemini, so they are moving together, but can appear anywhere in the sky.

NeonValley: At what speed are the meteors traveling through the atmosphere?

*(Moderator Rhiannon):* The Geminids are travelling at 80,000 miles per hour when they hit our atmosphere!

*(Moderator Bill):* We're getting some cloud cover on the Ustream feed on this page. You can also try to see Geminids from some other cameras at these links: <http://www.nasa.gov/connect/chat/allsky.html>

leo\_toni: 2 a.m. in the United States or in Brazil?

*(Moderator Bill):* 2 a.m. in both places.

lili098: Is this being recorded?? I have school and i have to go to bed, so is there any chance i can see on NASA again? if it is being recorded when can i view this again??

*(Moderator Rhiannon):* The live-stream will be posted, as well as a transcript of the chat. Thanks for joining us! Have a good day of school tomorrow!

khal: I live in North New Jersey close to New York city, when would be the best time to see the meteors?

*(Moderator Bill):* 2 a.m.

Karen\_Puerto\_Rico: here in Puerto Rico I saw 8 meteors around 15 minutes it's really incredible!!! BTW I love NASA :)

*(Moderator Rhiannon):* Awesome!

alams: in my city i can only moon

*(Moderator Bill):* If you have lots of clouds, you won't see meteors.

Carol: I don't know , I didn't see if somebody answered my question? The bright smoke falling apart can be a meteore , right ?

*(Moderator Bill):* Yes, it can be a fireball, fragmenting.

lili098: will any of these enter out atmosphere? if it does will it burn up??

*(Moderator Danielle):* Meteors are, by definition, atmospheric phenomena. So the Earth in its orbit runs into debris left behind by 3200 Phaethon... those particles enter the atmosphere and are ablated, or

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December 13, 2011**

---

"burned up" in the atmosphere. And we see the light produced as they ablate/ionize -- these are meteors!

me: it's way past 2:00 am here. I can still see the meteors?

*(Moderator Bill):* Yes, you can see them until dawn.

Victor\_Cullen: I only see stars .-l.

*(Moderator Bill):* You'll see meteors if you look long enough.

Raphael\_Brazil: like the ur ustream are dirty,with any type of smoke in front...why? (sorry for english mistakes)

*(Moderator Rhiannon):* It is a bit hazy here in northern Alabama, USA.

leo\_toni: But spent too slowly to be a satellite at that distance, he crossed the Orion nebula in about 7 seconds, I could follow it for about 15 seconds, and he had a magnitude of about +9. I think it might be an asteroid, or not?

*(Moderator Bill):* That would move too quickly for an asteroid -- has to be an Earth-orbiting object.

sarahldg: the Quadrantids meteor shower is going to happen in mid-January

*(Moderator Danielle):* Early January -- Jan 3/4.

Luan\_Martins: what are the chances I could see a meteor in my home? yet could not see any! :(

*(Moderator Bill):* You need to go outside, and give your eyes about 30 minutes to adjust.

Kurt: Are there any radio frequencies optimum to listen to in order to hear the effect of the meteor shower in the ionosphere?

*(Moderator Bill):* Many people tune to the frequency of a distant FM radio station to hear meteors.

Jao\_: Hello was wondering if there is a danger of these meteors collide with the atmosphere or something?

*(Moderator Rhiannon):* The reason you are seeing these meteors are because they are ablating (burning up) in our atmosphere. But there is a very small chance that they will make it all the way to the Earth's surface. Most of them burn up completely at 72 kilometers up.

*(Moderator Bill):* Hi everyone -- getting lots of questions about peak times. Peak times will be 2:00 a.m. local time, which will depend on where you're viewing the shower. If the skies are clear, lie on your back

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Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

and look straight up. You can see meteors up until dawn. Tonight is the peak of the Geminids -- you can see meteors tomorrow night, but rates will be about 1/2 to 1/3 of what you can see tonight.

Timasdf133: About how many meteors per hour can i expect to see?

*(Moderator Danielle):* With the bright waning gibbous moon washing out all but the brightest Geminids, we only expect to see perhaps 40 or so meteors per hour at shower peak.

leo\_toni: if a meteor 1 cm diameter came to ground, where the size of the crater that it would open?

*(Moderator Rhiannon):* A meteor one cm in diameter would burn up before it made it to the ground.

ryry4685: can you buy a geminid online

*(Moderator Danielle):* No, sorry.

LucasMartinez: The trail left by Phaethon never end? Year by year?

*(Moderator Bill):* The Earth runs into the trail every year at this time -- eventually in a couple of centuries, Jupiter's gravity will pull the trail far enough away from Earth that we will no longer run into the debris. When this happens, there will be no more Geminid meteors.

will: At what time will the meteors be most visible?

*(Moderator Danielle):* The Geminid radiant reaches its highest point around 2 am local time. So that's when we should see the most meteors.

subsfenandes: we can see it from every part of the planet?

*(Moderator Bill):* Yes, except Antarctica.

MCTriner: What is the real meteor size?

*(Moderator Rhiannon):* The meteors you are seeing tonight are mostly millimeter or centimeter size rocks. However when they burn up the ionization spreads out to be much, much larger than the actual rock. For example a mm-size rock may produce ionization as large as a battleship. This is why we can see them!

Seth: that's is going to be a big meteor shower or just a drizzle?

*(Moderator Bill):* Kind of in-between. 40/hour is pretty good.

superflutist: What materials are the meteors made of?

*(Moderator Rhiannon):* Ice, dust/dirt, organic chemicals.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
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**December 13, 2011**

---

DaGlom: I remember reading that the Geminids have been seen, at least at this strength, for only a few decades, and that the peak is shifting towards the end of the shower. Is this because the meteor stream is changing its orbit? If so, what does this mean for future Geminid displays?

*(Moderator Bill):* Yes, the Geminids have been gradually intensifying over the years. They were first seen in the 1830s and in another couple of centuries, Jupiter's gravity will pull the stream's orbit far from Earth, and there will be no more Geminids.

girardi: why my eyes need 30 minutes to adjust in the outside my home?

*(Moderator Bill):* Because it takes that long for your pupils to dilate after being exposed to bright light.

Boaventura: can the full moon obscure the meteors?

*(Moderator Rhiannon):* The moon definitely hampers the number of meteors we can see. The light from the moon washes out the fainter meteors which is why this year we can only see about 40 meteors per hour. If there was no moon, and clear skies, you can see as many as 120 Geminids per hour.

Mateus: I cant go outside now,can i see it trough my window?

*(Moderator Bill):* You probably won't see meteors by looking through your window.

Bruno\_-\_Brasil: When you end this phenomenon?

*(Moderator Bill):* Geminids will go on through the rest of this week, but you won't see many beyond tomorrow night.

sarahldg: the Quadrantids will be a big meteor shower too?

*(Moderator Bill):* Yes, but the meteors will be very faint.

Brad: This is not meteor related, but I'm curious about the music in the background. Third Rock Radio perhaps?

*(Moderator Bill):* Wow, yes -- it IS Third Rock Radio.

Jao\_: Oh thanks i love nasa ^^

*(Moderator Bill):* Thanks for being here!

Seth: I was expecting a big meteor shower... anyways, you guys have some idea when it will be possible to see? ( a great meteor shower )

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* The Moon was not favorable for meteor showers this year (i.e. it was fairly bright during the peaks of the showers), however next year (2012) it is more favorable and so hopefully we will have clear skies and be able to see many fantastic meteors!

lili098: how are meteor showers good things?? i mean aren't they destroying our atmosphere?

*(Moderator Danielle):* Meteor showers are natural phenomena -- I would say neither good nor bad -- just a fact of life. The Earth runs into meteoroids all the time -- the majority burn up in the atmosphere and never make it to the ground. They aren't destroying our atmosphere, no worries.

random: What is the largest geminid possible to make a crater on Earth's surface?

*(Moderator Rhiannon):* There is no known Geminid to land on the surface of the Earth. They all burn up by about 72 kilometers up.

R2TJLFDNY: Just saw a few in the last couple of minutes here on Long Island, N.Y. Amazing sight to see!!!! Thanks to all for the info!!

*(Moderator Rhiannon):* Awesome! So glad you got to see some for yourself. 😊

VFSL: looks like meteors are coming from the moon, why this happens ?

*(Moderator Danielle):* The meteors aren't coming from the Moon, it may just be a trick of the geometry. Geminid meteors APPEAR to come from the direction of the constellation Gemini.

random: Will you show the highlights of the meteors anywhere after this is over?

*(Moderator Bill):* A full replay of the shower will be available on the Ustream feed immediately after the shower. In the past, our users have gone in and created some really good highlight clips of the best meteors.

janellelucy: Saw three meteors!

*(Moderator Danielle):* Congratulations!!

Jao\_: Hello here is full of clouds in the sky is likely to see a meteor?

*(Moderator Danielle):* If you can't see stars, you won't see meteors. ☹️

subsferrandes: when does it finish ?

*(Moderator Bill):* Geminids will go on through the end of the week, but you won't see as many as tonight.

ryry4685: Whats the difference between a asteroid and meteor

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* Essentially size. An asteroid is large enough that we could detect it before it hits Earth's atmosphere. Meteors are smaller.

scienceiscrazy: i might go outside here in Chicago, what are the chances of seeing a Geminid(s)?

*(Moderator Bill):* Well, that depends on the amount of light around you. Dark skies are always better for viewing.

anipa: tonight is the night ?

*(Moderator Bill):* Yes, this is the peak of 40/hour. You can see Geminids tomorrow at about 1/2 to 1/3 the rates.

juju: when will the Quadrantids happen? what day will the peak happen?

*(Moderator Rhiannon):* The Quadrantids occur in early January. January 3rd/4th is your best bet to see them. There are reports that the Quadrantids will be quite nice this year.

Frodo: By the live stream, i can see any meteor?

*(Moderator Bill):* Yes, keep watching. We've seen several nice meteors on the feed tonight.

Nineth: What is the best time to see the geminids in Guatemala, Central America?

*(Moderator Bill):* 2 a.m. local time

geminid83: cloudy in my area, southern colorado, saw a few earlier and a few the past couple days...sad because this shower is always good, hoping it clears up

*(Moderator Bill):* Good luck with that -- we've been having some fog here as well. You can also try one of the cameras in our network: <http://www.nasa.gov/connect/chat/allsky.html>

Carol: Can we hear the sound of meteors ? Sometimes I heard strange sounds and was like .. Well , I can't explain that . They looked like "rockets" . But lower .

*(Moderator Danielle):* When you're out observing meteors you won't usually hear any audible sounds. Some hissing sounds and sonic booms have been reported for VERY bright meteors (especially Leonids). The sounds are thought to be due to very low frequency radio waves interacting with the local environment.

superflutist: How long is this chat open for?

*(Moderator Rhiannon):* We will be here until 4am central time (5am EST)!

Klindar: *(Moderator Bill)*, dark adaptation is more about production of rodopsin than pupil dilation. Rob

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* Yes, you're right.

Brunoogarciaa: This phenomenon can be called a meteor shower?

*(Moderator Bill):* Yes, it can.

hiiii: why the meteor shower can't be seen from Antartica?

*(Moderator Bill):* Because the constellation of Gemini is below the horizon.

geminid83: wondering what the rates will be like for tomorrow night dec 14th?

*(Moderator Bill):* About 10-15/hour.

thegough123: Ive counted ten here in atlanta georgia, and one looked to be close to the earth's surface. How close do they actually get?

*(Moderator Rhiannon):* Awesome! We are glad you have seen some! Geminids burn up by about 72 kilometers up (45 miles), however they often look to be much closer.

will: How long has this phenomenon been going on for?

*(Moderator Bill):* Since 1833 for the shower as periodic happening, or the past day or so for this year's shower. ☺

MME: here in Venezuela, the radiant is already in the zenith, is this the best moment to see the meteors right??

*(Moderator Danielle):* The radiant reaches zenith around 2 a.m. local time, both in the northern and southern hemisphere. This is when we would expect to see the most Geminids.

carolinecunnha1: What is the best time to see the geminids in Brazil, South America?

*(Moderator Bill):* 2 a.m. local

Andii14: in all the World we can see Quadrantids??? thanks for answering :D (sorry for the English mistakes :p)

*(Moderator Bill):* No, just the northern hemisphere.

scienceiscrazy: what is the live-stream above filmed by?

*(Moderator Rhiannon):* This is a low-light level video camera with a 25 degree field of view. It is pointing north, just above Polaris.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

ronnieking: Which is better for spotting these tonight: gazing at only one area of sky or scanning your gaze over all the sky that you can see?

*(Moderator Bill):* Best to look straight up and take in as much of the sky as possible.

will: How will I know if I see a meteor on the live stream?

*(Moderator Bill):* It will appear to streak across the field of view. It's cloudy right now, but we see a break coming in the clouds.

will: What date or time will the meteors stop?

*(Moderator Danielle):* The Geminid meteors you mean? The Geminids have historically been active from Dec 4 to Dec 17.

Kurt: Thank you for doing this. From the old NASA Spacelink BBS in the late 80's to today, MSFC has done a marvelous job of bringing the wonders of space to the public.

*(Moderator Bill):* Thank you, very much!

girardi: are the meteor toxics or radioatives?

*(Moderator Danielle):* Nope!

Delonix: Have you heard about any OnLine/Live meteor count available on the net?

*(Moderator Rhiannon):* The International Meteor Organization (imo.net) has rates published online for major meteor showers. This site is a great resource for meteor-related information.

sat: how many hours is that? left i mean

*(Moderator Bill):* You can see meteors until dawn.

erico: Hi! I'm from Brazil - South America. I can't see anything. I've been waiting for hours! It's kinda cloudy here. What's the best moment to see the meteors?

*(Moderator Bill):* Sadly, you can't see meteors through the clouds. Please share our Ustream view on this page -- we're seeing Geminids there.

Mateus: So if i dont wait 30 minutes outside i wont be able to see anything?

*(Moderator Danielle):* It is less likely you will see meteors if you don't let your eyes adjust to the dark. Meteor observing takes a lot of patience... and coffee. ☺

MME: some of this meteors could hit any spacecraft?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* There is a risk to spacecraft from meteors. We at the Meteoroid Environment Office (MEO) have models to try to predict the risk to spacecraft from meteors.

Brad: How is the research of Meteors, Geminids specifically, used at Marshall Space Flight Center and NASA?

*(Moderator Bill):* We use visual radar and other optical observations to calibrate our meteor shower forecasts, which are used by spacecraft operators.

thegough123: Is best viewing to be facing towards castor and the moon or away?

*(Moderator Bill):* Look straight up and try to avoid looking right at the moon.

leo\_toni: the sky is cloudy in the video now ?

*(Moderator Danielle):* We have clouds coming and going in the video... I think we expect a short break in the clouds soon. When the sky is clear, you should be able to see stars (twinkling points of light) in the video feed.

joaoPK: But is easy see any germinid meteor tomorrow ?

*(Moderator Rhiannon):* If you have clear skies tomorrow night, you will likely still be able to see Geminids, though the rates will be considerably less than tonight.

geminid83: *(Moderator Bill)*, what is the best meteor shower you have ever seen in your life??? mine was 2001 Lyrids i believe, Meteor storm about 2000 per hour for a few hours...amazing to say the least

*(Moderator Bill):* 2001 Leonids meteor storm (I believe you meant Leonids, not Lyrids). So we share the same notion of the best meteor shower we've seen.

VitorSeverino: Kay im going out now to see if I can see some! wish me luck! :P

*(Moderator Bill):* Good luck!

Andii14: how many years we can see this geminids ? from El Salvador Greetings everybody it's nice to share something that we can see in different places or our Continent :D

*(Moderator Rhiannon):* We have been able to see the Geminids for almost 2 centuries. And we expect to continue to see them every December.

samt2565393: I am in Huntsville, AL and have counted 12 so far and despite the bright moon, I managed to get a shot of a fain one

*(Moderator Rhiannon):* Fantastic!

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

xlok: what time is starts the meteor shower

*(Moderator Bill):* It's already started and will go until dawn, with peak rates at 2 a.m. local.

dorottta: I can't believe I waited the whole year for something like this and it's raining tonight! This is really disappointing. ):

*(Moderator Danielle):* I'm so sorry to hear that, Dorottta. The next chance to see a good shower will be the Quadrantids, January 3-4.

sat: Also might i suggest a google search to spaceweatherradio its a live stream of echo pings for meteors above texas.

*(Moderator Rhiannon):* Thanks for the suggestion!

Tau: A meteor is made of what ?

*(Moderator Rhiannon):* Ice, dust/rock, and organic chemicals.

caiodotcom: When will be the next meteor shower for the South Hemisphere?

*(Moderator Danielle):* From the southern hemisphere, I believe the next good shower may be the Eta Aquariids in May.

leocosta7: how many meteors are passing by for hour tonight? i saw a lot of!

*(Moderator Bill):* About 40/hour at 2 a.m. local time.

swatcats: Are the meteors just passing throught the atmosphere or are some of them hitting the ground?

*(Moderator Rhiannon):* Most of these meteors are just burning up in the atmosphere. It is very rare for them to make it through the atmosphere and land on the ground as a meteorite.

agency: When is the best time to see meteors in Orlando, FI?

*(Moderator Bill):* 2 a.m. local time.

thegough123: up to 22 to atlanta ga, why are we able to see them clearer than other places?

*(Moderator Danielle):* May be entirely weather dependent.

MME: is there any way to monitoring the meteors before reach the atmosphere?? or is it impossible?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* Not easily -- they're very small and dark, so they don't show up in optical instruments like telescopes, and because most are made of ice, they don't reflect radar very well. That's why we have to wait until they burn up in the atmosphere.

Vicky\_Dan: how is it they happen everywhere on earth at the same time?

*(Moderator Rhiannon):* You can see Geminids anywhere that the radiant is visible. The radiant is the point in the sky that all the Geminids appear to come from, and that is in the constellation Gemini. Gemini is placed such that the only place in the world that cannot see these meteors is Antarctica.

Isabel\_Ferreira: the possibility of a meteorite colliding with the earth

*(Moderator Bill):* Meteors collide with Earth all the time. If you mean asteroids, you need to talk to Don Yeomans at JPL.

Julio: how many meteors are passing in São Paulo, Brazil tonight? i not saw

*(Moderator Danielle):* Northern hemisphere observers may see about 40 meteors per hour at the maximum. Observers in the southern hemisphere won't see as many meteors as those in the northern hemisphere, because the Geminid radiant doesn't rise high above the horizon.

Mauro1721: what happen with the ustream live sky guys, Because i can't see the stars :S

*(Moderator Bill):* We're clouded out right now. Try these links to other cameras:

<http://www.nasa.gov/connect/chat/allsky.html>

Luan\_Martins: Hello, I'm from Brazil! I wonder if the fact that my region is under a cloudy sky, can disrupt to see the meteors?

*(Moderator Danielle):* If you can't see stars you won't be able to see meteors.

xavo: IN MEXICO IVE JUST SAW ONE!! =)

*(Moderator Danielle):* Congratulations!!!

thegough123: Is there a monitoring system counting each meteor that enters our atmosphere tonight?

*(Moderator Bill):* We have a network of six cameras that watch the skies every night for meteors and measures their trajectories and orbits.

subsferrandes: how does ti look like , the meteors?

*(Moderator Danielle):* On the video feed they'll look like quick streaks of light.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Alessandra\_Gallon: I'm fascinated by astronomy and one day I'll become a astronomer too! :) Although I can't see the meteor shower because here it's clouded, I saw the Perseid meteor shower and it was beautiful! Exciting! I'm very happy that you are talking with us :) Thank you for all the answers

*(Moderator Rhiannon):* Fantastic! It is clouding over here in Huntsville, Alabama. However we have cameras streaming in from other locations that are not clouded over. Check this link out:

<http://www.nasa.gov/connect/chat/allsky.html>

Carol: Some meteors have done a damage on the earth? Or is this not possible?

*(Moderator Bill):* Meteors are too small to damage the Earth. Asteroids can cause big craters and considerable damage to the climate.

Ayslan\_BR: I saw a lot, really I like it, it's beautiful! I'm from Brazil, Nordeste, Caruaru

*(Moderator Bill):* Glad you're enjoying the show.

caiodotcom: Why some of the meteors seem brighter and 'last' longer in the sky than the others?

*(Moderator Rhiannon):* Likely because those are larger meteors.

me: it's way past 2:00 am here. I can still see the meteors?

*(Moderator Danielle):* You may be able to see meteors up until just before sunrise.

Andii14: what happened with Camera ... I just can see gray screen :( ??

*(Moderator Rhiannon):* It has clouded over a bit here. We have seen several meteors through the clouds on the camera though!

rayane: Brazil is awake! :)

*(Moderator Bill):* So are we -- thanks for helping us watch the skies.

Luc.BR: Going to sleep, but don't know how! Looking to the sky or the Ustream on fullscreen. Saw 2 here in Rio de Janeiro. \*\_\*

*(Moderator Danielle):* Thanks for joining us Luc.BR. Sleep well!

dorottha: And when is it going to be the Quadrantids' peek time?

*(Moderator Bill):* Night of Jan. 3 into the morning of Jan. 4.

John\_M.: We went to Meteor Crater in Arizona last year. How big was that monster that hit and made a hole that big?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* It was about the size of a football field.

geminid83: mostly moonless meteor showers in 2012 correct?? its snowing now here...life in the mountains i guess lol

*(Moderator Bill):* Yes to your first question -- stay warm!

dorottta: Ok. I hope it won't rain. Good night, everyone! Greetings from Brazil.

*(Moderator Danielle):* Good night, Dorottta!

leo\_toni: than meteoroids are composed? iron, lead?

*(Moderator Bill):* Geminids are composed of small bits of rocks, bulk density about 3 g/cc.

enthu: Which Direction I need to look ??

*(Moderator Bill):* Look straight up.

caiodotcom: I'm from Brazil and this is the FIRST TIME I've watched a meteor shower, and actually managed to see 4 of them before it got cloudy here. It was amazing!

*(Moderator Bill):* Congratulations!

Brad: *(Moderator Rhiannon)* - First off, congratulations on becoming part of the M.E.O. team. Secondly, when it comes to observing meteors how does metal atom emissions effect the color of meteors? What is typical meteor color?

*(Moderator Rhiannon):* Brad - thanks! It has been a blast. When different elements in meteors are ionized they produce colors. For example, sodium produces a bright yellow color, nickel shows as green, and magnesium as blue-white.

titocan2010: its possible that here in mexico meteors are visible?

*(Moderator Danielle):* Yes indeed, if you have clear weather!

*(Moderator Bill):* Hi everyone -- getting lots of questions about peak times. Peak times will be 2:00 a.m. local time, which will depend on where you're viewing the shower. If the skies are clear, lie on your back and look straight up. You can see meteors up until dawn. Tonight is the peak of the Geminids -- you can see meteors tomorrow night, but rates will be about 1/2 to 1/3 of what you can see tonight.

ta9124: whats the best time to see meteors in vancouver,BC?, and in Mexico City?

*(Moderator Danielle):* When the Geminid radiant is highest in the sky -- around 2 am local time.

ta9124: whats the best time to see any meteors in vancouver,BC?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* 2 a.m. local time.

luri\_SSA: Can I see online ? In the USTREAM Live ?

*(Moderator Rhiannon):* Yes, the USTREAM is live from Huntsville, Alabama. You can see other cameras at: <http://www.nasa.gov/connect/chat/allsky.html>

soulWRITER: Saw a couple here in Connecticut, but the clouds started moving in, so my view was obscured. Too cold to stay outside, so I went in. but lucky me, I saw 6 or 7!

*(Moderator Danielle):* I don't envy you the cold weather! Congrats on seeing a few!

sigismund: what is the best time for like pennsylvania hour, i have seen a whooping two thus far

*(Moderator Rhiannon):* 2 a.m. local time is your best bet. Keep trying! Hopefully you will see that really bright Geminid that will make your night!

MME: Can the geminids hit the moon's surface?? can it be observed with a telescope??

*(Moderator Bill):* Yes and yes! Last year, we saw over 20 Geminids hit the surface of the moon with our telescopes. You can read more about our lunar impact monitoring here: <http://www.nasa.gov/centers/marshall/news/lunar/index.html>

Moonlover: Can they be seen with the naked eye?

*(Moderator Rhiannon):* Yes, the naked eye is the best way to view meteors. You want the largest field-of-view as possible, so using binoculars or telescopes is not helpful to observe meteors.

John\_M.: It's starting to clear here and I just seen one out our kitchen door. Didn't have to go outside. It's realllllllly cold here. So cool.

*(Moderator Rhiannon):* Fantastic!

geminid83: how are the peak hours calculated?? I understand we go through the same debris field roughly same day every year but do the peak hours of the geminids or any shower for that matter change from year to year? as far as i know peak for geminids is always early am...is that because we can see more due to sky being darker at that time???

*(Moderator Danielle):* We encounter the stream at a slightly different position each year, but it doesn't vary by much. The radiant is highest at 2 a.m., so that's when we'd expect to see the most meteors.

Antonio\_Brazil: *(MODERATOR BILL)* whats the best time to see any meteors in Brazil?

*(Moderator Bill):* 2 a.m. local time.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Carol: I'm going to sleep . congratulations to the job . It's ir very intersting. I'm sad because I just saw a bright "smoke" . Maybe I'll watch at the news tomorrow night . I expect . One more time , congratulations . XoXo .

*(Moderator Bill):* Thank you!

samt2565393: *(Moderator Bill)* are you in Huntsville, AL? If so do you know if we will clear up by then?

*(Moderator Bill):* Yes, in Huntsville. The skies look grim. ☹

leo\_toni: why some meteors leave a trail of red light and others leave a trail of blue light?

*(Moderator Rhiannon):* The color of meteors is highly dependent on what chemical/element is being ionized.

John\_M.: Since some of these geminids hit the surface of the moon, do any of them hit the ISS?

*(Moderator Bill):* No, the ISS is much smaller than the moon, so odds of impact are VERY low.

Myriam.: Why meteors make noise? i.e the "whistle" ?

*(Moderator Danielle):* If you listen to forward scatter radar, a meteor whistle is created when the ionization trail from the meteor reflects radio signals to the detector. The meteors ionize the air around them as they burn up and these ionized air molecules reflect radio waves to the antenna -- as the meteor moves, the frequency changes, which accounts for the various sounds.

caiodotcom: Do the shower offer great risk to artificial satellites? Is there any known cases of satellite damage caused by showers like the experienced today? Is there any way to "protect" them?

*(Moderator Bill):* Not great risk. The Perseid meteor shower has caused damage to at least two satellites. Satellites' sensitive areas are shielded to protect them from meteors.

Hev: There are a lot of Brazilians citizens so excited to see meteors...Here is 03:14am

*(Moderator Rhiannon):* We do have a lot of Brazilians here tonight. Thanks for your enthusiasm. ☺

jgatewood: Not good watching weather here. It is really rainy and cold

*(Moderator Bill):* We also have clouds, but we're still seeing some nice Geminids on the Ustream feed.

geminid83: thank you for all the insightful answers and the information provided here, always enjoy these chats just want to say you guys do an excellent job at responding !! It is much appreciated

*(Moderator Rhiannon):* So glad you enjoy them!

luisa: What is the best time to see shower meteors in Miami ..

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* 2 a.m. local time.

Brad: If I were to pursue a future career at NASA what advice would you offer? Also, what field of study should I pursue?

*(Moderator Bill):* Engineering or science are good fields -- get at least a bachelors degree in college.

xlok: where the camera is positioned up there

*(Moderator Bill):* It's pointed just above Polaris, the North Star.

samt2565393: Off the subject but do you know if there are any places to hunt meteors around huntsville? I have gotten into meteorite men and gotten a metal detector but am having a hard time finding a good place to hunt

*(Moderator Rhiannon):* If you are serious about finding a meteorite the best place to look is the Arctic/Antarctic or a desert. Any meteorite that falls there just sits on the surface! So if you see a black rock sitting on ice in the Arctic, there is a good chance that is a meteorite.

leocosta7: I'm going to sleep now! I saw about 5 meteors tonight! It was so beautiful! Thank you for all this! I love nasa!

*(Moderator Bill):* Pleasant dreams -- glad you saw some meteors.

rafaglima: big grey cloud on stream?

*(Moderator Bill):* We have some clouds in the skies over Huntsville, but still seeing meteors.

Antonio\_Brazil: *(Moderator Bill)* why 2 a.m. something special??

*(Moderator Bill):* Because that's when Gemini is straight overhead and you will see meteors coming from Gemini in all directions.

alex\_r: hi i don't know where to watch at the sky, could you tell me??

*(Moderator Rhiannon):* The best place to look is straight up. Lie on your back if you can and just wait. Hopefully you will see a few good Geminids!

Brazil: hey guys, im brazilian, from where i have to look on sky? neer the moon? north, south, east, where? and another question, can i still watch the shower tomorrow night? thanks!

*(Moderator Bill):* Look straight up and you can still see Geminids tomorrow night, but at a reduced rate.

MME: all debris from Phaeton have the same orbital inclination??

*(Moderator Bill):* Yes, it does.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Isabel\_Ferreira: What a beautiful night, I've seen seven meteors today. Perfect

*(Moderator Rhiannon):* Great!

John\_M.: Ones here in Nebraska are going to North to South. Is that correct?

*(Moderator Bill):* They can go north-south, east-west, etc. but they'll appear to come from the Constellation of Gemini.

anipa: I've seen 3 !

*(Moderator Bill):* Congrats!

Daniela8: Hello!, I'm from Colombia, Please, I want to know what time I can see the video

*(Moderator Bill):* The Ustream is live on the page now, and will replay immediately after the chat ends, too.

Maria: Think I will wait for the meteors tomorrow then! Goodnight and thanks from Brazil!

*(Moderator Bill):* Thanks for stopping by!

Isabel\_Ferreira: how to locate the constellation Gemini?

*(Moderator Bill):* It's to the north and east of Constellation of Orion.

geminid83: interesting point about finding meteorites on ice or desert,, who does one contact if they think they have found a meteorite for verification???

*(Moderator Bill):* Find out who owns the property -- they are the persons to contact.

samt2565393: Thanks *(Moderator Rhiannon)*, I was looking for some place more local to to Alabama. I have found allot of data on fireballs breaking up over the state but no actual locations

*(Moderator Rhiannon):* It is difficult to estimate where the meteorite actually lands as we stop observing it very high up (on the order of 15 to 70 kilometers up). The American Meteor Society ([amsmeters.com](http://amsmeters.com)) is a good resource that collects visual reports and can estimate where the fireballs landed. If you are not familiar with our own site, check out [fireballs.ndc.nasa.gov](http://fireballs.ndc.nasa.gov). This website automatically updates every morning with the fireballs seen on our cameras the night before, and includes quite a bit of information on them.

MME: why some meteors go faster than others??

*(Moderator Bill):* Geminids all move at the same speed, but meteors not Geminids move slower or faster because they're in different orbits.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

caiodotcom: Is the shower weaker in the southern hemisphere? Not getting as many meteors as apparently you are...

*(Moderator Rhiannon):* The radiant will not be as high in the southern hemisphere, so if the southern hemisphere is reporting lesser rates, that would not surprise us. We are sorry! Hopefully you can still see some meteors on our live feeds: <http://www.nasa.gov/connect/chat/allsky.html>

Bruno: did the shower stop? :(

*(Moderator Bill):* No, still goes on until dawn. We have clouds showing on the Ustream feed right now. Try some of these other links: <http://www.nasa.gov/connect/chat/allsky.html>

VFSL: Nice work with the live cam guys.

*(Moderator Bill):* Thank you!

xlok: do you know any iphone application that will show me the exact of rain where i am

*(Moderator Bill):* You can try downloading Meteor Counter from the App Store -- it's free and will help you observe meteors.

John\_M.: Is Mars the other bright star almost straight over head?

*(Moderator Bill):* Jupiter.

Daniela8: Thank you *(Moderator Bill)*, but now I can only see the gray image

*(Moderator Bill):* Yes, it's cloudy here right now. Try these links:  
<http://www.nasa.gov/connect/chat/allsky.html>

julicn: Here in Sao Paulo, Brazil, the sky is very cloudy and I can't see any star. So, no Geminids for me?

*(Moderator Bill):* No Geminids until the clouds go away.

StephanieW: *(Moderator Bill)*, can you tell us about the new app-- meteor counter?

*(Moderator Bill):* I can -- this news release has a lot of good information about the app:  
<http://www.nasa.gov/centers/marshall/news/news/releases/2011/11-155.html>

Bruno: could you guys just turn off the moon? :)

*(Moderator Bill):* I wish we could!

Teresa: what time does it peak in Los Angeles?

*(Moderator Bill):* 2 a.m. local.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

sorpk: what was the dark thing that just moved?

*(Moderator Bill):* A bug on the camera. ☺

MonsterMatt: can i see the shower if im in Missouri

*(Moderator Bill):* Yes, you can.

cw: are all of the links on allsky.html static pictures? Are there any other live streaming video sources that might not be couldy?

*(Moderator Bill):* Yes, they are static -- don't know of other streaming sources.

*(Moderator Bill):* WOW, just saw a very bright Geminid on the lower right corner of the feed.

caiodotcom: When a meteor hits the ground, would it be hot from the contact with the atmosphere or cold from the ice? I've read somewhere that they would feel really cold, but that seems unlikely

*(Moderator Rhiannon):* It will be cold to the touch. It stops burning up about 25 kilometers (16 miles) above the Earth's surface, and it has significantly slowed down by then. In the time it takes for the meteor to reach the Earth's surface, it has cooled down significantly.

John: Hey guys, i'm from brazil and here is 3 A.M. i want to know: I'm in front of the sea and until now, since 1 A.M, i didn't see anything. What i have to do? i'm looking to the sky but nothing happens =/

*(Moderator Bill):* Just lie on your back and look straight up -- you should see meteors until dawn. Since much of Brazil is under clouds, you won't see meteors if the sky is cloudy.

Teresa: The gibbous moon is just so bright now here even with some clouds. I just went outside.

*(Moderator Bill):* Yes, the brightness of the moon is reducing the number of Geminids you can see -- it washes out the faint meteors.

vanexel: I'm from Mexico and the sky looks beautiful shooting stars are amazing

*(Moderator Bill):* Glad you're getting a good show down there in Mexico.

MARCOO: IN ARGENTINA CAS SEE THE RAIN ?

*(Moderator Bill):* Yes, you can, until dawn.

John\_M.: If Jupiter is almost overhead, Mars off to my southeast?

*(Moderator Rhiannon):* There is a high chance what you are seeing is Mars off to your southeast. Check out this helpful link to see up to 5 planets tonight! <http://earthsky.org/astronomy-essentials/visible-planets-tonight-mars-jupiter-venus-saturn-mercury>

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

augusto.20: How many meteorites I can see in the central region of South America? And how late they will be passing through Brazil? Sorry about my bad english. ;x

*(Moderator Bill):* You'll see a maximum of 40/hour and you can see them until dawn.

MonsterMatt: dear *(Moderator Bill)*, do you know what time the shower will end in Kansas

*(Moderator Bill):* At dawn.

MonsterMatt: thank you i bet you are so busy you can't even watch the shower lol

*(Moderator Danielle):* We have the video feed up on the big screen, but it is hard to type and watch the feed at the same time. ☺

erico: You saw before that "if i can't see the stars, i'm not able to see the meteors". I can't see stars on that screen. Does it mean that i can't see any meteor here?

*(Moderator Rhiannon):* We actually have seen some meteors through the haze on our camera.

DaGlom: Any ideas on when these particles were actually shed by Phaethon?

*(Moderator Bill):* Several centuries ago -- different researchers give different answers. At least 500-2,000 years old.

natalie: will we be able to see it tomorrow again?

*(Moderator Bill):* Yes, but about 1/2-1/3 the rate for tonight. (10-15/hour)

MonsterMatt: i bet thank you for answering my questions

*(Moderator Bill):* You're welcome!

xlok: what is the best time to see meteors in Brazil

*(Moderator Bill):* 2:00 a.m. local.

Luis: Hey could any one tell me if it's worth it to look up to the sky if I'm in Mexico City? and what time would be the best? Thanks!

*(Moderator Bill):* If the sky is clear and you can see the stars in Orion, you can probably see Geminids. Best time is 2:00 a.m. local.

leo\_toni: if i fall to the earth atmosphere like a meteor, i'll burn too?

*(Moderator Bill):* Yes, you will.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

leo\_toni: why when i saw the orion nebula with my 60mm refractor telescope, the orion nebula is grey and not purple? the telescope is the problem?

*(Moderator Danielle):* Your eyes are most sensitive to black and white at night -- so indeed it may look gray. Pictures you see published of the Orion nebula combine color from different channels to make a colored image. Or, depending on the source, they are often false-color images.

Brazil: Number of meteors will be much smaller in brazil tomorrow night? And sorry about the bad english haha.

*(Moderator Danielle):* You may see a few tens of meteors tomorrow night... but the rates will be a lot less than tonight.

blue: im in puerto rico n cant c nothing y is a clear sky

*(Moderator Bill):* Give your eyes about 30 minutes to adjust, and be sure you're outside. ☺

MARCOO: not need a telescope or the naked eye can see in argentina ?

*(Moderator Rhiannon):* Do not use a telescope to see meteors. It is best to have the largest field of view as possible, which is using the naked eye. Lie on your back outside and be patient and hopefully you will see some beautiful Geminids!

SERGIO\_Brazil: It's Sad. At Brazil,Manaus - AM there are many clouds, I can't see directly the sky

*(Moderator Danielle):* I know that's very frustrating. ☹

Blueyes: What time would you say is peak in the Philadelphia area?

*(Moderator Danielle):* The Geminid radiant is highest at 2 am local time -- that's when you'd see the most meteors.

Daniela8: how I can distinguish a star from a planet with simple eye?

*(Moderator Rhiannon):* Some planets (i.e. right now Jupiter and Venus) are considerably brighter than stars in the sky. Planets move across the sky at a different rate. If the object that may be a planet is moving at a different rate than the stars around it, it is likely a planet (or the ISS!).

olorio: hi! i'm in chihuahua, mex. i just saw one meteor, at what time is the best for me to watch sky? (sorry for my english)

*(Moderator Bill):* 2 a.m. local time.

Sarah: What color are meteors that one sees???? Please, answer!! :)

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Danielle):* To me, most meteors look either white or green or yellow. Reported colors range across the spectrum, from red to bright blue.

Sarah: What color are meteors that one sees? Please, answer!

*(Moderator Bill):* Most are white, but some people see blue or green or yellow meteors.

MonsterMatt: What time will you be able to see the shower in Missouri? please reply?

*(Moderator Rhiannon):* The peak will be 2 a.m. local time. Hopefully your skies are clear at that time!

Fernando: What about brazil? We have a lot of brazillians here wanting to see it, but most of the country is cloudy. Will it be possible to see them another night?

*(Moderator Bill):* You can see Geminids through the end of the week, but at a reduced rate. Tomorrow night, peak rates would be about 10-15/hour.

MonsterMatt: what was the other adress that you have opened up for the live video of the shower

*(Moderator Bill):* This is the only feed we manage -- but right now, we're clouded in.

julicn: Meteor and shooting star are the same thing?

*(Moderator Bill):* Yes, they are.

girardi: what to do if I find a meteor on the ground? eat (haha)? sell?

*(Moderator Rhiannon):* You can donate it to a local university for testing, you can donate it (or sell it) to a museum, you can sell it.... lots of options! We wouldn't recommend eating it. ☺

Amanda\_: When its the best time for I see the meteors??????????? I am from São Paulo, brazil. And I can't see anything now. ):

*(Moderator Bill):* 2:00 a.m. local time. If you have clouds, you won't be able to see the Geminids.

John: Hey *(Moderator Bill)*, how i said, i'm from brazil and here is 3:30 A.M, I'm in front of the sea and until now, since 1 A.M, i didn't see anything. you said that i have to look straight up, but i do not see anything! i turn 360° and i can't see the meteors. I have to show this to my mum. what i have to do? =/=/. OBS: THE SKY IS CLEAR! NO CLOUDS HERE.

*(Moderator Danielle):* The most important thing is that you need to make sure you let your eyes adjust to the dark, which will take about 30 minutes or so. Also, if the moon is lighting up a lot of your sky, try shading yourself from moonlight -- sit in the shade of a house, or tree, etc, but leave an otherwise open view of the sky. That may help. Still... meteor observing takes a lot of patience!!

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Sarah: How large a proportion of them compared to a star?

*(Moderator Bill):* Meteors are very small -- the ones you're seeing are about 1/2 mm in size. Stars are very big -- like the sun, which can hold a million Earths.

eam: very nice job guys! I'm here for a long time and i'm going to the bed. The chat and the live ustream will be open again tomorrow? Good night.

*(Moderator Bill):* We won't be chatting, but we'll leave up the link to the Ustream camera for another night or two.

jgatewood: need a big wind to blow away the clouds

*(Moderator Rhiannon):* So do we!

bcwiegand: Hey *(Moderator Bill)*-is peak time 2:00am local time and should I go outside and lay on my back and look straight up? Sorry, couldn't resist that. I love you guys! I am in my senior years and I love bright shiny objects in the night sky. I can't think of anyone better than you all to stay up with for a night sky pajama party. Thanks for being there.

*(Moderator Rhiannon):* Thanks for the encouragement! We enjoy doing these chats. ☺

Guigo: How meteors don't hit the satellites, or ISS...?

*(Moderator Bill):* Because satellites and ISS are relatively small targets. When you look at the night sky, you see about 10K square kms of area, and you see only a few meteors/hour. The ISS is only about 100 meters across, far smaller than the amount of sky you see, so you can understand that the odds of it being hit are very small.

MME: you guys will be again in chat for the quadrantids?

*(Moderator Rhiannon):* We will not be doing a chat for the Quadrantids - too close to Christmas holidays and some members of the MEO will not be back in the office yet. Sorry!

Blueyes: I remember watching John Denver in an interview....he said that the line "I've seen it rain fire in the sky" came from an evening where he and his friends went up camping in the Rocky Mtns during a meteor shower and he was so impressed by what he experienced that he put it in a song.to inspire everyone who heard it.

*(Moderator Bill):* Yes, that was the Perseids meteor shower. John Denver was an avid amateur astronomer.

Fernando: Are there any spot? Or we can expect to see it from anywhere in the sky?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* Expect to see them from anywhere in the sky. Just look straight up and give it some time. We hope you see some beautiful Geminids!

paulo: i cant see anything

*(Moderator Bill):* Is it cloudy? You can't see Geminids through the clouds.

andufie: How long does it last?

*(Moderator Bill):* Until dawn for tonight, and through the rest of the week for the shower.

MonsterMatt: does it matter what part of the sky? does it favor in the south or north?

*(Moderator Danielle):* For the most part, you just want to keep an open view of the sky to see Geminids -- and look away from the bright moon. The Geminids are better for those in the northern hemisphere than the southern hemisphere.

natalie: What time tomorrow??

*(Moderator Rhiannon):* Same as tonight - the peak will be 2 a.m. local time. But the rates will be considerably less. If your skies are cloudy tonight, we still recommend trying tomorrow night as it really is spectacular to see these meteors.

linnegp\_brazil: I've saw some geminids, it's really incredible! Even with the clouds, i've seen 8 of them

*(Moderator Bill):* Great! You're getting a good show.

luri\_SSA: How many meteors the NASA saw ?

*(Moderator Rhiannon):* The NASA camera has seen quite a few meteors even though it is hazy/cloudy! We just saw one a couple minutes ago.

geminid83: will you guys be watching the quadrantids on your own time??? also I hear they may be really strong this year is there any truth to that???

*(Moderator Danielle):* If the weather is nice, yes. ☺ The Quadrantids are well placed for observers in North America this coming year.

leo\_toni: how much a 150mm reflector telescope is better than a 60mm refractor telescope? please answer

*(Moderator Bill):* If you're referring to the lens size, a 150mm reflecting telescope has over 4x the light-gathering power, so it can see fainter objects.

paulo: *(Moderator Bill)* are u a moderator ?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* Yes, I am.

linnegp\_brazil: It happens every year?

*(Moderator Rhiannon):* Yes. The Earth travels through a trail of debris left by the asteroid 3200 Phaethon every year. When that debris burns up in the Earth's atmosphere, we see Geminids! Every year mid-December.

Bruno: why does the nature put clouds on the sky JUST RIGHT NOW? is there some scientific explanation? :(

*(Moderator Bill):* Murphy's Law. ☺

paulo: i gues i saw some germinids, but i'm not sure, i was outside from my house, they look like green or something .. ?

*(Moderator Bill):* Geminids can have a green hue.

sssss: velocity of the geminids?

*(Moderator Danielle):* The Geminids travel about 35 km/s, or 78,000 mph! This is about 60 times faster than the Concorde jet.

caiodotcom: Will the Lyrids Shower be visible in the southern hemisphere?

*(Moderator Bill):* The Lyrids can be seen down to about -54 degrees latitude.

liziernaga: is everyone seeing all gray in that video? :D

*(Moderator Bill):* Yes, it's completely clouded out. We are still seeing some Geminids through the clouds.

MARCOO: In argentina is necessary to look to the north or anywhere in the sky?

*(Moderator Bill):* Look straight up.

leo\_toni: what is the average length of each streak of light?

*(Moderator Rhiannon):* Depending on the size of the meteor, it can be a fraction of a second up to several seconds. Very bright meteors (superbolides) can last 10+ seconds.

alex\_r: when a date of any meteor shower is announced, i must watch the sky the night before the date announced???

*(Moderator Bill):* Either the night before or the night after -- it depends on the shower.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

ThiagoReis\_Brazil: *(Moderator Bill)*, where are you from? Answer please.

*(Moderator Bill)*: We're in Huntsville, Ala.

MME: I'm gonna try to see some geminids and then go to sleep, thank you all member of MEO for this chat, you are so helpful.. we'll talk in next chat. Enjoy this raining!!

*(Moderator Bill)*: You are welcome.

geminid83: thank you, sorry for all the questions but i gotta get all the info from the experts while I can, you guys dont do this chat all the time ya know lol but its very much appreciated :)

*(Moderator Danielle)*: Your questions are good ones. We really enjoy doing these chats, so thank YOU for joining US!

John\_M.: Can we look at this UStream feed at any time of the year?

*(Moderator Bill)*: No, we just publish it for these events.

Rhian: When are the Quadrantids? I'm hoping the rain will clear here soon so I can see Geminids.

*(Moderator Rhiannon)*: The Quadrantids are early January. They will peak January 3/4. We are hoping your skies clear up, too, but if they don't, it is nice to know there is another meteor shower just around the corner!

swatcats: peak will be 2am local time, why is that, just because its the darkest part of the night?

*(Moderator Rhiannon)*: The radiant (point in the sky where the meteors appear to come up) is highest in the sky.

Blueyes: so as we see them only for a second, how far do they travel in that few seconds that they are visible to us?

*(Moderator Bill)*: About 80,000 mph for Geminids speed -- so they cover about 22 miles per second.

Blueyes: do they ever make sounds?

*(Moderator Bill)*: Some people claim to have heard sounds from bright fireballs.

Mychel: why we can't see in this cam ?

*(Moderator Bill)*: Because we're clouded in.

paulo: oh nice !, could u tell us when the shower get intensive, i need to see it outside from my house :D

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Danielle):* We expect to see the most Geminids around 2 a.m. local time when the radiant is highest in the sky.

caiodotcom: Well, I'm going to bed now! Thank you for the answers and for this chat. It was awesome!

*(Moderator Bill):* You're welcome.

Paul\_Gomes: nase have office in brazil ?

*(Moderator Bill):* No, we don't.

giovannisog: I`m from Nicaragua

*(Moderator Danielle):* Welcome, Giovannisog!

ThiagoReis\_Brazil: *(Moderator Bill)*, I can't see anything I'm in Rio de Janeiro - Brazil, do you have a opinion about this ? :x

*(Moderator Bill):* Is it cloudy? That will hinder viewing.

girardi: i'm going to bed... thank you for answering all my questions. sometimes do more, please... i love this chat and who answered the questions (you) BYE :D

*(Moderator Bill):* You're welcome!

Bruno: what's the next good shower that we can clearly watch in Brazil? (if weather helps :P)

*(Moderator Danielle):* The Eta Aquariids in May should be visible from the southern hemisphere.

kimi: what chance do i have of seeing the meteor on partly cloudy sky?

*(Moderator Bill):* You may see a few through gaps in the clouds.

Lucas\_BH: *(Moderator Bill)*, what time does it start in brazil? i have to look only straight up or i can look to the horizon? answer please

*(Moderator Bill):* Look straight up.

leo\_toni: Thanks *(Moderator Rhiannon)*, but I referred to the length in kilometers. XD

*(Moderator Rhiannon):* Thank you for clarifying! A Geminid travels 22 miles per second, so if it lasts for 1 second (which is common), it covers 22 miles.

ivan\_: Yo! *(Moderator Bill)* ... we are in Guatemala drinking milk and eating cookies... why we are only seeing the moon? where are the Geminids???

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

*(Moderator Bill)*: Make sure you get away from lights, to darker skies. Hard to see Geminids with bright lights around.

Rhian: Wicked cool, thanks *(Moderator Rhiannon)*, also, lovely name of course :)

*(Moderator Rhiannon)*: Same to you!

*(Moderator Bill)*: Hi everyone -- the Ustream is gray right now because we're clouded in over Huntsville. We're hoping for some breaks in the clouds...

Blueyes: I thought I heard a a high pitched sound 1x years ago during the one in Nov.....it was about 7 - 10 years ago and it was the most amazing show.....I saw several at the same time as well but I always wondered if what heard was truly one

*(Moderator Danielle)*: It's possible, though rare. When you're out observing meteors you won't usually hear any audible sounds. Some hissing sounds and sonic booms have been reported for VERY bright meteors (especially Leonids in November). The sounds are thought to be due to very low frequency radio waves interacting with the local environment.

ivan\_: come to Guatemala we have clear nighth ... and beers ...

*(Moderator Bill)*: We have cloudy nights and coffee. ☺

leo\_toni: which country is more watching Geminid meteor shower in the ustream?

*(Moderator Bill)*: It looks like Brazil is in the lead. ☺

olorio: I read that the asteroid Phaethon already extinct and what we see are the remainings ejected centuries ago. Is this true?

*(Moderator Rhiannon)*: Phaethon is not 'extinct', it still exists, and in fact we have taken pictures of it recently. However it is known as an extinct comet, since some people believe that Phaethon was a comet but its ices have burned completely away after travelling so close to the sun so many times, and now just the rocky body is left.

BCstargazer: 10 PM PST Luna peeking thru clouds...there is Hope after all

*(Moderator Danielle)*: \*keeping fingers crossed\*

ThiagoReis\_Brazil: *(Moderator Bill)*, I'm bored because i can't see anything, here in Brazil (Rio de Janeiro) isn't cloudy, what do you answer me?

*(Moderator Bill)*: Go outside if you're indoors. Get away from the lights -- it will take your eyes 30 minutes or so to adjust.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

sorpk: i think this is a very good tool, for people that is interested in astrony and dont know alot about it ! thank u

*(Moderator Danielle):* I'm glad you think so! Thanks for joining us!

norberto: Hi, I am from el Paso Texas, right now is cloudy but I am trying to watch the stars from the ustream but the camera is blank, do you have any ideas about this?

*(Moderator Rhiannon):* If all you are seeing is a grey background, unfortunately that is all we are seeing, too. It has clouded over in Alabama. There are other cameras streaming at:

<http://www.nasa.gov/connect/chat/allsky.html>

paulo: aa last question, not a quest but a ASK, take some photos for us, who did not see the germinids i'll be greatfull.

*(Moderator Bill):* We'll post some Geminids on the Watch the Skies blog.

Nick: Hi, I have a question: even if the odds of the ISS or even a satellite of being hit by something are almost 0, it will happen sometime. If small rocks travel so fast, what could happen to the ISS if it's hit by one? Does it actually have any kind of shield against that? (I guess the energy contained in a meteor couldn't be stopped by anything...)

*(Moderator Bill):* ISS is armored with "stuffed bumper shields" that can protect against meteoroids up to 1" (2.5 cm) in diameter.

Guigo: How will the intensity of Eta Aquariids? It's possible to predict?

*(Moderator Bill):* The Eta Aquarids have a typical rate of 30/hour.

Blueyes: it was the Leonids, the November shower do your recall which year that was, when it was absolutely amazing.....I think it may have been 1999 or 2000

*(Moderator Bill):* 1999 was good, 2001 was better.

Matt: What is the best time for viewing on the west coast?

*(Moderator Rhiannon):* 2 a.m. local time.

D13g0: From El Salvador, Central America, I just spend 1 hour watching to the sky and what I saw was beautiful! At least 10 of them, and many many stars I've never noticed before!

*(Moderator Bill):* Congratulations!

ivan\_: i'm trying to watch the geminids with a telescope but it goes so fast ... what is your opinion

*(Moderator Bill)?*

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill)*: Use only your eyes! Telescopes are no good for meteor observation.

leo\_toni: if one of these meteors reach the Hubble telescope, which would damage?

*(Moderator Bill)*: If a meteor struck Hubble, it could possibly cause damage -- but the odds are low.

Yommany: Greetings from Guatemala!!!

*(Moderator Bill)*: Greetings!

Bruno: what are the viewing rate for telescopes? i know my naked eyes are better, just asking. is there a good chance to see anything from a telescope?

*(Moderator Bill)*: Telescopes don't see enough of the sky ( too small a field of view) so they're no good for meteor watching.

Rayline: The cloudy sky can prevent view obstructs the meteors? In Brazil

*(Moderator Bill)*: Yes, you can't see meteors if the sky is cloudy.

jaikay: aww man its too cloudy here

*(Moderator Bill)*: Yes, we're seeing clouds here, too.

geminid83: *(Moderator Rhiannon)* if its just a rocky body, where does all this debris come from?? I read that only 0.01 percent is added to the debris field each year from when it comes close to the sun...do you think this asteroid broke apart or something in the past to cause all this debris?? seems its getting stronger each year right?

*(Moderator Rhiannon)*: Good question. There is evidence that Phaethon is a larger asteroid that broke up centuries ago. The debris the Earth is running into now could also be that small amount of debris that has been deposited by Phaethon over the years - Phaethon has a short period - less than 2 years - so it passes close to the Sun and leaves more debris fairly often. It is hard to tell exactly what Phaethon used to be, or how it deposited the debris that become our Geminids, but those are some plausible answers.

leo\_toni: thanks *(Moderator Rhiannon)* :D

*(Moderator Rhiannon)*: You are welcome!

ThiagoReis\_Brazil: *(Moderator Bill)*, I use glasses, so do you think is better I take it off?

*(Moderator Rhiannon)*: No. *(Moderator Bill)* has glasses himself so he knows that from personal experience.

drew2468: I am watching from Philadelphia, just came home, saw about 5-6 in 1 hour

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* Awesome! We love hearing those good reports.

Waagnerr: i can't see nothing... its all gray, why ?

*(Moderator Bill):* Sadly, we're clouded in!

Daniela8: Guys thanks for the info, you have helped to end my ignorance space :p

*(Moderator Rhiannon):* You are so welcome. Thanks for asking questions! Keep them coming!

leo\_toni: iwhen the Hubble telescope is turned off, will become part of a museum or be abandoned as NASA space junk?

*(Moderator Bill):* When turned off, it will eventually re-enter Earth's atmosphere and burn up.

Yommany: There is a chance to see the show if the sky is cloudy? :(

*(Moderator Bill):* No, you need clear skies.

drew2468: I looked straight up from downtown Philadelphia, was I supposed to look Southeast?

*(Moderator Bill):* Straight up is correct...

Bruno: when the next NASA's moon travel will happen? do you plan something about that?

*(Moderator Rhiannon):* We at the Meteoroid Environment Office (MEO) do not plan the next moon travel. However we quantify the meteor environment on the moon. Check out this link for an interesting part of the MEO: <http://www.nasa.gov/centers/marshall/news/lunar/index.html>

*(Moderator Bill):* Hey everyone -- the Ustream is gray beause we have cloudy skies. Check out some of these other links that may have better views: <http://www.nasa.gov/connect/chat/allsky.html>

geminid83: wow thank you, great answers ...when is the next predicted meteor storm or outburst??? and is there any way to obtain chat transcript from tonight?? this has been great

*(Moderator Bill):* Thank you! Next major shower is the Quadrantids on Jan 3 -- next meteor outburst is Perseids in 2016. We'll have a chat transcript posted by the end of the week.

Nick: What will replace the Hubble and it's going to be way better than the Hubble?

*(Moderator Bill):* James Webb Space Telescope: <http://www.jwst.nasa.gov/>

Alessandra\_Gallon: I'm going to bed, thank you so much for the informations! Greetings from Brazil! Merry Christmas and Happy new year! bye :)

*(Moderator Bill):* Happy holidays -- thanks for being here.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Interstella\_BR: Do you guys recommend any particular camera of the "NASA Watch the skies"?

*(Moderator Rhiannon):* We are fans of all-sky cameras. We have a network of them and you can see the results (posted automatically every morning) at [fireballs.ndc.nasa.gov](http://fireballs.ndc.nasa.gov).

Fernando: Here in Brazil, even with the cloudy sky, i saw like 4 in 10 minutes! I did just exactly like you say, waiting for my eyes to adapt themselves. It's a really wonderful event! Hope to see it again. Thanks for the help! And tell other brazillians to look and wait... It's happening all the time :)

*(Moderator Bill):* Glad you got a good show! Have a good night.

gempcola: i saw prob 12 in 20 mins from Pensacola FL

*(Moderator Bill):* Terrific!

VLo: I'm in California (LA area) and I haven't seen anything. The sky sure looks beautiful though. What time should we expect to see anything, and in what direction should we be looking? Thank you!

*(Moderator Bill):* The peak is 2 a.m. local time, but you can see meteors until dawn.

olorio: I love cloudy days, but... come on! ;)

*(Moderator Bill):* Yes, it's Murphy's Law, isn't it?

swatcats: so do you mods work for NASA or MEO?

*(Moderator Rhiannon):* The MEO (Meteoroid Environment Office) is a part of NASA.

Waagnnerr: Will it take long for sky be clean again ?

*(Moderator Danielle):* Here in Huntsville we're expecting clouds and more clouds. ☹

Bruno: all of the meteors falling now are Geminids?

*(Moderator Rhiannon):* Good question. Some of the meteors you will be seeing tonight are sporadic (background) meteors. On any given night you can see up to 8 meteors an hour. Most of the meteors you see tonight are Geminids though.

MonsterMatt: where is the camera aiming on the live stream is it strait up?

*(Moderator Bill):* It's aiming just above the North Star.

jaikay: where do i look from Waterloo, Ontario

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* Hello fellow Canadian! (I went to the University of Western Ontario in London, Ontario) Look straight up and just wait. If your skies are clear you should be able to see several Geminids!

Kiedis: Sorry you guys are clouded in! I've counted 26 Geminids in the hour and a half I've been watching, and they're only becoming more frequent. I hope things clear up for you.

*(Moderator Bill):* Wow, terrific rate. Where are you viewing, Kiedis?

Bruno: is the hint for Brazil the same for Florida: look straight up?

*(Moderator Bill):* Yes, it is.

Blueyes: so my son is very interested in working for NASA, he went down to Johnson space center and rode that microgravity simulator this summer, and had a fabulous experience...

*(Moderator Bill):* I didn't know they had one of those at JSC -- have to see if I can get a ride next time I'm down there.

laura: will it only happen today or we still have any chance for seeing it tomorrow?

*(Moderator Bill):* You can see tomorrow if skies are clear, but 10-20/hour.

ThiagoReis\_Brazil: *(Moderator Bill)*, how old are you and you think the cloudy will go away?

*(Moderator Rhiannon):* Unfortunately the clouds over Huntsville, Alabama are not forecasted to leave.

*(Moderator Bill)* does not want to disclose his age. 😊

Nick: Another question. Apophis will come very close to the earth in 2027, will we be able to see it with the naked eye? Can we expect a good show?

*(Moderator Bill):* My recollection -- and I could be wrong -- is that you'd need binoculars or a small telescope. You can go to the JPL Horizons Web site to determine visibility of Apophis. It's far better than my memory. [ssd.jpl.nasa.gov](http://ssd.jpl.nasa.gov)

leo\_toni: How Much Is a meteorite? scientifically and in price

*(Moderator Rhiannon):* It depends on several things - whether the specific meteorite fall made the news - what kind of meteorite it is (the more rare/expensive are Lunar and Martian meteorites) - etc. Look on eBay for an idea of what meteorites are selling for. 😊

geminid83: clouds breaking apart a lil bit here after light snow, jupiter visible with the moon still behind pretty heavy cloud cover, gotta love the mountains...ready to keep goin outside and checking until dawn.....one thing i learned about meteor showers many many times in the past, patience is the key

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Danielle):* Patience definitely is the key -- and lots of caffeine!!!

Kiedis: *(Moderator Bill)*, I'm watching from Wilmington, NC. There's some light pollution in my area, but overall I'm quite satisfied!

*(Moderator Bill):* Fantastic -- you're getting a great show.

Bruno: I saw a really big meteor falling last night. Was that probably a Geminid?

*(Moderator Bill):* It could very well have been.

MonsterMatt: how many geminids have you guys counted so far?

*(Moderator Rhiannon):* Our eyes are mostly on the chat answering your questions. However we have seen several on the USTREAM feed as well.

Paul\_Gomes: how has work for nasa ?

*(Moderator Rhiannon):* Working for NASA is a blast. We get to have incredible experiences and meet incredible people. Being a part of America's space program is priceless, yet we get to do this for our job!

Nick: Well I guess I'm going to sleep. Really cloudy here in Bogota Colombia. Thank you very much, hope tomorrow the sky will be clear!

*(Moderator Bill):* We hope you have good weather tomorrow.

Sheree: I just came in to warm up a bit, it's been amazing and inspiring so far, but I've got a silly question...The news said may see fireballs too how would I know if I saw one?

*(Moderator Danielle):* Sounds like a night for hot cocoa. ☺ A fireball is just a bright meteor, brighter than the planet Venus.

leo\_toni: I can not stand to stay awake, I'm very sleepy, here in São Paulo are already 04:25 a.m., unfortunately did not see any meteor today ... goodnight to all of NASA and the Chat. Thanks for the information. congratulations for the work. Merry Christmas and happy new year! : D

*(Moderator Rhiannon):* Merry Christmas and Happy New Year to you, too! Thanks for your great questions.

Mflores584: will we be able to see the meteor shower here in the pacific

*(Moderator Bill):* Yes, peak will be about 2 a.m. and you can see meteors until dawn.

Bruno: what was the rate yesterday night?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

*(Moderator Rhiannon):* It was cloudy last night over Huntsville, unfortunately! You can see the rates of the Geminids from other locations at the International Meteor Organization's website: imo.net

citlallifugaz: can i see something right now; from mexico city?

*(Moderator Bill):* You can see Geminids until dawn.

Kiedis: Earlier in the night I saw a brilliant fireball that appeared blue/green. What factors could have contributed to this - composition, angle of entry, speed? I'd love to know what that meteor was made of.

*(Moderator Bill):* The colors you saw are probably due to atmospheric oxygen being excited by the meteor moving through the air.

MonsterMatt: why does mother nature always insist on making it rainy and cloudy everytime something fascinating in space happens?

*(Moderator Danielle):* Good ol' Murphy's Law at work again.

paulo: I'm from brazil, and i'm so glad of seen 3 meteor, thx for this chat.time to bed !

*(Moderator Rhiannon):* Glad you got to see some meteors!

eileenjimena: can I see them tomorrow?

*(Moderator Danielle):* You can, but the rates will be much reduced.

Mflores584: will the meteor shower come again tomorrow here in the pacific

*(Moderator Rhiannon):* Yup! The Geminids are still visible tomorrow night, but you will probably only see 10-20 per hour.

Blueyes: so you mentioned that a transcript of 2nite's chat will be available, how would we go about obtaining this?...come back to this exact webpage ?

*(Moderator Bill):* Yes, come back here to this page, and a PDF link will be posted.

Chelesoft: I'm from El Salvador, can I see something right now?

*(Moderator Bill):* Yes, you can see meteors until dawn.

Paul\_Gomes: where is *(Moderator Danielle)* ? many women work for nasa?

*(Moderator Danielle):* Check out [women.nasa.gov](http://women.nasa.gov)

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

ThiagoReis\_Brazil: Wheel, I think I gonna sleep, the things are very weak here, good night and happy new year and Merry Christmas, for all the NASA members, mods, people etc. I don't see any meteor today, but tomorrow I'm shure that I'm gonna see about 10/hour. Now i little frase in brazilian : pros meus amigos brasileiros que ficam eu tenho o gramour so me falta-me a grana hehehehehe :)

*(Moderator Bill):* Happy holidays -- thanks for being here. ☺

Ale\_Rybakov: Reduced? How many meteors can I see tomorrow from São Paulo, Brazil?

*(Moderator Bill):* about 10-20/hour.

DieCri: i saw 10 in 20 min

*(Moderator Bill):* Congrats!

mjc: Starting at 2300 MST....so far we've seen 8 in 30 minutes here in Pocatello, Idaho. 3 of those in about a 1 minute span. All Geminids. Not bad considering the moonlight and the city light pollution.

*(Moderator Danielle):* Awesome!!!

geminid83: how much does observing from a higher altitude differ from sea level as far as meteors and the sky are concerned?? the sky is generally darker in the mountains and less populated areas but do we actually see more of the sky or stars due to elevation?

*(Moderator Bill):* The darker sky helps, but you don't see more of the sky or stars.

Nacho: I'm from Mexico City, In which place I will put my eyes to see more meteors?

*(Moderator Bill):* Lie on your back and look straight up.

Blueyes: does NASA have a group that is devoted to studying and researching the Aurora Borealis?

*(Moderator Danielle):* I know there are some researchers here that specialize in Aurora Borealis, yes.

MonsterMatt: r those stars on the screen or meterites

*(Moderator Rhiannon):* On our USTREAM right now you are seeing dots as stars. If you see a streak , that is a meteor.

Noah: Its possible to see it during the day or just at night?

*(Moderator Rhiannon):* Only the very, very brightest meteors are seen during the day. Those are extremely rare and I so hope to see one at some point in my life.

DieCri: here in mexico is awesome i saw 15 in 40 min im so happy i like so much

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

*(Moderator Rhiannon):* That is so great! Congrats!

Andii14: hii! i'm waitting to see one :3 .. and WHy the name Geminids?

*(Moderator Bill):* Meteor showers are named after the constellation in which their radiant is located. Geminids appear to come from the constellation Gemini, and that's how they get their name.

Bruno: which stars are those on the ustream?

*(Moderator Rhiannon):* The USTREAM is about a 25 degree field of view and it is pointed north, just above Polaris.

james: Vancouver is so cloudy =( only managed to see 2 in 1hour

*(Moderator Rhiannon):* We are sorry your skies are cloudy! We are experiencing clouds as well.

Noah: I need to look at the moon or the entire ske?

*(Moderator Rhiannon):* The entire sky. Look straight up to see the most Geminids.

BEAR: CANT SEE ANYTHING HERE IN SOUTHERN ONTARIO CANADA CLOUDS

*(Moderator Rhiannon):* We are sorry to hear that! (Hello fellow southern Ontario-ian. ☺ )

John\_M.: Isthat part of the big dipper in the ustream?

*(Moderator Rhiannon):* No. You are looking at a 25 degree field of view looking north. Just above Polaris.

citlallifugaz: can i seee in mexico city right now?

*(Moderator Bill):* You can see meteors until dawn, if skies are clear.

Rhian: The stream feed clouds are breaking up a wee bit - yay! Hopefully this will bode well for us here (also in Ontario)

*(Moderator Rhiannon):* We hope you are right! Thanks for sticking in there with us.

nia: Can I see something even if it's raining here?

*(Moderator Bill):* No, you will need clear skies.

laura: how many meteors could we see tonight?

*(Moderator Bill):* Peak rates around 40/hour, around 2:00 a.m. local time -- but you can see meteors until dawn.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

citlallifugaz: can we see from the Upstream video?

*(Moderator Bill):* Yes, the clouds have broken for now, so we're seeing more Geminids on the Ustream feed.

huracan: where should I be lookin'?

*(Moderator Bill):* Straight up...

Kiedis: This is my first time tuning in to one of these streams. How often do you guys do this?

*(Moderator Rhiannon):* We have done these chats for several major showers - we had a great turn-out for the Perseid (in August) of this year, and we were planning on doing a chat for the Eta Aquarids (in early May), but Huntsville was still largely affected by the tornados at that time so we had to cancel. Stay tuned for future chats. ☺

geminid83: when will be the next chat for a meteor shower??? goin back outside now just saw 2 in just a few minutes, starting to clear up a bit...in case i dont come back thank you again very much for all the insightful answers and information, Salute!!

*(Moderator Bill):* We're still planning the 2012 chat schedule. Check back at this page for updates: <http://www.nasa.gov/connect/chat/index.html>

gempcola: i got up to 22

*(Moderator Bill):* Great!

tony: what is the sound track for the stream?

*(Moderator Rhiannon):* The new Third Rock radio station from NASA!

Karen\_Puerto\_Rico: I saw 38 meteors in 40 min here in Puerto Rico!!! Thanks for all the answers!! Happy holidays!!

*(Moderator Bill):* You got a great show -- happy holidays!

rbarce1: whats the probability of a small meteorite hitting earth which contains an infectious bacteria?

*(Moderator Bill):* Bacteria can't survive long periods of exposure to space, so I'd say that chance is infinitesimally small.

kepler: what r the average size of these meteors?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* The actual piece of debris burning up is on the order of a millimeter to centimeters across, however the ionization extends to a much larger area. A piece of debris a millimeter across can produce ionization the size of a battleship. This is why we can see them!

CaioShinn: can I see some meteor before the dawn ? i'm from brazil :D

*(Moderator Bill):* Yes, if your skies are clear.

laura: When will this kind of event happen again?

*(Moderator Bill):* The next major meteor shower is the Quadrantids in January.

Kiedis: Awesome. Thanks for the great chat! Hopefully I'll catch you guys for the next shower. Final count for me is 39. Have a great night.

*(Moderator Rhiannon):* Fantastic, Kiedis! Thanks for joining us!

Daniel: About 50-60 in the hour my girlfriend and I were just out :) 3 of which were fairly bright fireballs! Excellent show despite the bright moon.

*(Moderator Bill):* That's an amazing rate --you got a fantastic show!

mjc: At what distance apart could two individuals see the same meteor?

*(Moderator Rhiannon):* Up to 200 miles away.

MonsterMatt: still aint nothin in boring old Missouri

*(Moderator Bill):* You're not too far off from the usual peak at 2:00 a.m. Hang in there.

amish: Can I see it in Totonto?

*(Moderator Rhiannon):* If your skies are clear!

Sheree: Thank you all for your time and putting the word out for this, I would have missed something wonderful had you not! Tell your boss this citizen says ok to give you all raises!! Thanks

*(Moderator Bill):* We appreciate that. 😊

John\_M.: Clouds moving in again?

*(Moderator Rhiannon):* It is looking clear for us here now for a bit! Woohoo!

sigismund: why are they straight up, if it was persay 11 pm, would it be directly to our right, or our left? or what?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill)*: You're looking straight up -- enables you to see as much of the sky as possible, which is what you want.

patfromny: i'm from NY where should i look??

*(Moderator Rhiannon)*: Look straight up. Try to lie on your back somewhere so you can see the whole sky. And be patient. We are hoping you get to see several nice Geminids!

swatcats: It's nice to see that the live stream is looking better. I have seen a few good ones on it in the last few min :). to bad i cant go outside and see them becuse of the clouds :(.

*(Moderator Bill)*: We hope the clouds stay away for awhile.

tony: I found the third rock radio station but it is playing different music, is this a play list specifically for this ustream?

*(Moderator Bill)*: Yes, it is.

tony: Is the shower expected to be as good tomorrow night?

*(Moderator Bill)*: Not quite as good -- rates of 10-15/hour.

AlexG: Hi all, not seeing much here in Roatan, Honduras, the Moon really isn't helping!

*(Moderator Bill)*: The Moon washes out the faint Geminids, which greatly cuts down the number you will see.

BEAR: DURING THE GEMINIDS METEOR IS THE ISO OR ANY OTHER OBJECT MAN MADE IN DANGER OF BEING HIT

*(Moderator Rhiannon)*: There is always a danger to spacecraft from meteors. During meteor showers the risk is higher, but the risk from background meteors risk is still collectively 90% of the total risk (the meteor showers being the other 10%). The main 'products' of the Meteoroid Environment Office (that's us!) are models that predict this risk. This helps engineers figure out how much protection to build onto their spacecraft.

patfromny: wow just saw two streaks of lights!!! amazing... too bad it's verry cold out here...:(

*(Moderator Rhiannon)*: Awesome! We are glad to hear these good reports!

Bruno: who is smoking in front of your camera? :(

*(Moderator Rhiannon)*: Just clouds... hopefully they will get out of our way soon! ☺

MonsterMatt: how many peopler are out there with you guys

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* There are 7 of us here at Marshall Space Flight Center working to make this chat and video stream happen. Your tax dollars at work. ☺ (if you are American)

georgiaknight: wait tomorrow night will be better?

*(Moderator Rhiannon):* If tomorrow night is clear for you, and tonight is cloudy, than yes it is better for you. However, the rates will be higher tonight (40 per hour). Tomorrow night expect 10-20 per hour.

georgiaknight: right now i am only seeing about 3 an hour ive seen about a dozen since 11 pm

*(Moderator Rhiannon):* Nice persistence!

Bruno: this radio is awesome! are these songs available to download?

*(Moderator Danielle):* For information on Third Rock radio see <http://www.rfcmedia.com/thirdrockradio/> and <http://www.nasa.gov/topics/nasalife/features/3rdrock.html>

BEAR: WEll Thanx for the stream and Q & A hope it is clear in JANUARY to see the next one

*(Moderator Rhiannon):* We are hoping for clear skies for the Quadrantids as well! However we won't be doing a chat for that one. Stay tuned for when we do our next chat!

olorio: I have to go bed now, thank you very much for this chat, you're doing an amazing job and we appreciate that. Greetings from Chihuahua, Mexico and Happy Holidays!

*(Moderator Rhiannon):* Thanks for the feedback! We enjoy doing these chats. Thanks for participating and sleep well!

midnightbohunk: when is this bright moon going to set tonight?

*(Moderator Danielle):* You can obtain the rise, set, and transit times for the Sun and Moon for your location at [http://aa.usno.navy.mil/data/docs/RS\\_OneDay.php](http://aa.usno.navy.mil/data/docs/RS_OneDay.php)

CaioShinn: I give up to see meteors. I can't see anything =(

*(Moderator Danielle):* Awww! I understand your frustration though. Meteor observing takes A LOT of patience.

alliepants: I'm in Philly, should I still go outside & check it out?

*(Moderator Bill):* Yes, the peak is at 2:00 a.m. local time!

midnightbohunk: did curiosity pass through this geminid belt when it launched? small chance of getting hit, but did it pass through it?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

*(Moderator Bill):* No, didn't pass through it.

Blueyes: Spectacular! I saw another 7 with the best being the last one....must've traveled about 44 miles....now, do you see the same ones that I am seeing at the same time?

*(Moderator Rhiannon):* Depending on where you are! The same meteor can be seen as far as 200 miles away on Earth.

mike1961: from what direction will the meteors appear here in nevada - just joined...

*(Moderator Danielle):* Geminids appear to radiate from the constellation Gemini. But you can see meteors all over the sky, no need to locate the radiant.

Noah: What is the music playing?

*(Moderator Rhiannon):* The new NASA Third Rock Radio!

big\_bot: what formed these meteors and how long have they passing by?

*(Moderator Rhiannon):* The Geminid meteors are from asteroid 3200 Phaethon. When Phaethon passes around the sun, it leaves a trail of debris. When the Earth passes through this debris, we have the Geminid meteor shower!

midnightbohunk: Gemini, geminids radiate from there. Hence the name?

*(Moderator Bill):* Yes, correct.

Blueyes: yes, i'm outside Philly and they are mostly in the northeast part of the sky....i've seen about 12 in a 30 minute viewing period, with the last 7 being just 15 minutes ago

*(Moderator Rhiannon):* Fantastic!

Noah: Finally i saw 3 at the same time here in Maringá Brazil, love it, thank you guys!

*(Moderator Rhiannon):* Thanks for the feedback. So glad you are seeing meteors!

rbarce1: If a huge meteor were headed straight to earth, how long before hand could you guys find out about it?

*(Moderator Bill):* You're talking about an asteroid, and if it was an asteroid 1 km or so across, we could pick it up centuries before it hit us.

Bruno: do you guys have a trusted weather forecast website?

*(Moderator Danielle):* There's a lot of good weather data out there, I don't have a favorite. Two I use somewhat regularly include usairnet, the national weather service/NOAA, and clear sky chart.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

CaioShinn: Bye Guys . =( I don't see any meteor but that's it january have more shower ? Merry christmas and a good new year =D

*(Moderator Bill):* Good night -- yes, the Quadrantids are in January.

Rhian: Eeek! I just saw 4! Clouds are starting to break over Ottawa Canada!

*(Moderator Bill):* Congrats on your 4!

Blueyes: ok, who names these things? Phaethon?

*(Moderator Rhiannon):* Phaethon gets very very close to the Sun... even closer than the planet Mercury. This is how it got its name! Phaeton was the son of the sun god Helios.

nh13.lingenfelterc: Anybody know what direction to look out in the east coast to have the highest chance of seeing anything?

*(Moderator Bill):* Look straight up so you're seeing as much sky as possible.

narf86: theres a chance to see this the next year ?

*(Moderator Danielle):* The Geminids happen each year in December. Next year, in 2012, the Geminids occur near new moon -- great news for meteor observing!!

nh13.lingenfelterc: What hour looks best to be seeing things? I read somewhere that 5 would be best...

*(Moderator Bill):* 2 a.m. local time is best, but you can see meteors until dawn.

georgiaknight: is there a better time during the morning to watch?

*(Moderator Bill):* Before dawn.

mike1961: how often are they expected to appear tonight?

*(Moderator Danielle):* We expect to see Geminids from about 10pm local time to sunrise. The radiant will be highest in the sky around 2 am, so we expect to see the highest rates around then.

big\_bot: when is the next time halley's comet will be visible

*(Moderator Rhiannon):* Not until 2060/2061...we've got a while to wait!

georgiaknight: will 2 or 4 am be a better time to watch ?

*(Moderator Bill):* 2:00 a.m. is a better time.

emmalee: I think I saw some meteors. are they supposed to be red?

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Bill):* They can appear reddish -- if they move very fast and only last a couple of seconds, you probably saw a meteor.

midnightbohunk: did the geminids come from an asteroid? If so, since this happens annually, how big was this asteroid or comet?

*(Moderator Bill):* Geminids comes from 3200 Phaethon, which is thought by some to be an asteroid. Current theory is that Phaethon was part of a larger asteroid that broke apart and Geminids are small debris from the break-up.

choon: this the live stream able to see any metoer? im from malaysia

*(Moderator Bill):* Yes, we've seen Geminids on the stream tonight.

-kk-: Checking in with parka, fedora, and gloves from our bitter cold 48 degs F in Los Angeles' East San Gabriel Valley. If you compare tonight with last years Gem event -- tonight is amazing! Mostly clear despite working around the neighbors Xmas lights, bright suburban streetlights, and a huge moon. In two half-hour trips outside at 2120 PST and 2245 PST, I've spotted one very large neon-green fireball, one pastel-lime-color fireball, and six white regulars! So far, so good. Regards!

*(Moderator Rhiannon):* So glad you are seeing meteors and having a good night!

Roger: Hi everyone!!

*(Moderator Danielle):* Welcome, Roger!

Blueyes: How was the Leonids shower in November.....I completely missed that one :(

*(Moderator Rhiannon):* They were less than expected, but a bright moon hindered observations. (The bright moon is a theme in meteor observations this year - but next year the Moon is looking much better for the major showers!)

Bruno: come on, you guys are from nasa. couldn't you had installed some switch on the moon to turn it off sometimes? :D

*(Moderator Bill):* Nope -- Apollo was cancelled a long time ago.

SoCalWatcher: Okay, seriously surprised here... to have a better sky here than your feed, unbelievable!

*(Moderator Rhiannon):* We are jealous! Send us your good fortune!

Blueyes: so what was the best celestial shower that you ever witnessed.....month and year?

*(Moderator Bill):* Leonids meteor storm -- November, 2001.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

midnightbohunk: i've seen some and gotten cold. (*Moderator Bill*) can't find the dimmer switch to tone down the moon. LOL!! Moderators for this chat were excellent. Thanks for making this fun, which is what it's meant to be. Keep up the good work.

(*Moderator Rhiannon*): Thanks for the encouragement! We enjoy doing these chats!

wa9jam: Rain in Chicago, can't see a thing :(

(*Moderator Rhiannon*): And we have clouds rolling through again here too... check some of these other camera's: <http://www.nasa.gov/connect/chat/allsky.html>

SoCalWatcher: I've only spotted half a dozen in a half hour of viewing (but light pollution probably washed out the fainter ones) still, Orion is visible as is Jupiter... so, a beautiful sky considering

(*Moderator Bill*): Glad you saw some meteors.

eileenjimena: Goodnight. Thank you so much for the streaming. Greetings from Colombia!

(*Moderator Bill*): Greeting Colombia! Have a good night.

MonsterMatt: saw one!

(*Moderator Danielle*): Sweet!

midnightbohunk: Previously (*Moderator Bill*) mentioned the Leonid meteor storm of 2001. What makes some meteor showers and some storms and when is that determined?

(*Moderator Bill*): A meteor storm occurs when the rate exceeds 1,000/hour. This happens when Earth runs into a dense stream of comet debris. A normal shower has rates of 10-100/hour and occurs when Earth encounters a less dense stream of debris. We can calculate when Earth will encounter these streams using fast, multi-processor computers.

bracketer: can someone do something about the clouds?

(*Moderator Bill*): No, wish we could.

Blueyes: Well, I have to get up early.....Good Night to all my fellow sky watchers! thank you to the moderators for sharing their stories! now I can say....I've seen it rain fire in the sky!

(*Moderator Danielle*): Thanks for joining us Blueyes! Sleep well!

MonsterMatt: you guys need to fly a bunch of planes through the clouds to break them up

(*Moderator Rhiannon*): If only that would work (and if we had the means to do that!)...

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Bruno: had seen a radar over Brazil lol. clouds are leaving, but still there. I can see some star shine, but sky is not a hundred percent clear. can I still see meteors, once I can see some stars and a radar walking through my sky?

*(Moderator Bill):* If you can see stars, you can see meteors, and you can sometimes see meteors if the clouds have gaps.

Blueyes: ooh, one more question.....so a meteor storm.....can this be predicted and if so, when will the next meteor storm be?

*(Moderator Bill):* There's a possible meteor storm that will occur in Oct. 2018 -- the Draconids.

mike1961: saw one coming in from the east to northwest - very quick little streak!

*(Moderator Bill):* Glad you saw something.

EddieD: has anybody really seen anything spectacular yet?

*(Moderator Danielle):* We've seen several on the video feed, despite the clouds. And no matter how many times I observe a meteor shower, they're still fascinating to watch! ☺

bracketeer: why is there only one site with a camera? you would think that there would be a provision for this type of weather

*(Moderator Bill):* You might try some of these other links to see if there's a better view:

<http://www.nasa.gov/connect/chat/allsky.html>

EddieD: I was out before and only saw 2...

*(Moderator Rhiannon):* Sorry to hear that, Eddie. Hopefully your skies will clear and the rates will go up soon! We are approaching our 2am local time here in Alabama.

SoCalWatcher: Here too! Thanks! You don't realize how much you miss a night sky until you get in a metropolitan area where most of it's lost :- /

*(Moderator Danielle):* I know what you mean. I grew up in the Chicago area, so that meant greatly light polluted skies. I was amazed the first time I saw the Milky Way from a dark site. Absolutely beautiful!

mike1961: about how fast are these entering the atmosphere?

*(Moderator Bill):* Geminids travel at about 80,000 mph.

midnightbohunk: How far ahead can you predict these kinds of things. 2018 is still 7 years away and you can predict that Draconids will be a storm then. Amazing.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

*(Moderator Rhiannon):* It depends on the shower. Typically we can predict 20-30 years ahead for each shower, depending on how much we know about the shower and the parent comet. Sometimes we get these predictions right on, but some years they aren't as accurate. There are many factors that go into meteor shower modelling!

aakvong: looking up at the san gabriel valley right now, just saw a few meteors! we actually have pretty clear skies tonight(:

*(Moderator Rhiannon):* Awesome! We are a bit jealous here at Marshall Space Flight Center.

patfromny: well, i'm calling it a night guys, saw a total of 3! 2 bright ones and one faint streak... hope to be here again on the next event, hope the moon won't be as bright then... night!

*(Moderator Bill):* Thanks for being here -- glad you saw a few meteors.

wa9jam: I'm N.W. of Chicago, in the corn feilds, great for viewing meeteor showers, and planets. Seen Jupiter and for of its moons a few weeks ago.

*(Moderator Bill):* Yes, those dark skies away from city lights make for good viewing.

MonsterMatt: hey *(Moderator Bill)*, i have a question when you said they enter the atmoshere at 80,000 mph didnt the saturn 5 rocket only go up to about 30,000 mph?

*(Moderator Bill):* Saturn V sent the Apollo capsule to the moon, which is still in Earth orbit. Meteors orbit the sun, which means they have to move faster.

mike1961: ok, 80K mph, are they "running" into us or catching up?

*(Moderator Rhiannon):* Both. If a meteor is going fast enough they can come up behind us and 'catch up' to us. However those are not as common. We are mostly 'running into' meteors (though they have their own velocity as well). Think of a car driving down a road - most of the bugs will splatter on the front of the car, though if the bug is going very fast into the back of the car, it will still splatter.

aakvong: have you guys seen any over at marshall?

*(Moderator Bill):* Yes, we've seen some bright Geminids tonight, when the clouds have cooperated.

MonsterMatt: so is the mercury mission capsule Gemini7 named after the shower or the constellation?

*(Moderator Bill):* The Gemini program got its name because two astronauts could fit in the capsule (the twins), so it got its name from neither the shower nor the constellation.

jova: What another day in this month is possible to see more meteors?

*(Moderator Bill):* Not this month, but Jan. 3 for Quadrantids.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

SoCalWatcher: (*Moderator Danielle*), agreed! Stunning! BTW on the allsky site... any feed in particular you guys recommend?

(*Moderator Danielle*): I've had some trouble loading some of the pages (I don't know if its internet trouble on my end or on theirs) but I noticed Meadow View Observatory has clear skies.

bracketer: Are you folks live there in marshall? or are you off-site? and if youi are live, does it look like the weather will let up anytime soon?

(*Moderator Bill*): Yes, we're here at Marshall, but the weather is degrading and clouds are getting thicker.

mjc: What is the proper term for the streak of light behind the meteor? Is "trail" or "train." Thank you.

(*Moderator Rhiannon*): Great question. It is semantics - you can use either term. Though commonly the streak of light is called 'train' and if there is a smoke trail (from very bright meteors) it is called a 'trail'. But you are correct if you use either/both terms.

ari: will i be able to see them from Queens NYC?

(*Moderator Danielle*): If you can see the stars in the Big Dipper you should be able to see Geminids.

mike1961: so the velocity of the geminides is 80K mph regardless of the velocity of the earth around the sun?

(*Moderator Rhiannon*): The Geminids hit the Earth's atmosphere moving 80,000 miles per hour. That is relative to the earth. Their velocity relative to the Sun is a different number.

Bruno: hey guys, have to go now. was a good show, though is a little cloudy over here now. congratulations, you are so cool and kind. i admire so much your work, you guys are my heroes. i want to leave here a advice to everybody who is reading this chat now: let's look up at our sky more. it's amazing, fascinating, brilliant. i wish that 2012 be a good year to all of you. good night and happy holidays! warm hugs from Brazil.

(*Moderator Rhiannon*): Thanks for the kind words, Bruno! And yes that is excellent advice... the night sky is fascinating and let's not let the popularity of electronics/screens/etc take us away from it! Thanks for joining us!

wa9jam: Whats the reports on JUNO, is it sending good info back so far. All is nominal ?

(*Moderator Danielle*): Don't know much about Juno personally -- but you can get the latest at [http://www.nasa.gov/mission\\_pages/juno/main/index.html](http://www.nasa.gov/mission_pages/juno/main/index.html)

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

Shay: Does the earth's gravity help pull meteors and comets closer to us as they pass our planet?

*(Moderator Rhiannon):* Yes. The Earth's gravity pulls objects in. No meteor hits the atmosphere slower than 11 meters/second because of this. And if comets have close encounters with the Earth, it will affect their speed and path.

BCstargazer: speaking of missions, amazing pics from Cassini that came in yesterday :)

*(Moderator Danielle):* Yep! Pretty cool! [http://www.nasa.gov/mission\\_pages/cassini/main/index.html](http://www.nasa.gov/mission_pages/cassini/main/index.html)

mike1961: what is the average size of a geminide meteor"

*(Moderator Rhiannon):* The actual particle causing these meteors is a millimeter to centimeter-sized object (pebbles or small rocks). The ionization spreads out much larger... the size of a battleship. That is why we can see meteors with our eyes. We would not be able to see the cm-sized particle itself.

-kk-: I see that next week's Ursids (December 21/22) are rated to be at 10/hour but among the more visible meteor showers?! Are they worth a peek?

*(Moderator Rhiannon):* If you have a clear night - by all means go out! :) The Ursids are known to have outbursts.

mike1961: still, at that small size, how much danger do they present to the ISS?

*(Moderator Rhiannon):* The ISS armor will stop anything less than an inch (2.5 cm) particle in diameter. The ISS is well-protected. The concern is with astronauts. A spacesuit can be penetrated by a millimeter-sized particle. A one-millimeter-sized particle has the punch of a 22 caliber bullet. So you don't want astronauts going out during increased activity!

KENINNC: Saw and recorded what I think was a fireball at 2:23 EST slightly south of east from northeastern NC.. Using a wide angle lens, so it is not very large in the frame.

*(Moderator Rhiannon):* Fantastic!

MonsterMatt: i just went outside and saw 2 all my patience paid off and you were right the climax was at 2:00 and the sky finally cleared up in the last twenty minutes

*(Moderator Rhiannon):* That's great! Thanks for the good report.

mjc: I've read that the Geminids enter the earth's atmosphere at a slower speed than most other meteor showers. Along with the earth's gravitational pull, is it the angle that the earth enters the debris field that also determines the speed?

*(Moderator Bill):* The geometry of the encounter is the major factor. Another is the gravitational influence of Earth, which accelerates the meteors in toward our planet.

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

MonsterMatt: jupiter is kinda like a bodyguard for earth though right?

*(Moderator Bill):* Yes, Jupiter's gravitational influence deflects Oort comets that might strike our planet.

MonsterMatt: no thank you for answering all my questions

*(Moderator Bill):* You're welcome.

Beck: How often do the three of you stay up all night?

*(Moderator Rhiannon):* We have done this a few times in the last year. These all-night chats are a relatively new event NASA has put on. As astronomers it isn't uncommon for us to stay up late, though!

nilson: i cant see anything!! :(

*(Moderator Danielle):* Unfortunately our video feed has been completely clouded out. ☹

MonsterMatt: do you guys actually work directly for NASA

*(Moderator Danielle):* Yep!

MonsterMatt: thats cool have you guys met any famous people

*(Moderator Rhiannon):* We have met several astronauts!

Beck: Do you have twitter accounts?

*(Moderator Rhiannon):* @NASA\_Marshall is our twitter! Check us out... we have been tweeting all night!

SoCalWatcher: say.... what's the idea? You asked me to send my clear skies your way... I don't recall you saying anything about sending your cloudy skies out here! :-P

*(Moderator Rhiannon):* Sorry SoCal!

omnydevi: will there ever be a chance for these chats to be unmoderated should they increase in popularity, or is this a permanent requirement?

*(Moderator Rhiannon):* The first chat allowed questions to be posted directly into the chat room, but people abused this and it had to be stopped very quickly.

geminid83: southern colorado here, saw about 30 in the last 50 minutes, moonlight is bright but most meteors are brighter :) warming up gonna go back out soon for the peak hours!!

*(Moderator Rhiannon):* Awesome! Thanks for the good news!

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

omnydevi: that is unfortunate, dang trolls are everywhere!. thank you for all the delicious information and for chatting with us, it is much appreciated. :)

*(Moderator Rhiannon):* You are so welcome! We are still willing to take questions... so if there is anything else you are curious about, ask away!

choon: is there any possibility to post some photo or video clip and share it out for those who miss out the session like me? :)

*(Moderator Rhiannon):* The USTREAM video will be posted as well as a transcript of the chat. Near the beginning of the night (before the clouds rolled in), we saw Geminids on the USTREAM.

SoCalWatcher: Thanks for hosting and all the great information! Have learned a lot!

*(Moderator Rhiannon):* You are welcome! Thanks for participating. ☺

mike1961: Is NASA still doing a skywatch for asteroids or comets that present a danger, or have we "cataloged" all potential dangers?

*(Moderator Rhiannon):* Yes. Spaceguard is still ongoing.

big\_bot: on average how many meteor showers are there a year?

*(Moderator Rhiannon):* There are over 30 significant showers a year.

TisaMarie: Hey Rhi! When will the next visible meteor shower be?

*(Moderator Rhiannon):* Hello Tisa! The next meteor shower will be in early January. Specifically, the peak will be January 3/4... if the skies are clear it is worth checking that out!

choon: i missed out the USTREAM as it's afternoon in malaysia. So do you mean the video and transcript will be posting in nasa web which is here after the session?

*(Moderator Rhiannon):* Yes. The transcript will be posted by the end of the week, and the video will be up at [ustream.tv/channel/nasa-msfc](http://ustream.tv/channel/nasa-msfc)

BCstargazer: re: Leonids...any probability of a "storm" before 2032 or is it scheduled for 2033 since the 2001 was 2 years late ?

*(Moderator Rhiannon):* We have not looked into that. We do not believe there will be a major Leonid outburst until 2033.

Beck: Thank you for hosting this. Time for some long awaited shut-eye.

*(Moderator Rhiannon):* You are so welcome! Thanks for joining!

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!**  
**Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw**  
**December 13, 2011**

---

*(Moderator Bill):* Hey everyone -- thank you for hanging in there with us. We seem to have been clouded out on the Ustream view, and it looks like activity is decreasing on the questions. We're going to close the chat early, in about 10-15 minutes, so if you have a question, now is a great time to ask.

geminid83: still 40 minutes or so away from expected peak correct?

*(Moderator Danielle):* Depends on your location. It's almost 2:30 am here in Huntsville, AL USA where the video feed is located and we are completely clouded out.

big\_bot: do any meteors in any of the showers ever impact earth

*(Moderator Rhiannon):* It is possible, though not probable. There are no known Geminids to have reached Earth's surface.

choon: thanks for 3 astronomers for sharing all the information. Looking forward for next event.

*(Moderator Rhiannon):* You are welcome! Stay tuned for when our next chat is held!

Lia: can these meteors be found on the earth surface, like rocks?

*(Moderator Rhiannon):* Yes. However if they reach Earth's surface they are known as meteorites.

BCstargazer: that 2001 Leonids was such an awesome display...was listening to the webcast and got a 3 or 4 minutes heads up from you guys...so many that it was not possible to count them all...like driving through a blizzard...dizzying show...thanks for your tireless work through the "lean" years

*(Moderator Rhiannon):* Awesome! *(Moderator Bill)* cites that as his most favorite meteor shower.

MonsterMatt: have any meteorites been reported tonight that you know of?

*(Moderator Rhiannon):* None tonight that we know of. [amsmeteors.com](http://amsmeteors.com) has 'Fireball Logs' in which observers can record when they see very bright events (the ones that would be large enough to have remnants hit the Earth's surface).

Lia: and can you preview where they will probably fall?

*(Moderator Rhiannon):* Yes. If we catch them on camera we can estimate where they landed. There is often a press release sent out to the area in which it landed. The press release asks those living in the area to search their properties. This has turned up several meteorites in the past.

geminid83: I agree, I asked *(Moderator Bill)* about that earlier, it was probably the most amazing event I have ever witnessed, literally looked like I was travelling thru space at high speed lol...watched it with my pops and a friend, blew us all away and still remains a talked about subject with those people

*(Moderator Rhiannon):* Awesome! I wish I had seen that!

**NASA Chat: Geminids Meteor Shower: 'Up All Night' With NASA!  
Experts Dr. Bill Cooke, Danielle Mosier and Rhiannon Blaauw  
December 13, 2011**

---

big\_bot: if found, are meteorites worth money?

*(Moderator Rhiannon):* Yes. You can check eBay for going rates.

MonsterMatt: ooh ok thankyou for all your help goodmorning merry christmas and happy new year to all of you there tonight at NASA and ISS

*(Moderator Rhiannon):* Merry Christmas! We had a blast answering your questions... thanks for tuning in!

*(Moderator Bill):* Thanks to everyone for a great Geminids chat -- we appreciate all the good questions. The Ustream feed will be up for a couple of days, and we've posted a few videos there that show the beginning of tonight's chat, complete with Geminid meteors. A transcript of this chat will be posted here on this page by the end of the week. Have a great evening.