NASA Chat: Asteroid 1998 QE2 to Sail Past Earth
Expert Dr. Bill Cooke
May 30, 2013

Moderator_Brooke: Welcome everyone! We're just about to start the chat, so please go ahead and send in your questions. Thanks for being here -- now let's talk asteroids!

RSEW: Hello

Bill_Cooke: We're here! Do you have a question? ☺

Moderator_Brooke: All right, here we go...Bill, over to you.

tyler_hussey : I was wondering if people in New Hampshire will be able to view this asteroid pass by, and if so, what is the length it will be visible, what direction, and how close to the horizon?

Bill_Cooke; Hi Tyler. You need a telescope to see the QE2 asteroid, and of course, it needs to be dark. It's visible there in N.H. with a small telescope about 10:30 p.m. local time. It will be in the constellation Hydra and be about eleventh magnitude.

tyler_hussey: I was wondering if people in New Hampshire will be able to view this asteroid pass by, and if so, what is the length it will be visible, what direction, and how close to the horizon?

Bill_Cooke: Unless you are Asia or Europe, you will not be able to see the asteroid at close approach. However, you can see it tonight around 10:30 pm local time with a small telescope. It will be in the constellation of Hydra.

Moderator_Brooke: You can also find more information about QE2 at this link: http://www.nasa.gov/mission_pages/asteroids/news/asteroid20130530.html

guest100: where did this asteroid come from

Bill_Cooke: The asteroid 1998 QE2 is an amor asteroid which means it approaches Earth from the outside. It takes it approximately 3.8 years to go around the Sun once. At it’s farthest from the Sun, it resides in the outer part of the asteroid belt, almost four times Earth's distance from the Sun.

knight6: what is this asteroid made of

Bill_Cooke: Asteroid 1998 QE2 is a chondrite with a dark surface. Its reflectivity is similar to that of asphalt.

riel190; is asteroid 1998 QE2 the closest astroid to earth right now?

Bill_Cooke: The closest large one, yes.

Paulo_F: Thanks Bill and Brooke, good evening! QE2 is 2.7 km wide. What is an asteroid size that would make us 'scramble' to find means to deflect it away, if coming straight onto Earth?

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Bill_Cooke: This one is big enough to make us scramble if it were heading towards us. We worry about any object football field-size or larger because those can get through the Earth's atmosphere.

Ava: From Ava, 6 y/o: What makes the astroids?

Bill_Cooke: Most asteroids reside between the orbits of Mars and Jupiter and are leftovers from the formation of the solar system. A planet tried to form in that area, but Jupiter's gravity kept tugging it apart and prevented its formation.

kingcrabJim: Will our tides be affected.

Bill_Cooke: No. Way too small.

Moderator_Brooke: Great questions from all of you in the room tonight -- keep them coming! Bill is working on your answers.

kingcrabJim: Will the international space station get some photos as it passes by.

Bill_Cooke: Probably not --- it's too faint.

DonnJ: WIll I be able to see it with the naked eye? If not what would be best for spotting it, a 10 inch SCT or a 4 inch Refrac?

Bill_Cooke: No. Go with a 10-inch SCT.

knight6: is there a chance that earths gravity will cause it to change course or is it to far away

Bill_Cooke: It is too far away for Earth's gravity to affect it significantly.

riel190: tonight? i thought it was tomorrow?

Bill_Cooke: The close approach is tomorrow at approximately 5 p.m. Eastern time. However, you can see it in small telescopes tonight and tomorrow night.

kingcrabJim: In its travels has it picked up more asteroids in its wake.

Bill_Cooke: No, but it does have a small satellite or moon about two thousand feet in diameter.

Joec: Is this object a typical nickle-iron asteroid?

Bill_Cooke: Probably a chondrite with some nickel-iron content, less than ten percent nickel-iron.

AnSith: We saw the news of QE2 being a binary asteroid today. Is there any information about the nature of its sattelite?

Bill_Cooke: Yes. Small body about two thousand feet (600 meters) across.

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Finback: anything special about this asteroid besides its location?

Bill_Cooke: Pretty ordinary asteroid, but having a satellite sort of makes it unusual.

Venix: So this particular asteriod would not be a good candidate for mining in the future due to its composition?

Bill_Cooke: You would have to ask a miner; I don't know what sells today.

kingcrabJim: Could we land a probe on it and watch were it goes. Kind of space telescope hitch hiker.

Bill_Cooke: We have the technology to send a spacecraft to this asteroid and do all sorts of things when we get there. One of the things we could do is place a radio beacon so we could keep constant track of the asteroid.

Galileo_Gary: Has NASA gotten a sample of QE2?

Bill_Cooke: No. Haven't been there yet.

DonnJ: When will the asteroid make another close approach to Earth?

Bill_Cooke: July 12, 2028.

Akitouki: Hello Bill. What kind of material is QE2 made of?

Bill_Cooke: Ordinary chondrite probably.

Atif: what are we aiming to study while the asteroid passes by?

Bill_Cooke: We will use radar to greatly improve our knowledge of its orbit; the radar has already shown us that it has a moon, which we did not know. We will get a better idea of its size, rotation and physical characteristics after it flies by.

kingcrabJim: What are the odds of it hitting something in its travels and changing its course.

Bill_Cooke: Practically zero.

tyler_hussey: Will you be able to see it tomorrow without a small telescope?

Bill_Cooke: No. At its brightest, it would be a hard target with binoculars.

Finback: I heard that the asteroid had a moon. Will NASA be looking at the moon as well?

Bill_Cooke: Yes, we will be imaging the moon using radar, just like the asteroid.

Harpalionu: Is there a chance that this asteroid affect network ? phone, internet..

Bill_Cooke: No.

hmg66: Will it affect the Earth at all?

Bill_Cooke: No.

guest100: how far away is the moon? they know its orbit speed?

Bill_Cooke: We will need more observations over the next couple of days to characterize its orbit and how fast it goes around the asteroid.

Trolllol: Can we expect andy HD photos to pop up this rock and his satellite once they have passed?

Bill_Cooke: There will be CCD images taken through telescopes. These will be high resolution telescopic photos, but this will not be HD television.

hmg66; Why QE2?

Bill_Cooke: 1998 denotes the year of discovery. QE2 tells us the time during the year.

cmra48: Could it come closer in 2028?

Bill_Cooke: In 2028, it will be over ten times farther away than this year.

Rodrigo: Hello. What is 1998 QE2's traveling speed?

Bill_Cooke: 36 kilometers per second (80,500 miles per hour) relative to the Sun.

Venix: What velocity is the object moving at? Could we potentially (in the future) slow it down in order to bring it closer to earth for studies?

Bill_Cooke: Yes, we have the technology to change the speed of an object like this, but I doubt future generations would choose this asteroid as a target.

AragonWestin: How common is for asteroids to have moons?

Bill_Cooke: A few percent.

tyler_hussey: What is the benefit of knowing about the make-up, it's moon, and it's orbital path?

Bill_Cooke: Asteroids are leftovers from the formation of the solar system, so a study of them is like going back in time to look at the original rocks the planets formed out of and knowledge of the orbit is essential to determine whether or not objects passing close to us will strike Earth in the future.

Namste: How big is its moon?

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Bill_Cooke: Two thousand feet of six hundred meters across.

Moderator_Brooke: Great questions, everyone -- thanks for your patience as we work through the queue. Again, there's more information on asteroid QE2 at this link: http://www.nasa.gov/mission_pages/asteroids/news/asteroid20130530.html

AndrewDavid: Could this asteroid be part of the one that impacted Earth millions of years ago? Any possibility?

Bill_Cooke: If you are referring to the asteroid that helped wipe out the dinosaurs, I sincerely doubt it.

riel190: are there any other asteroids that will come relatively close to the earth in the near future?

Bill_Cooke: Yes. After QE2, there are eleven asteroids that will pass close to Earth in the next week, between now and June 8th. Most of these are two football field-size or smaller.

Finback: Will this asteroid be the closest in 2013?

Bill_Cooke: No. On July 26th, asteroid 2003 DZ15 will pass closer to Earth than this one. There will be other asteroids that will pass very close throughout the year and into the foreseeable future.

riel190: how does the asteroid travel at such great speeds?

Bill_Cooke: It has to be moving that fast to orbit the Sun. If it didn't, it would fall into the Sun.

Moderator_Brooke: Hi everyone -- we're seeing a lot of comments and questions from people worried that QE2 will hit Earth. Be comforted -- it's passing Earth at a distance 15x the distance between Earth and its moon, or 3.6 million miles.

Trolllol: is this the only close approch QE2 does throu the system this pass or will she be "visiting" other planets aswell?

Bill_Cooke: I only have information for close approaches to Earth at this time. It may pass close to Mars at some time in the future, but I have not calculate that.

Nestorddiaz: Hi! Sorry if this has already been asked. Is there any estimate about the approximate distance between the asteroid and its moon?

Bill_Cooke: I am not aware of that number. It may not have been release yet. Observations of the asteroid are still going on, so it may be a couple of days before that information is release.

kingcrabJim: How close to the sun does it get in its orbit?

Bill_Cooke: The closest point in the asteroid's orbit to the Sun is about 94 million miles, almost the same as the Earth's distance to the Sun.

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Darthkiler: Would it be possible for us to discover unknown elements on an asteroid?

Bill_Cooke: I kind of doubt it. We expect to find elements up through iron asteroids and so far we have found nothing unusual in meteorites, which are pieces of asteroids that have hit the Earth.

Namste: How big is its moon?

Bill_Cooke: Two thousand feet or six hundred meters.

Dtomlinson: How long does it take to complete one orbit?

Bill_Cooke: 3.8 years.

Finback: do any of the other asteroids that pass near earth have moons?

Bill_Cooke: Yes.

Hayden: how devastatin would the impact be if this asteroid hit earth?

Bill_Cooke: It would produce a crater between ten and twenty miles across, create an earthquake 8.2 magnitude sixty miles away and sixty miles away will collapse houses and knock down 90%% of the trees. But it will not hit.

kingcrabJim: What do you speculate the temperture on the surface.

Bill_Cooke: Temperature on the surface would be around 384 degrees Kelvin, or approximately 290 degrees Fahrenheit at local noon.

guest100: does the radar see the asteroid wobble as a result of the large satelite's orbit?

Bill_Cooke: Probably, there is not enough observation time in this pass to notice that.

Borgs: Re: asteroid belt and Jupiter's gravity. Is it known whether Mars formed before Jupiter or that the latter's gravitational pull couldn't prevent the former's formation?

Bill_Cooke: Jupiter probably formed before Mars.

AragonWestin: Thanks to Moderator_Brok for that interesting link. I remember reading no long time ago that the tracking capabilities we have for smaller size asteroids is, at best, lacking and that a private individual was trying to raise funds to enhance such capability. Does NASA has projects on that respect?

Bill_Cooke: NASA is hoping to extend our ability to track asteroids down to objects as small as a football field. However, this will require new telescopes that have not yet come online.

Finback: I know that this QE2 is too far away, but could an asteroid traveling close to us be captured by Earth's gravity and become a moon?

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Bill_Cooke: It is possible for this to happen, but the asteroid would probably be captured only for a few months before escaping the Earth-Moon system.

tyler_hussey: Will 2003 DZ15 be bigger and brighter? What aspects and characteristics will you be looking at when it passes?

Bill_Cooke: 2003 DZ15 is ten to twenty times smaller than 1998 QE2.

Rodrigo: How intact does an asteroid's composition remain from its birth? Is it affected by time?

Bill_Cooke: The interior of the asteroid is probably not significantly changed. However, the surface can be weathered by meteoroid impacts and the space environment.

Moderator_Brooke: For those who might have missed the first part of the chat, we'll be posting a transcript of tonight's discussion in the next couple of days. You can access it by returning to this page tomorrow or Monday: http://www.nasa.gov/connect/chat/qe2_chat.html

Moe_Habash: Hey Is it true that this asteroid will the change the rotation of earth ?

Bill_Cooke: No.

Moe_Habash: this may sound a little stupid but can't we plug in a small electronic device on it. and that device could send us data and images ?

Bill_Cooke: If we had a spacecraft out there, we could, but we don't.

Dtomlinson: where in the sky would we have to look to see it with a telescope?

Bill_Cooke: It is currently in the Constellation Hydra below Saturn.

Trolllol: Can we expect any HD photos to pop up of this rock and his satellite once they have passed throu?

Bill_Cooke: No.

Hayden: when will be able to mine asteroids for resources and what not

Bill_Cooke: NASA has no plans to mine asteroids. However, there are commercial companies discussing ideas to do this.

Dtomlinson: How long does it take to complete one orbit?

Bill_Cooke: 3.8 years.

Finback: do any of the other asteroids that pass near earth have moons?

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Bill_Cooke: Yes.

MarkE: Are asteroids with moons common? First time I've heard of this.

Bill_Cooke: Yes, about sixteen percent of asteroids are binary or have moons.

Moderator_Brooke: Thanks for your patience as Bill answers your questions -- we have some in the queue that we're working on as we speak.

AragonWestin: Thanks for your time, Moderator_Brke and Bill. I also read (maybe I read too much) that a lot of the metals in the Earth crust, special rare one like gold, actually came from meteorites and that's one of the reasons that they expect the Moon to be rich in those metals. Is that accurate?

Bill_Cooke: I am not aware of gold meteorites and know of no gold found on the Moon. It may be there, but I know of no one who has found it.

Rodrigo: What would be the minimum size of an asteroid for a mass extintion event?

Bill_Cooke: One kilometer in diameter, roughly.

Dtomlinson: what are the major things NASA hopes to study from this approach?

Bill_Cooke: Characterize the asteroid's orbit, its rotation, its physical properties (composition and size) and the orbit/size of its moon now that we know that it has one.

QE2_Oldfield: How much is that in Celsius?

Bill_Cooke: 110 degrees Celsius.

Rodrigo: What are the slowest and fastest speeds observed for asteroids relative to the sun?

Bill_Cooke: It depends on their distance, so you would have to specify a location in the solar system.

Paulo_F: How much time in advance would we know, if an asteroid is found to be coming towards Earth?

Bill_Cooke: It depends on the size of the asteroid. Big ones we can predict their close approach centuries into the future.

arthur_street: hi, this may have already been asked. is there a way to calculate if and when this asteroid may come closer to earth than tomorrow?

Bill_Cooke: Yes, but it will be ten times farther away on its next approach.

Finback: Does QE2 follow the same general orbit path as Earth?

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Bill_Cooke: No, its orbit extends into the outer part of the asteroid belt and its closest point to the Sun is just outside Earth's orbit.

Light: Can the asteroid be visible to the naked eye, and where do I look ?

Bill_Cooke: It is much too faint to be seen with the naked eye. If you have a small telescope, 1998 QE2 is in the constellation of Hydra.

Trolllol: on QE2's wikipedia it claims: "The surface is covered with a sooty substance that may be the result of a close encounter with the sun." is there any thruth to this?

Bill_Cooke: It is certainly possible; I have not seen calculations as to how close QE2 came to the Sun in the past. That is a question better left to JPL.

Paulo_F : What is the biggest known size of an asteroid?

Bill_Cooke: The biggest asteroid is Ceres, located in the main asteroid belt. It is 590 miles across and it will never come anywhere near the Earth.

Joaquin: Speak spanish?

Bill_Cooke: Sorry, no.

PeterS: are there going to be any debry falling to earth

Bill_Cooke: No, the asteroid is too small and too far away.

Apple7: Is there any way to watch the asteroid's approach "live" ?

Bill_Cooke: SLOOH is streaming the asteroid live tomorrow.

riel190: If an asteroid came into earth's gravity like the moon is how would the additional satalite affect the earth?

Bill_Cooke: If it was captured by the Earth temporarily, an asteroid like 1998 QE2 is too small to affect the Earth.

Rodrigo: Could the asteroid belt nudge the asteroid enough to change its orbit?

Bill_Cooke: No. Asteroids are space on average a million miles apart, so they're not going to nudge anything.

Freemo: will there be a residual meteor shower that can be seen as a result of QE2/

Bill_Cooke: No.

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Bearmama: How much of the sky can NASA watch for asteriods

Bill_Cooke: NASA can watch the night part of the sky, but not the daylight side.

Natalia: Will there be live webcast coverage of the near pass?

Bill_Cooke: Check the NASA web site for events related to the pass tomorrow.

Trolllol: Thanks for everything Bill and Brooke, just one last question before I head of to bed (3am here after all). Is it certain that QE hails from the asteriod belt or is it possible she hails from regions further out in the system?

Bill_Cooke: The orbital parameters indicate it's an asteroidal body, certainly not cometary. So I am reasonably sure that this is an asteroid from the main belt.

Moderator_Brooke: A word of thanks to all of you -- these are very thoughtful questions that we're receiving in the chat tonight. Keep them coming!

Paulo_F: Could you expand a bit on what chondrite is? Are most asteroids made of chondrite?

Bill_Cooke: A chondrite is a stony object that has not been modified due to melting or differentiation of its parent body.

Dtomlinson: How fast is QE2 travelling?

Bill_Cooke: 80,500 miles per hour relative to the Sun at this point in time.

Rodrigo: Does our sun affect its orbit?

Bill_Cooke: The Sun's gravity is what causes 1998 QE2 to be in an orbit. But it does not alter the asteroid's orbit over time.

PeterS: what would the damage be if it hit lets say Cyprus?

Bill_Cooke: There would be a crater ten to twenty miles across and it would flatten trees all over Cyprus and would knock down houses and buildings, but it is not going to hit.

Pax: is it unusual for an asteroid to have a moon?

Bill_Cooke: No, one in six asteroids are binary (have moons).

Light: When the asteroid have been discovered since 1998 why haven't been plans to land a device and take advantage of this rare event to study the asteroid and perhaps it's future nearby objects (wherever it may end out in the Asteroid belt)?

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Bill_Cooke: We have been busy doing other things like building the space station, flying the Shuttle and exploring Mars. This asteroid, even though it is passing close to Earth, is not really all that unusual.

PeterS: what do you mean the asteroid has its own moon could you please explain how that could have happened?

Bill_Cooke: One possibility is the asteroid collided with another asteroid in the past which broke off a fragment which orbited. A more likely scenario is that the asteroid was spinning so fast that a piece of it flew off and went into orbit around QE2.

PeterS: you say next time it comes around it will be 10 times further away so how times will it go around in order to hit an other planet and if so which one

Bill_Cooke: As far as we know, QE2 is not going to hit another planet for many centuries to come.

Natalia: Do the moons of asteroids have irregular orbits? Or do the orbits tend to be circular?

Bill_Cooke: The orbits are usually elliptical with low eccentricities (almost circular).

Moderator_Brooke: If you missed the first part of the chat, please check back on this page in the next couple of days. We'll be posting a full transcript of tonight's discussion. Keep those questions coming!

Dtomlinson: Is it true that QE2 completes one rotation every 5 hours and do we know how long it takes for the moon of QE2 to orbit?

Bill_Cooke: We are still observing the asteroid and will be able to give better answers in a few days to both these questions.

ptgr1: Is there any chance there could be a debris trail from this which we may enter?

Bill_Cooke: No.

PeterS: what sort of minerals are there on this asteroid?

Bill_Cooke: Carbon, olivine, iron, nickel.

CrystalClover: Are there any other asteroids similar to this one that have been discovered, that have to potential to come this close in the future?

Bill_Cooke: Yes, many asteroids will come this close or closer in the future. For example 2003 DZ15 on July 29th, 2013.

Natalia: How many asteroids have been cataloged at this time?

Bill_Cooke: Hundreds of thousands, if you count the ones in the main belt.

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kingcrabJim: Could we land a ship on one of these and hitch a ride towards Mars

Bill_Cooke: Only if the asteroid were heading that way, which this one ain't.

Light: Is the center of this asteroid hotter than the surface, and/or consist of another materials. And what about a bigger asteroid like Ceres?

Bill_Cooke: Not on something this small. Ceres is big enough that there could be some differentiation as you go deep into it.

riel190: is this the first time since it was discovered that asteroid 1998 QE2 has come near earth?

Bill_Cooke: Yes, this is the first time that it has passed close to Earth since it was discovered.

PeterS: can an asteroid be traced back to its origin, where is begun its journey

Bill_Cooke: No, because we can't calculate orbits accurately billions of years back in time.

Natalia: What is the prevailing theory as to the origin of the asteroid belt?

Bill_Cooke: The asteroid belt is left over debris from the formation of the solar system. Jupiter's gravity prevented a planet from forming in that region.

Pax: How do you figure out what type of minerals are on the asteroid?

Bill_Cooke: Look at meteorites because meteorites are pieces of asteroids that have come to Earth.

Light: could an asteroid come close enough as between the orbit of Earth and Venus?

Bill_Cooke: Asteroids can come between the Earth and the Moon. The Earth and Venus are separated by over 40 million miles at their closest. Lots of asteroids travel between the Earth and Venus.

Pax: Hmmm.....so then all asteriods are made of the same minerals?

Bill_Cooke: Some are iron and pretty metallic and some are more like rock. Some are fragile like comets, but there are no unknown elements in them. Basically the same stuff as here on Earth, but in different proportions.

Light: Asteroids of the Asteroid belt can come that close ?

Bill_Cooke: No, asteroids in the asteroid belt are always between the orbits of Mars and Jupiter. But near-Earth asteroids can pass between us and the Moon on occasion.

Scared: Im scared im 13 years old. Wll everything be ok tomorrow. Am i afraaid for no reason

Bill_Cooke: Everything will be fine. The asteroid will certainly miss us.

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ptgr1: do you have the capabilities to know if large asteroids collide often...and if so how far in advance would you know?...

Bill_Cooke: One kilometer asteroids could be picked up centuries before they hit Earth and we could calculate their close approaches centuries in advance.

Natalia: Is it possible for an asteroid to gain such velocity and direction so as to escape the solar system?

Bill_Cooke: It is possible, but highly unlikely for an asteroid or comet to escape the solar system due to a close encounter with Jupiter. In this case, Jupiter's gravity would "slingshot" the object into deep space.

Freemo: How can you be sure that there are no unkown elements in astroids?

Bill_Cooke: Because we have meteorites, which are pieces of asteroids on Earth, and there are no unkown elements in them.

ptgr1: is it true that only 10% of the sky can be monitored at any one time?

Bill_Cooke: No.

Moderator_Brooke: We have about 20 minutes left in our chat, so if you have an asteroid question for Bill, now is your chance!

Light: I understand that asteroid have weak gravities to not hold atmosphere but could close asteroids have common atmosphere?

Bill_Cooke: No, because an asteroid would have to be very close to the atmosphere of a planet which would mean that it would collide.

ptgr1: how much of the sky is being monitored at anyone time?

Bill_Cooke: The proposed LSST telescope will produce a map of the visible sky every week, so it will cover a fifth of the sky each night.

CrystalClover: Does it seem like there is an increase in activities of NEOs recently or are we just paying attention more now? It seems the media doesn't report on these things enough and when it happens, people get scared. On that note, thank you so much for diligently answering our questions Mr. Cooke!

Bill_Cooke: We're paying more attention. These things have always been coming close. And you're welcome.

Natalia: Does a very large asteroid have enough gravity to hold loose material settled to it's surface?

Bill_Cooke: Yes. Large asteroids have sufficient gravity to retain a regolith.

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Light: Will the moon at any point eclipse the view of the 1998 QE2?

Bill_Cooke: No.

Guest: Is there any chance that an amateur astronomer in say Texas can use his telescope to see this asteroid as it passes earth? Where would be the best place to oberve the asteroid in real time??

Bill_Cooke: Yes. If you have a small telescope and look in the constellation Hydra around 10:30 p.m. local time, you can see the asteroid. It will look like a 10th magnitude star slowly moving across the field of view.

ptgr1: last one for me.....what is the shortest notice we have ever had of an asteroid passing by?

Bill_Cooke: Approximately 36 hours. Some we have detected after they went by. But these were very small, boulder-sized objects.

Moderator_Brooke: We have time for a few more questions...

Natalia: Thank you for this opportunity to ask questions, Mr. Cooke. Have a good night.

Bill_Cooke: You're welcome. Hope you have a good evening as well.

Light: Where is the normal orbit of this asteroid like always between the orbit of Mars and Earth ?

Bill_Cooke: The asteroid comes close to Earth's orbit and then swings out to the outer part of the asteroid belt.

ptgr1: something a little bit off on a tangeant.....do you know if there is any truth in the statement "there are more stars in the sky than grains of sand on all of our beaches on the planet"?

Bill_Cooke: I haven't counted, either, so I don't have an answer for you.

Light: Can there be a system of several asteroids held together by gravity and share a common atmosphere (wthout a planet)?

Bill_Cooke: No. Such a system would be dynamically unstable.

Moderator_Brooke: We're winding down our asteroid chat, but you can read more information here: http://www.nasa.gov/mission_pages/asteroids/news/asteroid20130530.html Last call for questions. ☺

ptgr1: How small must an asteroid be to totally burn up in our atmosphere?

Bill_Cooke: Asteroids smaller than a meter or a couple of yards will totally burn up in the atmosphere.

Light: Is there definitive proof that there's life outside earth, like the fossilized algae found from some meteors?

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Bill_Cooke: No extraterrestrial life has been found in meteorites. As far as life outside of Earth, you need to ask an astrobiologist.

Moderator_Brooke: ...and that's a wrap! Thanks to everyone for being here tonight -- excellent questions. Bill, thanks for being our expert on this chat. Check back on this page in the next couple of days for a full transcript. Have a great evening.

ptgr1: thx

Bill_Cooke: You're welcome.

Light: Thanks alot Mr. Cooke

Moderator_Brooke: (From Bill) You're very welcome!