good afternoon my name is Dwayne brown

with the office of communications and

welcome to NASA headquarters today NASA

reveals near-earth asteroid findings and

implications for future research from

the agency's near-earth object wild

short Neil wise today's information and

graphics can be obtained on the web at

WWDC gov / wise we will have brief

presentations from my presenters then

open it up for questions and unnecessary

in the phone bridge before we get

started let me introduce you to today's
speakers first up Lindley Johnson Neal

program executive NASA headquarters

Washington Amy Meinzer NEOWISE principal

investigator NASA's Jet Propulsion Laboratory Pasadena California Tim Spahr

director Minor Planet Center Smithsonian Astrophysical Observatory Cambridge

Massachusetts and Lucy McFadden

scientist NASA's Goddard Space Flight Center in Greenbelt Maryland and with

that I'll toss it to lindley to start us off thanks doing thank you all for tuning in to hear about our progress with the near-earth object observation
program we're here today to provide an
update of our understanding of the
near-earth asteroid population and
announce achievement of some significant
goals and finding our nearest neighbors
in the solar system over the past 12
years our work to find near-earth
asteroids has largely been done by
several ground-based observatory teams
but in 2010 NASA augmented those efforts
by enhancement of the ground processing
of the data being returned by the
wide-field Infrared Survey Explorer
this enhancement project called NEOWISE
process all the sky images sent it back

00:02:19,379 --> 00:02:23,340
from wise detect objects moving across

00:02:21,360 --> 00:02:25,740
the sky background those objects that

00:02:23,340 --> 00:02:27,539
would be in our solar system this was

00:02:25,740 --> 00:02:29,550
mainly done to find near-earth asteroids

00:02:27,539 --> 00:02:31,229
and comets but a great many main-belt

00:02:29,550 --> 00:02:34,110
asteroids and other objects in the solar

00:02:31,229 --> 00:02:36,119
system are also found the year of wyeth

00:02:34,110 --> 00:02:37,890
observation also led to two very

00:02:36,120 --> 00:02:40,950
significant findings for the near-earth

00:02:37,889 --> 00:02:43,289
object observation business the NEOWISE

00:02:40,949 --> 00:02:45,839
project has confirmed completion of the

00:02:43,289 --> 00:02:47,719
original goal set with Congress back in

00:02:45,840 --> 00:02:50,250
nineteen ninety eight of our program

00:02:47,719 --> 00:02:52,139
which was to find ninety percent of the
one kilometer and larger near-earth asteroids the second significant finding is the population of medium-sized near-earth asteroids have those between 100 metres and one kilometer and size is probably somewhat less than we were estimating before so if I can have the first graphic up this is an animated view of our solar system looking down from the Sun with the inner planets orbits depicted as circles Mercury Venus Earth and Mars is the outer ring I have to point out that this diagram the sizes of these objects is not to scale if it
were even the planets would be so small

that you couldn't really see them so if

we could have the animation in motion

now all the small red dots seemingly

swirling about like gnats are in their

orbits about the Sun are shown in the in

the red those that we previously knew

about are now shown in yellow or maybe

orange and some screens that those that

were detected by the NEOWISE project are

now in blue and the new objects that

were detected by neo eyes are now shown

in white

from this sample that the wise NEOWISE
The project was able to find we've projected a more accurate model the overall population that is over forty percent less in numbers which we now compare here with the old model of the estimated population so you can see considerably less numbers so if this new bottle holds up it will mean the number of hundred meter and larger near-earth asteroids yet to be found is somewhat less but even this new population there are over 15,000 objects still to be found it will take more capable systems and several more years of survey efforts to find
these relatively small and dim objects

00:04:47.529 --> 00:04:51.698
it's something like trying to detect a

candle at the distance of the moon to

00:04:49.029 --> 00:04:54.129
tell us more about the NEOWISE project

00:04:51.699 --> 00:04:56.560
is our principal investigator dr. Amy

00:04:54.129 --> 00:04:59.620
manger well thanks Lindley and thanks

00:04:56.560 --> 00:05:01.240
all of you for tuning in this afternoon

00:04:59.620 --> 00:05:03.399
it's great to be here wise was a very

00:05:01.240 --> 00:05:04.930
short mission and we're very happy to

00:05:03.399 --> 00:05:06.899
have these results to present so quickly

00:05:04.930 --> 00:05:09.759
so is Lily mentioned we find that there

00:05:06.899 --> 00:05:11.469
are fewer near-earth asteroids out there

00:05:09.759 --> 00:05:13.629
however it's very important to note that

00:05:11.470 --> 00:05:16.539
fewer does not mean none and there are

00:05:13.629 --> 00:05:17.978
still tens of thousands that are out
there that we need to find that are left

as one of my colleagues at the Jet Propulsion Laboratory likes to say the

best three ways of dealing with the potential of an asteroid impact our to find them early and find them early if you can find near-earth asteroids when they're far away it would take far less energy to mitigate a potentially threatening object so this is why we carry out surveys like the ones that Lindley has described and like NEOWISE so one of the characteristics of NEOWISE is that it really was a fairly
small telescope in a low-earth orbit in

fact the telescope would kind of fit

under your arm like this so it's not

particularly large but by virtue of

being in space and operating at infrared

wavelengths it's very powerful telescope

and it turns out to be very good at

finding asteroids and comets now if you

go to the first animation here you can

see a little representation of what wise

looks like going around the earth it's

always pointing outward from the earth

surveying the whole sky and as the earth

goes around the Sun this allows the
telescope to very quickly efficiently carry out a survey of the whole sky and in fact it was so fast we were able to survey the whole sky twice in infrared wavelengths in only one year and you can see here a little representation of the difference between visible light and the infrared light that wise was able to see so this was a very efficient and effective way of serving the sky and the original purpose of the mission was actually to study cool stars and very distant galaxies and it's doing a great job of that however
it turns out to also be very good at
detecting asteroids this is because it's

using infrared light if we look at the

next slide here we can see two asteroids

we can see a close-up of them one is

very bright and kind of shiny more

reflective and the other one is very

dark like a piece of charcoal or

barbecue soot at the bottom of your

barbecue they're both the same size

however now when we're close up to these

asteroids you can actually see that

they're the same size but the problem is

most of the time were not close up to

the asteroids if we roll the animation
we can start to see what happens next

when we're close up it's easy to get a very good estimate of their sizes but

now imagine that they're far away and we're observing them through a very distant telescope if even at the even if they're at the same distance to this visible light telescope the one that is brighter is going to appear brighter to the visible light telescope and the one that's darker looks fainter however if we can look with an infrared telescope what we're seeing now is actually heat that's being emitted from the objects
and so to the infrared telescope they look the same brightness and from that we're able to determine their sizes the other benefit of this is it means that infrared telescopes are less intrinsically biased against finding small dark near-earth asteroids and this gives us a better representative sample of the true population so with new eyes we didn't go out and find every single asteroid that's out there but we got a good representative sample kind of like doing a census where you take a poll of a small subset of people that you think
is representative of what everybody thinks and so that's what we've been able to do with NEOWISE if we go to our next chart we can see how these results have applied if we look at the very largest asteroids these are one kilometer larger objects so these are the planet busters these are the things that are like the one that has thought to have caused the extinction of the dinosaurs the good news here is that with NEOWISE we've been able to confirm that the worldwide community of astronomers both
amateur and professional all over the

place have now found more than ninety

percent of all of these really big

asteroids and that's represented as the

filled in asteroids the ones that look

sort of tan we believe that there are

something like 981 in the total

population and this is very close to the

original estimate of about a thousand

objects that's what you see in the blue

outline right there the green outline

represents the the difference in our

prediction with NEOWISE so we're saying

the total number is about the same but

the new thing here is that we can
now confirm that we have met the
so-called Spaceguard goal of finding
ninety percent of all the one kilometer
asteroids so we know where they are and
by virtue of the fact that we know these
objects and we know their orbits we can
predict that they are no longer
hazardous to earth in the sense that we
can follow them and we know that there
are none that pose any imminent risk of
an impact if we look at smaller sizes
with the NEOWISE data if we go to the
next line in the chart you can start to
see the differences in the previous
prediction of the population versus our

prediction of the population the

previous prediction is shown as the blue

outlines and our prediction is shown as

the green outlines and again you can see

that the the fraction of objects that

have already been discovered are shown

is filled in and going to still smaller

sizes we can see another layer of this

so if we could have the next layer in

the chart you can see that now the

prediction is showing that there are

somewhat less but we've also found

proportionally less of these objects so
there are still many remaining to be found and if we go to the next layer you can see that this continues so if we go to the final layer of the chart for objects that are smaller than about a hundred meters the NEOWISE survey is not really able to comment because we just didn't see very many objects that are that small so we're not able to comment however previous studies indicate that there may be as many as about a million or so of these very small asteroids but even so if we sum up and look at all of these things everything between a
hundred meters and a thousand meters one

00:10:47,450 --> 00:10:52,759
kilometer we believe that there's

00:10:49,220 --> 00:10:55,070
something like 19,500 predicted to exist

00:10:52,759 --> 00:10:57,830
in the total population compared to a

00:10:55,070 --> 00:10:59,930
previous estimate of about 35,000 so

00:10:57,830 --> 00:11:01,639
there are fewer however it's important

00:10:59,929 --> 00:11:04,939
to note that we've only found a fairly

00:11:01,639 --> 00:11:07,699
small fraction of these to date okay so

00:11:04,940 --> 00:11:09,950
to give us a little bit more information

00:11:07,700 --> 00:11:12,379
about infrared and the value of these

00:11:09,950 --> 00:11:13,790
surveys is Tim Spahr dr. Tim Spahr is

00:11:12,379 --> 00:11:17,120
the director of the Minor Planet Center

00:11:13,789 --> 00:11:20,750
in Massachusetts thanks for the lead in

00:11:17,120 --> 00:11:23,690
a me the job of the Minor Planet Center

00:11:20,750 --> 00:11:27,139
is to collect all of the asteroid data
that's taken worldwide and so we're in a position where we interact with all the other asteroid astronomers we collect positional data we distribute the orbits and one of the things that we do is to try to discriminate between near-earth asteroids and the main belt asteroids and from this perspective from my perspective at the MPC the NEOWISE mission is the most important project in my career and the real punch line of this is that they observed the size they were able to determine the size of every object that they observed in addition
when I combined the positional information that they gave us with that from the other surveys that Lindley described they were able to produce a very good orbit model for all of the objects and not just the near-earth objects I'm talking about the main belt asteroids the group between Mars and Jupiter Neowise observed actually twenty-five percent of the entire known asteroid population so that was something like a hundred and fifty thousand objects and because they could again because they could determine the
size of all of these objects we were able to put together a really good model and it's important to know that this was something that was it was a contributory effect this fit in perfectly with the other surveys that are already there it looked at a different wavelength and a different area of this guy so everything fit together very well now to give a little idea of the census we've got a video here and all right go ahead and start that please this each little dot again not to scale is an asteroid that was observed by the wise
the nao wise program in the center you

00:13:03,950 --> 00:13:07,820
have the Sun and the outer orbit there

00:13:06,379 --> 00:13:10,129
is the orbit of Jupiter and if you give

00:13:07,820 --> 00:13:12,650
that just a good look you can see the

00:13:10,129 --> 00:13:14,419
sampling of all the different

00:13:12,649 --> 00:13:16,189
populations of main belt asteroids

00:13:14,419 --> 00:13:17,990
there's objects out by Jupiter and

00:13:16,190 --> 00:13:20,360
there's a whole bunch of objects in

00:13:17,990 --> 00:13:22,580
there near the earth so that's the

00:13:20,360 --> 00:13:25,850
near-earth asteroid population and this

00:13:22,580 --> 00:13:28,220
is showing just over one year how

00:13:25,850 --> 00:13:29,778
powerful this program was observed a

00:13:28,220 --> 00:13:32,180
quarter of the known population and

00:13:29,778 --> 00:13:41,600
census a good bunch of the inner solar

00:13:32,179 --> 00:13:45,859
system so I would like to give sort of a
little information on how the spacecraft works in terms of determining the sizes

and we want to make sure we get this through so the next picture that we have here is a visible light image this would be what you would see go ahead cue that one up alright that would be what you would see from a visible light telescope like the existing surveys that we have so you see three asteroids that look similar brightness now we go to the next iteration please so on the left hand side we have a small reflective object and on the right hand side we have a
large dark object and again we as we
heard before those will look the same in
the visible light now if I could have
the last slide please this is the real
key in the infrared light we get a
discrimination in the size from NEOWISE
and so on the left-hand side the
smallest object actually looks to be the
dimmest and the NEOWISE images on the
right hand side the largest object looks
to be the brightest this is really the
most important part of it if you think
of trying to do a census you need to
know the actual physical characteristics
of the object and this is what we get

from neowise we got the actual sizes and

as we take a fraction of the population

we can extend that knowing the size and

the orbit characteristics to the whole

asteroid population and that to me is

why it was so important now I would like

to hand things over to dr. Lucy McFadden

to drill down into some of the other

aspects of the project and other NASA

missions thank you Tim um first of all I

find it really exciting that scientists

continue to find things in

solar system bodies in orbit around the
Sun and objects that are close to our

386
00:15:19,970 --> 00:15:25,370
backyard in the near-earth space I want

387
00:15:23,778 --> 00:15:27,470
to congratulate the team for your

388
00:15:25,370 --> 00:15:30,560
successes and I know from experience

389
00:15:27,470 --> 00:15:32,959
that in order to conduct a

390
00:15:30,559 --> 00:15:35,599
survey and to locate and discover new

391
00:15:32,958 --> 00:15:38,179
bodies in from spacecraft missions

392
00:15:35,600 --> 00:15:40,909
requires a lot of planning a lot of

393
00:15:38,179 --> 00:15:44,599
ingenuity a huge amounts of computing

394
00:15:40,909 --> 00:15:47,208
power and then hours and hours months of

395
00:15:44,600 --> 00:15:49,850
discussions with colleagues and poring

396
00:15:47,208 --> 00:15:51,619
over the data to validate the results so

397
00:15:49,850 --> 00:15:53,450
I want to congratulate you all it was a

398
00:15:51,620 --> 00:15:56,570
big team effort that you should all be

399
00:15:53,450 --> 00:15:58,970
proud of there are 28 co-authors on the
papers that are to be published and each
one of them has had a critical role in
the success of the project
additionally it's terrific to have a
satellite that can reach the greatest
depths of the universe and also find
things right here close to home can I
see that have the first slide here again
we like looking at the
bird's-eye view of our solar system with
the with the circles or actually
ellipses representing the paths of the
planets and the white dots representing
the asteroids there are minor
planets we consider the minor planets because of their small size and it's really fun to welcome the new asteroids into our consciousness of the solar system another concept that I marvel at is that their presence their mere presence reveals the past when the solar system was forming solids condensed from the rotating disk of gas and dust and and planets grew some of them to hundreds of kilometers and they weren't there growth was stopped by the formation of the larger plan it's the major planets that there are tens of
thousands to hundreds of thousands of kilometers in diameter so in the asteroid population we see both early planets that grew to us what I call a small size hundreds of kilometers but also the remnants of larger planets that were broken up from collisions in the solar system and and the challenge is to determine which asteroids are which and what the time scale is what happened when so um next slide please to complement the surveys what the surveys tell us is what the big population is give us the big picture
they also allow us to decide which ones
to go study up close with robotic
missions so here we have about nine
asteroids that have been studied with
robotic spacecraft missions in the past
20 years we've covered a wide range of sizes and asteroids from
different parts of the whole asteroid belt as well as some in near-earth space
what I'd like to point out here the obvious one the biggest one here is
asteroid 4 vesta which has a spacecraft in orbit about it today
orbiting for the next nine months and getting revealing this body as a
as a world of its own looking at the
surface properties determining its composition and determining the processes that hit it and you can see by looking at the surface that they're craters on the surface and that tells us that there were collisions bodies collided with the planet with I'm sorry bodies collided with Vesta and debris was ejected from it and over tens of millions of years or maybe longer objects have been have found their way through a dance and if we could go to the next slide through a dance of
gravity and solar system dynamics bodies

have found their way into collision

collision course with the earth and we

see these as meteors mostly fireballs

terrific fire balls that are spectacular

this one was captured during a football game in 1992 and it traveled the whole length of the eastern seaboard and

coincidently landed in a small town in the Hudson River of upstate New York

where I used to spend my summers and it landed as

meteorite so we have we have in our collection meteorites that have landed
on earth and as an example here we were showing a picture of myself on a scientific expedition in 2008 looking for the remnants of an asteroid that was discovered by astronomers with their telescope who determined that the asteroid was going to collide with Earth and it broke up in the Earth's atmosphere just as the Peekskill meteorite did and through communications and precise calculations and measurements we were able to determine the location of the meteorite fall and actually travel with students from
University of Khartoum and search for

these meteorites and recover them so we

have these samples here which now Cosmo

chemists can study in their laboratories

and give us yet more detail on the

processes and the history of products

and processes in the solar system so we

have so what we can go what we've done

is going from points of light amidst the

infrared glow of the universe to rocks

from space that tell us about the solar

system's four and a half billion year

existence and then instead of just being

afraid of asteroid impact disasters

these objects can teach us tell us
information about the solar system that

we can just marvel at four for summing

this all up and just to pull it all

together for what we've learned today

from the Neo Ice project so far is today

we have good news with some important
caveats so we've learned with NEOWISE

that the worldwide community of

astronomers looking at near-earth

asteroids have found 93% of all the

really big near-earth asteroids that we

think are out there and this is

substantially reduced the risk of of an

impact that is not warned in other words
we know now where most of them are and where most of them are going that really has reduced our risk of an impact from a really big one also we predict that there are somewhat fewer medium sized asteroids out there in near-earth space but fewer does not mean none and there are still tens of thousands out there that are left to find so we still need to keep going on the survey efforts we have a lot of work left to do much more research and we still need to specifically analyze the subset of near-earth asteroids that get.
really close to the earth but overall at this point our understanding of the near-earth asteroid population has been significantly improved and we believe that the hazard to the earth may be somewhat less thank you alright thank you all and now we're going to transition into the question and answer period we're going to first start down at the Kennedy Space Center where we have one question at a follow-up and then we'll go to the foam bridge Kennedy person Florida today last April where the President of the United States was
down here at Kennedy Space Center and he

00:22:59,589 --> 00:23:05,339
challenged NASA to send astronauts to an

00:23:03,160 --> 00:23:10,029
asteroid by the year twenty twenty-five

00:23:05,339 --> 00:23:13,419
I was wondering if you could tell us

00:23:10,029 --> 00:23:17,910
whether any of the findings that you

00:23:13,420 --> 00:23:21,610
found in your survey might produce

00:23:17,910 --> 00:23:26,259
targets of opportunity for human

00:23:21,609 --> 00:23:29,139
exploration or take that thanks for the

00:23:26,259 --> 00:23:31,359
question this is Lindley um we're

00:23:29,140 --> 00:23:35,110
working with the human spaceflight folks

00:23:31,359 --> 00:23:38,289
in examining the known population of

00:23:35,109 --> 00:23:42,129
near-earth asteroids to to determine if

00:23:38,289 --> 00:23:44,379
there are available targets this

00:23:42,130 --> 00:23:46,120
research the work that Neil wise is done

00:23:44,380 --> 00:23:47,800
has allowed us to understand the
population of these objects much more

and to understand where we could find more available targets but there are a number of things that still need to be done the survey the objects that come closest therefore tend to be the smaller ones and 100 meter class and as you see there's a large percentage of the population still to be found but the efforts to date have shown us what the population looked like and where we might be able to find in the techniques we need we need to use to find more of these objects Todd you have
a follow up and just as a follow could

you tell us in a general sense for say

my next-door neighbor why we would

actually want to send human explorers to

an asteroid well exploration of the

solar system is one of the goals of NASA

and our scientific program the human

spaceflight is a part of that

exploration so it's it's a natural

stepping stone of our exploration into

the solar system okay we're going to

transition to the phone lines now first

up is alan boyle with MSNBC Alan thank

you I realize you're focusing on New
Earth asteroids today but there's been

so much talk about the potential for

finding a Planet X or some sort of large

body through the wise survey can you

comment on any status on that sort

of search or maybe even reassure people

that Planet X isn't coming to get them

next year yes this is Amy meinzer I'm
happy to answer this one there Planet X

is not coming to get us so but we are

looking to see if there are any other

bodies in the outer part of the solar

system with the wise data this is a very

natural project for wise and so we're

still working on it right now it's we've

00:25:58.569 --> 00:26:01.929
obviously just returned a huge amount of

00:26:00.490 --> 00:26:04.359
data from the telescope it's going to

00:26:01.930 --> 00:26:05.470
take us a long time to sort through but

00:26:04.359 --> 00:26:07.509
the initial results are very promising

00:26:05.470 --> 00:26:09.339
you may have seen earlier results where

00:26:07.509 --> 00:26:12.519
we've discovered a new class of very

00:26:09.339 --> 00:26:14.589
cool type of stars with wise but the

00:26:12.519 --> 00:26:15.789
search is still on and we don't think

00:26:14.589 --> 00:26:17.649
that there's anything that's hazardous

00:26:15.789 --> 00:26:19.329
in the outer solar system we think that

00:26:17.650 --> 00:26:20.950
this is just sort of a

00:26:19.329 --> 00:26:24.869
there is something out there would be a

00:26:20.950 --> 00:26:28.840
large body in a roughly circular orbit a

00:26:24.869 --> 00:26:30.639
next caller Denise Chow from space calm
and you know when you say initial results are very promising yeah the the initial results are very promising anything else he wanted to say on that point we've actually been able to confirm the discovery of 100 new of objects that are these very cool stars called brown dwarfs and so that's very similar to what people are interested in looking for so we've actually found some of these that are relatively close to the earth but none of these are closer at this point than the nearest star to our solar system so it's a good start
though thank you now we'll go to Denise

um space com Denise I didn't showered

safe comden for taking my question I was

under the impression but please correct

me if I'm wrong that the the wide

mission was officially shut down in

February 2011 so does that mean that in

the month he needs to come it will be

more of sifting through deepest survey

information has been collected or is

there a plan to continue with another

mission to take more of these factories

well this is a me and I'll answer this

we like to think that the wise
spacecraft having completed its baseline mission successfully is now in honorable retirement it's in hibernation mode having accomplished all of the goals and then some that were set out for it so we're happy to now be looking at the data okay next up is now Greenfield boards from NPR no sorry just so the benefits of having a manned mission to an asteroid as opposed to just collecting samples robotically again the entire question I just wondering if you could explain the benefits of having a manned
A mission to an asteroid has approached you on collecting samples just robotically an attorney Mr. Arctic that this is Lindley again the human spaceflight they are still working out the objectives and constraints and requirements of human space flight mission to an any oh but with a robotic mission you have certain capabilities that you're able to do but since those have to be programmed ahead of time and has to be all planned out and thought out ahead of time to to get the robot to do what you needed to do there are some limitations to a robotic sample
collection one of the big advantages of humans is they're able to think on the fly and adapt quite quickly given some basic capabilities so that would certainly be one advantage of human exploration of an asteroid to be able to think of different things to be done while you're at the asteroid look in different places for samples to be returned of course one of the biggest science objectives of a human exploration to an asteroid would be to bring back samples and now do you have a follow-up
Ok Go Ahead she's coming right now new

estimate of roughly 19,000 mid-sized

near-earth asteroids the majority of

those have not been discovered and I'm

wondering what missions or projects are

underway to discover those and I also

wondered if you could characterize the

damage to our planet that would occur if

one of those mid sized objects struck

the earth I guess Arctic that again this

is uh this is Lindley your first

question is about the ongoing efforts

what are we continuing to do we continue

to run several ground-based teams that
have been in operation for several years

and have actually found the majority of the known objects those projects continue we are looking at increased more capabilities the NEOWISE mission kind of gave us a prototype of a space-based mission that we might look at for the future but we have to examine the cost and benefit of doing it from space in the infrared versus ground-based observatory larger ground-based observatories so there's actually a whole spectrum of capabilities to be looked at it's
really it's not one system to do it it's

00:31:32,180 --> 00:31:36,920
a complement of both ground and

00:31:34,670 --> 00:31:41,180
space-based systems which would probably

00:31:36,920 --> 00:31:45,920
be the best to recover the entire

00:31:41,180 --> 00:31:52,610
population of these objects and I

00:31:45,920 --> 00:32:01,549
forgotten your second question oh thanks

00:31:52,609 --> 00:32:04,180
Amy you wanted some idea of what the

00:31:55,579 --> 00:32:01,549
damage of say a hundred meter asteroid

00:31:58,640 --> 00:32:04,180
if it were to impact the earth because

00:32:01,549 --> 00:32:07,069
of the orbital dynamics the relative

00:32:04,180 --> 00:32:13,450
speed at which these objects hit the

00:32:07,069 --> 00:32:16,490
earth would be on the order of tens of

00:32:13,450 --> 00:32:19,019
miles per second so that's a lot of

00:32:16,490 --> 00:32:26,160
energy to be distant dissipated in

00:32:19,019 --> 00:32:28,500
and so it is quite a large area that
would be damaged by the impact of 100 meter objects something on the order of metropolitan area if say for instance one were to hit in the middle of the DC area it would pretty much devastate the entire area within the Beltway I'd like to make one general comment on the existing excuse me the existing search teams they're finding roughly 500 objects larger than 100 meters per year and so it's a little bit slow going but the existing assets are capable of certainly doing good job with this certainly given enough years they will
eventually recover the population that it will be several decades with just existing assets okay we have one final question I think this is a good wrap up this is for Amy 410 comms with all this data what are the next steps one of the most exciting things about having data from a spacecraft likewise and the NEOWISE project is that there's just so many different things you can do with it one of the things we're very interested in studying is the subset of near-earth asteroids that are considered potentially hazardous meaning that they
have orbits that take them very close to the earth we're going to be looking at those in greater detail we're also going to be studying asteroids between the main in the main belt between Mars and Jupiter and so we've just got a lot of good things left to do and it's going to keep us busy for a long time if I might add to that this subset of the population at Amy talks about those that are have closest encounters with earth that's also the population of objects which will make the base best human spaceflight targets so there a
particular interest for not just a
hazard but for exploration destinations
okay that's going to wrap up here and
would like to remind folks that go to ww
today also our participants all
available
follow up interviews just contact my
office 20 2 3 5 8 17 26 thank you for
joining us science never sleeps