



# Duck! Disaster! Destruction!

## Challenges in communicating about near-Earth objects

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# The current environment

2012: NASA's NEO budget grows 5X from one fiscal year to the next.

2012: B612/Sentinel, Planetary Resources, Deep Space Industries...

Events of Feb. 15, 2013, draw attention of U.S. Congress.

Mainstream media, social media, conspiracy theorists are paying attention.

NEO experts disseminate timely and complete information.

March 2013: David Weaver, NASA, says "What NASA's all about is humans to Mars and humans to an asteroid."

April 2013: NASA FY14 budget request doubles NEO program budget, initiates "mini-flagship" mission to capture an asteroid

# I can haz keyboard....



# Communication is....

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Practical action

Social action

Symbolic action



# Insights from research and practice

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Communication is contextual, contingent, situated, and symbolic as well as instrumental.

“The public” is not a monolithic audience.

Mass media and, increasingly, social media play a key role in public discourse about science.

The professional values and practices that journalists and scientists employ are different and sometimes conflicting.

“Facts,” “truth,” “knowledge” ....

# Communication style

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Strunk and White 101: Be clear and concise.

(Jargon, numbers, probabilities, scales...)

For science: Be timely, comprehensive and correct.

In the current environment: be open and transparent.  
Truly engage...

# Why?

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Statutory responsibility

Civic responsibility

Trust

# How we communicate

## *The cognitive-deficit model:*

Communication as a one-way process of transmitting information from expert to non-expert. (*Bang.*)

## *The interactive (dialogic, networked, participatory) model:*

Communication as a two-way, open, inclusive, continuous process, accommodating expert and “local” knowledge. (*Can we talk?*)



# Ambiguity and uncertainty

Scientists understand that research findings almost always involve some uncertainty or ambiguity. Findings, results, data are almost always open to interpretation. Following conventional scientific practice, scientists couch claims (findings, data, interpretations) in a qualifying frame of any and all uncertainties relating to the claims.

Journalists are compelled to clarify, avoid, or eliminate ambiguity or uncertainty, in keeping with long-standing news values and journalistic practices and conventions.

Can this dilemma be resolved? Yes. Will it be easy? No.

Both scientists and journalists are entrenched in their ways. Raising awareness in both camps about how professional and personal attitudes, values and beliefs shape scientific and journalistic practices can help.

# What we say and what they hear



What they hear

blah blah GINGER blah  
blah blah blah blah  
blah blah GINGER blah  
blah blah blah blah



What they hear



# What we say...

What is a PHA ?

A "killer," a "threat [from] the heavens," an "interplanetary projectile," a "mass extinction impactor," a "civilization destroyer," a "city buster," a "tsunami/regional killer..."

What if an asteroid hits Earth?

"Global firestorms...lethal blast wave...planet wide tsunamis [and] earthquakes....  
Consequences...worse than a full-scale nuclear war...."

# NEOs in the news...

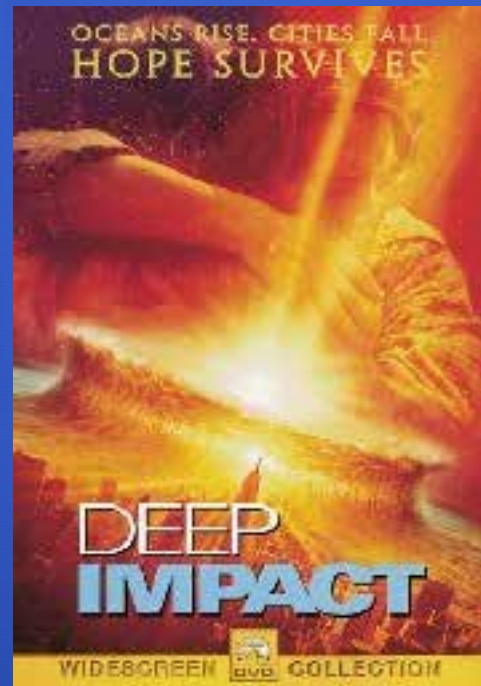
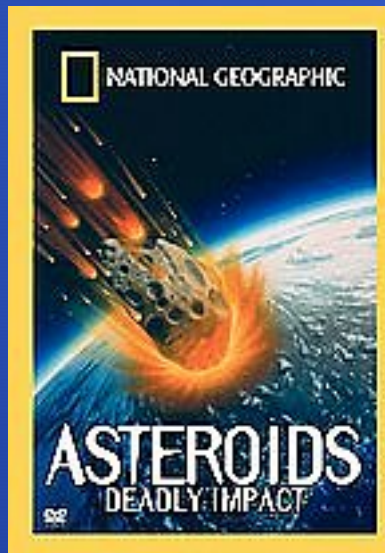
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“Big asteroid [2011 AG5] could pose threat to Earth in 2040”  
(space.com, 2/27/12)

“Well that’s a relief! NASA says asteroid [2011 AG5] won’t hit us in 2040” (Daily Mail, 6/18/12)



# NEOs in the movies...



# Chelyabinsk event

“Blindsided from space,” Washington Post, 2/15 (p. 1)

“Sun’s glare hid space rock as it approached Earth”

Sidebar: “What was that?” (terms – source: nasa.gov)

“Meteor explodes, injuring over 1,000 in Siberia,” NYT, 2/15

“Shock wave blows out windows – children hurt”

“Vindication for entrepreneurs watching the sky: yes, it can fall,”  
NYT, 2/17

“After assault from the heavens, Russians search for clues and  
count blessings,” NYT, 2/17

# "Meteor Strike," NOVA, 3/27/13

"It came from outer space." (Opening words of the narrative, and the title of a 1953 Hollywood SF film).

"The race is on to find out what *really* happened."

"Why was there no warning?"

"...the real threat we face from outer space..."

"Exploding death rocks from space."

"Two celestial hammer blows aimed at planet Earth on the same day..." (2/15/13)

"This asteroid [Chelyabinsk] snuck up on us."



# 2012 DA14

NASA: "On Feb. 15 at approximately 2:30 p.m. EST, a 150-foot sized asteroid will safely pass by Earth. Designated Asteroid 2012 DA14 by researchers, it will skirt by our planet at about 19,000 miles. This distance is well outside our atmosphere but inside the orbits of our communications and weather satellites stationed 22,300 miles from Earth. While this celestial object does not pose any threat to Earth or satellites, it creates a unique opportunity for researchers to observe and learn more about asteroids. "

The media:

"'Atomic bomb' asteroid will definitely miss us this time ... but it comes back every year" (UK Daily Mail, March 12)

"Alert: deadly asteroid bounds toward Earth out of the blue" (Realist News, March 2012)

"Asteroid 2012 DA14 WILL HIT Earth on 15th February 2013 ? IMPACT IMMINENT?" (YouTube, 80sSkyChild1987, 46,000+ views)

"Asteroid 2012 DA14 Won't Hit Earth, NASA Says, But Don't Rule Out Satellites" (Huffington Post)

"Asteroid With Power Of H-Bomb To Miss Earth, Experts Say" (Huffington Post U.K.)

"No, asteroid 2012 DA14 will not hit us next year" (Bad Astronomy)



# "Ask an Astrobiologist"

- | Q: I read that a comet will be visible to the human eye In the late months of 2013 and would be brighter than the moon is a comet hitting earth possible?
- | Q: I was just wondering if you looked into the collapse of the financial market which would result in Marshall law in the U.S. ? Or the possibility Osama bin laden is the the anti Christ and will rise again. Generally I do not believe in such things but a few prophecies that have not been wrong predict such outcomes? I also heard that an asteroid may hit the earth this year and have not found time to re search this on my own
- | Q: How safe are we from asteroid DA14 wchich is going to fly on February 15 (next month)?Is it headed towards us? If not how sure are you and how safe am I (in Switzerland, Europe) and how precise are the calculations given from you about this asteroid?(Im very scared)
- | Q: Im a guy from holland . I read here by the question . that you answerd . that nasa cant or have a way to blow are shoot a astroid away from earth .so if I understand it well you do nothing and let us die. or is ther a way than olny calculatate . and hope it missing earth .what the real truth about the astroid who comes to earth . 2013 - 2029 - 2040 or 48 I realy scarred about this . cant you tell me about this and take the fear awy

# And now, the ARM...

From the office of Sen. Bill Nelson (D-FL), 4/5/13:

“NASA has [a] plan to capture an asteroid and tow it to the moon. The plan calls for astronauts powered by a new monster rocket to land on the asteroid in just eight years.”

Associated Press, 4/5/13: “NASA to lasso asteroid, bring it closer.”

Orlando Sentinel, 4/5/13: “Space Cowboys: NASA's newest project aims at corralling asteroid.”

Time, 4/9/13: “Asteroid in a Bag: NASA's Long, Strange Trip.”

Cleveland Plain Dealer, 4/10/13: “NASA Glenn to get funding for asteroid program under President Obama's budget plan.”

# “Why explore?” (nasa.gov)

## “Why Asteroids?”

Asteroids are believed to have formed early in our solar system's history—about 4.5 billion years ago—when a cloud of gas and dust called the solar nebula collapsed and formed our sun and the planets. By visiting these near Earth objects to study the material that came from the solar nebula, we can look for answers to some compelling questions, such as: how did the solar system form and where did the Earth's water and other organic materials such as carbon come from?

Future robotic missions to asteroids are a critical step in preparing humans to visit asteroids where we will learn about the valuable resources available in space, and further develop ways to use them in our quest for more efficient and affordable exploration.”



# NASA history: humans to NEOs

April 16, 2013,

<http://www.nasa.gov/topics/history/features/asteroids.html>

Asteroid retrieval is not a new endeavor for NASA.... In a 1964 document that looked at "long range future mission planning," NASA expressed an early aspiration to visit asteroids through unmanned probes by the end of the 1970s.... By 1969, according to a "Five Year Plan" laid out by the Office of Manned Space Flight, NASA was already looking at plans to send crewed missions to asteroids.... NASA administrator Robert A. Frosch mentioned this in testimony to Congress on July 29, 1980, when he explained that "a number of evolutionary stages of technology development would be required" for such missions, including "asteroid retrieval to Earth."



# Planetary Resources

## “REDEFINING NATURAL RESOURCES

Planetary Resources is establishing a new paradigm for resource discovery and utilization that will bring the solar system into humanity's sphere of influence. Our technical principals boast extensive experience in all phases of robotic space missions, from designing and building, to testing and operating. We are visionaries, pioneers, rocket scientists and industry leaders with proven track records on—and off—this planet.

*Asteroid mining will ultimately lead to an environmentally and economically sustainable development of space resources.”*

# Deep Space Industries

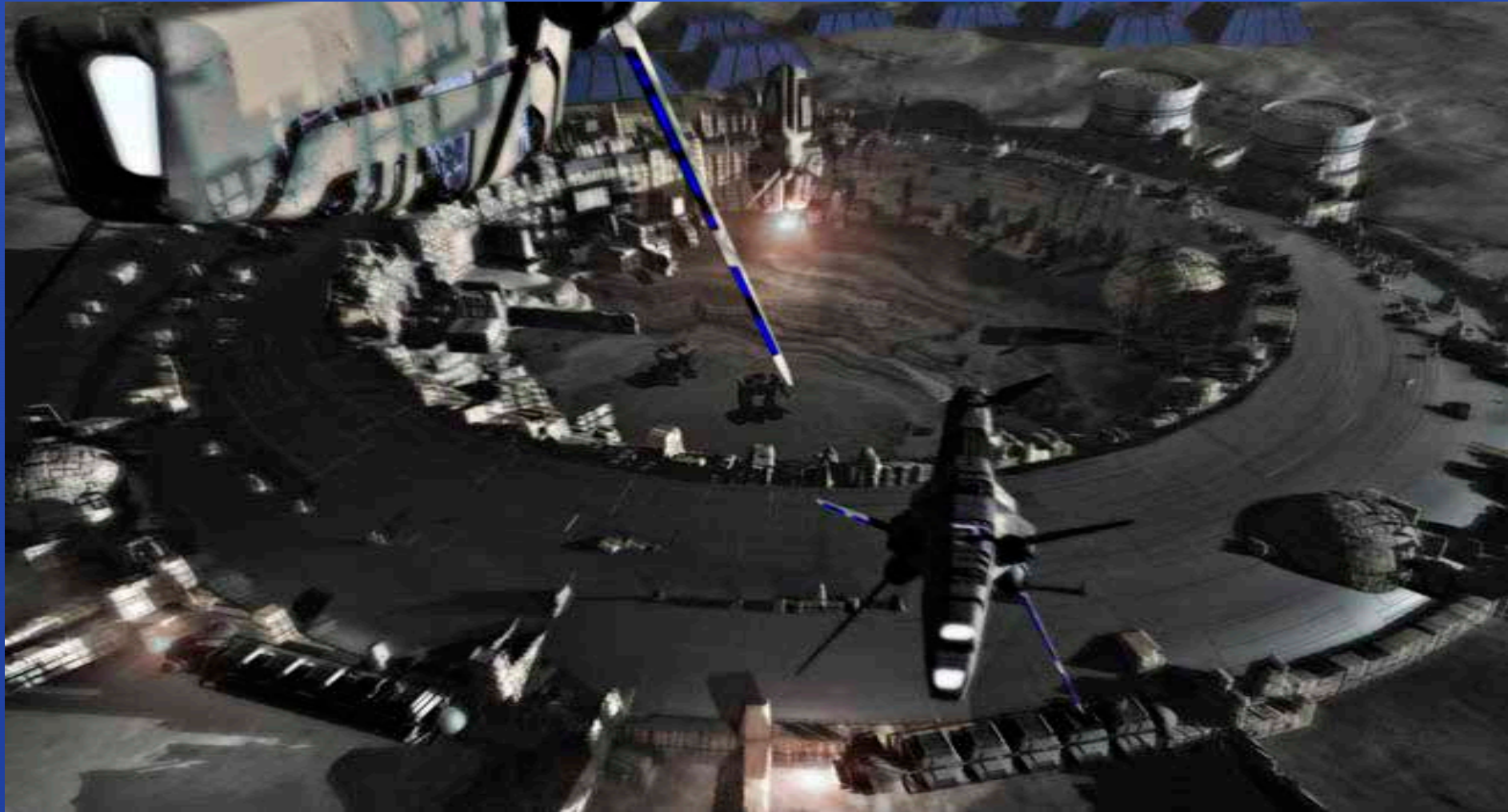
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Slogan: "We are dreamers."

Vision: "the human race is ready to begin harvesting the resources of space both for their use in space and to increase the wealth and prosperity of the people of planet Earth."

Operating principles: "...when it comes to asteroids the cry 'Thar's gold in them thar hills!' may be true...."

Will our future in space  
look like this?



Or this?





Or this?



# It's not a new challenge....

"In 1773 the French astronomer Jérôme Lalande wrote a paper on comets and their unstable trajectories, stating that it was possible that a comet could come close to the Earth, thus producing catastrophic events. When the Paris Académie des sciences, due to lack of time, cancelled his lecture – already announced on newspapers – people started to think that Lalande had been censored, in order not to reveal the imminent apocalypse.

Rumours and fears spread out in Paris, and soon after in the provinces of France and all over Europe: many intellectuals commented the fact, many journals propagated the story. Lalande tried to calm down the public, writing on the "Gazette de France" and printing a popular version of his memory, titled "Réflexions sur les comètes", which had a considerable diffusion, but apparently the panic did not stop.

One of these issues is the information on risks and uncertainties and of informing about the unlikelihood/impossibility of some hazardous event. Our study shows that at Lalande's time, scientists were concerned about these problems and discussed them in a way that closely resembles the recent debates on risks related to asteroids and high-energy accelerators."

(Ilaria Ampollini, "Communicating risk in Enlightenment Europe: Lalande and the comets approaching the Earth," Public Communication of Science and Technology, Florence, Italy, April 18-20, 2012)

# The power of rhetoric





# Questions?

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