United Nations/Azerbaijan Workshop on the International Space Weather Initiative: The Sun, Space Weather and Geosphere

October 31 - November 4, 2022

“Protecting the Planet from Space Threats”

Roald Sagdeev (Univ. of Maryland)

- The Space Weather related activities serve as the first step in implementing a broader program ofmeasures designed to protect our Planet from dangers the Space poses.
- Future invites to prepare the scenarios to be ready to deal with potential threats which may go beyond those presented by Space Weather.
- Such events like Superflares (not yet witnessed extremes of Solar Activity), Cataclysmic asteroid impacts while being considered as low probability cases, might be of high consequences.
- One truly major threat in Space is actually man made: the Orbital Debris.

Superflares

I - ARTIFICIAL INTELLIGENCE IN THE SERVICE OF SPACE WEATHER

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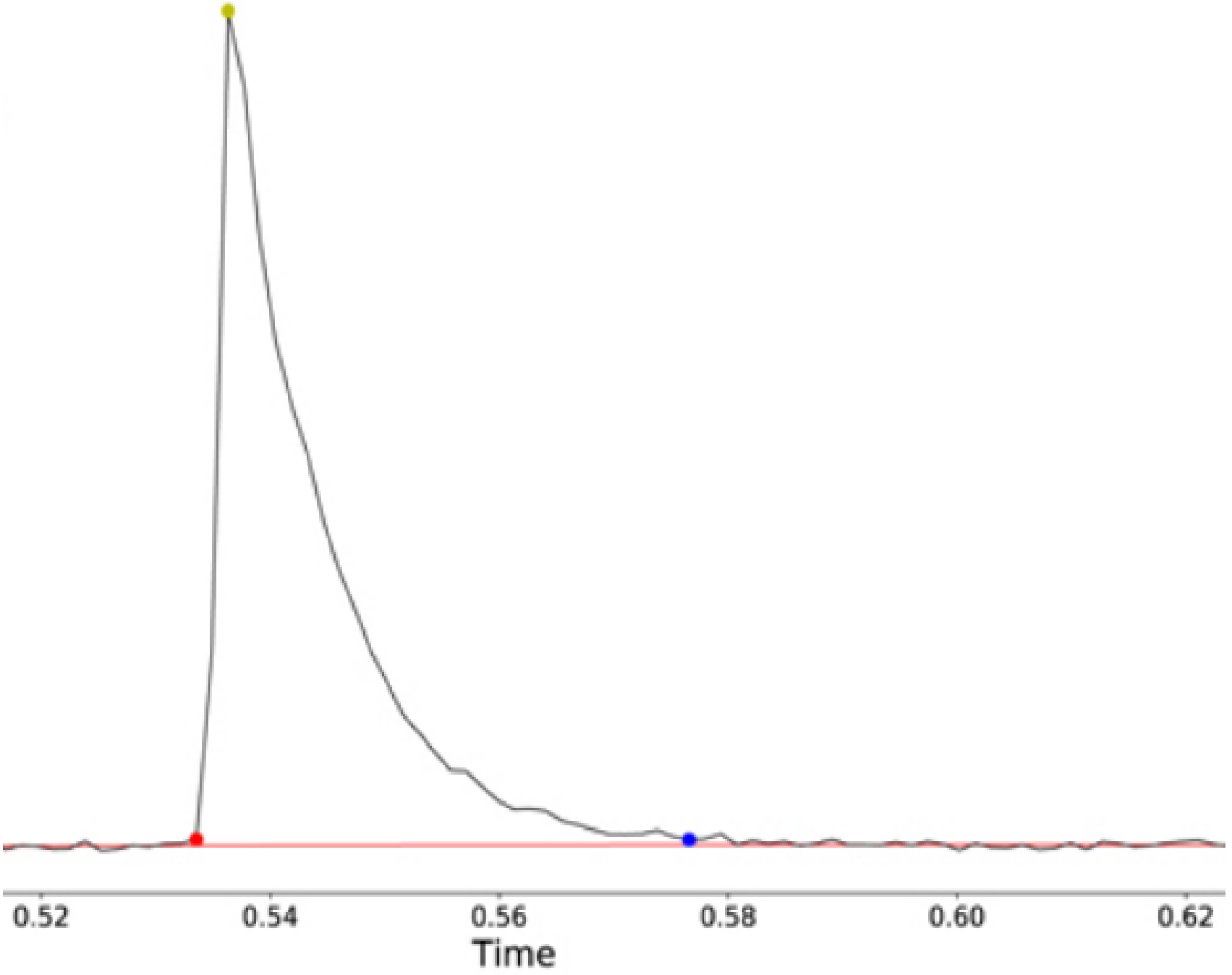
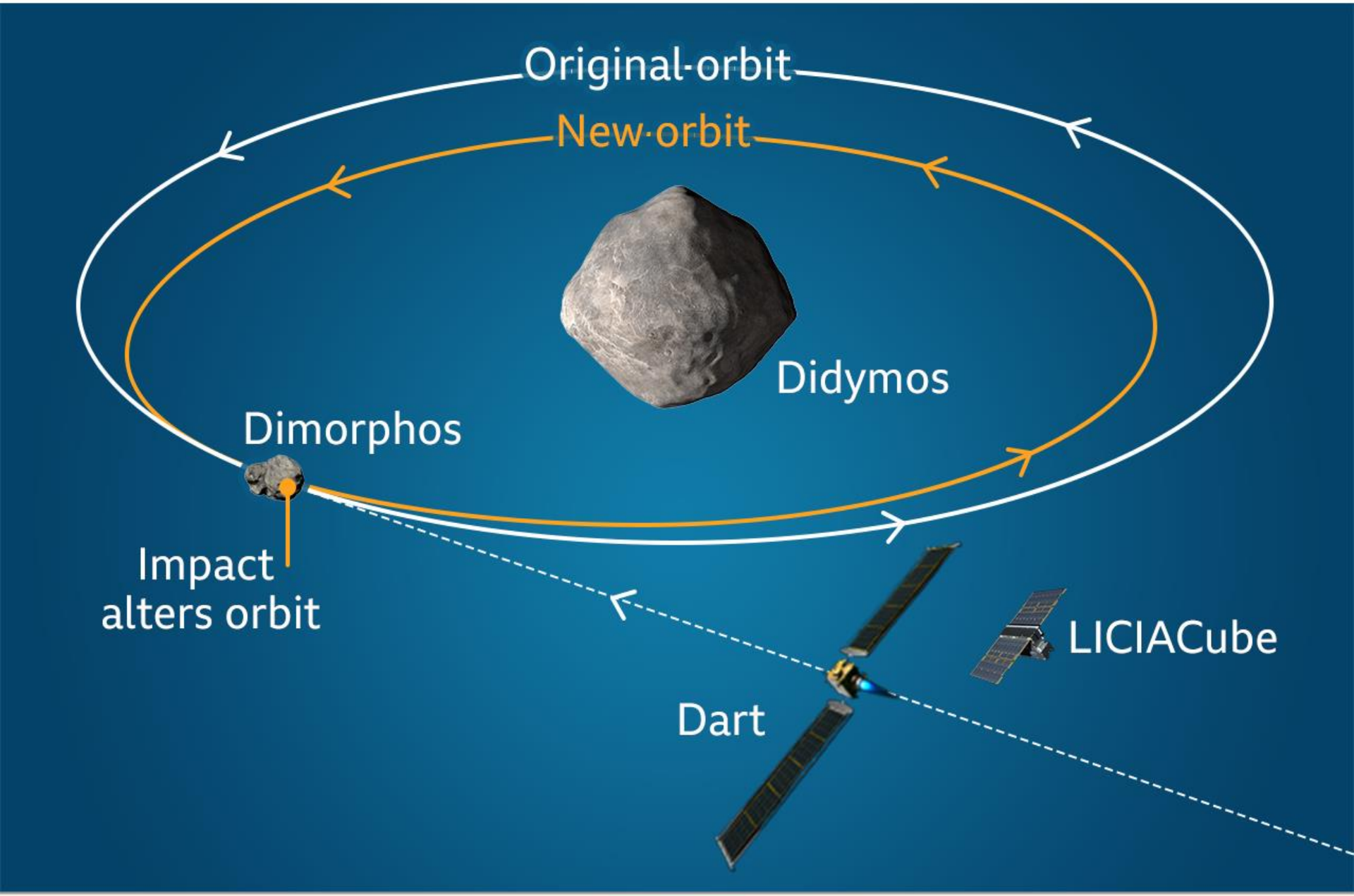
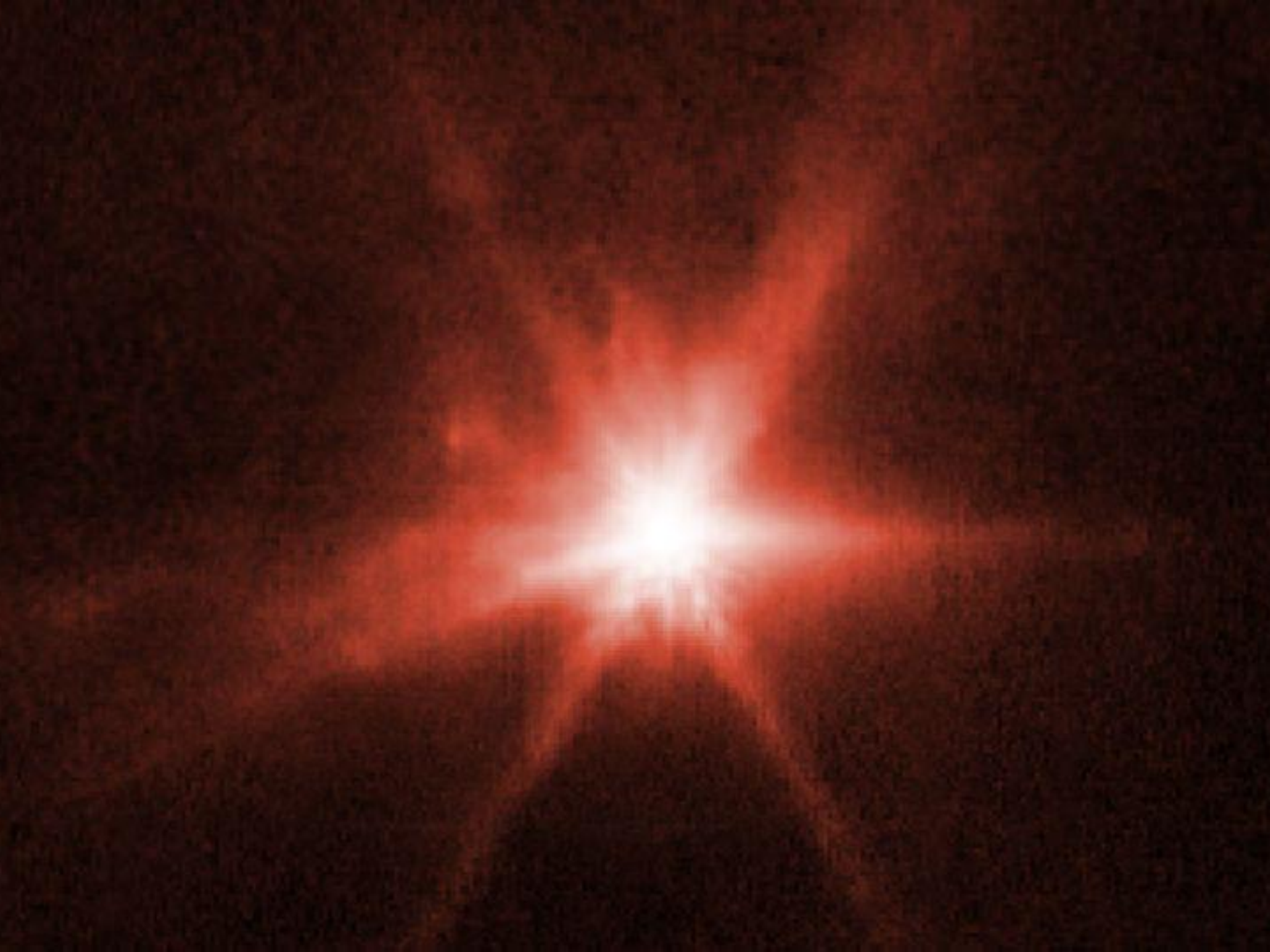

0.52
0.54
0.56
0.58
0.60
0.62
Time

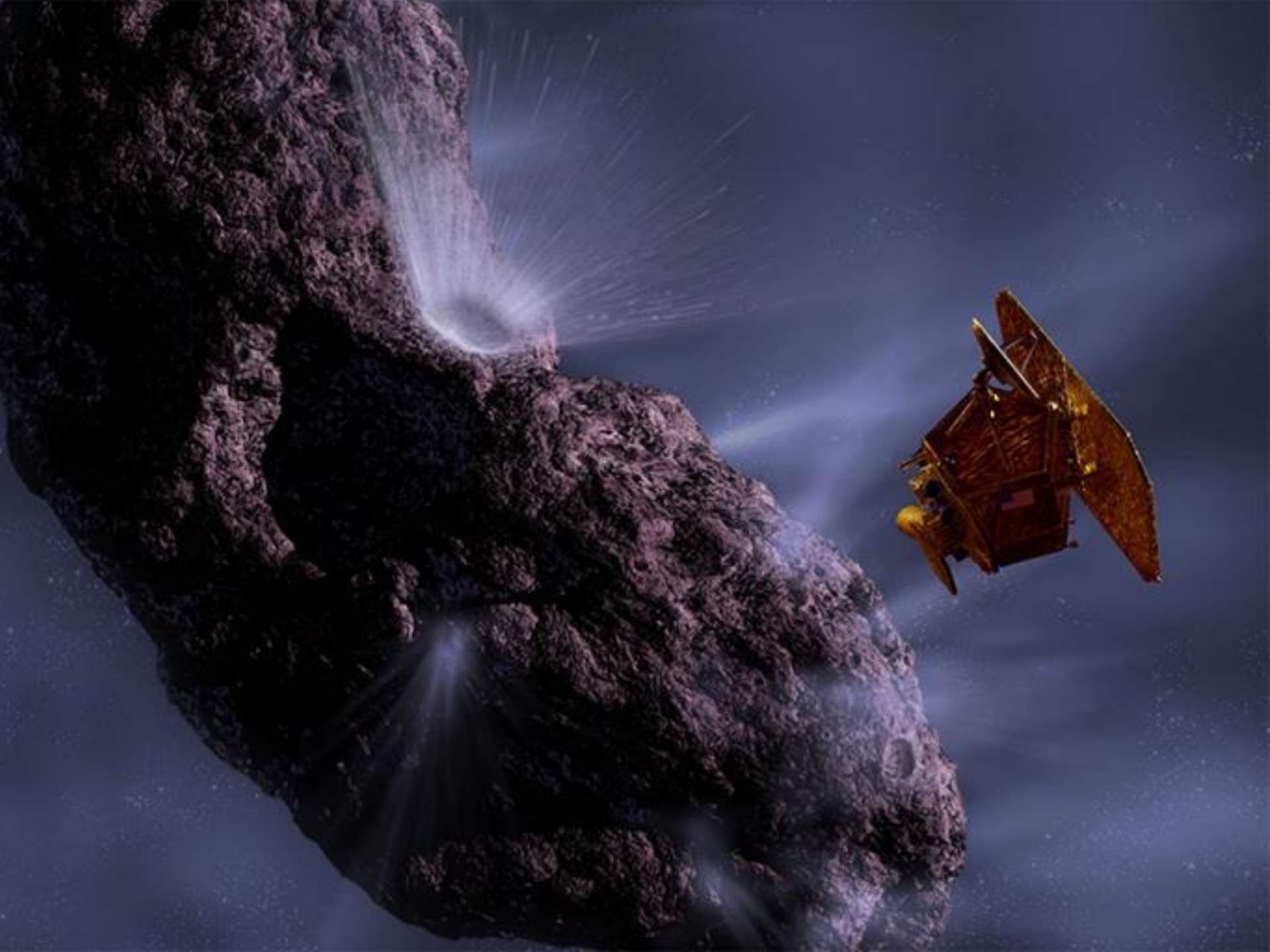
Nasa spacecraft will crash into asteroid's moon



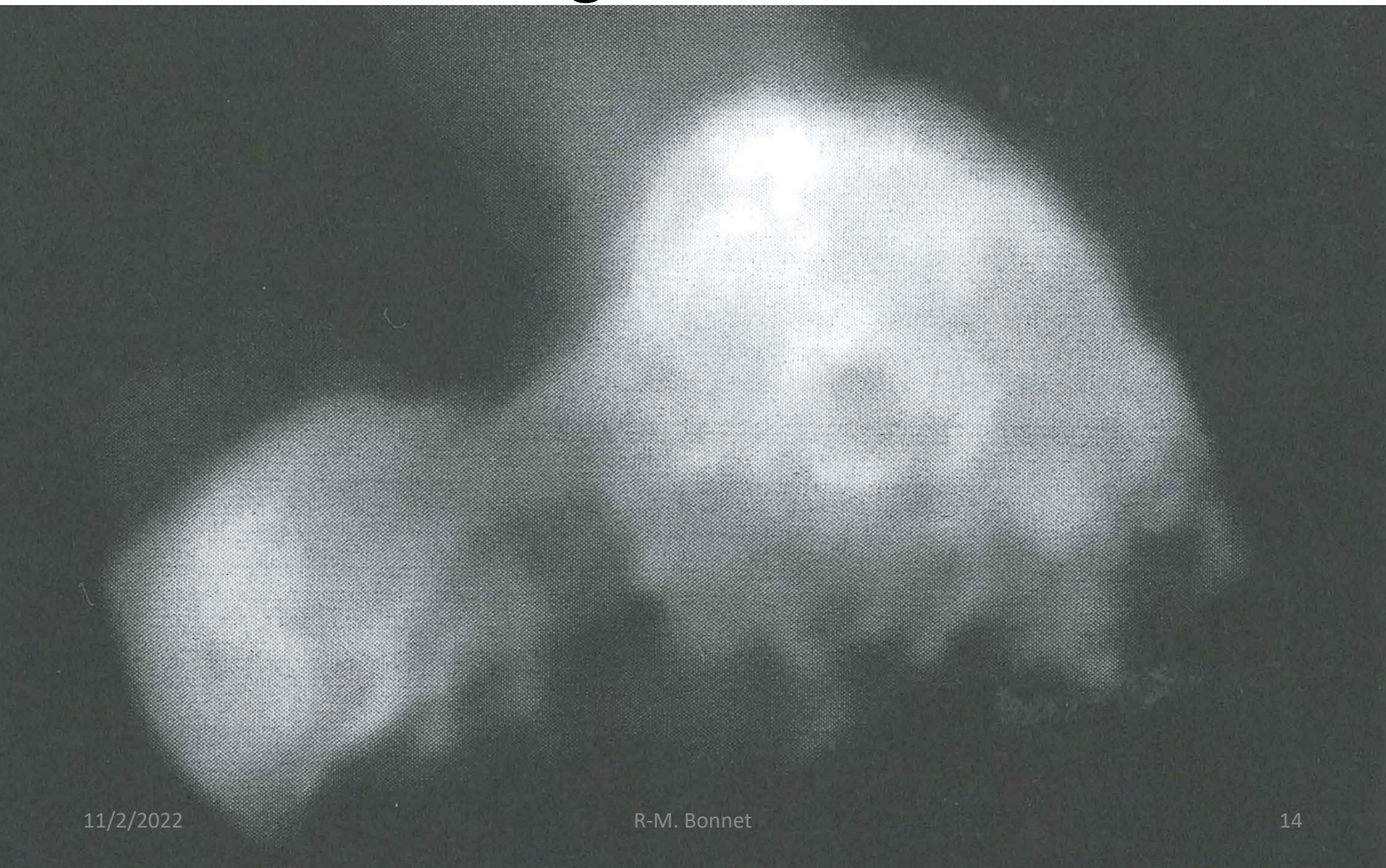


The Chicxulub Event

- 65 million years ago an asteroid roughly 10 to 15 kilometers (6 to 9 miles) in diameter hit Earth in what is now Mexico. The impact killed 70% of all species on Earth, including the dinosaurs.
- An impact of that size would have had devastating effects, and the geological record gives us some indication of what happened. The asteroid hit in water, creating mega-tsunamis reaching from southeastern Mexico all the way to Texas and Florida and up a shallow interior ocean that covered what is now the Great Plains. The blast would have thrown chunks of the asteroid and Earth so far that they would have briefly left the atmosphere before falling back to the ground.
- Like millions of shooting stars, all this material would have been heated to incandescence upon re-entry, heating Earth's surface and igniting wildfires. It is possible that all of Earth’s forests burned. Meanwhile, colossal shock waves would have triggered global earthquakes and possibly volcanic eruptions. A cloud of super-heated dust, ash and steam would have spread from the crater as the impactor slammed underground in less than a second. This dust could have covered the entire surface of Earth for up to a decade, creating a harsh environment for living things. Perhaps more significantly, the dust could also have lingered in the atmosphere, blocking out the Sun and interrupting the photosynthesis of plants that the entire food chain depends on, as well as cooling the temperatures of the Earth for many years.



First picture of a comet nucleus
Vega mission



Giotto picture