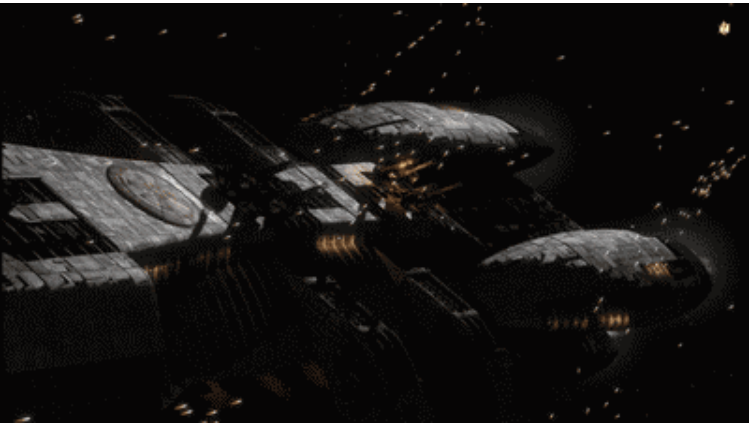
Modern Technologies and Conflicts

Space

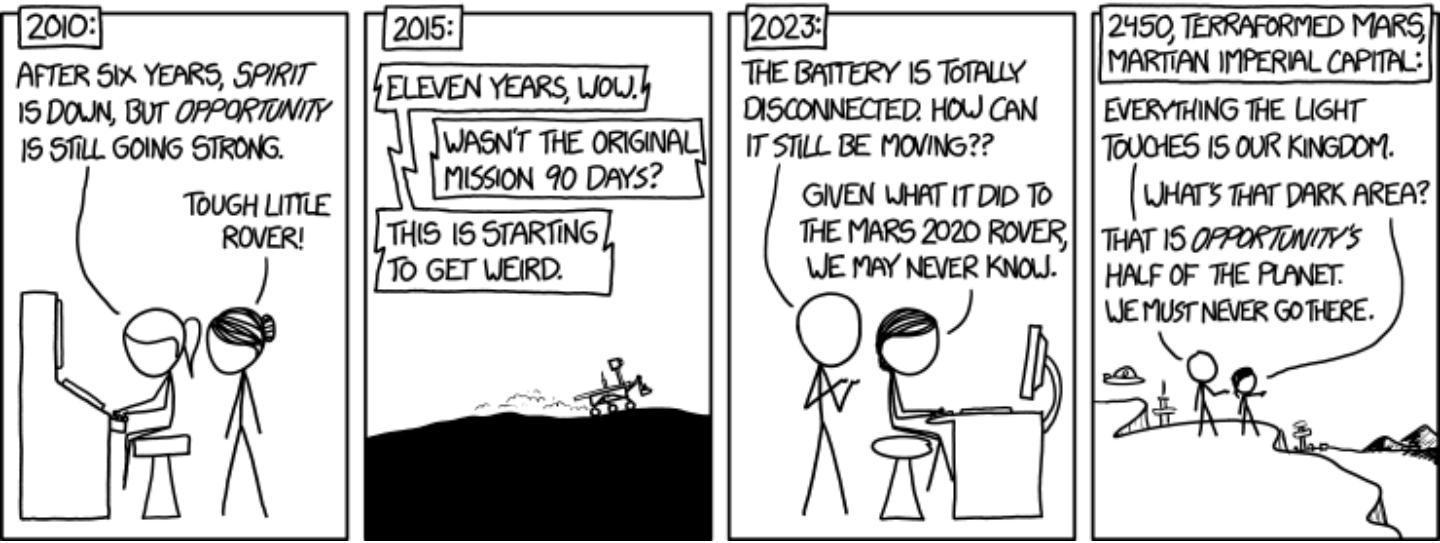
4.10. 2017

Jakub Drmola



Brief history

- 1942 - V2
- 1957 - Sputnik 1
- 1961 - Gagarin
- 1966 - Luna 9
- 1969 - Apollo 11
- 1970 - Venera 7
- 1981 - STS
- 1997 - Pathfinder
- 1998 - ISS
- 2004 - Opportunity
- 2014 - Rosetta


2010:
AFTER SIX YEARS, SPIRIT IS DOWN, BUT OPPORTUNITY IS STILL GOING STRONG.
TOUGH LITTLE ROVER!
2015:
ELEVEN YEARS, WOW.
WASN'T THE ORIGINAL MISSION 90 DAYS?
THIS IS STARTING TO GET WEIRD.
2023:
THE BATTERY IS TOTALLY DISCONNECTED. HOW CAN IT STILL BE MOVING??
GIVEN WHAT IT DID TO THE MARS 2020 ROVER, WE MAY NEVER KNOW.
2450, TERRAFORMED MARS, MARTIAN IMPERIAL CAPITAL:
EVERYTHING THE LIGHT TOUCHES IS OUR KINGDOM.
WHAT'S THAT DARK AREA?
THAT IS OPPORTUNITY'S HALF OF THE PLANET. WE MUST NEVER GO THERE.

Militarization

- information
  - espionage
  - communication
- defense
  - SDI (1983)
- offense
  - WMD/kinetic/EM
  - Outer Space Treaty (1967)
- ASATs

- advantages and disadvantages?

1970s
Salyut

Impact

- space race was part of the Cold War
  - for prestige and military application
- spin-offs for civilian life and economy
  - 1983 - GPS for public use
  - navigation, communication
  - boost for industry
- inspirational

1968
Apollo 8

1990
Voyager 1

Privatization

1965 - IntelSat 1
2001 – first tourist
2008 - Falcon 1
2012 – Dragon
2017 – first reflight

around 40% of currently active satellites

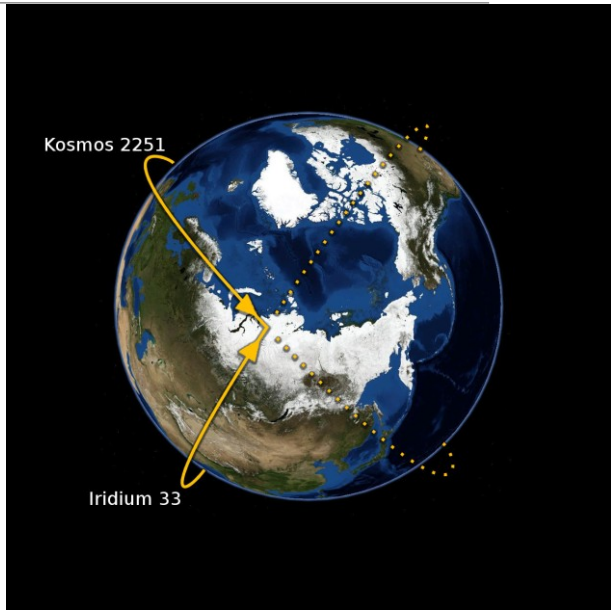
Orbital debris

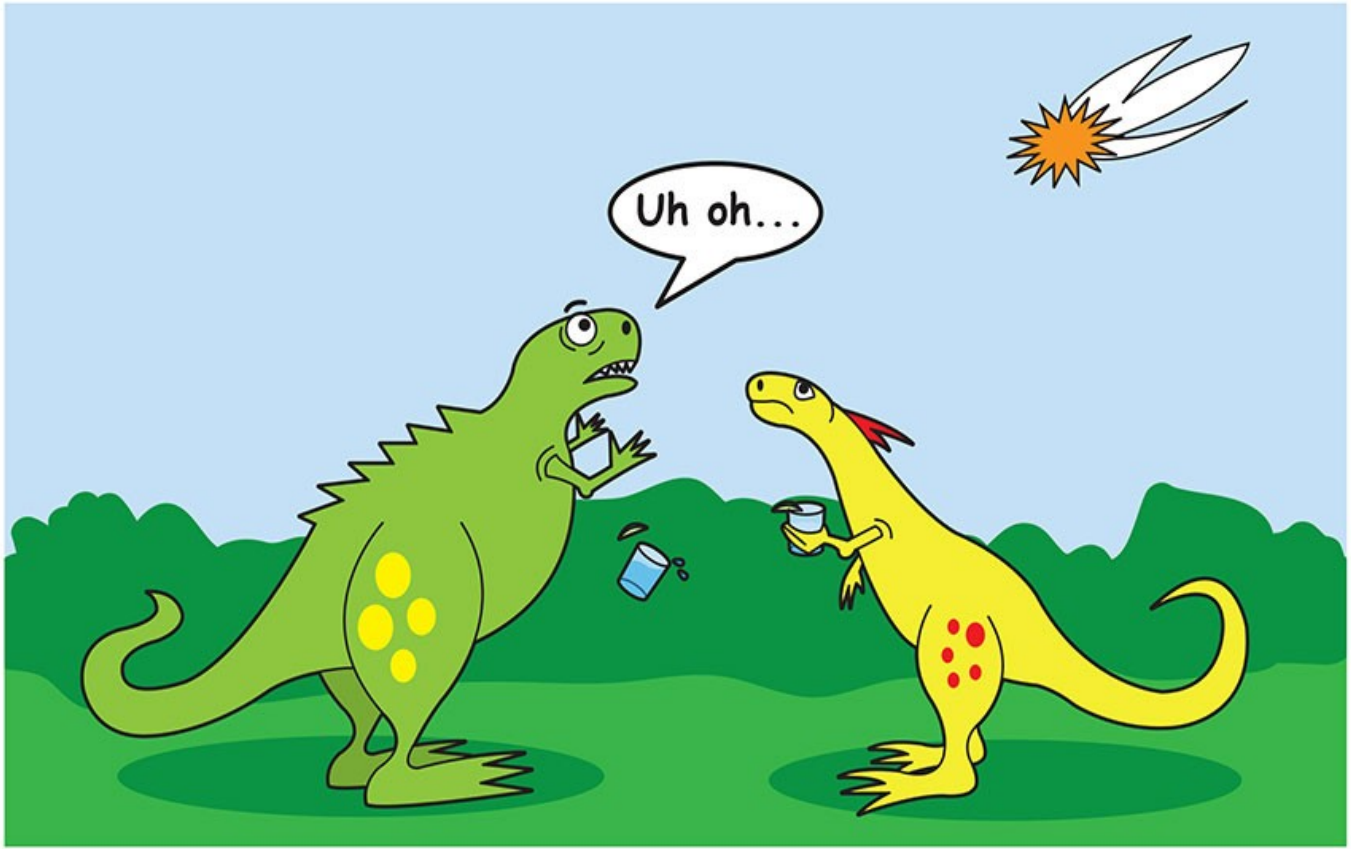
http://stuffin.space/

- Kessler syndrome
  - chain reaction of collisions

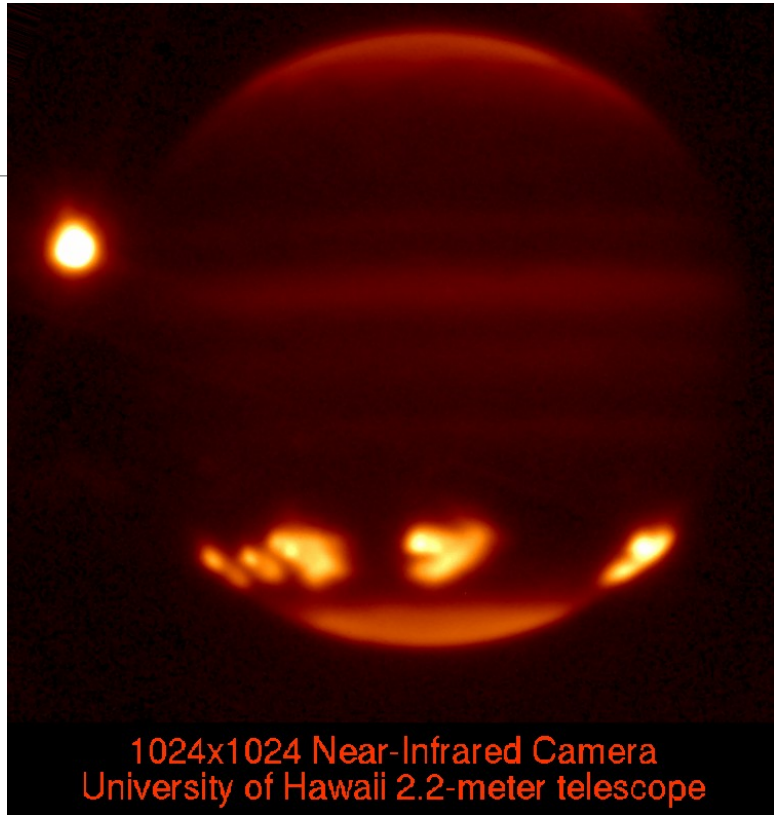
- caused by:
  - launches
  - dead satellites
  - collisions

- it is getting worse…
- how to clean it up?



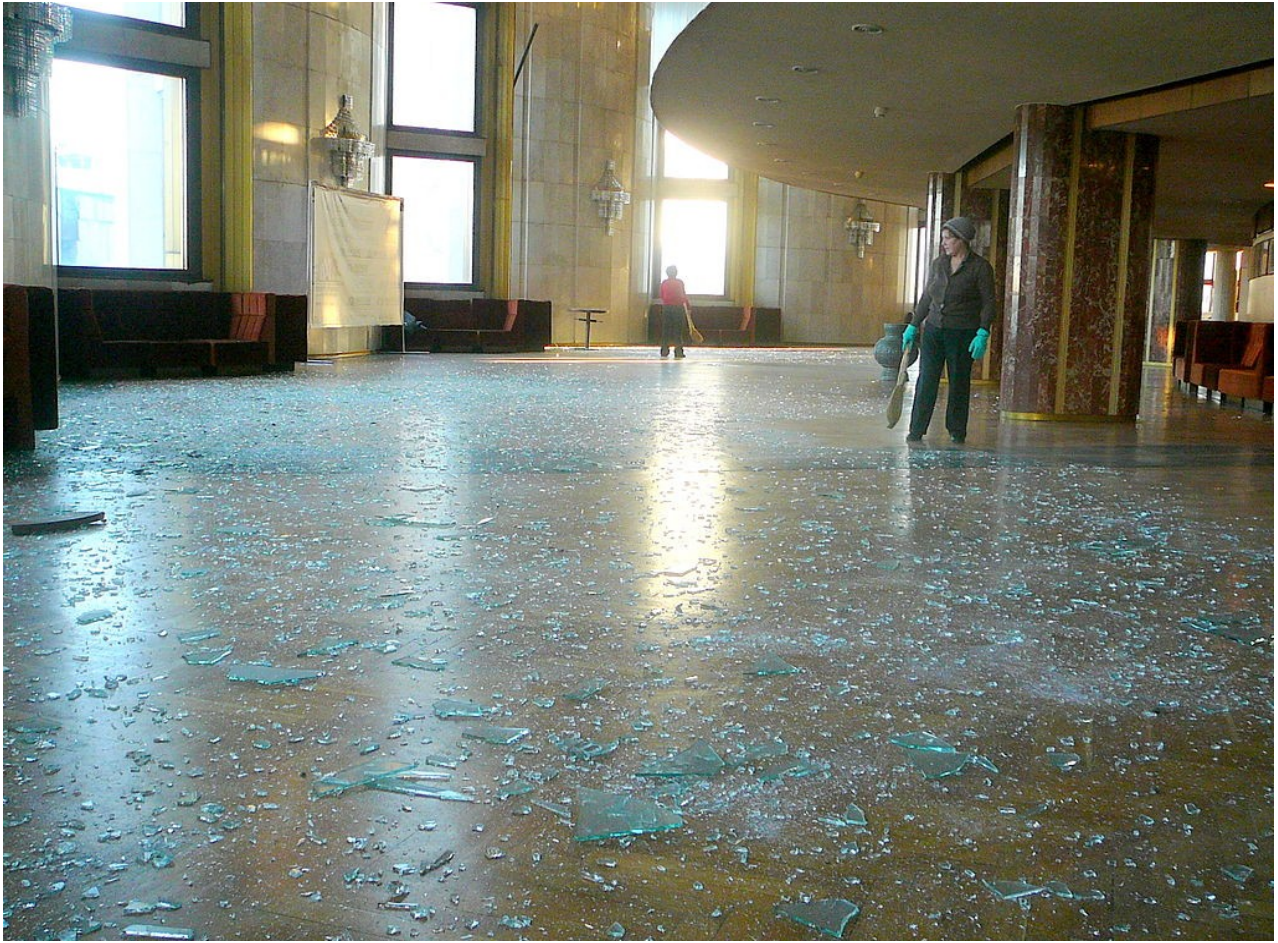

Uh oh...

- 66 million years ago, K-Pg extinction
  - dinosaurs died out
  - (and 75% of all life)
- 1994, Shoemaker-Levy 9
  - comet hit Jupiter >>
- 2013, Chelyabinsk
  - over thousand injured
- 1908, Tunguska



BBC


МЕТАН
5км

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Some comparisons

- Chicxulub — 100 000 000 megatons TNT
- Shoemaker-Levy 9 (G) — 6 000 000 megatons TNT
- Tsar nuclear bomb — 50 megatons TNT
- Tunguska — 10-30 megatons TNT
- Chelyabinsk — 0.5 megaton TNT
- Little Boy (Hiroshima) — 0.015 megaton TNT

Solution?

- Or a new problem?

- If we can deflect an asteroid, we can also inflect it = “Deflection Dilemma”
  - Probability of getting hit by a massive asteroid in the near future is very low.
  - Probability of someone misusing it is … ?

Space Industry

- asteroid mining
  - water
  - precious metals (platinum, paladium, rhodium)
  - Planetary Resources Inc.
    - http://www.planetaryresources.com/
  - Deep Space Industries
    - https://deepspaceindustries.com/
- H.R. 2262
  - Spurring Private Aerospace Competitiveness and Entrepreneurship Act of 2015
- Asteroid Redirect Mission
  - canceled