



#4

# *Space Removal Inc.*

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**TOM**

***Your uncle just  
died in a space  
debris accident  
–  
he was killed  
by a piece of  
falling rocket  
fragment***



**LINA**

***Now you inherited his nearly bankrupt space debris removal company – but you are lucky ... just before he passed he got a contract to build a space station that could save the company!***





LEARN THE  
FUN WAY

A cartoon character with brown hair, wearing a white t-shirt and blue pants, is jumping joyfully with arms and legs spread wide, positioned in front of the word 'FUN'.

# Target groups



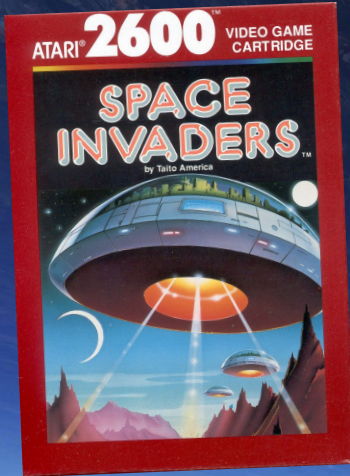
<https://www.brandchannel.com/wp-content/uploads/2017/03/kids-cell-phones.jpg>



<https://dynasis.com/wp-content/uploads/2017/11/employees-on-cell-phone-4.jpg>



# Space Games



## Space game history

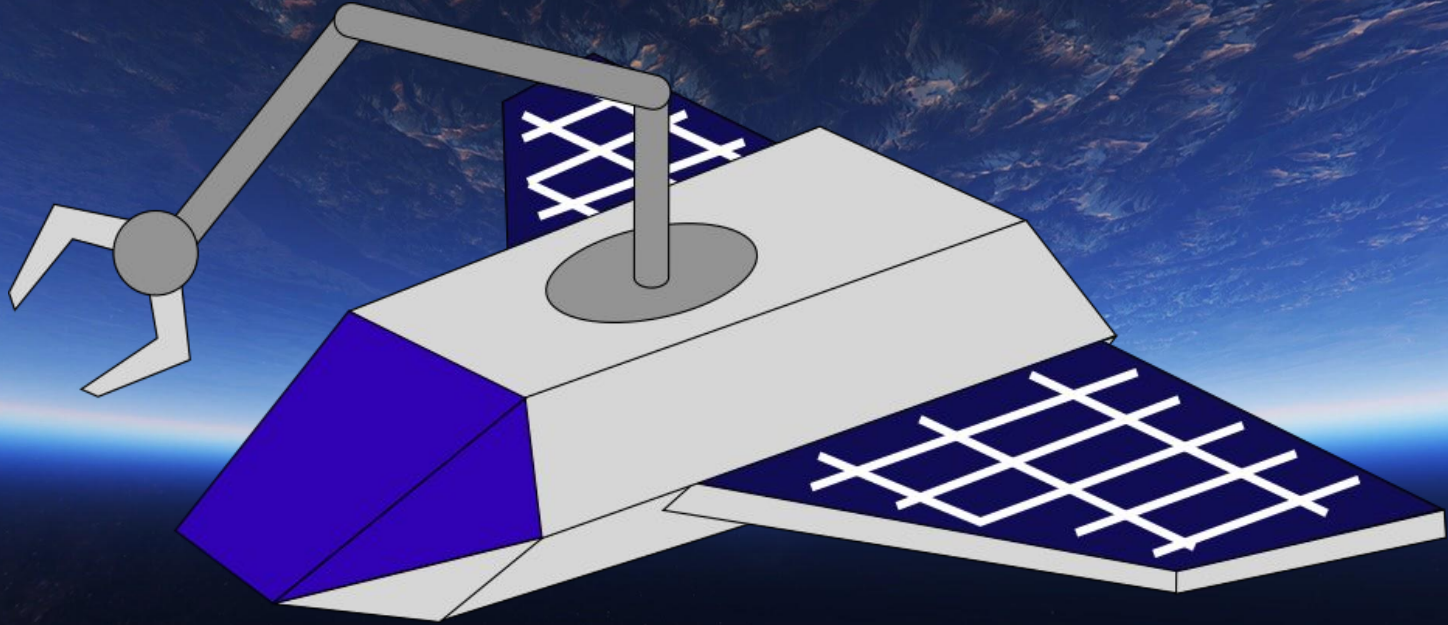
Top 5 games



2M players (3k daily)

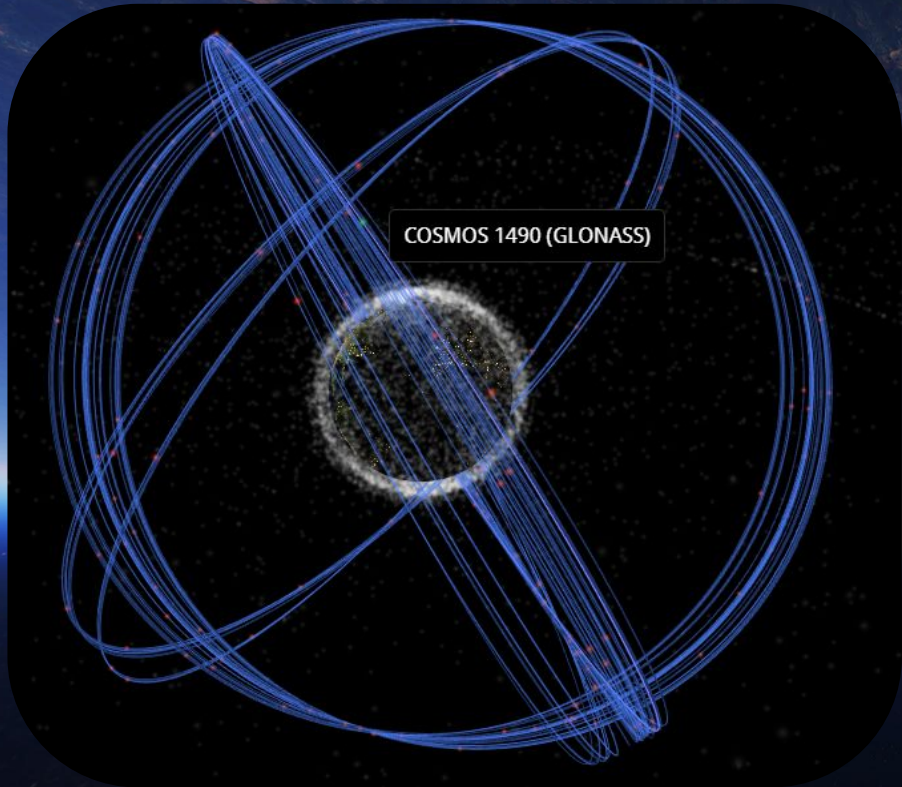


# Game mechanics





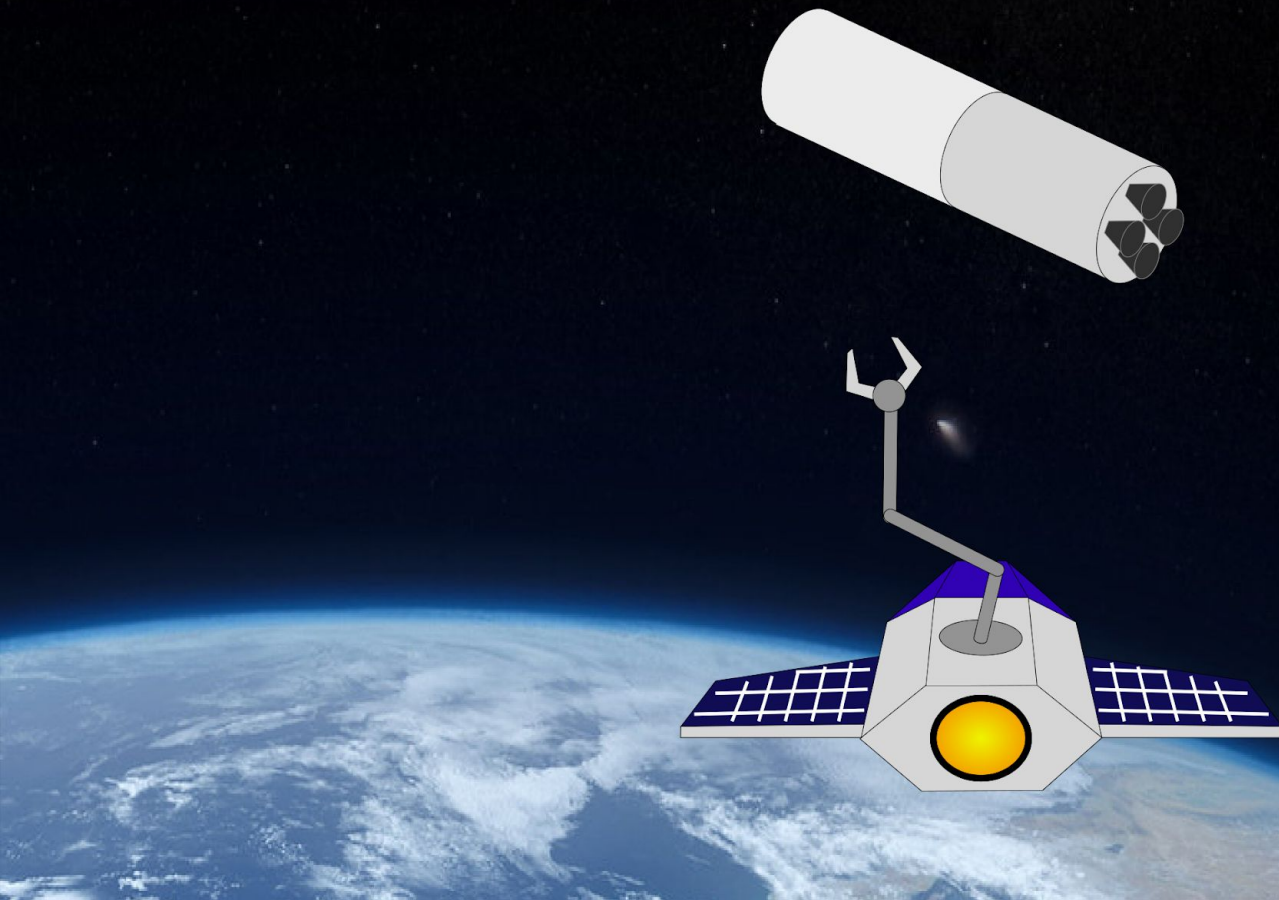
# Augmented Reality





HP 

FUEL 



HP 

FUEL 

## CATCH SUCCESSFUL

Ariane 5 upper stage

€75.000

Type: Rocket body

Velocity: 6,5 km/s

Mass: 1.686kg

Altitude: 630km

Launch information: Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua.



HP 

FUEL 

## ILLEGAL CATCH

Long March upper stage **€-137.000**

Type: Rocket body

Velocity: 7,9 km/s

Mass: 2.135kg

Altitude: 825km

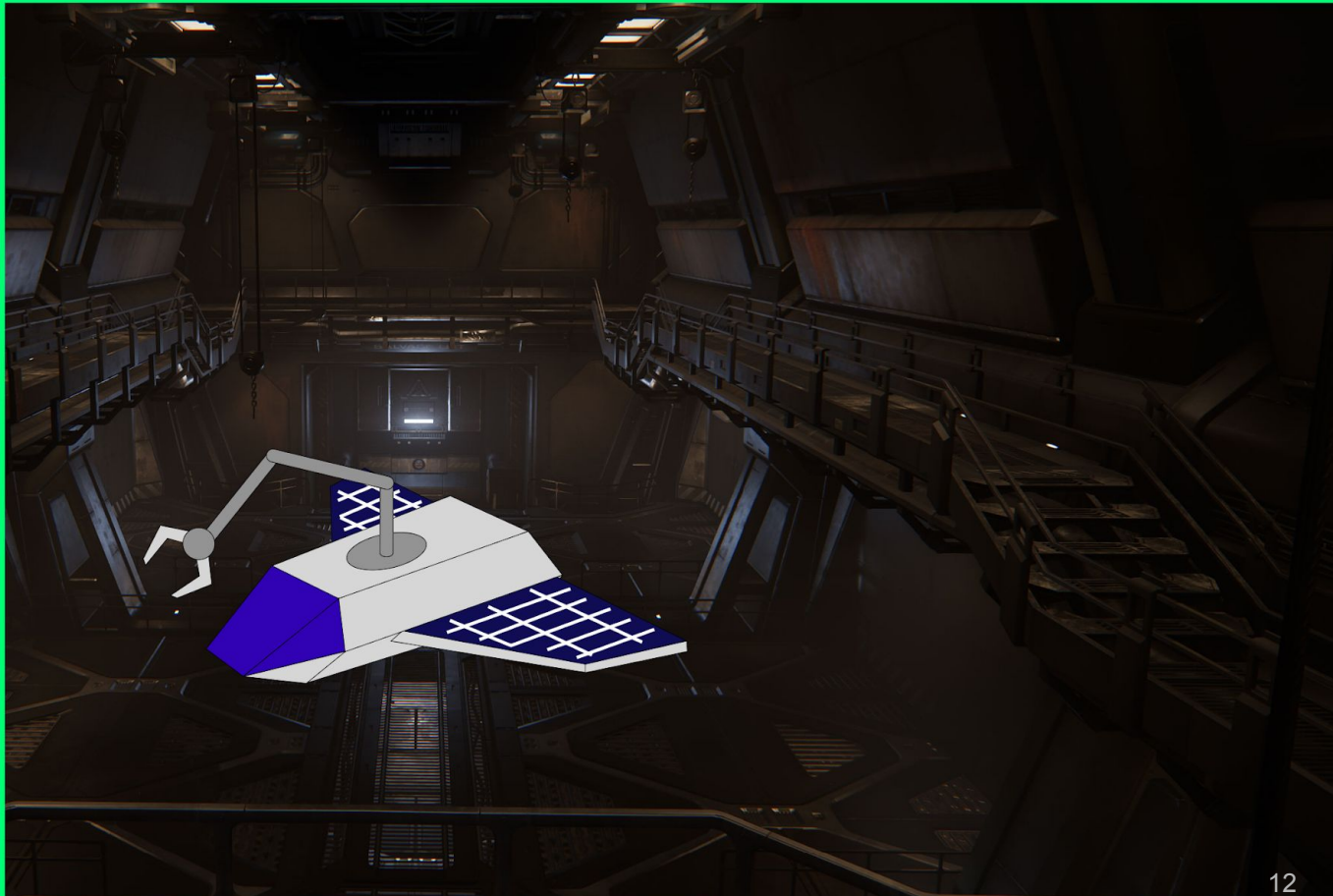
Oh no!

You provoked an diplomatic crisis with China for catching one of their rockets.



# SPACESHIP WORKSHOP

## TOOLS





# SPACESHIP WORKSHOP

## TOOLS



## HARPOON

€2.800.000

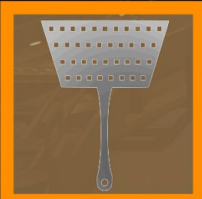
Real tool

Developed by Airbus

The harpoon is best suited for Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo

# SPACESHIP WORKSHOP

## TOOLS



## FLY SLAPPER

€3.350.000

Fantasy tool

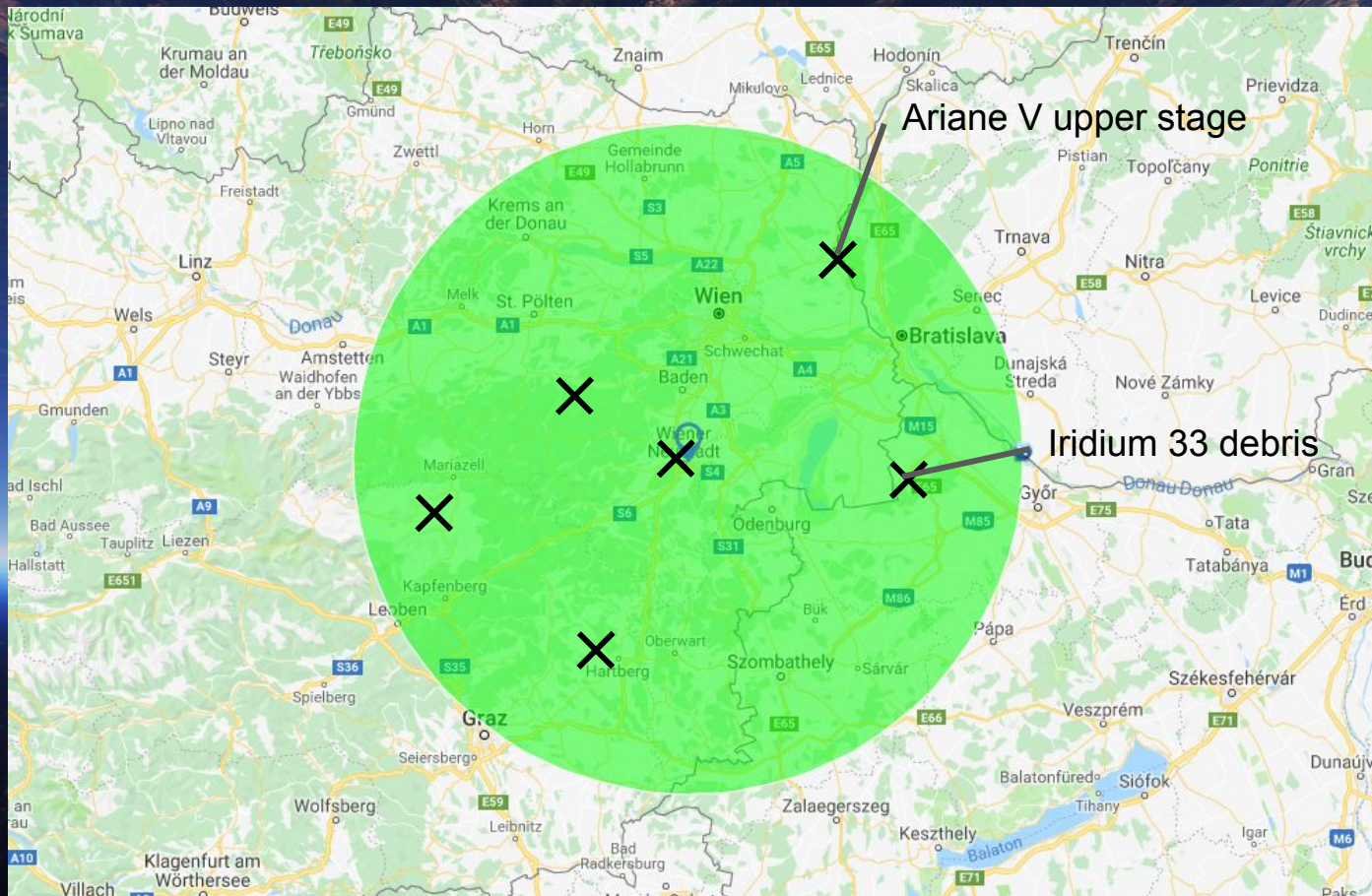
The fly slapper is best suited for Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.



A high-resolution image of Earth from space, showing the curvature of the planet and the thin blue atmosphere. The top half of the image is filled with dark, swirling cloud patterns over landmasses. The bottom half shows the bright blue horizon line against the blackness of space.

# Learning Factors

# Space debris is not just a number





# Debris removal methods



# Vast amount of types of space debris







**Now you know how to clean up  
Earth's orbit!**

**Are you ready to play?**

# References

- [1] <https://steamspy.com/app/220200>
- [2] <https://steamdb.info/app/220200/graphs/>



*1,5 min*

## Why?

- Raise awareness
  - Target groups
    - Current generation
    - Next generations
  - Why would they care?
    - Effects everyday life
    - Economy
- Visualise information

## How?

- Mobile game
  - Independently developed game - more flexible
- Non-profit or for-profit
  - In case of non-profit, maybe cooperate with ESA?
  - In case of for-profit, use the profit to create a fund to fund space debris start-ups/companies

# Why?

- Raise awareness
  - What that would/could achieve?
    - Current generation: making people aware of the problem → make them care → more pressure on decision making → (manufacturing) companies, politics
    - Next generations: educating children → decision makers of the future → analogy with climate change (young people more supporting the idea of protecting the planet)
  - Why people would care?
    - The problem might be a problem in near enough future
    - Working with the problem later would be much more expensive



Have multiple arguments as to why space debris is bad

- Emotional: 'ESA clean space' ad on youtube; not scientifically correct, but invoked emotion of people (e.g with Kerbals in Kerbal Space Program)  
<https://www.youtube.com/watch?v=cX89BpZrAVY>
  - Important to give people ways to solve the issue - not just show them the problem
- Applications (Earth observation, navigation, comms)→ [GPS/TV] satellites lost
- Space tourism: Your children probably want to go on holiday to the moon.
- Financial
- could hinder future missions to the moon or Mars, according to the CEO of Astroscale, Nobu Okada  
(<https://www.cnn.com/2018/09/18/wef-tianjin-space-junk-is-a-big-problem-and-its-going-to-get-worse.html>)
- Having too many debris → rockets will have hard time getting out → we are trapped on Earth
- Paper about Space debris economy: [https://law.stanford.edu/wp-content/uploads/2017/11/19-2-2-salter-final\\_0.pdf](https://law.stanford.edu/wp-content/uploads/2017/11/19-2-2-salter-final_0.pdf)
  - "Global satellite revenue in 2014 totaled \$195.2 billion.<sup>6</sup> That stream of economic activity is most threatened by significantly increased concentrations of space debris in orbit. Other activities within the "space economy" (\$320 billion in revenue in 2013) that are potentially threatened include human spaceflight and non-orbital spacecraft.<sup>7</sup> Private-sector space activities planned for the more distant future, including space tourism and asteroid mining, will also be affected if access to orbit is complicated by space debris."
  - "Of the approximately 6,300 tons of space debris currently in orbit, approximately 2,700 tons are in LEO.[...]This fact is troubling because almost half of all existing satellites, many of which are used for communication and earth observation, are in LEO."
- In 10 years the removal of space debris will be more expensive and the problem will get worse over the years → do it now

# What?

- Benefits - influence future without spending lots of time and resources (get into meetings with important people etc. )
- **Generates discussion:** look at movie review of Gravity online - gets people angry that we are polluting something so pristine - feelings are involved rather than numbers (cuteness factor)
  - Anecdote: German army wanted to use an area for test facility, but the green party opposed and did not obtain any following, until they showed an ad of a cute animal → public opinion changed → political opinion changed
-



# How?

- **Computer game**
  - Kerbal Space Program add-on (has the community already)
  - Independently developed game (more flexible?)
- **Mobile game**
  - Independently developed game
- **Non-profit or for-profit**
  - In case of non-profit, maybe cooperate with ESA?
  - In case of for-profit, use the profit to create a fund to fund space debris start-ups/companies
  -

- Through games to raise awareness
- Economic viability: is the game non-profit or for-profit?
- Idea 1: Make mods/hack for Kerbal Space Program (KSP)
  - In-game missions to capture space debris - design your own s/c
  - Manoeuvring against space debris (one of the missions, like a mini-game)
- Idea 2: In-game build your own removal tools (like LEGO stacking) and “test fly” a mission
  - Laboratory → mission planning → fly
  - Choose orbit (low/middle/high)
  - Choose object size to remove
  - Remove one or many objects
- Idea 3: RPG-FPS game
  - A satellite (player) is moving forward with debris are seen around. When debris get too close (danger zone), an alarm goes off and the screen shows: what to do?
    - i. Deploy Weapon (net, laser, ...)
    - ii. Move away ( $v=...$ )
    - iii. Do nothing and intercept the target