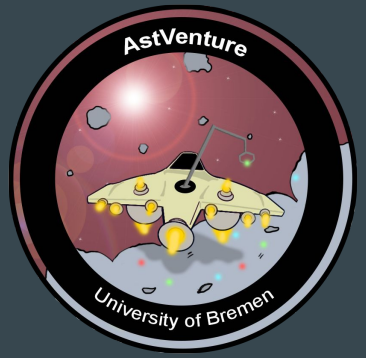
AstVenture master project

Goal of the game and context

- goal: serious game with playful character to inform the player about asteroid missions and potential challenges
- context: KaNaRiA space flight simulator project

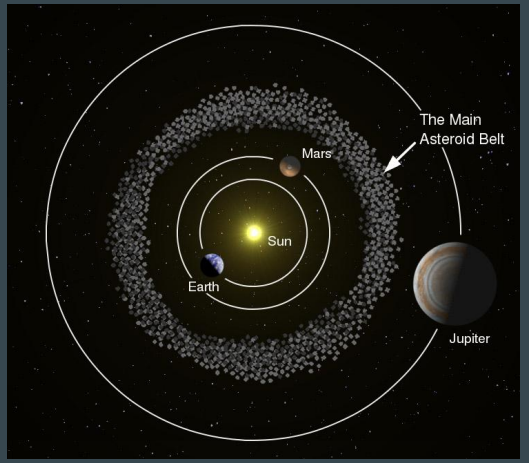


Game concept

- related to KaNaRiA:
    - different game/mission phases
    - landing site selection
    - battery & fuel consumption
    - gathering (precious) materials
- additional playful aspects:
    - space debris
    - upgradeable spacecraft via tool catalog
    - quiz and badges

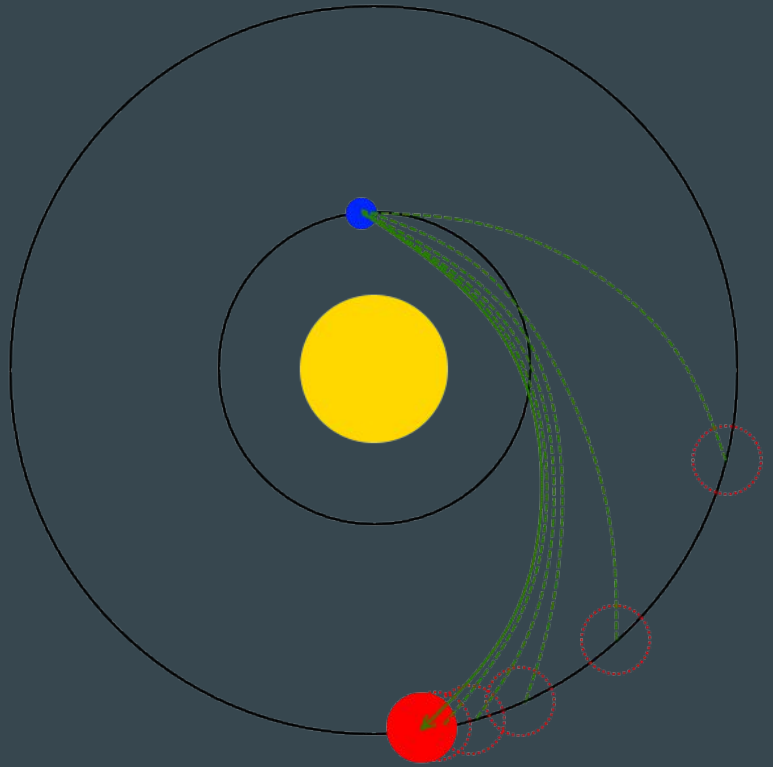
Realistic asteroids

- scene: main asteroid belt
- considers the biggest known asteroids
- data source: IAU, MPC
- real orbits and textures
- different asteroid types considered:
  - C-Type: carbon
  - M-Type: metallic
  - S-Type: silicate
  - V-Type: basalt



Cruise phase

- for sake of fun: not realistic
- uses a spline as transfer orbit
- multiple iterations for determination of the trajectory



Overview map

- popup menu: information about the chosen celestial bodies
  - name
  - exploration progress
  - surface and mineral information
  - …
- travel to, scan, and land on asteroids

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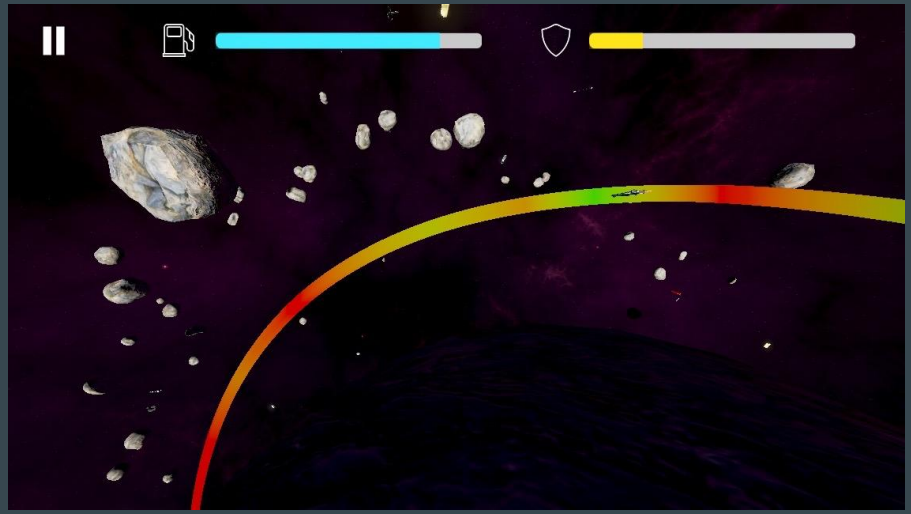
Landing

- proximity phase
  - control spaceship in outer space
  - spaceship follows spiral spline
  - avoid space debris
  - maneuver costs fuel
  - collisions decrease your shield
  - gadgets improve tank, shield, fuel consumption and movement speed

Landing

- orbit phase
  - control spaceship in orbit
  - click in the right moment to drop the lander
  - different colors indicate quality of the landing site
  - sensors lidar and altimeter improve the range and nice value



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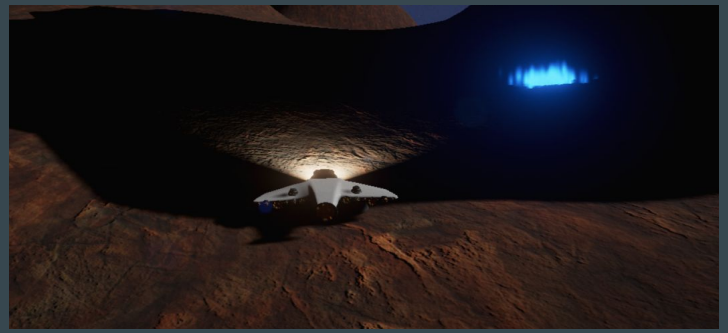
Exploration

- explore the asteroid and collect resources
- lander
- resources are shown by particle systems
- back to drop off point to store collected resources
- fuel and battery

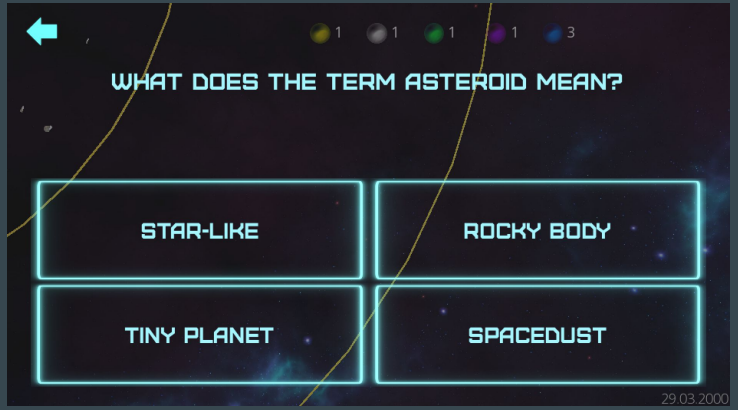
Exploration

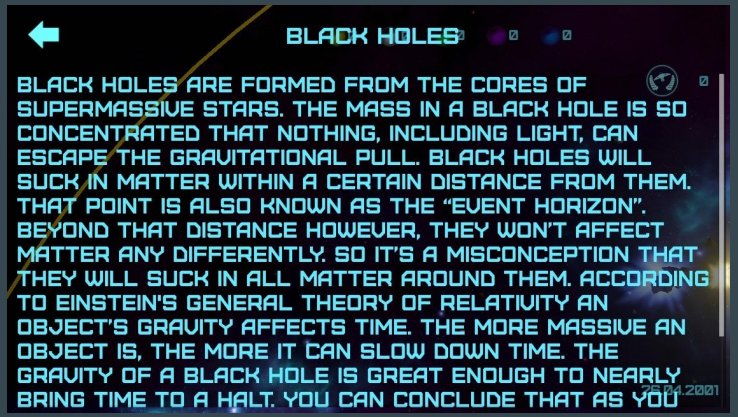
- possible hazards like solar storms, falling space debris, darkness
- attachments like flashlight, magnetometer, resource scanner, drill and different protection shields
- gather information



Library & Quiz

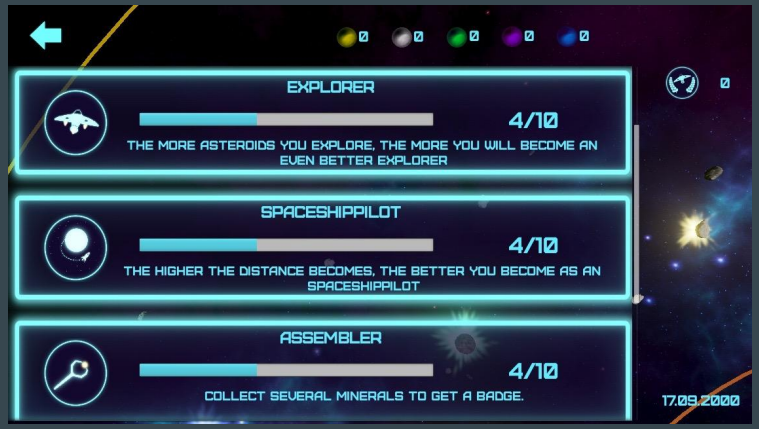
- content collected by the player during the game
- offers a database of information regarding five different categories (general space knowledge, mission knowledge, ..)
- quiz can be played all the time
- different difficulty levels





Badges & Gadgets

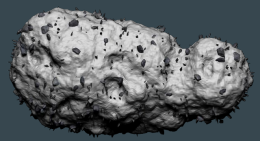
- badges can be earned
  - solving quizzes
  - reach something in the game
  - rewarded with space coins
  - used to motivate player
- list of sensors and tools
  - buy, repair and upgrade by using minerals



Modeling & Animation

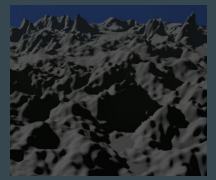

spaceship


lander


asteroids


planets


debris


landscapes

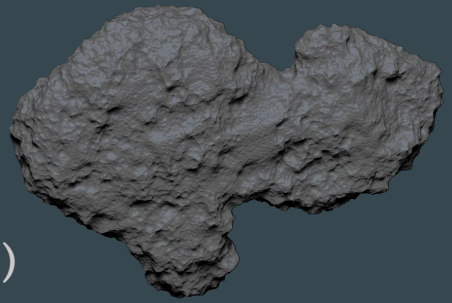
our use of animations:

- animations which are included in the game (e.g. drill, hatch)
- rendered video sequences for loading screens

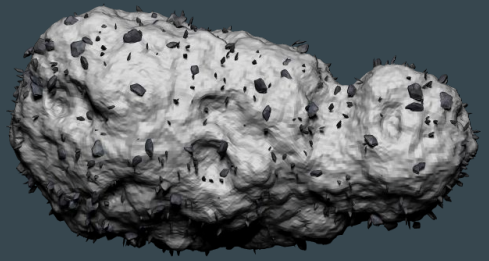
Modeling & Animation

modeling techniques:

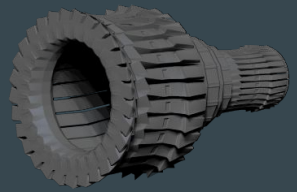
- sculpting (for organic models)
- surface noise (detail on highpoly models)



- nano meshes (generate an arbitrary amount of meshes based on one single one)

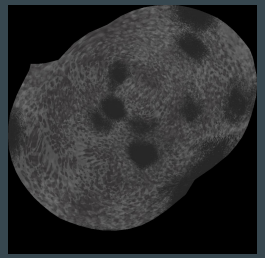


- radial symmetry (lander thruster)

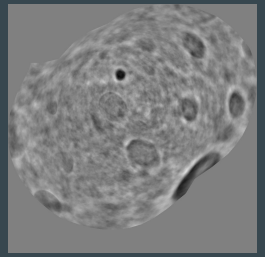


Texturing

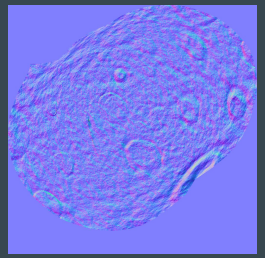
- asteroids and landscapes
- particle systems (based on meshes)
- spaceshuttle and hover
- skybox
- use of different maps in combination is necessary for realistic material creation in Unreal Engine



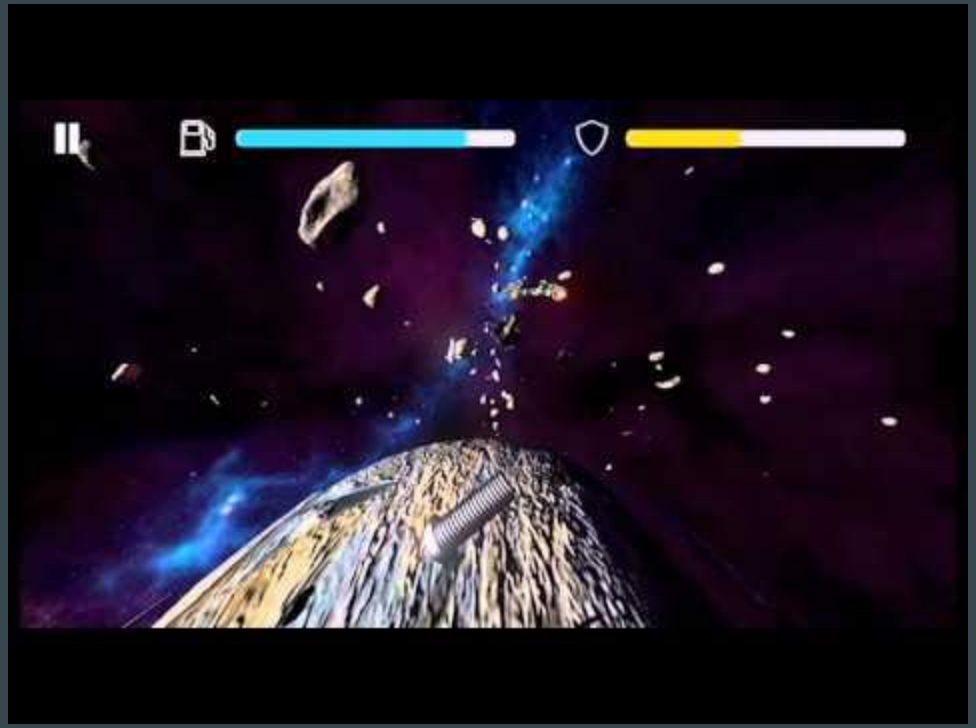
Base Color



Displacement Map



Normal Map



Thank you for your attention!

Any questions?