SPACE SETTLEMENT  DODONA

# BULGARIA VARNA

**Team:**

Stanislav Schterev

Nanyo Penkov

Dimcho Karalashev

Ilko Shtirkov

Denis Hadjigenchev

Alexander Alexiev

**Leaders:**

Dr Veselka Radeva

Silvia Zaharieva

**Astronomical Observatory and Planetarium & High Mathematical School "Dr Petar Beron"**

SCIENTIFIC RESERCH SECTION

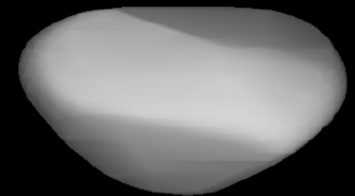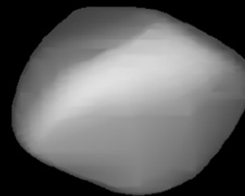**Problems with the resources on Earth**

# Goals and Choice of
# the Location of the Settlement

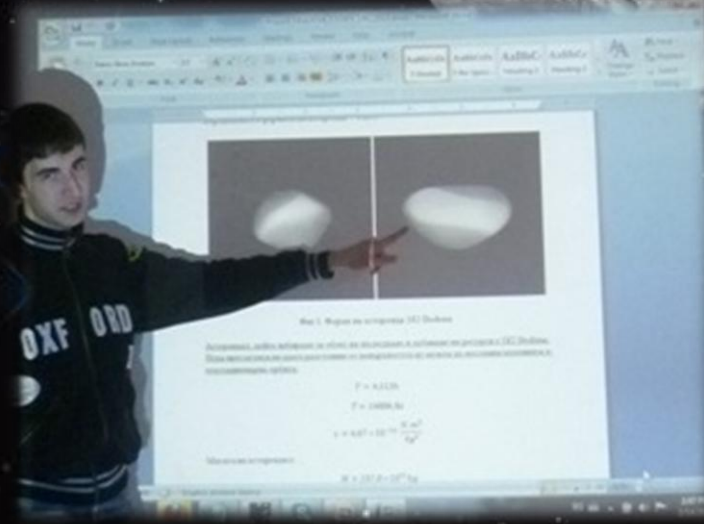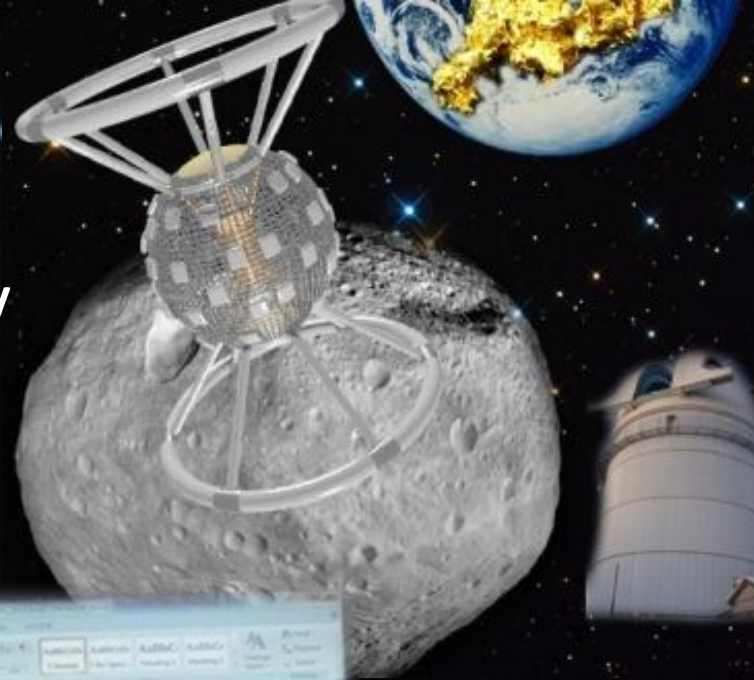**Using the resources of the asteroid for the Earth's economy and space research**
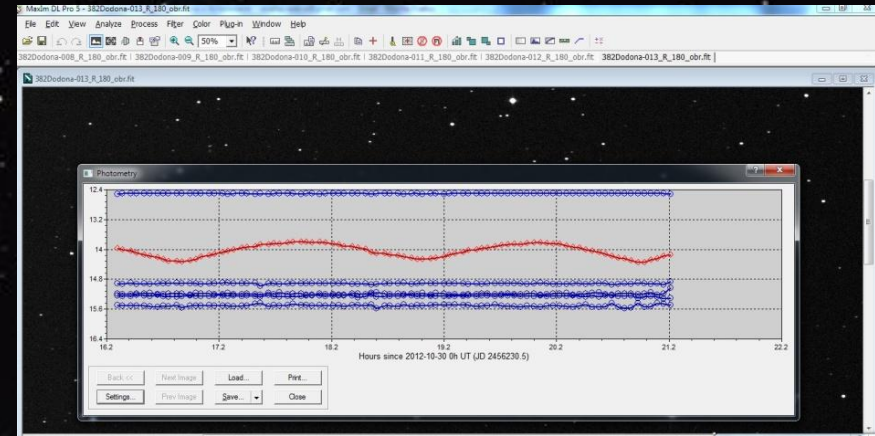
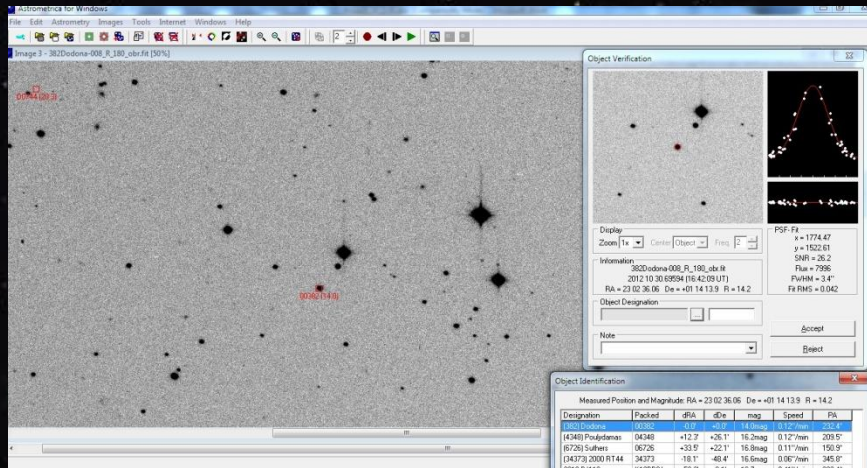**The asteroid belt between Mars and Jupiter**

**Asteroid 382 Dodona**

# Observational expedition in the National Astronomical Observatory "Rozhen"
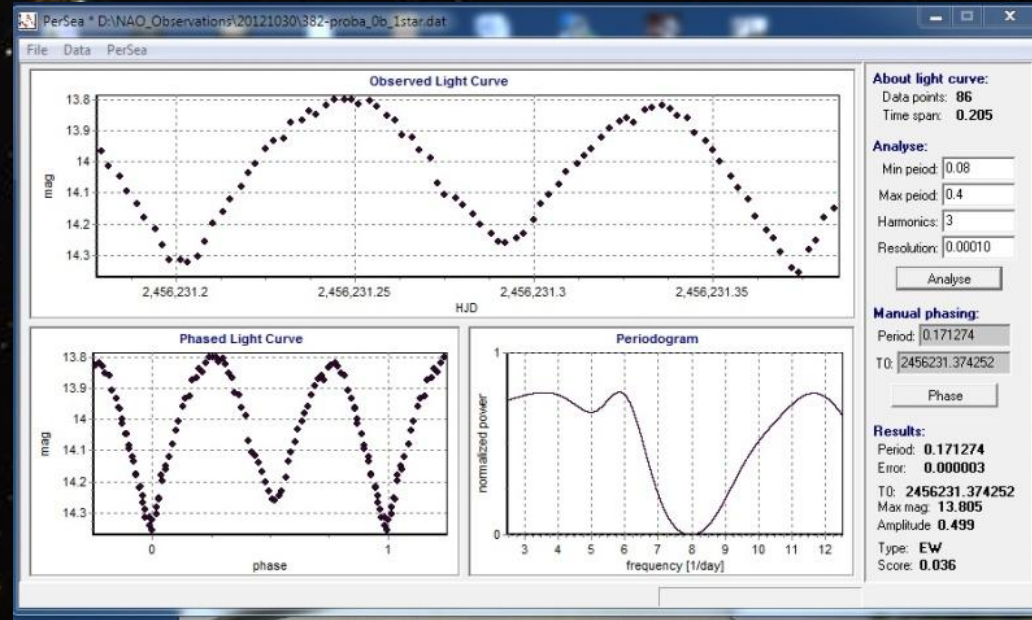# Observation of 382 Dodona

# Results of the astronomical and the photometrical processing of the asteroid 382 Dodona



**Equatorial coordinates:**
**RA and Decl**
**during 10 hours**

**M type**

**ROTATIONAL**
**PERIOD: 4.11hours**

# Choice of the Location of the Settlement

**Calculating the 'asteroid' – stationary orbit of the settlement**

DODONA

$R \approx 42876,57 \; m \approx 42,88 \; km$

Let the height at which we need to be located from the asteroid be h.

$$h = R - r$$

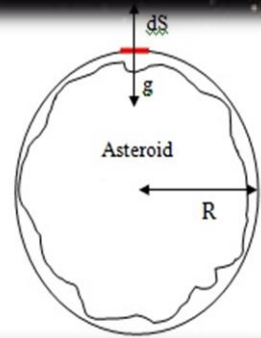$r = 29,185 \; km, \; therefore \; h \approx 13,7 \; km$

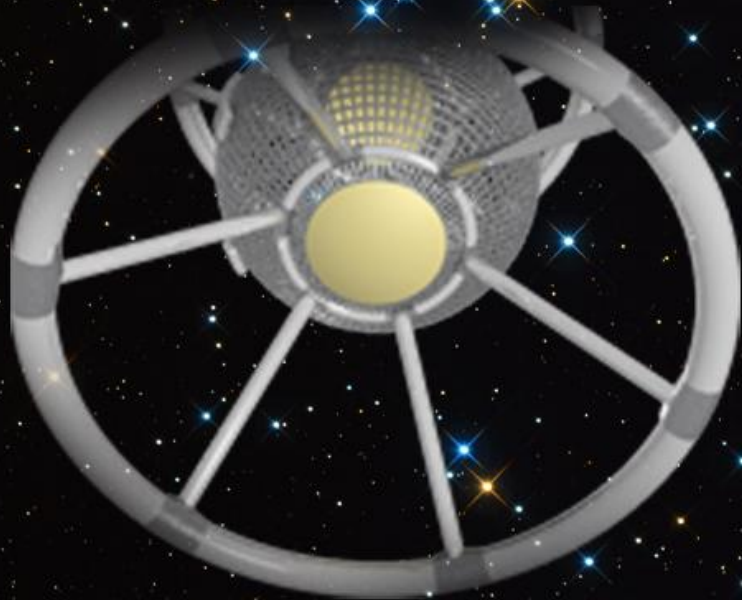To determine R we will use the formula:

$$R^3 = \frac{\gamma M T^2}{4\pi^2}$$

$$R = \sqrt[3]{\frac{\gamma M T^2}{4\pi^2}}$$

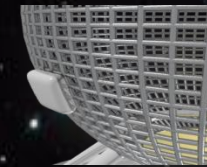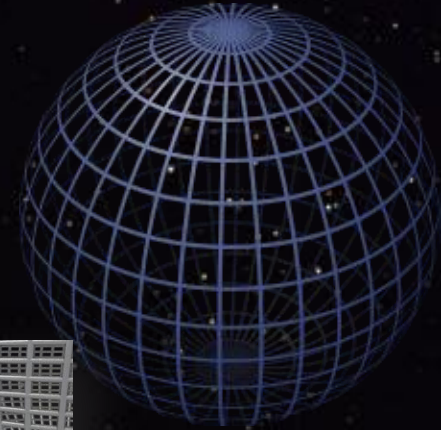*In such a away we have found a way to determine the distance to the asteroid, at which we have to set up our space settlement "Dodona".*

dS

g

Asteroid

R

# ENGINEERING-TECHNICAL SECTION

# Role of the gravitation

**Choice and argumentation for the shape of the settlement**

The creating of gravity on the sphere

In order to create artificial gravity in the settlement, found in space, we will have to rotate it. The whole construction will spin with a constant velocity with minimal losses of energy. In order for the settlement to rotate on its axis, engines must be placed along the surface of the torus and the sphere. This way, the force they will convey is perpendicular to the axis of rotation. After the settlement has been rotated and the desired speed has been reached, the engines will be able to rotate in 360 degrees, so that corrections can be made.

The principal point, on which we will determine what the angular velocity will be, will be the equator of the sphere. It is 500 m from the axis of rotation and we want an acceleration of 1,2 g to be present along its length.

$$a = 1,2 . g = \omega^2 R_{sp}$$

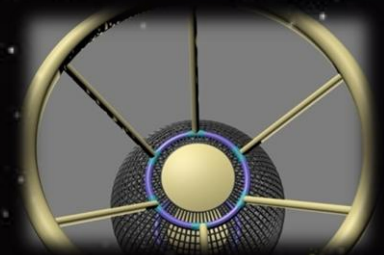$$g = 9,8 \frac{m}{s^2}$$

$$11,76 = \omega^2 . 500$$

$$\omega \approx 0,153 \frac{rad}{s}$$
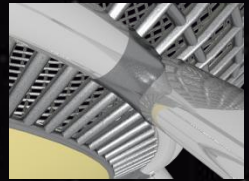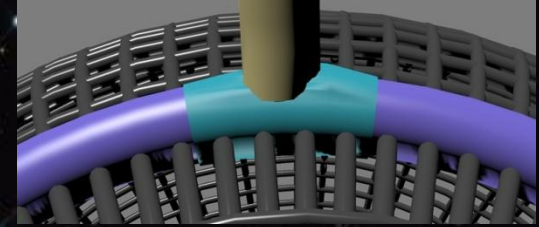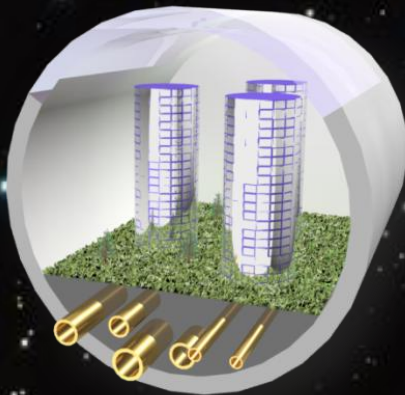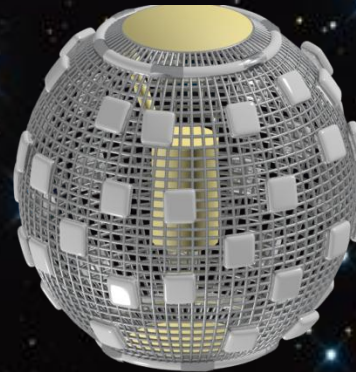
$$V_{sp} = \omega R_{sp} = 76,68 \frac{m}{s}$$
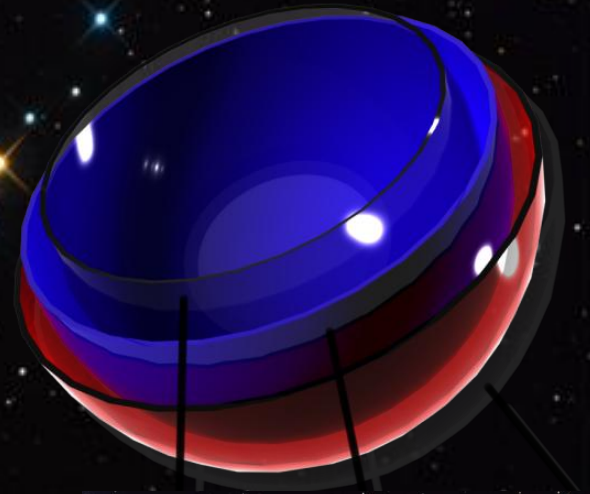
$$\omega = \frac{2\pi}{T}$$
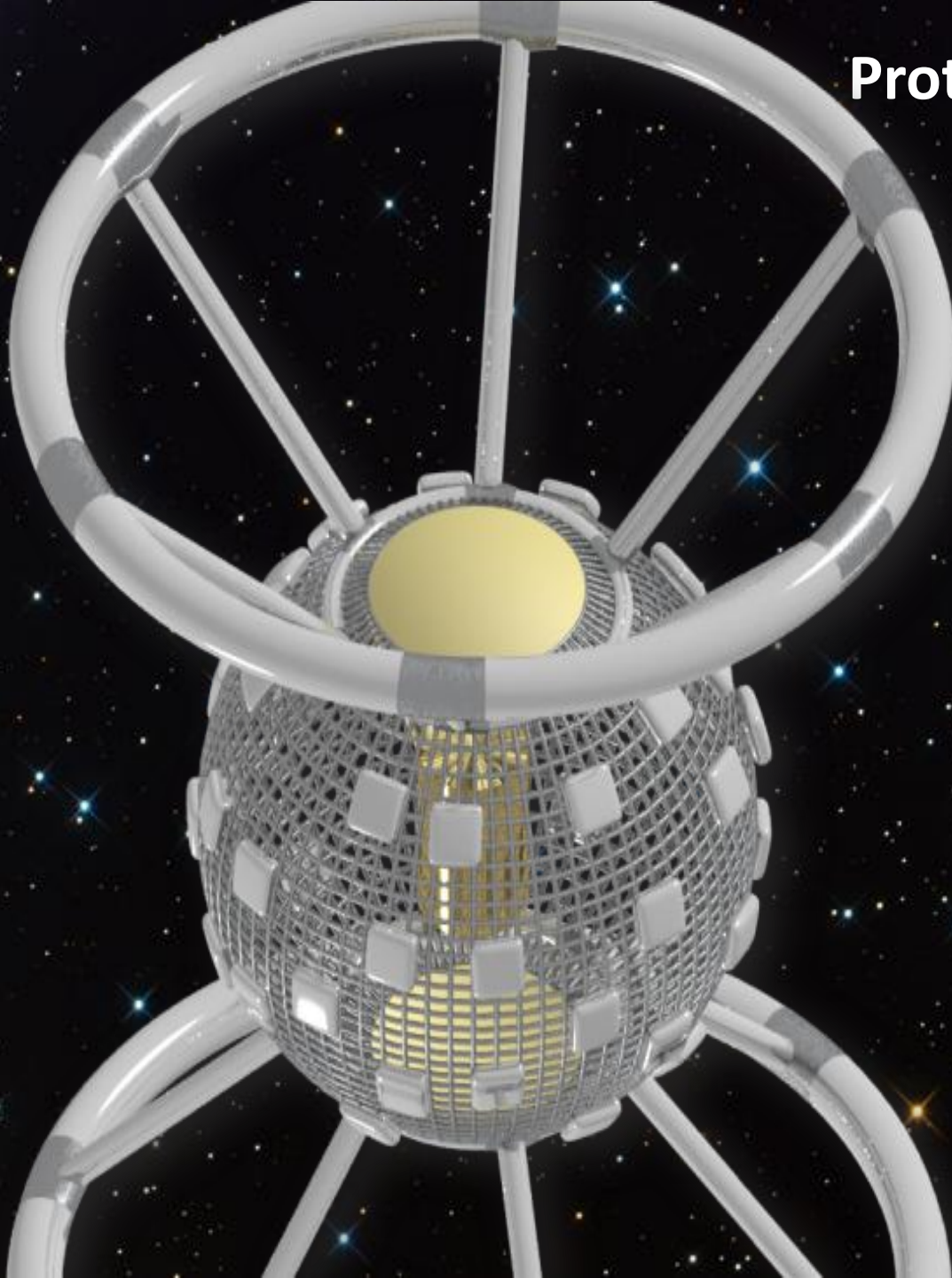
$$T = \frac{2\pi}{\omega}$$

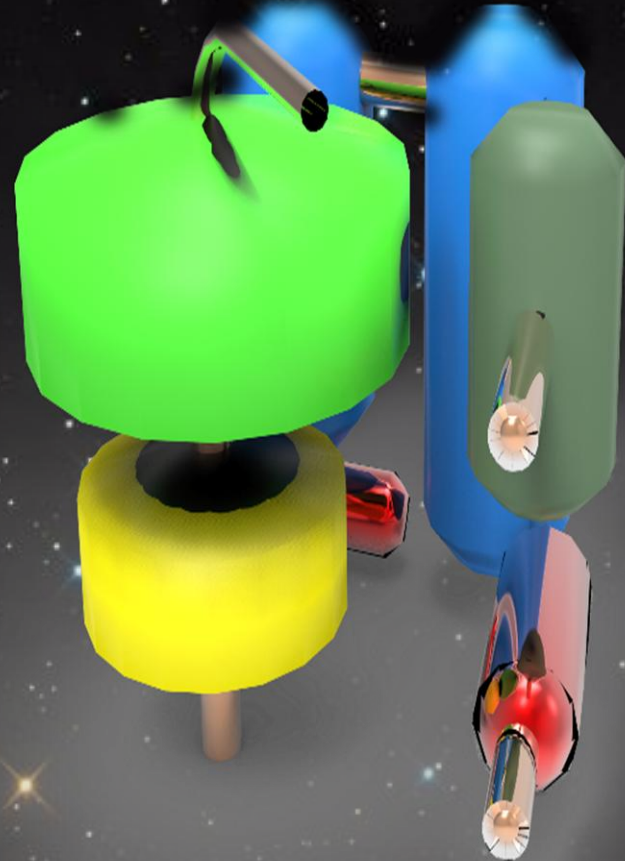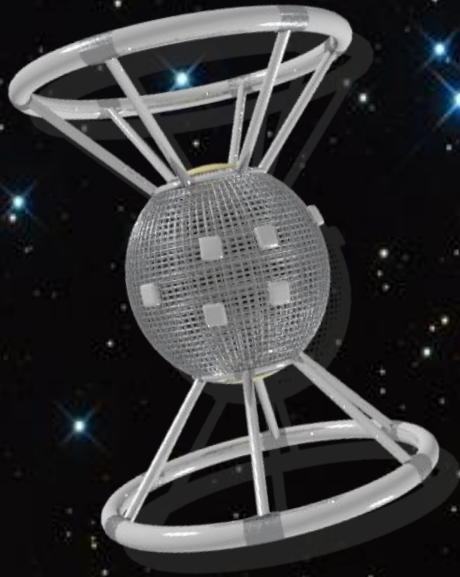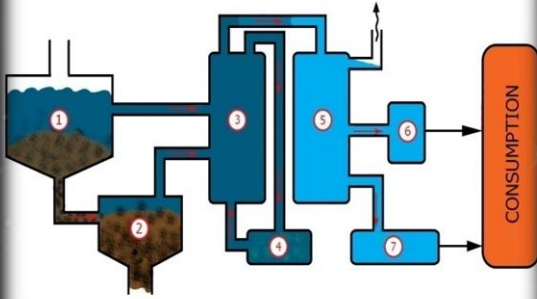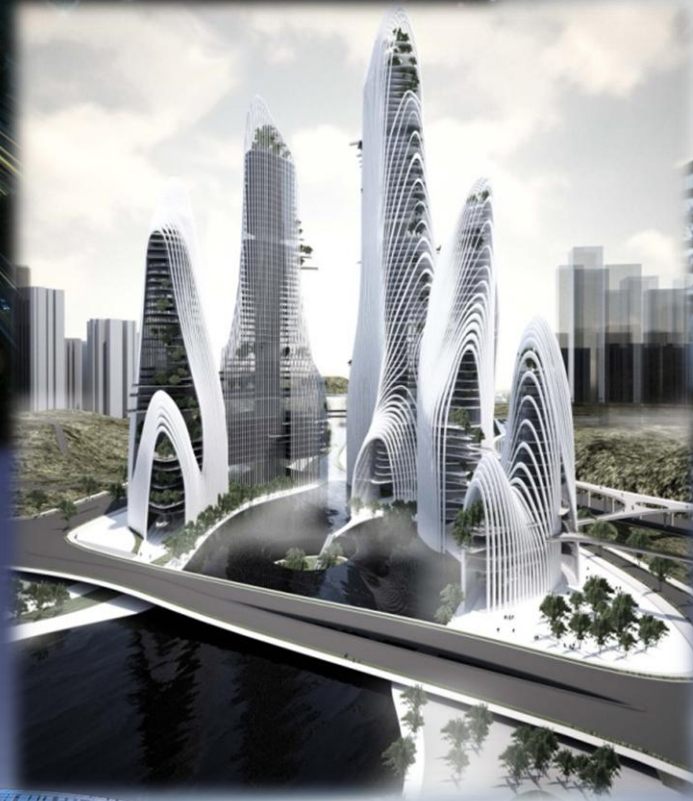# Stages of the Construction of the Space Settlement
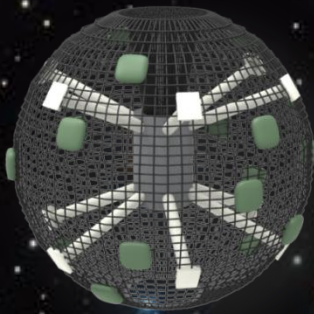
Protection of cosmic dangers

Space and solar radiation
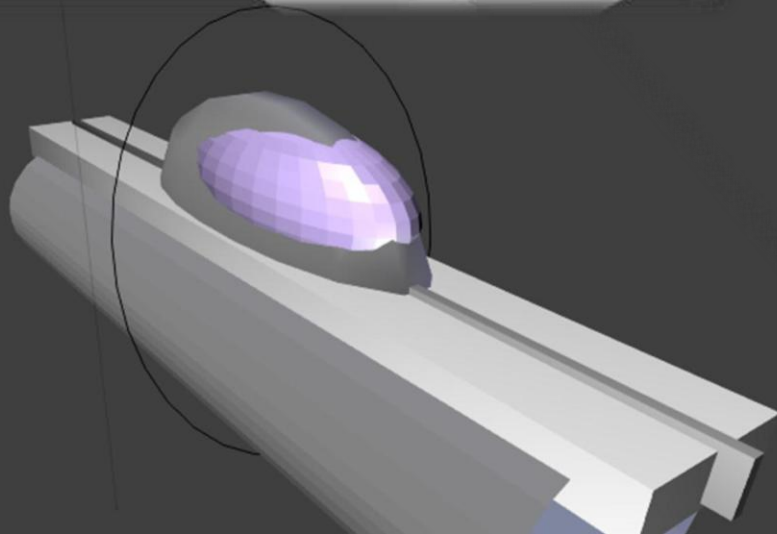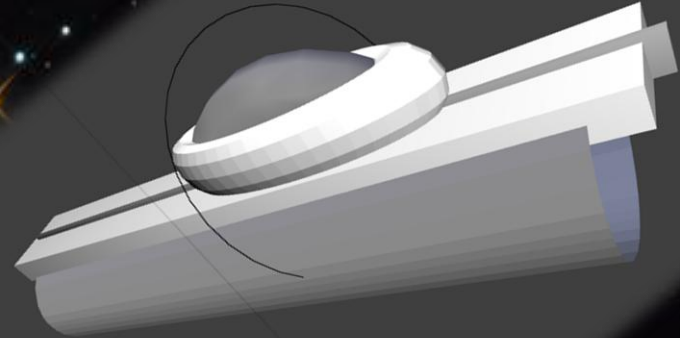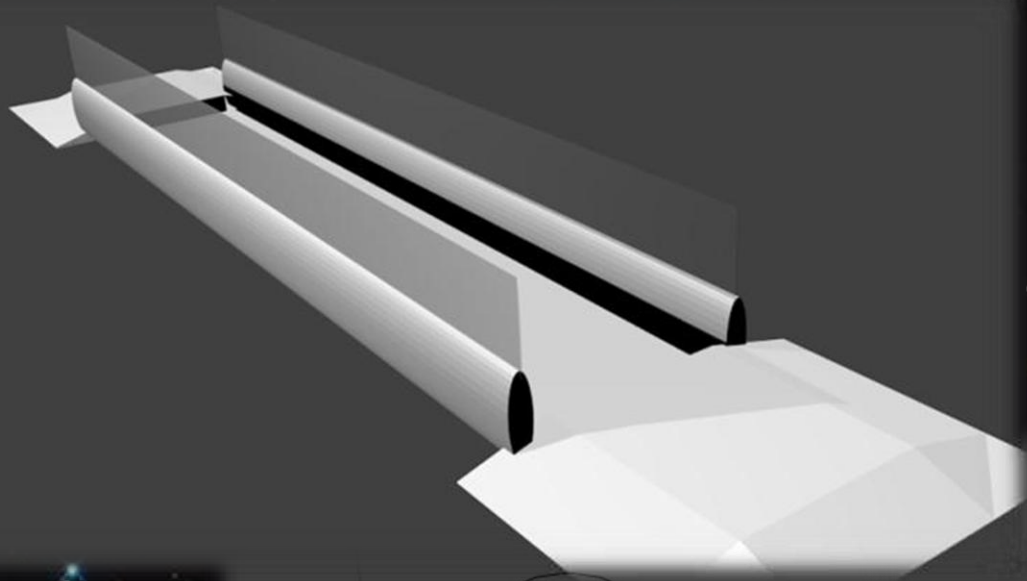
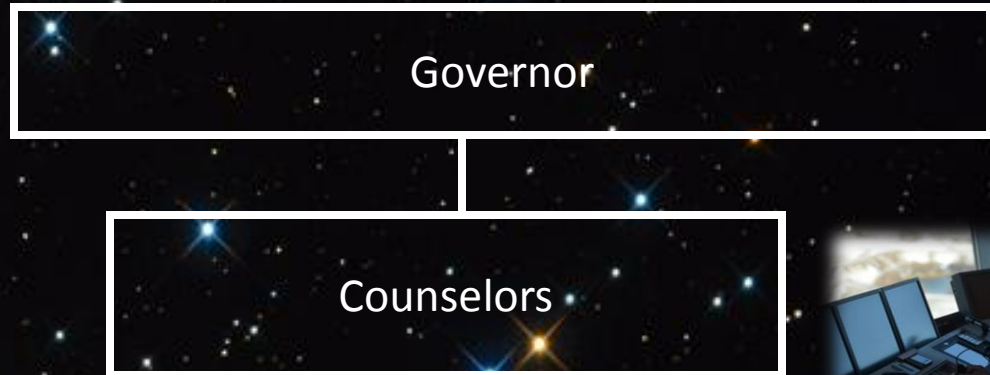# Life-Supporting Systems

# Architecture

# Interior design

# Transport

# Society

-Democracy principles

Governor

Counselors

-Gender distribution

Male
Female
Children
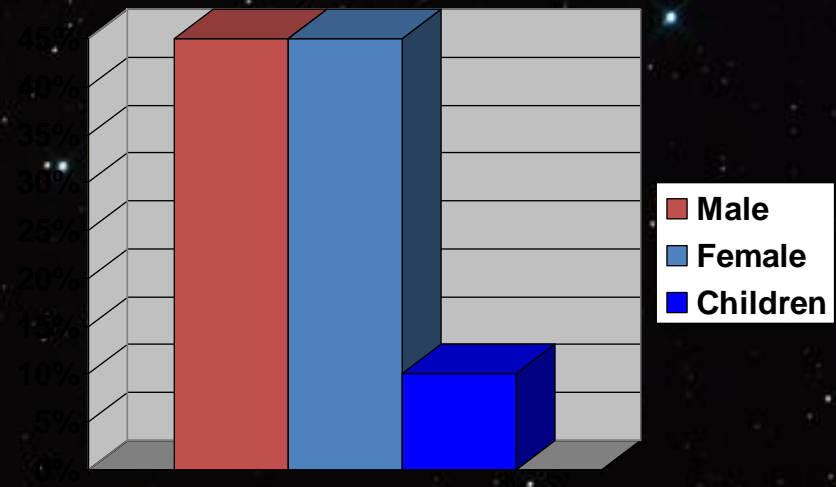
# Economics – sustainable development

## Primary sector

1. Asteroid mining

2. Comet mining

3. Food production

Material storage



Food production system



different
layers of
plants

# Secondary sector

- Pharmacy

- Bio-mimicry

- Metallurgy – stages of metal processing:

      - preparation of the ores

      - subtraction of the metal
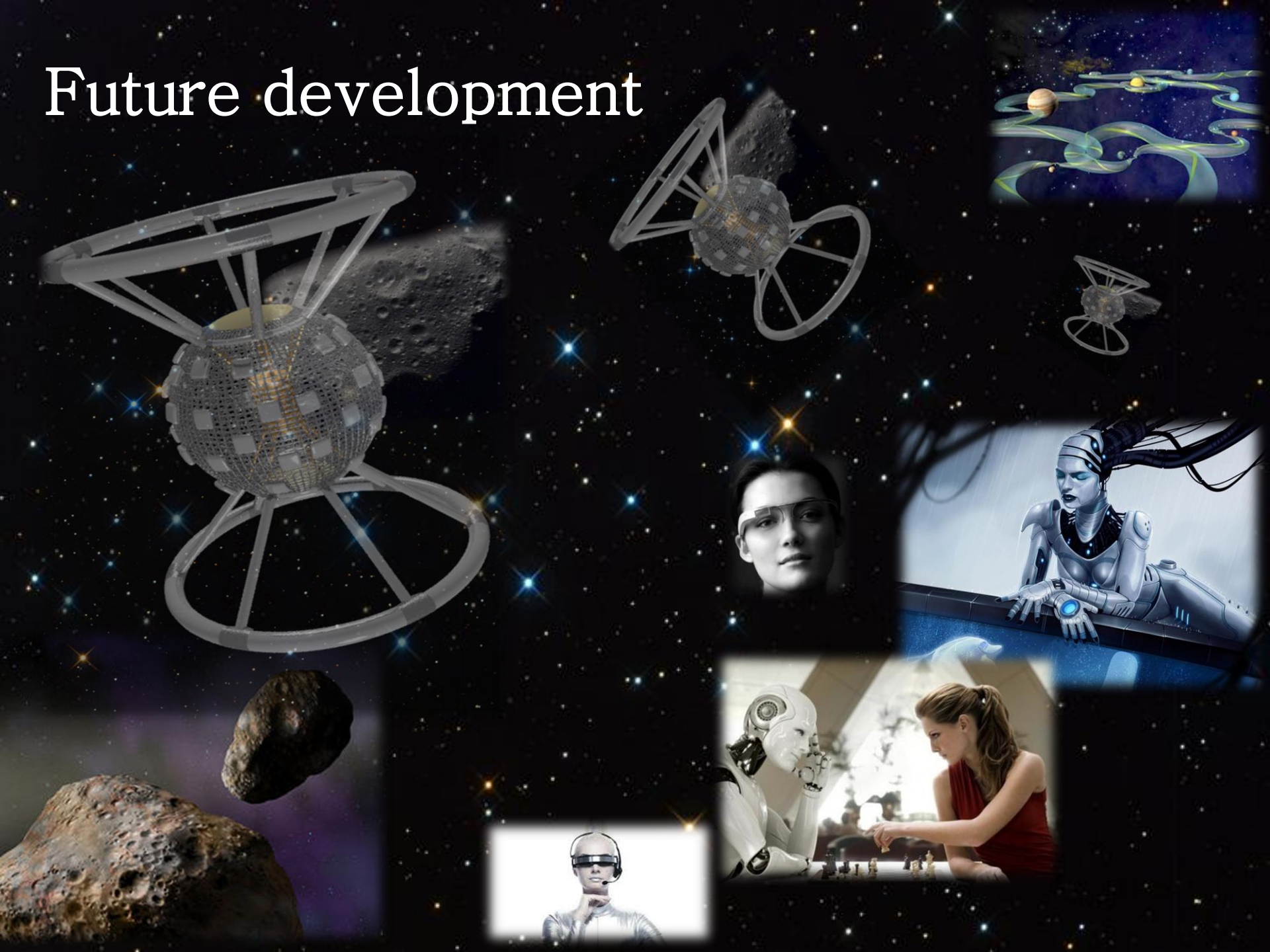
      - processing of the metal

# Tertiary sector

- Space Tourism

- Education

- Sports

- Entertainment

# Future development

Thank you for your attention!