



GALAKTIKA GROUP: ORBITAL CITY «EFIR»



«ETHEREAL DWELLING»

SPACE COLONY CONCEPT BY TSIOLKOVSKY



BASIC PRINCIPLES OF CONSTRUCTING A SPACE COLONY UPON THE CONCEPT BY K.E. TSIOLKOVSKY:

- IN-SPACE ASSEMBLING
- USING MATERIALS FROM PLANETS AND ASTEROIDS
- ARTIFICIAL GRAVITY
- PLANTS CULTIVATION

HE PRESENTED HIS RESEARCHES IN THE BOOKS: BEYOND THE PLANET EARTH, BIOLOGICAL LIFE IN COSMOS, ETHEREAL ISLAND, ETC.

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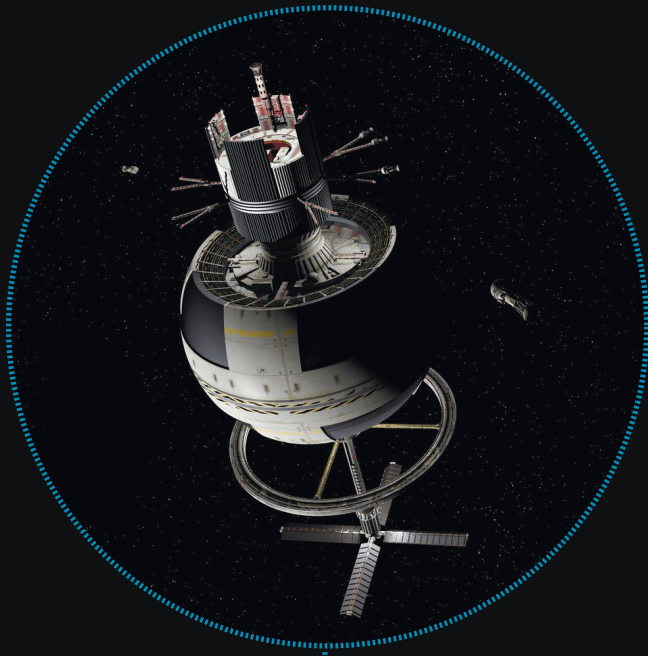
MANKIND WILL NOT FOREVER REMAIN ON EARTH, BUT IN THE PURSUIT OF LIGHT AND SPACE WILL FIRST TIMIDLY EMERGE FROM THE BOUNDS OF THE ATMOSPHERE, AND THEN ADVANCE UNTIL HE HAS CONQUERED THE WHOLE OF CIRCUMSOLAR SPACE.

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COLONY CONCEPTS [SHORT] REVIEW

BERNAL'S SPHERE, STANFORD TORUS, O'NEILL'S CYLINDER



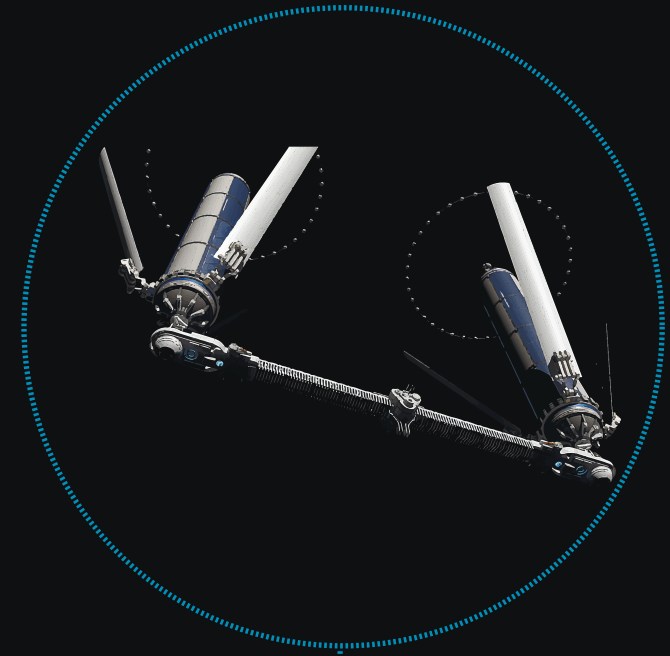
BERNAL'S SPHERE

JOHN DESMOND BERNAL 1929 POPULATION:
20—30 THOUSAND INHABITANTS DIAMETER
ABOUT 16 KM



STANFORD TORUS

STUDENTS OF THE STANFORD UNIVERSITY 1975
POPULATION: 10 THND. AND MORE INHABITANTS
DIAMETER 1.8KM AND MORE



O'NEILL'S CYLINDER

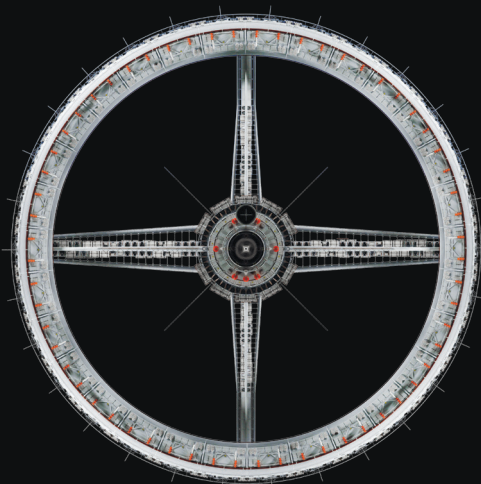
GERARD K. O'NEILL, 1979 POPULATION: 20 MLN.
INHABITANTS DIAMETER OF CYLINDERS: 6.4 KM
LENGTH OF CYLINDERS: 32 KM

ORBITAL CITY «EFIR»

SCHEME AND CHARACTERISTICS



TOP VIEW



RESIDENTIAL TORUS

ASSEMBLY DOCK

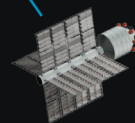
RADIATORS



ELEVATOR

VARIABLE GRAVITY MODULE

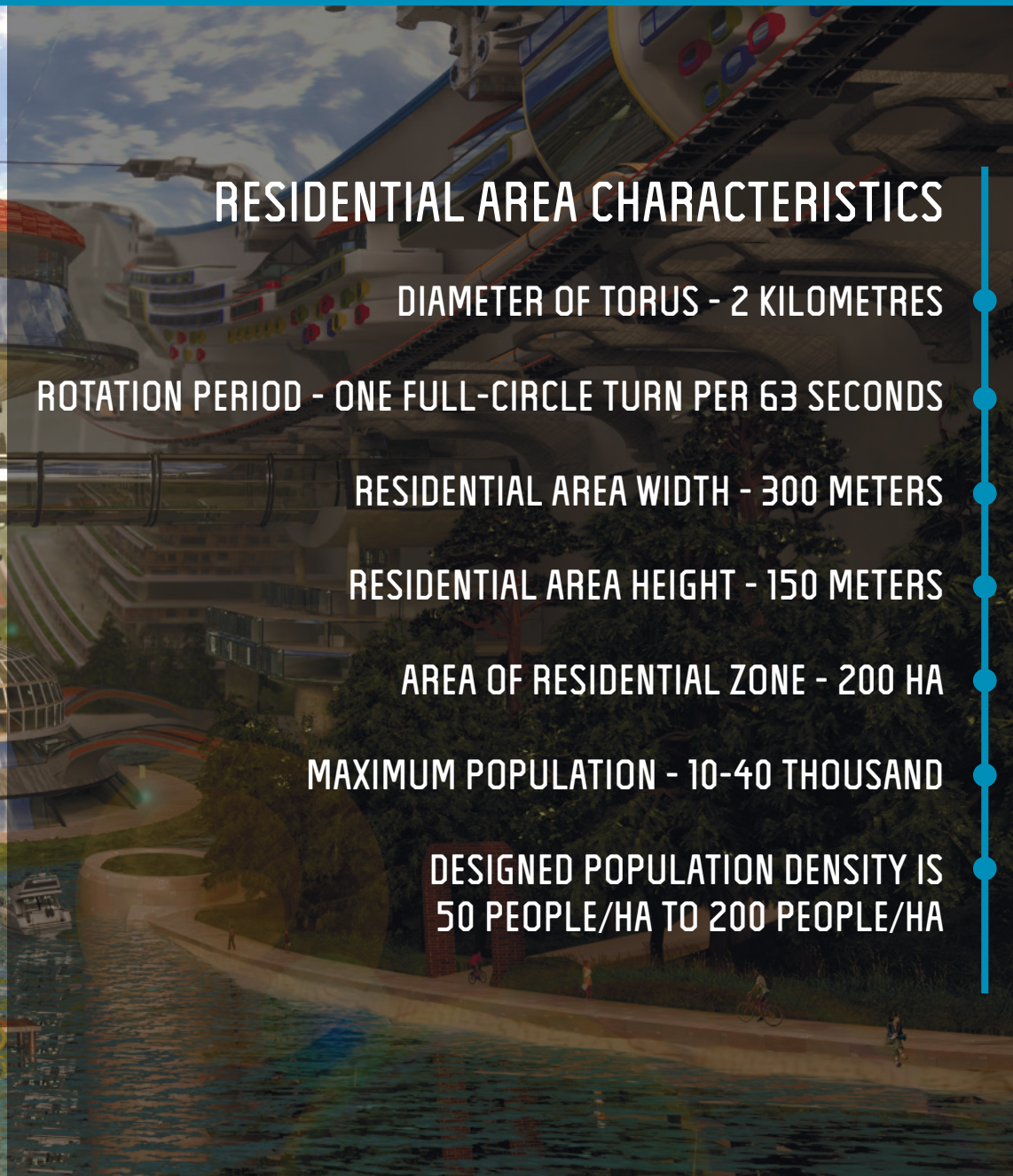
ELECTRIC POWER STATION



- ☀ 10,000 INHABITANTS
- ☀ DIAMETER OF TORUS – 2 KILOMETRES
- ☀ MASS OF ORBITAL CITY – 25 MLN. TONS

RESIDENTIAL AREA

DESCRIPTION OF THE INTERIOR AREA



RESIDENTIAL AREA CHARACTERISTICS

DIAMETER OF TORUS - 2 KILOMETRES

ROTATION PERIOD - ONE FULL-CIRCLE TURN PER 63 SECONDS

RESIDENTIAL AREA WIDTH - 300 METERS

RESIDENTIAL AREA HEIGHT - 150 METERS

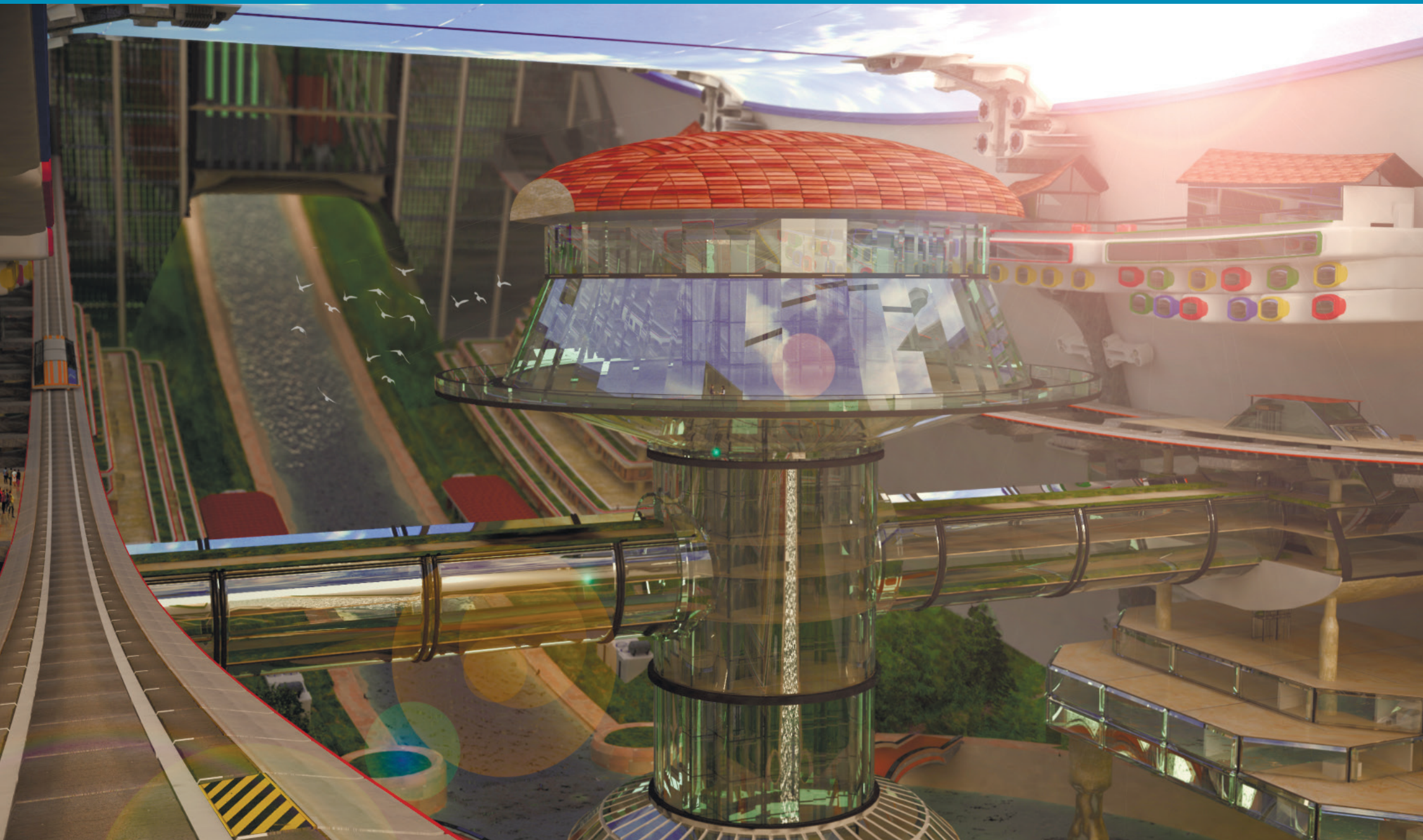
AREA OF RESIDENTIAL ZONE - 200 HA

MAXIMUM POPULATION - 10-40 THOUSAND

DESIGNED POPULATION DENSITY IS
50 PEOPLE/HA TO 200 PEOPLE/HA

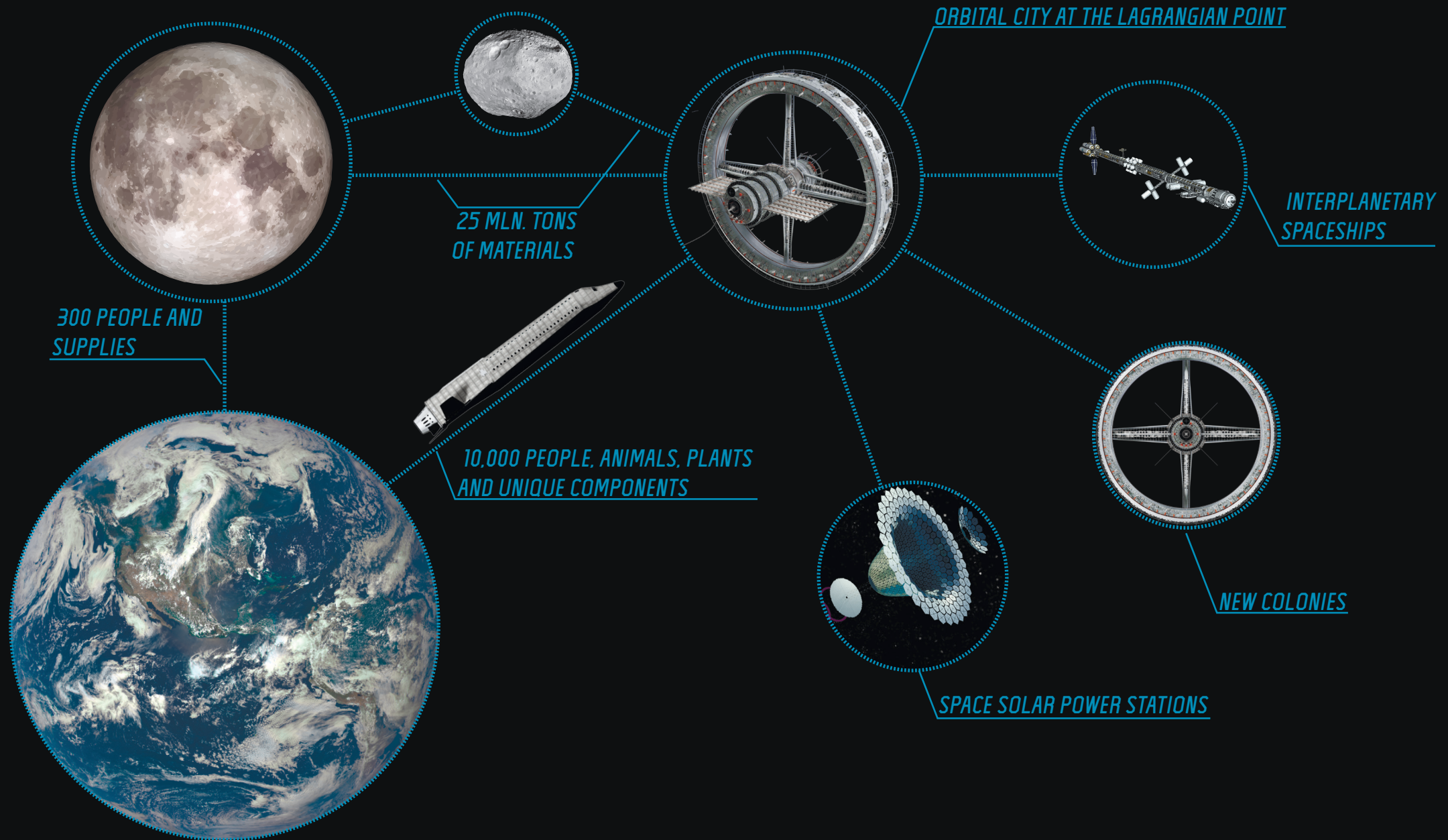
RESIDENTIAL AREA

DESCRIPTION OF THE INTERIOR AREA



LOGISTICS

TRANSPORT PLANS FOR PASSENGERS AND CARGOES

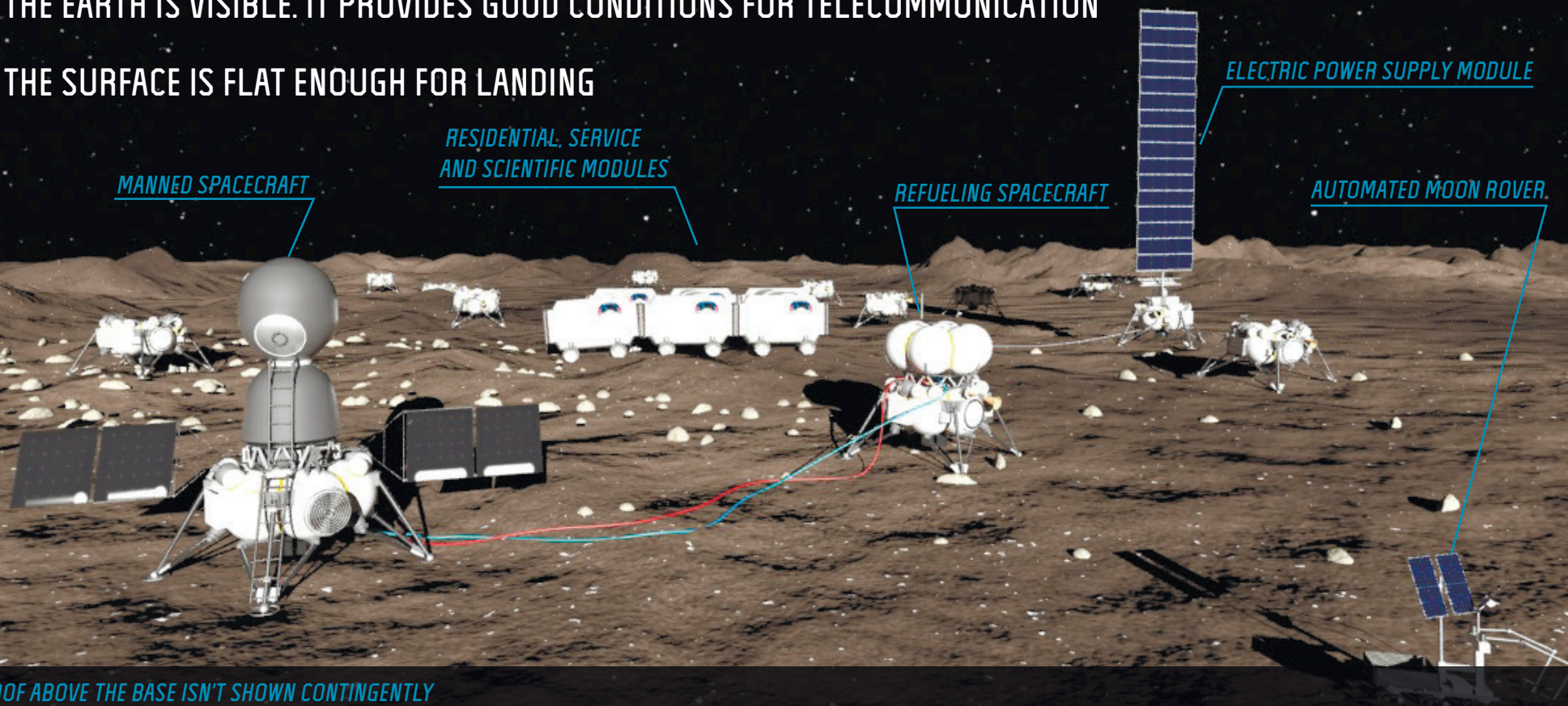


MOONBASE

FIRST-PHASE MOONBASE



- ☉ THE SOUTH POLE REGION—MALAPERT MOUNTAIN
- ☉ PEAK OF ETERNAL LIGHT. A DURATION OF NIGHT IS ONLY 3-6 DAYS INSTEAD OF TWO WEEKS.
- ☉ THERE IS A SUN LIGHT FOR A 89% OF TIME
- ☉ A POSSIBLE PRESENCE OF ICE IN SHADED AREAS OF THE NEARBY CRATERS
- ☉ THE EARTH IS VISIBLE. IT PROVIDES GOOD CONDITIONS FOR TELECOMMUNICATION
- ☉ THE SURFACE IS FLAT ENOUGH FOR LANDING



* THE ROOF ABOVE THE BASE ISN'T SHOWN CONTINGENTLY

HYPERION

BIG DUMB BOOSTER



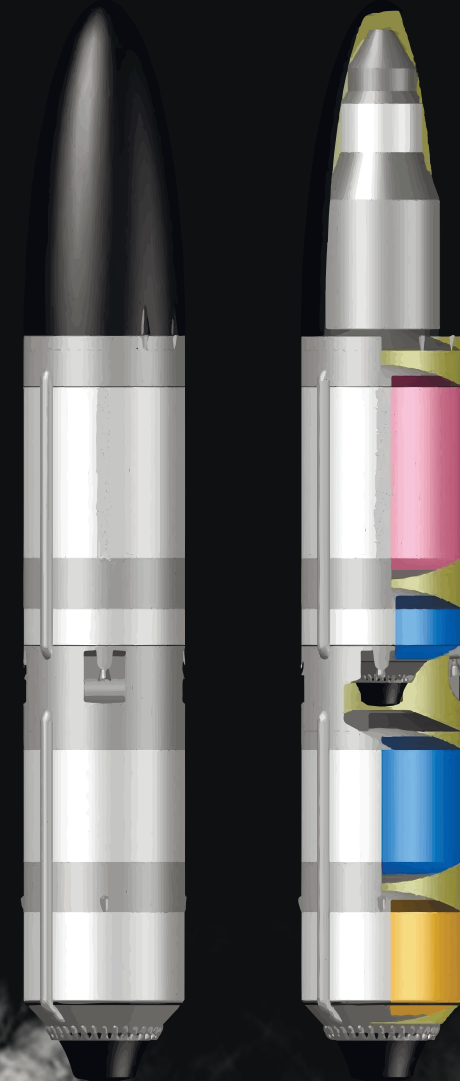
PARTIALLY REUSABLE SUPER-HEAVY SEA-LAUNCH VEHICLE

BASIC TECHNICAL DECISIONS:

- ☀ PRESSURE-FEED SYSTEM
- ☀ FUEL COMPONENTS:
 - FIRST STAGE- LIQUID METHANE AND OXYGEN
 - SECOND STAGE – LIQUID HYDROGEN AND OXYGEN
- ☀ LAUNCHING FROM SEA
- ☀ AEROSPIKE ENGINES
- ☀ BASED ON CONCEPTION OF “BIG DUMB BOOSTER”
- ☀ FIRST-STAGE RECOVERY

CHARACTERISTICS:

- ☀ 2 STAGES
- ☀ LIVE-MASS-700 TONS
- ☀ ORBITAL HEIGHT – 200 KM
- ☀ LENGTH – 140 METERS
- ☀ DIAMETER – 17 METERS

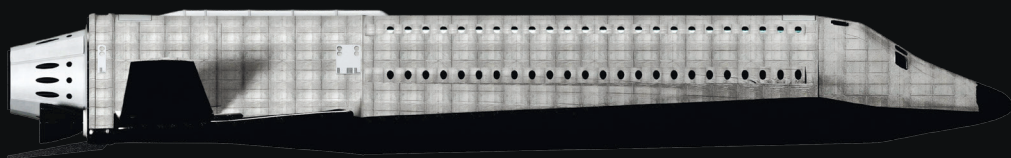


ARK

MAIN TRANSPORT SYSTEM

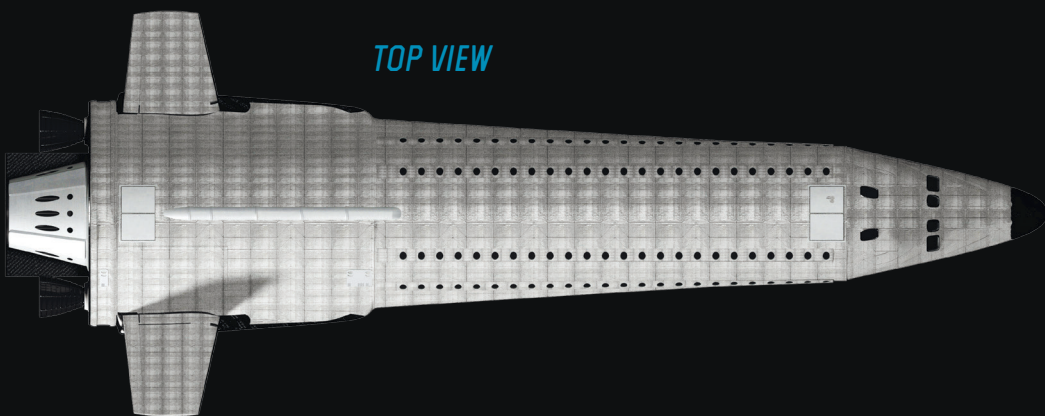


SIDE VIEW



RECOVERY SYSTEM SOLID-FUEL ENGINE

TOP VIEW



FOLDING WINGS

FORE-BODY CARGO DOOR

MAIN ENGINES

DOCKING ADAPTER

5.5 KM/S
DV

65 M
LENGTH

500
PASSENGERS

700 TONS
LAUNCH MASS

1300 TONS
MASS AFTER ORBITAL REFILL

320 TONS
DRY MASS

ARK

MAIN TRANSPORT SYSTEM IS CAPABLE TO DELIVER CARGOES AND PASSENGERS BOTH TO SPACE AND PLANETARY ENVIRONMENT



MOONBASE

RESOURCE BASE WITH MAGNETIC CATAPULTS



MOON-BASED SELF-REPLICATING FACTORY SYSTEM (REVISED PROJECT FOR A SELF-REPLICATING FACTORY SYSTEM OF 1981).

MINING INFRASTRUCTURE FOR:

- SILICON, IRON, ALUMINIUM, TITANIUM, OXYGEN – FROM REGOLITH
- WATER ICE, HYDROGEN, OXYGEN – IN POLAR CRATERS

CATAPULTS TO TAKE CARGO CONTAINERS UP FROM THE MOON SURFACE TO THE LAGRANGIAN POINT.

A MOONBASE IS REQUIRED AT THE FIRST STAGE OF THE PROJECT BROUGHT INTO LIFE TO DEVELOP TECHNOLOGIES OF LUNAR RESOURCES EXTRACTION, SELF-REPLICATING FACTORY SYSTEMS AND LUNAR ELECTROMAGNETIC CATAPULTS.

AT THE SAME TIME INITIAL RESEARCH AND SURVEY FOR SMALL ASTEROIDS FOR FUTURE ORBITAL CITY CONSTRUCTION ARE POSSIBLE.

ACTION PLAN

PATH TO ORBITAL CITY



PREPARATION STAGE. DURATION: 5 YEARS

- CREATING A RESEARCH, CULTURAL AND EDUCATIONAL PLATFORM
- LAUNCHING VR-ARCADES AND TV SHOWS
- ESTABLISHING AN ENGINEERING BUREAU AND EXPERIMENTAL PRODUCTION
- DEVELOPING AND CREATING MICROSATELLITE PLATFORM-BASED DRONE BUILDERS
- 3D-PRINTING TEST IN VACUUM AND SPACE-BASED METALLURGY EXPERIMENTS
- DEVELOPING AND BUILDING AN ULTRA-LIGHT SPACE PROBE- AND ORBITAL ROCKETS THEIA AND TAIMYR
- DEVELOPING A DESIGN OF MANNED SPACESHIP AND ORBITAL STATIONS
- PARTICIPATION IN A MANNED FLIGHT AROUND THE MOON AND OPERATIONS ON THE LUNAR ORBIT
- SENDING A MICROSATELLITE PLATFORM-BASED PROBES ONTO THE ORBIT AND THE SURFACE OF THE MOON, EXPERIMENTAL CONSTRUCTION ON THE LUNAR SURFACE

SEARCH-FOR-TECHNOLOGIES STAGE. DURATION: 10 YEARS

- BUILDING A FIRST-PHASE LAUNCH ROCKET HYPERION
- LIFTING BODY TRANSPORT SHIP
- AN EXPERIMENTAL ORBITAL STATION
- A PRIVATE MODULE INTEGRATED TO THE INTERNATIONAL CISLUNAR SPACE STATION DEEP SPACE GATEWAY TO CONTROL THE INFRASTRUCTURE ON THE MOON SURFACE
- HEAVY ROBOTS ON THE MOON SURFACE; CONSTRUCTING A CORE STRUCTURES OF THE FUTURE HABITABLE BASE; PREPARING A LANDING SITES INFRASTRUCTURE; VALUABLE RESOURCES PROSPECTING
- DEVELOPMENT OF ORBITAL CRYOGENIC REFUELING TECHNOLOGY

ACTION PLAN

PATH TO ORBITAL CITY



INFRASTRUCTURE DEPLOYMENT STAGE: 15 YEARS

- CONSTRUCTION OF THE LUNAR INDUSTRY STARTED
- CREATING A SUPER-HEAVY LAUNCH VEHICLE HYPERION
- TESTING FULL-SIZE CONSTRUCTING DRONES
- LARGE REFUELING STATIONS IN THE SPACE
- BUILDING STRUCTURES IN VACUUM USING LUNAR RESOURCES
- TEST OF LUNAR CATAPULTS

PRE-CONSTRUCTION STAGE: 10 YEARS

- SENDING A DRONES SWARM TO THE CONSTRUCTION SITE
- BUILDING SUPPORTING POINTS FOR FUTURE STATION CONSTRUCTION IN SPACE USING THE LUNAR RESOURCES; BUILDING OF EXPERIMENTAL IN-SPACE STRUCTURES
- SENDING SPECIALISTS TO THE CONSTRUCTION SITE OF THE ORBITAL CITY
- ASSEMBLING OF A STATION RIG; ESTABLISHING A SPACE-BASED IRON AND STEEL PLANT

CONSTRUCTION STAGE: 20 YEARS

- PROJECT REVISION TO TAKE INTO CONSIDERATION THE LATEST TECHNOLOGIES
- MODERNIZATION OF THE LUNAR INDUSTRIAL BASE
- CONSTRUCTION OF A SPACE POWER PLANT AND PUTTING IT INTO OPERATION
- BUILDING A TORUS SEGMENTS ON THE RIG, ASSEMBLING A WHOLE STRUCTURE
- ASSEMBLING A DRY-DOCK
- ASSEMBLING HUBS AND OTHER MODULES OF THE ORBITAL CITY

COLONIZATION STAGE: 5 YEARS

- FINISHING STATION INTERIOR
- ADDING OF UTILITIES AND COMMUNICATIONS
- BUILDING OF A BIOSPHERE
- ARRIVAL OF THE CITY RESIDENTS



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