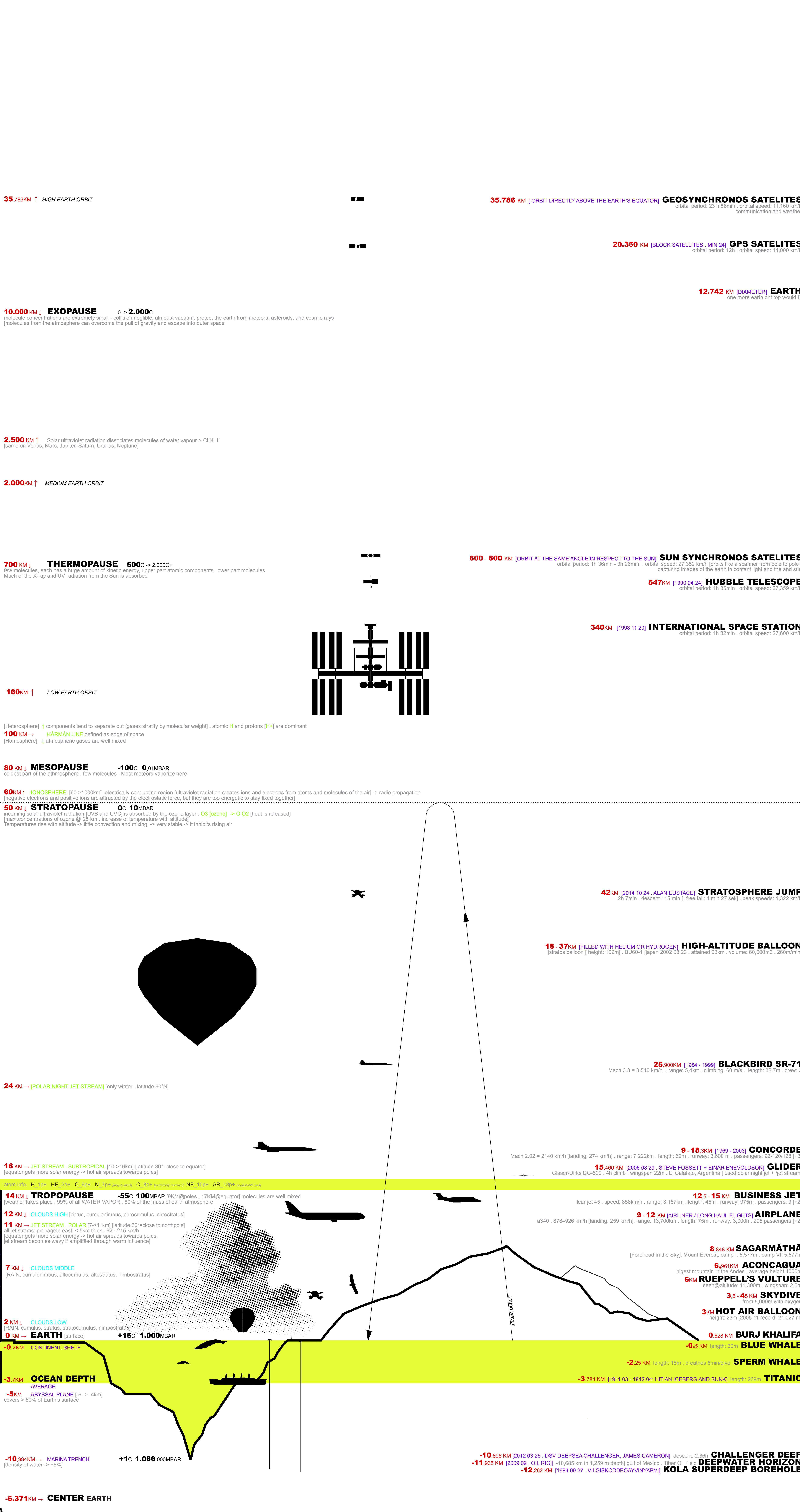
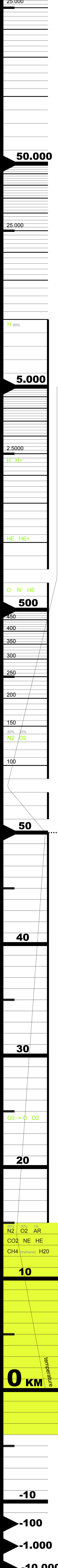


500.000

ALTITUDE

-11.000 -> 500.000



384.786 KM MOON
orbital period: 27.3 days [655.2h] · orbital speed: 3600 km/h

35.786KM ↑ HIGH EARTH ORBIT

35.786 KM [ORBIT DIRECTLY ABOVE THE EARTH'S EQUATOR] GEOSYNCHRONOUS SATELITES
orbital period: 23 h 56min · orbital speed: 11,186 km/h
communication and weather

20.350 KM [BLOCK SATELLITES, MIN 24] GPS SATELITES
orbital period: 12h · orbital speed: 14,000 km/h

12.742 KM [DIAMETER] EARTH
one more earth on top would fit

10.000 KM ↓ EXOPAUSE 0 -> 2.000°C
molecule concentrations are extremely small - collision negligible, almost vacuum, protect the earth from meteors, asteroids, and cosmic rays
[molecules from the atmosphere can overcome the pull of gravity and escape into outer space

2.500 KM ↑ Solar ultraviolet radiation dissociates molecules of water vapour -> CH4 H
(same on Venus, Mars, Jupiter, Saturn, Uranus, Neptune)

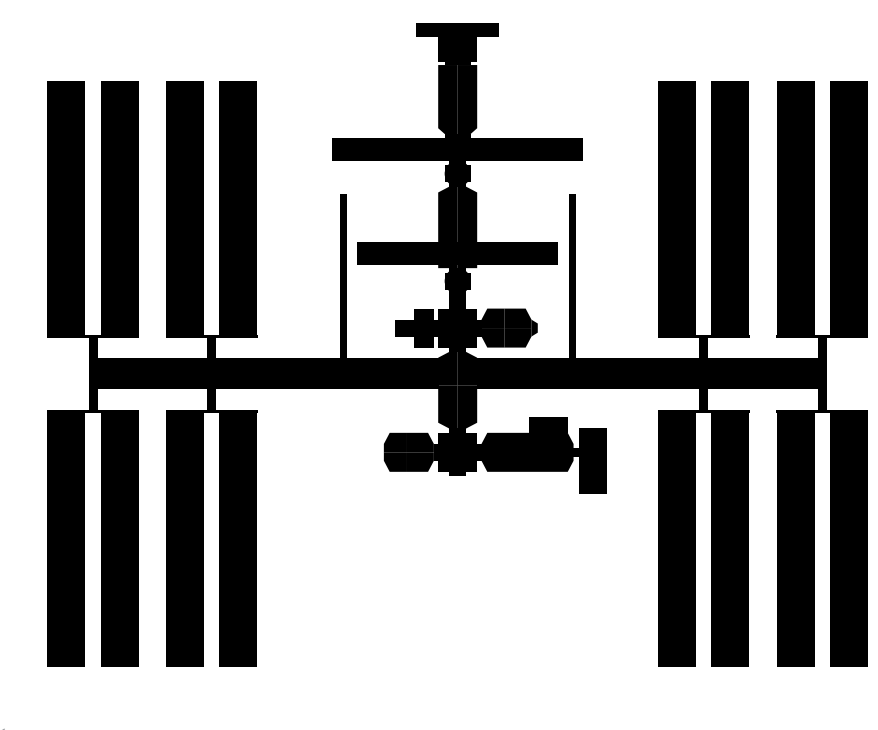
2.000KM ↑ MEDIUM EARTH ORBIT

700 KM ↓ THERMOPAUSE 500°C -> 2.000°C
few molecules, each has a huge amount of kinetic energy, upper part atomic components, lower part molecules
Much of the X-ray and UV radiation from the Sun is absorbed

600 - 800 KM [ORBIT AT THE SAME ANGLE IN RESPECT TO THE SUN] SUN SYNCHRONOUS SATELITES
orbital period: 1h 36min - 3h 26min · orbital speed: 27,359 km/h [orbits like a scanner from pole to pole]
capturing images of the earth in constant light and the and sun

547KM [1990 04 24] HUBBLE TELESCOPE
orbital period: 1h 35min · orbital speed: 27,359 km/h

340KM [1998 11 20] INTERNATIONAL SPACE STATION
orbital period: 1h 32min · orbital speed: 27,600 km/h



160KM ↑ LOW EARTH ORBIT

[Heterosphere] ↑ components tend to separate out [gases stratify by molecular weight] · atomic H and protons [H+] are dominant
100 KM → KÄRMÄN LINE defined as edge of space
[Homosphere] ↓ atmospheric gases are well mixed

80 KM ↓ MESOPAUSE -100°C 0.01MBAR
coldest part of the atmosphere · few molecules · Most meteors vaporize here

60KM ↑ IONOSPHERE [60->1000km] electrically conducting region [ultraviolet radiation creates ions and electrons from atoms and molecules of the air] -> radio propagation
[negative electrons and positive ions are attracted by the electrostatic force, but they are too energetic to stay fixed together]

50 KM ↓ STRATOPAUSE 0°C 10MBAR
incoming solar ultraviolet radiation [UVB and UVC] is absorbed by the ozone layer : O3 [ozone] -> O O2 [heat is released]
[maxi.concentrations of ozone @ 25 km · increase of temperature with altitude]
Temperatures rise with altitude -> little convection and mixing -> very stable -> it inhibits rising air

42KM [2014 10 24 · ALAN EUSTACE] STRATOSPHERE JUMP
2h 7min · descent : 15 min [free fall: 4 min 27 sek] · peak speeds: 1,322 km/h

18 - 37KM [FILLED WITH HELIUM OR HYDROGEN] HIGH-ALTITUDE BALLOON
[stratos balloon [height: 102m] · BU60-1 [japan 2002 03 23 · attained 53km · volume: 60,000m³ · 260m/min]

25.900KM [1964 - 1999] BLACKBIRD SR-71
Mach 3.3 = 3,540 km/h · range: 5,4km · climbing: 60 m/s · length: 32.7m · crew: 3

9 - 18.3KM [1969 - 2003] CONCORDE
Mach 2.02 = 2140 km/h [landing: 274 km/h] · range: 7,222km · length: 62m · runway: 3,600 m · passengers: 9 [+2]

15.460 KM [2006 08 29 · STEVE FOSSETT + EINAR ENEVOLDSON] GLIDER
Glaser-Dirks DG-500 · 4h climb · wingspan 22m · El Calafate, Argentina [used polar night jet + jet stream]

12.5 - 15 KM BUSINESS JET
lear jet 45 · speed: 858km/h · range: 3,167km · length: 45m · runway: 975m · passengers: 9 [+2]

9 - 12 KM [AIRLINER / LONG HAUL FLIGHTS] AIRPLANE
a340 · 876-926 km/h [landing: 259 km/h] · range: 13,700km · length: 75m · runway: 3,000m · 295 passengers [+2]

8.848 KM SAGARMATHA
[Forehead in the Sky], Mount Everest, camp I, 5.577m · camp VI, 5.577m

6.961KM ACONCAGUA
highest mountain in the Andes · average height: 4000m

6KM RUEPPELL'S VULTURE
seen @ altitude: 11.300m · wingspan: 2.6m

3.5 - 4.5 KM SKYDIVE
from 5.840m with oxygen

3KM HOT AIR BALLOON
height: 23m [2005 11 record: 21,027 m]

0.828 KM BURJ KHALIFA
height: 23m

-0.5 KM BLUE WHALE
length: 30m

-2.25 KM length: 16m · breathes 6min/dive SPERM WHALE

-3.784 KM [1911 03 - 1912 04: HIT AN ICEBERG AND SUNK] length: 269m TITANIC

-10.898 KM [2012 03 26 · DSV DEEPSEA CHALLENGER, JAMES CAMERON] descent: 2.36h CHALLENGER DEEP

-11.935 KM [2009 09 · OIL RIG] -10,685 km in 1,259 m depth] gulf of Mexico · Tiber Oil Field DEEPWATER HORIZON

-12.262 KM [1984 09 27 · VILGISKODDEQAYVINYARVI] KOLA SUPERDEEP BOREHOLE

atom info: H_{1p+} HE_{2p+} C_{6p+} N_{7p+} oxygen ions O_{8p+} nitrogen ion NE_{10p+} AR_{18p+} [2nd ion gas]

14 KM ↓ TROPOPAUSE -55°C 100MBAR [9KM@poles · 17KM@equator] molecules are well mixed
[weather takes place · 99% of all WATER VAPOR · 80% of the mass of earth atmosphere

12 KM ↓ CLOUDS HIGH [cirrus, cumulonimbus, cirrocumulus, cirrostratus]

11 KM → JET STREAM, POLAR [7->11km] [latitude 60°=close to northpole]
all jet streams: propagate east < 5km thick · 92 - 215 km/h
[equator gets more solar energy -> hot air spreads towards poles, jet stream becomes wavy if amplified through warm influence]

7 KM ↓ CLOUDS MIDDLE [RAIN, cumulonimbus, altostratus, nimbostratus]

2 KM ↓ CLOUDS LOW [RAIN, cumulus, stratus, stratocumulus, nimbostratus]

0 KM → EARTH [surface] +15°C 1.000MBAR

-0.2KM CONTINENT SHELF

-3.7KM OCEAN DEPTH AVERAGE

-5KM ABYSSAL PLANE [-6 -> -4km]
covers > 50% of Earth's surface

-10.994KM → MARINA TRENCH +1°C 1.086.000MBAR
[density of water -> +5%]

-6.371KM → CENTER EARTH

-12.742KM → EARTH [surface] = 0KM