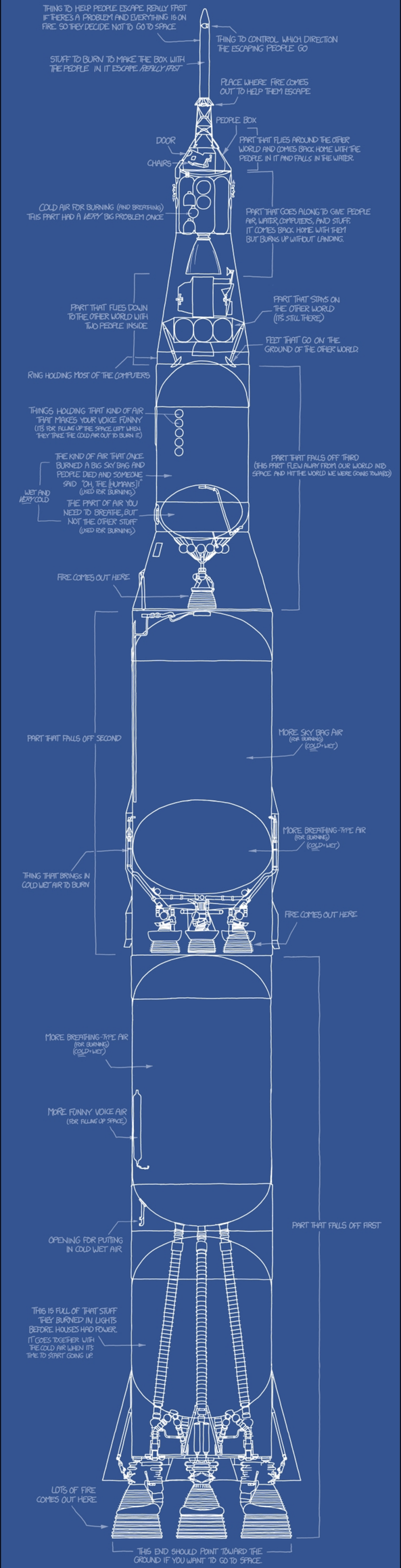
US SPACE TEAM'S UP GOER FIVE

THE ONLY FLYING SPACE CAR THAT'S TAKEN ANYONE TO ANOTHER WORLD

(EXPLAINED USING ONLY THE TEN HUNDRED WORDS PEOPLE USE THE MOST OFTEN)



IF IT STARTS POINTING TOWARD SPACE YOU ARE HAVING A BAD PROBLEM AND YOU WILL NOT GO TO SPACE TODAY.

TOP OF OBSERVABLE UNIVERSE

MROWL!

(46 BILLION LIGHT-YEARS UP)

HUBBLE DEEP FIELD OBJECTS

ONE BILLION LIGHT-YEARS

GREAT ATTRACTOR

ANTENNAE GALAXIES (COLLIDING)

ANDROMEDA

HOLY CRAP LOTS OF SPACE

ONE MILLION LIGHT YEARS

MAGELLANIC CLOUDS

EDGE OF GALAXY

GALACTIC CENTER

CRAB NEBULA

ORION NEBULA

HORSEHEAD NEBULA

ROMULAN NEUTRAL ZONE

THE PLEIADES, DUH.

RIGEL

BETELGEUSE

FORD PREFECT

EXPANDING SHELL OF RADIO TRANSMISSIONS

EDGE OF FEDERATION SECTOR 0-0-1

POLLUX

ARCTURUS

MISSING WINDS

SIRIUS

ALPHA CENTAURI

BARNARD'S STAR

ONE PARSEC

ONE LIGHT-YEAR

OORT CLOUD (?)

BUPKIS

COMET WHICH WILL DESTROY EARTH IN LATE 2063

PIONEER 10

VOYAGER I

ERIS (ALL HAIL DISCORDIA!)

PLUTO (NOT A PLANET. NEENER NEENER.)

NEPTUNE

URANUS

SATURN

ASTEROIDS

LIFE

JUPITER

MARS

VENUS

MERCURY

SUN

HEY, A HEAPING BOWL OF SALT!

OPEN THE FRIDGE DOOR, HAL.

MOON

HUMAN ALTITUDE RECORD (APOLLO 13)

2ND PLACE: SNOOP DOGG

SPACE ELEVATOR — ONE OF THESE DAYS, PROMISE!

GEOSYNCHRONOUS ORBIT

GPS SATELLITES

IN RETROSPECT, THEY SHOULDN'T HAVE SENT A POET.

I HAVE NO IDEA HOW TO LAND.

INTERNATIONAL SPACE STATION

SPACE JUNK

OFFICIAL EDGE OF SPACE (100 km)

METEORS

1/10 ATM

HIGH-ALTITUDE BALLOONS

AIRLINERS

1/2 ATM

CORY DOCTOROW

SHUTTLE COLUMBIA LOST

EVEREST

WOO PYTHON!

HELICOPTERS (6,000 m)

800 m

BURJ DUBAI (~800m)

EIFFEL TOWER (325m)

GREAT PYRAMID (140m)

KITES

POP FLY

REDWOOD (115 m)

HEY SQUIRRELS!

TALLEST STILTS

OAK (20m)

BRACHIOSAUR (13m)

GIRAFFE (8m)

FOLKS

1 km

THE OBSERVABLE UNIVERSE, FROM TOP TO BOTTOM

— ON A LOG SCALE —

SIZES ARE NOT TO SCALE, BUT HEIGHTS ABOVE THE EARTH'S SURFACE ARE ACCURATE ON A LOG SCALE. (THAT IS, EACH STEP UP IS DOUBLE THE HEIGHT.)

GRAVITY WELLS

SCALED TO EARTH SURFACE GRAVITY

THIS CHART SHOWS THE "DEPTH" OF VARIOUS SOLAR SYSTEM GRAVITY WELLS.

EACH WELL IS SCALED SUCH THAT RISING OUT OF A PHYSICAL WELL OF THAT DEPTH — IN CONSTANT EARTH SURFACE GRAVITY — WOULD TAKE THE SAME ENERGY AS ESCAPING FROM THAT PLANET'S GRAVITY IN REALITY.

EACH PLANET IS SHOWN CUT IN HALF AT THE BOTTOM OF ITS WELL, WITH THE DEPTH OF THE WELL MEASURED DOWN TO THE PLANET'S *FLAT* SURFACE.

THE PLANET SIZES ARE TO THE SAME SCALE AS THE WELLS. INTERPLANETARY DISTANCES ARE NOT TO SCALE.

$$\text{DEPTH} = \frac{G \times \text{PLANETMASS}}{g \times \text{PLANETRADIUS}}$$

G = NEWTON'S CONSTANT

$g = 9.81\ m/s^2$

TO SUN, VERY VERY FAR DOWN

MERCURY

VENUS

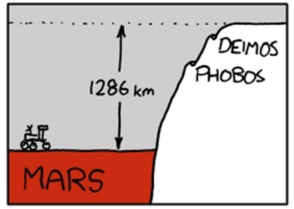
EARTH 5,478 km

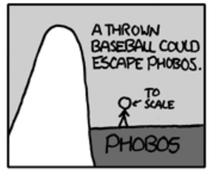
MOON 288 km

MARS 1,286 km

GANYMEDE

10





JUPITER

JUPITER IS NOT MUCH LARGER THAN SATURN, BUT MUCH MORE MASSIVE. AT ITS SIZE, ADDING MORE MASS JUST MAKES IT DENSER DUE TO THE EXTRA SQUEEZING OF GRAVITY.

IF YOU DROPPED A FEW DOZEN MORE JUPITERS INTO IT, THE PRESSURE WOULD IGNITE FUSION AND MAKE IT A STAR.

WEEEEEEEEEEEEEEE

TITAN

EUROPA

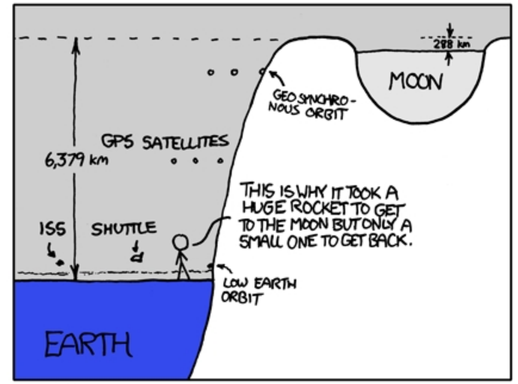
RINGS

SATURN

URANUS

AN EVEN MORE GLORIOUS DAWN AWAITS!

NEPTUNE



IT TAKES THE SAME AMOUNT OF ENERGY TO LAUNCH SOMETHING ON AN ESCAPE TRAJECTORY AWAY FROM EARTH AS IT WOULD TO LAUNCH IT 6,000 km UPWARD UNDER CONSTANT 9.81 m/s^2 EARTH GRAVITY.

HENCE, EARTH'S WELL IS 6,000 km DEEP.