

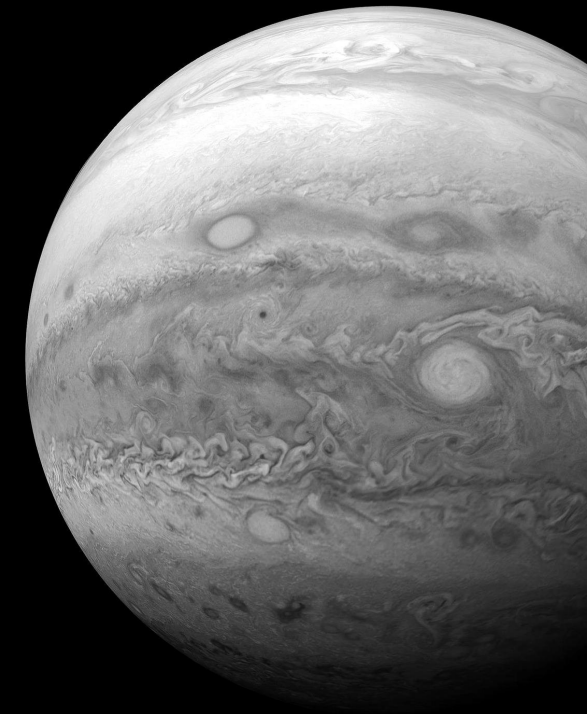
八大行星

SOLAR SYSTEM SURVEY — TWENTY PLATES

EIGHT WORLDS

行星档案 · PLANETARY ARCHIVE, PLATES 01–20

MERCURY → NEPTUNE · GRayscale PLATES · NASA/JPL IMAGERY

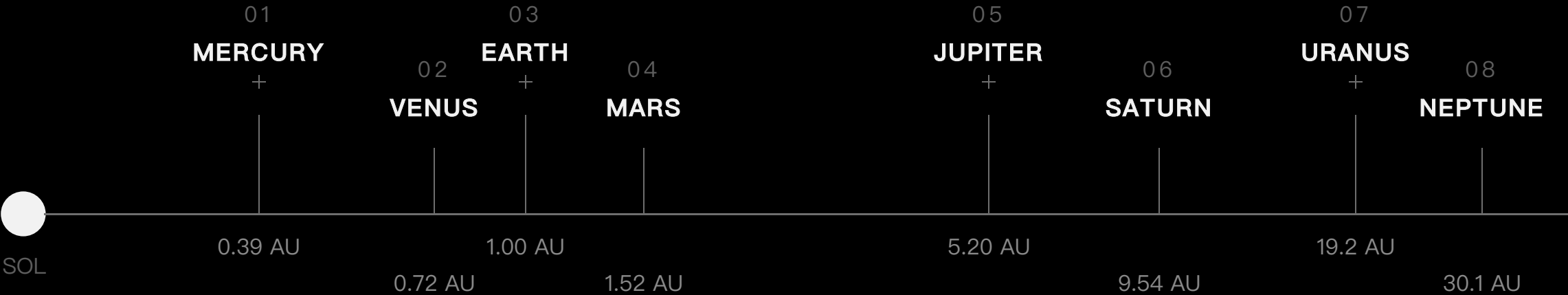


MEAN DISTANCE FROM SOL · LOG SCALE · AU



DISTANCE TO SCALE, NOT SIZE — THIS IS HOW EMPTY IT REALLY IS

SEMI-MAJOR AXIS, LOGARITHMIC — EIGHT STOPS, ONE STAR



LIGHT-TIME FROM THE SUN — MERCURY 3.2 MIN · JUPITER 43 MIN · NEPTUNE 4.2 H
ORBITAL PERIOD — 88 D · 687 D · 11.9 Y · 29.4 Y · 165 Y · SOURCE — NASA/JPL SSD



水星

DAY 430 °C · NIGHT -180 °C

MERCURY

THE INNERMOST WORLD · 水星

0.39 AU

FROM SUN

4,879 KM

DIAMETER

88 D

PERIOD

0

MOONS

AIRLESS

No atmosphere — the surface swings -180°C to 430°C .

SPIN-ORBIT 3:2

Rotates exactly three times for every two orbits.

CALORIS BASIN

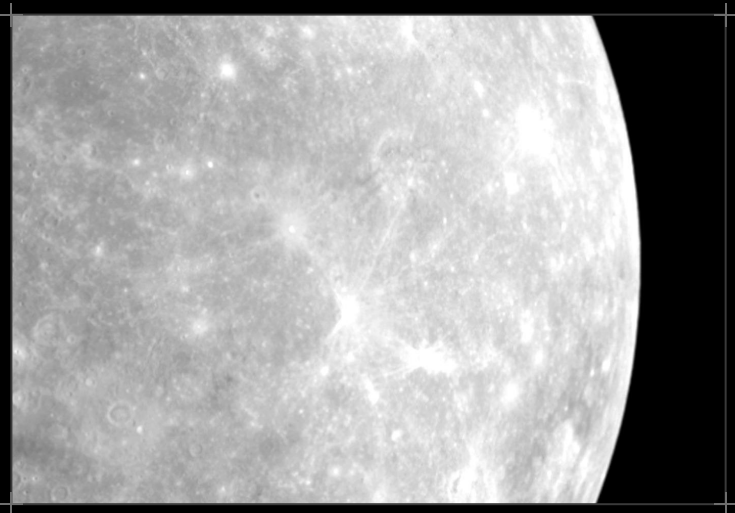
A 1,550 km impact basin ringed by volcanic plains.

IRON HEART

A vast iron core fills the smallest planet — no moons.

MISSION LOG — SELECTED

1974	MARINER 10 — THREE FLYBYS · FIRST CLOSE-UP IMAGES EVER TAKEN
2011	MESSENGER — FIRST ORBITER · 4,100 ORBITS MAPPED THE GLOBE
2026	BEPICOLOMBO — ESA/JAXA CRUISER · ARRIVES NOVEMBER 2026

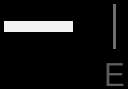


DETAIL 01-B — CRATERED TERRAIN
NEAR THE LIMB

MEAN ELEMENTS — J2000

SEMI-MAJOR a	0.387 AU
ECCENTRICITY e	0.2056
INCLINATION i	7.00°
PERIOD T	88.0 D

DIAMETER · EARTH = 1.00
0.38 × E



SOURCE — NASA/JPL SSD

金星

SURFACE 465 °C · PRESSURE 92 BAR

VENUS

THE GREENHOUSE WORLD · 金星

0.72 AU	12,104 KM	225 D	0
FROM SUN	DIAMETER	PERIOD	MOONS



RUNAWAY GREENHOUSE

465 °C under 92 bar of CO₂ — hot enough to melt lead.

RETROGRADE

One rotation takes 243 days — its day outlasts its year.

VEILED

Sulfuric-acid clouds veil the surface from all optics.

SEEN BY RADAR

Magellan's radar mapped 98% of the hidden terrain.

MISSION LOG — SELECTED

1970	VENERA 7 — FIRST SUCCESSFUL LANDING ON ANOTHER PLANET
1975	VENERA 9 — FIRST PHOTOGRAPHS FROM A PLANET SURFACE
1990	MAGELLAN — RADAR MAPPER · 98% COVERAGE AT 100 M RES



DETAIL 02-B — RADAR TEXTURE,
MAGELLAN MOSAIC

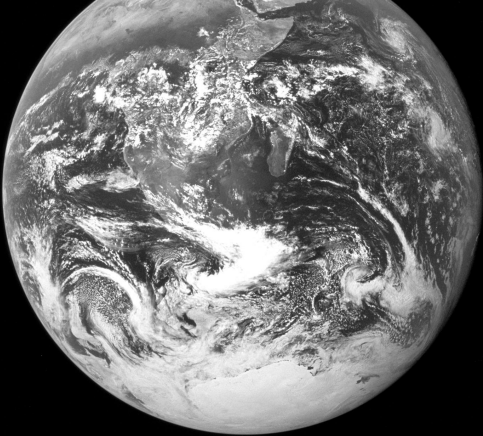
MEAN ELEMENTS — J2000

SEMI-MAJOR a	0.723 AU
ECCENTRICITY e	0.0068
INCLINATION i	3.39°
PERIOD T	224.7 D

DIAMETER · EARTH = 1.00
0.95 × E



SOURCE — NASA/JPL SSD



+

+

地球

SEVENTY-ONE PERCENT WATER

EARTH

THE LIVING WORLD · 地球

1.00 AU	12,742 KM	1 MOON	1
FROM SUN	DIAMETER	LUNA	BIOSPHERE

THE OCEAN WORLD

71% of the surface lies beneath liquid water.

THE BIOSPHERE

The only world known to be inhabited.

SHIELDED

A magnetic shield; one large moon steadies the tilt.

OXYGEN

An O₂ sky, exhaled by three billion years of photosynthesis.

MISSION LOG — SELECTED

1957	SPUTNIK 1 — FIRST ARTIFICIAL SATELLITE · ONE PERIOD, 96 MIN
1961	VOSTOK 1 — Y. GAGARIN · FIRST HUMAN ORBIT · 108 MINUTES
1968	APOLLO 8 — EARTHRISE PHOTOGRAPHED FROM LUNAR ORBIT



DETAIL 03-B — OCEAN AND LIMB,
APOLLO 17 FRAME

MEAN ELEMENTS — J2000

SEMI-MAJOR a	1.000 AU
ECCENTRICITY e	0.0167
INCLINATION i	0.00°
PERIOD T	365.25 D

DIAMETER · EARTH = 1.00
1.00 × E



SOURCE — NASA/JPL SSD

火星

−63 °C · 6 MBAR CO₂ SKY

MARS

THE EXPLORED FRONTIER · 火星



1.52 AU	6,779 KM	687 D	2
FROM SUN	DIAMETER	PERIOD	MOONS

HYDROSPHERE — PAST

Deltas and clays record rivers that ran for aeons.

OLYMPUS MONS

21.9 km tall — the largest volcano known.

THIN AIR

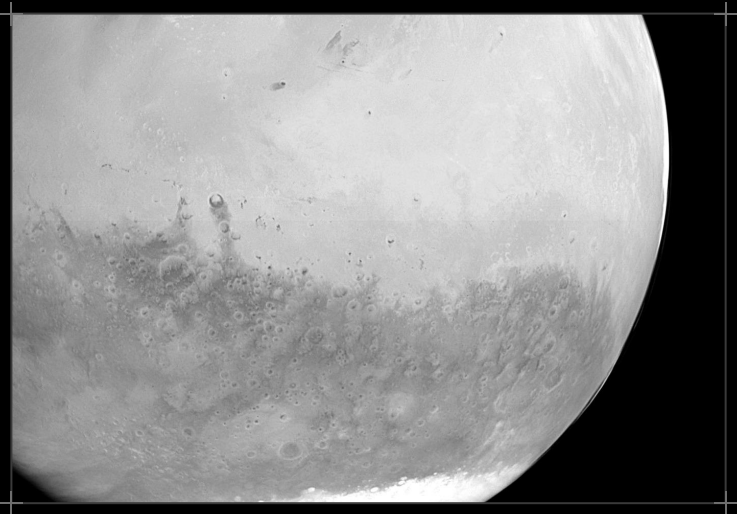
−63 °C mean beneath a 6-millibar sky of CO₂.

TWO CAPTIVES

Phobos and Deimos — probably captured asteroids.

MISSION LOG — SELECTED

1965	MARINER 4 — FIRST FLYBY · 21 PHOTOS · CRATERS, NOT CANALS
1976	VIKING 1 — FIRST LONG-DURATION SURFACE MISSION
2012	CURIOSITY — NUCLEAR ROVER IN GALE CRATER · STILL ROLLING



DETAIL 04-B — MARTIAN TERRAIN,
OSIRIS FRAME

MEAN ELEMENTS — J2000

SEMI-MAJOR a	1.524 AU
ECCENTRICITY e	0.0934
INCLINATION i	1.85°
PERIOD T	687.0 D

DIAMETER · EARTH = 1.00
0.53 × E



SOURCE — NASA/JPL SSD

PLATE 05A — JUPITER

木星

MASS 2.5× ALL OTHER PLANETS COMBINED

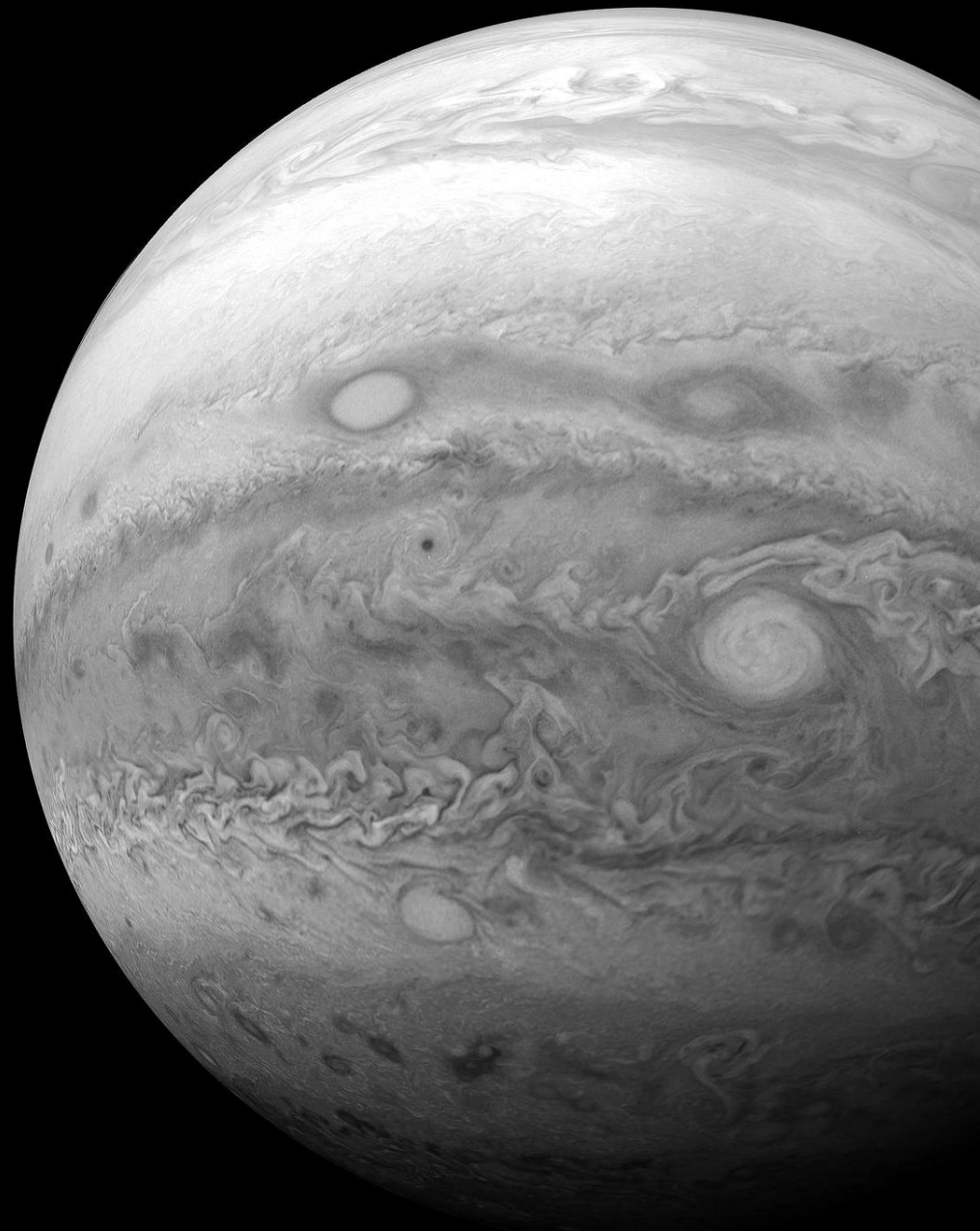
JUPITER

THE GIANT · 木星

5.20 AU	139,820 KM	11.9 Y	95
FROM SUN	DIAMETER	PERIOD	SATELLITES

SSS-08 · SOLAR SYSTEM SURVEY

SHEET 11 / 20



COLOSSAL

2.5x the mass of every other planet combined.

THE RED SPOT

A storm wider than Earth, watched since the 1830s.

FAST SPIN

One day lasts 9.9 hours — the globe is flattened.

A SYSTEM

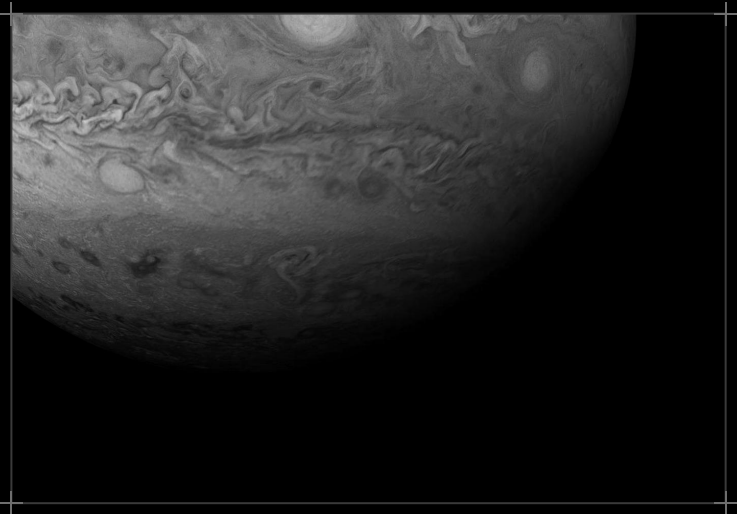
95 moons; four Galilean worlds form a system of their own.

MISSION LOG — SELECTED

1973 PIONEER 10 — FIRST FLYBY · SURVIVED THE RADIATION BELTS

1995 GALILEO — FIRST ORBITER · RELEASED AN ATMOSPHERIC PROBE

2016 JUNO — POLAR ORBITER · MAPPING CORE, GRAVITY, AURORAE



DETAIL 05-B — EQUATORIAL BANDS AND STORMS, JUNO

MEAN ELEMENTS — J2000

SEMI-MAJOR a 5.203 AU

ECCENTRICITY e 0.0489

INCLINATION i 1.31°

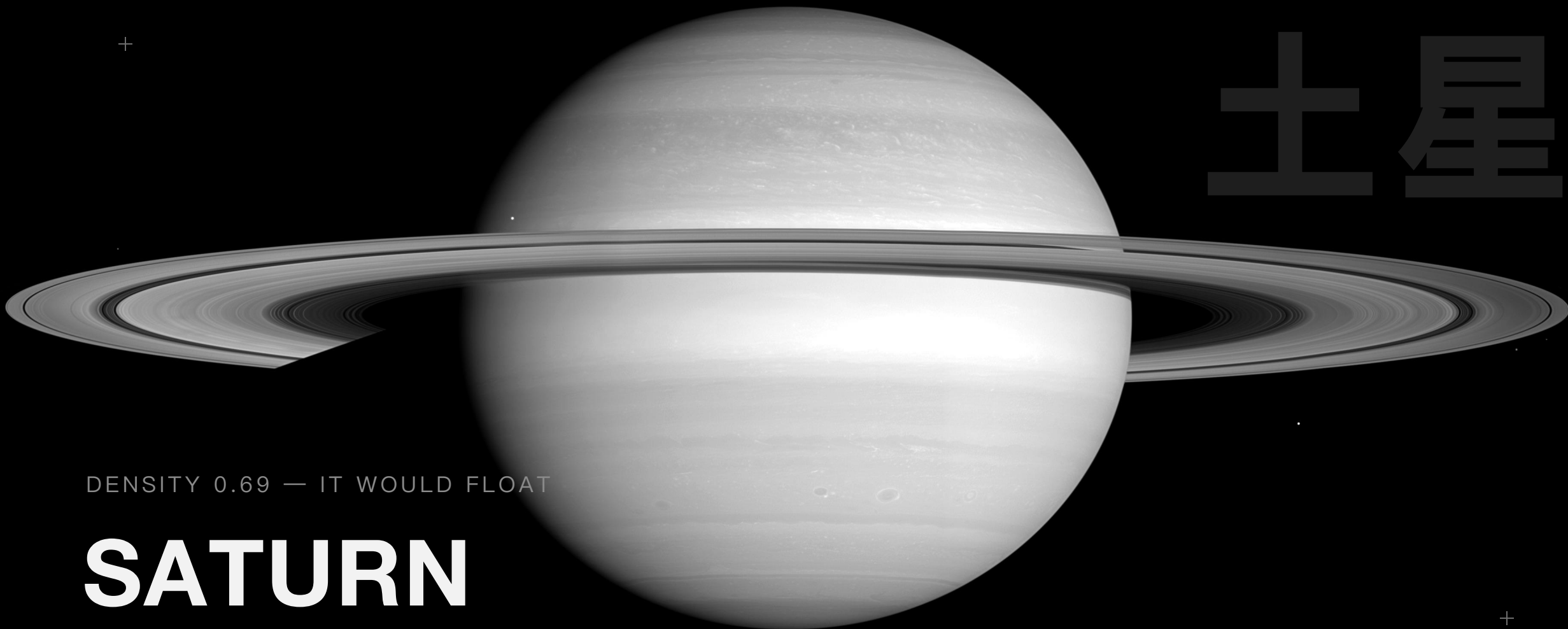
PERIOD T 11.86 Y

DIAMETER · EARTH = 1.00

11.21 × E



SOURCE — NASA/JPL SSD



DENSITY 0.69 — IT WOULD FLOAT

SATURN

THE RINGED WORLD · 土星

9.58 AU

FROM SUN

116,460 KM

DIAMETER

29.4 Y

PERIOD

274

SATELLITES

THE RINGS

282,000 km across, and in places only 10 metres thick.

BUOYANT

Mean density 0.69 g/cm³ — lighter than water.

THE HEXAGON

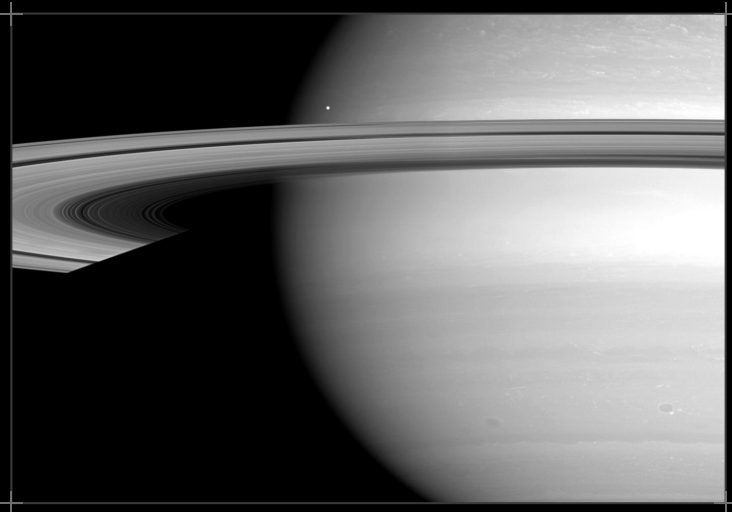
A six-sided jet stream pinwheels the north pole.

TITAN

274 moons known; Titan keeps rivers of methane.

MISSION LOG — SELECTED

1979	PIONEER 11 — FIRST FLYBY · PAVED THE PATH FOR VOYAGER
2004	CASSINI–HUYGENS — 13 YEARS IN ORBIT · TITAN LANDING 2005
2017	GRAND FINALE — 22 PLUNGE ORBITS BETWEEN PLANET AND RINGS



DETAIL 06-B — RING PLANE AT EQUINOX, CASSINI

MEAN ELEMENTS — J2000

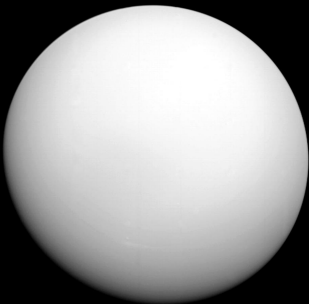
SEMI-MAJOR a	9.537 AU
ECCENTRICITY e	0.0565
INCLINATION i	2.49°
PERIOD T	29.45 Y

DIAMETER · EARTH = 1.00
9.45 × E



SOURCE — NASA/JPL SSD

+



AXIAL TILT 97.8° — IT ORBITS ON ITS SIDE

URANUS

THE TILTED WORLD · 天王星

VGR-2 · 24 JAN 1986 · Δ 81,500 KM

天王星

19.2 AU	50,724 KM	84 Y	28
FROM SUN	DIAMETER	PERIOD	SATELLITES

+

TIPPED OVER

Axial tilt 97.8° — it rolls along its orbit, on its side.

DEEP FREEZE

−224 °C — the coldest planetary atmosphere measured.

42-YEAR NIGHTS

Each pole passes through a night lasting a generation.

NAMED FOR POETRY

Its 28 moons carry names from Shakespeare and Pope.

MISSION LOG — SELECTED

1781	W. HERSCHEL — DISCOVERED FROM BATH, ENGLAND · 13 MAR 1781
1986	VOYAGER 2 — THE ONLY SPACECRAFT VISIT · 24 JAN 1986
2023	JWST — INFRARED VIEW RESOLVES FINE RING STRUCTURE



DETAIL 07-B — LIMB GRADIENT,
VOYAGER 2

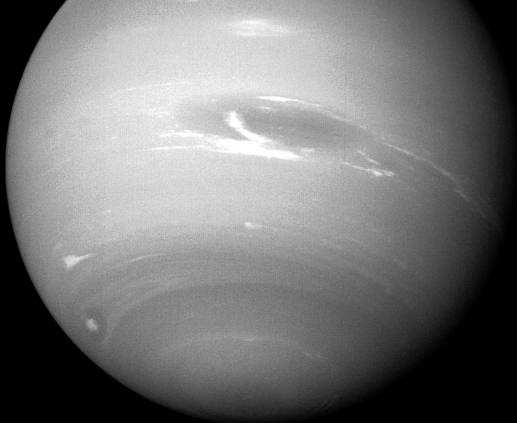
MEAN ELEMENTS — J2000

SEMI-MAJOR a	19.191 AU
ECCENTRICITY e	0.0472
INCLINATION i	0.77°
PERIOD T	84.02 Y

DIAMETER · EARTH = 1.00
4.01 × E



SOURCE — NASA/JPL SSD



+

VGR-2 · 25 AUG 1989 · Δ 4,951 KM

WINDS 2,100 KM/H — SUPERSONIC

+

NEPTUNE

THE LAST WORLD · 海王星

海王星

30.1 AU	49,244 KM	165 Y	16
FROM SUN	DIAMETER	PERIOD	SATELLITES

SUPERSONIC WINDS

Winds to 2,100 km/h — the fastest weather found anywhere.

FOUND ON PAPER

Predicted by Le Verrier; found within 1° of his point.

TRITON

A captured Kuiper Belt world, orbiting backwards.

THE EDGE

4.1 light-hours out. One orbit takes 165 years.

MISSION LOG — SELECTED

1846	LE VERRIER + GALLE — FOUND BY PREDICTION · 23 SEPT 1846
1989	VOYAGER 2 — THE ONLY VISIT · GREAT DARK SPOT RECORDED
2022	JWST — SHARP RING ARCS AND TRITON IN NEAR-INFRARED



DETAIL 08-B — CLOUD ARCS,
VOYAGER 2

MEAN ELEMENTS — J2000

SEMI-MAJOR a	30.069 AU
ECCENTRICITY e	0.0086
INCLINATION i	1.77°
PERIOD T	164.8 Y

DIAMETER · EARTH = 1.00

3.88 × E



SOURCE — NASA/JPL SSD

LOOK AGAIN AT THAT DOT.

That's here. That's home. That's us. On it everyone you love, everyone you know, every human being who ever was, lived out their lives.

“...a mote of dust suspended in a sunbeam.”

— CARL SAGAN · PALE BLUE DOT, 1994

6.05 × 10⁹ KM

RANGE AT EXPOSURE

40.5 AU

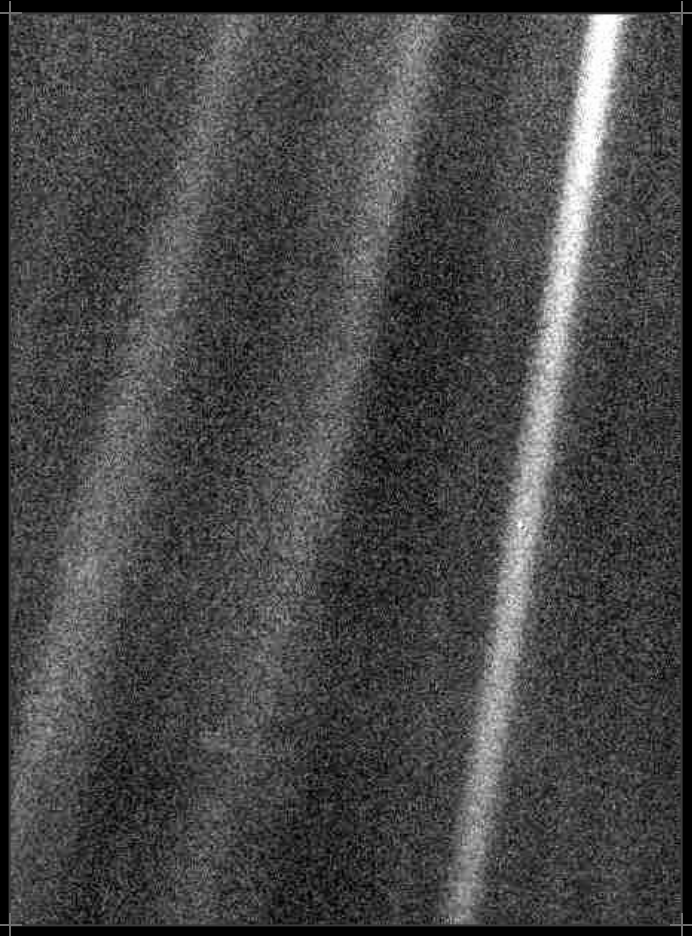
FROM THE SUN

0.12 PX

EARTH'S WIDTH IN
FRAME

161

FRAMES IN THE
MOSAIC



PIA-00452 — EARTH HALF A PIXEL WIDE,
INSIDE A BAND OF SCATTERED SUNLIGHT

A MOTE OF DUST SUSPENDED IN A SUNBEAM.

EARTH OCCUPIES 0.12 OF ONE PIXEL IN VOYAGER 1'S LAST FRAME — LESS THAN A MILLIONTH OF THE PICTURE. EVERYTHING IN THIS SURVEY FITS INSIDE IT.

VOYAGER 1 — ALREADY BEYOND THIS LINE · ~168 AU

