

✧ astraread

THE ARRIVAL / EDITION 000142

Your First Sky

a portrait of the night you arrived

Calculated from your date, time and place, with seven real images from
NASA and Hubble archives.

PREPARED FOR

Sofia Bennett

24 DECEMBER 1998 / 21:15 / LONDON

FROM MUM & DAD

For Sofia — a small record of how vast the world already was when you arrived.

This book begins with one real instant. The charts are calculated; the archive images are genuine; the reason for keeping them is entirely personal.

A NOTE KEPT WITH THIS EDITION

With all our love — Mum & Dad

Written by the giver and preserved inside the report.

01

THE EXACT INSTANT

Where the story begins

One point in time fixes the local horizon: which stars were overhead, where the Moon was setting and which planets had risen over London.

LOCAL DATE

24 December 1998

LOCAL TIME

21:15

BIRTHPLACE

London, United Kingdom

COORDINATES

51.5074° N / 0.1278° W

TIME ZONE

Europe/London / UTC+0

CALCULATED INSTANT

24 Dec 1998 / 21:15 UTC

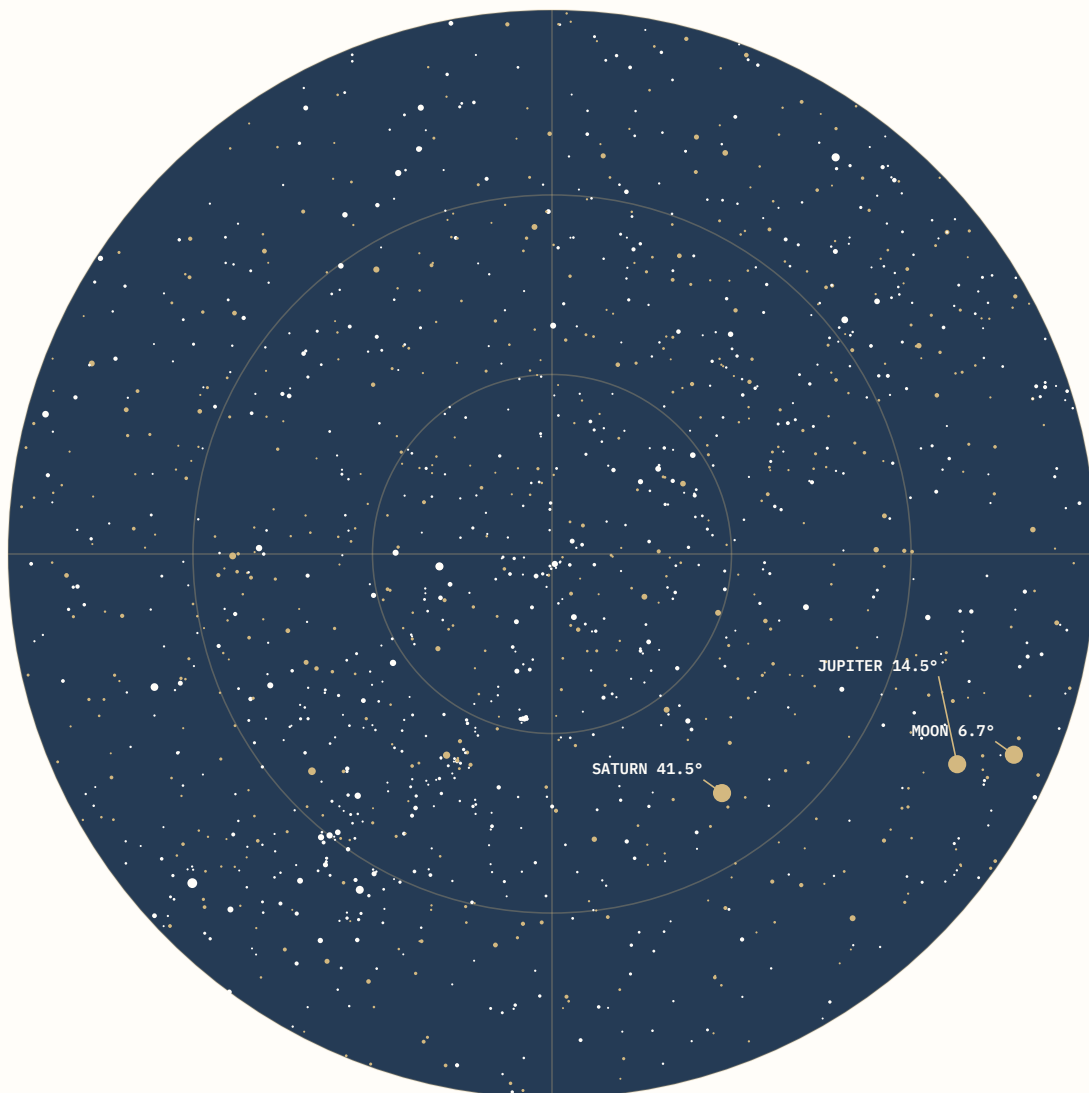
THE FIRST COORDINATE

This is the anchor for every chart and number that follows.

02

CALCULATED LOCAL SKY

The sky above London



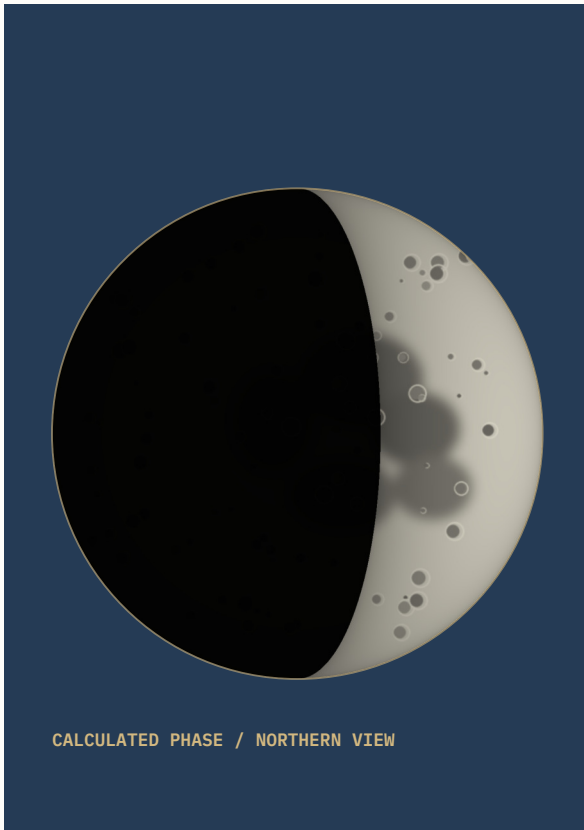
UPWARD VIEW / EAST LEFT / WEST RIGHT

The Moon sat 6.7° above the south-western horizon. Jupiter was nearby; Saturn stood higher in the south-west. The rim is the horizon and the centre is directly overhead.

03

LUNAR PORTRAIT

The Moon you arrived under



Waxing Crescent

A young crescent was moving towards first quarter. At 21:15 it was already low in the west, with moonset less than an hour away.

33.2%

SUNLIT

5.8 days

AGE IN THE LUNAR CYCLE

378,829 km

FROM EARTH

22:07

MOONSET IN LONDON

COMPARED WITH THE AVERAGE

Its distance was about 5,571 km closer than the long-term average of 384,400 km.

04

SUN AND SEASON

A midwinter arrival

7 h 50 min

DAYLIGHT IN LONDON

SUNRISE



08:05

SUNSET



15:55

Sofia arrived after nightfall, two days after the December solstice. The Sun was 47.4° below the horizon and Earth was approaching perihelion, the closest point of its yearly orbit to the Sun.

147.1
million km

EARTH-SUN

05

THE WHOLE SCENE

Where everything stood

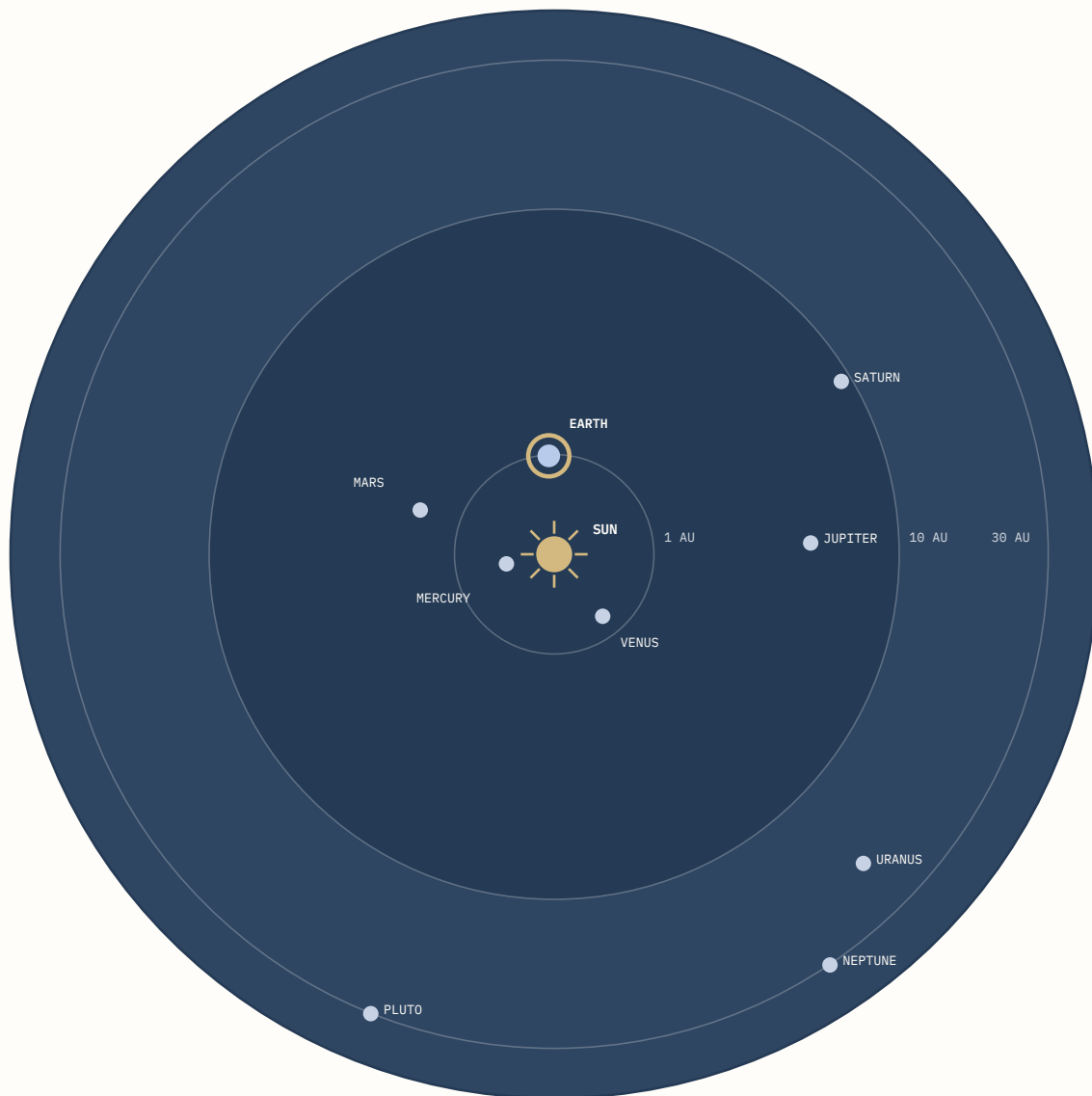
OBJECT	ECLIPTIC POSITION	ALTITUDE	AZIMUTH	HORIZON
Sun	2.9° Capricorn	-47.4°	295.8° NW	BELOW
Moon	13.1° Pisces	+6.7°	246.5° SW	ABOVE
Mercury	11.8° Sagittarius	-55.6°	327.6° NW	BELOW
Venus	16.5° Capricorn	-38.7°	281.2° W	BELOW
Mars	14.8° Libra	-32.9°	46.5° NE	BELOW
Jupiter	21.0° Pisces	+14.5°	242.6° SW	ABOVE
Saturn	26.8° Aries	+41.5°	215.4° SW	ABOVE
Uranus	10.6° Aquarius	-18.9°	264.9° W	BELOW
Neptune	0.8° Aquarius	-26.5°	271.8° W	BELOW
Pluto	8.9° Sagittarius	-46.4°	335.1° NW	BELOW

Ecliptic sectors are astronomical sky coordinates. Page 16 shows how the twelve-sector circle is constructed.

06

HELIOCENTRIC VIEW

Your solar-system moment



LOGARITHMIC DISTANCE SCALE / AU = EARTH-SUN DISTANCE

The Sun is the gold centre. Earth has a gold orbit ring around its pale-blue marker. Positions preserve direction and distance; planet sizes are not to scale.

07

A MEASURED NIGHT

Details of this particular night

147.1 million km

EARTH-SUN DISTANCE

5,571 km

MOON CLOSER THAN AVERAGE

3

MOON + PLANETS ABOVE

-47.4°

SUN BELOW HORIZON

BRIGHT NAMED STARS AT LEAST 15° HIGH

Capella	ALT 71.3° / E / MAG 0.08
Rigel	ALT 26.0° / SE / MAG 0.18
Procyon	ALT 20.6° / E / MAG 0.40
Betelgeuse	ALT 36.4° / SE / MAG 0.45
Aldebaran	ALT 52.4° / SE / MAG 0.87
Pollux	ALT 37.2° / E / MAG 1.16

LOW ABOVE THE HORIZON

Sirius 9°, Vega 9°

HUBBLE / 24 DECEMBER

Five windows *on one date*

Hubble's birthday archive links this calendar day to five observations made in different years. They are not images from 1998; they are five authentic views attached to 24 December.

FEATURED VIEW

Dwarf Galaxy NGC 4214 / observed 2009

08

FEATURED HUBBLE VIEW

Dwarf Galaxy NGC 4214



WFC3/UVIS / OBSERVATIONS 22–25 DEC 2009

A compact galaxy alive with young stars, glowing hydrogen and cavities cleared by stellar winds. The frame spans roughly 3,700 light-years.

10 million ly

DISTANCE

3,700 ly

IMAGE WIDTH

3.6 hours

EXPOSURE

Canes Venatici

CONSTELLATION

Credit: NASA, ESA, and the Hubble Heritage (STScI/AURA)–ESA/Hubble Collaboration; acknowledgement: R. O’Connell and the WFC3 Scientific Oversight Committee.

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FOUR MORE OBSERVATIONS

From nearby stars to deep time

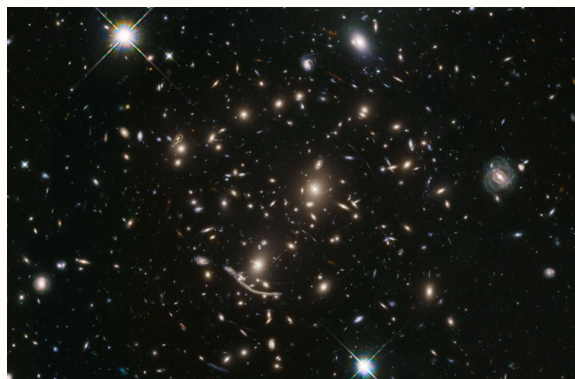


Andromeda Galaxy

OBSERVED 2010

More than 100 million stars appear in this portion of our galactic neighbour.

Credit: NASA, ESA, J. Dalcanton, B. F. Williams, L. C. Johnson, PHAT team, R. Gendler

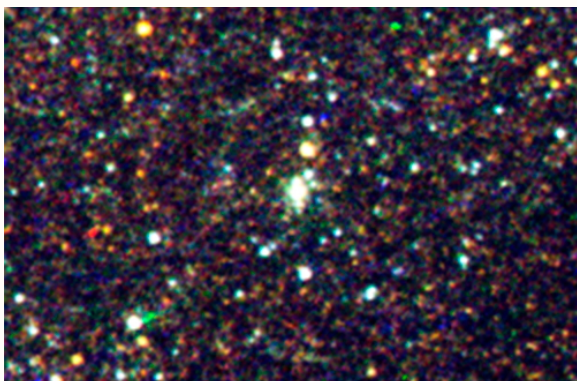


Galaxy Cluster Abell 370

OBSERVED 2015

Blue arcs reveal galaxies whose light has been bent and magnified by gravity.

Credit: NASA, ESA, A. Koekemoer, M. Jauzac, C. Steinhardt, BUFFALO team

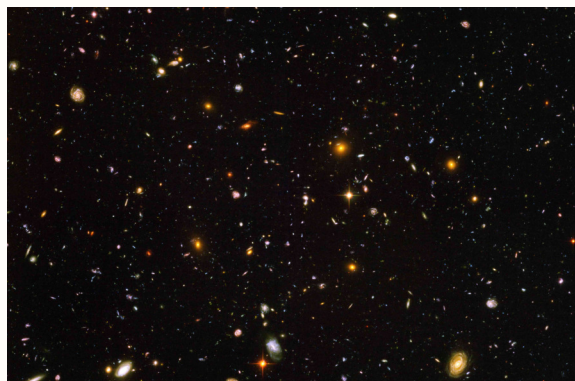


Supernova 1993J

OBSERVED 2011

The fading explosion exposed the hot companion star that survived beside it.

Credit: NASA, ESA, G. Bacon (STScI); science: O. Fox (UC Berkeley)



Hubble Ultra Deep Field

OBSERVED 2003

Nearly 10,000 galaxies fill a narrow view reaching across billions of light-years.

Credit: NASA, ESA, S. Beckwith (STScI) and the HUDF Team

10

FIVE VIEWS, FIVE STORIES

What the images reveal

01

STAR BIRTH

NGC 4214

New stars sculpt the gas that formed them.

02

A GALACTIC NEIGHBOUR

Andromeda

A mosaic resolves more than 100 million stars.

03

GRAVITY AS A LENS

Abell 370

Mass bends light into blue arcs.

04

STELLAR AFTERMATH

Supernova 1993J

A surviving companion emerged from the glare.

05

DEEP TIME

Ultra Deep Field

Nearly 10,000 galaxies occupy one narrow view.

A DATE AT FIVE SCALES

Five images. Five scales. One date that now carries a private meaning of its own.

11

PUBLISHED ON YOUR DATE

Mars Climate Orbiter Launches



LAUNCH FRAME 1



LAUNCH FRAME 2

ASTRONOMY PICTURE OF THE DAY / 24 DECEMBER 1998

On Sofia's birth date, Astronomy Picture of the Day featured two launch-camera views from the Mars Climate Orbiter mission. The photographs were taken on 11 December and published by APOD on 24 December.

THE PRECISE CONNECTION

These are the real images published on the date — not photographs taken at the birth moment.

Images: NASA / Astronomy Picture of the Day.

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WHAT HAPPENED NEXT

A mission and a lesson

11

December 1998

LAUNCH FROM CAPE CANAVERAL

Mars Climate Orbiter set out to study the Martian atmosphere and relay communications. Contact was lost on 23 September 1999. Investigators traced the navigation failure to a mismatch between imperial and metric units; the spacecraft entered the atmosphere too low and was destroyed.

Why this story stays

An archive image can hold more than a beautiful launch. It also preserves ambition, precision and the human consequences of a small mismatch.

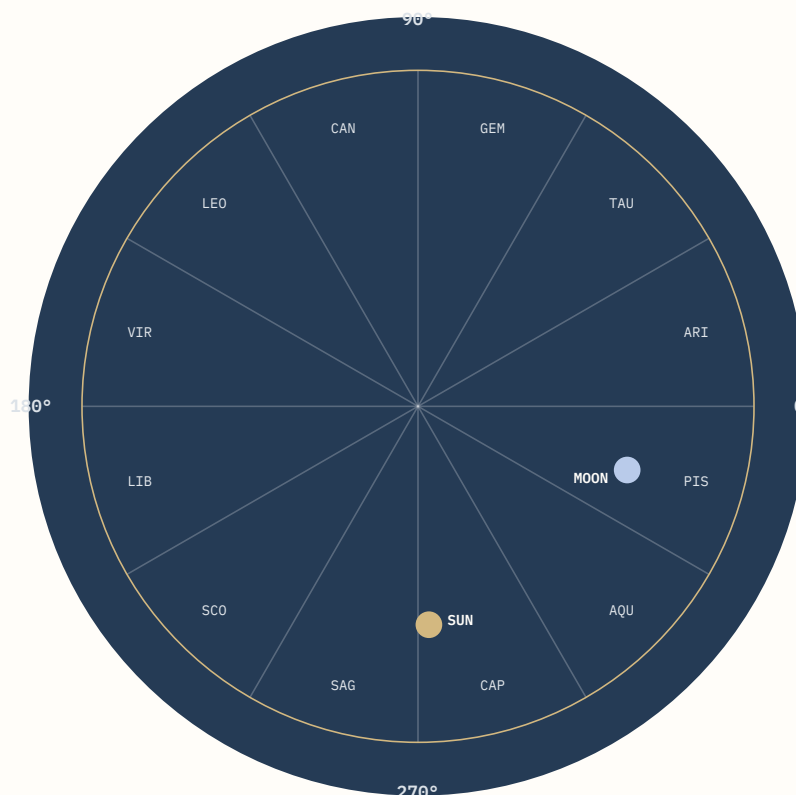
MISSION RECORD

Launch: 11 Dec 1998 / last contact: 23 Sep 1999 / destination: Mars

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HISTORY AND MEANING

Two ways to read one sky



ECLIPTIC NORTH VIEW / LONGITUDE INCREASES COUNTERCLOCKWISE

MEASURED

Astronomy locates light and motion using time, place and geometry.

INHERITED LANGUAGE

Sun 2.9° Capricorn / Moon 13.1° Pisces.

Sector names preserve a historic coordinate language; they are not evidence of personality, fate or health.

14

MOTION AND SCALE

Your journey around the Sun

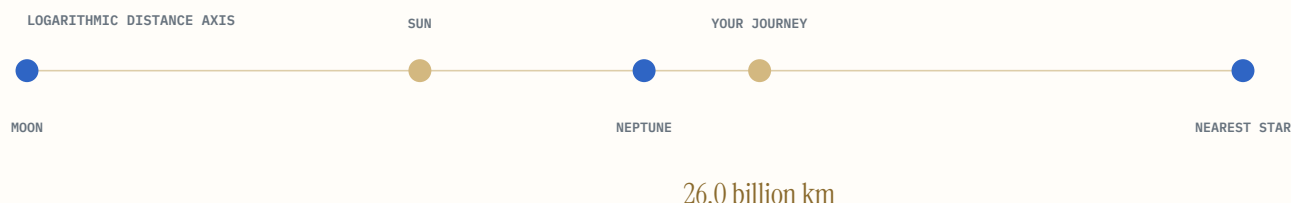
27.67

EARTH ORBITS ELAPSED / AS OF 24 AUG 2026

about 26.0 billion km travelled with Earth

A speed-based measure of motion along Earth's orbit — not straight-line displacement.

Put that distance on a cosmic scale



Still about one fifteen-hundredth of the way to the nearest star.

One light-year is the distance light travels in one year: about 9.46 trillion kilometres.

15

TRANSPARENT BY DESIGN

How your sky was calculated

01

ONE INSTANT

Local date and time were interpreted in Europe/London, then converted to the exact UTC instant.

02

ONE OBSERVER

Latitude, longitude and elevation fixed Sofia's horizon and the altitude and direction of each object.

03

REAL CELESTIAL POSITIONS

Sun, Moon and planetary coordinates were calculated for that instant. The sky chart is data-driven.

04

CATALOGUED STARS

Catalogue stars were projected above the local horizon; named stars are grouped by altitude.

05

ARCHIVE IMAGES

Hubble images are connected by calendar day. APOD images are connected by full publication date. Capture dates remain explicit.

Every chart can be traced back to the stated time, place and source.

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SOURCES

Credits for this edition

ASTRONOMY

Astronomy Engine 2.1.19. Calculations use the stated observer coordinates and UTC instant.

STAR MAP

HYG Database v4.1, licensed CC BY-SA 4.0. The map is an AstraRead projection of catalogue data.

NGC 4214

NASA, ESA, and the Hubble Heritage (STScI/AURA)–ESA/Hubble Collaboration; R. O’Connell and WFC3 Scientific Oversight Committee.

ANDROMEDA

NASA, ESA, J. Dalcanton, B. F. Williams, L. C. Johnson, PHAT team, R. Gendler.

ABELL 370

NASA, ESA, A. Koekemoer, M. Jauzac, C. Steinhardt, BUFFALO team.

SUPERNOVA 1993J

NASA, ESA, G. Bacon (STScI); science: O. Fox (UC Berkeley).

ULTRA DEEP FIELD

NASA, ESA, S. Beckwith (STScI) and the HUDF Team.

APOD

NASA / Astronomy Picture of the Day, 24 December 1998. The launch photographs were captured 11 December 1998.

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The sky moved on. *This moment stayed.*

A calculated record of one arrival, made to be opened again on birthdays, Christmas mornings and the ordinary days that become important later.

Sofia Bennett

EDITION 000142



CREATE YOUR OWN REPORT

Background: Hubble Ultra Deep Field / NASA, ESA, S. Beckwith (STScI) and the HUDF Team.