

Object information file

COLLABORATORS

	<i>TITLE :</i> Object information file		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
WRITTEN BY		July 26, 2024	

REVISION HISTORY

NUMBER	DATE	DESCRIPTION	NAME

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Chapter 1

Object information file

1.1 Index of Additional Information

Our Solar System

=====

"The Digital Universe" provides detailed information on the Sun, the 9 planets, and all 61 known moons in our solar system. As well, you can read information about asteroids, comets, meteors, and the interplanetary medium (the space between the planets).

The Sun

Planets and their satellites

Asteroids

Comets

Meteors

Interplanetary medium

Hypothetical objects (things which were once thought to exist)

Earth-orbiting satellites

Spacecraft

Elsewhere

=====

Detailed information is available for all of the Messier objects, some NGC and IC objects, and several significant stars.

Deep Sky Objects (Messier, NGC, IC objects)

Stars

1.2 Planets and their satellites

Planets and their satellites

=====

Mercury

Venus

Earth

The Moon

Mars

Phobos

Deimos

Jupiter

Ganymede	Amalthea	Pasiphae	Sinope
Callisto	Himalia	Metis	Ananke
Io	Thebe	Carme	Adrastea
Europa	Elara	Lysithea	Leda

Saturn

Titan	Hyperion	Pandora	1995 S1
Rhea	Mimas	Atlas	1995 S2
Iapetus	Phoebe	Helene	1995 S3
Dione	Janus	Telesto	1995 S4
Tethys	Epimetheus	Calypso	
Enceladus	Prometheus	Pan	

Uranus

Cordelia	Cressida	Portia	Puck	Umbriel
Ophelia	Desdemona	Rosalind	Miranda	Titania
Bianca	Juliet	Belinda	Ariel	Oberon

Neptune

Proteus	Despina	Thalassa	Triton
Larissa	Galatea	Naiad	Nereid

Pluto

Charon

1.3 Deep Sky Objects

Deep Sky Objects (Galaxies, Nebulae, and Clusters)

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=====
M1    (NGC 1952) - The Crab Nebula
M2    (NGC 7089)
M3    (NGC 5272)
M4    (NGC 6121)
M5    (NGC 5904)
M6    (NGC 6405) - The Butterfly Cluster
M7    (NGC 6475)
M8    (NGC 6523) - The Lagoon Nebula
M9    (NGC 6333)
M10   (NGC 6254)
M11   (NGC 6705) - The Wild Duck Cluster
M12   (NGC 6218)
M13   (NGC 6205) - The Keystone Cluster
M14   (NGC 6402)
M15   (NGC 7078)
M16   (NGC 6611) - The Eagle Nebula
M17   (NGC 6618) - The Swan, Omega, or Horseshoe Nebula
M18   (NGC 6613)
M19   (NGC 6273)
M20   (NGC 6514) - The Trifid Nebula
M21   (NGC 6531)
M22   (NGC 6656)
M23   (NGC 6494)
M24   (NGC 6603)
M25   (IC 4725)
M26   (NGC 6694)
M27   (NGC 6853) - The Dumbbell Nebula
M28   (NGC 6626)
M29   (NGC 6913)
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M30	(NGC 7099)	
M31	(NGC 224)	- The Andromeda Galaxy
M32	(NGC 221)	
M33	(NGC 598)	- The Pinwheel Galaxy
M34	(NGC 1039)	
M35	(NGC 2168)	
M36	(NGC 1960)	
M37	(NGC 2099)	
M38	(NGC 1912)	
M39	(NGC 7092)	
M40		- Double star, SAO 28353 & SAO 28355
M41	(NGC 2287)	
M42	(NGC 1976)	- The Great Orion Nebula
M43	(NGC 1982)	
M44	(NGC 2632)	- Praesepe, or the Beehive Cluster
M45		- The Pleiades
M46	(NGC 2437)	
M47	(NGC 2422)	
M48	(NGC 2548)	
M49	(NGC 4472)	
M50	(NGC 2323)	
M51	(NGC 5194)	- The Whirlpool Galaxy
M52	(NGC 7654)	
M53	(NGC 5024)	
M54	(NGC 6715)	
M55	(NGC 6809)	
M56	(NGC 6779)	
M57	(NGC 6720)	- The Ring Nebula
M58	(NGC 4579)	
M59	(NGC 4621)	
M60	(NGC 4649)	
M61	(NGC 4303)	
M62	(NGC 6266)	
M63	(NGC 5055)	- The Sunflower Galaxy
M64	(NGC 4826)	- The Black Eye Galaxy
M65	(NGC 3623)	
M66	(NGC 3627)	
M67	(NGC 2682)	
M68	(NGC 4590)	
M69	(NGC 6637)	
M70	(NGC 6681)	
M71	(NGC 6838)	
M72	(NGC 6981)	
M73	(NGC 6994)	
M74	(NGC 628)	
M75	(NGC 6864)	
M76	(NGC 650)	- The Little Dumbbell, Barbell, or Cork Nebula
M77	(NGC 1068)	
M78	(NGC 2068)	
M79	(NGC 1904)	
M80	(NGC 6093)	
M81	(NGC 3031)	- Bode's Nebula
M82	(NGC 3034)	
M83	(NGC 5236)	
M84	(NGC 4374)	
M85	(NGC 4382)	
M86	(NGC 4406)	

M87	(NGC 4486)	
M88	(NGC 4501)	
M89	(NGC 4552)	
M90	(NGC 4569)	
M91	(NGC 4548)	
M92	(NGC 6341)	
M93	(NGC 2447)	
M94	(NGC 4736)	
M95	(NGC 3351)	
M96	(NGC 3368)	
M97	(NGC 3587)	- The Owl Nebula
M98	(NGC 4192)	
M99	(NGC 4254)	
M100	(NGC 4321)	
M101	(NGC 5457)	
M102	(NGC 5457)	- Messier's Error - duplicate entry of M101
M103	(NGC 581)	
M104	(NGC 4594)	- The Sombrero Galaxy
M105	(NGC 3379)	
M106	(NGC 4258)	
M107	(NGC 6171)	
M108	(NGC 3556)	
M109	(NGC 3992)	
M110	(NGC 205)	
IC 434		- The Horsehead Nebula
IC 5070		- The Pelican Nebula
NGC 206		
NGC 891		
NGC 1432		- The Maia Nebula
NGC 1435		- The Merope Nebula
NGC 1499		- The California Nebula
NGC 1977		
NGC 2237		- The Rosette Nebula
NGC 2264		- The Christmas Tree Cluster, Cone Nebula
NGC 2346		
NGC 2419		
NGC 2440		
NGC 2841		
NGC 3115		
NGC 3372		- The Keyhole, Eta Carinae Nebula
NGC 3628		
NGC 4261		
NGC 4388		
NGC 4394		
NGC 4402		
NGC 4647		
NGC 4945		
NGC 5033		
NGC 5139		- The Omega Centauri Cluster
NGC 5548		
NGC 6164		
NGC 6165		
NGC 6240		
NGC 6543		- The Cat's Eye Nebula
NGC 6814		

NGC 7000 - The North American Nebula
NGC 7252
NGC 7331

1.4 Stars

Stars

=====

Alcyone
Aldebaran
Algol
Altair
Asterope
Atlas
Betelgeuse
Celaeno
Electra
Fomalhaut
Maia
Merope
Pleione
Polaris
Sirius
Sterope II
Taygeta

Alpha Centauri
Beta Pictoris
Epsilon Aurigae
Eta Boötes

SAO 69181
SAO 100458
SAO 226891

1.5 Earth-orbiting satellites

For information on interplanetary spacecraft, [click here](#).

Earth-orbiting satellites

Though there are literally thousands of satellites in orbit around the Earth, descriptions of only a few hundred are provided with "The Digital Universe". Most of the objects presented here are reasonably well-suited for visual or binocular observation.

Alouette 1
Alouette 1 Rocket/Body
Alouette 2 Rocket/Body
AMPTE Rocket/Body
Astro 3
Atmosphere 1

Atmosphere 2
Centaur 2
COBE
Comstar 1 Rocket/Body
Copernicus (OAO 3)
Copernicus (OAO 3) Rocket/Body
Cosmos 382
Cosmos 398
Cosmos 825-832 Rocket/Body
Cosmos 871-878 Rocket/Body
Cosmos 939-946 Rocket/Body
Cosmos 1051-1058 Rocket/Body
Cosmos 1076
Cosmos 1130-1137 Rocket/Body
Cosmos 1151
Cosmos 1171 Rocket/Body
Cosmos 1320-1327 Rocket/Body
Cosmos 1473-1480 Rocket/Body
Cosmos 1500
Cosmos 1522-1529 Rocket/Body
Cosmos 1602
Cosmos 1603
Cosmos 1635-1642 Rocket/Body
Cosmos 1697
Cosmos 1697 Rocket/Body
Cosmos 1745 Rocket/Body
Cosmos 1794-1801 Rocket/Body
Cosmos 1833
Cosmos 1833 Rocket/Body
Cosmos 1844
Cosmos 1844 Rocket/Body
Cosmos 1852-1859 Rocket/Body
Cosmos 1861
Cosmos 1900
Cosmos 1924-1931 Rocket/Body
Cosmos 1934 Rocket/Body
Cosmos 1943
Cosmos 1943 Rocket/Body
Cosmos 1954 Rocket/Body
Cosmos 1980
Cosmos 1980 Rocket/Body
Cosmos 2004
Cosmos 2004 Rocket/Body
Cosmos 2008-2015 Rocket/Body
Cosmos 2016
Cosmos 2016 Rocket/Body
Cosmos 2026
Cosmos 2026 Rocket/Body
Cosmos 2027
Cosmos 2034
Cosmos 2034 Rocket/Body
Cosmos 2037 Rocket/Body
Cosmos 2046
Cosmos 2056
Cosmos 2056 Rocket/Body
Cosmos 2058
Cosmos 2060

Cosmos 2061
Cosmos 2061 Rocket/Body
Cosmos 2064-2071 Rocket/Body
Cosmos 2074
Cosmos 2075 Rocket/Body
Cosmos 2082
Cosmos 2082 Rocket/Body
Cosmos 2084
Cosmos 2084 Rocket/Body
Cosmos 2098 Rocket/Body
Courier 1-B Rocket/Body
CRRES
Delta Star
DMSP 2-3
DMSP 2-4
DMSP 2-5
Echo 2 Rocket/Body
EGP/AJISAI
EGP Rocket/Body
ERBS
Exosat Rocket/Body
Feng Yun 1-A
Feng Yun 1-B
Feng Yun 1-B Rocket/Body
Fltsatcom 4 Rocket/Body
Gamma
Geosat
Goes 3 Rocket/Body
Goes 6 Rocket/Body
GPS 2-4 Rocket/Body
GPS 2-5 Rocket/Body
GPS 2-6 Rocket/Body
GPS 2-10 Rocket/Body
Hubble Space Telescope
Inmarsat 2-1 Rocket/Body
Intelsat 4-1 Rocket/Body
Intelsat 4A-1 Rocket/Body
Intelsat 5-1 Rocket/Body
Intelsat 5-3 Rocket/Body
Intelsat 6-3
Intercosmos 19 Rocket/Body
Intercosmos 24
Intercosmos 24 Rocket/Body
IRAS
IRAS Rocket/Body
JCSAT 2 Rocket/Body
LACE
Lacrosse 1
Lageos
Landsat 1
Landsat 2
Landsat 3
Landsat 4
Landsat 5
Leasat 1 Rocket/Body
Leasat 2 Rocket/Body
Leasat 3 Rocket/Body

Leasat 4 Rocket/Body
Leasat 5 Rocket/Body
MAO 1 Rocket/Body
Meteor 2-12
Meteor 2-13
Meteor 2-16
Meteor 2-16 Rocket/Body
Meteor 2-17
Meteor 2-17 Rocket/Body
Meteor 2-18
Meteor 2-19
Meteor 3-1
Meteor 3-2
Meteor 3-3
Mir Complex
Miranda Rocket/Body
MOS 1-A
MOS 1-B
MOS 1-B Rocket/Body
Nadezhda 1
Nadezhda 2
Nadezhda 2 Rocket/Body
Nimbus 2 Rocket/Body
Nimbus 6 Rocket/Body
Nimbus 7
NOAA 1 Rocket/Body
NOAA 7
NOAA 8
NOAA 9
NOAA 10
NOAA 11
OAO 1
OAO 1 Rocket/Body
OAO 2
OAO 2 Rocket/Body
Okean 1
Okean 2
Orizuru (Debut)
Pageos DA
Pageos H
Pageos Rocket/Body
Palapa 4 Rocket/Body
Palapa 6 Rocket/Body
Pegsat
Polar Bear
RME
Rosat
Rosat Rocket/Body
Sakura Rocket/Body
Satcom 6 Rocket/Body
Seasat
SERT 2
Sirio Rocket/Body
SME
SME Rocket/Body
Solrad 7A/Secor 1 Rocket/Body
Solrad 7B/Secor 3 Rocket/Body

Spot 2
Spot 2 Rocket/Body
Starlette
Timation 1 Rocket/Body
Timation 2 Rocket/Body
Transit 2-A Rocket/Body
Ulysses Rocket/Body
UME 1
UME 1 Rocket/Body
UME 2
UME 2 Rocket/Body
Vanguard 1
Vanguard 1 Rocket/Body
Vanguard 3
Westar 6 Rocket/Body
Yuri Rocket/Body

1.6 The Sun

The Sun

=====

[View picture](#)

[Fast facts](#)
[The Sun's power source](#)
[Structure and Nuclear Processes](#)
[Features visible from Earth](#)
[The solar wind & solar flares](#)
[The Solar Cycle](#)
[Helioseismology](#)
[Observing the Sun safely](#)
[Solar Eclipses](#)
[Exploration](#)
[Nemesis - an unseen companion?](#)
[Pictures](#)

Planets orbiting the Sun:

[Mercury](#)
[Venus](#)
[Earth](#)
[Mars](#)
[Jupiter](#)
[Saturn](#)
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1.7 Mercury

Mercury

=====

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Discovery
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A Strange Orbit
Length of the Day
Physical features
Observing Mercury
Pictures

1.8 Venus

Venus
=====
Fast facts
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Discovery
Exploration
Runaway Greenhouse Effect
Length of the Day
Physical features
Observing Venus
Neith - Venus' mistaken moon
Pictures

1.9 Earth

Earth
=====

Though a program such as this cannot even begin to describe what we currently know about our own planet, the following information is provided as a brief summary to compare the Earth against other objects in the solar system.

Fast facts
Structure of the Earth
Atmosphere
Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
The Moon	384,400	1738

1.10 The Moon

The Moon - Satelllite of The Earth
=====

Fast facts
Exploration
Physical features
The lunar day
Phases of the Moon

Do we have only one moon?
Pictures & Audio clips

1.11 Mars

Mars

=====

Fast facts
Mythology
Discovery
Exploration
Physical features
Is there life on Mars?
Observing Mars
Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
Phobos	9,378	13.5 x 10.8 x 9.4
Deimos	23,459	7.5 x 6.1 x 5.5

1.12 Phobos

Phobos - Satellite of Mars

=====

Fast facts
Brief description

1.13 Deimos

Deimos - Satellite of Mars

=====

Fast facts
Brief description

1.14 Jupiter

Jupiter

=====

Fast facts
Mythology
Discovery
Exploration
Physical features
Jupiter's ring
Observing Jupiter
Collision with comet SL9

Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
Metis	128,000	20
Adrastea	129,000	12.5 x 10 x 7.5
Amalthea	181,000	135 x 83 x 75
Thebe	222,000	55 x 45
Io	422,000	1815
Europa	671,000	1569
Ganymede	1,070,000	2631
Callisto	1,883,000	2400
Leda	11,094,000	8
Himalia	11,480,000	93
Lysithea	11,720,000	18
Elara	11,737,000	38
Ananke	21,200,000	15
Carme	22,600,000	20
Pasiphae	23,500,000	25
Sinope	23,700,000	18

1.15 Ganymede

Ganymede - Satellite of Jupiter

=====

Fast facts

Brief description

1.16 Callisto

Callisto - Satellite of Jupiter

=====

Fast facts

Brief description

1.17 Io

Io - Satellite of Jupiter

=====

Fast facts

Brief description

1.18 Europa

Europa - Satellite of Jupiter

=====

Fast facts

Brief description

1.19 Amalthea

Amalthea - Satellite of Jupiter

=====

Fast facts

Brief description

1.20 Himalia

Himalia - Satellite of Jupiter

=====

Fast facts

Brief description

1.21 Thebe

Thebe - Satellite of Jupiter

=====

Fast facts

Brief description

1.22 Elara

Elara - Satellite of Jupiter

=====

Fast facts

Brief description

1.23 Pasiphae

Pasiphae - Satellite of Jupiter

=====

Fast facts

Brief description

1.24 Metis

Metis - Satellite of Jupiter

=====

Fast facts

Brief description

1.25 Carme

Carme - Satellite of Jupiter

=====

Fast facts

Brief description

1.26 Lysithea

Lysithea - Satellite of Jupiter

=====

Fast facts

Brief description

1.27 Sinope

Sinope - Satellite of Jupiter

=====

Fast facts

Brief description

1.28 Ananke

Ananke - Satellite of Jupiter

=====

Fast facts

Brief description

1.29 Adrastea

Adrastea - Satellite of Jupiter

=====

Fast facts

Brief description

1.30 Leda

Leda - Satellite of Jupiter

=====

Fast facts

Brief description

1.31 Saturn

Saturn

=====

Fast facts

Mythology

Discovery

Exploration

Physical features

Saturn's rings

Observing Saturn

Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
*1980 S35	118,000	5
*1980 S36	118,000	8
Pan	133,583	10
1995 S1	137,450	?
Atlas	137,670	20 x 10
Prometheus	139,353	70 x 50 x 40
1995 S2	139,700	?
1995 S3	141,050	?
Pandora	141,700	55 x 45 x 35
1995 S4	146,450	?
Epimetheus	151,422	70 x 60 x 50
Janus	151,472	110 x 100 x 80
Mimas	185,520	196
*1980 S12	186,000	5
* (unnamed)	210,000	2
Enceladus	238,020	250
Tethys	294,660	530
Telesto	294,660	17 x 14 x 13
Calypso	294,660	17 x 11 x 11
*1981 S10	350,000	6
Dione	377,400	560
Helene	377,400	18 x 16 x 15
*1981 S7	377,400	8
*1981 S9	470,000	8
Rhea	527,040	765
Titan	1,221,830	2575
Hyperion	1,481,100	250 x 130 x 110
Iapetus	3,561,300	730
Phoebe	12,952,000	110

NOTE: The satellites preceded by an asterisk (*) have been reported from single Voyager photographs. As two photographs are required for confirmation, they are likely to remain unnamed until future spacecraft study the Saturnian system.

1.32 1995 S1, 1995 S2, 1995 S3, and 1995 S4

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe

for more information on how to obtain a registered version.

1.33 Pan

Pan - Satellite of Saturn
=====
Fast facts
Brief description

1.34 Atlas

Atlas - Satellite of Saturn
=====
Fast facts
Brief description

1.35 Prometheus

Prometheus - Satellite of Saturn
=====
Fast facts
Brief description

1.36 Pandora

Pandora - Satellite of Saturn
=====
Fast facts
Brief description

1.37 Epimetheus

Epimetheus - Satellite of Saturn
=====
Fast facts
Brief description

1.38 Janus

Janus - Satellite of Saturn
=====
Fast facts
Brief description

1.39 Mimas

Mimas - Satellite of Saturn

=====

Fast facts

Brief description

1.40 Enceladus

Enceladus - Satellite of Saturn

=====

Fast facts

Brief description

1.41 Tethys

Tethys - Satellite of Saturn

=====

Fast facts

Brief description

1.42 Telesto

Telesto - Satellite of Saturn

=====

Fast facts

Brief description

1.43 Calypso

Calypso - Satellite of Saturn

=====

Fast facts

Brief description

1.44 Dione

Dione - Satellite of Saturn

=====

Fast facts

Brief description

1.45 Helene

Helene - Satellite of Saturn

=====

Fast facts

Brief description

1.46 Rhea

Rhea - Satellite of Saturn

=====

Fast facts

Brief description

1.47 Titan

Titan - Satellite of Saturn

=====

Fast facts

Brief description

1.48 Hyperion

Hyperion - Satellite of Saturn

=====

Fast facts

Brief description

1.49 Iapetus

Iapetus - Satellite of Saturn

=====

Fast facts

Brief description

1.50 Phoebe

Phoebe - Satellite of Saturn

=====

Fast facts

Brief description

1.51 Uranus

Uranus (pronounced YUR-uh-nus)

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Fast facts
Mythology
Discovery
Exploration
Physical features
Uranus' rings
Observing Uranus
Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
Cordelia	49,770	13
Ophelia	53,790	15
Bianca	59,170	21
Cressida	61,780	31
Desdemona	62,680	27
Juliet	64,350	42
Portia	66,090	54
Rosalind	69,940	27
Belinda	75,260	33
Puck	86,010	77
Miranda	129,390	240
Ariel	191,020	579
Umbriel	266,300	586
Titania	435,910	790
Oberon	583,520	762

1.52 Cordelia

Cordelia - Satellite of Uranus

=====

Fast facts
Brief description

1.53 Ophelia

Ophelia - Satellite of Uranus

=====

Fast facts
Brief description

1.54 Bianca

Bianca - Satellite of Uranus

=====

Fast facts
Brief description

1.55 Cressida

Cressida - Satellite of Uranus
=====
Fast facts
Brief description

1.56 Desdemona

Desdemona - Satellite of Uranus
=====
Fast facts
Brief description

1.57 Juliet

Juliet - Satellite of Uranus
=====
Fast facts
Brief description

1.58 Portia

Portia - Satellite of Uranus
=====
Fast facts
Brief description

1.59 Rosalind

Rosalind - Satellite of Uranus
=====
Fast facts
Brief description

1.60 Belinda

Belinda - Satellite of Uranus
=====
Fast facts
Brief description

1.61 Puck

Puck - Satellite of Uranus

=====

Fast facts

Brief description

1.62 Miranda

Miranda - Satellite of Uranus

=====

Fast facts

Brief description

1.63 Ariel

Ariel - Satellite of Uranus

=====

Fast facts

Brief description

1.64 Umbriel

Umbriel - Satellite of Uranus

=====

Fast facts

Brief description

1.65 Titania

Titania - Satellite of Uranus

=====

Fast facts

Brief description

1.66 Oberon

Oberon - Satellite of Uranus

=====

Fast facts

Brief description

1.67 Neptune

Neptune

=====

Fast facts

Mythology

Discovery

Exploration

Physical features

Neptune's rings

Furthest planet from the Sun?

Observing Neptune

Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
Proteus	48,200	218 x 208 x 201
Larissa	50,000	104 x 89
Despina	52,600	74
Galatea	62,000	79
Thalassa	73,600	40
Naiad	117,600	29
Triton	354,760	1353
Nereid	5,513,400	170

1.68 Proteus

Proteus - Satellite of Neptune

=====

Fast facts

Brief description

1.69 Larissa

Larissa - Satellite of Neptune

=====

Fast facts

Brief description

1.70 Despina

Despina - Satellite of Neptune

=====

Fast facts

Brief description

1.71 Galatea

Galatea - Satellite of Neptune

=====

Fast facts

Brief description

1.72 Thalassa

Thalassa - Satellite of Neptune

=====

Fast facts

Brief description

1.73 Naiad

Naiad - Satellite of Neptune

=====

Fast facts

Brief description

1.74 Triton

Triton - Satellite of Neptune

=====

Fast facts

Brief description

1.75 Nereid

Nereid - Satellite of Neptune

=====

Fast facts

Brief description

1.76 Pluto

Pluto

=====

Fast facts

Mythology

Discovery

Exploration

Physical features

Furthest planet from the Sun?
Pluto's strange orbit
Observing Pluto
Pictures

Satellite	Distance (km)	Radius (km)
-----	-----	-----
Charon	19,600	593

1.77 Charon

Charon - Satellite of Pluto
=====

- Fast facts
- Brief description

1.78 M1, NGC 1952, The Crab Nebula

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1.79 M2, NGC 7089

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1.80 M3, NGC 5272

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1.81 M4, NGC 6121

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1.82 M5, NGC 5904

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1.83 M6, NGC 6405, The Butterfly Cluster

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1.84 M7, NGC 6475

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1.85 M8, NGC 6523, The Lagoon Nebula

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1.86 M9, NGC 6333

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1.87 M10, NGC 6254

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1.88 M11, NGC 6705, The Wild Duck Cluster

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1.89 M12, NGC 6218

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1.90 M13, NGC 6205, The Keystone Cluster

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1.91 M14, NGC 6402

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1.92 M15, NGC 7078

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1.93 M16, NGC 6611, The Eagle Nebula

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1.94 M17, NGC 6618, The Swan, Omega, or Horseshoe Nebula

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1.95 M18, NGC 6613

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe for more information on how to obtain a registered version.

1.96 M19, NGC 6273

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe for more information on how to obtain a registered version.

1.97 M20, NGC 6514, The Trifid Nebula

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1.98 M21, NGC 6531

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1.99 M22, NGC 6656

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1.100 M23, NGC 6494

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1.101 M24, NGC 6603

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1.102 M25, IC 4725

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1.103 M26, NGC 6694

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1.104 M27, NGC 6853, The Dumbbell Nebula

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1.105 M28, NGC 6626

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1.106 M29, NGC 6913

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1.107 M30, NGC 7099

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1.108 M31, NGC 224, The Andromeda Galaxy

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1.109 M32, NGC 221

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe for more information on how to obtain a registered version.

1.110 M33, NGC 598, The Pinwheel Galaxy

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1.111 M34, NGC 1039

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1.112 M35, NGC 2168

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1.113 M36, NGC 1960

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1.114 M37, NGC 2099

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1.115 M38, NGC 1912

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1.116 M39, NGC 7092

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1.117 M40, Double star - SAO 28353 & SAO 28355

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1.118 SAO 28355

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1.119 M41, NGC 2287

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe for more information on how to obtain a registered version.

1.120 M42, NGC 1976, The Great Orion Nebula

[View Picture](#)

Discoverer.....Nicholas Peiresc, 1611

Distance.....1700 light years

True diameter.....30 light years

M42, or the Great Orion Nebula, is one of the most spectacular and interesting objects in the sky. Plainly visible even to the naked eye, it may be observed in binoculars as a faint mist near four stars known as "The Trapezium", or Theta 1 Orionis. Small telescopes reveal this mist to be greenish in color. A larger telescope (and particularly, long exposure photography) allows the observer to view detail unmatched by any other deep sky object in the heavens. Best observations are done with low power, wide field eyepieces.

Since the Orion Nebula is so obvious to all but the most casual observers, it is surprising that the first mention of it did not occur until 1611. In 1880, M42 became the first nebula to be photographed, when it was captured by Henry Draper with an 11 inch telescope, and an exposure time of 51 minutes.

The nebula itself consists of an extremely tenuous cloud of gas and dust. It has a density a million times smaller than that of a good laboratory vacuum, yet its massive size contains enough material to form 10,000 stars like the Sun. In fact, stellar formation is occurring within the nebula, as the cloud condenses into "pockets" which eventually become dense and hot enough for nuclear fusion to initiate.

The composition of the Orion nebula is believed to be as follows:

Element	Concentration (atoms per cubic metre)
-----	-----
Hydrogen	880,000,000
Helium	88,000,000
Carbon	530,000
Oxygen	220,000
Nitrogen	180,000
Sulphur	32,000
Neon	8,800
Chlorine	1,800
Argon	1,300

Fluorine 110

The "Trapezium", or the multiple system of four bright stars designated as Theta 1 Orionis is estimated to be only 23,000 years old. This is one of the best indications to prove that the Orion Nebula is indeed a star forming region. In addition, photographs taken in 1947 and 1954 showed changes in the appearance of condensation regions in the nebula. These regions are suspected to be protostars still in the process of accumulating enough matter for fusion to begin.

Studies done with the 27-disk VLA (Very Large Array) radio telescope in New Mexico in 1990 have revealed the existence of bright filaments surrounding the Trapezium. Visual evidence had hinted to such structures, but they are much more obvious with the radio data. Astronomers do not yet know what they are. They may be the edges of gas 'bubbles' inflated by stellar winds. Other possibilities include their being condensations of cooling interstellar gas, or regions where expanding gas bubbles encounter abrupt changes in the density of the interstellar medium.

In 1994, C. Robert O'Dell (Rice University) and Zheng Wen (University of Kentucky) used the Hubble Space Telescope to study stars near the Trapezium to see if they could detect any disks of gas and dust surrounding them (thought to be planetary systems in the making). They were surprised to find that 56 of the 110 stars they surveyed had such disks. Because the stars are so young, the disks have not yet had time to condense into planets, however the data indicates that planetary formation may be a common occurrence in the universe.

More than 50 variable stars have been detected in M42. One of the most interesting is designated as "T Orionis". This irregular variable 5.2 arcminutes south and 9 arcminutes east of the Trapezium stays at a magnitude of about 9.4 for several months. Then, it rapidly and unpredictably fluctuates in brightness, on occasion becoming as dim as magnitude 12.6. Astronomers are not sure what causes these variations.

As a whole, M42 is moving away from us at a rate of about 30 km/sec, although the cloud is quite turbulent, and different portions are receding at different rates. In addition, it is measured to be expanding at the rate of about 10 km/sec in the inner regions and 7 km/sec in the outer.

There is some evidence to suggest the existence of a black hole in the Orion nebula. Strong X-rays from a source designated 2U0525-06 (near Theta 2 Orionis) were detected in 1976.

In 1992, C. Robert O'Dell of Rice University used the Hubble Space Telescope to identify 15 disks of gas and dust surrounding newly formed stars. These disks are believed to contain a mass 15 times greater than that of Jupiter, and it is thought that they may condense into planets in the future. Based on his data, O'Dell believes that up to 40% of the newly formed stars in the Orion nebula may be surrounded by these 'protoplanetary' disks.

1.121 M43, NGC 1982

[View Picture](#)

[View M43 and its relationship to M42](#)

Discoverer.....Nicholas Peiresc, 1611

Distance.....1700 light years
True diameter.....6 light years
M43 is a detached portion of the Great Orion Nebula, located just to the north of it. It is illuminated by its own 8th magnitude star.

For more information, see M42.

1.122 M44, NGC 2632, Praesepe, or the Beehive Cluster

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1.123 M45, The Pleiades

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1.124 M46, NGC 2437

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1.125 M47, NGC 2422

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1.126 M48, NGC 2548

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1.127 M49, NGC 4472

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1.128 M50, NGC 2323

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1.129 M51, NGC 5194, The Whirlpool Galaxy

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1.130 M52, NGC 7654

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1.131 M53, NGC 5024

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1.132 M54, NGC 6715

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1.133 M55, NGC 6809

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1.134 M56, NGC 6779

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1.135 M57, NGC 6720, The Ring Nebula

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1.136 M58, NGC 4579

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1.137 M59, NGC 4621

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1.138 M60, NGC 4649

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1.139 M61, NGC 4303

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1.140 M62, NGC 6266

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1.141 M63, NGC 5055, The Sunflower Galaxy

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1.142 M64, NGC 4826, The Black Eye Galaxy

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1.143 M65, NGC 3623

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1.144 M66, NGC 3627

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1.145 M67, NGC 2682

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1.146 M68, NGC 4590

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1.147 M69, NGC 6637

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1.148 M70, NGC 6681

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1.149 M71, NGC 6838

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1.150 M72, NGC 6981

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1.151 M73, NGC 6994

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1.152 M74, NGC 628

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1.153 M75, NGC 6864

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1.154 M76, NGC 650, The Little Dumbbell, Barbell, or Cork Nebula

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1.155 M77, NGC 1068, 3C71

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1.156 M78, NGC 2068

View Picture

Discoverer.....P. Mechain, 1780
Distance.....1,600 light years
True diameter.....3 light years

M78 is a diffuse nebula, visible in small telescopes as a faint patch of light. It is one of the brighter portions of a huge nebula covering much of the constellation of Orion. Very little detail can be seen, even with larger instruments.

Two stars of 10th magnitude and spectral type B are found within the nebula.

1.157 M79, NGC 1904

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1.158 M80, NGC 6093

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1.159 M81, NGC 3031, Bode's Nebula

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1.160 M82, NGC 3034

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1.161 M83, NGC 5236

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1.162 M84, NGC 4374

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1.163 M85, NGC 4382

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1.164 M86, NGC 4406

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1.165 M87, NGC 4486, 3C274

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1.166 M88, NGC 4501

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1.167 M89, NGC 4552

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1.168 M90, NGC 4569

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1.169 M91, NGC 4548

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1.170 M92, NGC 6341

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1.171 M93, NGC 2447

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1.172 M94, NGC 4736

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1.173 M95, NGC 3351

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1.174 M96, NGC 3368

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1.175 M97, NGC 3587, The Owl Nebula

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1.176 M98, NGC 4192

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1.177 M99, NGC 4254

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1.178 M100, NGC 4321

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1.179 M101, M102, NGC 5457

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1.180 M103, NGC 581

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1.181 M104, NGC 4594, The Sombrero Galaxy

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1.182 M105, NGC 3379

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1.183 M106, NGC 4258

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1.184 M107, NGC 6171

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1.185 M108, NGC 3556

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1.186 M109, NGC 3992

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1.187 M110, NGC 205

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1.188 IC 434 - Background illumination for the Horsehead Nebula

View Picture

Discoverer.....E. Pickering, 1889

Distance.....1,500 light years

True diameter.....26 light years

The Horsehead Nebula is probably one of the most famous nebulae in the sky. This fame is brought about by its spectacular appearance in long exposure photographs of the region. Unfortunately, a very large telescope is required to see the nebula if photography is not used.

The appearance of the Horsehead is made possible by two separately designated nebulae. IC 434 is a bright nebula (appearing red in the picture) providing

background illumination to silhouette B33, the dark Horsehead itself.

IC 434 is believed to be illuminated by the nearby star Zeta Orionis. It is suspected that new stars are currently being formed in the nebula.

1.189 IC 5070 - The Pelican Nebula

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1.190 NGC 206

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1.191 NGC 891

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1.192 NGC 1432, The Maia Nebula

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1.193 NGC 1435, The Merope Nebula

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1.194 NGC 1499, The California Nebula

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1.195 NGC 1977

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1.196 NGC 2237 - The Rosette Nebula

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1.197 NGC 2264, Cone Nebula, Christmas Tree Cluster

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1.198 NGC 2346

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1.199 NGC 2419

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1.200 NGC 2440

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1.201 NGC 2841

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1.202 NGC 3115, Spindle Nebula

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1.203 NGC 3372, The Keyhole Nebula, Eta Carinae Nebula

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1.204 NGC 3628

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1.205 NGC 4261

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1.206 NGC 4388

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1.207 NGC 4394

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1.208 NGC 4402

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1.209 NGC 4647

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1.210 NGC 4945

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1.211 NGC 5033

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1.212 NGC 5139, The Omega Centauri Cluster

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1.213 NGC 5548

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1.214 NGC 6164, NGC 6165 & SAO 226891

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1.215 NGC 6165

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1.216 NGC 6240

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1.217 NGC 6543, The Cat's Eye Nebula

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1.218 NGC 6814

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1.219 NGC 7000, The North American Nebula

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1.220 NGC 7252

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1.221 NGC 7331

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1.222 Alcyone

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1.223 Aldebaran

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1.224 Algol, Beta Persei

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1.225 Altair

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1.226 Asterope, Sterope I

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1.227 Atlas

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1.228 Betelgeuse

Betelgeuse (pronounced BAY-tel-jooz) is a bright red giant star in the constellation of Orion. Its name is believed to have come from the Arabic 'Beit Algueze', meaning the "Armpit of the Giant".

This star is an irregular variable, with a period roughly 5.7 years long. The star has been measured at magnitudes between 0.4 and 1.2 in recent history, but the brightness variations are quite irregular. Spectroscopic studies show that during periods of maximum brightness, the diameter of the star may actually increase to a size 60% larger than its size when faint. The star is so large that if it were to replace our Sun, it will engulf Mercury, Venus, Earth, and Mars. During periods of its maximum size, Jupiter would be in jeopardy as well.

Betelgeuse is believed to be located about 520 light years away. To shine as brightly in our skies as it does, astronomers infer that it must be 10,000 times more powerful than our Sun.

1.229 Celaeno

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1.230 Electra

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1.231 Fomalhaut

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1.232 Maia

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1.233 Merope

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1.234 Pleione

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1.235 Polaris - the North Star

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1.236 Sirius

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1.237 Sterope II

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1.238 Taygeta

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1.239 Alpha Centauri

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1.240 Alpha Centauri 2

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1.241 Beta Pictoris

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1.242 Epsilon Aurigae

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1.243 Eta Boötes

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1.244 SAO 69181

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1.245 SAO 100458

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1.246 SAO 226891

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1.247 Comet Halley

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1.248 951 Gaspra

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1.249 243 Ida

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1.250 Vanguard 1

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1.251 Vanguard 1 Rocket/Body

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1.252 Vanguard 3

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1.253 Transit 2-A Rocket/Body

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1.254 Courier 1-B Rocket/Body

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1.255 Alouette 1

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1.256 Alouette 1 Rocket/Body

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1.257 Centaur 2

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1.258 Solrad 7A/Secor 1 Rocket/Body

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1.259 Echo 2 Rocket/Body

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1.260 Solrad 7B/Secor 3 Rocket/Body

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1.261 Alouette 2 Rocket/Body

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1.262 OAO 1

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1.263 OAO 1 Rocket/Body

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1.264 Nimbus 2 Rocket/Body

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1.265 Pageos Rocket/Body

This information is not provided with the demonstration version of "The Digital Universe". Please consult Ordering The Digital Universe for more information on how to obtain a registered version.

1.266 Timation 1 Rocket/Body

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1.267 OAO 2

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1.268 OAO 2 Rocket/Body

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1.269 Timation 2 Rocket/Body

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1.270 SERT 2

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1.271 MAO 1 Rocket/Body

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1.272 Cosmos 382

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1.273 NOAA 1 Rocket/Body

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1.274 Cosmos 398

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1.275 Pageos DA

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1.276 Landsat 1

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1.277 Copernicus (OAO 3)

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1.278 Copernicus (OAO 3) Rocket/Body

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1.279 Miranda Rocket/Body

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1.280 Landsat 2

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1.281 Intelsat 4-1 Rocket/Body

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1.282 Starlette

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1.283 Nimbus 6 Rocket/Body

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1.284 Pageos H

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1.285 Intelsat 4A-1 Rocket/Body

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1.286 UME 1

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1.287 UME 1 Rocket/Body

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1.288 Lageos

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1.289 Comstar 1 Rocket/Body

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1.290 Cosmos 825-832 Rocket/Body

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1.291 Cosmos 871-878 Rocket/Body

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1.292 Cosmos 939-946 Rocket/Body

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1.293 Sirio Rocket/Body

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1.294 Sakura Rocket/Body

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1.295 UME 2

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1.296 UME 2 Rocket/Body

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1.297 Landsat 3

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1.298 Yuri Rocket/Body

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1.299 Goes 3 Rocket/Body

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1.300 Seasat

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1.301 Nimbus 7

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1.302 Cosmos 1051-1058 Rocket/Body

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1.303 Cosmos 1076

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1.304 Intercosmos 19 Rocket/Body

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1.305 Cosmos 1130-1137 Rocket/Body

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1.306 Cosmos 1151

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1.307 Cosmos 1171 Rocket/Body

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1.308 Fltsatcom 4 Rocket/Body

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1.309 Intelsat 5-1 Rocket/Body

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1.310 NOAA 7

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1.311 SME

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1.312 SME Rocket/Body

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1.313 Cosmos 1320-1327 Rocket/Body

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1.314 Intelsat 5-3 Rocket/Body

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1.315 NOAA 8

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1.316 Landsat 4

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1.317 IRAS

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1.318 IRAS Rocket/Body

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1.319 Satcom 6 Rocket/Body

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1.320 Goes 6 Rocket/Body

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1.321 Exosat Rocket/Body

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1.322 Cosmos 1473-1480 Rocket/Body

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1.323 Cosmos 1500

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1.324 Cosmos 1522-1529 Rocket/Body

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1.325 Palapa 4 Rocket/Body & Westar 6 Rocket/Body

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1.326 Westar 6 Rocket/Body

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1.327 Landsat 5

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1.328 AMPTE Rocket/Body

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1.329 Leasat 2 Rocket/Body

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1.330 Cosmos 1602

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1.331 Cosmos 1603

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1.332 ERBS

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1.333 Leasat 1 Rocket/Body

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1.334 NOAA 9

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1.335 Meteor 2-12

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1.336 Geosat

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1.337 Cosmos 1635-1642 Rocket/Body

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1.338 Leasat 4 Rocket/Body

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1.339 Cosmos 1697

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1.340 Cosmos 1697 Rocket/Body

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1.341 Meteor 3-1

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1.342 Leasat 3 Rocket/Body

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1.343 Meteor 2-13

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1.344 Mir Complex

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1.345 Cosmos 1745 Rocket/Body

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1.346 EGP/AJISAI

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1.347 EGP Rocket/Body

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1.348 NOAA 10

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1.349 Polar Bear

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1.350 Cosmos 1794-1801 Rocket/Body

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1.351 Astro 3

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1.352 MOS 1-A

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1.353 Cosmos 1833

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1.354 Cosmos 1833 Rocket/Body

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1.355 Cosmos 1844

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1.356 Cosmos 1844 Rocket/Body

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1.357 Cosmos 1852-1859 Rocket/Body

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1.358 DMSP 2-3

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1.359 Cosmos 1861

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1.360 Meteor 2-16

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1.361 Meteor 2-16 Rocket/Body

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1.362 Cosmos 1900

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1.363 Meteor 2-17

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1.364 Meteor 2-17 Rocket/Body

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1.365 DMSP 2-4

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1.366 Cosmos 1924-1931 Rocket/Body

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1.367 Cosmos 1934 Rocket/Body

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1.368 Cosmos 1943

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1.369 Cosmos 1943 Rocket/Body

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1.370 Cosmos 1954 Rocket/Body

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1.371 Okean 1

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1.372 Meteor 3-2

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1.373 Feng Yun 1-A

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1.374 NOAA 11

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1.375 Cosmos 1980

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1.376 Cosmos 1980 Rocket/Body

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1.377 Lacrosse 1

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1.378 Cosmos 2004

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1.379 Cosmos 2004 Rocket/Body

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1.380 Meteor 2-18

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1.381 Cosmos 2008-2015 Rocket/Body

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1.382 Delta Star

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1.383 Cosmos 2016

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1.384 Cosmos 2016 Rocket/Body

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1.385 Cosmos 2026

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1.386 Cosmos 2026 Rocket/Body

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1.387 Cosmos 2027

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1.388 Nadezhda 1

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1.389 Cosmos 2034

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1.390 Cosmos 2034 Rocket/Body

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1.391 Cosmos 2037 Rocket/Body

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1.392 Cosmos 2046

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1.393 Intercosmos 24

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1.394 Intercosmos 24 Rocket/Body

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1.395 GPS 2-4 Rocket/Body

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1.396 Meteor 3-3

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1.397 COBE

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1.398 GPS 2-5 Rocket/Body

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1.399 JCSAT 2 Rocket/Body

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1.400 Leasat 5 Rocket/Body

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1.401 Cosmos 2056

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1.402 Cosmos 2056 Rocket/Body

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1.403 Spot 2

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1.404 Spot 2 Rocket/Body

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1.405 GPS 2-6 Rocket/Body

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1.406 Cosmos 2058

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1.407 MOS 1-B

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1.408 Orizuru (Debut)

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1.409 MOS 1-B Rocket/Body

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1.410 LACE

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1.411 RME

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1.412 Nadezhda 2

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1.413 Nadezhda 2 Rocket/Body

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1.414 Okean 2

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1.415 Intelsat 6-3

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1.416 Cosmos 2060

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1.417 Cosmos 2061

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1.418 Cosmos 2061 Rocket/Body

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1.419 Pegsat

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1.420 Cosmos 2064-2071 Rocket/Body

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1.421 Palapa 6 Rocket/Body

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1.422 Cosmos 2074

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1.423 Hubble Space Telescope

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1.424 Cosmos 2075 Rocket/Body

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1.425 Cosmos 2082

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1.426 Cosmos 2082 Rocket/Body

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1.427 Rosat

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1.428 Rosat Rocket/Body

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1.429 Cosmos 2084

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1.430 Cosmos 2084 Rocket/Body

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1.431 Meteor 2-19

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1.432 Gamma

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1.433 CRRES

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1.434 Cosmos 2098 Rocket/Body

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1.435 Feng Yun 1-B

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1.436 Atmosphere 1 & Atmosphere 2

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1.437 Atmosphere 2

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1.438 Feng Yun 1-B Rocket/Body

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1.439 Ulysses Rocket/Body

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1.440 Inmarsat 2-1 Rocket/Body

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1.441 GPS 2-10 Rocket/Body

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1.442 DMSP 2-5

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