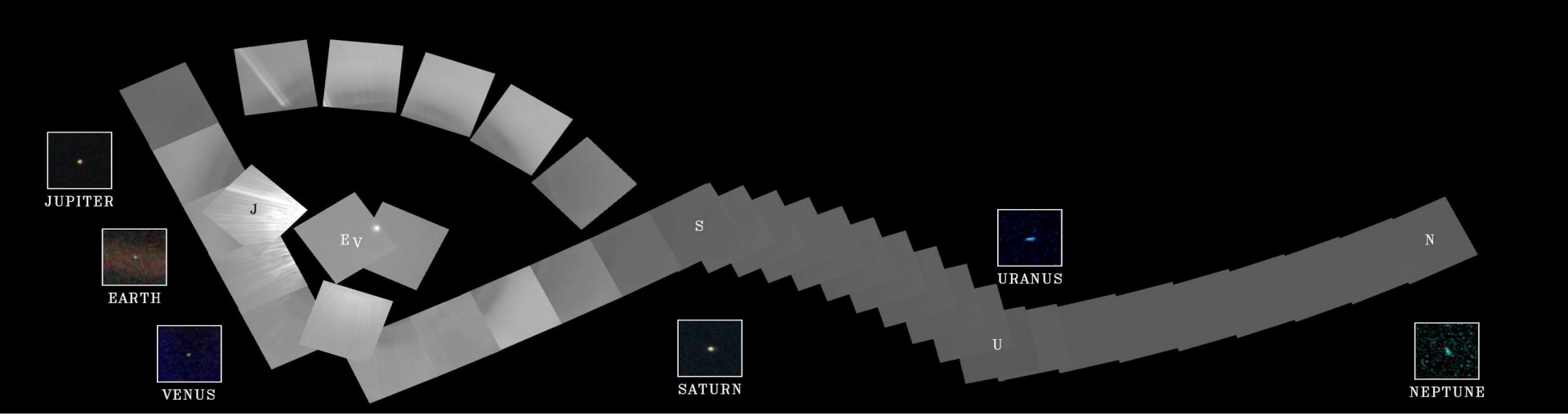


AE673A

Group Number- 3

- Mataria Pence Jagatkumar (170382)
- Amrendra Pratap Singh (170097)
- Aditya Raghuwanshi (170052)

Sun

Type: **star**
Magnitude: **-26.76**
Absolute Magnitude: 4.83
RA/Dec (J2000.0): 14h16m11.04s/-13°38'40.5"
RA/Dec (on date): 14h16m09.58s/-13°38'29.5"
HA/Dec: 22h59m28.30s/-13°38'29.5"
Az./Alt.: +156°09'32.4"/+51°07'32.7"
Gal. long./lat.: -27°39'40.0"/+44°20'04.6"
Supergal. long./lat.: +135°42'08.4"/+15°06'11.4"
Ecl. long./lat. (J2000.0): +216°22'12.1"/-0°00'03.9"
Ecl. long./lat. (on date): +216°21'48.5"/-0°00'03.8"
Ecliptic obliquity (on date): +23°26'15.9"
Mean Sidereal Time: 13h15m38.8s
Apparent Sidereal Time: 13h15m37.9s
Rise: 6h51m
Transit: 12h31m
Set: 18h10m
Daytime: 11h19m
Parallactic Angle: -22°37'59.1"
IAU Constellation: Vir
Hourly motion: +0°02'28" towards 109.1°
Hourly motion: dα=+0°02'24" dδ=-0°00'50"
Distance: 0.993 AU (148.563 M km)
Light time: 0h08m15.6s
Sidereal period: 1.00 days (0.003 a)
Apparent diameter: +0°32'12.64"
Diameter: 1392000.0 km
Sidereal day: 654h36m35.9s
Equatorial rotation velocity: 1.856 km/s

MATLAB Values

RA = -2.543392 rad

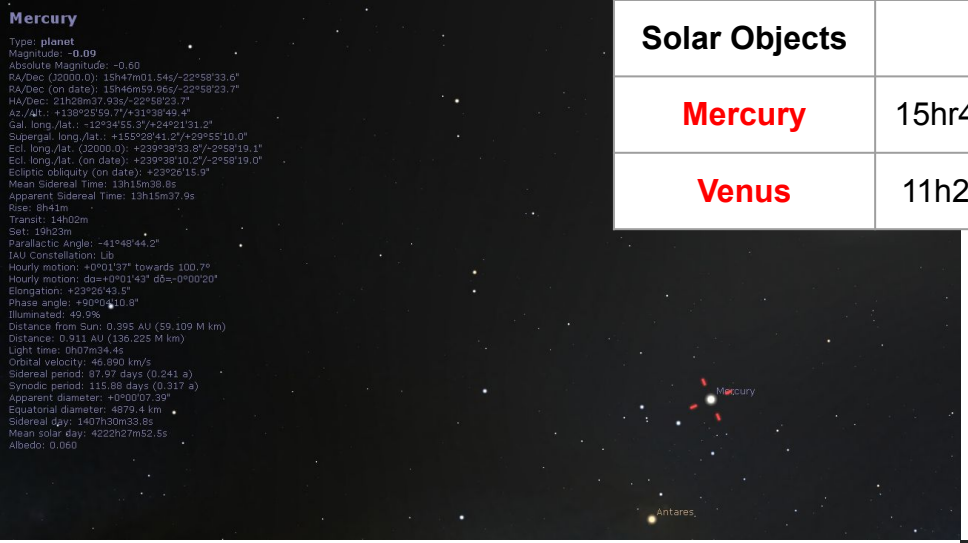
dec = -0.239485 rad

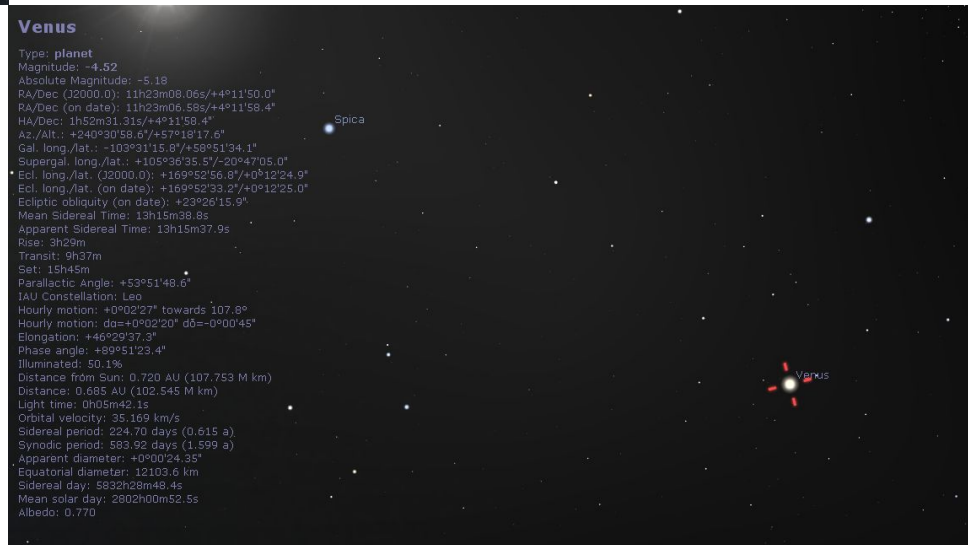
Upon Conversion of Sterillium values,
RA= -2.6226 rad
declination= -0.2381 rad

RA and Declination values from both the sources are nearly same. Hence our MATLAB code is perfectly good for this

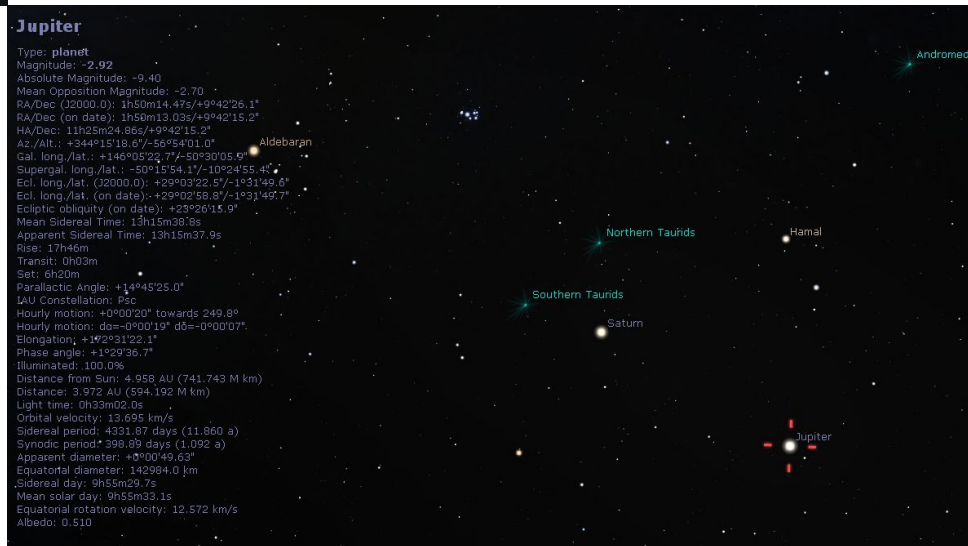
Solar Objects	RA	Declination	Altitude	Azimuth
Sun	14h16m09.58s	-13°38’29.5”	+51°07’32.5”	+156°09’32.4”

Solar Objects	RA	Declination	Altitude	Azimuth
Mercury	15hr46m59.96s	-22°58’23.7”	+31°38’49.4”	+138°25’59.7”
Venus	11h23m06.58s	+4°11’58.4”	+57°18’17.6”	+240°30’58.6”

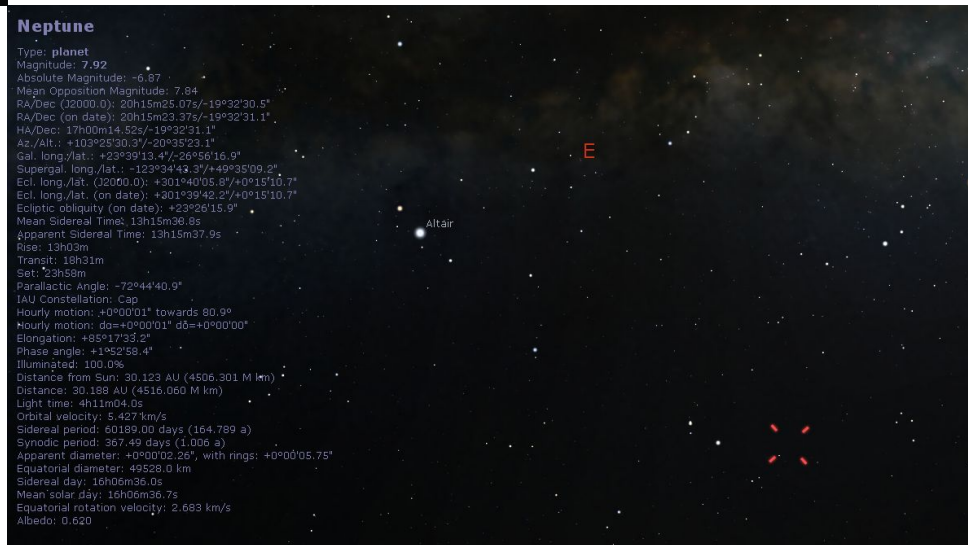




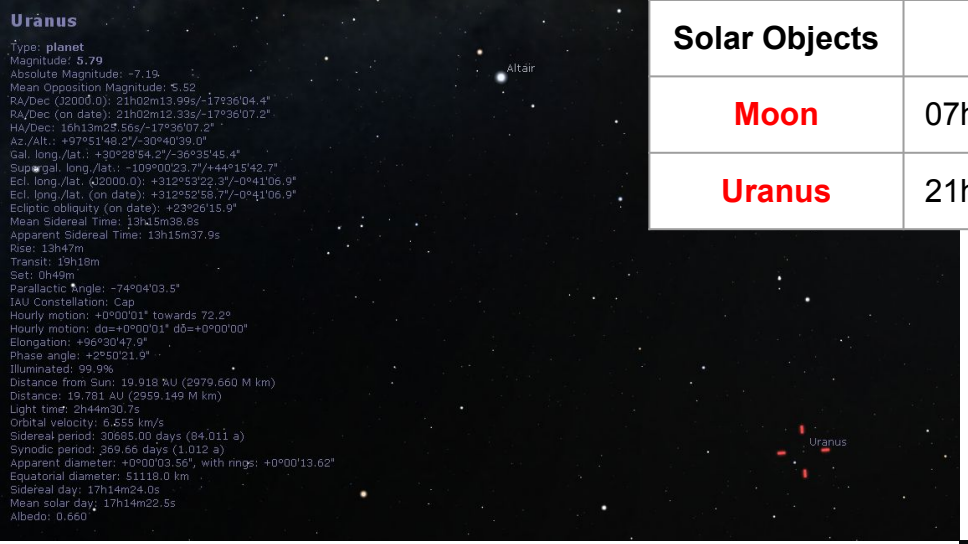
Solar Objects	RA	Declination	Altitude	Azimuth
Mars	18h42m28.12s	-24°46'48.6"	-02°10'09.7"	+115°57'46.0"
Jupiter	01h50m13.03s	+09°42'15.2"	-56°54'01.0"	+344°15'18.6"

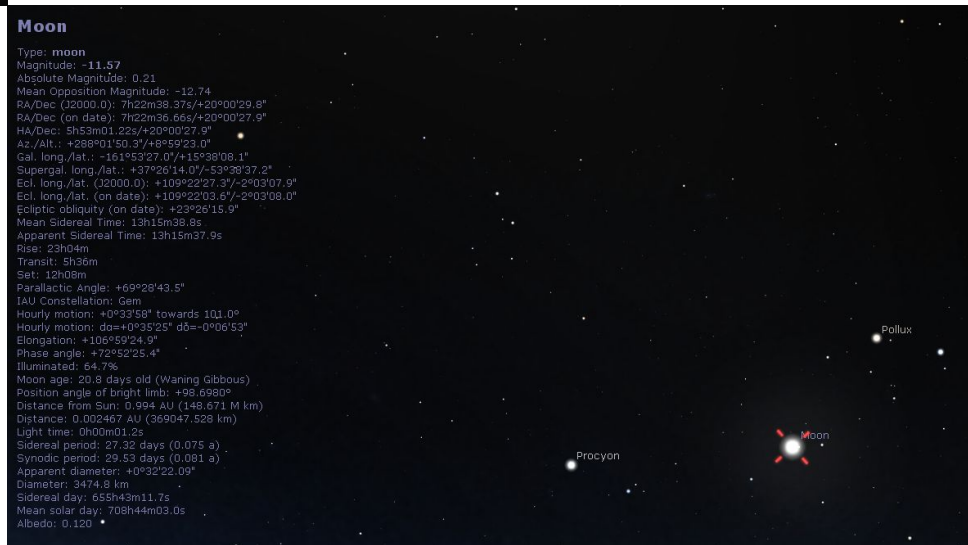


Solar Objects	RA	Declination	Altitude	Azimuth
Saturn	2h50m29.21s	+13°37’16.2”	-47°02’44.7”	+324°51’56.3”
Neptune	20h15m23.37s	-19°32’31.1”	-20°35’23.1”	+103°25’30.3”



Solar Objects	RA	Declination	Altitude	Azimuth
Moon	07h22m36.66s	+20°00’27.9”	+8°59’23.0	+288°01’50.3”
Uranus	21h02m12.33s	-17°36’07.2”	-30°40’39.0”	+97°51’48.2”





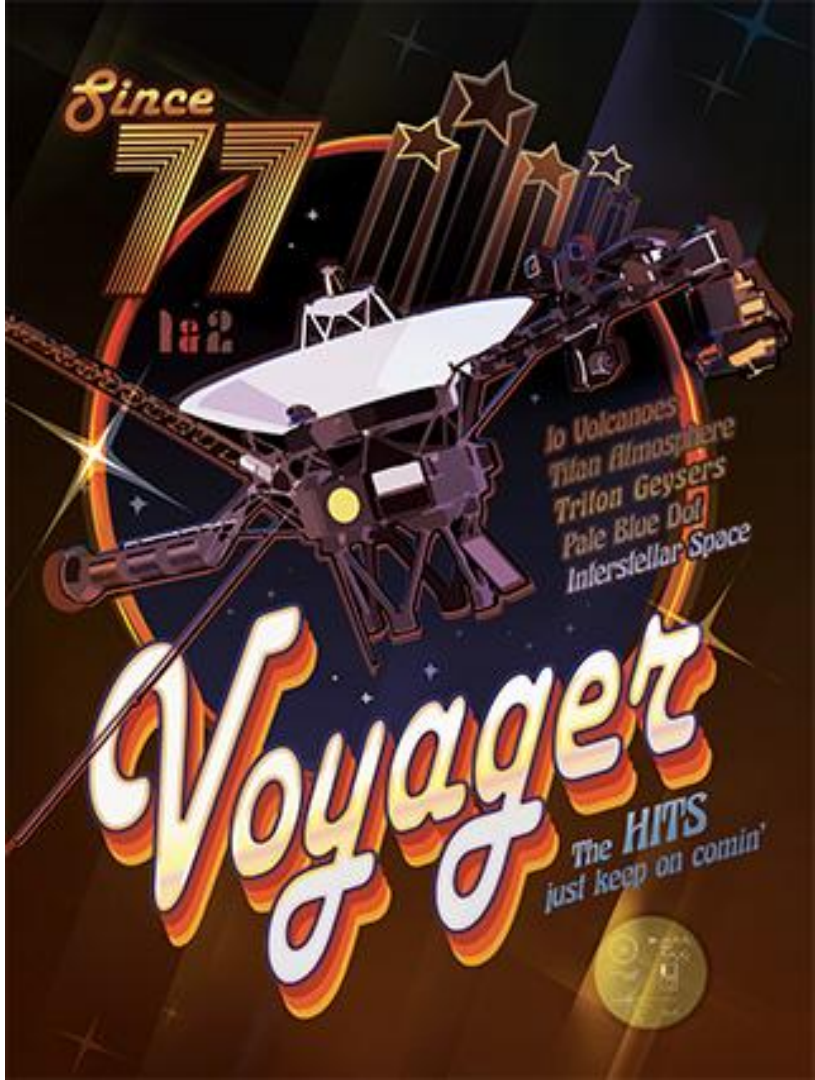
```
[RA,delta] = SolarAzElq('1999-10-30 11:30:00',22.2913,70.7930,140);
fprintf('RA = %f rad \n',RA)
fprintf('dec = %f rad \n',delta)

function [RA,delta] = SolarAzElq(UTC,Lat,Lon,Alt)
if nargin<4 || isempty(Alt), Alt = 0;end
d2r = pi/180; %radiance to degrees conversion factor
r2d = 180/pi; %radiance to degrees conversion factor
if ischar(UTC)
UTC = cellstr(UTC);
end
if iscell(UTC)
UTC = reshape(datenum(UTC(:),'yyyy-mm-dd HH:MM:SS'),size(UTC));
end
[year,month,day,hour,min,sec] = datevec(UTC);
if ndims(UTC)>2 %#ok<ISMAT>
year = reshape(year ,size(UTC));
month = reshape(month,size(UTC));
day = reshape(day ,size(UTC));
hour = reshape(hour ,size(UTC));
min = reshape(min ,size(UTC));
sec = reshape(sec ,size(UTC));
end
[jd,UTH] = juliandate(year,month,day,hour,min,sec);
day = jd - 2451543.5;
w = 282.9404 + 4.70935e-5 * day;
e = 0.016709 - 1.151e-9 * day;
M = mod(356.0470 + 0.9856002585 * day, 360);
L = w + M;
oblecl = (23.4393 - 3.563e-7 * day)*d2r;
E = M + r2d*e.*sin(M*d2r).*(1+e.*cos(M*d2r));
x = cos(E*d2r)-e;
year = sin(E*d2r).*sqrt(1-e.^2);
r = sqrt(x.^2 + year.^2);
v = atan2(year,x)*r2d;
lon = v + w;
xeclip = r.*cos(lon*d2r);
yeclip = r.*sin(lon*d2r);
zeclip = 0;
xequat = xeclip;
yequat = yeclip.*cos(oblecl) +
zeclip*sin(oblecl);
zequat = yeclip.*sin(0.409115648642983) +
zeclip*cos(oblecl);
r = sqrt(xequat.^2 + yequat.^2 + zequat.^2) -
(Alt/149598000);
RA = atan2(yequat,xequat);% in radians
delta = asin(zequat./r);% in radians
end

function [jd,UTH] =
juliandate(year,month,day,hour,min,sec)
```

"Further than anyone, or anything, in history"

VOYAGER
INTERSTELLAR MISSION

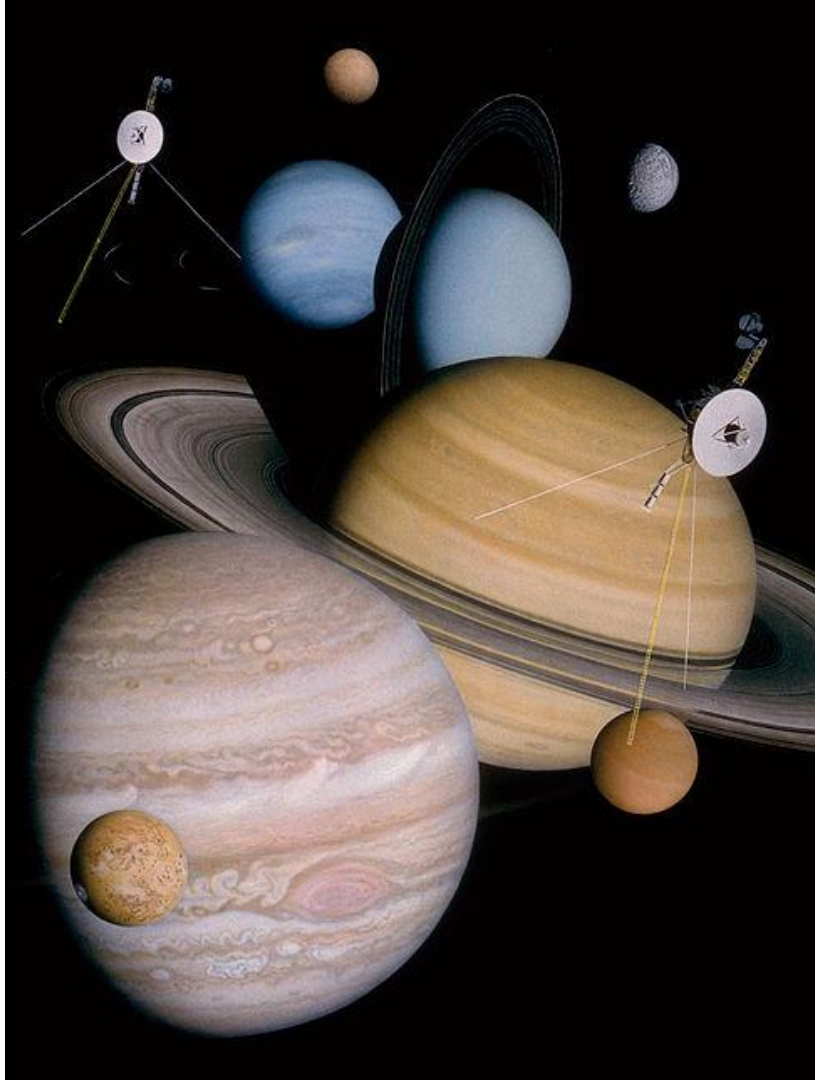
The Mission

- The initial mission was launched in 1977 to study Jupiter, Uranus, Saturn, Neptune.
- The mission was a part of “The Grand Tour”.
- The original mission got extended to “Voyager Interstellar Mission”.
- They are the only and the farthest interstellar man made probes in the history.
- Expected to cross the realms of Milky way.

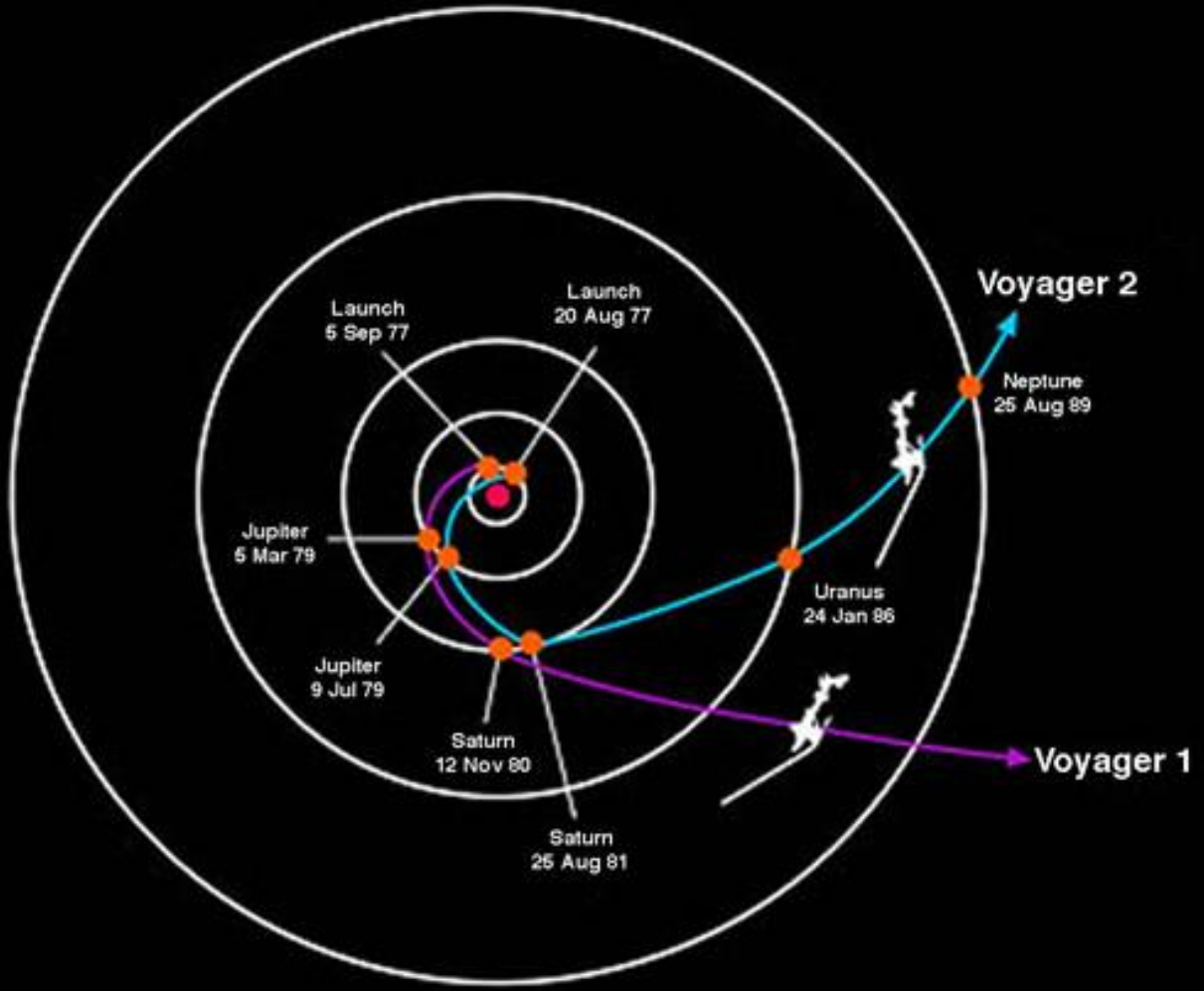


Astonishing Discoveries

- Active Volcanoes on Jupiter’s moon Io.
- V1 Discovered the Rings and moons of Jupiter.
- Various data on Saturn surface and its moons.
- V2 revealed the Great Red Spot on Jupiter to be a complex storm system, and also imaged several smaller storms.
- All our knowledge of Uranus and Neptune comes from V2.
- On Uranus, V 2 found evidence of an ocean of boiling water about 500 miles (800 kilometers) below its cloud tops.
- In October 2020, Voyagers confirmed high density of space outside the solar system.

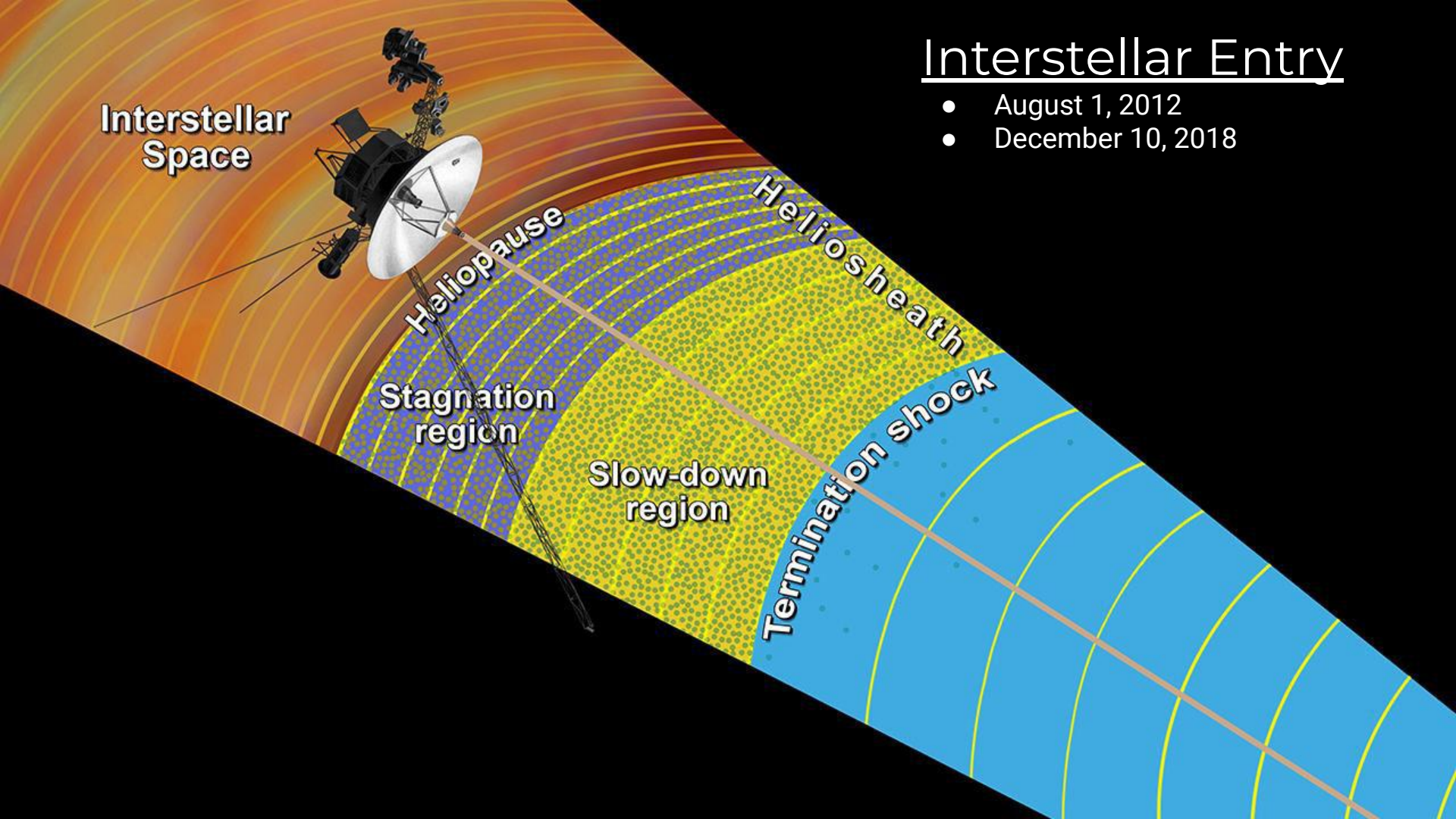


Timeline


Launch
5 Sep 77
Launch
20 Aug 77
Voyager 2
Neptune
25 Aug 89
Jupiter
5 Mar 79
Uranus
24 Jan 86
Jupiter
9 Jul 79
Saturn
12 Nov 80
Voyager 1
Saturn
25 Aug 81

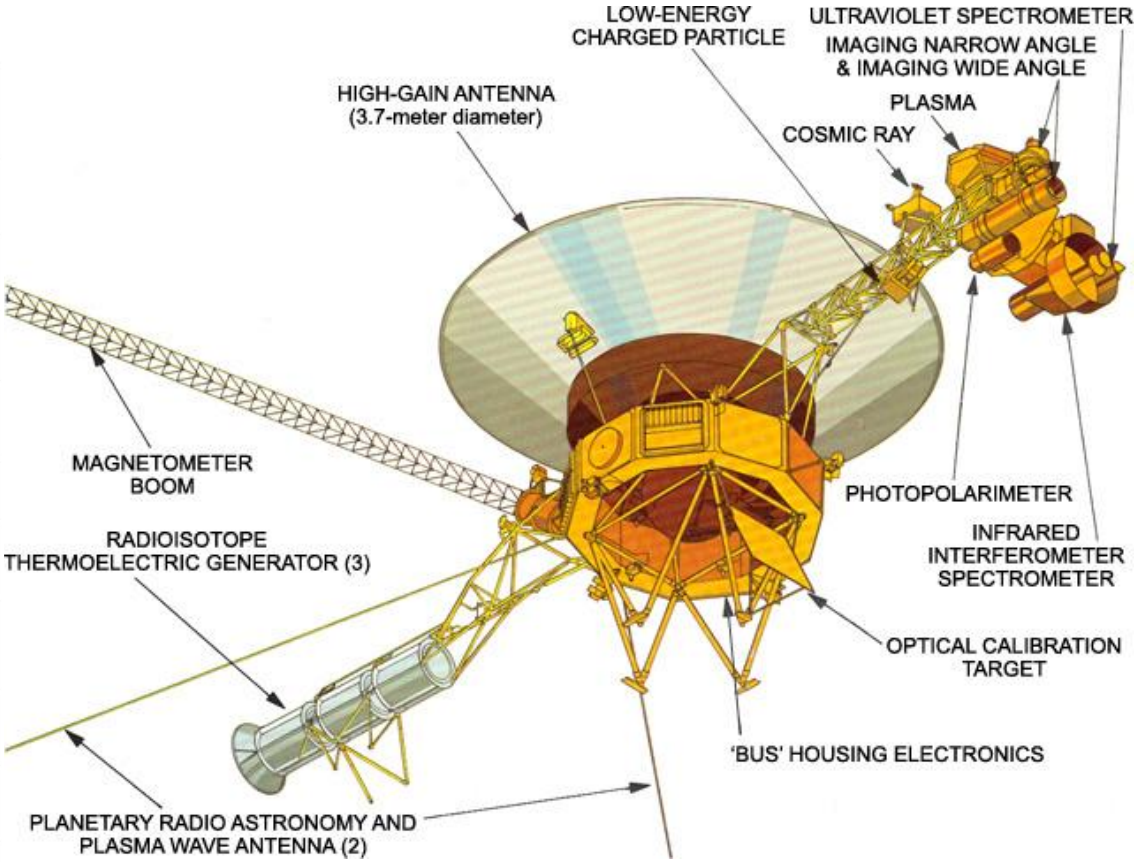
Interstellar Entry

- August 1, 2012
- December 10, 2018



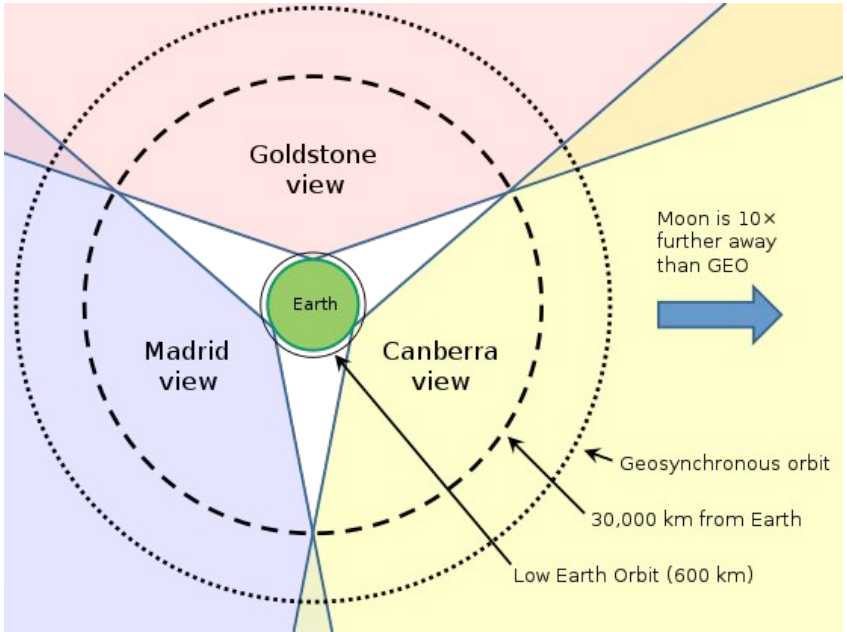
Instruments

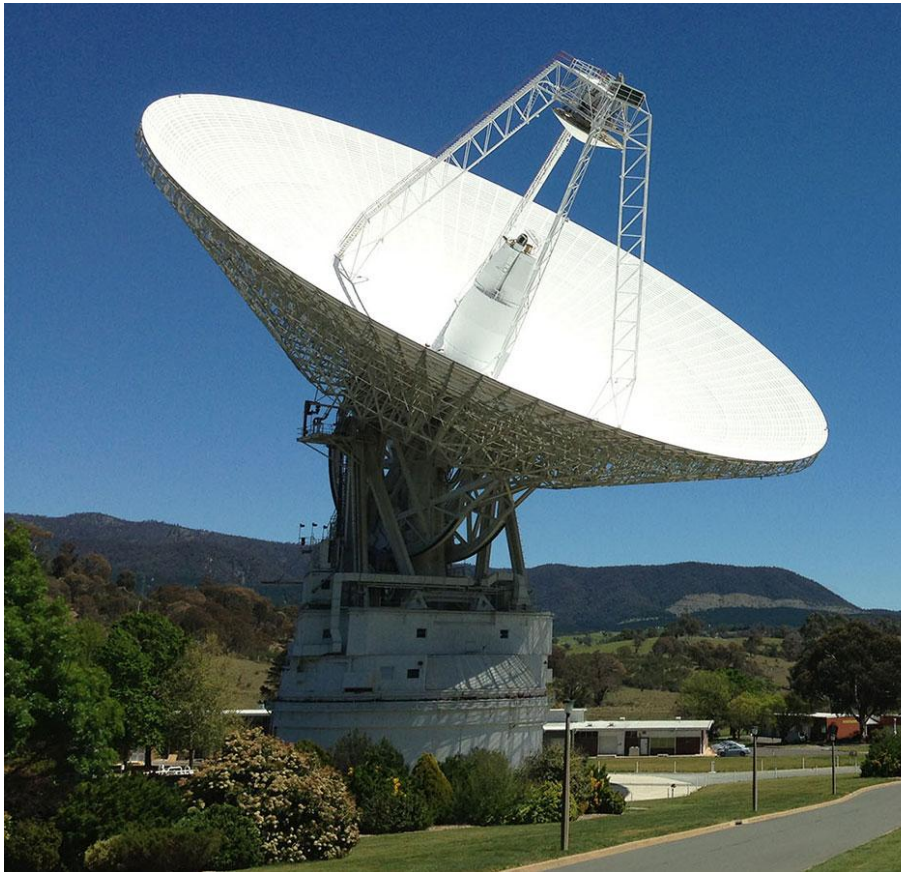
Instrument	Voyager 1	Voyager 2
Cosmic Ray Subsystem (CRS)	ON	ON
Low-Energy Charged Particles (LECP)	ON	ON
Magnetometer (MAG)	ON	ON
Plasma Wave Subsystem (PWS)	ON	ON
Plasma Science (PLS)	OFF	ON
Imaging Science Subsystem (ISS)	OFF	OFF
Infrared Interferometer Spectrometer and Radiometer (IRIS)	OFF	OFF
Photopolarimeter Subsystem (PPS)	OFF	OFF
Planetary Radio Astronomy (PRA)	OFF	OFF
Ultraviolet Spectrometer (UVS)	OFF	OFF



Communication

20KW Uplink
20W Downlink





The Golden Record

- Variety of natural sounds, such as those made by surf, wind and thunder, birds, whales, and other animals
- 115 images (encoded in analog form)
- Music (total duration of 90min)
- Spoken greetings from Earth-people (in fifty-five languages)

THANK YOU!