Chapter 3 - Earth/Moon 2 Flyby Geometries

Contents

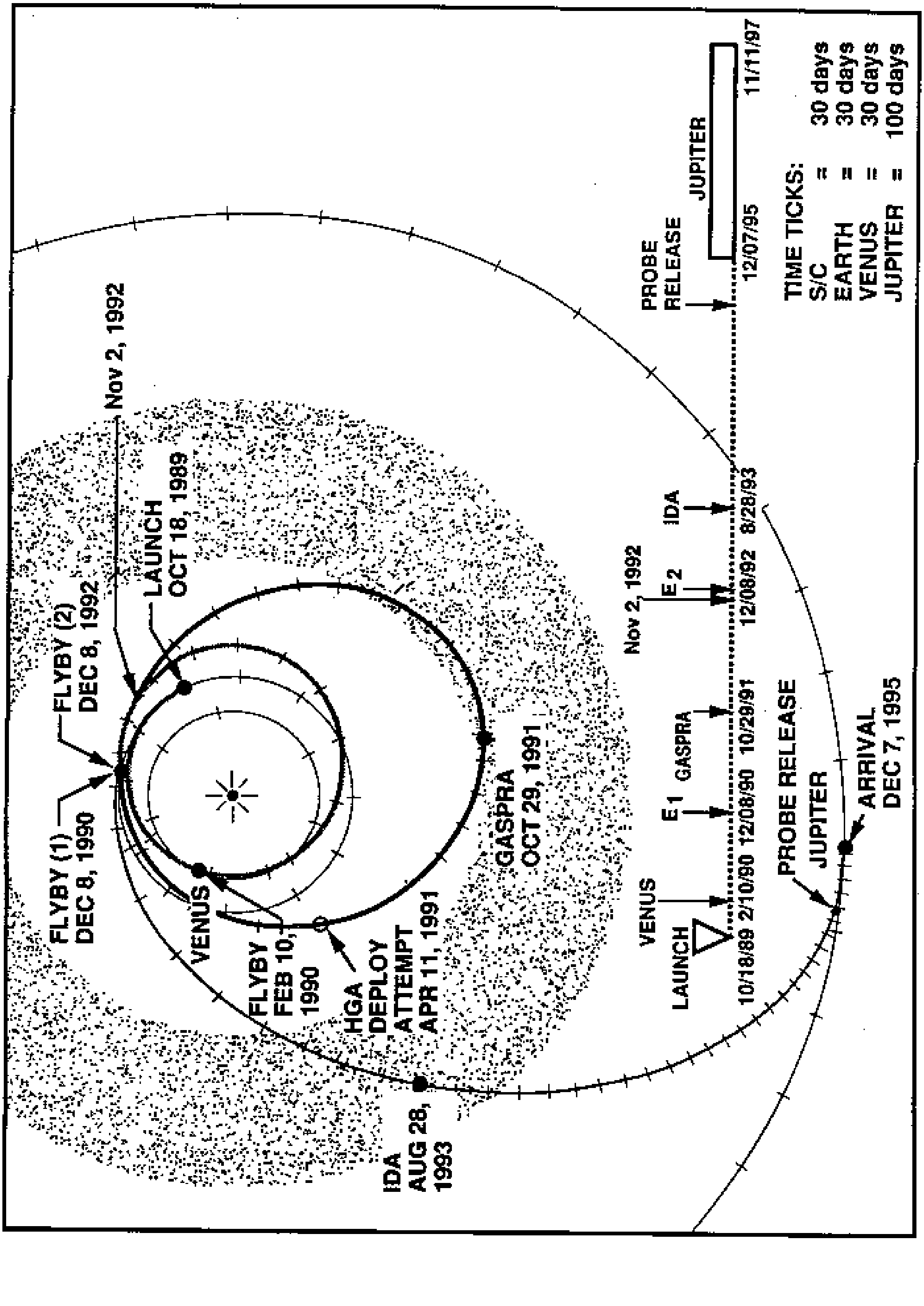
Chapter 3

Introduction

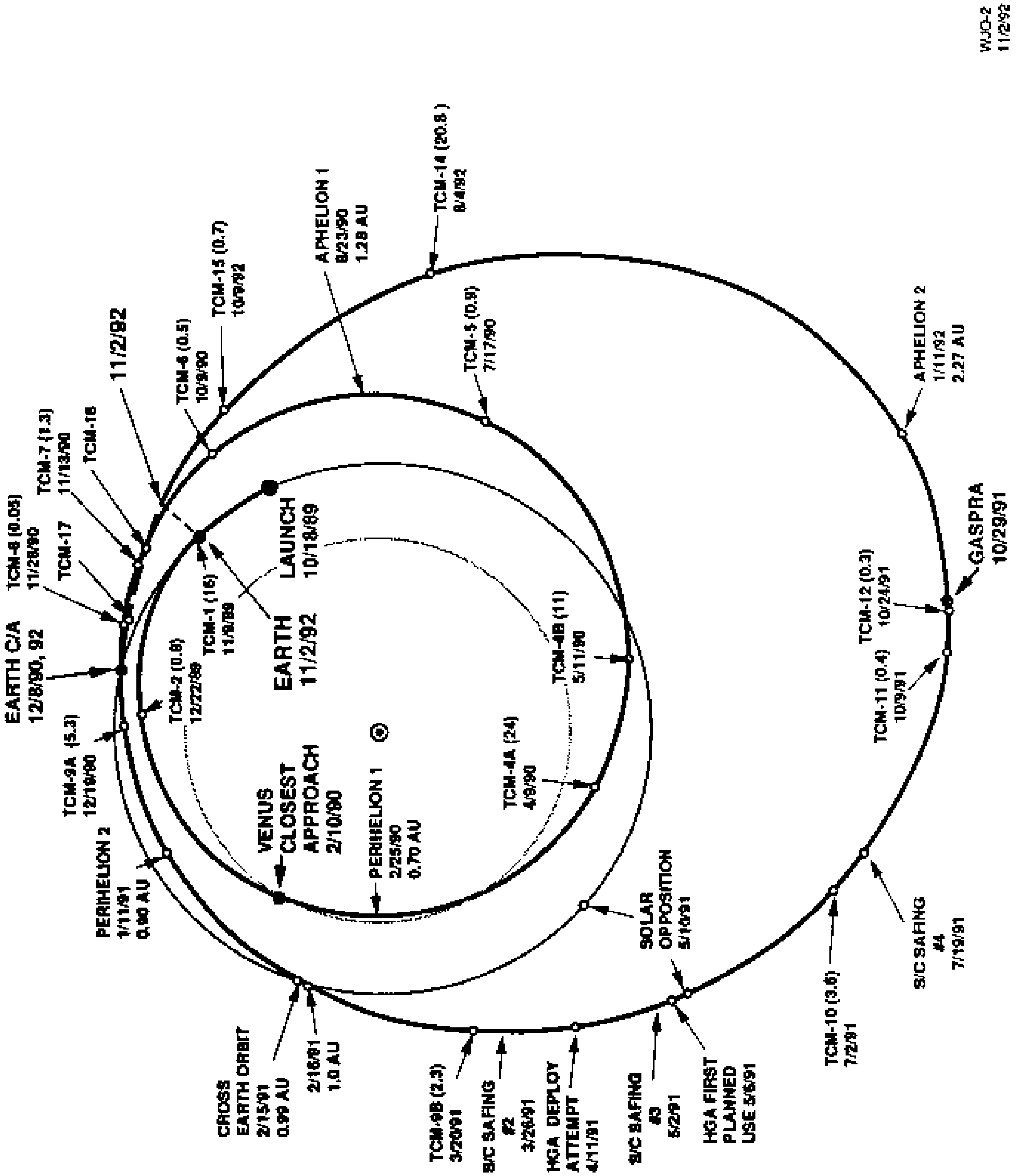
This chapter provides an overview of Galileo's traverse of the solar system (Pages 3 and 4) and a comparison of the Earth 2 flyby with Earth 1 for the lunar orbit traverse and Galileo's Earth ground track. Earth 1 flyby information is found on Pages 5 and 6. Comparable information for Earth 2 flyby can be found on Pages 7 and 8.

The EE9 and EE11 attitude strategies are given on Page 9. These represent RA/DEC values for the -Z axis.

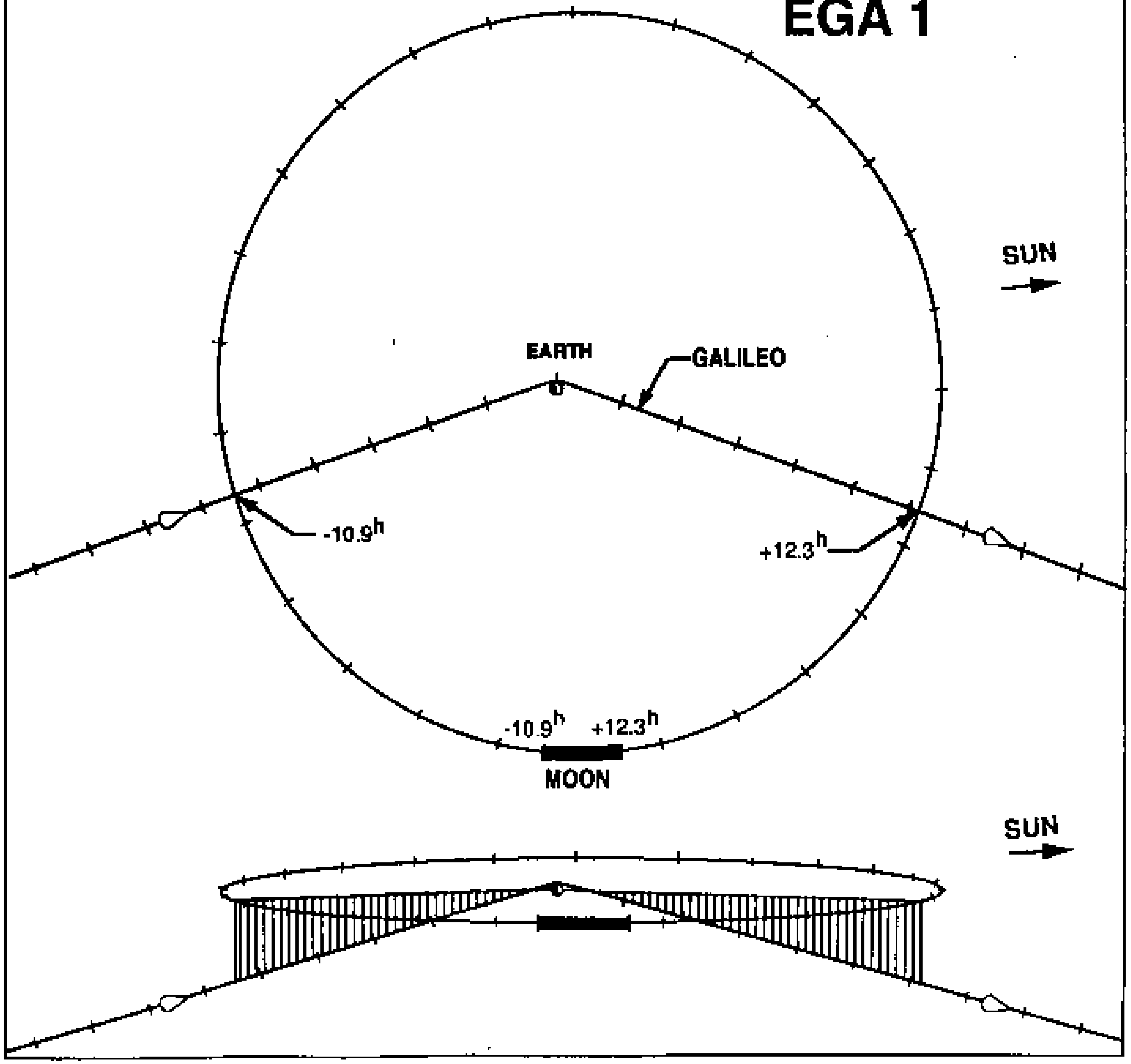
Further flyby geometrical information for Earth and Moon, including range, altitude and phase angle can be found on Pages 12-19 and 25-32. The y-axis for these plots are labeled with Target-Craft-Distance (TCDIS), Target-Craft-Altitude (TCAL), Sun-Target-Craft (STC) and Angular Semi-Diameter (ASD). Units are shown on the axis.


FLYBY (1) DEC 8, 1990
FLYBY (2) DEC 8, 1992
Nov 2, 1992
LAUNCH OCT 18, 1989
VENUS
FLYBY FEB 10, 1990
HGA DEPLOY ATTEMPT APR 11, 1991
GASPRA OCT 29, 1991
IDA AUG 28, 1993
PROBE RELEASE
JUPITER
ARRIVAL DEC 7, 1995
LAUNCH
VENUS
E1
GASPRA
Nov 2, 1992
E2
IDA
PROBE RELEASE
JUPITER
10/18/89 2/10/90 12/08/90 10/29/91 12/08/92 8/28/93 12/07/95 11/11/97
TIME TICKS:
S/C = 30 days
EARTH = 30 days
VENUS = 30 days
JUPITER = 100 days

WJO-1
11/2/92


WJO-2
11/2/92
TCM-14 (20.8)
8/4/92
APHELION 1
8/23/90
1.28 AU
TCM-15 (0.7)
10/9/92
11/2/92
TCM-6 (0.5)
10/9/90
TCM-5 (0.9)
7/17/90
APHELION 2
1/11/92
2.27 AU
TCM-7 (1.3)
11/13/90
TCM-16
TCM-8 (0.05)
11/28/90
TCM-17
LAUNCH
10/18/89
EARTH C/A
12/8/90, 92
TCM-1 (16)
11/9/89
EARTH
11/2/92
GASPRA
10/29/91
TCM-12 (0.3)
10/24/91
TCM-2 (0.8)
12/22/89
TCM-4B (11)
5/11/90
TCM-11 (0.4)
10/9/91
TCM-9A (5.3)
12/19/90
VENUS
CLOSEST
APPROACH
2/10/90
TCM-4A (24)
4/9/90
PERIHELION 1
2/25/90
0.70 AU
PERIHELION 2
1/11/91
0.90 AU
SOLAR
OPPOSITION
5/10/91
S/C SAFING
#4
7/19/91
TCM-10 (3.6)
7/2/91
CROSS
EARTH ORBIT
2/15/91
0.99 AU
2/18/91
1.0 AU
TCM-9B (2.3)
3/20/91
S/C SAFING
#2
3/26/91
HGA DEPLOY
ATTEMPT
4/11/91
S/C SAFING
#3
5/2/91
HGA FIRST
PLANNED
USE 5/6/91

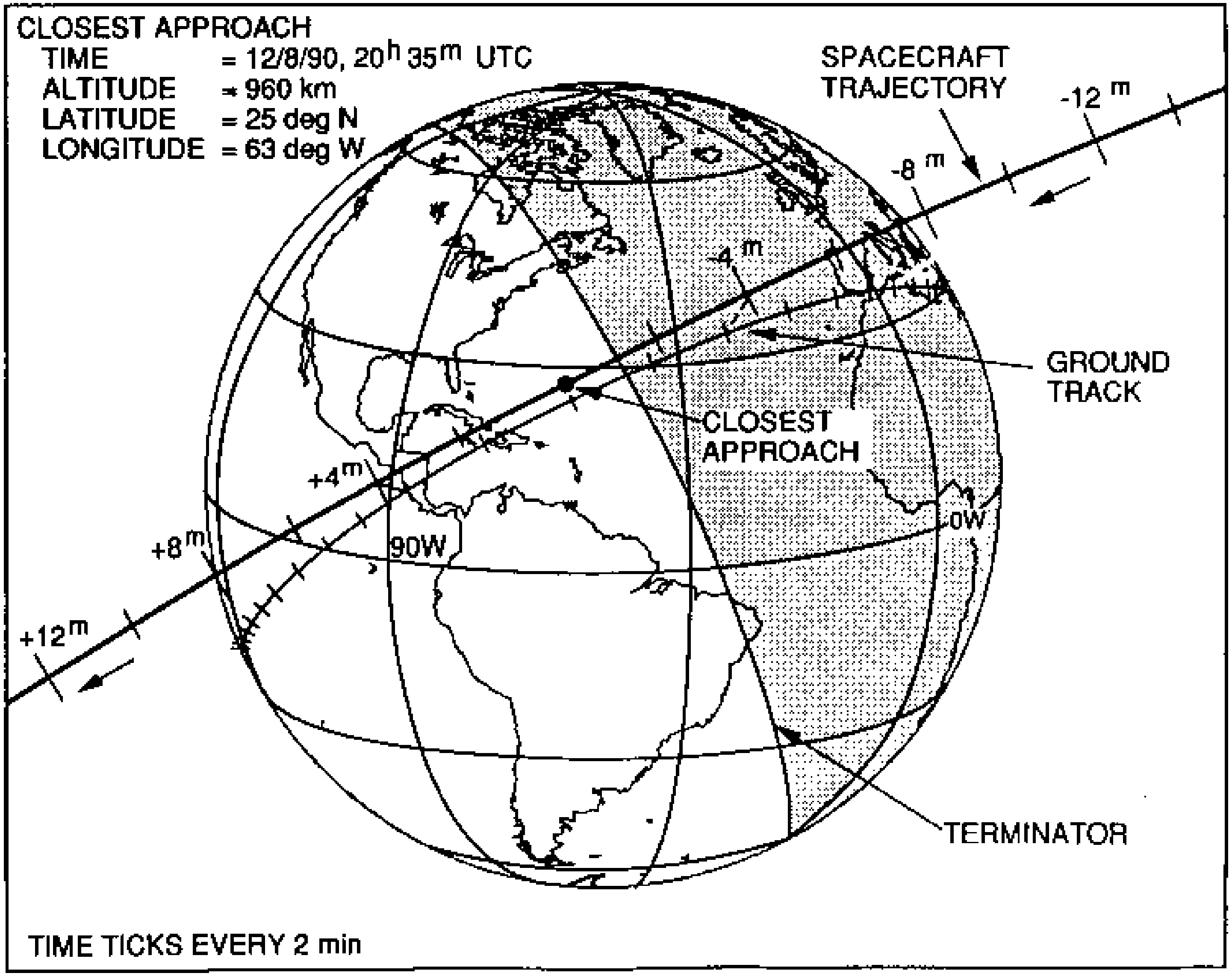
LUNAR ORBIT TRAVERSE
EGA 1



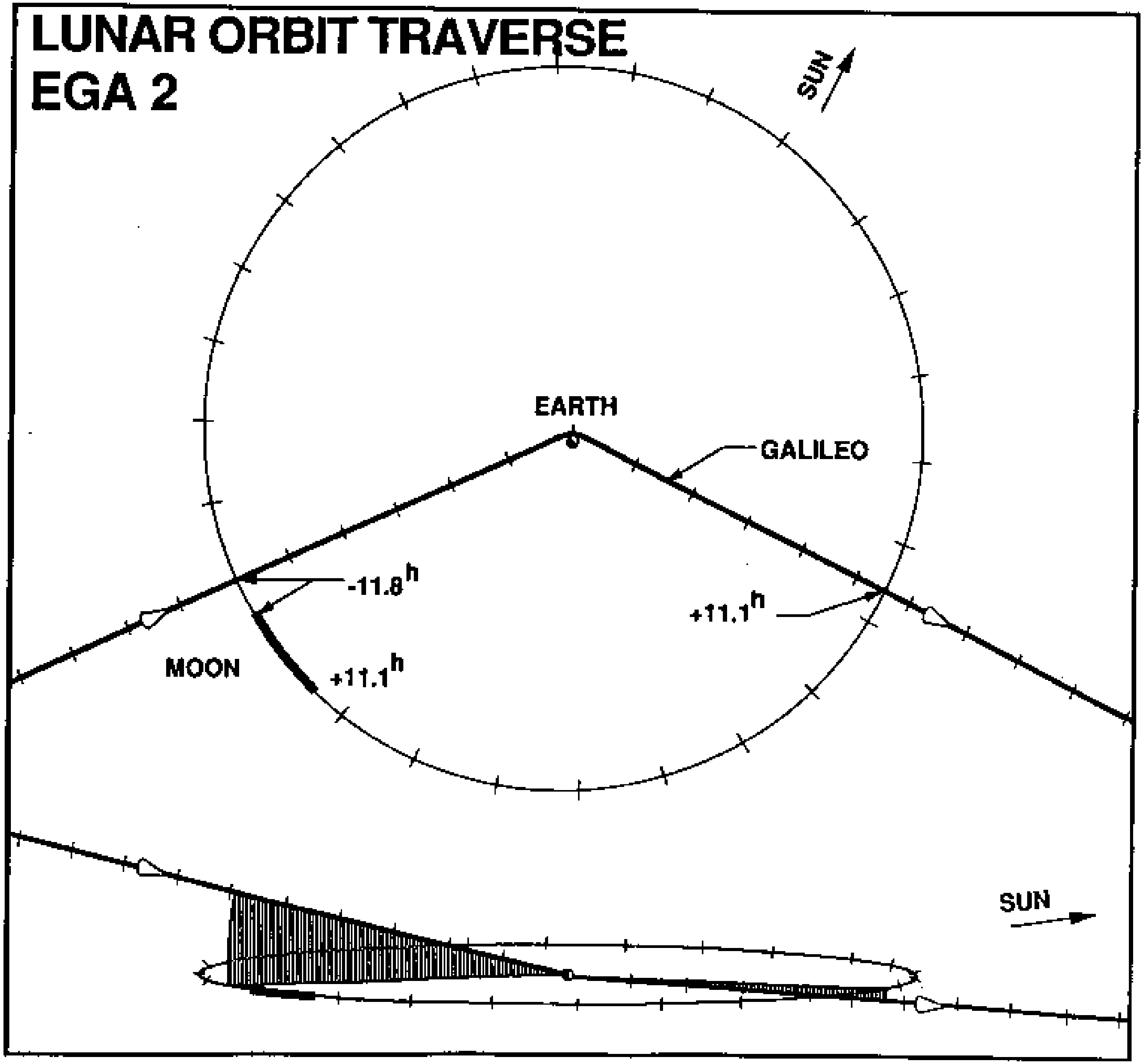
WJO-12
11/2/92

Galileo

GROUND TRACK EARTH 1 FLYBY

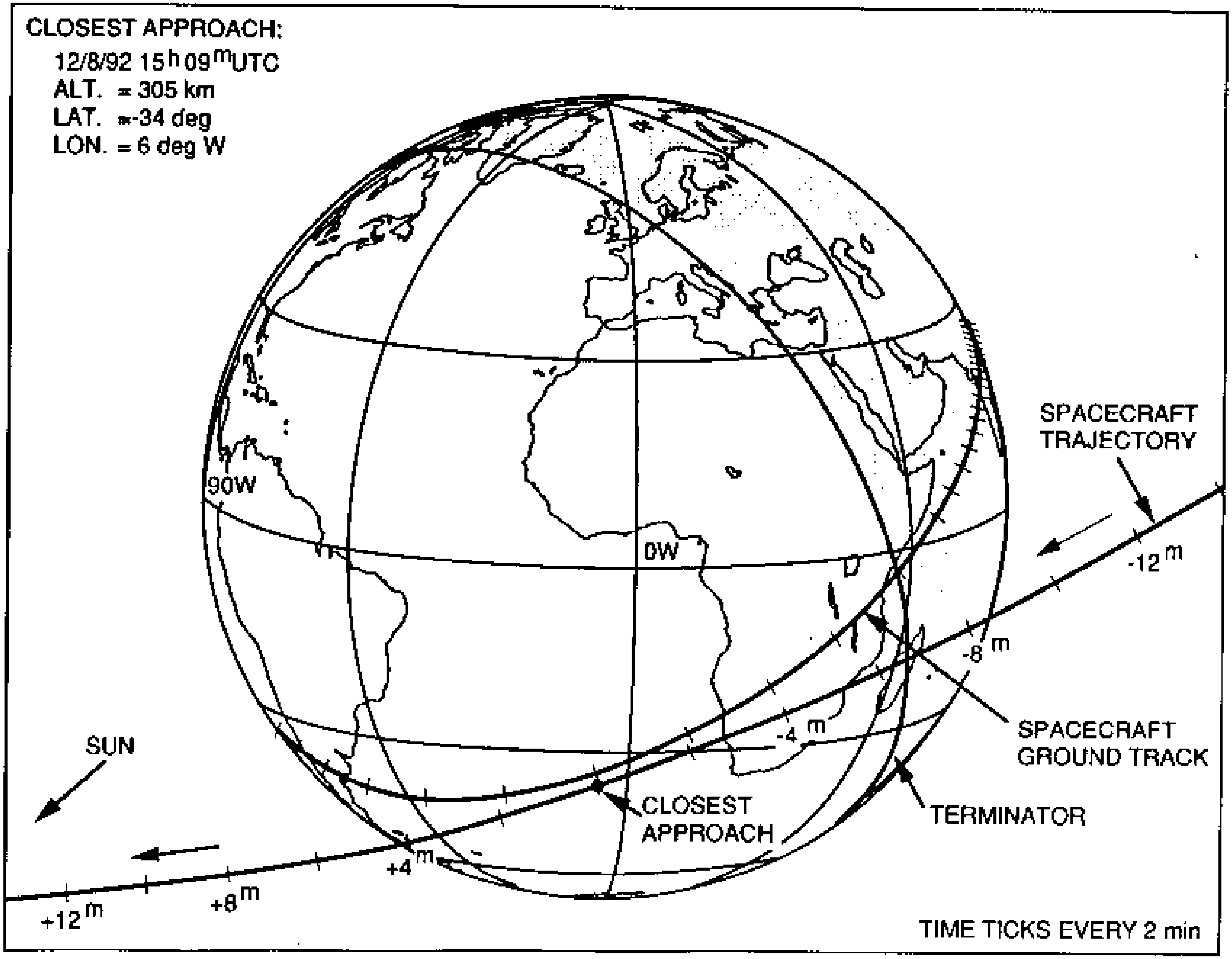


WJO-13
11/2/92


LUNAR ORBIT TRAVERSE
EGA 2
SUN
EARTH
GALILEO
-11.8h
+11.1h
MOON
+11.1h
SUN

WJO-14
11/2/92

GROUND TRACK OF EARTH 2 FLYBY



WJO-15
11/2/92

Attitude Strategy

The fundamental attitude strategy during the EE9/EE11 sequences is to maintain sun-orientation with a maximum excursion of 9 degrees off sun-line. A lead-lag implementation maintains this strategy, with a small period of time (7.5 hours) prior to the SITURN on DOY 335 during which the excursion goes out to 9.3 degrees before the SITURN resets the position. OET/Thermal and the science instrument teams have indicated that this is not a concern. The RA/Dec coordinates of the turns in EE9/EE11 are listed in the following table.

SITURNs in EE9/EE11

Day of Turn	Turn Target	Turn RA	Turn Dec
Incoming Attitude	Minimum off-Sun angle for PCT on 330	236.44	-26.60
DOY 335	Sun @ 338	248.845	-23.665
DOY 345 * (to be verified)	EUV * Cal	260.24	-19.49
DOY 351	Sun @ 358	274.0	-24.0
DOY 363	Sun @ 366	288.0	-18.0
DOY 004	Sun @ 009	298.0	-19.0

G+I; MOON AT EARTH #2: TRAJECTORY POLE VIEW, -2 TO +2 DAYS