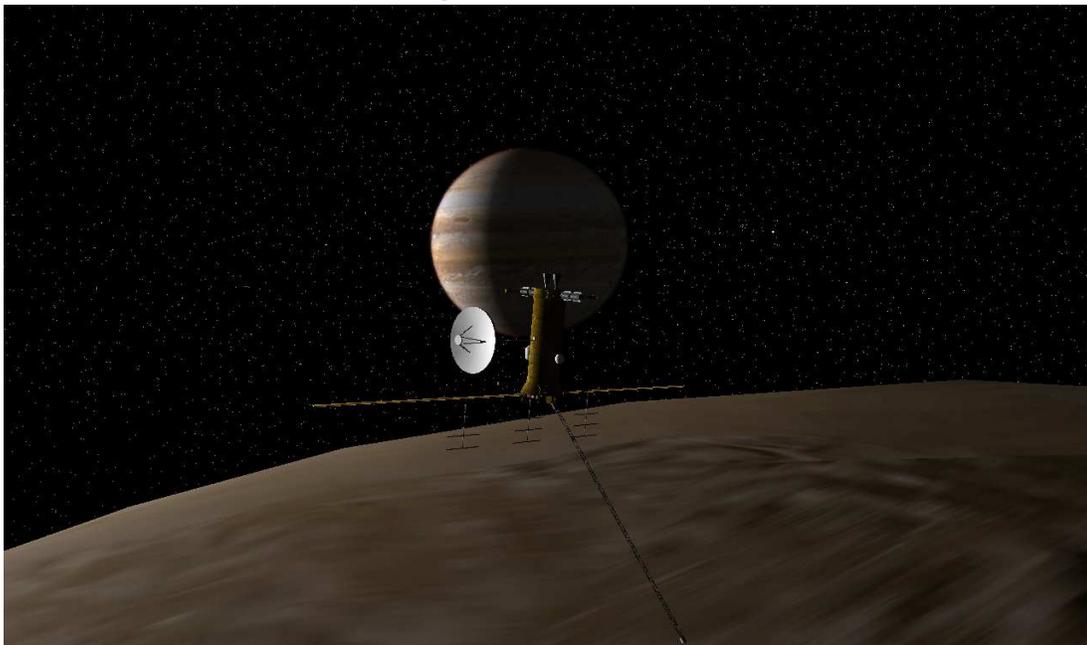


Nicoya, Guanacaste

***COSTA RICA SPACE SYSTEMS Scientific Payloads division proudly presents...***



**PAYLOADS FOR ORBITER PART 2  
NASA JUPITER EUROPA ORBITER**

**By Istochnikov**

## ABOUT THIS ADD-ON

This add-on represents the Jupiter Europa Orbiter planned by NASA as Flagship-Class Mission for the next decade, as part of an international Europa-Jupiter System Mission.

## THE EUROPA JUPITER SYSTEM MISSION

This mission forms part of an international effort for explore the Jovian Satellite System, especially the icy-surface moon Europa and Ganymede.

The mission possibly will include 4 spaceships:

- The NASA Jupiter-Europa Orbiter (Represented in this Add-on)
- An ESA Jupiter-Ganymede Orbiter (in development by me :P)
- A JAXA Jupiter Magnetosphere Orbiter (in development by me :P)
- Possibly a Russian Europa Astrobiological Lander (ehrrr... maybe i'll develope this too :P)

The Jupiter Europa Orbiter will carry 11 instruments (at sweet optimal point):

- Wide-Angle Camera (WAC)
- Medium-Angle Camera (MAC)
- Narrow Angle Camera (NAC)
- IR Spectrometer (IRS)
- UV Spectrometer (UVS)
- Laser Altimeter (LA)
- Ice Penetrating Radar (IPR)
- Thermal Instrument (TI)
- Magnetometer (MAG)
- Ion & Neutral Mass Spectrometer (INMS)
- Particle & Plasma Instrument (PPI)

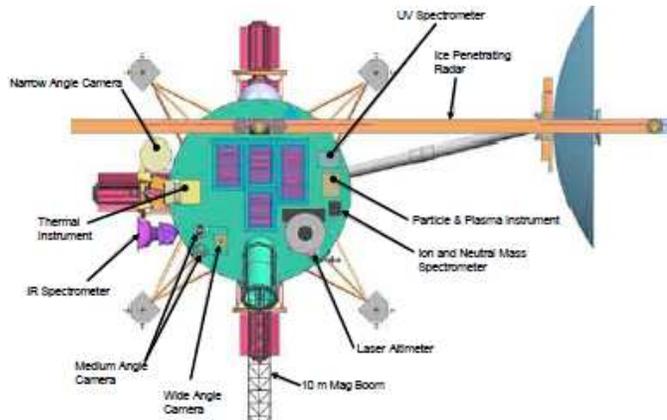


Figure 1: Jupiter Europa Orbiter instrumental deck (original proposal)

All the instrumental is feeded by 5 MMRTGs (in the mesh are rendered the 6 original MMRTGs).

The launch is scheduled for August 2016 aboard an Atlas V-551 rocket following a Venus-Earth Gravity Assistance (VEGA) for a Jupiter orbital insertion (JOI) in September 2021. The original plans (both using a Delta 4 HV rocket) were a Venus-Venus-Earth Gravity Assistance (VEEGA) launch in June 2015 and a JOI in april 2021 or a VEEGA launch in january 2017 and a JOI in September 2022.

## REQUERIMENTS

-Vinka's Spacecraft 3 library available here:

-Delta 4 HV by Francisdrake available here:

-LC 37 A by Kev 33 available here:

-Interplanetary MFD by Jarmo Nikanen available here:

-If you want to run the overload scenario also is required the three parts of "Commercial Satellites Add-on" released until now, these are available here:

## FLYING THE JEO

The Stage 01 shows the JEO atop its launcher (Delta 4HV) and Interplanetary MFD in Surface Launch mode in the left MFD. Ignite engines when E.inc parameter reaches less than  $1^\circ$  and the phrase "BAD PLANE" disappears of the MFD.

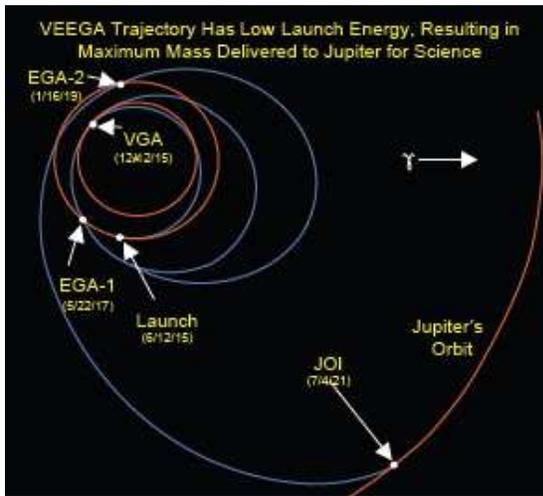


Figure 2: VEEGA Launch trajectory for a launch at June 12, 2015

of IMFD or TransX MFD. For me it was very difficult ever reach the earth for the first earth gravity assistance.

LAUNCH TIP: I prefer fly the launcher manually, because i can achieve a precision of less than  $0.05^\circ$  (in fact, in some tests, i reached the inclination zero :P).

Later, activate the Orbit-eject mode in IMFD and let go!

NOTE: This mission, with its launch trajectory involving 3 slingshots only for reaching Jupiter and other high number of moon flybys, is (possibly) one of the most complex missions developed for Orbiter. It can be very challenging try to do it without a VERY advanced knowledge of IMFD or TransX MFD. For me it was very difficult ever reach the earth for the first earth gravity assistance.

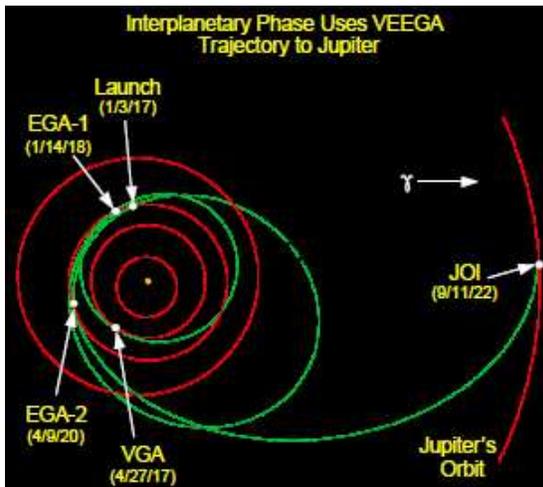


Figure 3: VEEGA Launch trajectory for a launch at January 3, 2017

NOTE: Be very careful with your fuel. If fuel is wasted during the trip, the orbital lifetime in Europa will be much shortened.

The data for the launch window of 2015 requires a Ganymede fly-by before the JOI. For the launch window of 2017 an Io slingshot is required. I've found no data for the launch window of 2016.

After the JOI it will be a Perijove Raising Burn, this burn raises the perigee at least to the orbit of Ganymede. After that, you will do a nice "planetary" tour for all the Galilean satellites (2015 launch window doesn't include Io encounters, due the radiation hazard).

The tour will finish in Europa (the tour for launch window for 2017 should be modified), where will insert, first in an elliptical orbit (200 km x 8000 km x  $85^\circ$ ) an later in a circular orbit (100 km x 100 km x  $85^\circ$ ). It will remain in this orbit for at least 6 earth months and - when its fuel will deplete- it will crash in Europa surface. For this reason, this spaceship should be sterilized before its launch.

## KEYMAP

G key: Deploys everything.

## POSSIBLE BUGS

In low-end computers, the framerate could be affected due the ENORMOUS count of polygons (exactly 51129) of the mesh. Although i've tested the JEO jointly with my Anik F2 (41136 polygons), DirecTV 11 (29278 polygons) and other 2 satellites made by me (39108 polygons each) in my IBM/Lenovo T60 6371-6MU with a Intel Core 2 Duo @ T5550 1,6 Ghz 1,5 GB of RAM and integrated Intel Graphic Media Accelerator Express X3100 (GMA 945 Chipset) and reported me no problems.

I provide you an "Overload Scenario" that test how much can resist a computer the JEO and other meshes. If your computer can resist it, there is no problem. If not, run the scenario deleting some vessels.

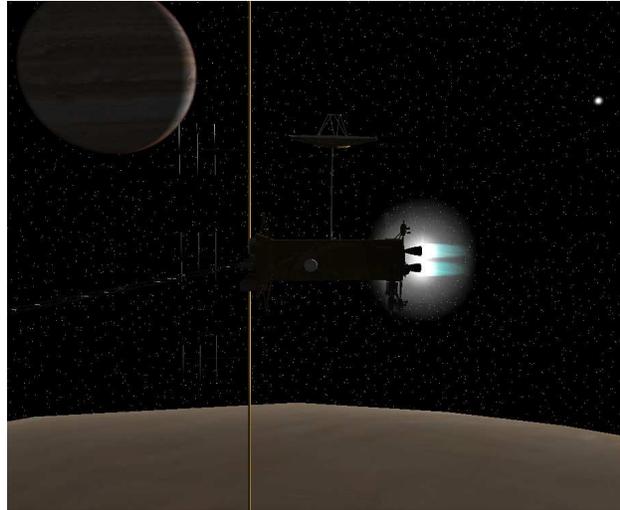


Figure 4: Jupiter Europa Orbiter last burn on its mission: the circularization of the Europa orbit

## LICENSE DISCLAIMER

-You can distribute this add-on freely. Its sale is forbidden.

-I give this add-on as it is. Don't guilt me for any incident you have as CTDS, data lost, viruses, insomnia, terrible academic performance, firing from job by absences, girlfriend infidelities AND/OR/XOR ruptures (or girlfriend's suicides), dogs dead by starvation, damage of your rooms by irruptions by the police due you don't exit your room, the re-election of George Bush, a naked Bin Laden apparition in your room (yuck!!!!!!), other things that appear here: etc, etc, etc...

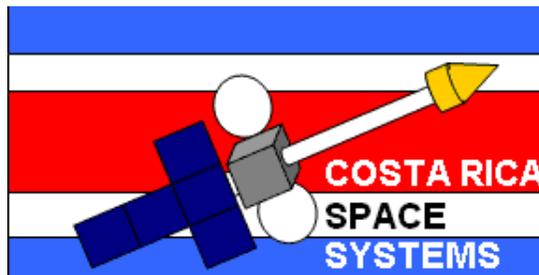
## THANKS TO...

-Dr Martin Scheiger for doing the best space flight simulator ever seen...

-My brother Luis Fernando and my best friend Rolando for the support and their evaluations.

## TECHNICAL SUPPORT

Questions, Comments, Bug reports, etc, etc, etc, send them to [istochnikov@gmail.com](mailto:istochnikov@gmail.com) (put in the subject "Payloads for Orbiter" or "Jupiter Europa Orbiter", insults will be ignored) Telephonic support on +506-8321-9889. ONLY IN SPANISH :-P



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