A FUTURE SPACECRAFT MISSION TOWARDS THE JOVIAN SYSTEM – PROVIDING KEY OBSERVATIONAL TESTS TO CONSTRAIN FORMATION SCENARIOS. O. Mousis¹, Y1036. Alibert², J. Horner² et J.-M. Petit¹. Observatoire de Besançon, UMR-CNRS 6091 (41 bis, Avenue de l’Observatoire, BP 1615 Besançon, France, olivier.mousis@obs-besancon.fr, jean-marc.petit@obs-besancon.fr). ²Physikalisches Institut, University of Bern (Sidlerstrasse 5, CH-3012 Bern, Switzerland, yann.alibert@phim.unibe.ch, sid9979575, jonathan.horner@phim.unibe.ch).

We propose several observational tests derived from recent formation scenarios of Jupiter and its satellite system that a subsequent spacecraft mission would be likely to measure. We then discuss the constraints that could be derived from the following measurements:

- Abundances of volatiles within Jupiter’s atmosphere. Are the abundances of C, N, S, Kr, Xe, and Ar homogeneous within the Jovian atmosphere? What is the oxygen abundance? Is the oxygen abundance compatible with the theory of clathration used to constrain the composition of planetesimals produced in Jupiter’s feeding zone? Is it also homogeneous? What can we infer on the homogeneity of Jupiter’s envelope from measurements of its oscillations?

- Chemical composition of ices of both regular and irregular satellites. Does the chemical composition of ices differ among the regular satellites (presence of a catalytically active region within the Jovian subnebula)? Does also the composition of ices incorporated within regular satellites differ from that of ices in irregular satellites (subdisk initially warm enough to vaporize the entering icy solids)?

- Isotopic composition (deuterium to hydrogen ratio in water ice) of both regular and irregular satellites. Is there a fractionation of the D:H ratio in water (the most abundant ice) between regular and irregular satellites (this would also favor the hypothesis of an initially warm subdisk)?

Such measurements should allow to check the validity of the proposed recent formation scenarios.