**Common Coordinate System for the Jovian Satellites within the JUICE Project**

A common and consistent coordinate system for the Jovian satellites shall be used within the JUICE project. Main reasons are to

* avoid misunderstandings and reduce failure risk by making use of a common coordinate system definition for the Jovian satellites during JUICE science planning and JUICE science operations;
* support merging of different instrument data and data products for science analysis;
* facilitate reading and understanding of JUICE science reports, publications and PR products by making use of a consistent definition for cartographic products.

The International Astronomical Union (IAU) approved in 1970 two kinds of coordinate systems for planetary bodies with

1. “East and Planetocentric”:
	* Longitudes positive East;
	* Latitudes planetocentric.
2. “West and Planetographic”:
	* Longitudes positive West;
	* Latitudes planetographic (i.e. normal to reference surface);
	* Based on Earth-centered view following the movement of the sub-Earth point in time.

Both coordinate systems are actually applied throughout the solar system with

* West Longitudes
	+ Used by Voyager and Galileo for the Jovian satellites;
	+ Applied for former USGS mapping products of the Jovian satellites;
	+ Used by Cassini for the Saturnian satellites;
	+ Used by the IAU Nomenclature Gazetteer.
* East Longitudes
	+ Introduced by Dawn for Vesta and Ceres;
	+ Used for Mars since MGS (before West) and for the Martian moons since MEX (before West);
	+ Used for Mercury since Messenger (before West);
	+ Used for the Earth’s Moon since LRO (before West);
	+ Applied within the JUICE CREMA report;
	+ Applied for the JUICE Red Book operation scenarios.
* 180° West to 180° East applied for the latest global geological map (SIM 3237; Collins et al., 2013) but also provided at USGS (http://astrogeology.usgs.gov) in East planetocentric.

It has to be noted that the West longitude system stems from an Earth-centered view applied for astronomical surveys which refer to the movement of the sub-Earth point with time. New planetary missions have changed, however, their point-of-view and apply coordinate systems centered to the rotation of the observed planetary body starting with MGS and continued by Messenger, LRO, and Dawn.

**The Galilean satellites are rotating East and JUICE shall follow the recent target-centered coordinate system definition by using East longitudes.**

**It is strongly recommended to enter discussions with IAU as well as with the Europa Clipper mission if selected to ensure the use of a common coordinate sytem.**

*References:*

Collins, G.C., Patterson, G.W., Head, J.W., Pappalardo, R.T., Prockter, L.M., Lucchitta, B.K., and Kay, J.P., 2013, Global geologic map of Ganymede: U.S. Geological Survey Scientific Investigations Map 3237, pamphlet 4 p., 1 sheet, scale 1:15,000,000, http://dx.doi.org/10.3133/sim3237