GALILEO SSI OBSERVATION PLANS FOR CALLISTO AND EUROPA, *R. Greeley[1], K. Bender[1], R. Sullivan[1], R. Pappalardo[2], K. Homan[1], [1]Arizona State University, Tempe, AZ, 85287, [2]Brown University, Providence, RI, 02912*

On December 7, 1995, the Galileo spacecraft successfully entered orbit around Jupiter, beginning its two-year mission to explore the planet's atmosphere, family of satellites, ring system, and magnetospheric environment. here we present an update to previously published work[1] of the solid-sate imaging (SSI) plans for observing Callisto and Europa during Galileo's two-year mission. Due to a problem with the on-board tape-recorder during Jupiter approach, a unique 700 m/pixel mosaic of the south pole of Europa was canceled, along with high resolution imaging of Io. As a consequence of the tape recorder anomaly and revised rules for its use, approximately 16% less tape capacity will be available for storing SSI images and other data throughout the mission.

The surface of Callisto is characterized by globally extensive impact-cratered plains and several large multi-ring structures. Abundant impact craters indicate the surface of Callisto is the oldest preserved of the four Galilean satellites. Callisto's bulk density of 1.86 g/cm^3 makes it the least dense and iciest of the Galilean satellites[2]. Although Callisto's ancient surface is relatively simple when compared to the other Galilean satellites, it represents an important end-member which provides a key for studying the early Jovian environment as well as impact cratering and other fundamental processes on icy bodies.

The present Galileo SSI imaging plan includes 163 pictures at Callisto. Of these, 9% are color observations and 54% are at resolutions better than 500 m/pixel (Table 1). The Galileo images of Callisto are targeted on locations and features that will allow investigation of: (a) the morphology and origin of multi-ring structures, including associated scarps, troughs, and ridges; (b) the morphology and origin of candidate endogenic deposits; (c) the morphology and origin of crater chains (catenae); (d) the morphology of impact craters in an icy target; (e) spectral indications of ice/silicate mixture variations on the surface; (f) the presence and mobility of volatile frosts at high latitudes; and (g) the exploration of area poorly imaged or not imaged by Voyager. Callisto will be imaged on five of the eleven orbits of the Galileo spacecraft, with the majority of pictures being taken on orbits 3 (Nov. 1996), 8 (May 1997), 9 (June 1997), and 10 (Sept. 1997).

Several large multi-ring systems were imaged by Voyager. These systems occur in the leading hemisphere of Callisto, and so one goal is to acquire images in the southern half of the leading hemisphere where Voyager coverage is very poor. Investigations into multi-ring systems provide insight into the mechanics of large impacts in icy targets (including the formation of associated scarps, ridges, and troughs), the modification of these structures and landforms by resurfacing or isostatic adjustment, and the state of the lithosphere at the time of the impact event.

Because cratered plains dominate the surface of Callisto, they will be seen in almost all images taken of the surface. For this reason, only seven frames are targeted specifically to sample these plains. Two dome craters (Har and Tindr) of different apparent ages will be imaged to investigate the morphology and origin of central dome features in icy target craters. Opportunities for investigating general effects of an icy target on impact cratering will exist in every frame, as well as the opportunity to evaluate the impactor flux at Jupiter through the time span preserved on the surface of Callisto.

In contrast to Callisto, Europa's surface is apparently very young and very complex, with few identified impact craters and a globally extensive set of dark bands and lineations. Of the four Galilean satellites, Europa was imaged least well by Voyager, with 20% of the surface covered at 2 km/pixel and the remainder at $\geq$ 12 km/pixel. The Galileo SSI imaging plan for Europa includes 200 pictures, 9% of which are color observations and 69% at resolutions better than 500 m/pixel (see Table 2). The Galileo images of Europa are targeted on locations and features that will allow investigation of: (a) the morphology, origin, and age of tectonic features such as ridges and dark lineations; (b) the morphology, origin, and age of surface units and resurfacing events; (c) the cratering history; and (d) variations in spectral and photometric properties of the surface. Europa will be imaged on eight of Galileo's eleven orbits, with the primary orbits being numbers 3 (Nov. 1996), 4 (Dec. 1996), 6 (Feb. 1997), 7 (April 1997), and 11 (Nov. 1997).

Constraints on achieving science goals for Europa involve more than just sharing limited

GALILEO SSI PLANS, CALLISTO & EUROPA, R. Greeley et al.

spacecraft tape recorder and downlink resources. Europa orbits close enough to Jupiter for radiation noise in images to be a significant concern. For this reason some SSI exposure modes are unsuitable. A fast 2x2 summation mode, which moves the image rapidly from the CCD to radiation-safe storage, must be used extensively for imaging Europa within 12 R_J. All three Europa close flybys occur where high-resolution targets must be selected using Voyager images with >10 km/pixel resolution and poor cartographic control. Therefore, preliminary imaging of the potential high resolution target areas of orbits 4, 6, and 11 must be scheduled during earlier orbits. Without adequate Voyager coverage, regional scale context frames of the highest resolution targets must also be obtained. With these constraints, the widest possible selection of targets of known interest were incorporated into the observing plan, along with extensive exploratory coverage.

[1] Carr, M. et al (1995) *JGR, 100,* 18935.
[2] Passey, Q.R. and Shoemaker, E.M., (1982) Satellites of Jupiter, 379-434.

Table 1 CALLISTO OBSERVATIONS <500 m/pixel

Name	Orbit	Latitude	Longitude	Resolution, m/pixel
Valhalla Palimpsest	C3	14	55	28
Catena	C3	35	46	39
Valhalla scarp, plains	C3	36	34	37
Valhalla graben zone	C3	4	32	42-55
Crater statistics	C9	-4	6	125
Crater Har	C9	-3	359	125
Valhalla regional	C9	20	30	412
Smooth plains	C10	14	349	290/69
Small ring structure	C10	35	358	360
Crater Tindr	C10	-3	355	345
Asgard transect	C10	27	156	85

Table 2 EUROPA OBSERVATIONS <500 m/pixel

Name	Orbit	Latitude	Longitude	Resolution, m/pixel
Wedges	C3	-15	195	418
Maculae	E4	7	323	235/60
Dark material	E4	7	327	150/20
Dark linea	E6	13	273	200
Macula/linea	E6	-5.5	270	235/50
Bright halo	E6	-25.5	271	125
Bright material	E6	-9.5	271	110/12
Apex	G7	-8	95	300
Triple band	E11	15	189	350/85
Linea intersection	E11	44	215	300/60
North pole stereo	E11	65	150	22
North pole	E11	62	175	11
North pole	E11	86	150	22