WISE-CAPS: AN INTEGRTATED AND SECURE WEB-BASED ENVIRONMENT FOR ANALYSIS AND BROWSING OF LUNAR AND PLANETARY DATA. J. Terazono[1], R. Nakamura[2], Shinsuke Kodama[2], Naotaka Yamamoto[2], Hirohide Demura[1], Naru Hirata[1] and Yoshiko Ogawa[1], Jun'ichi Haruyama[3], Makiko Ohtake[3], Tsuneo Matsunaga[4], Taro Suzuki[1] and Takafumi Hayashi[1]. [1]The University of Aizu (Tsuruga, Ikki-Machi, Aizu-Wakamatsu, Fukushima 965-8580, Japan; terazono@u-aizu.ac.jp), [2] National Institute of Advanced Industrial Science and Technology (AIST), [3]Japan Aerospace Exploration Agency (JAXA), [4]National Institute for Environmental Studies (NIES).

Introduction: Location information is an essential key for all data of lunar and planetary science. Recent maps are generally web based and these systems are generally called as Web-GIS (Geographical Information System). Web-GIS is becoming common in lunar and planetary field such as USGS Map-a-Planet [1]. However, some features should be required with conventional GIS to enable the researchers as a research platform to share and exchange their data:

- It should be capable of handling large amount of data common in lunar and planetary exploration.
- It should be secure both in data transmission path, authentication and server.

We are developing Web-GIS based data analysis environment for lunar and planetary exploration [2][3], and this system, called "WISE-CAPS" (Web-based Interactive Secure Environment for Collaborative Analysis of Planetary Science), has new flexible and rigid security capability.

System Software: All system software and their components are based on open-source software, including base operating system (Linux), web server (Apache), database server (PostgreSQL) and connecting script language (PHP).

Also, the key component of the system uses open-source software. The base of mapping system is Map-Server [4], one of the Open Source Geospatial Foundation [5]. The mapserver offers extensible mapping capability and wide range of support on image format such as JPEG, PNG and TIFF (GeoTIFF). As the mapserver supports the OGC standard [6], the system can communicate with other OGC-compliant servers to form distributed Web-GIS based mapping network.

In the mapping area, OpenLayers [7], the open-source mapping control framework written mainly by JavaScript, enables us to draw layered maps without writing complex scripts and programs from scratch. OpenLayers also provides built-in Ajax (Asynchronous JavaScript + XML) capability to provide smooth and agile display redrawing (such as zooming and moving of the map) without reloading webpages.

Security Control: WISE-CAPS uses Tsukuba-GAMA [9], in order to access secured Apache web services protected by the GridSite [10]. GridSite is an Apache authentication module using local Grid Access Control List (GACL) files. The GACL determines whether user can access files based on users' certification files. Moreover, by creating Virtual Organization (VO), the group of users who shares common works, the users belong to the same group can share and browse the data of other users with the same group. The mechanism enables flexible security control required for collaboration in science field.

Current Implementation: We have constructed mapping system and tested system performance and capability and network security control using some Kaguya images including ones obtained by Terrain Camera (TC), Multiband Imager (MI) and Spectral Profiler (SP). We confirmed that the system works as we designed and the system can realize high-level security level and flexible security settings using GACL. We are now adding more data, mainly Kaguya camera data, and working for enhancement of security settings.

Future Considerations: As current users are targeted for the closed test, we have no sophisticated portal pages for the WISE-CAPS. We should prepare some modern (Wiki-based) front pages soon.

Currently, worldwide data sharing efforts of lunar and planetary data are conducted by IPDA (International Planetary Data Alliance) [11] and they are actively discussing the feasibility of Planetary GIS for the future data browsing and sharing platform [12]. Our WISE-CAPS is also a test platform for these future data interoperability platform.

Also, the similar system will exchange data with some modern data format in future.

References:

[1] http://www.map-a-planet.org/ [2] Terazono *et al.* (2008) *LPS XXXIX,* Abstract #1052. [3] Terazono *et al.* (2009) *LPS XL*, Abstract #1232, [4] http://www.mapserver.org/ [5] http://www.osgeo.org/ [6] http://www.opengeospatial.org/ [7] http://openlayers.org/ [8] http://webgis.wr.usgs.gov/pigwad/down/moon_clementine_750nm_basemapV2.htm [9] Yamamoto *et al.* (2008) *Proc. IEEE International Conference on eScience*. [10] http://www.gridsite.org/ [11] http://www.planetarydata.org/ [12] Kasaba *et al.* (2009) *Proc. DPS meeting* #41, #46.02.