**Integrated Lunar Coverage Information System: Implemented for Chandrayaan-2 payloads.** Sachin Narang[1*], Himanshu Pandey[1,] P. Gunasekhar[1], BN Ramakrishna[1], [1](Indian Space Science Data Center (ISSDC), ISRO Telemetry, Tracking and Command Network (ISTRAC/ISRO), Bengaluru, 560058, India). Contact[*] (sachin_narang@istrac.gov.in)

**Introduction:** The Chandrayaan-2 spacecraft was launched by ISRO in August, 2019 and is placed in a 100x100 km lunar polar orbit. The Chandrayaan-2 Orbiter is carrying 8 state of the art payloads on-board which include three optical payloads viz. Terrain Mapping Camera (TMC), Imaging IR Spectrometer (IIRS) and Optical High Resolution Camera (OHRC). The primary objectives of these optical payloads is to map the lunar surface with high spatial resolution of 5 m, mineralogical and volatile mapping of the Moon in the spectral range of ~0.8-5.0 microns and provide high resolution imagery with a ground sampling of 0.32 m of lunar regions of interest among other objectives.

**Problem Statement:** Due to Sun-Moon-Spacecraft geometry, only a limited three month time window in a six months period can be utilized for optical payload operations. To achieve the mission objective of coverage of entire lunar surface quickly under the constraint of operating these payloads in the favorable season conditions, the payload planning & operations team is tasked to optimize the coverage strategy. Though the uploaded plan and the target coverage is known, the timely feedback of the processed data from Payload Operation Centers (POCs) is critical to assess the actual coverage, finding the gaps and calibrate the coverage strategy during the on-going season.

**System envisaged:** To provide quick feedback to the payload planning & operations teams, an integrated lunar coverage information system is envisaged and implemented using the time sampled ground trace of the spacecraft, instrument bias and swath of the instruments and provide information on coverage aspects in the processed data.

**Features:** The system provides Coverage Visualization in 2D/3D lunar globe, dynamic queries and search based on station-id, dump orbit number and dump time, selection based on Pre-OD and Post-OD data, data analytics functions and coverage percentage. The system also provides for instrument selection and is generically developed to provide quick feedback for any payload of Chandrayaan-2, if configured.

**Usage:** The system is continuously operational from July, 2021 onwards and is providing on-demand feedback to the operations team regarding daily coverage on lunar map and data coverage summary.

**Design and Implementation Brief:** The developed system transforms the ground-trace information to the targeted coordinate system in a geo-tagged standard format which is persisted in the spatial database, published dynamically through the geospatial server and estimated swath coverage is made available through a web-based interactive lunar globe to the stakeholders in a fully automated way on a regular basis.

**Tools & Technologies Used:** Free and open source technologies (FOSS) have been used for the implementation of the project viz. Java to transform the spatial ground trace information to geo-tagged standard format, GeoServer to serve high resolution lunar imagery and publish spatial data overlay, PostGIS to persist spatial information in the database, Cesium JS: to render an interactive lunar globe and fetching the data-layers from the geospatial server, HTML, CSS, JavaScript: for rendering and user input in the browser, Linux Shell Scripting for complete pipeline automation and Apache/Tomcat server to host the application.

**Detailed Paper Summary:** The paper describes the idea and the implementation approach to provide quicker feedback on lunar surface coverage using standard protocols which can be readily configured, extended, adapted and upgraded for any such requirements for lunar and planetary missions.

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