**Assessing the urban damage due to aerial bombing in Gaza City with use of**

**combine Multispectral and SAR imagery**

Kumarasiri W.M.A1 \*, Wijesinghe M.A.S2, Welikanna D.R3 and Sivanantharajah S4

1 \*, 2 Department of Geography, University of Sri Jayawardhanapura, Sri Lanka

3 Department of Surveying and Geodesy, University of Sabaragamuwa, Sri Lanka

4 Retired Survey General, Department Survey, Sri Lanka

\*anandakumarasiri1977@gmail.com

***ABSTRACT***

This study investigates the extent of urban damage in Gaza City resulting from aerial bombings that occurred between October 7th, 2023, and November 6th, 2023, utilizing Sentinel-1 and Sentinel- 2 satellite data. The primary aim is to provide a detailed assessment of infrastructure damage and changes in land cover. Further the study is set to determine a time series damage assessment in order to understand the damage pattern propagation. Sentinel-1 Synthetic Aperture Radar (SAR) data was processed through a series of preprocessing steps, including radiometric calibration, speckle filtering, and terrain correction, to enhance the quality and accuracy of the backscatter measurements. Concurrently, Sentinel-2 Multi Spectral (MS) imagery was utilized to assess changes in land cover and calculate the Normalized Difference Built-up Index (NDBI) to identify the land use land cover changes in the built-up areas. At the initial stage of the study, we have employed ratio-based change detection method to deduce the temporal variations and quantify the damages. The combine use of the MS and SAR imagery provide the advantage of identifying the damages by compromising missing information especially in the MS data due to adverse weather and atmospheric effects. Preliminary results reveal significant changes in urban areas, highlighting the impact of the conflict on infrastructure and urban damage. This assessment provides valuable insights for aid response strategies and recovery planning in conflict-affected regions. The integration of SAR and optical data offers a comprehensive approach to understanding urban damage, contributing to improved disaster management and urban resilience.

**Keywords:** Urban Damage, Sentinel-1, Sentinel-2, Gaza City, Change Detection