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Mapping the World at 10 m: A Novel Deep-Learning Land Use Land Cover Product and Beyond

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Land use / land cover (LULC) maps provide critical information to governments, land use planners, and decision-makers about the spatial layout of the environment and how it is changing. While a variety of LULC products exist, they are often coarse in resolution, not updated regularly, or require manual editing to be useful. In partnership, Esri, Microsoft Planetary Computer, and Impact Observatory created the world's first publicly available 10-m LULC map by automating and sharing a deep-learning model that was run on over 450,000 Sentinel-2 scenes. The resulting map, released freely on Esri's Living Atlas in June 2021, displays ten classes across the globe: built area, trees, scrub/shrub, cropland, bare ground, flooded vegetation, water, grassland, permanent snow/ice, clouds. Here, we discuss key findings from the resulting map, including a quantitative analysis of how 10-m resolution allows us to assess small, low density urban areas compared to other LULC products, including the Copernicus CGLS-LC100 100-m resolution global map. We will also share how we support project-based, on-demand LULC mapping and will present preliminary findings from a new globally consistent 2017-2021 annual LULC dataset across the entire Sentinel-2 archive.