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# ASSESSMENT OF GLARE/GLINT FROM PHOTOVOLTAIC SYSTEM NEAR TRANSPORT INFRASTRUCTURES

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**Abstract** – Installation of solar photovoltaic (PV) systems in built areas pose challenges in balancing renewable energy use with safety concerns. The aim of the study is to assess the glare/glint associated with a hypothetical solar power plant in the Mardin region in Türkiye, which offers favorable solar potential and is situated near key transportation infrastructures. The methodology involved analysis of eight PV configurations across three installation types with due consideration to anti-glare measures such as anti-reflective coatings and glass texture. Using industry-compliant *ForgeSolar* software, the duration and intensity of glare were obtained from multiple observer viewpoints, including air traffic control, flight paths, roadways, and police checkpoints. The analysis underscores significant aviation safety concerns, indicating that specific PV configurations may disrupt flight operations and visibility. The configuration featuring single-axis tracking with AR-coated glass – was identified as optimal. It achieved an annual energy production of 183 GWh, the highest among all configurations. The associated glare duration was limited to 185.5 hours per year of green-level glare, with no yellow-level glare observed, thereby remaining fully compliant with safety thresholds. This scenario also demonstrated approximately 18 % cost reduction compared to dual axis tracking alternatives. Seasonal glare patterns are observed for police checkpoints, particularly during spring and late summer. The findings revealed that optimal PV design in sensitive regions requires a balance between maximizing energy yield and minimizing glare impact. This research provides a framework for solar development near critical infrastructures in built environment, by adopting optimal combination of panel orientation, tracking technologies, and anti-glare measures. This work lays the groundwork for policy development and offers practical insights for solar developers, airport operators, and regulators navigating the complexities of renewable energy and transportation safety.

**Keywords** – *Airport; aviation safety; reflectivity; roadways; solar energy*

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