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Despite that aircraft positions and movements can be easily monitored on the radar displays at major airports nowadays, it is still important for the air traffic control tower (ATCT) controllers to look outside the window as much as possible to assure safe operations of traffic management. The present paper investigates whether an introduction of the NASA's proposed Spot and Runway Departure Advisor (SARDA), a decision support tool for the ATCT controller, would increase or decrease the controllers' head-up time. SARDA provides the controller departure-release schedule advisories, i.e., when to release each departure aircraft in order to minimize individual aircraft's fuel consumption on taxiways and simultaneously maximize the overall runway throughput. The SARDA advisories were presented on electronic flight strips (EFS). To investigate effects on the head-up time, a human-in-the-loop simulation experiment with two retired ATCT controller participants was conducted in a high-fidelity ATCT cab simulator with 360-degree computer-generated out-the-window view. Each controller participant wore a wearable video camera on a side of their head with the camera facing forward. The video data were later used to calculate their line of sight at each moment and eventually identify their head-up times. Four sessions were run with the SARDA advisories, and four sessions were run without (baseline). Traffic-load levels were varied in each session. The same set of user interface – EFS and the radar displays – were used in both the advisory and baseline sessions to make them directly comparable. The paper reports the findings and discusses their implications.