

# COORDINATED USE OF OPTICAL AND GPS DIAGNOSTIC SYSTEMS TO STUDY IONOSPHERIC-THERMOSPHERE PHENOMENA

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**Abstract.** Satellite radio beacon observations provide satellite-to-ground site ionospheric data along specific ray-paths. For GPS and other soon-to-be-operational GNSS methods (e.g., the European Galileo system), the number of such instantaneous observation points (i.e., using multiple satellites) is typically ten or less within a spatial region of about 1 million square kilometers. When observations of multiple satellites from multiple stations are employed, maps of ionospheric parameters (such as total electron content) can be produced over vast regions.

All-sky-imaging (ASI) data of 630 nm airglow provide 2-dimensional (horizontal) portrayals of ionosphere-thermosphere gradients and structures over the  $\sim 1$  million square kilometers associated with a single GPS site. In addition to studies of the optical science yield conveyed in a single image, all-sky coverage also provides the context for methods that sample points within an image. This presentation will review the multiple opportunities that coordinated GPS-ASI observations offer to advance studies of ionospheric disturbances in ways not possible using single diagnostic systems.