Development and Applications of' the GPS Ionospheric Mapping Technology

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60+ dual frequency G1'S receivers are now operating permanently in the global International GPS Service (IGS) network. which implies that the Earth's ionosphere may be monitored globally on a continuous basis. The GPS data is used to generate global ionospheric maps (GIM), which compute ionospheric tots] electron content (TEC) values hourl y on a global shell structure. There are numerous applications of the GIM's including monitoring variations of the. radiative and particle flux over the solar cycle: the inter action between the geomagnetic field and the ionosphere; ionosphere-thermosphere interactions; and calibration of ionospheric delay errors for remote sensing satellites (for example single frequency satellite S-band range signals to Earth ante.nnas and Ku-band radar altimeter measurements from low Earth orbiters).

The accuracy of the GIM's are currently limited by sparse. GPS measurements (lack of GPS stations in some parts of the world), lower signal-lo-noise data due to encryption, mapping function errors, and usc of a 2-dimensional shell model. A complete overhaul of the GIM system has been initiated with the objectives of maximizing the GPS data strength, extending the mapping function to 3 dimensions, improving the. grid and parameter estimation strategy, and including model information to bridge data spar seness. Plans arc underway to generate GIM's hourly with a 24-hour delay for the applications mentioned above and to build a global, continuous data base of ionospheric measure.mcnts. The current and future ionospheric research and development program base.d on the GIM's at JPL will be outlined.

1.1995 Spring Meeting

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5. (a) G07 G1'S and the Ionosphere
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6. 0 (Oral) preferred

7. 30% at the September'94 10N conference in Salt Lake City, Utah.

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10. Schedule after B. Wilson, ct. al

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