

Ionosphere Propagation Delay Measurement System Using an Inverse Spread Spectrum

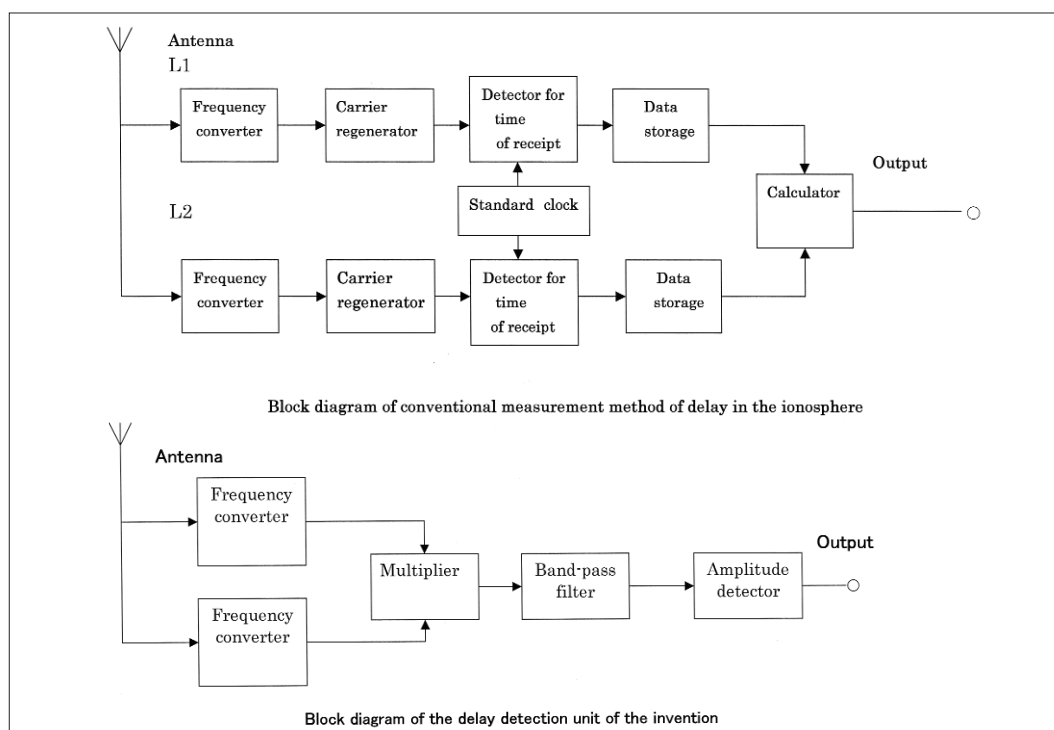
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External view of the GPS Real-Time TECMETER (Total Electron Content Meter)

Technological Overview

This system was invented to measure the delay in electromagnetic waves during their propagation in the ionosphere. One feature of the invention is that a voltage proportional to the difference in propagation delay in the ionosphere is directly provided through the multiplication of frequencies of two electromagnetic waves that have been spectrum-spread using a common code. Using this measurement system, it becomes possible to simplify and downsize the ionosphere delay correction system that is an essential component of the time comparison system for satellite communications and applications. In particular, the principal mechanism — an inverse spectrum spread through the multiplication of two signals of different frequencies that have been spectrum-spread using a common code — is expected to be used as a new method in other communications applications.



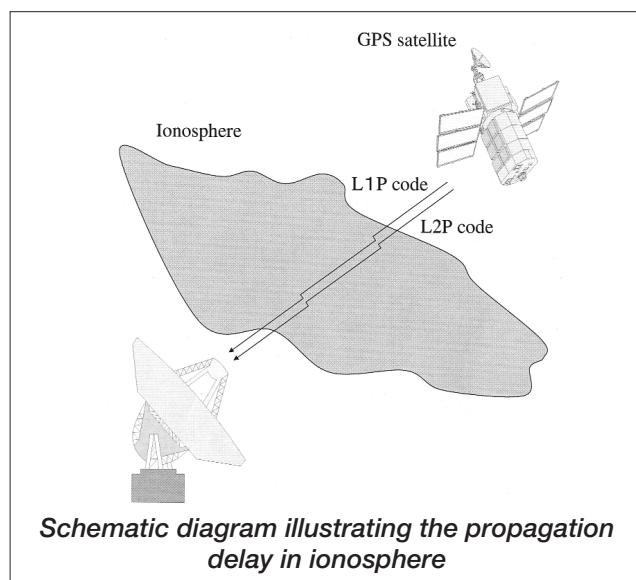
Commercialization

This system has been commercialized by Nihon Tsushinki Co., Ltd. under the name “GPS Real-Time TECMETER,” and is under contract development by Research Development Corporation of Japan (currently the Japan Science and Technology (JST) Corporation).

Under the contract development program, if a university or public research institute provides JST with a new technology, JST examines its novelty, potential problems with its commercialization, the scale of development work it would entail, and the feasibility and risk of its commercialization, and then outsources its commercialization to an appropriate company that meets the requirements of JST. Upon outsourcing, JST pays a development fee to the company. The development fee for this technology was ¥150 million, and its development period was 2.5 years. JST outsourced the commercialization of this new technology of CRL as an extended version of the patent, “High-Precision Position Measurement System Using the Correlation between Two Frequencies.”

Product Features

It is now widely known that the GPS satellite can pinpoint the current location of humans. The factor that determines its final positioning accuracy is the delay of electromagnetic waves in the ionosphere. Thus, the precise measurement of delay leads to precise positioning. As shown in the right-hand figure, the radio waves emitted from a GPS satellite are delayed during propagation in the ionosphere, and the degree of delay varies occasionally. This measurement system was launched on the market in 1988 as a landmark system capable of providing delay in the ionosphere on a real-time basis.



Horizontal Technology Transfer

The idea of licensing a patent to a company and receiving a royalty may lead to thoughts of monopolies and large profits. However, there are two means of technology transfers to users by a public institute: vertical transfers to the public, and horizontal transfers to another public institute. We feel that technology transfers between public institutes are as important as vertical transfers. Though huge royalties may not be expected, we will make efforts to continue such horizontal technology transfers, eventually contributing to society.

Patents Obtained by CRL may be used for a fee.
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