

28-Day Extended Ephemeris

Next Generation GNSS Satellite Orbit Prediction Technology

Before a GPS receiver can calculate a position, it must know the locations of a minimum of four satellites. A standard GPS receiver does this by downloading satellite broadcast information that describes their orbital trajectory (also known as an “ephemeris”). The problem with this approach is that broadcast ephemeris messages are transmitted at a very slow speed (50bps) and they are valid only for a short period of time (2-4 hours). In addition, under poor signal environments such as indoors, urban canyons, and dense tree covered areas, downloading broadcast ephemeris information can take minutes or, often, fail altogether.

Today, end-users expect instant connectivity; as such, they are not willing to wait upwards of 30-60 seconds for a GPS position fix. Using our 28-Day Extended Ephemeris service, GPS chipsets or OEM devices can expect a significantly reduced time to position fix of around 2 seconds¹.

Our patent pending 28-Day Extended Ephemeris service is based on ultra-high performance data compression techniques designed to minimize the ephemeris data file to 20 kbyte per week without any noticeable loss in accuracy. In addition, with our proprietary prediction algorithms, our orbit and clock prediction accuracy is at least 2 times better than the competition.

Along with our 28-Day Extended Ephemeris service, we also offer a lightweight software client written in platform independent C code. This software client was designed from the ground up to operate efficiently on low-power processors (e.g. ARM Cortex M0 and M3 etc.) with very low memory and storage requirements.

While a typical mobile phone may require 7 or 14 days of extended ephemeris, an unconnected device such as a digital camera would likely need 28 days. Likewise, depending on the intended application and network availability, M2M applications may require up to 28 days of prediction information. Our 28-Day Extended Ephemeris service is capable of providing different levels of prediction duration and compression accuracy, this feature enables a chipset or OEM device manufacturer to manage and optimize the network traffic based on their unique applications.

For customers that would like to incorporate our technologies into silicon, proprietary platforms, or operating systems, we can provide collaborative engineering support to assist in integration; please contact us for details.

Features and Benefits

28-Day Extended Ephemeris service for reducing average receiver Time-To-First-Fix from upwards of 30-60 seconds to around 2 seconds¹

With extended ephemeris data, GNSS receivers can **obtain position fixes without continuous tracking of satellites**

Ultra-high performance data compression techniques to **minimize data transfer requirements** (20 kbyte per week) without any noticeable loss in accuracy

Unparalleled orbit and clock prediction accuracy allow users to obtain accurate predictions with at least 2 times better than the competition

Ultra-efficient client software was designed from the ground up to operate on low-power processors

Very low memory and storage footprint opens up new opportunities for low-cost M2M applications for the internet of things

Platform independent client software allows for seamless support across different hardware and software platforms

Variable prediction duration and compression accuracy allow customers to manage and optimize network traffic for specific target applications



Performance at a Glance

System Performance²

Time-To-First-Fix (TTFF)¹

Warm 1 - 2 seconds
Cold 1 - 6 seconds

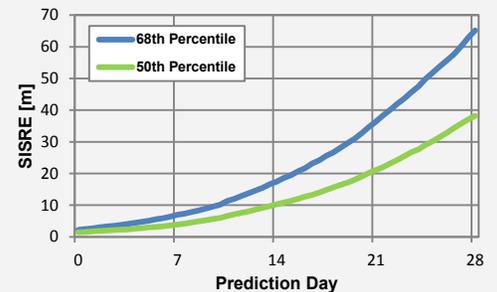
Prediction Duration 1, 7, 14, 21 or 28 Days

Accuracy Performance
68th Percentile SISRE
(Orbit and Clock)
Day 1 2.7 m
Day 7 7.0 m
Day 14 17 m
Day 28 65 m

Extended Ephemeris
Data Size 20 kbyte per week

GNSS Constellations GPS
GLONASS (Q2-2013)

28-Day Extended Ephemeris Accuracy
Signal-In-Space Range Error (Orbit and Clock)



Software Client Specifications²

Execution Code Size 9.5 kbyte
Run-Time Memory Usage 3 kbyte
Run-Time (ARM Cortex M3) < 0.9 seconds
Programming Language C
Platform Support Windows 7, Linux,
Embedded ARM &
others³
GNSS Chipset Support SiRF, u-blox & others

Target Applications

- Mobile phones
- M2M devices and internet of things
- GNSS chipsets and modules
- Digital cameras
- Low-power tracking devices

Notes:

1. TTFF is chipset/receiver dependent
2. Specifications are subject to change
3. Please contact us for Windows Phone, Android, and other operating systems

For more information on the 28-Day Extended Ephemeris satellite orbit prediction technology, please visit www.basebandtech.com.



Preliminary

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