

TRIMBLE ATMOSPHERE APP TECHNICAL NOTES



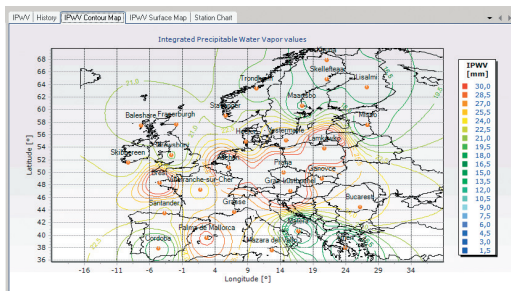
The Trimble® Atmosphere App is a unique scientific application designed to support atmospheric estimation based on GNSS and weather station data. The Trimble Atmosphere App operates on the Trimble Pivot™ platform, the foundation for multiple Infrastructure apps that serve various markets and their specific needs.

TRIMBLE ATMOSPHERE APP

Designed to meet the specific needs of Earth Systems applications, the Trimble Atmosphere App enables users to evaluate ionosphere and troposphere conditions. Atmosphere Watch and Weather Condition are the modules within the application that allow users to calculate a variety of different atmospheric parameters:

- Integrated Precipitable Water Vapor (IPWV)
- Total Electron Content (TEC)
- Tropospheric Slant Delay and Wet Slant Delay

Advanced modern algorithms are used to derive atmospheric state parameters from GNSS observables and meteorological sensor data. Both postprocessing and real-time approaches are supported. The Trimble Atmosphere App allows you to present results in ASCII or binary (BUFR) format or in graphical form. In addition to station or condition charts, results can be visualized as a contour or a surface map.



Trimble Atmosphere App Contour Map

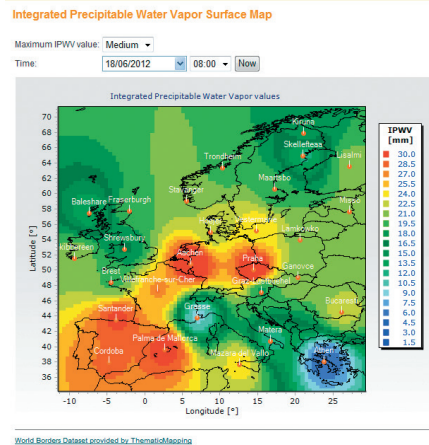
TRIMBLE ATMOSPHERE APP PAGES IN PIVOT WEB APPLICATION

The Trimble Pivot platform includes a basic web installation. The Trimble Atmosphere App adds the following web pages to support and display the atmospheric conditions to a wide user range.

- IPWV Map
- Station Chart
- Condition Chart
- IPWV Contour Map, Surface Map and Surface Map Animation
- TEC Contour Map, Surface Map and Surface Map Animation
- TEC Surface Map, Surface Map and Surface Map Animation
- TEC Surface Map Animation

The content of those pages are defined through a management page. In addition, all visualizations within the Web Application are interactive, to enable the user to zoom in on a detail or select a specific time from which the user would like to receive the information.

The Sensor Map provides an overview of the network layout with health and status information, while the IPWV map shows current water vapor information per station.



Trimble Atmosphere App IPWV Surface Map

TRIMBLE ATMOSPHERE APP STATUS VIEW

The Trimble Atmosphere App Status View provides an overview of the atmosphere watch processors in the network as well as available weather condition modules. The details pane provides the settings on the different modules as well as the TEC and IPWV results. The App Status View assists the operator in analyzing critical and non-critical situations in real-time to better assist field end users. This smart and interactive feature will point you to the exact module and functionality you want to analyze. The traffic light indicator provides a high level application status summary.

ORDER INFORMATION

Default Configuration	Part Number
Trimble Atmosphere App	96805-00
Optional Functions*	Part Number
Water Vapor (IPWV) calculation	96805-01

*May be included for an additional charge

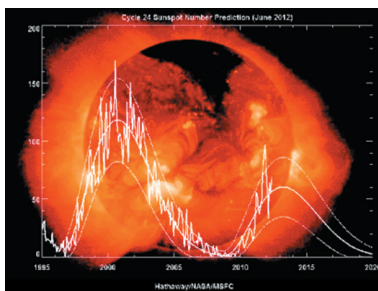
TRIMBLE IONOSPHERE APP TECHNICAL NOTES



The Trimble Ionosphere App is an addition to the Trimble Atmosphere App designed to calculate ionosphere scintillation and activity and to report the information back to a system administrator.

THE IONOSPHERE AND WHAT TO EXPECT

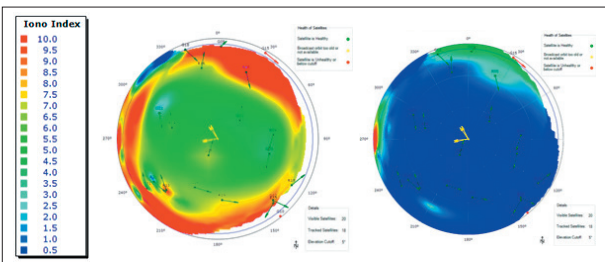
The ionosphere, the upper part of the atmosphere, consists of electrons, which are highly influenced by solar activities. The strength of solar activities follows a so-called solar cycle, where huge disturbances can appear in a GNSS station network/array at the maximum point of this solar cycle. In addition to solar activities, the ionosphere scintillation is another disturbance within the ionosphere that influences the quality of GNSS signals.



Solar activities to expect within the next years

TRIMBLE IONOSPHERE APP

The new Trimble Ionosphere App is an application / tool, which allows an operator of reference stations to receive indications about ionosphere activities, the strength of disturbances and the location of where those negative impacts appear. Some of the information presented within the Ionosphere App is dependent on results derived from the Trimble VRS³Net App or the SparseVRS App and the Atmosphere App.



Solar activity represented in the skyplot at the same station at different times of the year

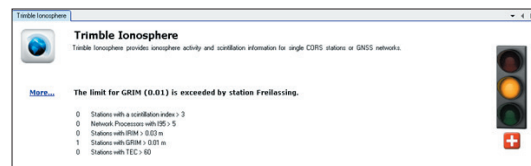
The Ionosphere App calculates and summarizes the following information:

- Scintillation Index for a reference station
- I95 Index, IRIM and GRIM values out of the network processor
- TEC values out of the Atmosphere Watch module.

The Ionosphere App allows an operator to apply different filter levels to minimize the ionosphere influence on the stations and to maximize the performance within the operated network.

IONOSPHERE APP STATUS VIEW

The Ionosphere App Status View provides an overview on the health of the app as well as information about critical counters, such as increased scintillation index, stations with increased IRIM, GRIM or TEC values, or an increased I95 Index.



MOBILE CAPABILITIES

Administrators also have the ability to publish the information derived from the Trimble Ionosphere App to their end users by simply activating the Trimble Mobile Communication App. The published information from the Ionosphere App can be presented and visualized on a new mobile app called Pivot Field, available for download for all end users. Trimble Pivot platform now supports mobile apps running on devices (such as tablets or smart phones) that are powered by the Android or Apple iOS operating systems.

ORDER INFORMATION

Default Configuration	Part Number
Trimble Ionosphere App	96805-10

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