Inmarsat TCP Accelerator V2

User Guide for WindowsVista, WindowsXP and Windows7

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inmarsat.com/bgan

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Inmarsat TCP Accelerator V2

1 Introduction

1.1 Purpose of this manual

The purpose of this document is to provide guidance on the client version of Inmarsat TCP Accelerator V2 (referred to as TCP Accelerator throughout this document) for the BGAN terminal using the Windows XP, Vista and 7 operating systems.

It is intended for end-users of BGAN, Distribution Partners, Service Providers and anyone who is involved in applications and solutions development or testing over BGAN. A previous knowledge of satellite communications and TCP/IP is useful, but not essential.

1.2 Scope

This document provides an overview of TCP Accelerator, and gives instructions on installing and configuring the client version of the software. It also provides troubleshooting information.

1.3 Assumptions

- You have access to all the programs referenced in this document.
- You are familiar with Windows Vista, XP or 7 operating systems.

1.4 Terminology

When you see the terms BGAN TCP-PEP or TCP Accelerator in this guide, this refers to Inmarsat TCP Accelerator V2.

1.5 How to use this manual

This section explains how the information in this manual is organised, and introduces the conventions that have been used.

Introducing the chapters

The following table gives an overview of the chapters in this manual:

Chapter	Contents
Inmarsat TCP Accelerator V2	Introduces TCP Accelerator, defines the purpose, scope, and intended audience of this manual, explains how information is organised in this document.
Overview	Provides a brief overview of TCP Accelerator including how it differs from standard TCP.
Installation	Describes the minimum hardware and software requirements for installing and using TCP Accelerator and provides detailed installation instructions.
Configuration	Explains how to configure TCP Accelerator and monitor status and alarms.
Troubleshooting	Provides some hints and tips and details known issues.

Text conventions

This manual uses typographical conventions to help you easily identify certain types of information. The following table introduces the conventions used:

Convention	Usage	Example
Blue italic text	References to sections, chapters or other documents	See *Introduction*
Bold text	Options that you select on a user interface	Click on **Next**

Acronyms and abbreviations

Acronym	Explanation
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
UT	User terminal
SOHO	Small office home office
NDIS	Network Driver Interface Specification

1.6 Associated documents

BGAN LaunchPad User Guide available for download at **www.inmarsat.com/support**.

Overview

2 Introducing TCP Accelerator

The client version of TCP Accelerator is an application that can be installed on a BGAN user's computer to significantly enhance performance when sending TCP traffic over BGAN. The client version of TCP Accelerator is available for download free of charge from the Inmarsat support website at **www.inmarsat.com/support**.

This chapter gives a brief overview of TCP Accelerator and how it operates on the BGAN terminal and connected devices.

2.1 The TCP Accelerator suite

The following components are required to accelerate TCP traffic in both directions.

TCP Accelerator Client:	This is a client-based software application and is installed on the user's PC to enhance performance in the send/upload direction.
TCP Accelerator Network:	A server-based application for non-VPN users. This resides within the network and together with TCP Accelerator Client enhances performance in the receive/download direction.
TCP Accelerator VPN Enterprise:	A server-based application for VPN users. This resides within the enterprise site and together with TCP Accelerator Client enhances performance in the receive/download direction. (To be released).

TCP performance can be further enhanced by modifying server configuration. Please refer to *Optimising performance of end host servers though adjustment of TCP parameters* on page 20.

2.2 Overview of TCP Accelerator

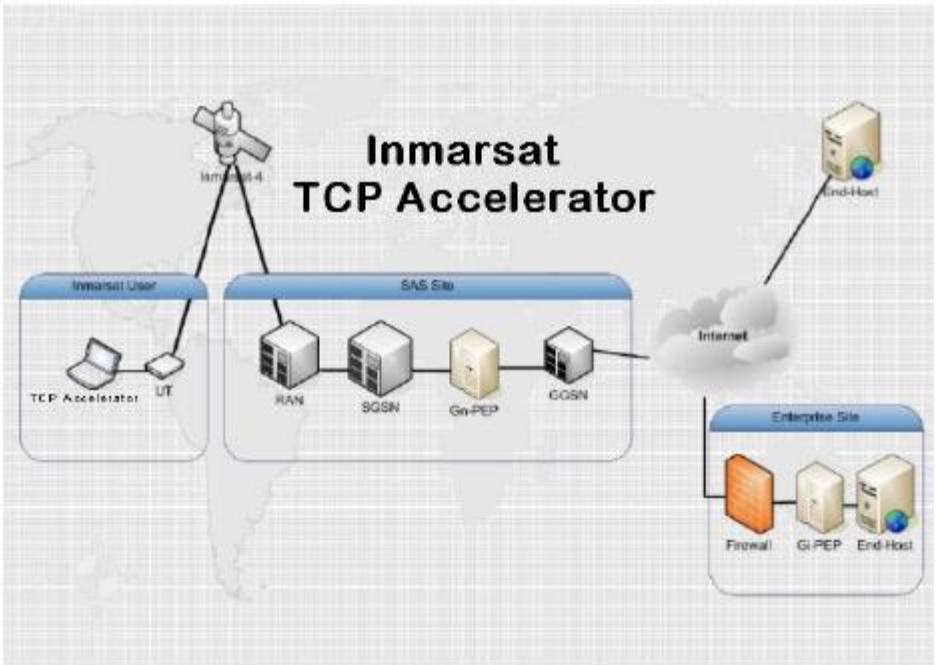


Table 1: Overview of TCP Accelerator

The network version of TCP Accelerator (referred to as Gn-PEP in Table1) is currently installed in three Inmarsat BGAN Satellite Access Stations (SAS): Burum, Fucino and Paumalu and available on I-4 America's, I-4 Asia Pacific and I-4 Europe, Middle East and Africa.

TCP Accelerator VPN Enterprise (referred to as Gi-PEP in Table1), when released, would typically be installed at customer office locations.

2.3 About Standard TCP

Transmission Control Protocol (TCP) handles communications between applications and network software. It breaks messages into individual packets before they are sent by IP (Internet Protocol) and reassembles them when they arrive.

TCP provides connection-oriented reliable data delivery, duplicate data suppression, congestion control and flow control. Most user applications such as email, Telnet and FTP, use TCP.

Standard TCP congestion control works by estimating the true bandwidth available in the network. True bandwidth is the number of packets per second that the network can deliver for an individual TCP session. It is limited by the processing speeds of routers, bandwidth available in intermediate links and various other factors, depending on the nature of the network.

Standard TCP has two major drawbacks for the satellite communications environment:

- Delays in the network are overestimated.
- Starts at a low transmission rate, then increases.

2.4 About Inmarsat TCP Accelerator V2

Inmarsat TCP Accelerator V2 has been built into the Inmarsat BGAN system for two reasons:

- Increase user experience.
- Enhance system capacity.

Inmarsat TCP Accelerator V2 overcomes the drawbacks of standard TCP and enhances the performance over a satellite network by:

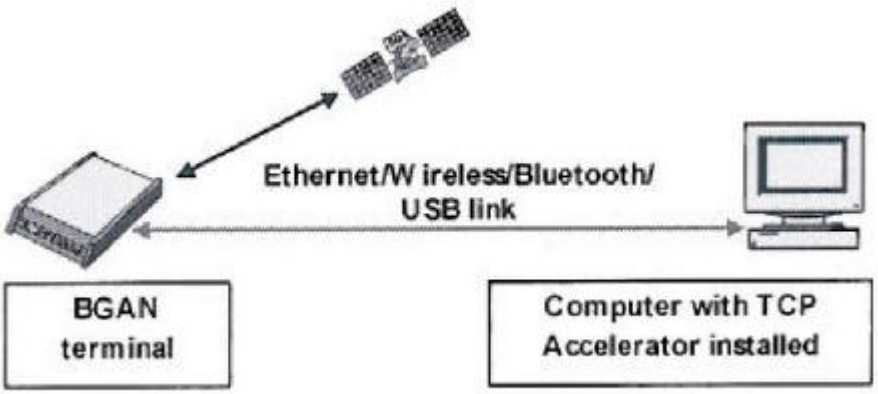
- Improving true bandwidth estimation, thus customers with high QoS can start at a higher transmission rate. It can also withstand occasional packet drops and is resilient to sudden bandwidth changes.
- Increasing window size, thus improves TCP performance in larger bandwidth applications.
- Ensuring high transfer rates and less delay through delay-based congestion control.
-

The net result is faster file transfers for TCP-based applications like email, FTP, web browsing and VPN. Transfer speed improvements vary depending on usage, but files that are highly-compressible will have a higher throughput performance and thus lower transfer time.

TCP Accelerator splits an end-to-end TCP connection into two, to enhance the performance of TCP on your BGAN terminal. One of the two TCP connections is a high-delay, wireless/satellite packet data link, and the other is a terrestrial link. TCP Accelerator operates each link separately, using built-in algorithms to optimise the operation of the link for the physical media being used. As the links can be of different types and different bandwidths, TCP Accelerator can buffer intermediate packets and control the flow on both links. TCP Accelerator operates in a way that is transparent to the end-to-end connection.

TCP Accelerator is installed on a device connected to the terminal, for example a computer running Windows Vista, XP or 7. The terminal contains the radio and related software and hardware. The computer operates the TCP Accelerator software.

The following diagram shows how the terminal integrates TCP Accelerator.



2.5 When to use TCP Accelerator

TCP Accelerator can be used on any BGAN terminal. It will enhance the performance of BGAN when your PC is sending data from TCP applications only.

Typical TCP applications include:

- File transfer.
- Email.
- Web browsing.
- Webmail.
- VPN with Checkpoint, Nortel, Cisco and Netscreen. Other VPN applications may work but they have not been tested by Inmarsat.

The use of TCP Accelerator is transparent to the user as it is enabled by default within BGAN, however the absolute improvement seen in file transfer speeds depends on network usage, file size and terminal type. User tests have shown significant improvements in upload speed with DOS FTP.

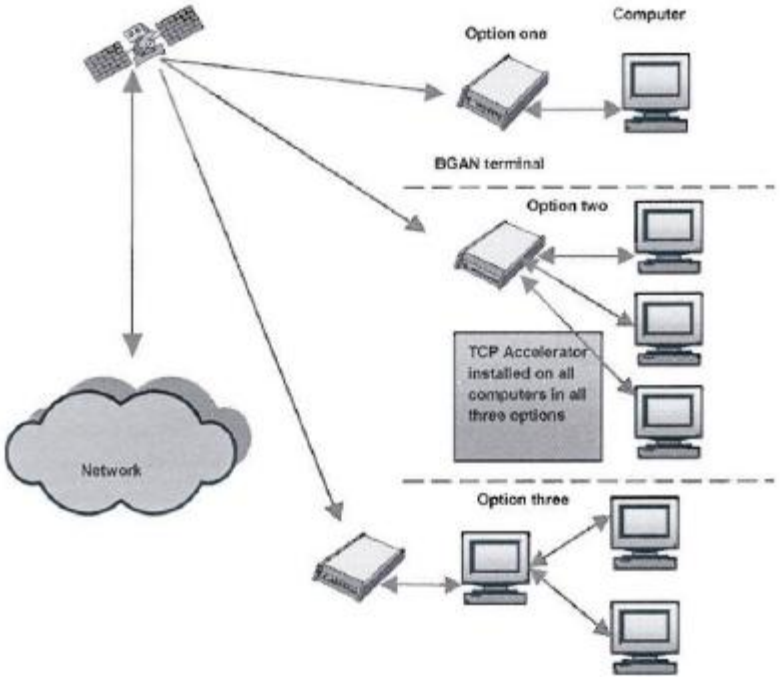
As an example, TCP office applications such as email and FTP have typical file sizes of less than 2MB. For these file sizes and traffic types, the client version of TCP Accelerator is particularly effective, delivering improvements in average throughput rates of over 100%.

Note: TCP Accelerator will not enhance performance when you are using any streaming-based application including video streaming and audio streaming because these are UDP (User Datagram Protocol) based applications.

Note: User test results have been accurately assessed and reported using an ethereal trace capture process. Typical measurement software applications generally over-report performance.

2.6 Deployment options

TCP Accelerator can be deployed in three different configurations, as shown in the following diagram. The basic functionality of TCP Accelerator is the same in all configurations, although the capabilities of the terminal may change depending on the deployment option you use.



The three deployment options are:

- **Single computer connected to a single terminal**. In this configuration, the computer is connected to a single terminal. This is the most widely used configuration. The applications using TCP Accelerator are installed on the computer.
- **Multiple computers connected to a single terminal**. In this configuration, more than one computer is connected to a single terminal. The applications using TCP Accelerator are installed on each of the computers.
- **Single computer connected to another computer**. This configuration is used in some SOHO (small office, home office) environments. In this configuration, TCP Accelerator has to cater to more connections and load as compared to the other two options. The applications using TCP Accelerator may be installed external to the computer, therefore the terrestrial link can also be external to the computer. It is being proposed that the TCP Accelerator enterprise solution be used in this configuration, as it meets the necessary requirements of the solution. However, this is the least preferred configuration and is only used for SOHO environments with 2-4 users.

Installation

3 Installing TCP Accelerator

Inmarsat recommends that you install the client version of TCP Accelerator as it enhances performance when sending files. This chapter describes the installation procedures for the client version of TCP Accelerator.

3.1 Minimum system requirements

The following are the mandatory hardware and software requirements for successful installation of TCP Accelerator on your computer:

Hardware requirements

- Intel Pentium IV, or equivalent
- 256 MB RAM
- 20 MB hard disc space

Software requirements

- Windows Vista Service Pack1, or
- Windows XP SP2, or
- Windows 7 Professional

Note: Windows XP/Vista/7 64bit is not supported.

3.2 How to obtain the latest version of TCP Accelerator

Independent of whether you have a CD containing a version of the TCP Accelerator software, Inmarsat recommends that you always check for and download the latest version of TCP Accelerator by either:

- Using the BGAN LaunchPad update process. In BGAN LaunchPad, select the menu item **Updates > Check for updates** and check **TCP Accelerator**. Follow the on-screen instructions to install the software automatically.
- Browsing to **www.inmarsat.com/support** and downloading the latest TCP Accelerator release to your computer. Refer to *Installing TCP Accelerator on Windows Vista/XP/7 Operating Systems* below for details on the installation process.

Note that you do not have to download software over BGAN; you can use any other reliable broadband network. Inmarsat suggests that you do not download software using a BGAN terminal unless absolutely necessary, as you will be charged for the download and the files may be large.

3.3 Installing TCP Accelerator on Windows Vista/XP/7 Operating Systems

Use this section if you are installing TCP Accelerator from a CD-ROM, or if you have downloaded the application from the Inmarsat website to your computer. These instructions are not needed if you use the BGAN LaunchPad update process.

Note: You must have administrator privileges to install TCP Accelerator as it is an NDIS (Network Driver Interface Specification) intermediate driver, which is loaded into the Windows kernel.

To install the driver:

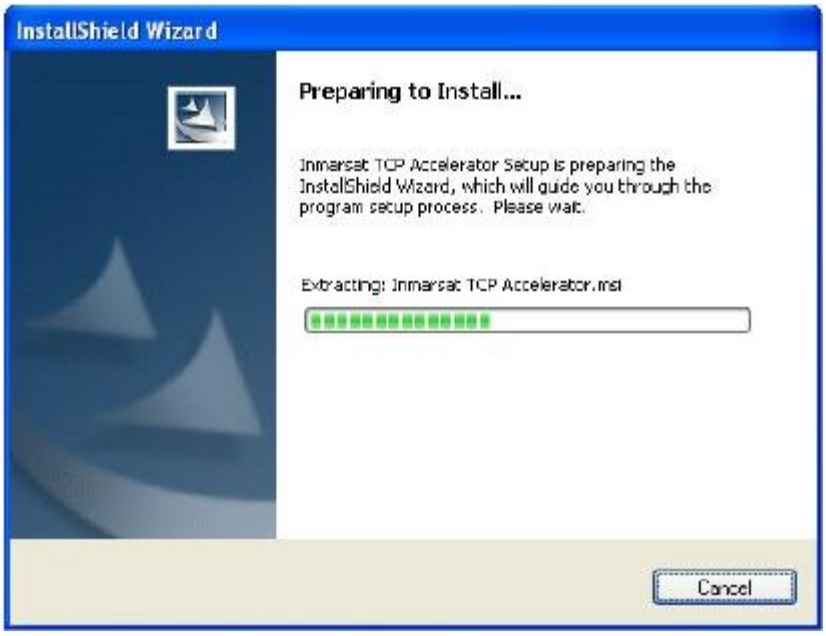
a. Either:

- Insert the Setup Wizard CD-ROM into the computer's CD-ROM drive, or
- Double-click on the **Setup.exe** file you downloaded to your computer.

b. The Operating System may warn that the publisher of the application to be installed is unknown and prompts you to confirm that you wish to run the program.

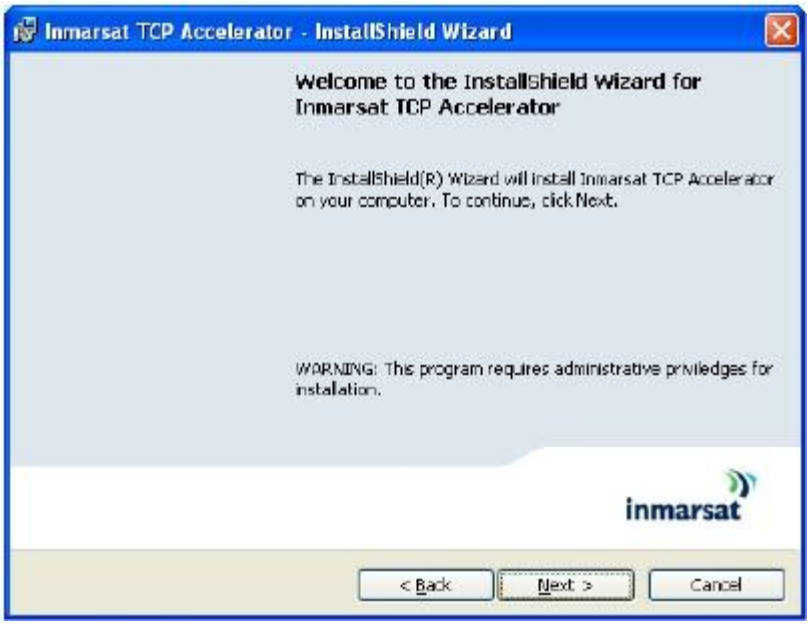
c. Click on **Run.**

d. The **InstallShield Wizard** prepares to install TCP Accelerator. No action is required unless you wish to stop installation in which case click on **Cancel**.

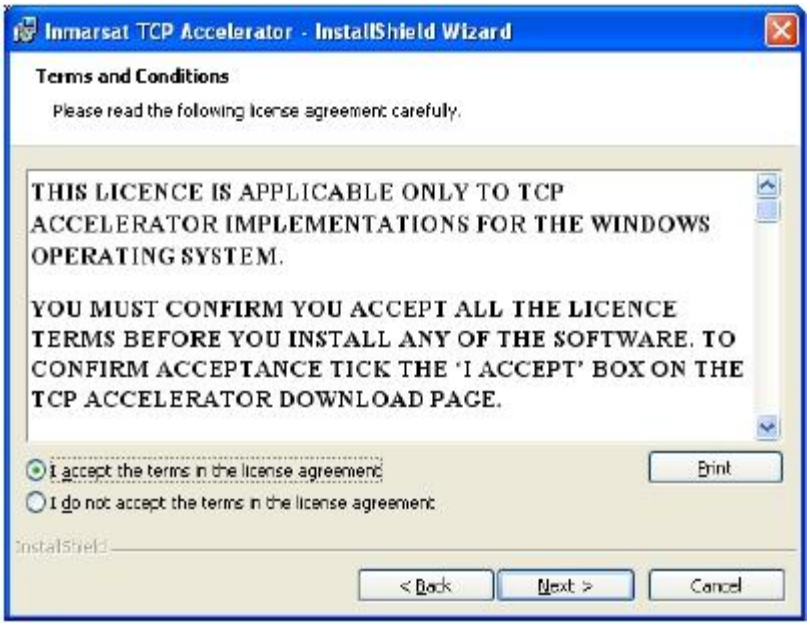


e. The Setup Wizard launches automatically, and the following screen is displayed:

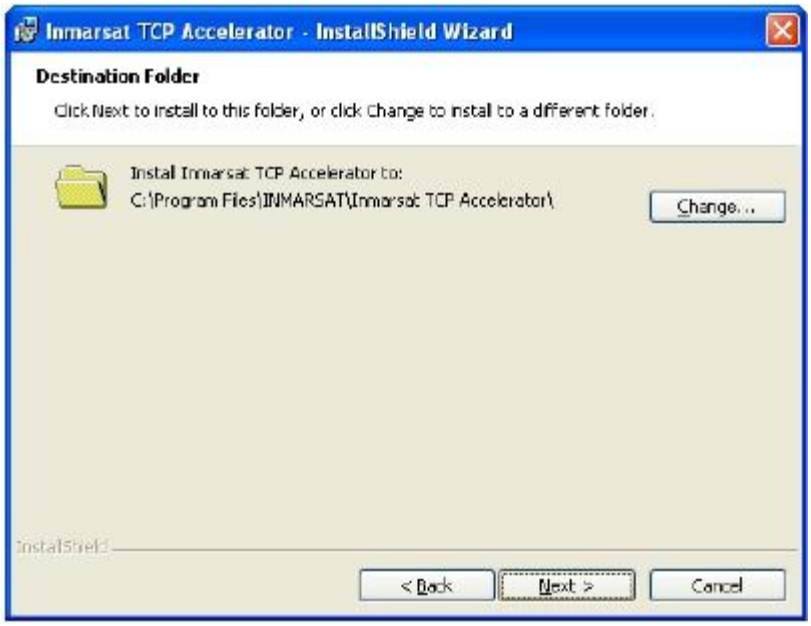
f. Click on **Next**. The **Inmarsat TCP Accelerator – InstallShield Wizard** confirms that it is about to install the application on your computer and that administrative privileges are required for installation.



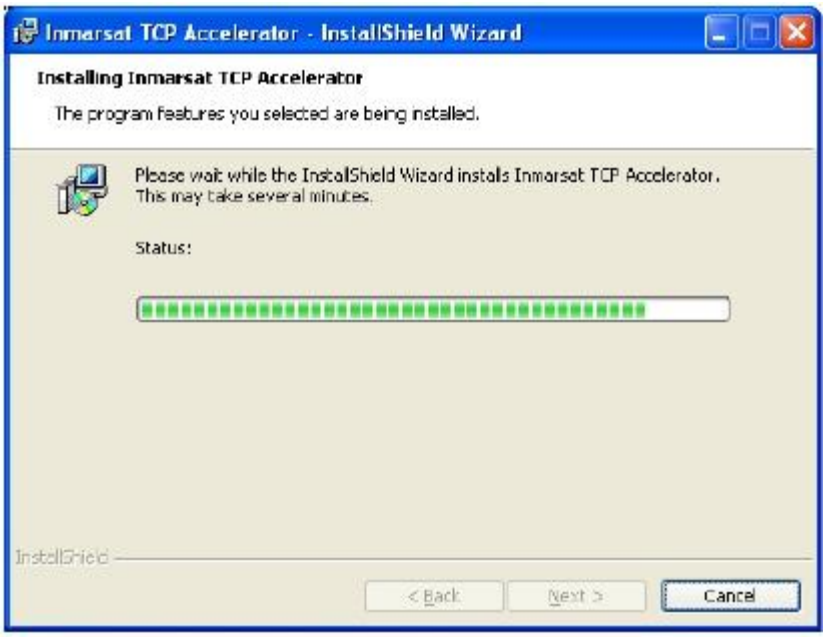
g. Click on **Next**. The **Terms and Conditions** screen is displayed:



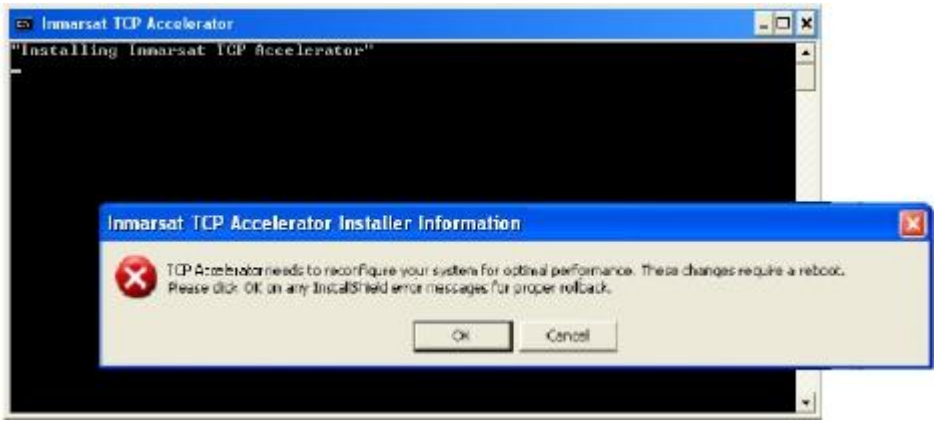
h. Check **I accept the terms in the license agreement** and click on **Next**. The **Destination Folder** screen is displayed:



i. Click on **Next** to accept the default directory. TCP Accelerator installation commences.



j. If the program detects that your computer is not fully optimised for TCP Accelerator and requires a reboot, a window similar to the following is displayed:



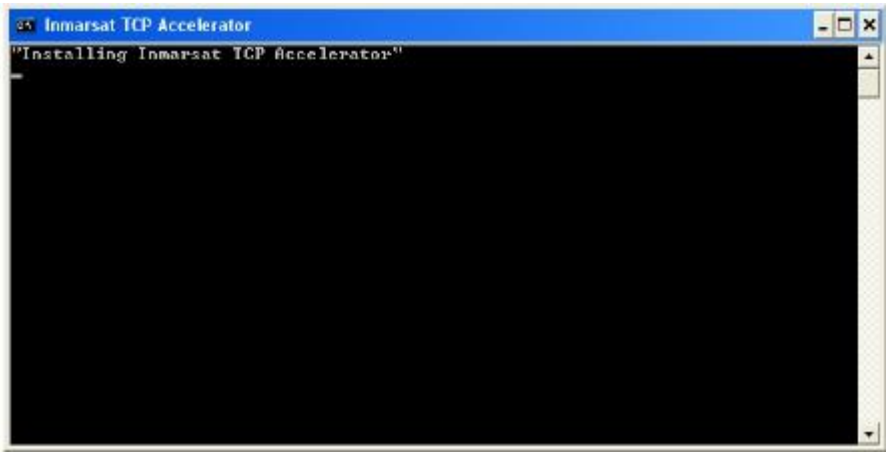
k. Click on **OK** to reboot your computer. This is a one-time optimisation and is not repeated for subsequent TCP Accelerator releases.

l. The program warns that your computer is going to be rebooted and prompts for closure of all applications and system messages. Close all applications and messages and then click on **OK**. Your computer is automatically rebooted. Software installation automatically resumes once your computer is restarted.

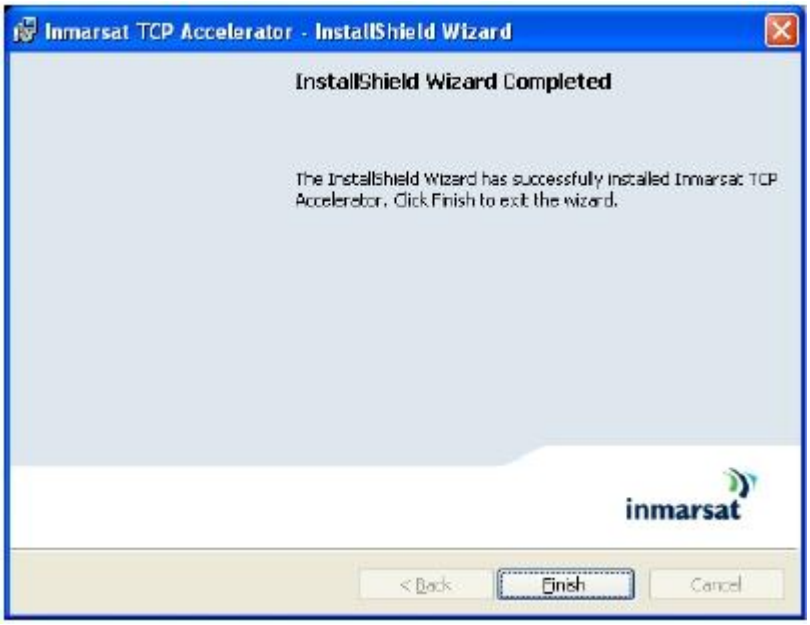
m. If the program fails Windows Logo testing, a window similar the following is displayed:

n. Click on **Continue Anyway**. Note that you may see this screen more than once; click on **Continue Anyway** each time. (This screen displays if the driver is yet to formally complete the certification procedure for Windows).

o. TCP Accelerator continues installation and an interim screen similar to the following is displayed. No action is required.

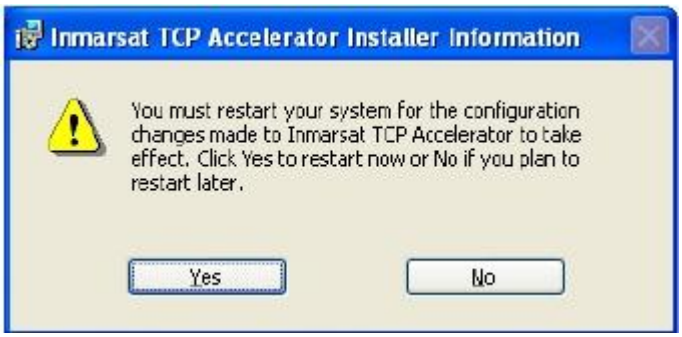


p. When the installation is complete, the following screen is displayed:



q. Click on **Finish** to complete the installation.

r. Your computer must be restarted in order for TCP Accelerator configuration changes to take affect. The following screen is displayed:



s. Click on **Yes** to restart your computer. Once your computer is restarted, TCP Accelerator changes take affect and the application is application is automatically enabled without the need for LaunchPad.

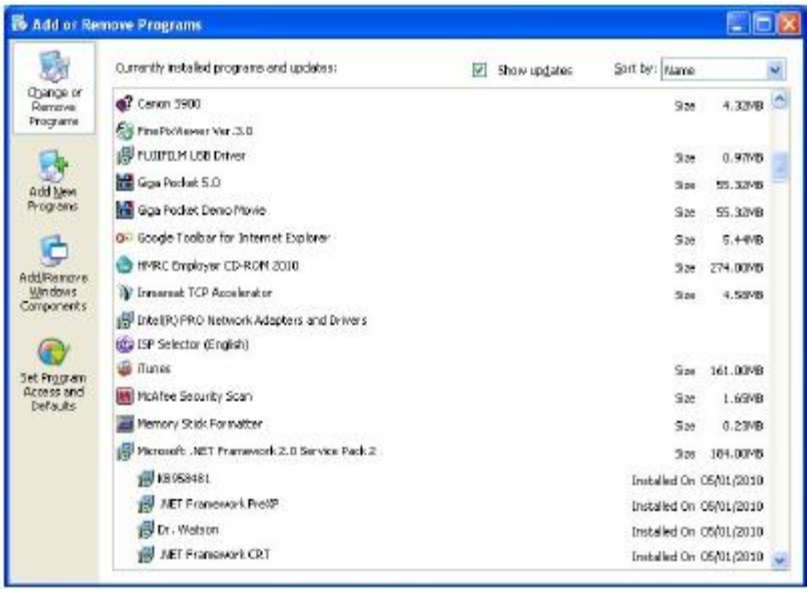
3.4 Un-installing TCP Accelerator

Note: Inmarsat recommends that you save your work and close all applications before proceeding. Any driver de-installation poses the risk of crashing your operating system.

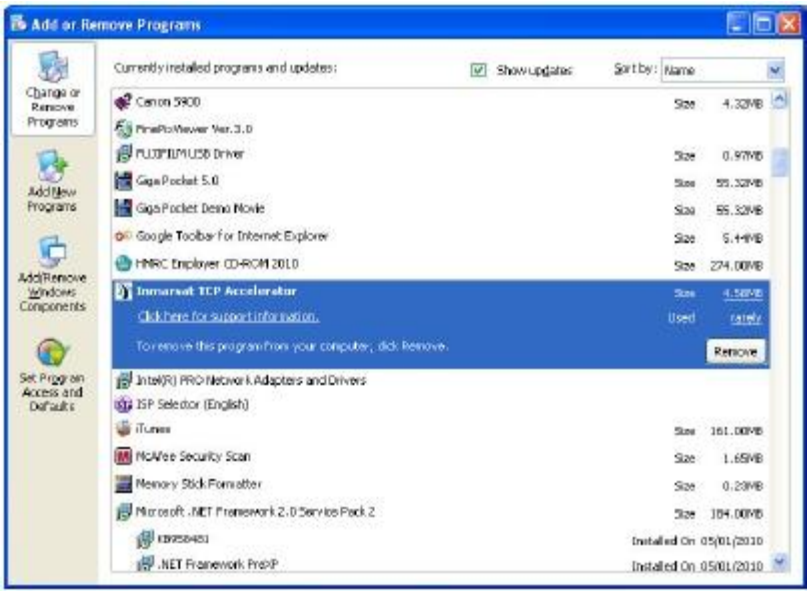
Note: Driver de-installation usually requires administrator privileges. Inmarsat recommends that you log in to an account with administrator privileges before proceeding.

To un-install TCP Accelerator:

a. Select **Start > Control Panel > Add or Remove Programs** to display the **Add or Remove Programs** screen:



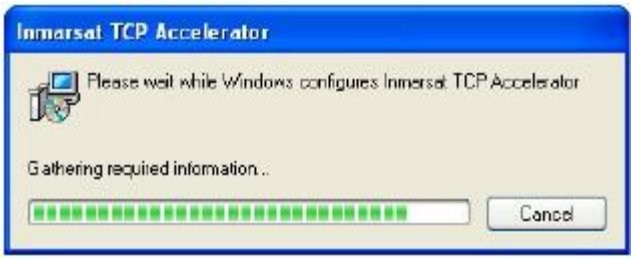
b. Select **Inmarsat TCP Accelerator** then click on **Remove**.



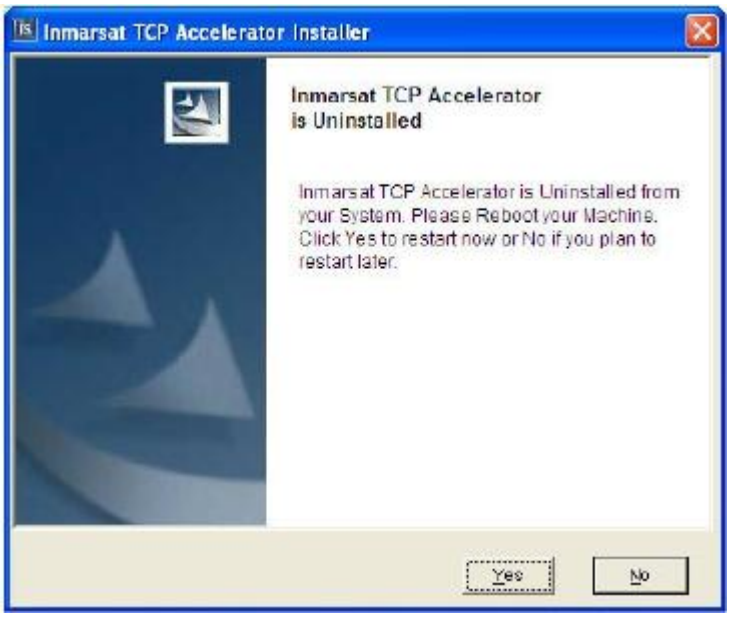
c. You are prompted to confirm the removal; click on **Yes**.

d. Windows installer prepares to remove TCP Accelerator:

e. Windows configures TCP Accelerator:

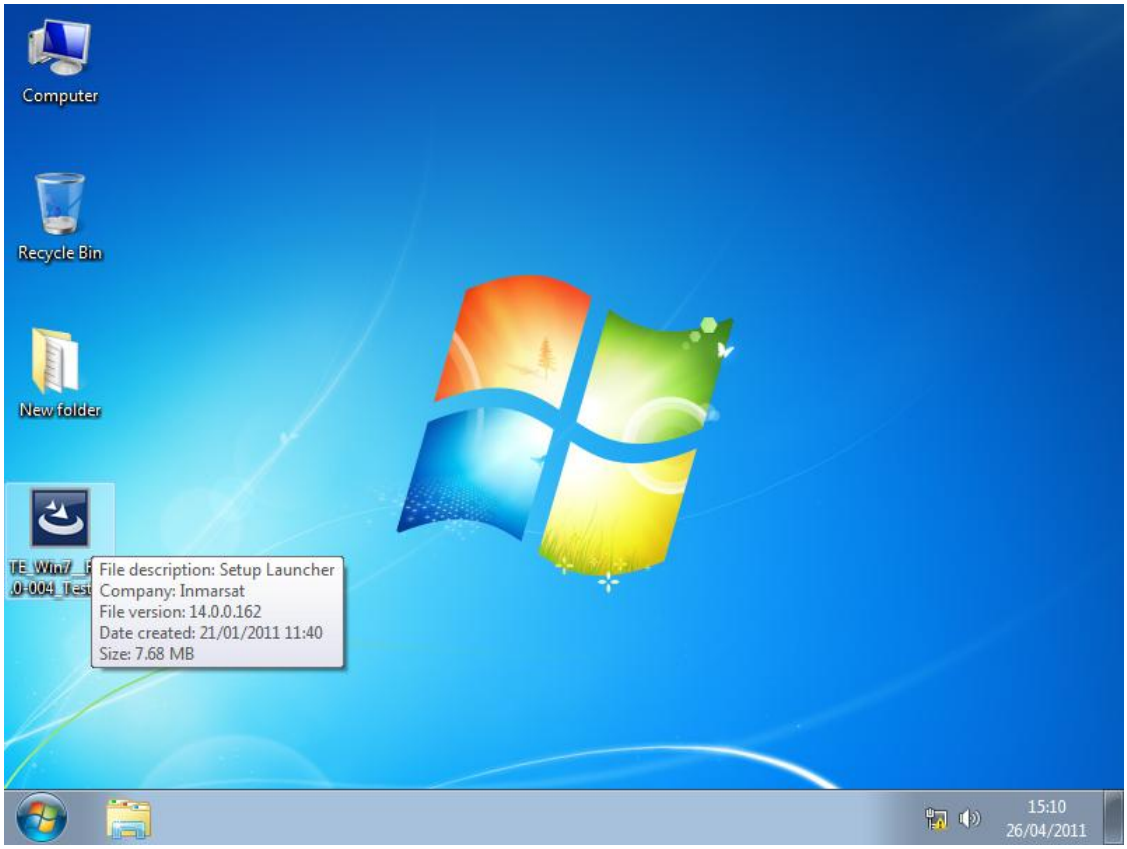


f. TCP Accelerator is removed from your computer and you are prompted to reboot the computer. Click on **Yes** to complete uninstallation and reboot your PC.

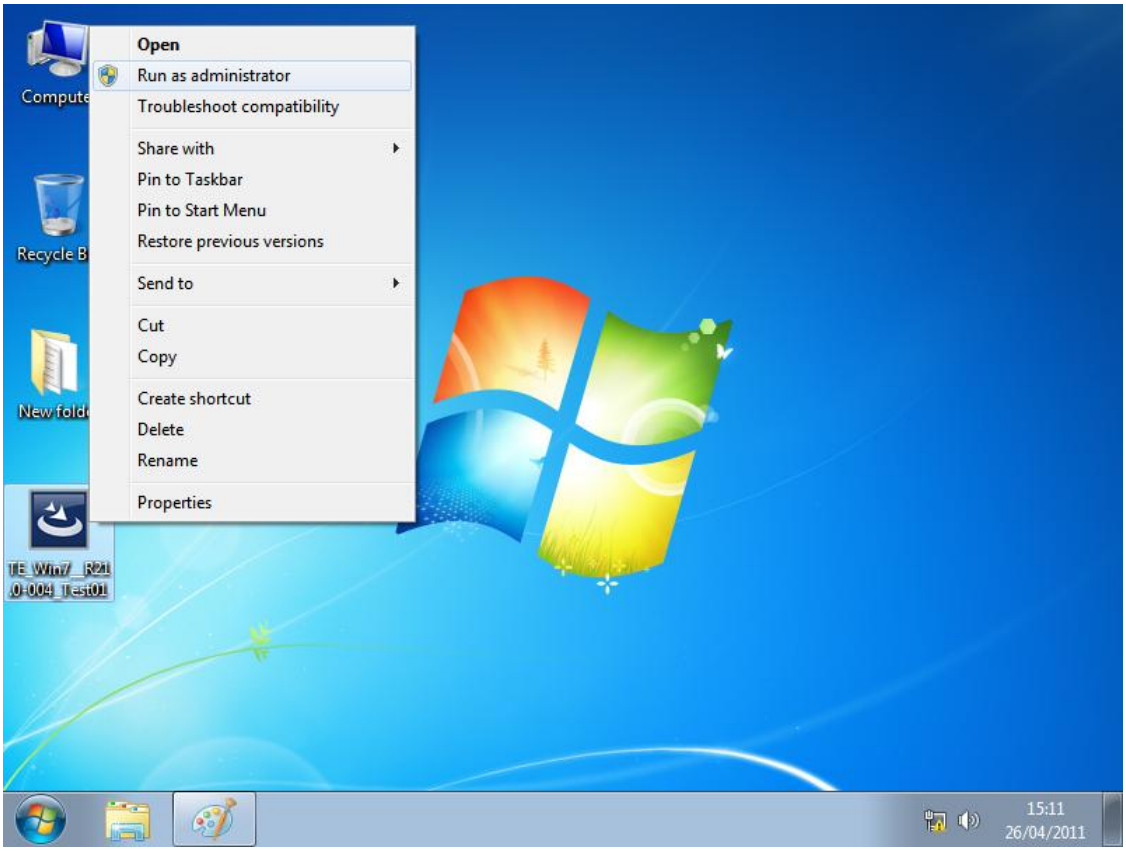


3.5 Installing TCP Accelerator on Windows Vista/7 Operating Systems

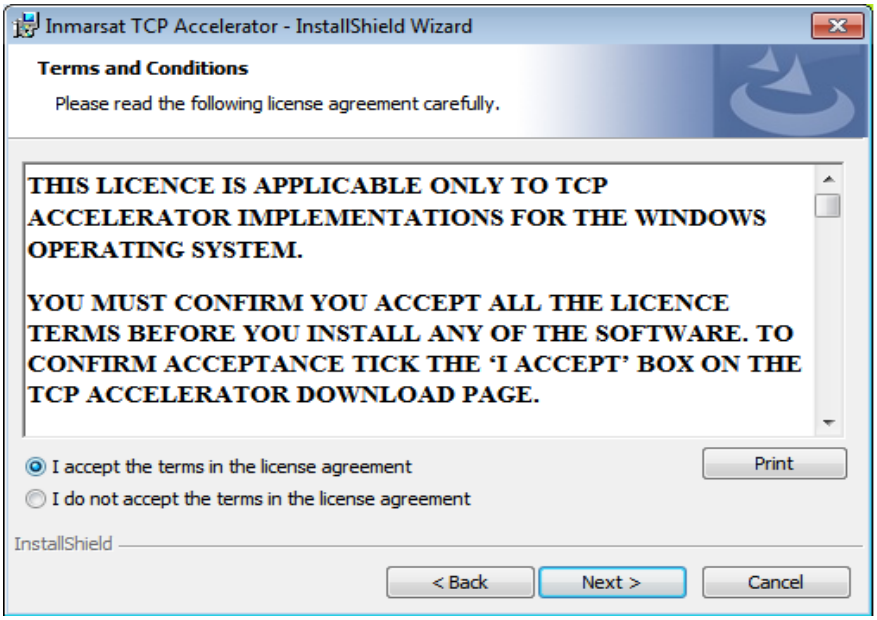
a. User must insert the Setup Wizard CD-ROM into the target machine's CD-ROM drive. The Setup Wizard should run as shown in below figure. For installing TE TCP PEP without the CD, user have to just double click on the **Setup.exe** provided as part of the software



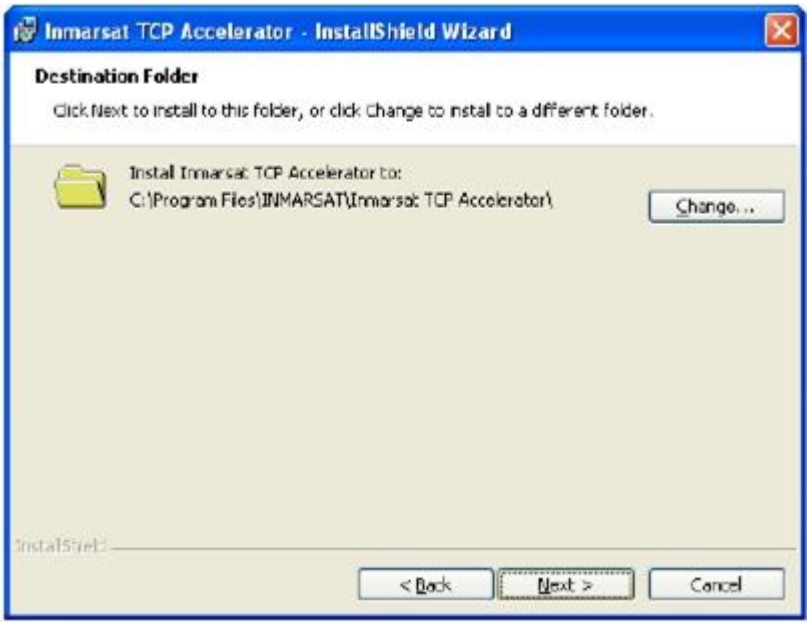
b. User should Run as administrator to install.



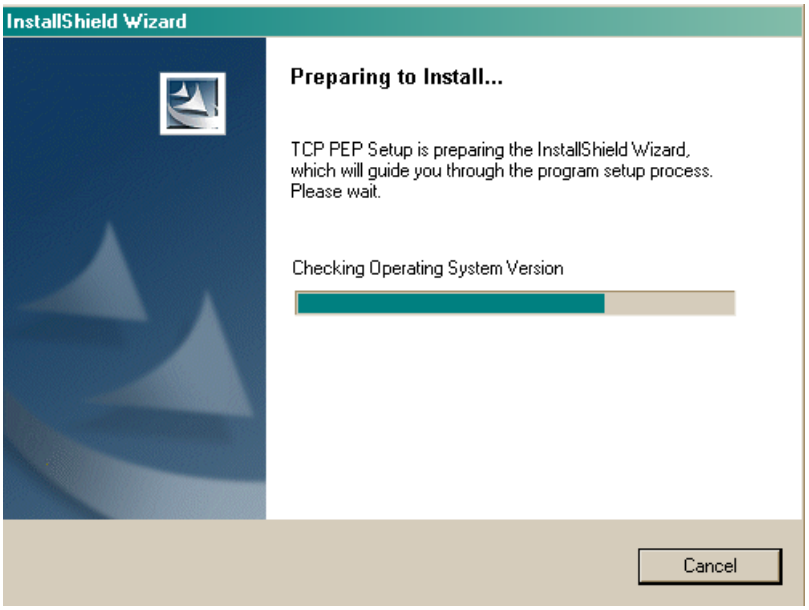
c. The user should click on Next and the terms and condition screen shall be displayed as shown in figure



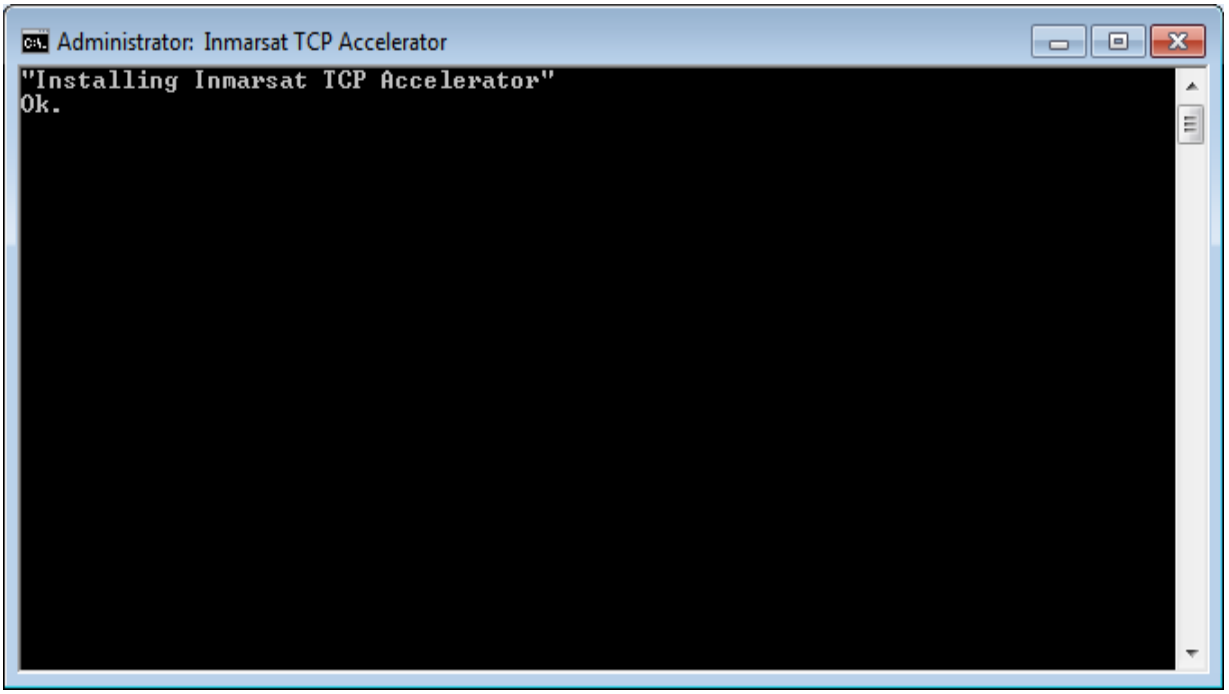
d. This will start installation procedure of TE-TCP PEP in the default **<Systemroot>\Program Files\Inmarsat\TCP PEP** folder as in **Error! Reference source not found.**. If the user wants to change the folder, then he/she can change it by clicking on the **Change** button. After selecting the folder to install the TE TCP PEP, user have to click the **Next** button**.**



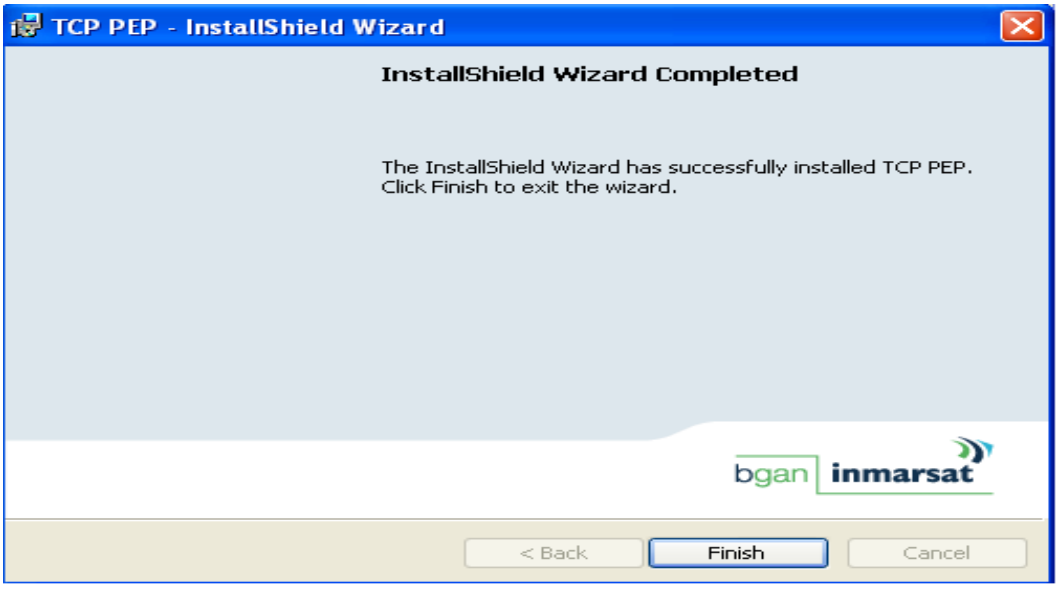
e. Installation process started .user need to wait for sometime to complete the procedure



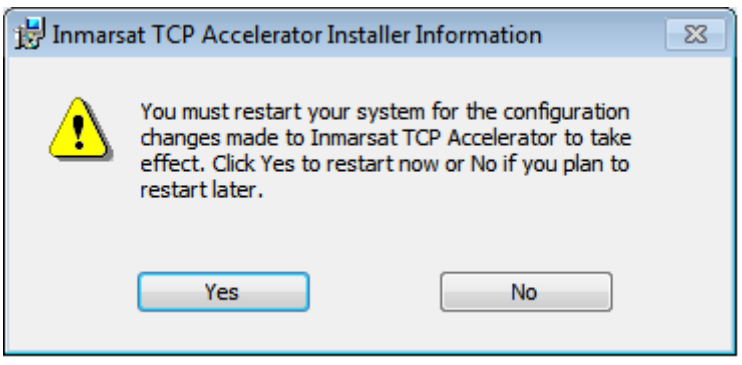
f. Installation continues



g. This will install the TE TCP PEP on the target machine. User should click the Finish button for completing the installation as shown in **Error! Reference source not found.**, which in turn will ask the user to restart the system.



h. . It is mandatory to restart the system once the installation procedure is completed.



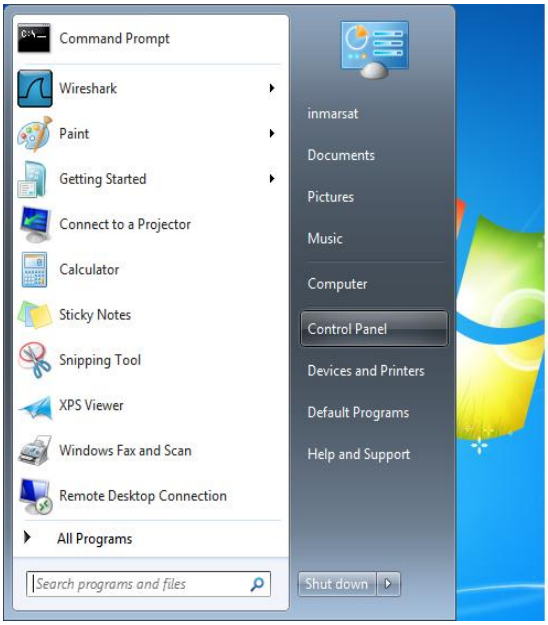
3.6 Un – Installation TCP Accelerator on Windows 7 Operating Systems

In order to uninstall TE TCP PEP, user should follow the following steps:

Any driver uninstallation poses a non-zero risk of crashing your operating system, user is advised to save his/her work and close all running applications before proceeding.

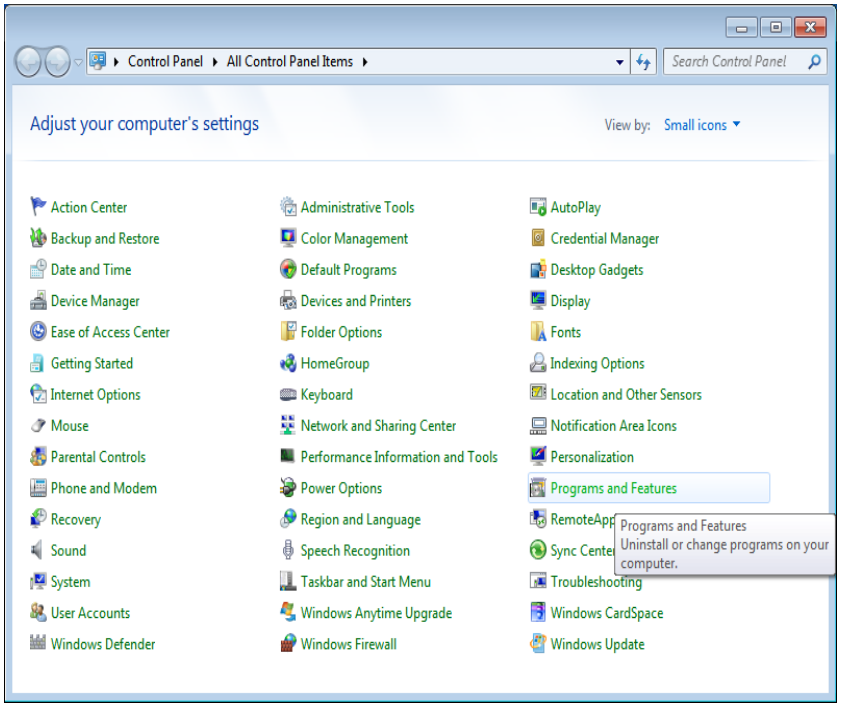
Driver uninstallation (usually) requires **administrative privileges** to perform the uninstallation properly. So the user is recommended to log on to an account with administrative privileges before proceeding further.

a. To uninstall the TE TCP PEP from the system user have to click the **Start button** then **Control Panel** and then **Add Remove Program**, which will display the Add Remove Program window as shown in 3.12

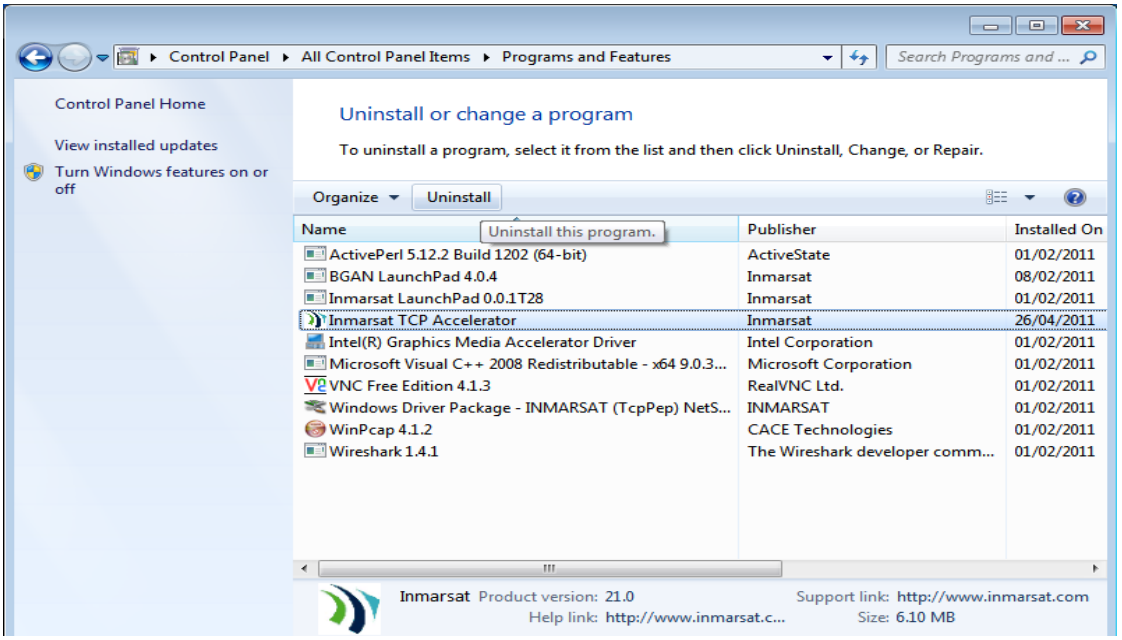


V

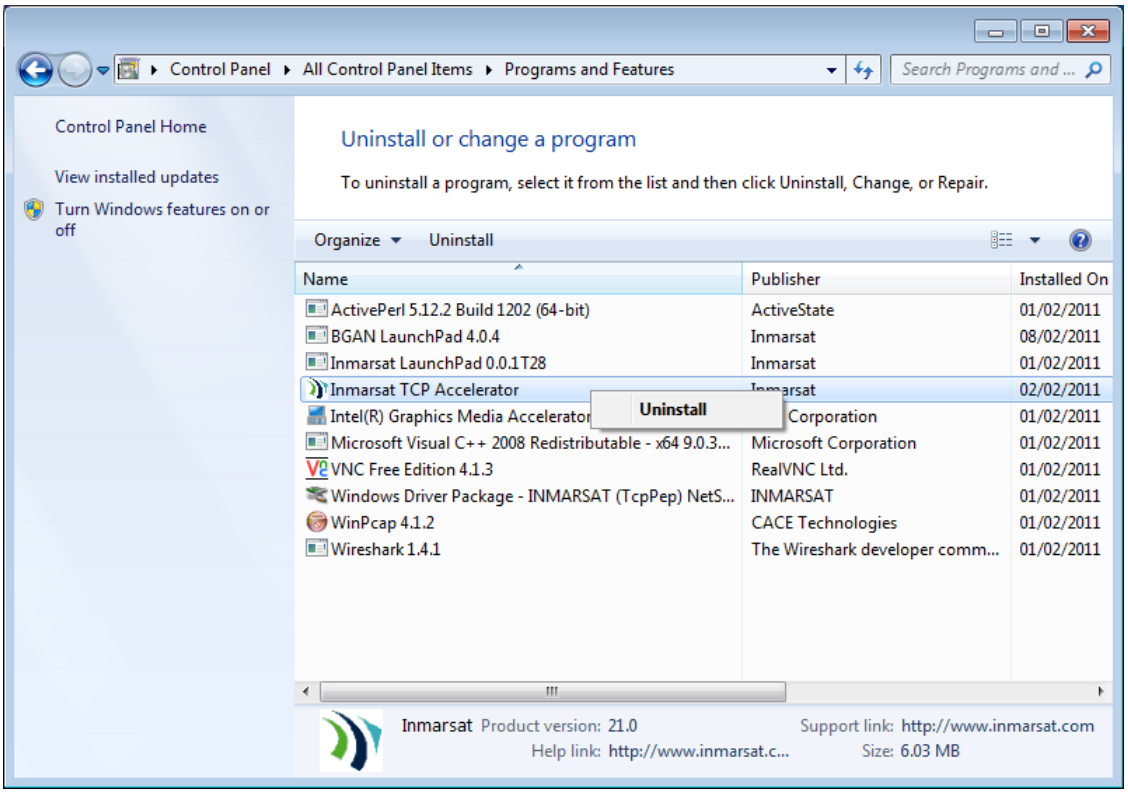
b. Select Programs and features in control panel -> all control panel items



c. Select TCP PEP from the list and then right click on it . Here the user will get prompt for uninstall.



d. Select Uninstall to proceed.



e. Select YES in confirmation box .

f. This will uninstall the TE TCP PEP from the system. Once the TE TCP PEP is uninstalled from the system, the prompt to restart the system will come. User should click on the YES button to restart the system as shown in **Error! Reference source not found.**. It is recommended to restart the system for proper uninstallation.

Configuration

4 Managing and monitoring TCP Accelerator

You can manage and monitor the operation of TCP Accelerator using BGAN LaunchPad. You can enable and disable TCP Accelerator and monitor any errors by opening the TCP Accelerator dialog in BGAN LaunchPad.

Disabling TCP Accelerator

TCP Accelerator V2 is automatically enabled within BGAN LaunchPad after installation and all its benefits are immediately available on standard data connections.

The accelerator may only be switched off after the terminal is registered with the network.

To disable TCP Accelerator:

a. After you have registered, select **BGAN Services > TCP Accelerator**. The **TCP Acclerator** screen is displayed:

b. Select **OFF** from the **TCP Accelerator State** drop-down list and then click on **Apply**.

c. The following screen is displayed if the settings have been successfully changed:

4.1 BGAN LaunchPad automatic control

BGAN LaunchPad remembers the ON/OFF status of TCP Accelerator from session to session. When BGAN LaunchPad starts up it checks the status of TCP Accelerator when last used with BGAN LaunchPad.

Inmarsat recommends that you keep BGAN TCP Accelerator **ON** if you commonly use TCP applications (eg email, web browsing, file transfer) for sending data.

Troubleshooting

5 Troubleshooting and Known Issues

This section helps you with possible problems and issues you might encounter during the installation and use of TCP Accelerator.

5.1 Compatibility issues with Netscreen VPN

Netscreen VPN client has compatibility issues with NDIS (Network Driver Interface Specification) intermediate drivers like TCP Accelerator. Therefore, you must un-install Netscreen VPN client must before installing TCP Accelerator. (The TCP Accelerator install program detects the presence of Netscreen VPN client and prompts you to un-install it). Once TCP Accelerator is installed, you can re-install Netscreen VPN.

5.2 Compatibility issues with Packet QoS Packet Scheduler and VPN clients

VPN clients have compatibility issues when installed with Microsoft QoS packet scheduler and TCP Accelerator. Therefore, the TCP Accelerator install program un-installs the QoS packet scheduler prior to installation of TCP Accelerator. This incompatibility with QoS Packet Scheduler is recorded in many VPN advisories and release notes are available on the Internet.

5.3 LAN Properties shows no components after installation of TCP Accelerator

This occurs when TCP Accelerator is not properly installed and appears as a bug in the **Local Area Connection Properties** window. If you select **Inmarsat TCP Accelerator** and click on **OK,** an error message is displayed indicating that no components are installed. If you click on **Cancel** to close the **Local Area Connection Properties** dialog box and then re-open it again, the list of components displays.

To remove TCP Accelerator:

a. Select **Inmarsat TCP Accelerator**, click on **Uninstall** and confirm the un-installation. Before you make another installation attempt, make sure that **Windows** is not set to block the installation of unsigned drivers, as follows:

b. Right-click on **My Computer**, then select **Properties**.

c. Select the **Hardware** tab, and click on **Driver Signing…**

d. Make sure that **Block – Never install unsigned driver software** is not selected. If it is, select one of the other buttons, and click on **OK**.

5.4 Devices are still shown after un-installation of TCP Accelerator

When a client programme like TCP Accelerator establishes a session with an LDAP (Lightweight Directory Access Protocol) server this is a process known as “binding”. The client specifies the host name, or IP address and TCP/IP number, where the LDAP server is listening. When the client has finished making requests, this is known as “unbinding”.

When you un-bind TCP Accelerator from an adapter or even completely un-install the program, the devices it created still display in **Hardware Device Manager** and are not deleted until you reboot. If you re-bind to an adapter or re-install the protocol without rebooting, you will see two entries per adapter, one having a number in brackets after the name. This is a bug in Windows. While the additional entries do not affect operations, they can be confusing. They can be deleted by a reboot.

Note: This issue is known to Microsoft and is currently intended behavior. Microsoft is working on a fix.

5.5 Compatibility issues with Windows XP Service Pack 2 Bluetooth driver

Windows XP Service Pack 2 includes a generic Bluetooth driver. When you plug in a Bluetooth device, Windows installs this generic Bluetooth driver. If you then try to install a manufacturer-specific Bluetooth driver on Windows Service Pack 2, this driver does not work because Windows XP continues to use the generic driver.

TCP Accelerator does not bind with the Microsoft generic driver. Therefore, to make TCP Accelerator work on Bluetooth devices, you must force Windows XP to use the manufacturer-specific Bluetooth driver.

Before you plug in the device, take the following actions to force Windows XP to use the manufacturer-specific Bluetooth driver (Belkin Bluetooth driver used in this example):

a. If you have any Bluetooth software other than the Windows generic driver installed, uninstall the software and reboot your PC.

b. Install the Belkin Bluetooth software. When prompted to plug in the Bluetooth device, do not plug in the device but click on **Cancel**.

c. When the Belkin setup has completed, plug in your Bluetooth device and let Windows install its own driver.

   Note: There should be two Bluetooth icons in the system tray: one blue-white which is the activated Windows driver; one blue-red which is the currently-deactivated Belkin driver.

d. Select **Device Manager**. **Right-click** on **Generic Bluetooth Radio** and select **Update Driver**.

e. Prevent Windows XP from connecting to the Internet then select **Choose software from a list or specified location** and in the next window select **Don't search, but select the driver to install.**

f. In the next window activate **Show compatible hardware** (if it is not already activated) and select the Belkin driver instead of the **Generic Bluetooth Radio driver**.

g. Click on **Next** until the new driver is installed. Now the Belkin system tray icon should also be blue-white, activated and ready for use.

h. If you now double-click on **My Bluetooth Places**, the Belkin software installation process is continued and finished.

The above steps force Windows XP to use the Bluetooth software provided by the manufacturer. TCP Accelerator can now bind to this driver and the Bluetooth software is ready to use with TCP Accelerator.

5.6 TCP Accelerator incompatible with Windows XP Hotfix 886199

TCP Accelerator is denied access to computer resources and stops sending spoof packets (required to reduce network overhead) if you install Windows XP Hotfix 886199 on your PC. The details of this Hotfix are given in the following URL:

www.support.microsoft.com/default.aspx?scid=kb;en-us;886199

Microsoft advises that the fix is still under test and should only be installed if it is urgently required and you have experienced this incompatibility problem. The fix interferes with the operation of TCP Accelerator.

5.7 TCP Accelerator does not work if the source and destination IP addresses are in the private IP range

TCP Accelerator does not provide spoofing services (a mechanism to reduce network overhead) if both the source and destination IP addresses are located in the private IP range. This is to prevent usage of TCP Accelerator on intranets. The private IP ranges are:

10.0.0.0 – 10.255.255.255
172.16.0.0 – 172.31.255.255
192.168.0.0 – 192.168.255.255

TCP Accelerator spoofing services can be turned on for the above IP addresses as follows:

a. Select **Start > Run** from the Windows taskbar.

b. Type **regedit.exe** and press **Enter**.

c. Browse to **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\tcppep**.

d. In the right hand window, click on **UnspoofPrivateIP**.

e. In the dialog box which opens up, type **0** in the **Value Data:** text box and then reboot your PC.

Note: No other registry value should be changed as this might impact the functioning of the PC and TCP Accelerator.

5.8 Further support

For further support with TCP Accelerator, visit the Inmarsat website at **www.inmarsat.com/support**.

6 Optimising performance of Windows servers though adjustment of TCP parameters

It is possible to improve the performance of BGAN on any Windows server that is receiving data by setting the following TCP parameters on the server.

Follow the instructions below to implement the change:

Disclaimer

Modifying the registry may cause serious problems that may require you to reinstall your operating system. Inmarsat cannot guarantee that problems resulting from modifications to the registry can be solved. Use the information provided at your own risk.

6.1 Configuring TCP parameters manually

Using **Windows Registry Editor**, enter the following settings when configuring the TCP parameters.

Note: Please ensure you reboot your PC after the settings have been entered.

Registry Settings

System Key: [HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters]

Value Name:	TcpWindowSize
Data Type:	REG_DWORD (DWORD Value)
Value:	HEX: 1FFFF Decimal: 131071

Value Name:	Tcp1323Opts
Data Type:	REG_DWORD (DWORD Value)
Value:	HEX: 1 Decimal: 1