

Petroleum Experts



Getting Started Guide



IPM 13

**PROSPER
GAP
GAP TRANSIENT
PVTP
MBAL
REVEAL
RESOLVE
OpenServer
MOVE
HARDLOCK**

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Copyright Notice

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1 The IPM suite

We are pleased to enclose the latest version of the **IPM** suite of tools. The client base includes more than 550 oil, gas, mining and service companies throughout the world, using the software for managing and modelling fields. The tools aid in decision making on the production strategies, and solving production problems as well as optimising existing and future production.

1.1 What is this guide for?

This brief guide is designed to demonstrate the initial set-up and use of the **IPM** suite. It covers areas like:

- Your computer system
- How to install the software
- How to get up and running with a licence you have purchased
- How to start running the software
- The User Guides
- Support from Petroleum Experts

1.2 Petroleum Experts Software Tools

The Integrated Production Modelling toolkit (**IPM**) is a set of petroleum engineering software tools that model the complete production system, from reservoir through the wells to the surface network.

The **IPM** suite is composed of:

GAP	- IPM Multiphase Surface and System Optimisation
GAP Transient	- IPM Transient Multi-Phase Flow Modelling
PROSPER	- IPM Well Modelling and Design
MBAL	- IPM Reservoir Analytical Simulation
PVTP	- IPM Fluid Characterisation
REVEAL	- IPM Platform for Specialised Reservoir Studies
RESOLVE	- IPM Controller for IPM and third party software tools
OpenServer	- Open Architecture provided by all IPM software tools
IFM	- Integrated Field Management
IVM	- Integrated Visualisation Management
MOVE	- Geological Modelling package

1.3 What the IPM solution provides

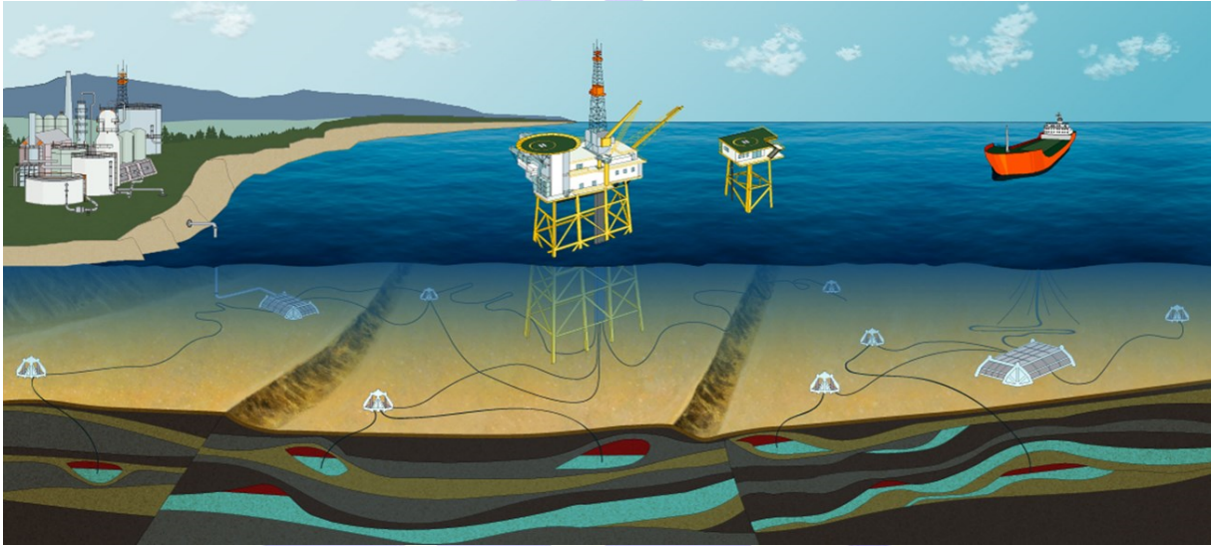
The **IPM suite** enables the user to work with one set of tools to model the elements of the full production system and thus manage, optimise and run field production forecasts.

Some key benefits are:

- **Reservoir, multiple well and surface network Optimisation and Production Forecasting**
- **Fluids**
 - Multiphase fluids Oil, Gas and Condensate
 - Commingled production from multiple layers or reservoirs
- **Reservoir**
 - Analytical or Numerical Simulation Models
 - Single or Multi-tanks reservoir models, with inter tank communication
 - Structural Geological Models
- **Wells**
 - Vertical, Multi-Lateral, Horizontal and Smart well modelling
 - Modelling of Multi-layers and interferences effects within the reservoir
 - Artificial Lift designs and diagnostics: including ESP's, HSP's, Gas Lift, PCP
 - The proprietary Petroleum Experts correlations are becoming industry standards showing stability in some of the most challenging fluids
- **Surface Network**
 - The most advanced optimisation method in the industry using a non-linear programming approach. Most optimisation problems require a non-linear optimiser
 - Modelling of surface networks, pumps, compressors, multiple pipelines and looped gathering systems
 - No limit to number of the wells or surface elements as equipment
 - Complete system modelling: History matching
- **Connectivity**
 - The **IPM suite** can be linked through **RESOLVE** to third party reservoir simulators, process simulators, economic packages and client proprietary software tools
 - With **OpenServer** the user can build and link each **IPM** tool to spreadsheets, Visual Basic Macros, data bases, etc.
- **Each tool can be operated standalone or seamlessly with the other tools**

1.4 An Example of Integrated Production Modelling - IPM

The **IPM** (Integrated Production Modelling) suite of tools is developed to address some specific issues with regards to field wide modelling. Consider the following production system:



As one can see from the picture, a number of wells are present, producing through risers to the platform. Production from the wells is commingled for some wells at the sub sea level.

Traditionally, the way this system was modeled was by building a simulation model for the reservoir that would then be run (including the well models) in order to do predictions based on a fixed wellhead pressure. This however was not as accurate as it could be, since the wellhead pressures will depend on the pressure drops through the surface pipelines, and in more complex systems, the pressure drops through facilities in the production line.

In order to accurately model production, an integrated system is needed. This is a model that includes the reservoir, well and surface facilities and can do predictions taking the interactions between different elements of the system into account.

Some of the fundamental questions the **IPM** suite of tools is trying to address are:

- How can a production profile from the whole field be predicted, taking reservoir, wells and surface facilities into account?
- Which part of the system is acting as a bottleneck to the system?
- How can production from the field be managed and optimised?
- If a problem in the system exists, is it due to the reservoir, the wells or the

surface facilities?

The strength of the **IPM** suite stems from Petroleum Experts' understanding of the fundamental physics that govern production through a system and our long experience in the field. We constantly try to find ways of helping engineers throughout the world in solving problems.



2 Installing the IPM Software

We recommend that the **IPM 13** software is installed and run on the users local PC, logged on as local administrator.

Web Download

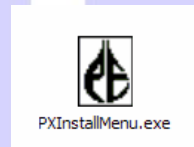
- If the tools have been downloaded from our Web Site, run the **IPM13-xxx.exe**, where: xxx refers to the build number.

Or:

Installation from DVD

The following steps should be taken:

- i.) Put the DVD in the DVD drive and the installation will begin automatically.
- ii.) If nothing happens, you can start the installation manually by opening Windows Explorer on the DVD Drive and double clicking on the StartSetup.exe icon:

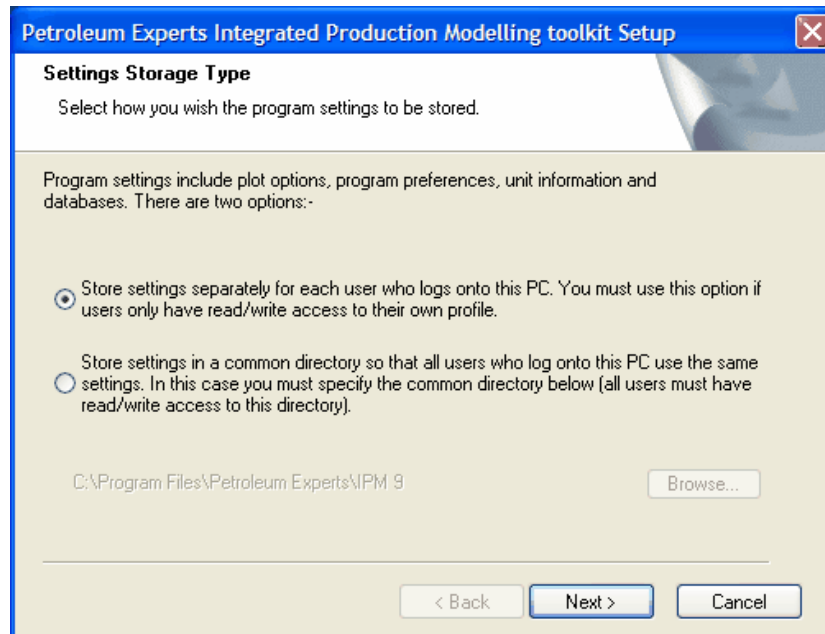


Installation

If there is an existing version of **IPM** already installed, the installation will first want to remove this older version. This is highly recommended as we do not support multiple version of the tools, and the install will not progress until this is done.

To perform this step, and subsequently install the software, please follow the steps guided by the installer.

The very first time the programs are installed the *Settings Storage Type* dialogue will appear:



The settings include the programs *.ini file that capture any customized settings for the tools such as font type and size, interface color, plotting colors, etc., plus other databases.

In almost all cases you should use the default option “***Store settings separately for each user...***”.

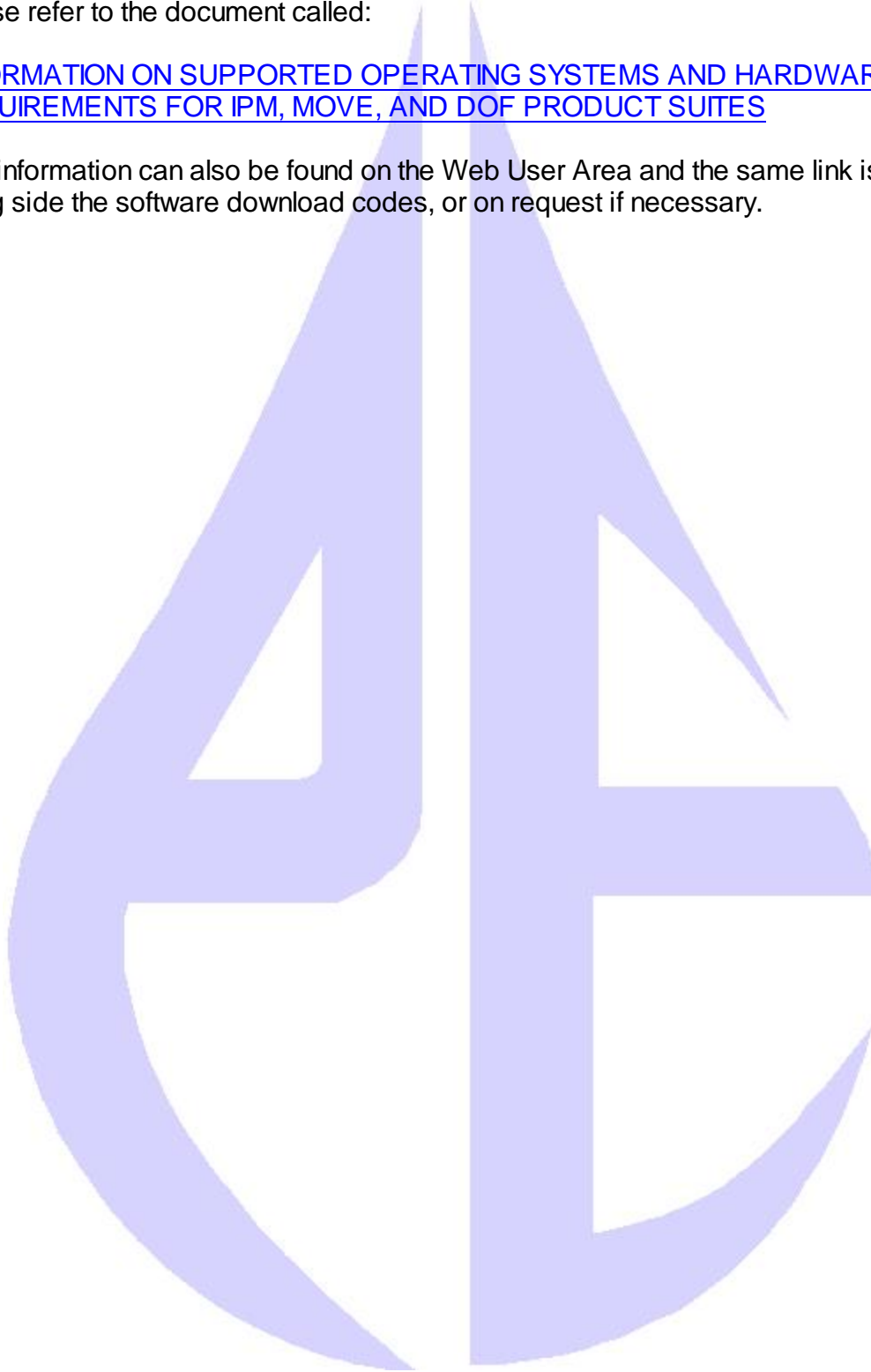
If for some reason you wish all users to share the same settings then you may consider using the other option “***Store settings in a common directory***”. In this case all users must have read/write access to this directory. **WARNING: If any user does not have read/write access to this directory then the programs will not work correctly.**

2.1 Client Computer System Requirements

For the most up to date information on the system requirements to install and run IPM, please refer to the document called:

[INFORMATION ON SUPPORTED OPERATING SYSTEMS AND HARDWARE REQUIREMENTS FOR IPM, MOVE, AND DOF PRODUCT SUITES](#)

This information can also be found on the Web User Area and the same link is shared along side the software download codes, or on request if necessary.



3 Software Licence Management - User PC

The **Petroleum Experts Licensing Version 12.0** is the Petroleum Experts' (PETEX) propriety licensing daemon used with Petroleum Expert's applications and is installed with Petroleum Expert's programs suites **IPM 13.0, IFM 7.0, IVM 10.**

The main application (PxLsConsole.exe) runs as a windows service and is responsible for communicating with the standalone licence bitlocks/dongles keys and/or the **HARDLOCK network license server (HARDLOCK)** to obtain licences for the PETEX program running on the local computer.

Checking that License service is installed

The following will allow you to determine if the **Petroleum Experts Licensing Service** is installed.

1. Open windows services
2. Look for service called "**PETEXPXLS Service 12.0.xx.x**"
3. Confirm that the service is started and running

Additionally check that there is an application folder from the windows start menu

1. Windows Start Menu, **Start -> Petroleum Experts Licensing 12.0**

This window application folder will have other utilities that are used to configure the service. It also contains a link to "Setup HASP Bitlock Driver" which is the **Thales Sentinel HASP Driver installer.**

If you are using a Standalone USB Bitlock or Dongle for licences please see the section "**Using Standalone Bitlocks/Dongles**"

If you are using the HARDLOCK Network license server please see the section "**Using HARDLOCK network license server(s)**"

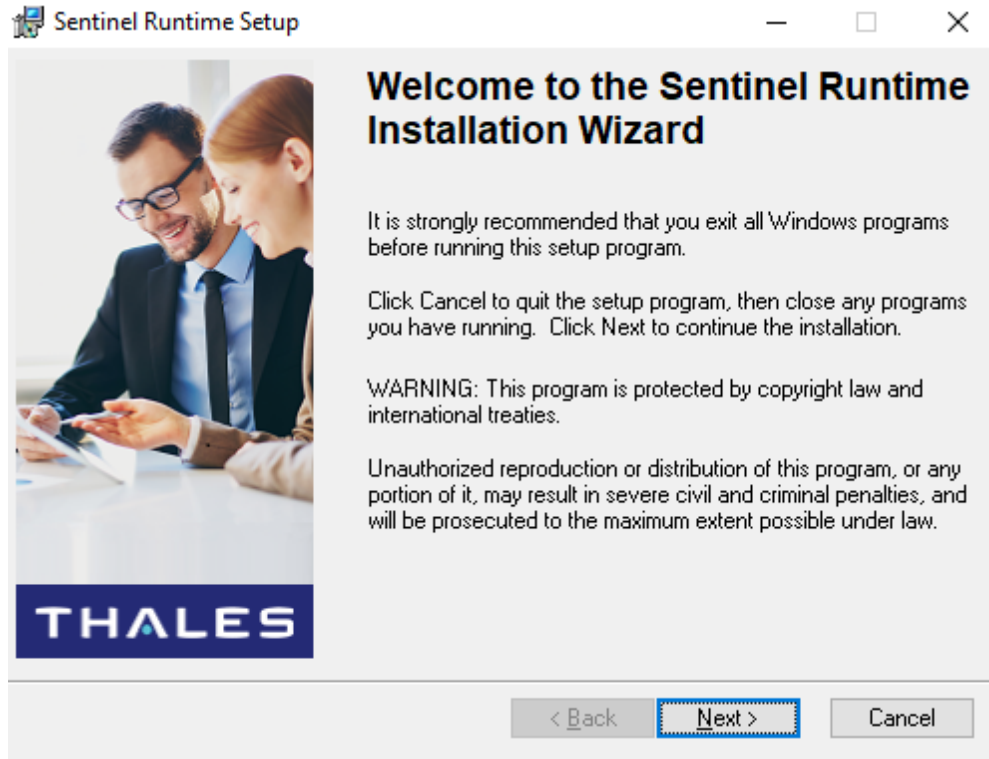
3.1 Installing Thales Sentinel HASP Drivers

When installing or upgrading existing PETEX programs, it is recommended that Thales HASP Sentinel Bitlock driver provided is installed to ensure that the contents of the HASP HL MAX USB Bitlock/Dongle can be read. The driver installation may require the computer to be restarted.

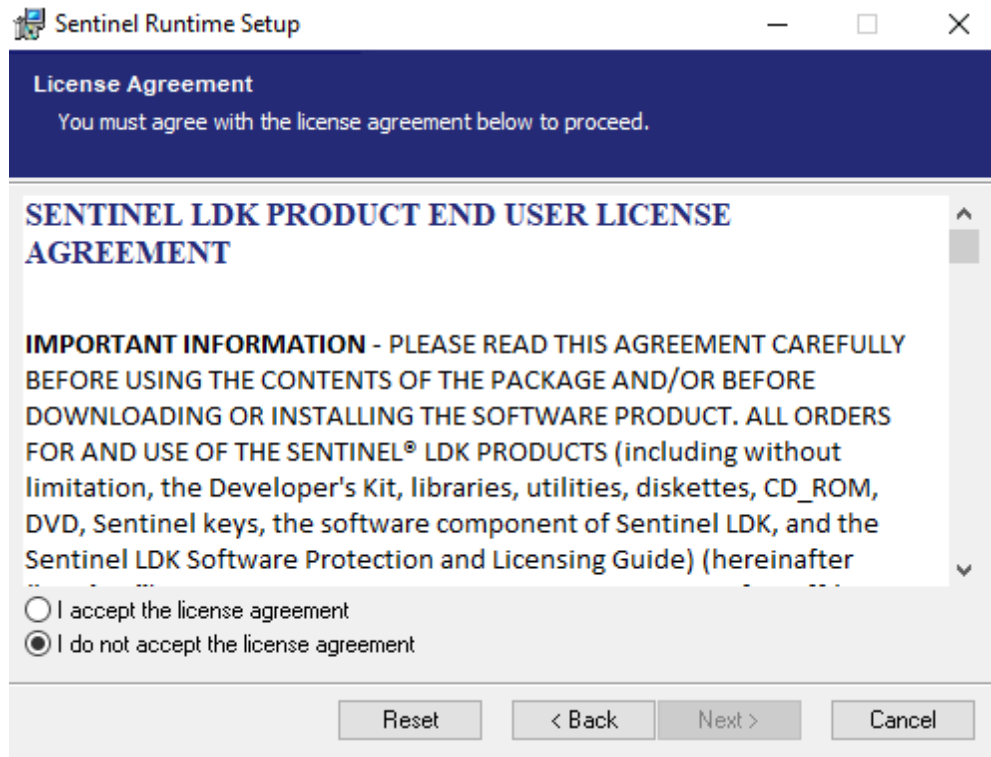
If this is the first installation of Petroleum Experts Software and a Standalone bitlock will be used then the Thales Sentinel HASP Bitlock driver have not been installed yet, please follow the steps below:

1. Unplug the USB Bitlock/dongle

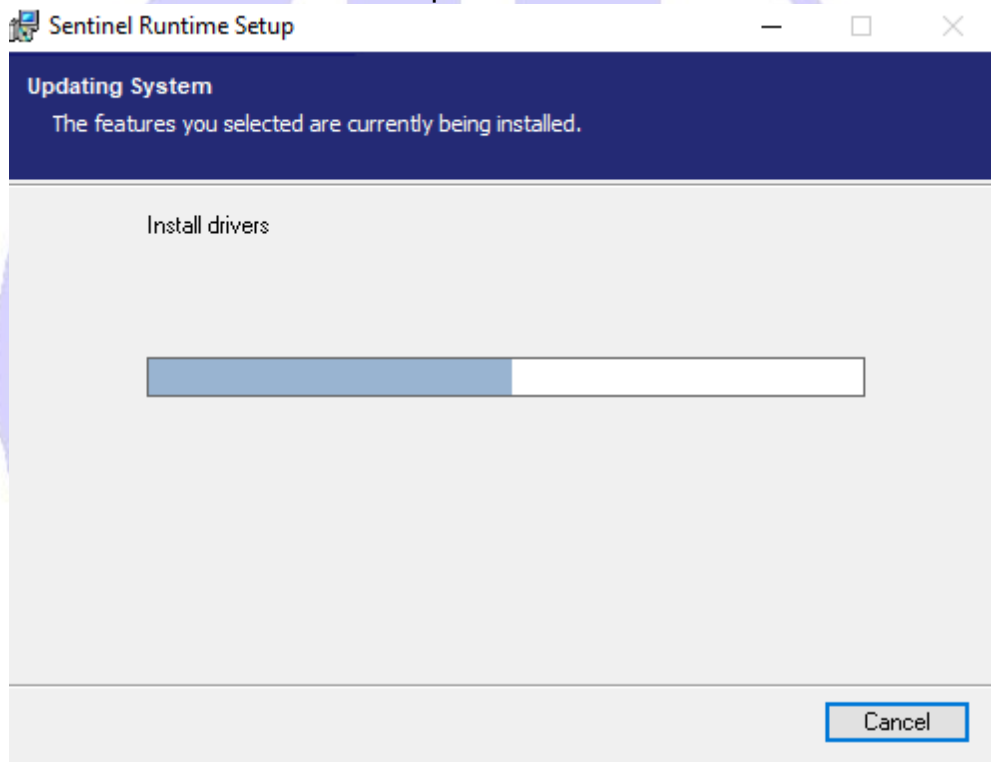
2. Log on as a local windows administrator user.
3. After installing a PETEX program and the licensing component, from the windows start menu **Start ->Petroleum Experts Licensing 12.0 -> Setup HASP Bitlock Driver** (right click and select run as administrator)”
4. The Thales HASP Bitlock Driver installer will start, click on Next

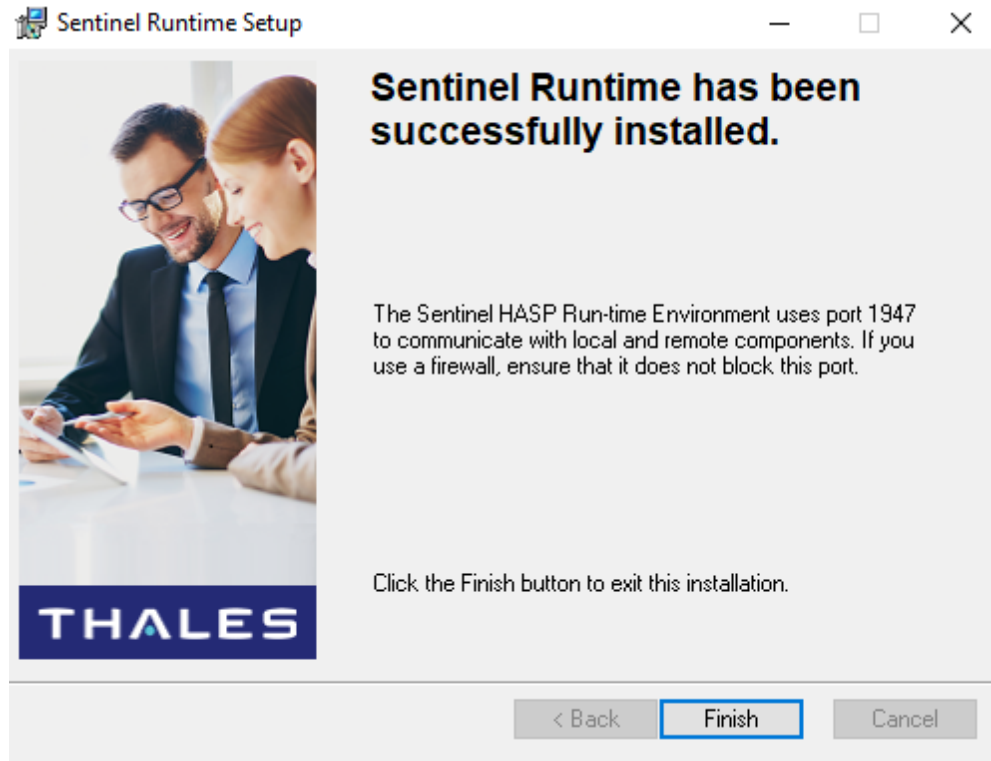


5. Accept the license agreement and click on NEXT, then Next Again.



6. After the driver installation complete click on Finish.

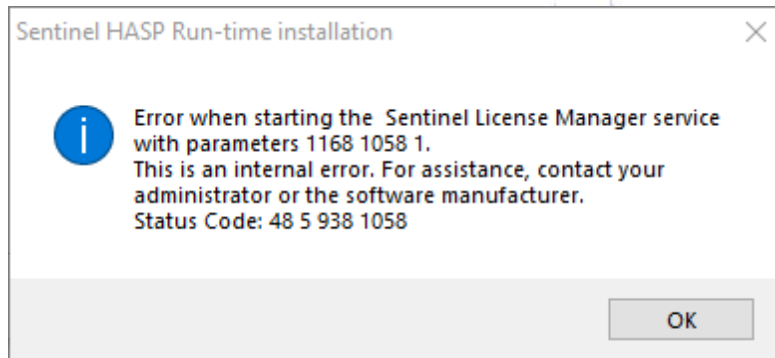




7. Plug in the USB Bitlock/Dongle, after a few seconds the red light in the Bitlock/Dongle will come on. This indicates that the computer is able to communicate with the Bitlock/Dongle.

Trouble Shooting

Sentinel HASP Bitlock Driver Installation



The error message above from the HASP Bitlock driver installation, indicates a service installation failure “48”, and access denied “5”. There are potentially two reason for this:

1. The logged on user does not have local windows administrator privileges.
2. The driver is already installed or in use.
3. If the driver uninstall has just run, the system may need to be restarted to delete the old driver that is possibly still in use.

General Issue

If you have an issue with the installation, please send an email to Edinburgh@petex.com including the following if possible:

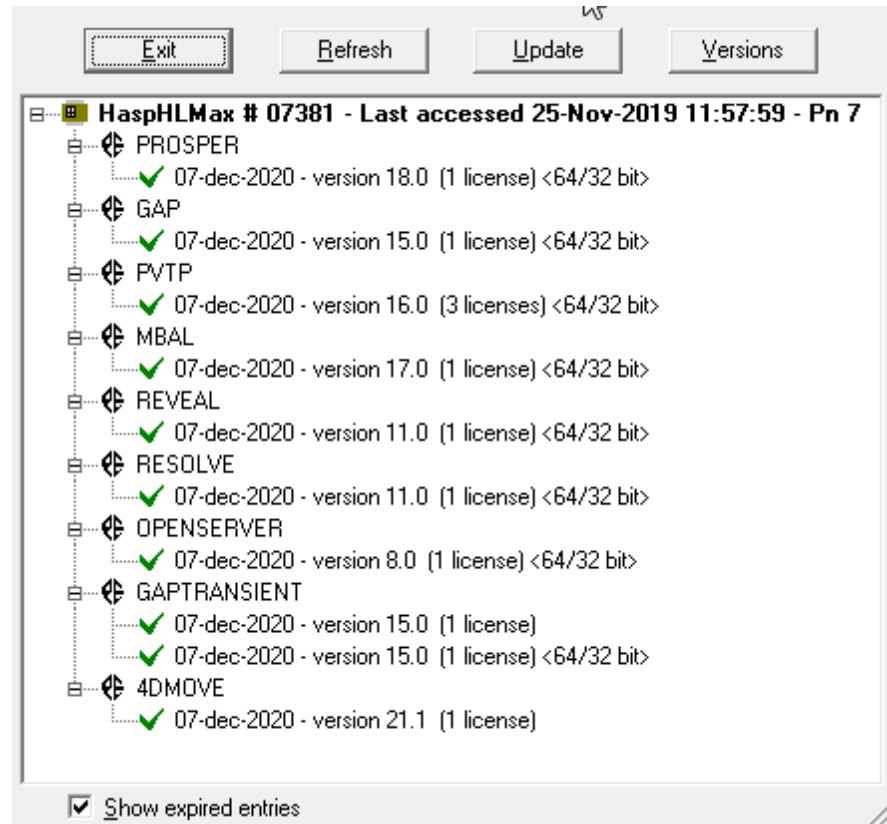
1. Screenshot of error message
2. Any other useful information.

3.2 Using Standalone Bitlocks/Dongles

The Petroleum Experts Licensing service (PXLSConsole.exe) can only communicate with locally attached HASP Bitlock/Dongle s via the **HASP Bitlock Driver** and the **Sentinel LDK License Manager** (service). The driver and the service can be installed following the instructions in the “Installing Thales HASP Driver” section of this document.

Once the driver is installed, check that the Licence Bitlock/Dongle can be read by doing the following:

1. From Windows Start Menu, **Start-> Petroleum Experts Licensing 12.0-> Remote**
2. The Remote utility window will open.



Note that the licence bitlock/dongle number is displayed for each dongle attached followed by licences details.

If there are no products on the dongle the message “No products enabled” will appear below the bitlock/dongle number.

If the licence bitlock/dongle cannot be read the message “No licensing system detected” will appear. This could indicate a HASP driver installation issue or the Sentinel LDK License Manager (service) is not running.

If there are **red crosses** next to any of the products licences, the bitlock may need to be activated using the set of codes provided by Petroleum Experts. If you do not yet have the codes, please e-mail Petroleum Experts at edinburgh@petex.com.

If you see yellow padlock icons next the licences, this indicates that the codes were applied on a previous version of the the remote utility that does not support new security enhancements. Please apply the code file again using the current version of the remote utility.

3.3 Using HARDLOCK network license server(s)

The Petroleum Experts Licensing system by default will automatically scan the local network for the Petroleum Experts' proprietary **HARDLOCK** network licence server if they

are available. However if the **HARDLOCK** is on a different network or virtual network then the **Hostname** or **IP Address** needs to be configured.

The **HARDLOCK** and the Petroleum Experts licensing service communicate with each other using:

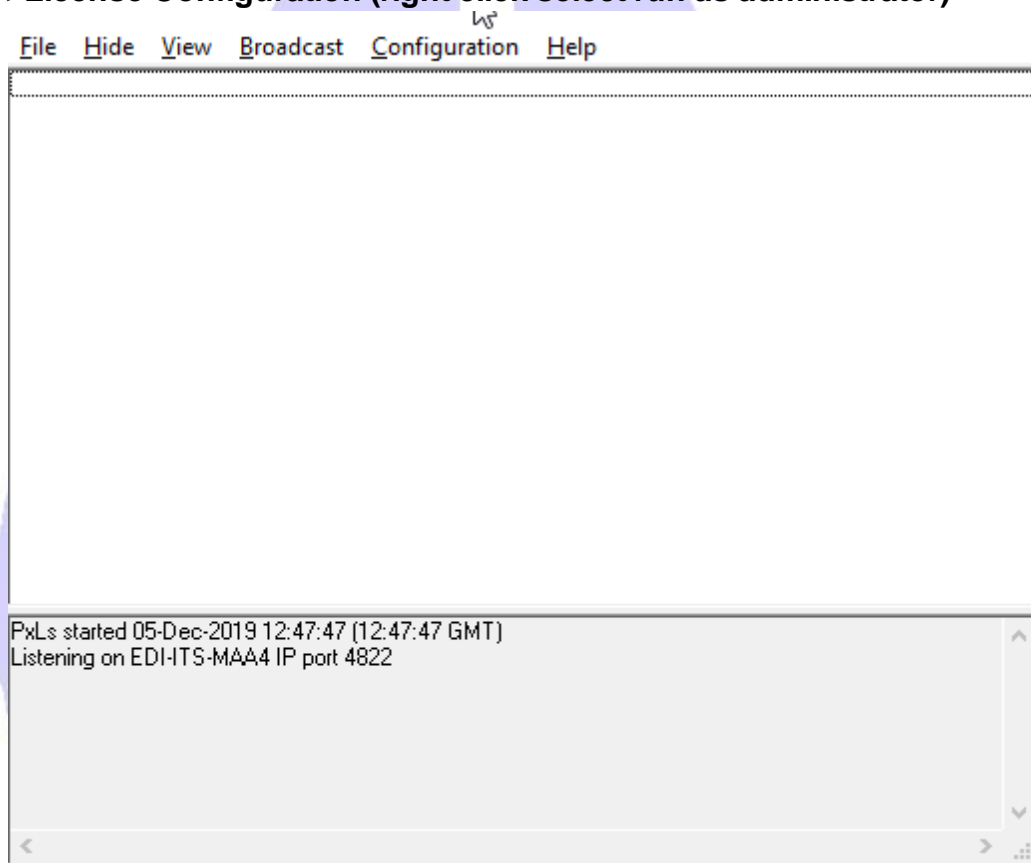
PORT **4720** on **UDP** and **TCP**

PORT **4721** on **UDP** and **TCP**

Please make sure that the firewalls on the **HARDLOCK** computer the PETEX program client computer and any network devices between the two allow inbound and outbound traffic on the ports and protocols above.

The Petroleum Experts Licensing service can be configured using the following steps:

1. From windows start menu, **Start->Petroleum Experts Licensing 12.0->License Configuration (right click select run as administrator)**



2. Click on "Configuration" along the top menu

HostID or IP address	Comments	Priority (<0 = disabled)
255.255.255.255	General local broadcast	0

TCP/IP Ports
Server: 4720
Client: 4721

Debug
 Switch debug mode on

Log file
Format: Format 2

Automatically re-synchronise bitlock clocks with Petroleum Experts Time Server
 Improved Socket Timeout

OK Cancel

3. Click on “Add” button

Enter the HardLock server computer name or TCP/IP address: 255.255.255.255
Priority (<0 = disabled): 0
Comments: General local broadcast

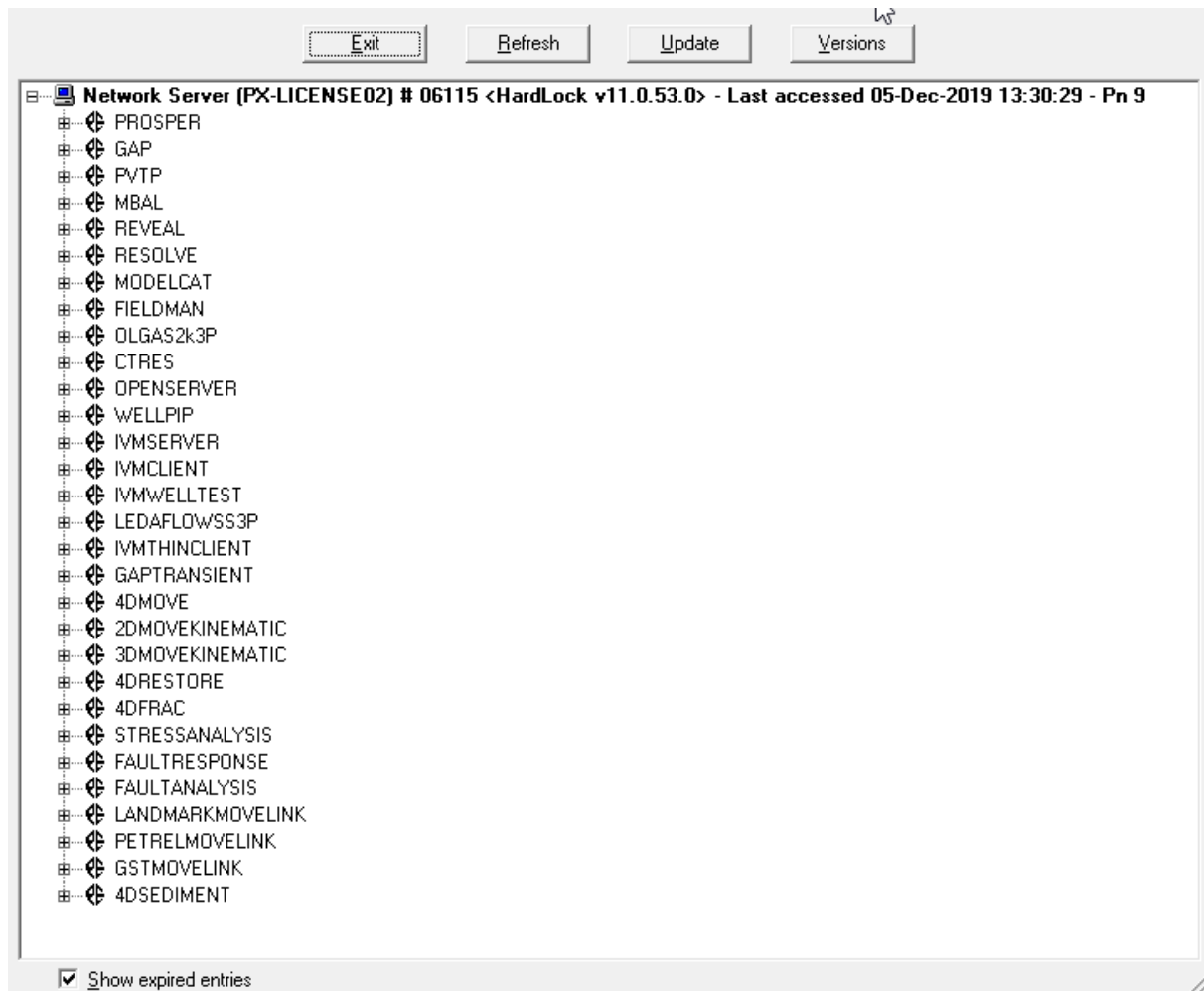
OK Cancel

4. Type HOSTNAME or IP Address in first box
5. Set Priority to 0 or higher.(-1 is disabled)
6. Enter a comment to describe the server
7. Click on “OK” button
8. Click on “OK” button confirm changes and go back to first screen.

File Hide View Broadcast Configuration Help

```
PxLs started 05-Dec-2019 12:47:47 (12:47:47 GMT)
Listening on EDI-ITS-MAA4 IP port 4822
Broadcasting on Px-license02:4720
Broadcast answered by IP PX-LICENSE02:4720
```

9. Notice that the bottom half of the screen while entry to broadcast to the new **HARDLOCK** added. There should also be a corresponding answer from the **HARDLOCK** server. This indicates that the configuration is correct and can communicate with the **HARDLOCK**.
 10. Close the window using File-> Exit.
- After the configuration the **HARDLOCK** should appear in the Remote Utility windows like below:

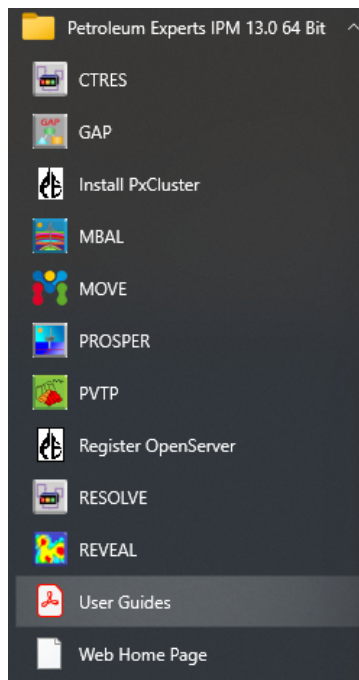


Note that the name of the **HARDLOCK** server, the licence bitlock/dongle number and the version running on server are shown on the first line.

The installation process is now finished. The software is now ready to run by selecting the appropriate option from the list under the Petroleum Experts menu accessed via the following Windows command: "START | ALL PROGRAMS | PETROLEUM EXPERTS IPM13.0"

4 IPM User Manuals and Worked Examples

The User Guides for the software can be accessed through:



A screen will appear from which it is possible to access the different User Guides (**GAP**, **PROSPER**, **MBAL**, etc)

These documents are in Acrobat Reader format (pdf). Acrobat reader is required in order to read them.

If Acrobat Reader is not already installed on the computer, a web link is provided where the newest version of Acrobat Reader can be installed.

We would suggest for the users to go through some of the worked examples to familiarize themselves with the functionality and workflows of the software. There is a separate installation for sample files, which is provided with the IPM downloader.

5 Technical Support

In Petroleum Experts we aim to provide the highest level of support we possibly can in order to assist our users with their work involving the **IPM** suite of tools. Technical support is provided to all users who maintain yearly their licenses.

5.1 Contact Technical Teams in Edinburgh and Houston

There are various ways that the users can get in touch with us:

Edinburgh, UK: Monday to Friday, 09:00 to 18:00 hrs

- e-mail at: edinburgh@petex.com
- Phone: +44 (0)131 474 7030
- Fax: +44 (0)131 474 7031

Houston, USA: Monday to Friday, 08:30 to 17:30 hrs.

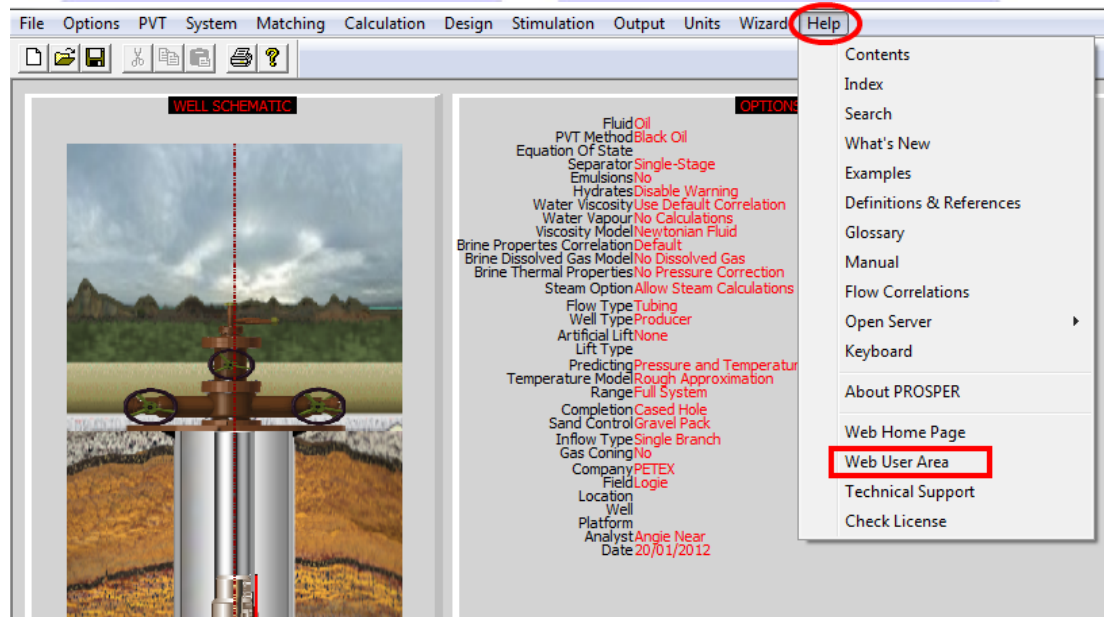
- e-mail at: houston@petex.com
- Phone: +1 281 531 1121
- Fax: +1 281 531 0810

From the programs themselves, a feature allows accessing the technical support web area (under Help | Technical Support).

5.2 Technical Support via the Web

A web area that only users of the software can access has been implemented. This can be accessed from any of the programs:

From **PROSPER** for instance:



Selecting this option will start your Web Browsing software, e.g Internet Explorer and show the following screen, first time you log on:

Petroleum Experts - User Area

User Area Login Information

This is the first time you are logging into the User Area. Please complete the form below. Once completed a cookie will be stored on your PC. This will avoid you having to fill in this form again. Fields with names highlighted in orange require to be filled in. When you have successfully submitted the form you will enter the user area.

Name: **My Name Surname**

Company Name: **My Licensed Company**

Address 1: **My Address**

Address 2:

City: **My City**

ZIP/Postcode:

Country: **United Kingdom**

Telephone: **+444747030** (Please include the Country Code)

Fax: **+44**

Email: **edinburgh@petex.com**

License Number: 3109

The information supplied will be used exclusively by Petroleum Experts client Support

For the first logon the user needs to enter their details and then have access to the area. These details are then stored and used for subsequent entries, provided your PC allow Cookies to be stored on your PC.

Clicking on submit will present the web page and links:

January 6, 2010
Petroleum Experts
Giuseppe Tizzano

Engineering Software Development - User Area

Technical News

User Meeting Update

- **Petex** - Pipeline pressure drop benchmark using steady state models - June 2009
- **Petex** - PVTP & IPM Compositional - June 2009
- **Petex** - Achieving a consistent fluid description across multiple applications- June 2009
- **Petex** - MBAL Reservoir Allocation Tool - June 2009
- **Petex** - Tight Gas Analysis - June 2009
- **Petex** - Coal Bed Methane - June 2009
- **Petex** - REVEAL Specialised Numerical Simulator - June 2009
- **Petex** - Life of Field Optimisation (part 1) - June 2009
- **Petex** - Mitigating Severe Slugging with Riser-based Gas-lift: an Integrated Approach - June 2009
- **Petex** - PROSPER presentation - June 2009
- **Petex** - SPOT Shell Perforating Optimisation Tool - June 2009
- **Petex** - GAP - PVT Modelling Options - June 2009
- **Petex** - RESOLVE Treatment of compositional data in integrated models - June 2009
- **Petex** - Oil Production Optimization in operationally challenging environments - 2009
- **Petex** - Life of Field Optimisation (part 2) - June 2009
- **Petex** - Global Optimisation using RESOLVE - June 2009
- **Petex** - RESOLVE Preparation of integrated compositional models - June 2009
- **Petex** - Building a large tight gas IPM model (part 2) - June 2009
- 2008, 2007, 2006, 2005, 2004, 2003, 2002 and 2001 User Meeting Client Presentations Archive

IPM Case Examples

- **Houston Meeting** - IFM Knowledge Management
- **Houston Meeting** - IFM developments
- **Houston Meeting** - Large IPM model Case Example
- **Houston Meeting** - Reservoir reserves optimisation - Case Study
- **Houston Meeting** - Tight gas field - Case Study
- **Houston Meeting** - Development an integrated compositional model
- **Houston Meeting** - Case examples using REVEAL
- **Houston Meeting** - Oil Production Optimization in operationally challenging environments
- **Houston Meeting** - IPM 7.5 Summary of Developments

Technical Support

Latest Software Information









- **Current Version, Build #166(IPM 7.1)**. Click here to see the report of bugs fixed.

IFM Area

- Click here to access the IFM Area.

Your Technical Support Case Log

- You have no open cases logged. If you want to log a new case now, click here

Admin 
News 
Technical Support 
IPM Case Studies 
Products 
Other 
Public Web 
Log Out 

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If technical support is required, the Technical Support tab can be selected, as highlighted above.

On the following page, there are a number of options to select from. The user can access our searchable FAQ database or send us an e-mail directly from the webpage.

[Searchable FAQ](#)
[Questions to Support](#)
[Your Case Log](#)
[Bug Log](#)
[Macros Downloads](#)

MAINTENANCE and SUPPORT:

All Licence users that have maintained I
This annual maintenance fee will ensure

- Program bugs and defects correc
- Technical Support for the desig support will only be given to en licences to the Petroleum Expert
- Free upgrades to new releases o
- Minor program modifications req
- Invitation to the Annual User Mee

PRODUCT DEVELOPMENT PLAN

- Petroleum Expert set an annual i
- All companies who maintain their
- All developments agreed at the U
- The user receive all these develop

News 
Technical Support 

The highlighted "Questions to Support" option can be used to enter technical requests:

The screenshot shows a web browser window titled "Petex User Area - Windows Internet Explorer" with the address bar showing "http://www.petex.com/user_area/". The page header includes the date "January 5, 2010", the company name "Petroleum Experts Lt Giuseppe", and the page title "Engineering Software Development - User Area". The main content is a "Technical Support Form" with the following fields:

- Name: Giuseppe Tizzano
- Company: Petroleum Experts Ltd
- Email: edinburgh@petex.com
- Phone: +441314747030
- Copy Email To: (Use ; for email address separation)
- Product: All
- Version: 7.50.0.557
- Type: Request
- Public Flag: Confidential

The form contains two large text areas:

- Context:** Please input the full background and context to your work. INFORMATION ABOUT THE OBJECTIVES TO ACHIEVE AND GENERAL SCOPE OF THE PROJECT
- Problem/Question:** SPECIFIC QUESTION WITH DESCRIPTION AND/OR STEPS FOLLOWED

Below the text areas, there is a note: "Please attach the relevant archive file. (Click [here](#) to view 'How to create an archive file' (PDF,310kb)). PLEASE NOTE: File attachments must be smaller than 4 MB. If your file is larger send this mail without attachment and add the request for an FTP link to your question." An "Attachment:" field with a "Browse..." button is located below the note. At the bottom of the form are "Clear" and "Send" buttons. The footer of the page reads "© 2000 - 2010 Copyright Petroleum Experts - Confidential Data".

The fields required are:

- Name
- Company
- Email
- Phone
- Context - general background of the project and detailed objectives the model is meant to achieve
- Problem/Question - specific question or problem encountered
- Attachment - the model file can be attached to the support request

6 User Group Meeting

Petroleum Experts publish an annual development plan for each software product in the **IPM** suite.

Every year a week long forum, the User Meeting, is held in Edinburgh UK where the company is based. This is an opportunity for the user community to discuss the use of the software and take decisions on future developments for the software.

The decisions are based on practical needs of the client companies after presentations of the problems or proposals by company representatives.

