User guide: Flow through pipes rig (Laminar Flow Rig)

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Contents

Overview ................................................................................................................................................. 3
Requirements .......................................................................................................................................... 3
Login in to Labshare@Curtin ................................................................. ........................................... 3
Using the Laminar Flow rigs .............................................................................................................. 4
Laminar Fluid Flow Laboratory rig applications .......................................................... 6
   Rig Control application .............................................................................................................. 6
   PIV camera application ......................................................................................................... 7
Troubleshooting................................................................................................................................. 9
   Question: .............................................................................................................................. 9
   Answer: ............................................................................................................................... 9
   Question: .............................................................................................................................. 9
   Answer: ............................................................................................................................... 9
   Question: .............................................................................................................................. 9
   Answer: ............................................................................................................................... 9
Overview

Traditional engineering laboratories require students to be physically present in order to interact with equipment, limiting both student flexibility and sharing of facilities. Conversely, remote laboratories allow students to use the internet to remotely access physical laboratory equipment. The interaction is supported by the use of sensors and cameras that the student can use to monitor the laboratory equipment and application(s) to control the lab equipment. Students are still capable of carrying out experiments using real equipment, but with much greater flexibility and the access can occur from anywhere and anytime.

Requirements

Please ensure you meet the requirements below prior to access the Labshare web site.

- Firefox web browser version 4 or higher (http://www.mozilla.com/en-US/firefox/)
- Adobe Flash plug-in for the Firefox web browser version 10.2.153.1 or higher (http://get.adobe.com/flashplayer/)
- Java runtime for the Firefox web browser version 1.6.0_24 or higher (http://www.java.com/en/download/)
- High speed ADSL or better internet connection.

Login in to Labshare@Curtin

In order to access LabShare type in https://labshare.curtin.edu.au in the location bar of your web browser (please use the Firefox web browser with requirements list above).
To login, use your user name and password, for Curtin staff and students this will be your Oasis login credentials and for non-Curtin users it will be the user name and password that was emailed to you.

Using the Laminar Flow rigs

Once logged in the user will be greeted by the screen depicting available resource permission types for the logged in user’s type.

Figure 2: Resource permission type selection screen
Selecting an available resource permission type will notify the user of the number of available rigs and allocate the user to next available rig. Once allocated to a rig the user will see a screen like the one visible below. The screen shows the time available to the user on the rig, rig control window, which allows the use to run the rig experimentation application (Laminar Flow Rig) and the camera video feeds for that rig.
Clicking on the “Launch” button in the “Rig Control” window will start up the Laminar Flow Rig application (Please note: The rig control application session might take up to 5 minutes to start depending on your internet connection speed). Once the rig control session has started click on the “Control GUI” tab and click on the “pump ON/OFF” button to start the liquid flow through the rig Changes done to the rig via the application should now be visible through the video feeds. Clicking on “record current data” will save data from the experiment into a text file; this file is then visible via the “Results” button on the web site. Clicking on the “Load PIV System” button will launch the PIV camera application session and click “OK” to the login window. Clicking on the “play” button on the PIV camera application will display the fluid flow video captured from the PIV camera. Closing the Laminar Flow Rig applications will automatically end the rig control session.

The user’s session will expire once his allocated time ends or the user clicks on the “Finish Session” button. Once the session ends the user will be redirect back to the resource permission type selection screen. On the end of the session all user results data will be deleted from the server. Clicking on the “Logout” button will take the user to the login page of the LabShare site.

Laminar Fluid Flow Laboratory rig applications

Rig Control application
The rig is controlled via a control GUI application written with “Labview”, a screenshot of which is shown below. The two controllable elements of the rig are the pump (ON/OFF) and the valve position. Feedback elements include ten pressure sensors, a flow rate sensor, both oil and ambient temperatures and a valve position signal. Click on the “Record Current Data” button in order to take a “snapshot” of the current readings and save it on to a file. The PIV camera application session is activated via the “Load PIV System” button.
PIV camera application

This application displays the characteristics of the flow of liquid through a transparent area of tubing on the rig. Select the type of display from the “Display” drop down box (fig 7). Clicking on the play and stop buttons starts and stops the video capture process.
Figure 7: PIV camera application session

Change type of display
Troubleshooting

Question:
When I click on the “Launch” button I get a message box stating that an error has occurred or no rig control session window appears.

Answer:
Try one or both of the following options.

- Check that all requirements have been followed.
- Click the refresh button on the browser.
- Clear Firefox cache by selecting tools->Clear Recent History, select cookies and cache and click “Clear Now”, logout of the LabShare session, close and reopen the Firefox browser and re-login to the LabShare web site.

Question:
When I click on the “Launch” button nothing seems to happen.

Answer:
Please note the following;

1. When the “Launch” button is clicked its colour changes, if this has not occurred it is due to the button not being clicked properly.
2. The launching of the rig control application session can take up to 5 minutes depending on your internet connection speed. Please only use a high speed ADSL or better internet connection when using Labshare.

Question:
When I click on the queue in the available resources window (see fig 3) I am taken to the rig session site (see fig 4), but video sources are not shown and I am taken back to the Laminar Flow rig privileges site.

Answer:
Please re-try to select an available resource via the available resources window (see fig 3).