

Novel ways of controlling laboratory automated work cells

By Andy Mash, Process Analysis & Automation, Falcon House, Fernhill Road, Farnborough, Hampshire, UK, andy.mash@paa.co.uk

Introduction

Laboratory automation control software has become a well developed field with a number of vendors providing different software solutions. However, as the software has been created from a hardware perspective, the software works in a instrument centric fashion. It can often be difficult for a novice user who is un-experienced with the automated system to quickly learn how to use the system

A solution is needed where the control of a laboratory automation system can be approached by an inexperienced user and with limited training they can start using the system immediately. This requires careful planning at the design stage to ensure a solution is created that performs in the desired manner. One design process that aims to achieve this is User Centric Design.

User Centric Design

User Centric Design (UCD) is an approach that has been used in the software design fields for a number of years. The idea behind UCD, is to design with end user's input from an early stage in the design process. This helps to ensure that the design process involves the user's perspective of how the automated system should function.

Designing and creating a piece of automation software that involves UCD is often viewed as creating a bespoke piece of software. Creating bespoke software is often a costly and time consuming process that can be undesirable for the customer.

At PAA, we have been using Overlord2 software as the back-end for a user interface that has been designed to a customer's specific requirements. This approach of using Overlord2 reduces the cost of developing the interface. The front end presents to the user what is occurring in the Overlord2 run-engine.

Experiment Manager

Experiment Manager is a piece of software that has used UCD principles to create a user interface for controlling complex automated systems. The principle behind Experiment Manager is a piece of software that can be used on different systems whilst still presenting the same common interface. This reduces the amount of training that users require because automation systems have a common interface. It is possible to use Experiment Manager on different systems without having to make any major changes.

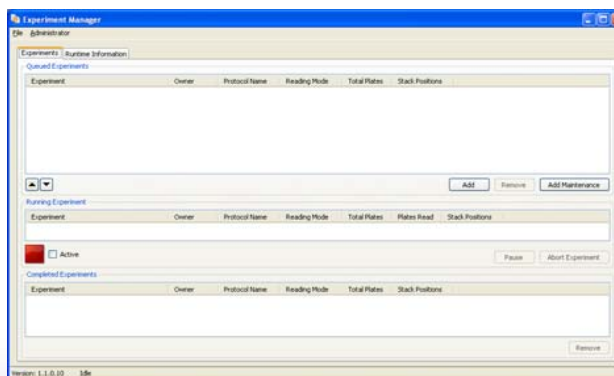


Figure 1—Experiment Manager Main Screen

Experiment Manager works as a front end to the Overlord2 run engine. A procedure is designed in

Overlord2 that will control the automated system. Experiment Manager then passes information to the procedure during the automated run. The user needs no knowledge of how Overlord2 is processing the system. All the information is returned to the Experiment Manager interface so the user can easily see the status of the system.

Advantages

- The system status is clearly displayed to the users
- A list of queued experiments are displayed
- The current experiment running is displayed
- Completed experiments are listed so the plates can be removed from the system
- An advanced output shows the exact status of the run
- Errors on the system are clearly displayed, and the user is presented an option to retry or ignore the error
- The user is prevented from making errors when configuring the system. Plates cannot be added when there is no space on the system

Conclusion

Users of Experiment Manager don't need to have any knowledge of Overlord2 or how the procedures run the automated system. This solution allows inexperienced users to quickly start using an automation platform with the need for extensive training.

