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The CIWS-FW Control Panel

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DOCUMENT HISTORY

Version	Date	Modification
d0.1	20 March 2014	First draft

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1. Introduction

1.1 Purpose of the document

The Customizable Instrument Workstation Software (CIWS) project is aimed at providing a software framework (CIWS-FW) for the development and operations of the Instrument Workstation (IW) required to support the Assembly, Integration, Verification and Testing (AIV/AIT) activities on scientific instruments for space borne experiments and ground-based telescopes in Astrophysics.

In addition, the CIWS-FW should facilitate the refurbishment of the IW software for the subsequent Commissioning and Operations phases to be carried out either in the mission Ground Segment of space-borne experiments, or in the Observatory site of ground-based telescopes.

The CIWS-FW architecture provides a component which has in charge the Instrument Workstation configuration and control.The purpose of this document is to present the Control Panel concept and design.

1.2 Definitions, acronyms and abbreviations

1.2.1 Definitions and Terminology

Name	Alias	Description
Acquisition pipeline	pipeline	a chain of processes that manage the data flow
Measure		It defines the process of setting up the instrument, followed by the acquisition of at least one detector and the storage of the obtained data product in mass memory and/or in main memory for display.
Measure ID		An incremental number that univocally identifies each measure.
Measure Plan	Measure	A sequence of consecutive and correlated Measure sessions.
Measure Plan ID	Pid	Measure plan identifier.
Measure Session		A sequence of correlated Measure, (e.g.: the smallest schedulable unit containing all information necessary to execute sequentially and without interruption a set of correlated measures, involving a single telescope preset).
Measure Session ID	Sid	Measure session identifier
Measure Block		The session can be split in more blocks when it is required.
Measure Block ID	Bid	Measure Block identifier

1.2.2 Acronyms and abbreviations

IW Instrument Workstation

API	Application Programming Interface
CIWS	Customizable Instrument Workstation Software
IDE	Integrated Development Environment
JRE	Java Runtime Environment
JDK	Java Development Kit

1.3 References

1.3.1 Applicable Documents

1.3.2 Reference documents

RD [1] CIWS User Requirement Document (URD) - M. Trifoglio - 16/09/2013.

RD [2] CIWS Software Specification Document (SSD) - A. Bulgarelli - 19/06/2013.

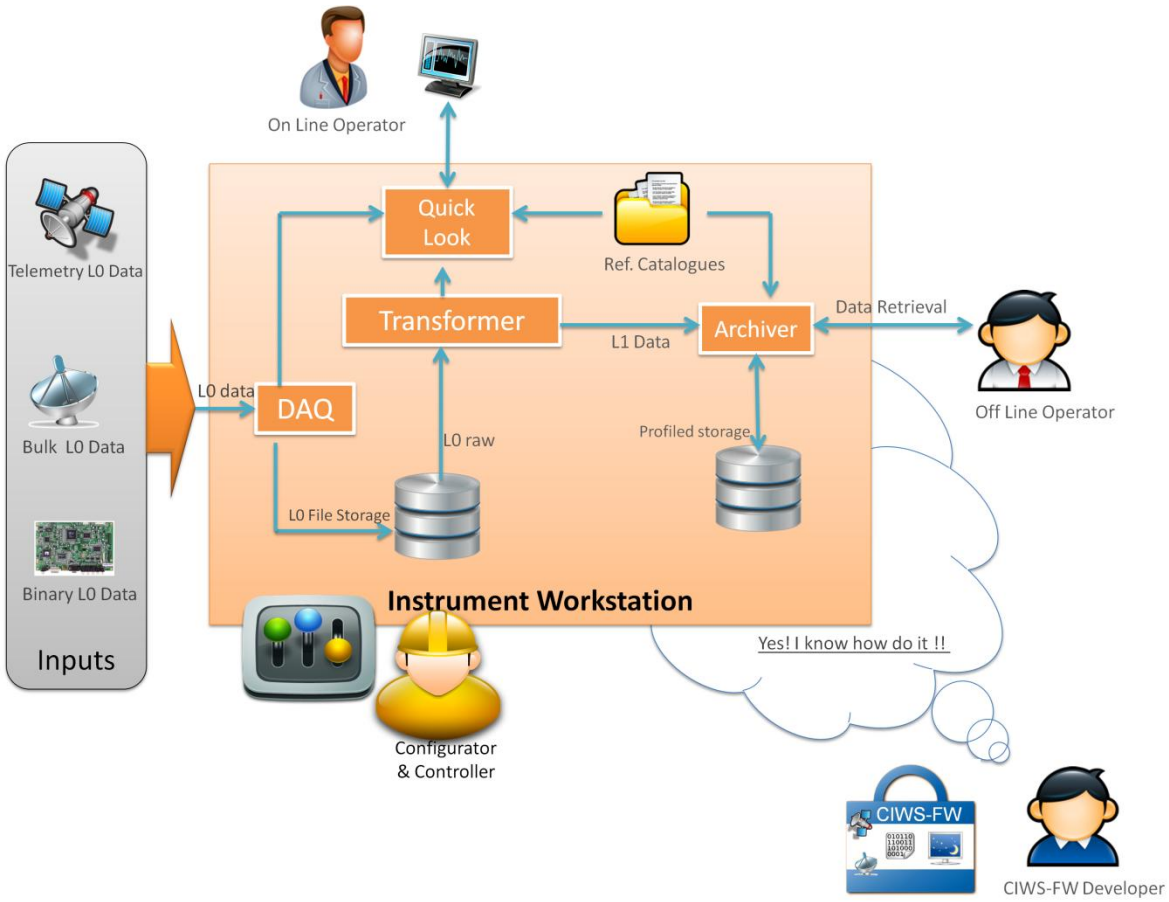
RD [3] CIWS-FW: a Customizable InstrumentWorkstation Software Framework for instrument-independent data handling" In proceeding of ADASS XIII Conference Waikoloa (HI) October 2013 - V. Conforti in behalf of CIWS

1.4 Overview of the document

The next chapter presents the Control Panel in the CIWS-FW architecture. Chapter 3 shows the Control Panel design. In the last chapter is presented a Control Panel prototype.

2. The Control Panel in the CIWS-FW context

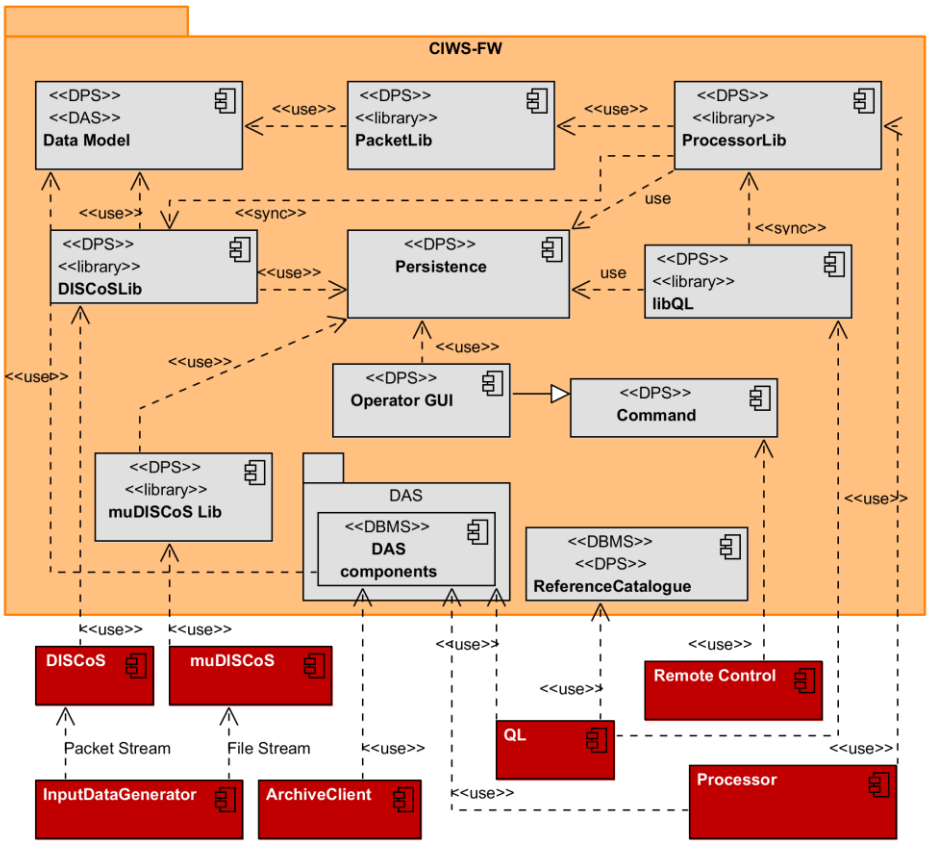
The CIWS-FW concept detailed in presented in the RD [3] is depicted in figure 2-1.



2-1CIWS-FW Model View

The CIWS-FW provides the tools for the IW building. the IW allows the near real time acquisition of input packet data streams and file data streams that should be transformed and archived according to the data models defined by the user. The IW shall provides configuration and controller GUI to control and monitor the operations. The CIWS-FW provide as Configurator & Controller GUI the Control Panel.

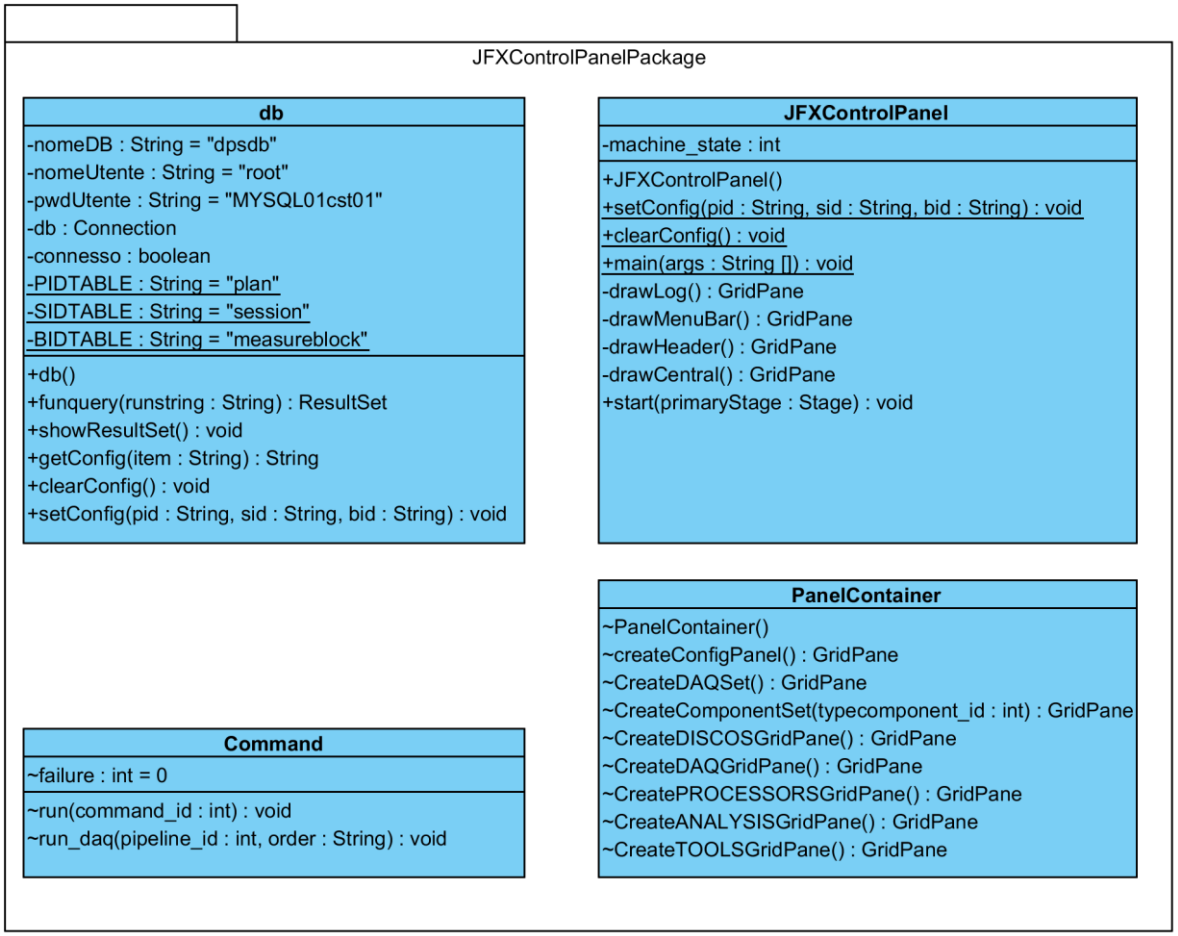
The figure 2-2 depicts the CIWS-FW architecture. The Operator GUI provide the User interface forward the Instrument Workstation. Since the CIWS-FW allow to build etherogeneous IW, the Control Panel uses the Persistence Component in order customize itself to support specific IW.



2-2 CIWS-FW Architecture

3. The Control Panel Design

The Control Panel software design is resumed in the following class diagram.



3-1 Class Diagram

The adopted programming language is Oracle Java which provides the following advantages:

- It is designed to be easy to use and it is easy to write, compile and debug through many tools and IDE;
- It allows to create modular programs and reusable code beacuse it is object oriented;
- Java is platform independent;

In order to implement a modern GUI we are adopted JavaFX which is the evolution of Java as a rich client platform. JavaFX is already included with the standard version 7 of JDK and JRE.

The JFXControlPanel class includes the method to start the Control Panel GUI. The Control Panel is organized in sections:

- Header: it contains the logo and title of the IW;
- MenuBar: it provide a menu to close, configure and monitor the IW;
- Central: it provides the controllers;
- Log: it provide a space to track all executed commands;

The PanelContainer class contains the methods to build the central section and it is realized with the methods:

- DAQ pipeline;
- DISCoS;
- Processors;
- Analysis;
- Other tools;

Each of the above methods loads the IW configuration and draws the panels through the CIWS-FW Persistence component. When the configuration changes it is needed to restart the Control Panel.

The interface to the Persistence Component is managed by the db class which provides the facilities to connect and query the database.

The command class executes commands through two methods:

- run: it executes a command of a single software taking in input the command identifier;
- run_daq: it executes all commands of a pipeline taking in input the pipeline identifier;

4. Control Panel Prototype

A first prototype is implemented and exported as jar file. The Control Panel shall be run on the Instrument Workstation by user which has grant to command the IW.

To lunch the Control Panel open a shell and select the command:

```
java -jar ControlPanel.jar
```

The program starts:

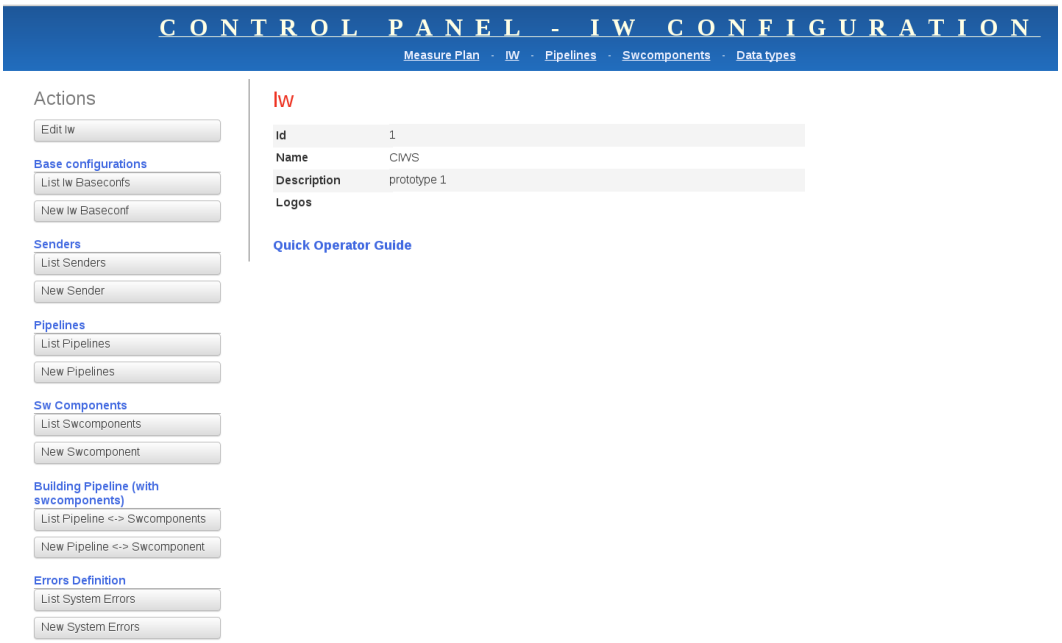
4-1 *Control Panel GUI*

The Control Panel allows two configuration type:

- IW configuration;
- Acquisition plan configuration;

4.1 IW configuration & Data Retrieval

The IW configuration and Data retrieval program can be executed directly by the Control Panel while it is included in the CIWS-FW Persistence component. The figure 4-2 show an IW Configuration and Data Retrieval software screen shot.



4-2 IW Configuration Software

4.2 Acquisition plan configuration

Once the IW is well configured it is the time to start operation. Usually the observations are organized in measure plans as define in RD1:

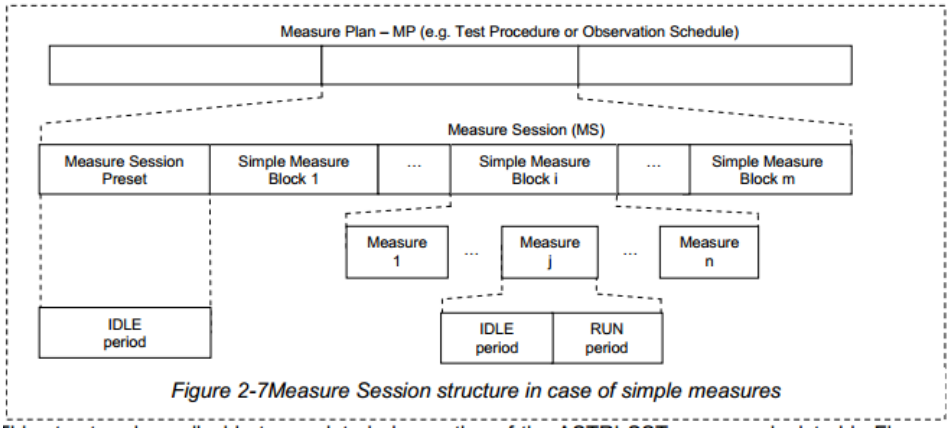


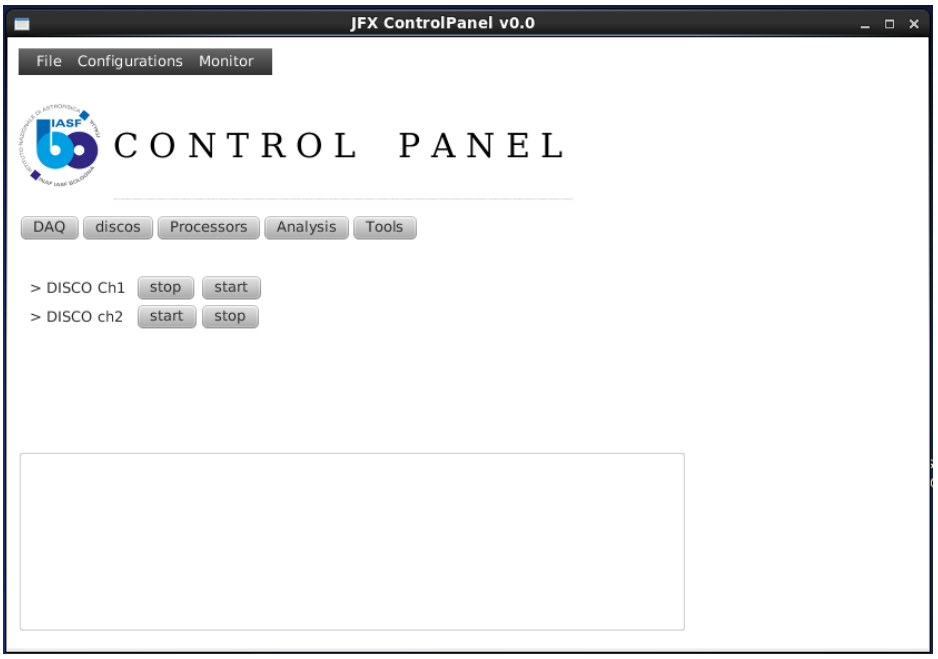
Figure 2-7Measure Session structure in case of simple measures

4-3 Measure Plan

The Control Panel provide the commands to set the pid, sid and bid as depicted in figure 4-1.

4.3 IW components test

The software components, analysis softwares and tools can be executed also outside the pipeline. In figure 4-4 is shown the panel to command the DISCoS component.



4-4 Software components management