D2 - User Interface in General

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1. Introduction

For the **D**ISPLAY and **D**IALOG **S**YSTEM (**DDS**), which builds the interface between the plant operator and the machine, the software tool TeleUSE is used.

TeleUSE belongs to a class of software called User Interface Management Systems. It is workstation-based in OSF/Motif look and requires the X-Window System and a window manager.

The following chapters give an overview about the general layout and the usage of the DDS system.

2. General Window Design

2.1 Window Basic Types

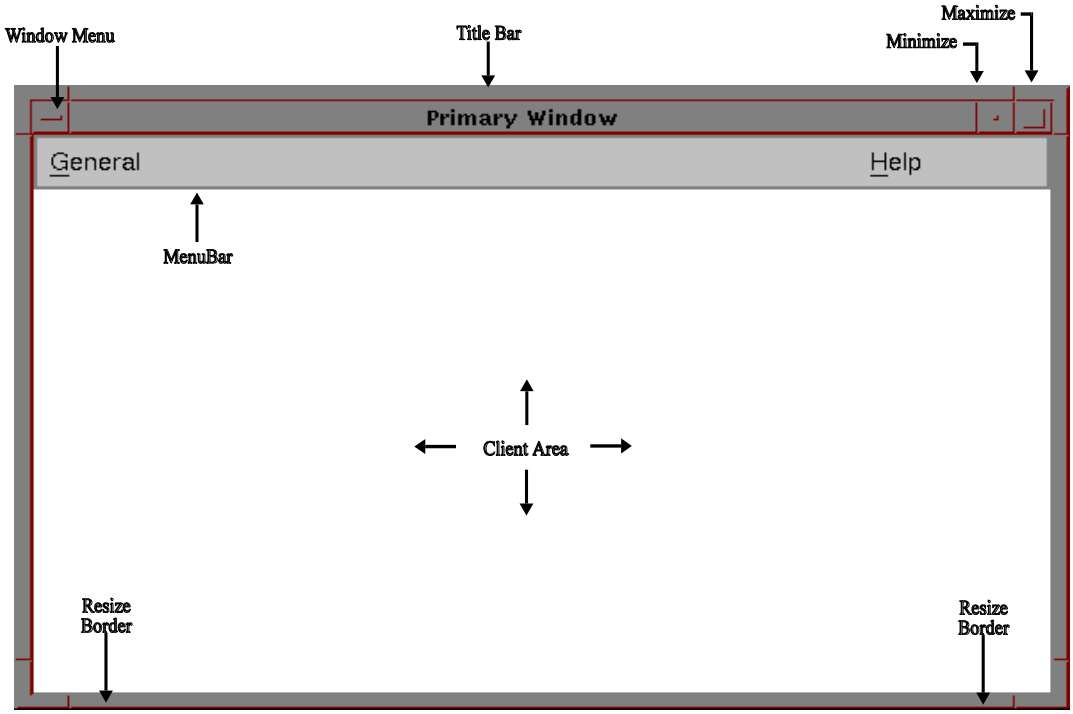
While each application can be made up of many windows, each window (except Login/Logout-Display) used in the DDS is one of only three basic types:

- A primary window, the main application window.
- A secondary window, a window that provides secondary and transient interaction with the user.
- A real dialog, a special type of a secondary window that enables the operator to perform keyboard-based input, mouse-based input, or both.

2.1.1 Primary Window

A primary window is the window from which all the other windows used by the application are generated.

When a primary window is iconized (minimised), the window and all of its associated secondary windows must be removed from the display and replaced with a single icon representing the primary window. Iconising a window must not automatically suspend the process of the window.



primw.wmf

A primary window must have at least:

- **Title Bar:** The title bar, also called title area, supplies a place to identify the window. It must be a horizontal bar at the top of the window. Besides supplying a location for a label, the title area also acts as a position, or handle, for moving a window. Pressing MB1 in the title area and dragging the pointer must move the window relative to the moving pointer.

- **Maximise button:** Activating the maximise button must increase the size of the window to the maximum allowable size.

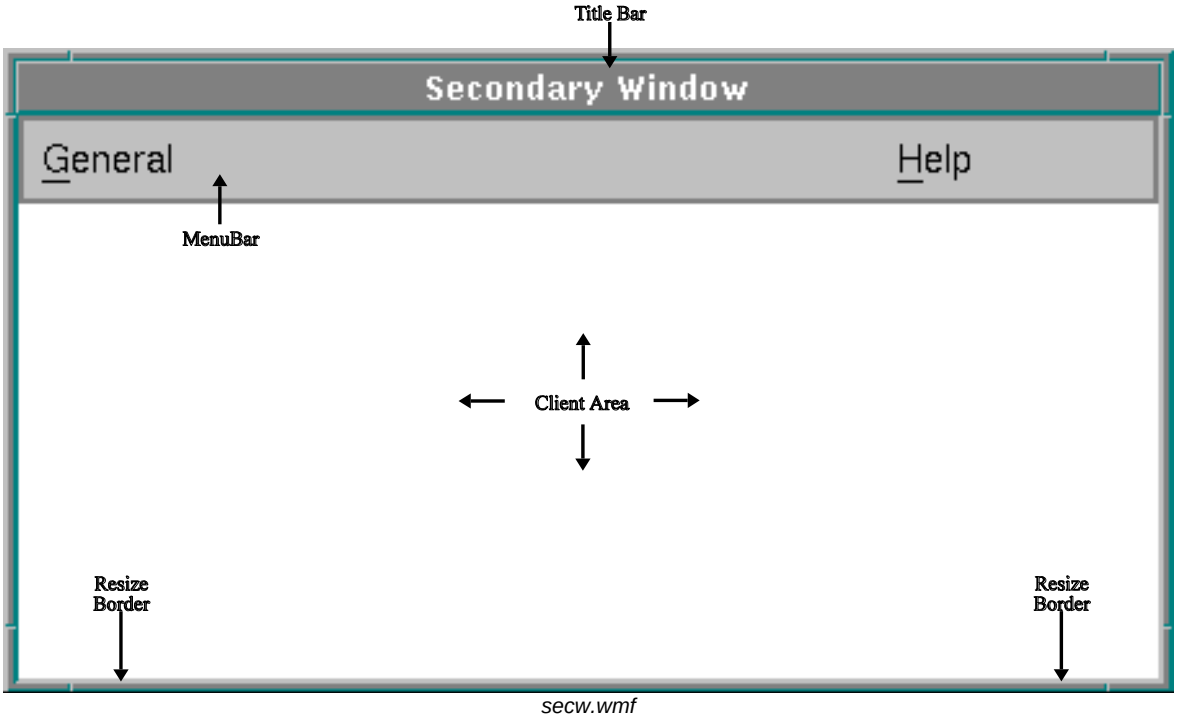
- **Minimise button:** Activating the minimise button must iconise the window.

- **Resize border:** The resize borders are made up of two components: the corner handles and the edge handles. Pressing MB1 in a corner handle and dragging the pointer must change the height and the width of the window relative to the moving pointer without changing the position of the opposite corner. Pressing MB1 in a top or bottom edge handle and dragging the pointer must change the height of the window relative to the moving pointer without changing the width or the position of the opposite edge. Pressing MB1 in a side edge handle and dragging the pointer must change the width of the window relative to the moving pointer without changing the height or the position of the opposite edge.

- **Menu bar:** The menu bar must be a horizontal bar at the top edge of the of the application just below the title area of the window frame. The menu bar contains a list of Cascade Buttons with Pull Down Menus connected to them. On the very left side of the menu bar has to be the General-menu (containing the Exit button) and on the very right side the Help-menu (containing on-line help functions). All other used menu titles depends on the nature of the application. The menu title and all Push Buttons of the Pull Down Menus has to have a mnemonics.

2.1.2 Secondary Window

Secondary windows are usually transitory and can be removed when they are no longer needed. They are always related to a parent window. Sometimes the parent is a primary window, sometimes another secondary window. Any window can have any number of secondary window children.



secw.wmf

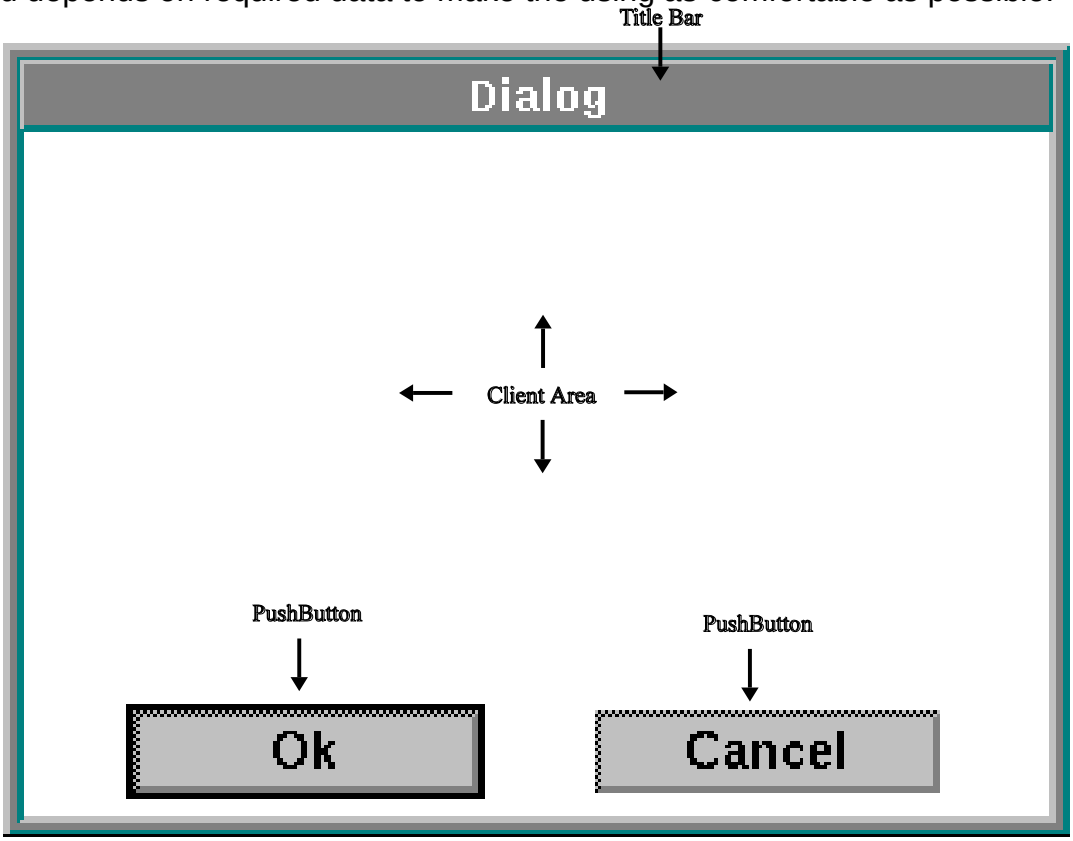
A secondary window must have at least:

- **Title bar:** Description see above.
- **Menu border:** Description see above.

If applicable secondary windows can have resize borders, but they must not have minimise and maximise button.

2.1.3 Real Dialog

A real dialog, a special type of a secondary window, enables the operator to perform keyboard-based input, mouse-based input, or both. There are several possibilities the input can be done: selection from lists, pressing buttons (Push Button, Radio Button, Toggle Button), Pull DoWn Menus, typing. The input mode used depends on required data to make the using as comfortable as possible.



dialogw.wmf

A real dialog must have at least:

- Title bar: Description see above.
- **Push Buttons:** Push buttons are the only way to exit from the dialog, so a dialog must not have a menu bar. Button actions are arranged according to order and frequency of use. Positive responses should be presented first, followed by negative responses and cancelling responses. Help, if applicable and available , is always the indicated as action button right to the cancel button.

The type of interaction for real dialogs is **application modal**, that means, no interaction with any window created by the same application is allowed. The shape of the cursor outside of the dialog window is changed until the dialog is finished.

2.2 Components of User Interface Design

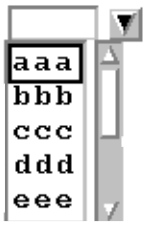
This chapter presents detailed information about the most important components the User Interface is made of in alphabetical order.

2.2.1 Cascade Button

A Cascade Button is used to post a Pull DowN Menu. Following the text label, this component has to include an arrow graphic, pointing in the direction that the Menu will be posted to distinguish it from a Push ButTon.

2.2.2 Combo Box

A Combo Box is used to select one item of a variable number of elements. Pressing the Arrow Button the list appears. Selecting one item with MB1 the list disappears and the selected item is written to the text field. Also keyboard-based input into the text field is possible. While the list is visible the type of interaction is system modal that means, the operator has to select one item before he can do something else.
The combo box is the preferred way of implementing a pick list.



2.2.3 Frame

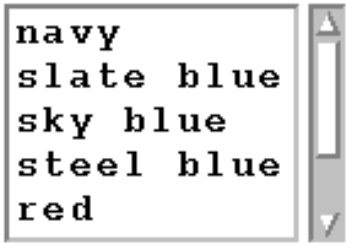
A Frame is used to frame other components. It simply provides a decorative border.

2.2.4 Label

A Label is used to display non editable text.

2.2.5 List

A List is used to present a variable number of elements. It can optionally have vertical and horizontal Scroll Bars. For manipulating the list items (e.g. delete item, detailed information) single or multiple selection is possible. For viewing data only the list is insensitive, that means no selection is possible.



2.2.6 Menu Bar

Refer to description of ‘primary window’.

2.2.7 Option Button

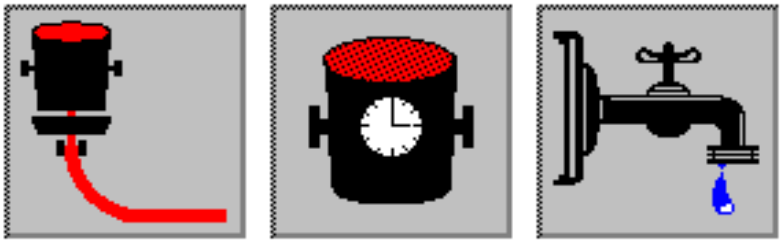
An Option Button is used to post an Option Menu. Following the text label, this component has to include a bar graphic to distinguish it from a Push BuTton.

2.2.8 Push Button

A Push Button is used to start an operation. It must contain either a text or graphic label indicating the operation of the button.

2.2.9 Quick Choice Panel

A Quick Choice Panel contains a list of Push BUttons. It is used to provide a quick selection for the most used masks and actions. This is an addition to the Menu BAr, which has to have full functionality. The position of the Button Bar has to be just below the Menu BaR (horizontal) or on the very left side of the window (vertical).



2.2.10 Radio Button

A Radio Button is used to select one option from a fixed number of options. A Radio BUtton is a special case of a Toggle Button. Only one Radio BUtton can be set at a time. This component must be composed of a text or graphic label, and a graphic that indicates the state of the Radio BUtton. The graphic should be a diamond preceding the label, and should have two distinctive states that indicate the set and reset states of the Radio Button.

2.2.11 Scale

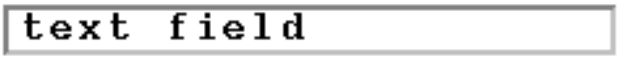
A Scale is used to select a value from a range. The position of the slider indicates the value relative to the range.

2.2.12 Separator

A Separator, a horizontal or vertical line, is used to separate elements of the application. It simply provides a decorative element.

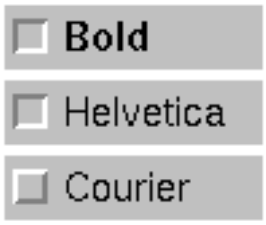
2.2.13 Text

A Text component is used to display and enter text.



2.2.14 Toggle Button

A Toggle Button is used to select options in an application. When the choice is one of many, the Toggle Button is called a Radio Button. When the choice is any of many, the Toggle Button is called a Check Button.. This component must be composed of a text or graphic label, and a graphic that indicates the state of the Toggle Button. The graphic should precede the label, and should have two distinctive states that indicate the set and reset states of the Radio Button.



2.3 System Protection

To avoid unauthorised data access a system protection is implemented based on **user identification** and **mask access rights**. This identification requirements can be defined via display windows accessible from the login display (button **DDS Set-up and Security**). Windows for maintaining system protection, security and set-up are **only** accessible for the user **system**. As a consequence of this the user system is defined as the minimum and is allowed to access all available functions.

2.3.1 User Identification

The very first window of the application is the LOGIN/LOGOUT display to force the operator to identify himself (user name and password) at login time. Based on this user identification (authority level) the user will get access to the windows defined as ‘accessible’ for this user identification.

To exit from the user interface by pressing the Exit button of the General menu in the main window the user has to enter user name and password as well. Only users with higher authority level will be allowed to exit the application and work on the command level.

The system user has the possibility to set and reset the access rights for all protected windows specific for each user (on-line) via the window ‘**User Access**’. The ‘user definition’ can be done via the window ‘**User Definition**’.

2.3.2 Mask Identification

For predefined protected windows the system user can also set and reset the Exclusive-Attribute. A window defined as exclusive can be opened only from one user at the same time. If another user tries to open the same window a warning will be triggered showing the user locking the mask at the moment.

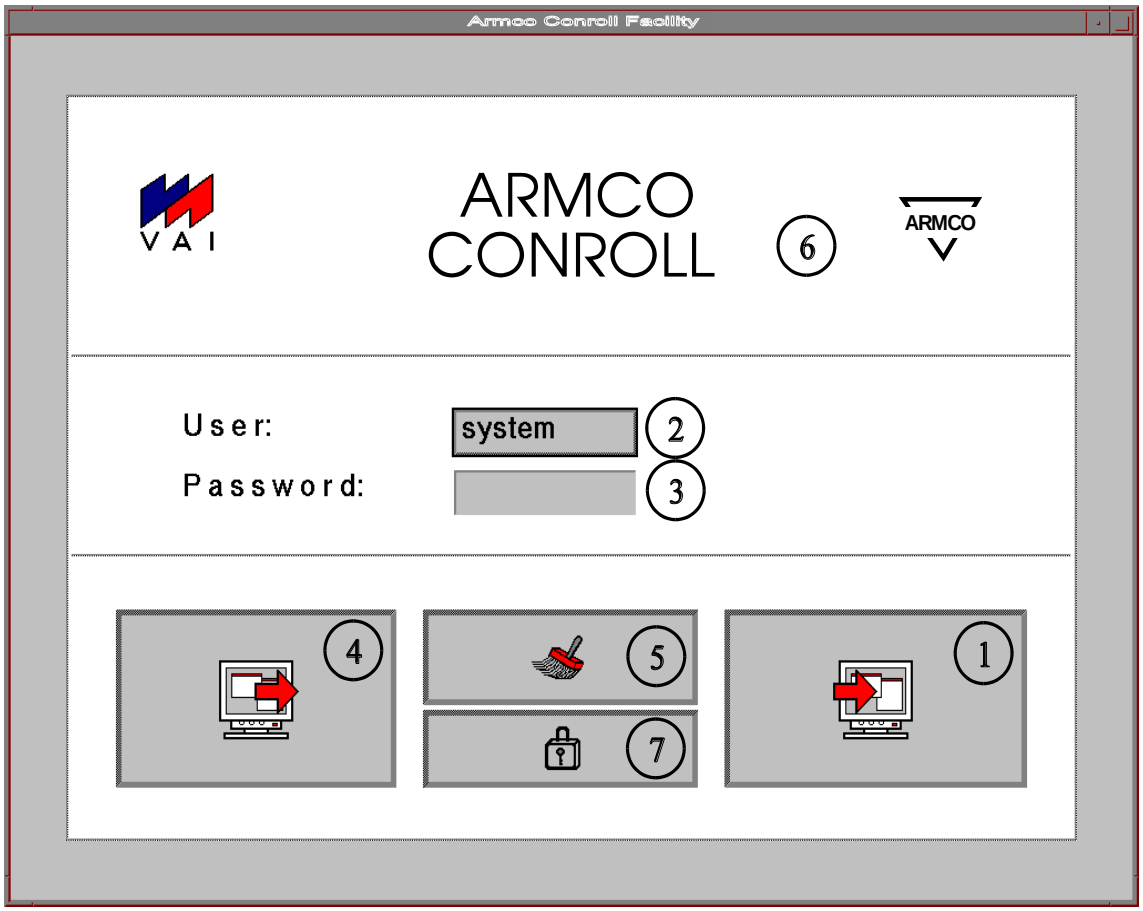
To define a window as '**protected**' or '**exclusive**' the window '**mask protection**' shall be used.

To keep system performance and clearness the number of open windows is limited. If a user tries to open too many windows at the same time he will be called to close other windows. The number of open windows is significant for the system performance and will be defined by a program parameter.

2.3.3 System Protection Maintenance Windows

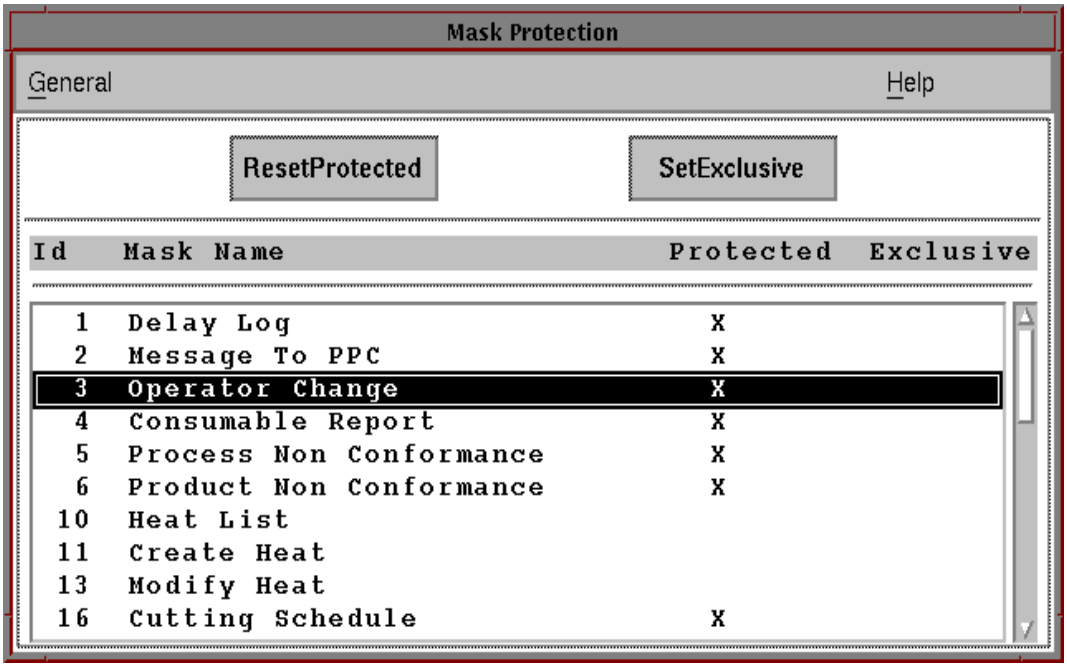
The maintenance of the system protection can be done via the following prepared windows.

2.3.3.1 Login / Logout Window



1 ..... Login-Button
2 ..... Username-Textfield
3 ..... Password-Text field
4 ..... Logout-Button
5 ..... Brush-Button (Clears the manual input fields)
6 ..... System Name (e.g. CC1, EAF,...)
7 ..... DDS System Setup and Security

2.3.3.2 Mask Protection



maskprot.bmp

This **Mask Protection Winbdow** displays a list of all available windows and dialoges and the protection attributes for each displayed item.
An item defined as **protected** can be accessed only by the users explicitly enabled via the **User Access Definition** window. A **non protected** mask can be accessed by all users.
The **Exclusive** attribute limits the access for **protected masks** to only one user at the same time. Defining an unprotected mask as exclusive will automatically set the protected attribute as well

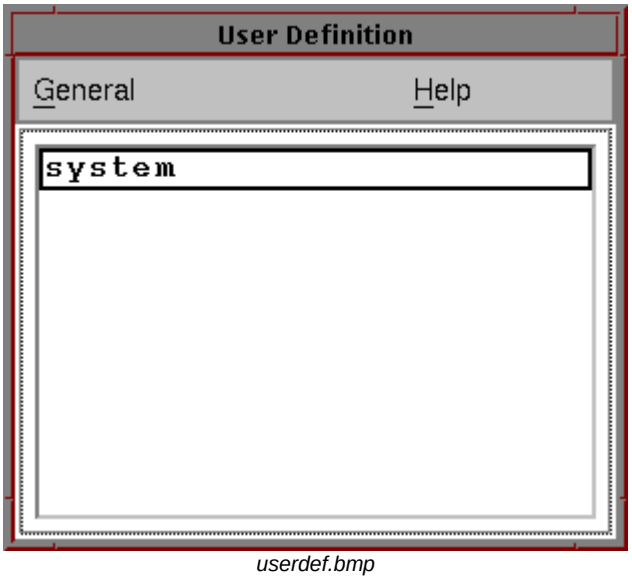
DIALOG - Set / Reset Protected

Dialog to **set / reset** the **protection attribute** for the selected item**.**

DIALOG - Set / Reset Exclusive

Dialog to **set / reset** the **exclusive attribute** for the selected item

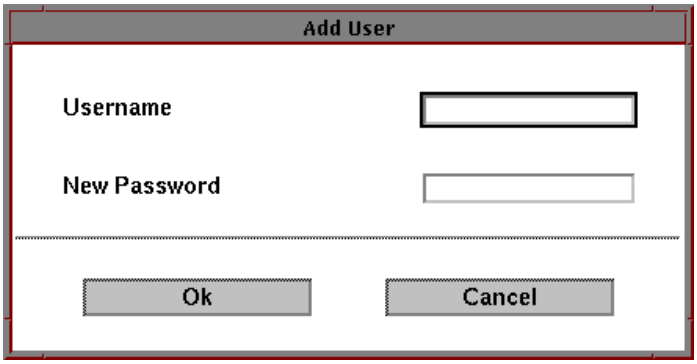
2.3.3.3 User Definition



userdef.bmp

This **User Definition Window** displays all users introduced for the DDS system and allows to maintain the user definition via the connected dialoges (add, remove, set password). The information shown and adjusted via this window is significant for the security and needs to be maintained very carefully.

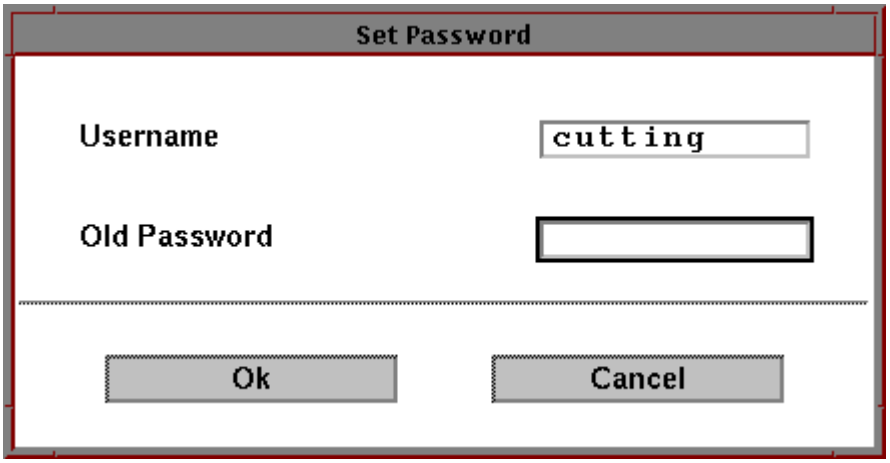
DIALOG - Add User



adduser.bmp

This dialog window allows to add a new user to the DDS system by detailing the **User name** and a **Password**. After the user is created access to all unprotected masks is granted automatically (default access).
If access to protected masks is required the user set-up needs to be continued via the **User Access Window**.
The user **system** is implemented as the minimum.

DIALOG - Set Password



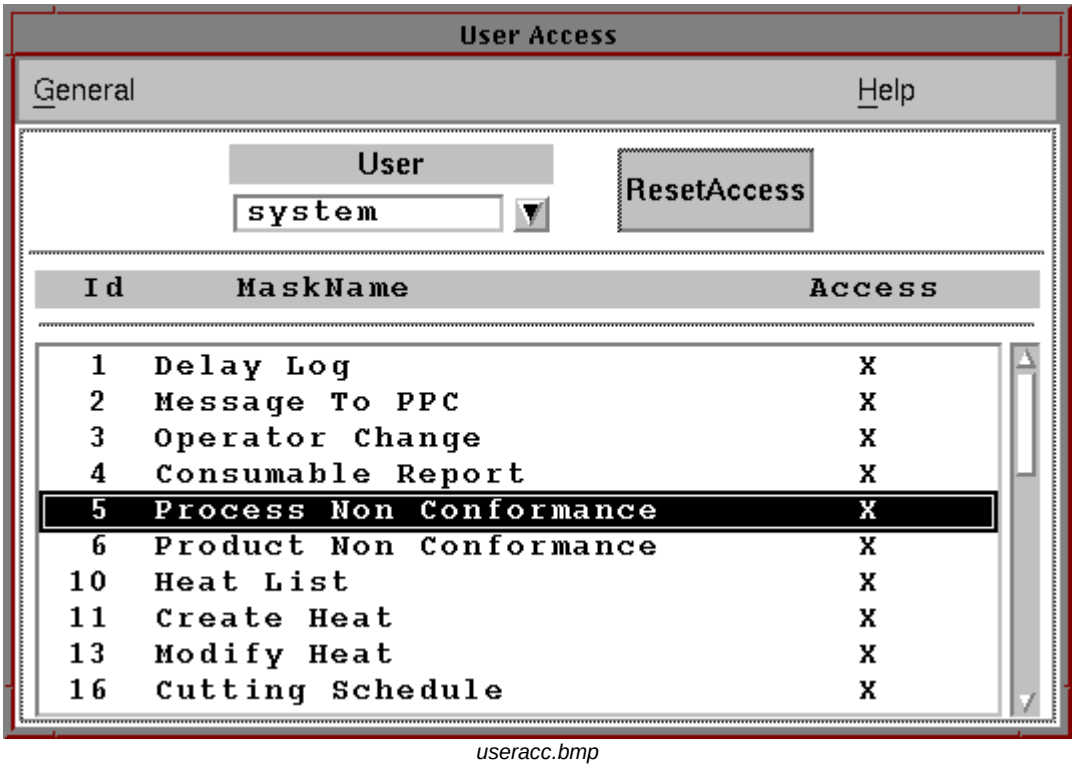
setpass.bmp

This dialog window allows the password maintenance for the selected user.

DIALOG - Remove User

This dialog removes the selected user from the DDS system. The remove dialog is disabled for the user **system** because the user system is required to make the access and maintenance of the DDS possible.

2.3.3.4 User Access



useracc.bmp

This **User Access Window** allows to grant **access to protected masks** for a certain user. At the time the window is started the own user information is displayed. Selecting a different user can be done by the **User Pick List**.
After the user selection is done the access rights for the selected user are shown and modification is allowed via the **Set / Reset Access** button.

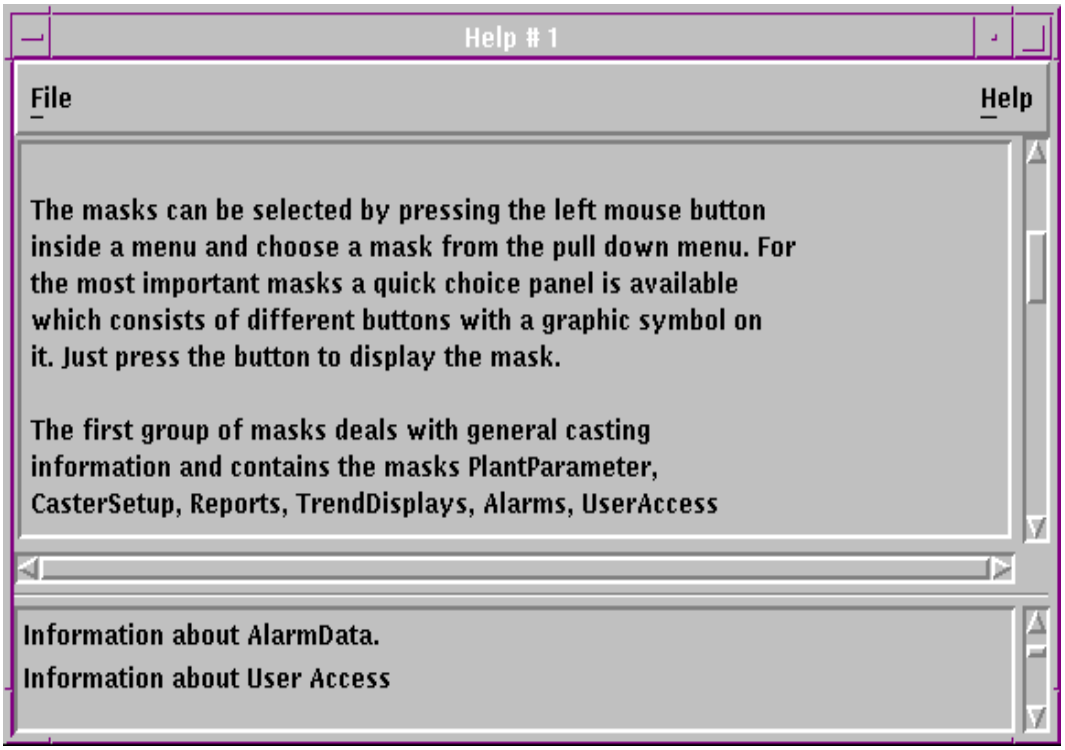
DIALOG - Set / Reset Access

Dialog to **set / reset** the **access right** for the selected item**.**
Reset the access right for the user system can not be done because **system** needs access to all items in any case.

2.4 Help Tool

To give support to the operator the display of help windows on window-level is implemented.

Example of a help window displayed after selecting help from the menu bar.



help.wmf

Once in the help window all available helps can be selected, by double clicking MB1 on the desired line in the help selection list on the bottom of the help mask.

Example: When selecting the **Information about Alarm Data** help, a list of all possible alarms is displayed in the help selection list. By selecting an alarm, a detailed description of the alarm will be displayed.

2.5 Alarms

Generally the DDS distinguishes 3 types of alarms:

- Normal alarms
- Severe alarms
- Special alarms

When an alarm occurs, the alarm is displayed at the bottom of the basic window (see also main window layout).
Normal and special alarms are displayed in normal text colour
Severe alarms are displayed in red colour and have to be **acknowledged**.
When a severe alarm is acknowledged (by pressing the **accept alarm** button on the bottom right side of the basic window) it's colour changes to normal text colour and the treatment continues as a normal alarm.
Every alarm contains date, time, alarm number and alarm specific text and data.
In the basic window a special alarm is treated as a normal alarm. Additionally to this an alarm specific dialog mask is displayed, to inform the operator that a certain action is necessary immediately. No other action can be done, until the alarm dialog is performed.
The last 2 alarms are always displayed on the bottom of the basic window. If a new alarm occurs, the alarms are shifted upwards by one line. If a severe alarm is not acknowledged immediately and other alarms occur, they will be queued. Up to 20 alarms can be queued. If more than 20 alarms occur without acknowledging, the last alarms will be lost.
At the time an alarm occurs (any type) the alarm will be written to a chronological save file. This save file can be used for reporting and stores the alarms for a certain time given by the definition of the file size.

3. Facility Specific Conventions

3.1 Window Border Colors

EAF: red

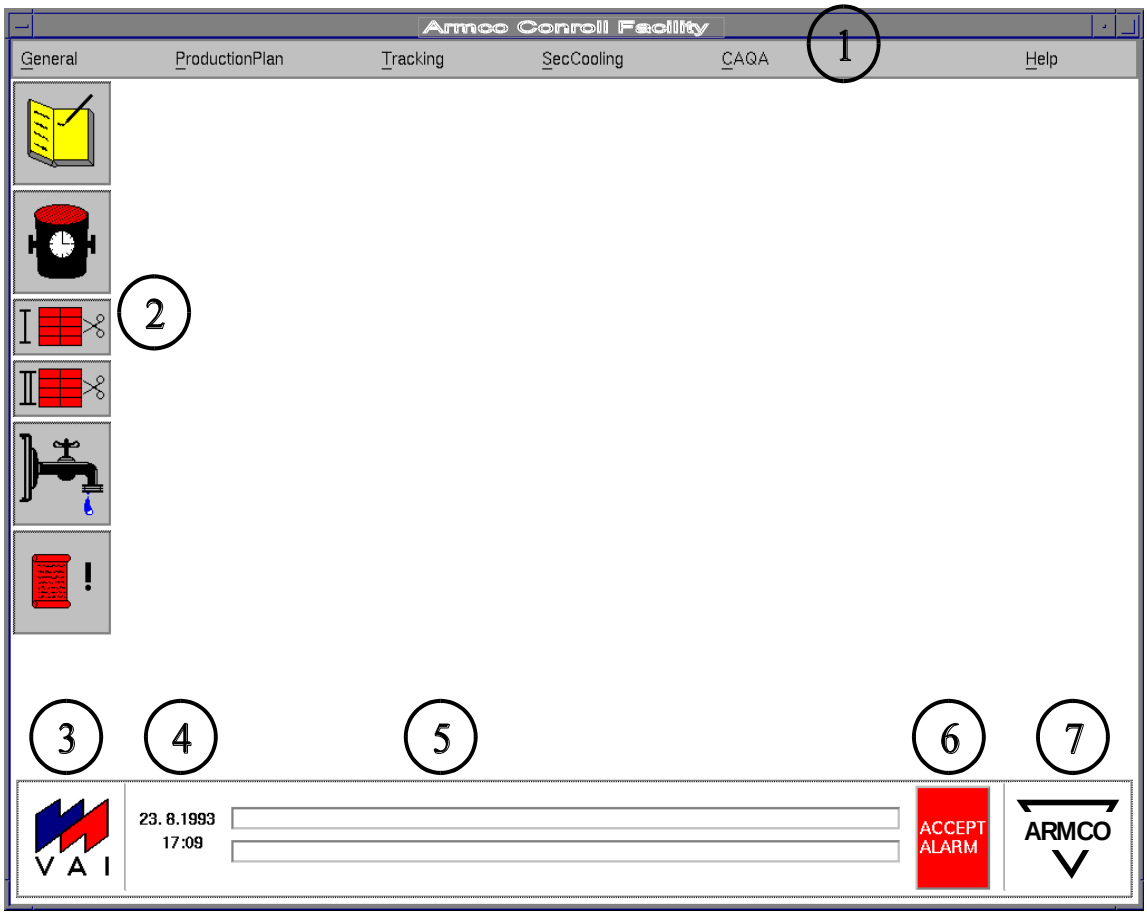
LMF: yellow

CC1: green

HSM: blue

4. DDS General Windows

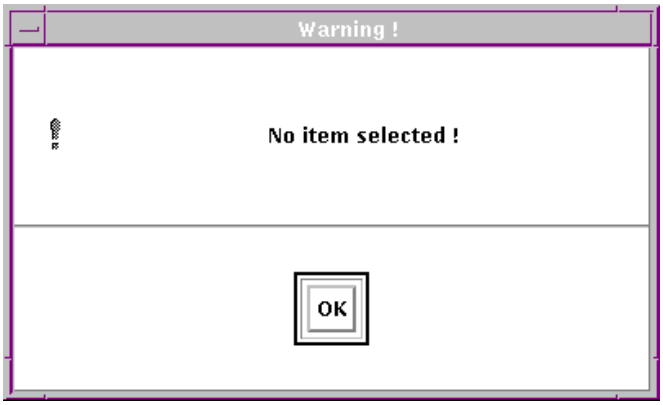
4.1 Main Window (Example)



main.wmf

1 ..... Title and Menu bar
2 ..... Quick Choice Panel
3 ..... VAI logo
4 ..... System date and time
5 ..... Two alarm lines
6 ..... Alarm acknowledge button
7 ..... Customer´s logo

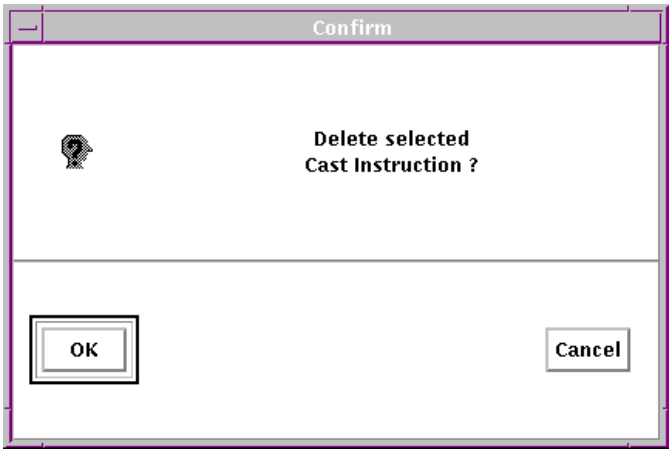
4.2 Warning Dialog Window



warning.wmf

This window will inform the operator that a situation has occured which can not be done. The trigger for this window and the shown text is implemented in the display program. The shown text details the occured situation.
To continue with any action the warning dialog needs to be terminated by the **OK** button.

4.3 Confirmation Dialog Window



confirm.wmf

This window will ask the operator to confirm a certain action. The trigger for this window and the shown text is implemented in the display program. The shown text details the activity requiring confirmation. The **OK** button terminates the dialog and starts the activity. The **CANCEL** button terminates the dialog without performing the activity.

4.4 Alarm List

Purpose: The **Alarm List Window** gives an overview about the recently occurred alarms. On the left side of each alarm the date and time is shown. Each message (event, alarm) in the system has a number (message ID) which is shown as well. The right part of the alarm information shows alarm/event specific text and data.

Dialogs:

None

4.5 Delay Entry

Purpose: The **Delay Information** window shows the opened delay for the facility.

The **Delay Entry** window, which is called up from the **Delay Information** window, is used by the operator to enter delay reasons.

When the application detects an delay (automatic delay) an icon is displayed at the main window, a mouse click on the icon will call up the **Delay Entry** window. After entering a delay reason the icon will disapear. Operator logout is disabled as long as the icon is on the screen.

Dialogs:

Open Delay:

The operator is guided by two pick lists to enter a delay code and a facility code. The delay start time, the estimated end time (absolute or relative) and a delay comment can be entered. The delay start time is initialized with the current time or the delay start time (for automatic delays). The operator may change the time, but not to a later time than the initial.

Close Delay:

The currently opened delay will be closed. This dialog may be disabled for facilities with automatic delay end detection.

4.6 General Plant Overview

Purpose: Displays the heats in progress with start time and expected treatment end time, and the plant delay information of the steelmaking area (EAF, AOD, LMF, CC1). Additionally the plant delay information for the RHF and the HSM is shown.

Dialogs:

Select heat:

This dialogue enables the LMF operator to select a heat out of the pool for treatment start or for retreament at LMF.
It also enables the EAF operator to select a heat out of the pool which has returned to electric arc furnace.

5. Revision and Document Distribution List

REVISION LIST

Date	Version	Author	Description
94-Dec-05	V1.0	F.Dvo.	first draft
95-Jan-30	V1.1	F.Dvo.	final version
95-Dec-30	V1.2	F.Dvo.	revision
96-Feb-28	as built	F.Dvo.	as built

DISTRIBUTION LIST

Version	Receiver
as built	ARMCO