PLS: interaction interface 2nd version proposal

J.Boillot M.Boutheon B.Frammery D.Gueugnon A.Pace

This document is an attempt to define a user interface for the PLS process . Based on what we have already tested (ref Noas minutes 3,4,5,6,7,8), we think that this second version should be much more adapted to MCR use. The authors are aware that this is not yet a complete specification, but they consider that details might be specified whenever needed .

It is based on several meetings held on 3 ,16 May; 15,22,27 June : M.Boutheon J.Boillot B.Frammery D.Gueugnon A.Pace were present.

1. Principles

We tried to keep (at least in our mind) as far as possible the functionalities implemented in the existing first approach of PLS interface on a VAX workstation. Notions like BEAM and CYCLE were already admitted.
- the supercycle (BCD's) length is defined as fundamental parameter
- the BCD editing from scratch is done backwards
- the algorithms maintain the consistency between machines all along the edition.

1.1 Opening a session

A PLS edition session always starts as "Edit BCD" :the CURRENT file is loaded and the current supercycle is displayed on the Main Window (= MW). This window is similar to the existing one, presenting the succession of Beams in the 3 machines: CPS, PSB, LPI. It shows the equivalent of 16 basic periods. In addition a series of selectable objets represents some PLS conditions correlated with each CYCLE composing a BEAM and will be treated in a different manner (see later point 5.3)This format is the "Standard" presentation of the VIEW menu (see later and Ref 1). The window properties will be limited to Positioning and H-Scrolling only (Ref 1). The MW must present as title the classifiers and comments corresponding to the BCD archiving system (see 2.3).

For the time being the synchronism of the 3 machines is supposed to obey to the following rules:
- the supercycle length is determined by the CPS for both injectors these latter being or not used by CPS.
- the start of the supercycles will be the same i.e. the machines are declared "synchronized" and the basic period is common to all three machines.

The MW is exposed on figure 1a below.

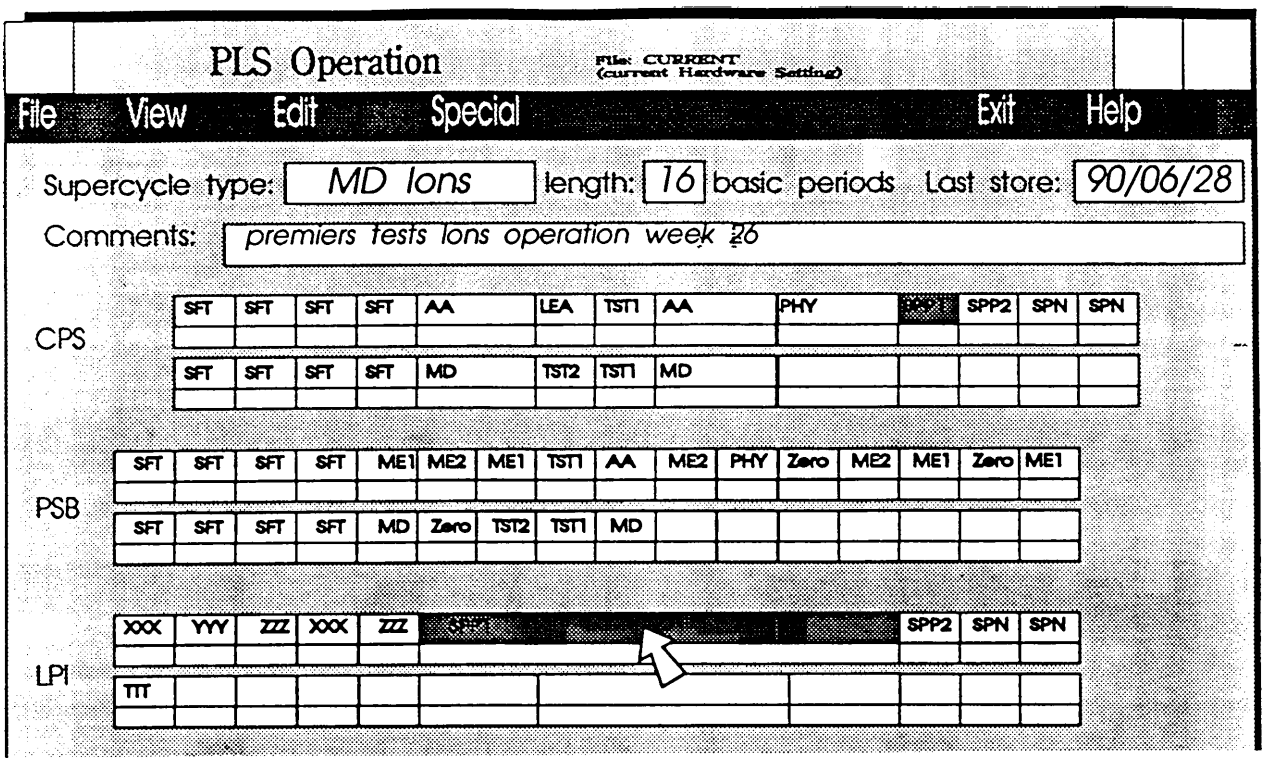

Figure 1 a: Main Window (MW)

1.2. Pull-Down menus

Associated to the MW, the menu bar (figure 1b)presents the following actions:

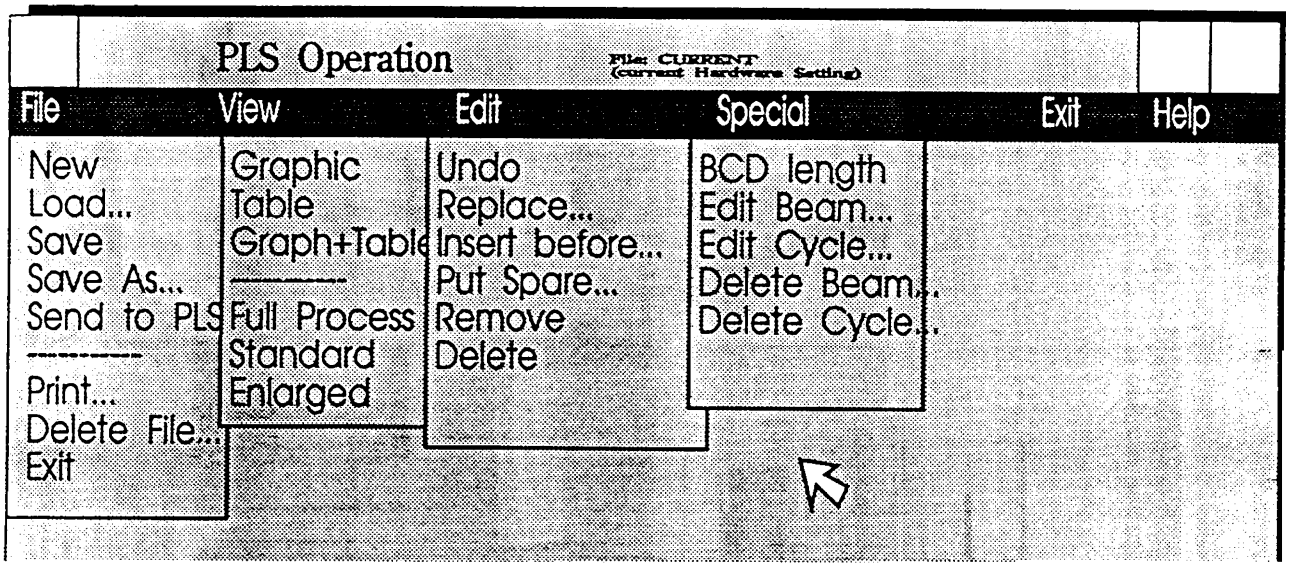

Figure 1 b: Main Window (MW) menu bar and available menus

The two first pull-down menus are probably of general use and will be a standard in a lot of applications.
Items followed by "..." call automatically for selection windows.

2. FILE menu

2.1 NEW

The Length window , presenting the current one is opened allowing a possible updating (the value is expressed as a Basic Period (1.2 s) number. After action this window disappears, and the Beam Available Window (BAW) is opened ready for use, i.e. in its INSERT BEFORE mode. See BAW description under 4.3, and insertion under 4.5 .

If a file is being edited when NEW is entered, a "Save File ?" request should appear.

2.2 LOAD ...

The BCD's or Supercycle Available Window (SAW) is opened. This window (figure 2) shows the supercycles stored in archives. The file access is a two steps selection in two list boxes associated with vertical sliders. A selection in the left list fills the right (reverse date ordered) list where the selection process can be completed. Thereafter push button LOAD put the corresponding BCD in MW and the SAW disappears as well. CANCEL has usual function.

We think that the first selection list should be edited with not too complex tools in order to allow modifications or additions. Composition, length, date are automatically (known) filled by the program. CURRENT and LAST_BACKUP have invariable comments.

2.3 SAVE

Used after modification to the supercycle present in MW, when MW is active. No change to its archive classification nor comments. A confirm window must be provided before real saving is performed.

If the CURRENT file was selected, a warning message is displayed ("this BCD will be sent to PLS" OK/Cancel) then the current BCD (as before the editing session) is stored in LAST_BACKUP and the edited BCD is sent to the CURRENT file and to the PLS.

Of course, "LAST_BACKUP" must not be selectable in SAVE situation. The window disappears leaving only MW.

2.4 SAVE AS ...

Opens the SAW, as on figure 2 except that the LOAD key becomes a SAVE key and that the COMMENTS field can be edited. The composition , length, and date fields are already filled by the program. A selection in the classification list must be applicable; if not a pop-up message must inform the user. Then pushing SAVE will archive the BCD.

If CURRENT is selected , the procedure described in 2.3 applies.

Of course, LAST_BACKUP must not be selectable in SAVE AS ... situation. The window disappears leaving only MW.

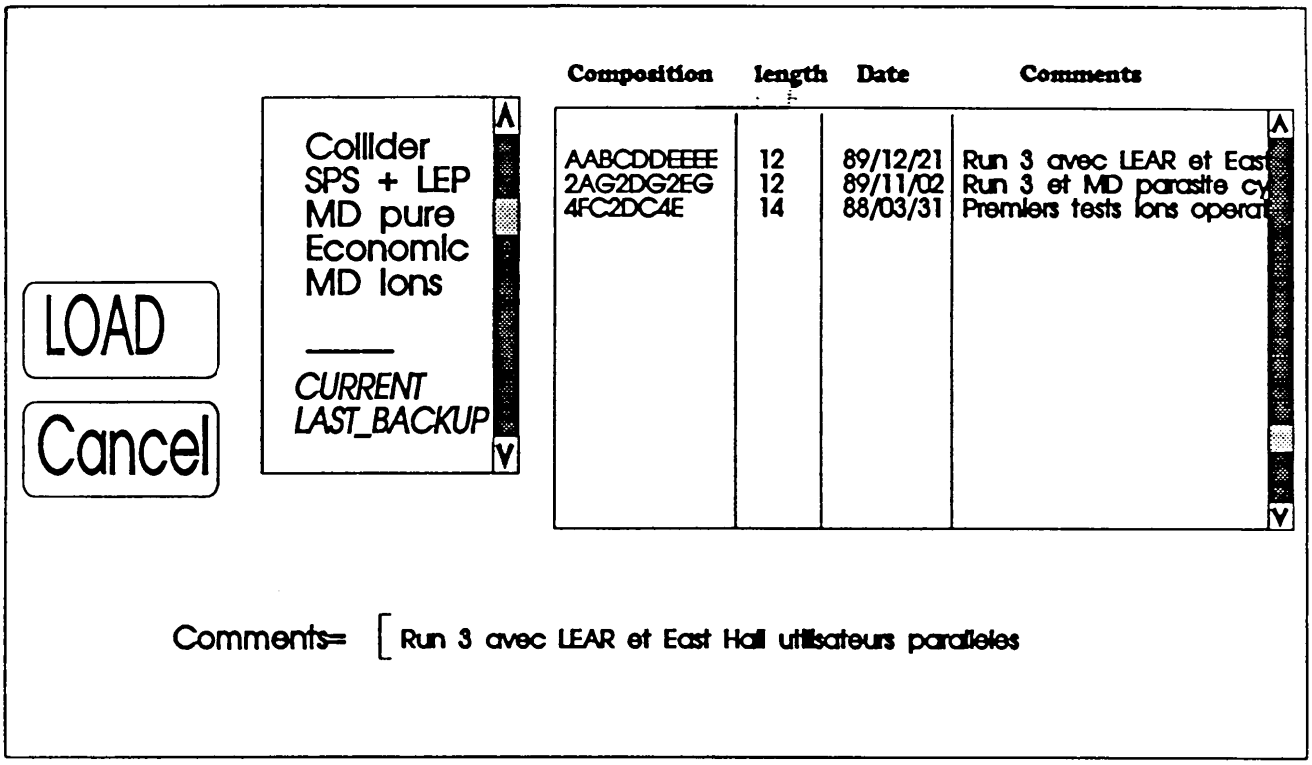

Figure 2: Supercycle Available Window (SAW)

2.5 SEND TO PLS

It is equivalent to SAVE AS "CURRENT". The data sent are those from the MW. Once sent to the PLS, the data are left in the MW and the saved flag is left unchanged. The user will receive a warning dialog if the data have been modified and have not been saved in a commented archive when he will try to exit the program or load another BCD.

2.6 PRINT ...

This option will open a dialog box that will allow to log the contents of the archive displayed in the MW on the line printer. Several levels of details should be available in the dialog box to satisfy both quick operational requirements and detailed specialist log.

2.7 DELETE FILE ...

This opens the SAW with DELETE and CANCEL keys; the selection is done as in 2.2 . Deletion of CURRENT and LAST_BACKUP are forbidden. A warning pop-up ("Are you sure..." YES/NO) is presented after activation of the DELETE key then the SAW window is killed.

If a file was being edited when the DELETE is requested from menu, a warning should be issued as for a possible saving of the last modifications.

2.8 EXIT

Leaving the supercycle edition session. If (off line) modifications were done and not saved a pop-up warning must inform the user before really leaving.

3. VIEW Menu

This menu is a standard (we hope) way to change the visibility of processes, and follows a proposal guide for window usage in operation workstations (Ref 1).

Graphic	probably the only used in PLS process
Table	dual presentation (see Ref 2)
Graphic + Table	

Full Process	will give the view of the entire supercycle but probably will prevent any interaction when in use.
Standard	format presented at the beginning of the edition session, showing 16 basic periods
Enlarged	possibility not used in PLS edition but certainly needed in some other applications

4. EDIT Menu

This menu is dedicated to the edition of the BCDs using existing Beams.
Before any action, except for the UNDO (reversion of the very last edition action performed) a selection of a Beam (normal or spare) in the MW is compulsory. If none was performed, an Error pop-up message is provided, calling for a selection.

4.1 REMOVE

It removes the selected Beam and its associated spare(s) and leaves an empty hole(s).

4.2 DELETE

It removes the selected Beam and its associated spare(s) and packs the empty hole(s) following the algorithms of supercycle consistency.

4.3 REPLACE ...

The Beam Available Window (BAW) is opened with the two REPLACE and CANCEL. keys (figure 3). This window enables for a structured access to the existing BEAMs stored in archives.

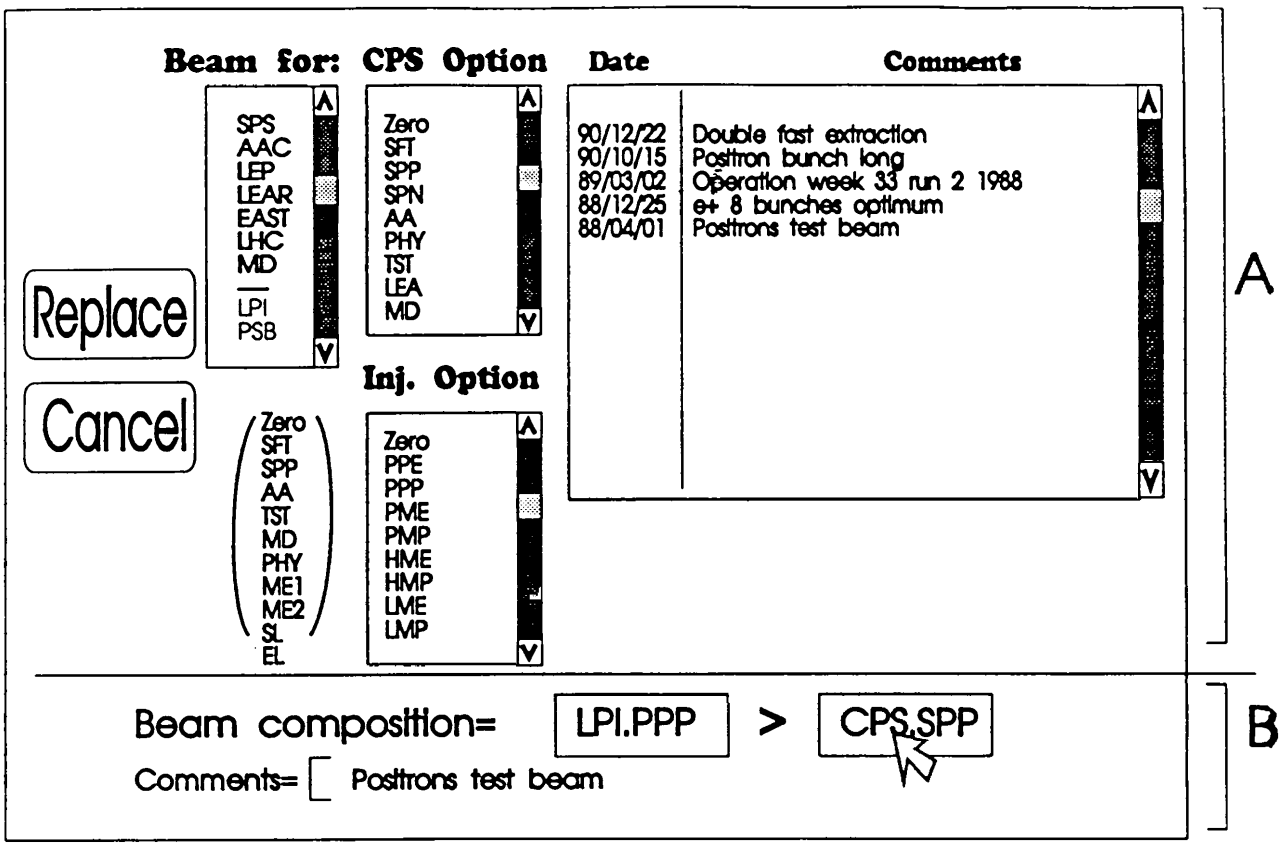

Figure 3: Beams Available Window (BAW)

Four selection list boxes are presented in the upper part (part A) of the window:

- in the first one on the left, the purpose of the beam is requested: the selection starts by clicking on one of the items,
- the 2 superimposed list boxes present the options characterizing the PPM composition, i.e. the Users of both the CPS and its injectors; they are filled after a selection was performed in the former list box: the upper one presents the CPS option and the lower one the options specific to the concerned injector. If LPI or PSB are selected from the far left list box, the lower box alone is filled since the beam is not supposed to transit through the CPS; these Beams are typically injector cycles without any logical link with any CPS cycle *(except synchronism ?).*
- the right hand selection list box eventually presents, by reverse date order (the older at the end) the Beams corresponding to the selections formerly performed.

Once the selection is done, the part B of the window is filled with Beam composition (CYCLEs names see 5.2) showing the complete comment.

Pushing on the REPLACE key starts the appropriate actions after checking the feasibility using its internal algorithms. *Is should be possible to replace a beam by a beam using a different number of basic periods in the CPS but this need to be clarified later; for the time being we accept the replacement limited to the same CPS basic period duration.*

The BAW is closed leaving the screen with MW.

4.5 INSERT BEFORE ...

Call the BAW as described under 4.3 with the two INSERT and CANCEL keys. We request to ask for an insertion BEFORE the selected Beam in order to be coherent with the present software which inserts a new Beam at the left hand side when you are in the NEW function. In this later case the BAW stays open after INSERT key used, ready for a continuous insertion in order to create a BCD. The creation stops when the anticipated BCD length is filled or by using the CANCEL key.
Insert before does not apply to a spare beam selection.

4.6 PUT SPARE ...

This again call the BAW with the upper key being labeled PUT. The usual checks, as done in the existing program, are performed when managing the spare Beams.
Put spare of course does not apply to a spare beam selection.

5. Special Menu

5.1 BCD LENGTH

Opens the supercycle length control window; after completion of the action this window collapses.

5.3 Edit CYCLE ...

The purpose of this program is either to modify an existing CYCLE or to create from scratch a new one. In both cases, a CYCLE should be first declared or selected, then its composition (= USER matrix) should be either edited or modified.

There are two way of selection:
- if you work from a selection done on the MW supercycle display, you selected a beam by clicking on one of its component; in that case if then you activate the Edit CYCLE program from menu bar: the Cycle Composition Window (=CCW) is opened (see figure 4) with the different selection list boxes validated from the actual information.
- if you activate directly the menu line Edit CYCLE, your selection will be done in a step procedure on the CCW (from left to right list boxes) similar to the one described under 4.3.

If the edition of Cycle composition is done without a valid selection present you will be requested to make one before any further action (saving) can take place.

Activating the program Edit Cycle opens the Cycle Composition Window (CCW) and its two keys OK and CANCEL shown in figure 4:

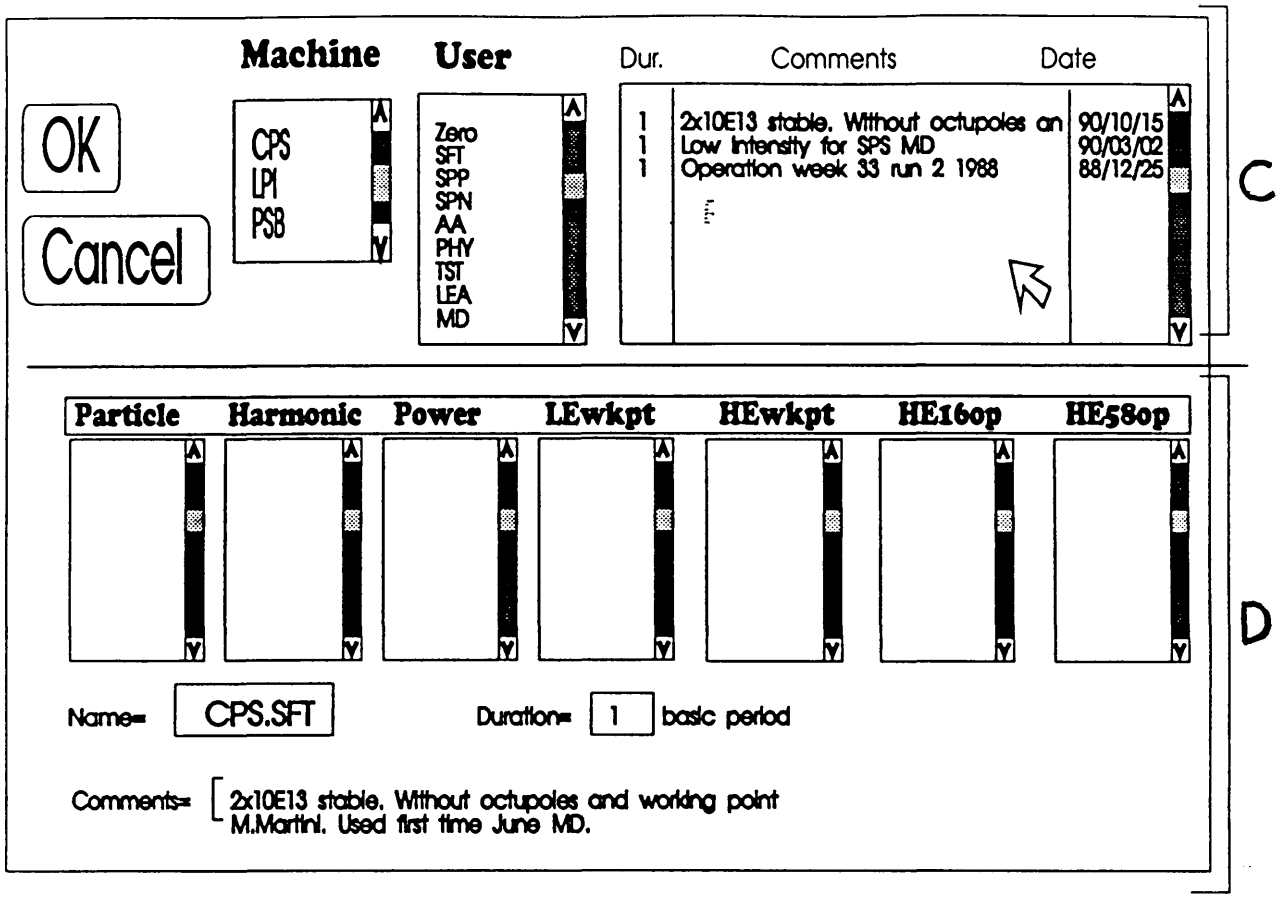

Figure 4: Cycle Composition Window (CCW)

- the upper part (C) presents the 3 list boxes (with their associated vertical scroll bars) to select the Machine, the Options relatives to the selected Machine (its USERS names) and the list (by reverse date order) of the CYCLES available under the selected Option.
- the lower part (D) of the window contains several list boxes presenting the different elementary lines composing a User (number and titles are machine dependant) plus a cycle duration field, a comments field and a name field. This last item is only accessed by selecting an Option on the User list box. It is this name that will appears on the objects presented on the MW display.

After edition or modification your work is registered by acting on the OK key.

Now an important point have to be precise in case of modification of an existing CYCLE stored in archives and that you want to keep its (User) name:

one can want that a modified CYCLE [used in BEAM(s) themselves used in BCD(s)] replace exactly all its existing occurrences or

one can desire that the modified CYCLE is considered as a new one (used on-line for example). Note that the date stamp is automatic and cannot be used for this choice.

We propose that the Comments change or not will serve as switch for the program to

consider or not the updating of the archives (no Comments change = full pointers updating). A confirm pop-up message should be given.

The CCW disappears as soon as the OK key is used and confirm pop-up acknowledged.

A special cycle valid in each machine and named Zero must exist. Its composition should be defined once and no more modified (except by specialists), nor to be deleted. These Zero cycles can be used to compose Beams. They can be also used in an automatic way to ease some BCD consistency algorithms.

5.2 Edit BEAM ...

This action deals with the Beam editing, which usually means creating a bond between an injector CYCLE and a CPS CYCLE, both stored in archives. Similarly to what was described for CYCLE edition the selection can be performed from clicking an object in the MW or directly activating the Edit Beam menu line. In the first case the selection is validated and visualized otherwise you have to make it on the BAW. If here also you are creating from scratch a new Beam, you will have to make a valid selection before any further action (saving) in undertaken.

Edit beam opens the BAW (figure 3) described under 4.3, with the two SAVE and CANCEL keys.The part B is now active, i.e. actions can be initiated by clicking on its elements. The task to be performed is to select two existing CYCLES (only one if we are making an injector MD) and to combine them to form a BEAM. Thereafter a click on left or right boxes relative to the Beam composition will open the Cycles Composition Window (CCW) presented in figure 4. In this case, the CCW upper part is the only active portion used for selection, the lower part (D) being only informative.

The machine CYCLE being selected hitting the OK key will put this CYCLE in the previously selected Beam composition slot, its Cycle name introduced in the box of BAW and the CCW disappears. The screen is left with BAW window.
When satisfied with Beam composition and related informations filled, a push of SAVE button will save this Beam in archives.
What was said for the CYCLE archiving with full updating or not is applicable here too: the detection of Comments modification will serve as the decision switch. As in the CYCLE edition procedure, after acknowledgement of the confirm message the BAW is closed leaving the screen with the only MW.

Of course, all editions being finished the full batch of work is preserved by sending the BCD (if one was the starting point of the session) either to the hardware by using the menu line Send to PLS or either in archives with Save As...activated.

5.3 Delete BEAM ...

This menu line activated opens the BAW with the DELETE and CANCEL keys. The selection list boxes are used as described under 4.3 . Hitting DELETE key will erase the selected Beam.

As verified in the existing Vax interface, you cannot delete a beam used in any BCD. You have first to delete all the BCDs containing the beam you want to eliminate.

5.4 Delete CYCLE ...

This action is identical to deleting a beam but addressed to a Cycle. The CCW is opened with DELETE and CANCEL keys. You cannot delete a cycle used in any existing Beam. By the way, cycles and beams participating in CURRENT or LAST_BACKUP supercycles cannot be exterminated...

6. Secondary elementary conditions

Each machine owns some conditions (for ex. at PS : beam destination, miscellaneous) which are treated as secondary User characteristics. These elementary lines groups are often changed and do not constitute the frame of a User but serve to distinguish between different usage of the beams. We decided to treat these PLS conditions directly from the MW display. These conditions will not be archived in the CYCLE store but will be saved with the BCD.

The procedure will be the following: a click on the lower object situated under each Cycle present in a BCD will open a small pop-up window (figure 5) with the keys OK and CANCEL. The selection list boxes corresponding to the available conditions would be used to modify these conditions. Hitting the OK key would register the new situation and close itself . The File menu lines would complete the action, determining the archiving and possibly the hardware change.

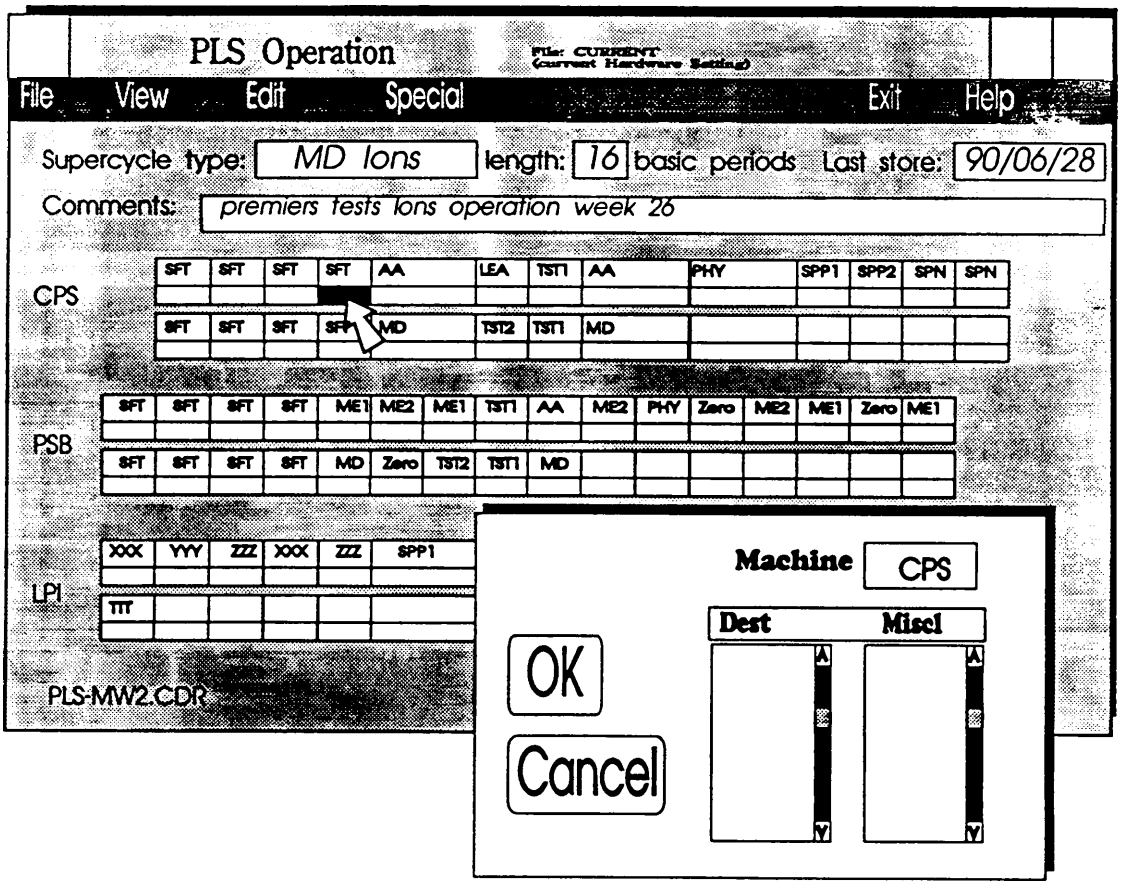

Figure 5: Main Window with Secondary conditions change Window opened

Remarks.

a) About naming
From a general selection point of view as proposed here to the user, a name is not needed; only the database has to classify the archives from the selection fields information. This apply entirely to the Supercycles and Beams. But Cycle names appear in the MW. We propose to automatically name the Cycles with the User names. If by preceding selection an User is elected the Cycle will be saved; otherwise an User selection will be requested (pop-up Message). This is possible because the User is the more relevant classification for beam delivery. and up to now an User is a composition of elementary lines which must be used unambiguously along a BCD.
In this proposal we limited ourselves to the present PLS operation, where the User is the only relevant "title" of a machine CYCLE and is recognized as an unique formula containing elementary lines when used in a valid BCD. Checking this could be either left to the operator' cleverness or could be automated.

b) Selection
After a beam selection in the MW , the corresponding composition (Cycle, Matrix) must be the default selection for further actions, easing and speeding up presentation and interactions. This represents the major work performed in PLS operation, so that the selection, naming ..etc.. conventions will be much less complex that fully described here.

7. Conclusion (provisional)

All this proposal is not fully detailed. it must be finalized with CO before its introduction in Control Room (first Off-line up to debugging achieved). We trust that the tools described represent better the Operation needs and will be much more easy to use in MCR than the first approach we tested on VAX station up to now.

MB.

Ref 1: PS/OP/Note Technique 90-09: Proposition de gestion des windows B.Frammery

Ref 2: - PS/OP/Note 90-10 A proposal for a general Man-Workstation interface used in Accelerators Controls M.Boutheon A.Pace

- CUF Chamonix; Current trends in Operation and MMI Presented by A.Pace

Short lexicon:

CYCLE	= time slot and hardware conditions corresponding to a beam travelling through one accelerator managed by the PLS. At present LPI, PSB and PS are only considered. Duration of a CYCLE is expressed by a basic periods number (1 basic period is fixed to 1.2 s at present).
BEAM	= a combination of CYCLES with a time link. The more evident is an injector firing its beam in a collecting machine: LPI --> CPS. Beams are manipulated as a block.
BCD	= Supercycle = a succession of Beams composing a deck that will be periodic along an operation period.
MW	= Main Window were BCDs are displayed for edition
BAW	= Beams Available Window used when BCDs have to be edited. It presents a choice of archived Beams.
CCW	= Cycles Available Window used when Beams have to be edited. It presents a choice of archived Cycles.
SAW	= Supercycles Available Window used to load, store BCDs. It presents a choice of archived BCDs.
SCW	= Secondary Conditions Window allows edition of some beam delivery conditions or special states machine dependent.

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