

MACHINES AND AREAS COMMITTEE
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Summary of meeting No. 77 - December 16, 1977

Present

O. Barbalat, F. Bonaudi, D. Bloess, M. Bouthéon, B. Carpenter,
A. Daneels, D. Dekkers, M. Georgijevic, C. Germain, P. Germain,
U. Jacob, H. Kugler, B. Kuiper, L. Hoffmann, G.L. Munday (Chairman),
F. Perriollat, G. Plass, K.H. Reich, Ch. Rufer, W. Remmer

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1. Review of fire protection at the PS

U. Jacob presented the results of a review made in November (PS/SM/Note 77-26) showing the progress made since the first survey in mid'1975. Among the buildings functionally linked to the accelerators and not yet protected, first priority was given to the TT2 tunnel, the 200 MHz amplifiers in the North Hall, and the South Hall (in which a fire could have secondary effects in the MCR). The East experimental area and the associated buildings and tunnels were given second priority since a fire there would not affect ISR or SPS operation. Local supervisors at the request of their Group Leaders will initiate the price requests and the "demandes de travaux"*.

During the survey, it appeared that the installations in the A4 and A5 tunnels (between the MCR, the Power House and the Ring) are not very clean; there are many unused cables which present a substantial and useless risk in case of fire.

The MU and PO Group Leaders together with U. Jacob will have a look at the situation and decide appropriate action.

They will also clarify the responsibilities on the tunnels below the East area and check that the SB Division feels effectively responsible for the B7 tunnel (between East area and PS Power House).

A proposal was also made to install partitions in cable ducts to act as fire barriers and prevent the spreading of smoke and corrosive gases between tunnels and buildings. A procedure (mineral wool with foam developing paint) has been successfully tested at CERN and is used already in several areas (MCR and CCR for instance). Each case should however be studied individually to avoid the blocking of ventilation path but the principle was approved. For PS areas, expenses of 100 kFr are estimated which could be spread over several years. The responsible group should initiate the action.

* Care should be taken when locating the fire detectors of possible interferences with the ventilation so as to take into account air stream trajectories and avoid that smoke by-passes the detectors. Such an effect was established during test of an existing installation (in the BCER, Building 361).

2. Review of the Controls Improvement Project

a) Chinese copy

B. Kuiper started with a report on the so-called "Chinese copy". It consisted in implementing a subprocess of the PS (namely the Continuous Transfer) working with the SPS controls system.

The main aims were to assess the applicability of SPS solutions to specific PS problems, draw conclusions for the final design, set up and run in procedures for software production with wide divisional participation. All of these objectives have been reached, the system works on-line with the process and 90% of the application programmes are ready. (The missing 10% concern mainly documentation.)

A mini-run with this equipment will be done in March to finalize the conclusions; the equipment will then be dismantled in April as it is needed for the final configuration.

The implementation of the "Chinese copy" has been a most useful exercise used by the project team to effect its transition from the initial DEC design to a NORD based system. B. Kuiper acknowledged the particular help from SPS and from the AE Group as well as the collaboration from all other PS Groups.

b) New Control System

B. Kuiper recalled the main objectives of the new system : improve exploitation (taking into account needs of the operating team, the machine studies users, the equipment and controls engineers) while maintaining at least the same availability as today and making provision for future evolution.

The design has used the SPS system as starting point but has taken into account specific PS requirements (in particular the higher speed requirement of a 0.6 s cycle against 8 s), the SPS and the Chinese copy experience and the technical progress which has occurred in the last 5 years. (Some developments, in particular in the microprocessor field, will be done jointly with SPS).

The hardware layout will be similar to the SPS scheme but one has used the possibility (offered by the geography and the availability of serial CAMAC) to group all computers in one room so as to allow easy back-up.

The maintenance computer linked to CAMAC crates near equipment clusters and accessible through mobile consoles could constitute a second back-up. There will be four consoles, each driven by its own computer, a message switching computer (similar to SPS) but also a so-called "tree computer" to monitor what goes on in the whole network and an "MCR computer" to support a printer, hard copy devices, large permanent display screens, and perform as service machine for semi-batch processing (e.g. emittance calculations). Only two of the central computers (as opposed to 4 at the SPS) are essential to keep the system on.

Time lacked to give any detail on the software design work which has also been done in parallel.

c) Interface

Computers have few physical input/output channels, have a rigid data format and are adapted only to sequential data. The task of the interface is to provide the needed fan out, adapt the data format, buffer the data stream. A new development is the apparition of the microprocessor.

As the interface relates to everything and everybody, its design required time and discussions. Although a substantial degree of the desired streamlining could be achieved, limits of effort and money imposed compromise.

A list of objectives was given as well as the technical means to achieve them. The evolution of the design, starting from a detailed inventory through a choice of standards and modules to the final layout was sketched.

The salient features of the design are the selection of serial CAMAC, a uniform signal observation system, a systematic multi-level diagnostic connected to a maintenance computer, the application of a single microprocessor (TMS 9900) selected in agreement with other divisions. A module pool will be organized, and documentation is foreseen from the start. The standardisation of the interface will allow a centralised programming effort.

In answer to a question, it was stated that the selected microprocessor is expected to be adequate for quite a number of years. As to manufacturer support, Texas Instruments says to support the TMS9900 for 8 years and follows a policy of upward compatibility. In general, wherever possible, programming will be done in a high level language rather than in assembler, for reliability, production and ease of a later possible switch.

d) Implementation

The plan for the first conversion package covering the next two years are given in the document PS/CCI/Note 77-29. Taking various criteria into consideration it has finally been decided to convert first the PS Booster and the Programme Line Sequencer (PLS). The minimum initial investment (four consoles, computer network, system software, fraction of interface and application programmes) will need one and a half year.

It will be supplemented by the slice of interface and application programmes which can be completed by the second half of 1979, as the planned installation is fixed by the shut-down of the beginning of 1980.

The following slices will be the PS accelerator itself or the ejections; the Linac is scheduled last. The following slice will be decided in the second half of 1978.

It was stressed that this implementation schedule will meet a number of problems due to the fact that it must be made on a working accelerator. It will be very much a common job of the BR, OP and CCI groups and require a substantial participation of other groups. A survey of the available manpower resources will be made in January to establish the collaboration for this project. It should be understood that a majority of the divisional participants must continue to work on the project after the

implementation of the first part if one wants to avoid loss of efficiency through excessive turn-over. This survey of resources will also have to take into account other divisional commitments, like the multibatch filling and the $p\bar{p}$ project. The AE and BR Groups in particular expressed concern on their ability to achieve their various tasks.

The following details were precised in answer to questions :

- Effort on the present system (IBM 1800) is limited to 1 to 2 menyear/year and is tightly controlled but with the participation of users so as to meet the most pressing needs.
- Two DEC computers have already benn released for other CERN users (through M. Sendall/DD), a 3rd one is scheduled to be freed in the Spring 1978, a further two in 1980 (PLS computer) and another five when the ejection system is converted.
- The controls of the $p\bar{p}$ project are still an open question. The problem will be studied in the coming months once the proposed machine design study is available.

In conclusion, G.L. Munday expressed his appreciation of the tremendous work done by people in all PS Groups for getting this first step.

e) Summary of decisions

- First slice for conversion to new control system will be Booster and PLS.
- Survey in January should establish divisional participation for this first slice.

O. Barbalat

Distribution

PS Scientific Staff