The Future of AAC Controls System: Options for Discussion

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This Note formulates the available options & scenarios that one could en-
visage at this point in time for a viable, maintainable control system in
the early nineties for the pbar source complex.

Basic Premise: We have considerable investment in CAMAC-based hardware at
the equipment-end and involves around 36 Camac crates and related specific
hardware beyond to the equipment. All these crates, serial highways and
serial highway drivers emanate from a parallel camac crate connected to a
Norsk Data Nord-120 processor via a Nord-10 Camac driver card and an adap-
ter. For the purposes of this discussion, it is assumed that all these
aspects remain unchanged; however, the replacement of Nord-120 may be en-
visaged at the considerable expense of software both at system & low-level
(Equipment Module) application level; this would be within the framework of
a large project for PS controls system upgrade using VME-based Camac-
drivers driving clusters of 7 parallel crates, OS/9 , ethernet TCP/IP com-
munications and Vax workstations. The aspects of VME to Camac serial
drivers, speed implications, etc are unknown at the moment.

However, all this would be a long-term (4 to 6 years?) project involving
considerable new hardware & software investment and the basic premise
excludes this as a valid option in the early nineties. This reduces the
discussion to the possible scenarios for controls system evolution at the
application programming and user level in the early nineties.

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1st Scenario: AAC is shipped to Serpukhov

Option (1): Nothing needs to be changed and we ship it out on a "as-is" basis. One of the points to consider in this option are that the SPS Touch Terminals used today can have spares available for them. In fact, a fully-fledged Terminal of this type costs around 33 KSfr (Feb. '89 prices) and would provide no hinderance from embargo rules; Today, we use at most 3 Touch terminals at a time and so our total of 5, spread between ACR & MCR already has the inherent spare capacity!

Nord-120 may provide an embargo hinderance today but perhaps not so in 2 to 3 years; the mother-crate serial drivers would need maintainable spares or a replacement driver but this would be a minor problem which can be re-solved in a short while since nothing beyond changes. Some of the existing Camac modules may have future spares problem but again , these could be solved at Serpukhov using local expertise. In fact, there is an active in-dustrial firm in Hungary producing an extensive range of Camac modules.

An important point on this "as-is" option is that all our low-level Equip-ment and Interface Modules have been developed on the program development machine and only the binary versions loaded down to the front-end AA Nord-120. One can assume that whoever who maintains the system in Serpukhov would want to have the source versions for future modifications, etc. This then implies that we need to ship a spare Nord-120 configured as a suitable program development and source storage machine at Serpukhov. For the new NAPS modules, the database aspects from IBM would also have to be ported to this configured Nord-120 Prdev. Similar problem arises for SMACC software developed on Priam unix vax and the source versions would need similar de-velopment environment in USSR for future modifications. Fortunately, only 2 SMACC applications exist on the AAC and both could be treated as dedicated black-boxes if no suitably easy solution is found .

Option (2): This option depends on what Serpukhov expects in the light of their UNK project and whether AAC has to be fully integrated into their environment in the controls sense. If the answer is affirmative then, they should propose the suitable controls strategy at the applications level. In the interests of CERN, this is a non-option unless Serpukhov is providing the necessary manpower. It also means that a fast start-up of the UNK Collider program would very much depend not only on de-installation here, re-installation and commissioning of AAC in Serpukhov but also on the new Controls system availibility. In the interests of CERN in providing a reasonable and guaranteed startup in Serpukhov, this would be a heavy man-power -intensive activity that we could ill-afford.

Option (3): Replace SPS Touch Terminals by an IBM-compatible PC , used es-sentially as a terminal emulator using the simple serial driver or via a TCP/IP card. The advantages of the latter interface are obvious for future communications development; the embargo problems would be minimal depending on the IBM-compatible chosen. Further details of this option are included in the Option (1) below. Real costs trade-offs (both Hardware & Software) between this option and option(1) above needs to be worked out. From the pure monetary angle, option (1) above may turn out to be the cheapest.

2nd Scenario : AAC Remains at CERN

For the case of hardware and software maintenance at the top level, it could be foreseen to have a uniform interaction means at the user level in line with the rest of the PS complex. In this sense, the SPS Touch Terminals should be gradually phased out and replaced by whatever is agreed upon in the general PS context. In this sense, the LEAR control system cannot be considered as a typical PS context controls system and therefore not considered here for the sake of current discussion.

Option (1): Emulate all the SPS Touch Terminal functions on an IBM-compatible PC using mouse, cursor and lists (menu-driven) and providing windows for multi-task displays. In essence, the touch panels are replaced by mouse cursor combination in one window and the display, DICO-DIME emulation in another. Initially, multi-tasks could be excluded since present one-at-a-time operations are more than sufficient for the day-to-day running; however, new needs could be imagined or better operational methods envisaged using multi-tasks and multi-windows. The terminal emulator project would be completely independent of the rest of the controls system and could be carried in a relatively short-time (1 to 1.5 man-years ?) given suitable manpower (1 CERN Fellow ?)

Option (2): Replace the SPS Touch Terminals with a fully-fledged VAX workstation using all its tools and capabilities. In a sense, this would an extended terminal emulator project but , with considerable effort at all levels in providing fast communications (ethernet, TCP/IP must all work at least and upto the execution time specifications of Nodal for remote EXECs, etc) in addition to the effort needed for all the interaction (mouse, cursor, lists) and display windows. In fact, for simplicity at the beginning, a prototype emulation of the touch terminal functions may be necessary in any case!

For both the above options , considerable tailoring of existing (and automated) AAC programs written in Nodal will be necessary. All Nodal calls to equipment may also need to be routed to remote front-end processor, leading to further tailoring and modification of the high-level application software.

Under the present scheduling Scenarios with at most 2 months a year for long shutdowns, only the simple emulation option (1) seems the easiest if anything. However, parallel development could be envisaged, keeping the Touch terminals as functionally operational till all the problems have yielded their definitive solutions.