DISCUSSION 5 : TUESDAY MORNING (11:30HRS – 13:00HRS)

Digital Signal Treatment in Beam Instrumentation

Digital Signal Processing has grown dramatically over the last five years. The evolution of digital logic and processors has opened up the use of digital signal processing in domains, which were reserved to analog signal processing.

In this discussion session we would like to review digital signal treatment for beam diagnostics application.
Participants are encouraged to present their different approaches and their motivation to do it in one or the other way.

Emphasis shall be put on the following subjects:

?? **Digital Signal Processing for :**

- image processing **- BPMs** **- current monitors**

- beam loss monitors **- feedback systems** **- others**

What are the advantages/disadvantages with respect to their analog counterpart?

?? Digital Signal Processing – Overkill versus more flexibility?
?? Can digital signal processing provide better calibration methods?
?? Do commercial products suit the beam diagnostic needs or are in-house developments inevitable?
?? The fields of digital systems are manifold, different expertise on different levels is needed. Does a digital system need more manpower than a conventional analog system?
?? Trend in digital signal processing:
DSP / General Purpose Processor (PowerPC, Pentium MMX, etc.) / Field Programmable Gate Arrays (FPGA)?
?? Coding dilemma in DSP based systems:
- benefits and drawbacks of low- and high-level programming?
- benefits and drawbacks of using an operating system?
?? How risky is the use of newest commercial products or should one better rely on established hardware/tools with better software environment?
?? Integration into control systems:
What are the possibilities today for the communication with the ‘control room’?
How easy is remote debugging?
?? Next generation of diagnostic devices: Could a modular design of a digital signal processing device (general processing unit + customizable signal conditioning hardware) be used as a general purpose diagnostic device?