# Automated Availability Tracking @ PETRA III

Don’t do it yourself !  
Let the control system do it for you …

D. Haupt, R. Bacher, P. Duval, H. Ehrlichmann, M. Lomperski, DESY, Hamburg, Germany  
J. Bobnar, Cosylab, Ljubljana, Slovenia

## Abstract

The basis for machine reliability investigation is a reliable operation statistic. At PETRA III we recently implemented a new control system functionality to generate the statistics automatically according to predefined rules. Here we describe key components and tools: a beam operation calendar for definition of the planned machine status, the central logic to generate the actual machine state and the OperationHistoryViewer as the flexible tool to view and, if necessary, correct the results.

### Motivation

- reduce human bias
- reduce workload on machine coordinator
- monitor availability and online
- integrate into the operator's responsibility

## The Operations Calendar

- contains the machine operation schedule
- defines the nominal machine state with 1 hour resolution
- specifies the nominal beam parameters

## The State Server

- The essential control service
- Central logic to generate the current machine state, 10Hz update rate
- based on many predefined machine states:
  - User Run
  - User Run (Timing)
  - User Run out of specs
  - User Run low beam current
  - Test Run
  - Maintenance
  - Studies
  - Preparing
  - Failure
  - Warmup
  - No beam permission
  - Undefined

## The Central Alarm System

- The alarm system collects alarms for each subsystem
- If there is at least one FATAL alarm in one subsystem then the current accelerator state is set to FAILURE

## The Operation History Viewer

- A flexible tool to view the history of machine states and alarms
  - for any time interval
  - zooming possibility down to seconds
- Accelerator Availability and MTBF calculation for the selected time interval

## State Corrections

- No system is perfect, offline state corrections must be possible:
  - incorrect current state generated
  - incorrect alarm definition/severity
  - ...

## Failure Statistics

- based on the corrected machine states and selected time interval
  - total number of failures
  - total failure duration
  - MTBF for each subsystem

## Conclusions

With beginning of this year we implemented a new control system functionality to generate the operations statistics automatically. Up to now there are frequently offline state corrections necessary. Our goal is to achieve a perfect automated system without corrections. This is an ongoing iterative process to identify incorrect states and alarms where machine coordinators and operators are highly involved.