Beam Quality Reporting Project

Encouraging Feedback Concerning Beam Quality

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Project Overview Documentation
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Project Goal/Motivation

- Recent miscommunications concerning beam quality advocated a need for a tool to promote and easily report beam quality issues.
- Promote communication:
  - Make it easier for beamline personnel to report poor beam quality
  - Make Operations aware of possible delivered-beam issues
  - Improve Operator communication and efficiency
- Simplify reporting of detailed beam quality issues.

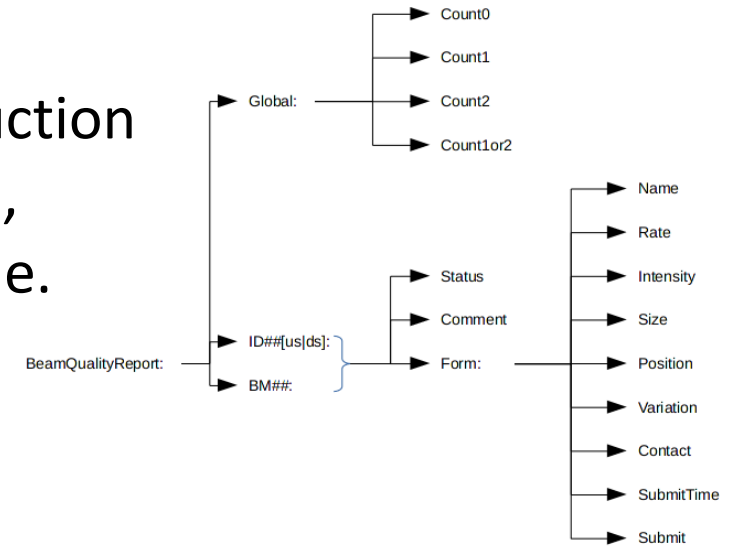
Excerpt from the AOP Mission Statement:

1. Safe, reliable, attentive, and responsive operation of APS accelerator systems, ensuring optimal machine performance, high availability, and excellent service to users.

An EPICS based solution

- The agreed upon requirements for the system are that it includes:
  - –General beam status for each beamline
  - –Specific values for beam qualities such as intensity, position, and size
  - –Indication of global conditions such as RMS motion and emittance

This system will require the introduction of over 1000 new process variables, enough for each operating beamline.



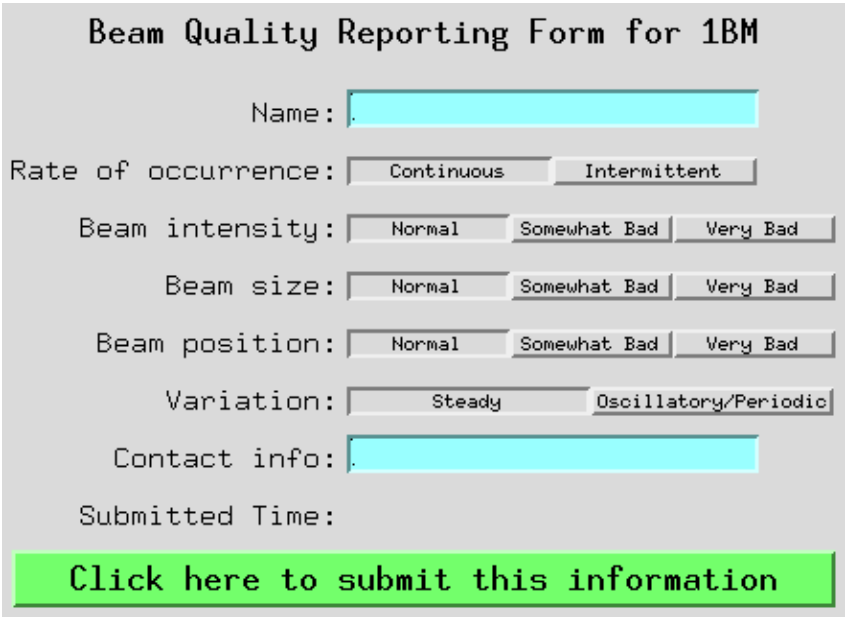
The Main MEDM Interface for Beamlines

Acceptable beam indication

Questionable beam indication

- Local indication
- Global motion alarm
- Global emittance alarm
- Total beamlines reporting
- Global issue information
- Beam status select buttons
- Beamline investigated buttons
- Link to detailed report form
- Ops comment concerning local condition

The Reporting Form MEDM Interface for Beamlines

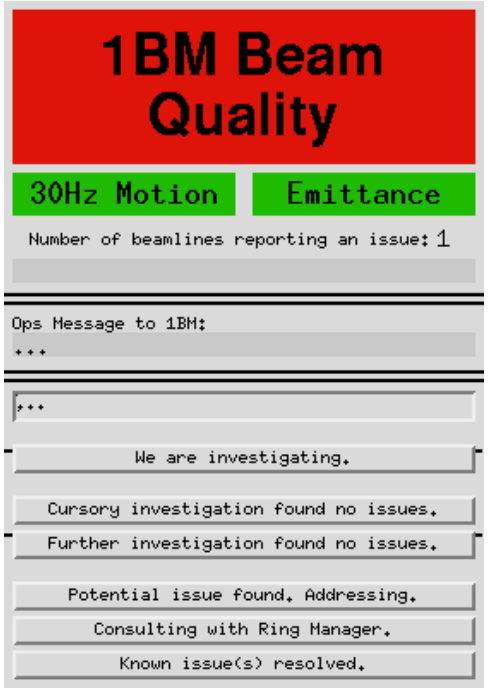


The reporting form allows the beamline personnel to specify beam properties.

The “Submitted Time” will be generated when the user clicks the submit button at the bottom of the form.

The entire form will automatically be cleared four hours after the beam status is first indicated as questionable.

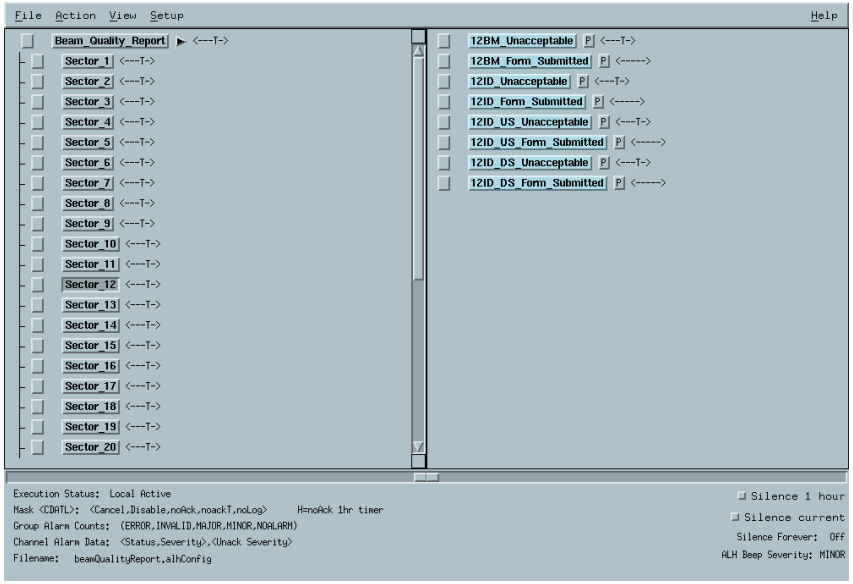
The Main MEDM Interface for Operators



The top of the operator's screen has the same indications as the beamline's version.

The lower half allows operators to quickly and conveniently provide feedback concerning the investigation.

The AlarmHandler Interface for Operators

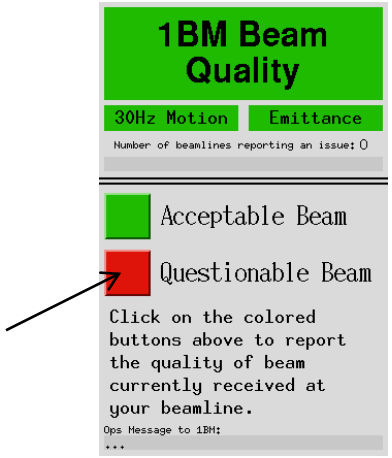


This is an example of the alarm handler channels. There are two channels for each active beamline.

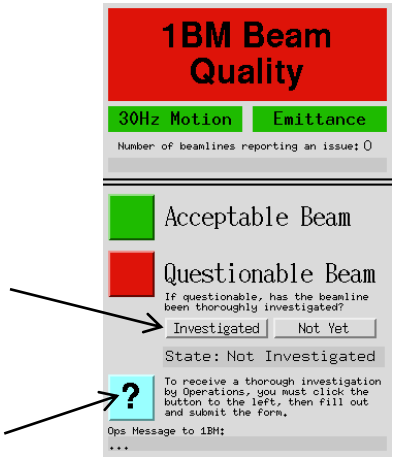
The “Questionable” channel alarm severity is dependent upon whether the beamline has been thoroughly investigated.

The “Form Submitted” channel will alarm when the form submit button is pressed.

Beamline Expected Usage

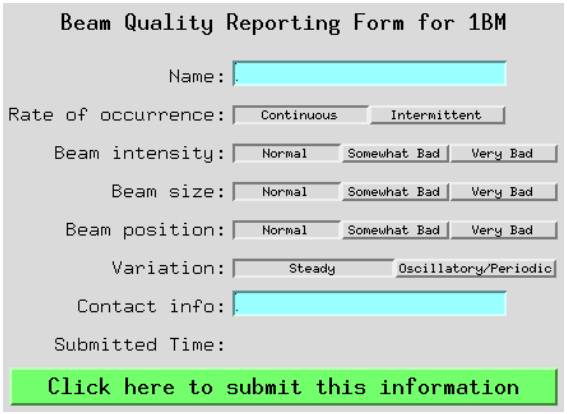


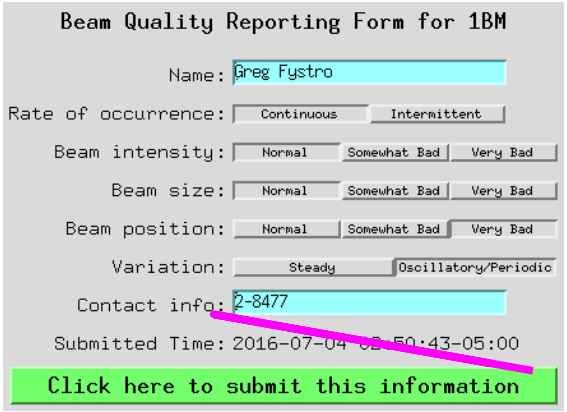
As soon as a beamline's delivered beam is deemed questionable, the "Questionable Beam" button is clicked to change their status.



Additional options appear when the status is "questionable". At this point you may choose to click on the form link in order to provide detailed problem information. Or you may choose to first inspect their beamline, then click the "Investigated" button, then fill in the form.

Beamline Expected Usage (continued)

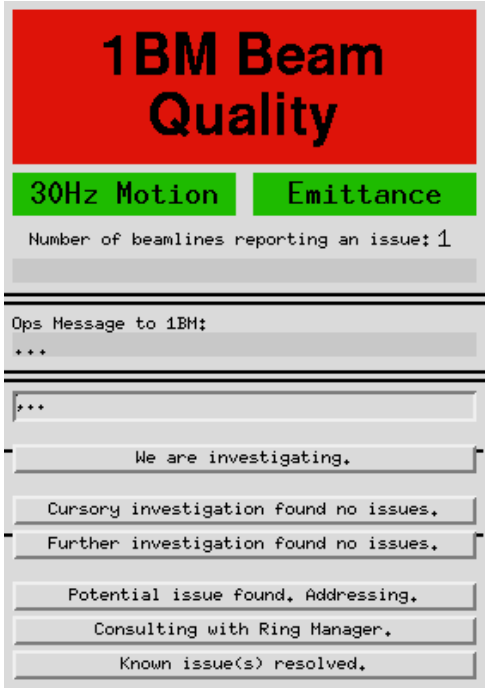




In order to ensure that Operations performs an in-depth investigation, a form must be submitted. Information should be entered, then the green button should be clicked to submit the form.

Verification that the form was submitted is provided by the timestamp generated at the time of submission.

Operations Expected Usage

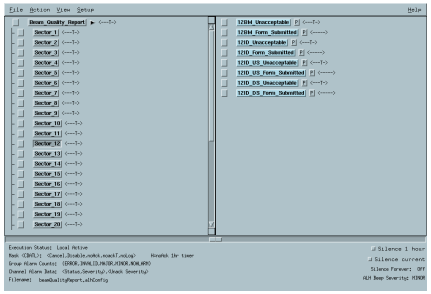


Operators will receive an alarm as soon as a beamline changes their status to questionable.

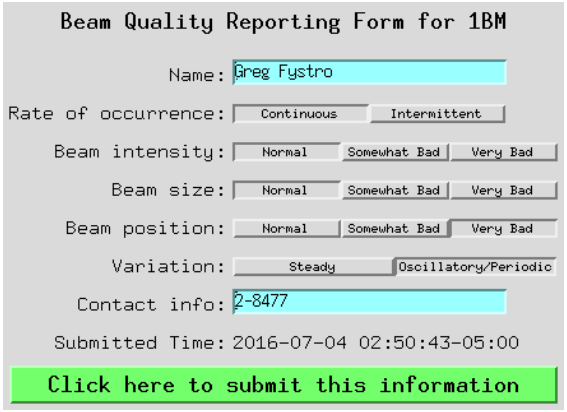
The associated MEDM window will be opened via a “process button” on the alarm handler.

Operators are expected to set the message to an appropriate value. A brief investigation of the beam condition is conducted. Their finding will be communicated to the user via the message.

Operations Expected Usage (continued)



If and when a beamline submits a form, operators will receive an alarm. A “process button” is associated with the “Form Submitted” alarm which will open the form window.

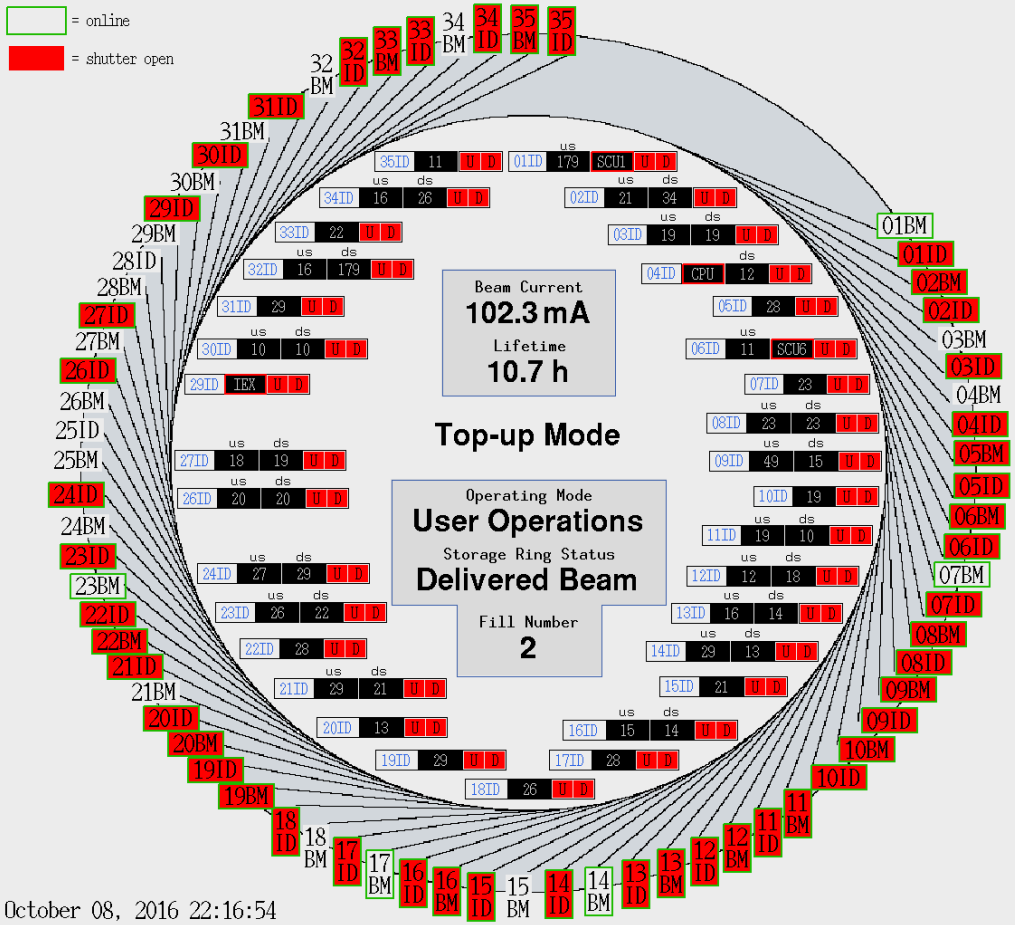


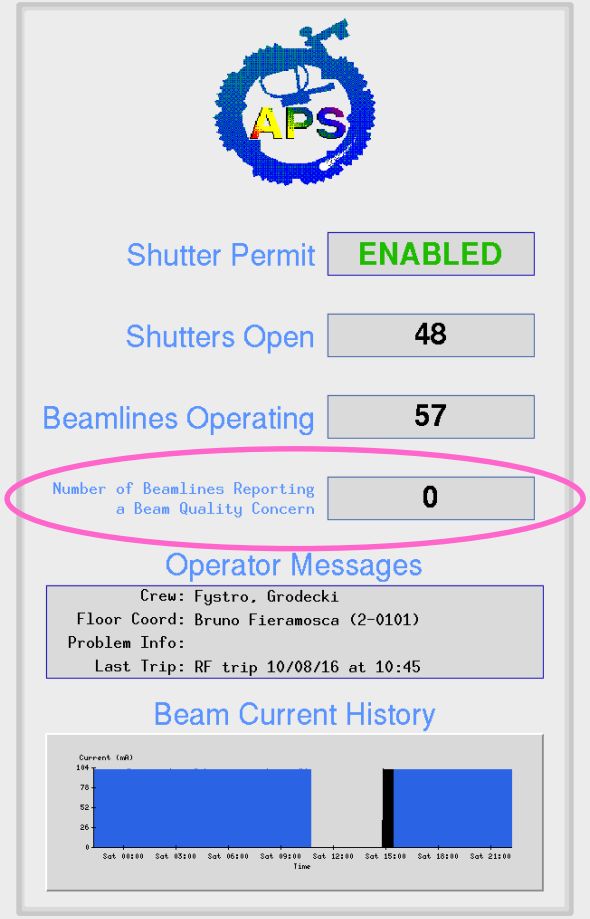
Operators will then follow the policy for an in-depth investigation of the issue. Progress and completion of the investigation will be communicated in the Ops message (on the previously shown screen).

Additional Features of the System

- Four hours after the state change from “acceptable” to “questionable”, a reset of the system will occur. This includes:
  - Reset form values to default.
  - Clear the form timestamp.
  - Reset status to “acceptable”.
  - Set Operator message to “...”.
- Logging of status and form data.
- Global information is made publicly available including a count of the number of beamlines that are currently indicating questionable beam.

Related Components





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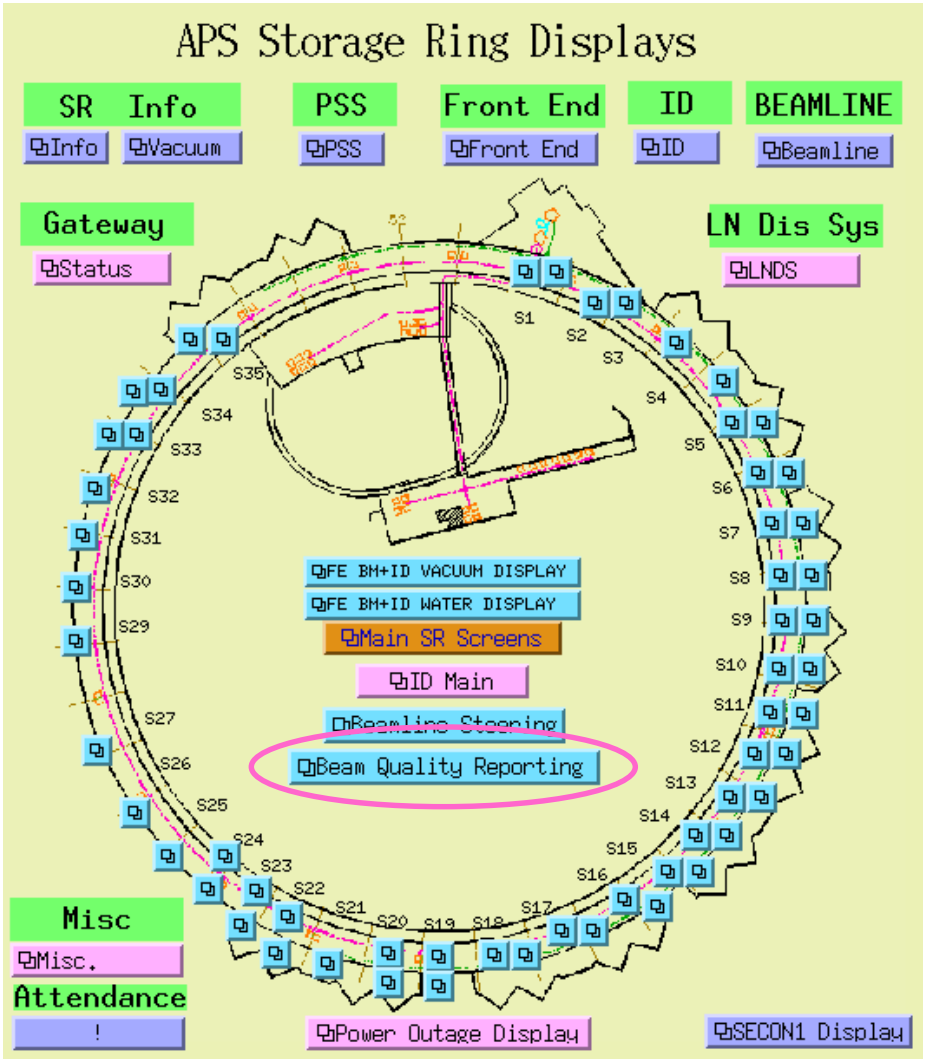

Timeline for Rollout

- Week of October 10
- Put IOC into production and set-up data logging.

- Week of October 17
- Train Operations staff and implement in the MCR.

- October 25
  - System goes live.
  - E-mail reminder and information to be sent out ahead of time.