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Further uses of fast orbit feedback controllers

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Diamond has had an operational fast orbit feedback system since 2007 which has proved to be reliable through routine use since that time. The implementation of the feedback controllers uses distributed VxWorks IOCs for calculating the required correction values in each corrector magnet. These IOCs are more easily modified than systems using FPGAs, allowing us to introduce additional features into our soft real time control system and control these features using EPICS. We have used this functionality to produce dynamic closed bumps into our electron beam orbit, measure the BPM to corrector response matrix and characterise the response of our corrector magnets. In the future an additional feature we would like to implement is feed-forward suppression of electron beam noise introduced by I10's fast switching chicane.

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