Module production for the Phase 1 upgrade of the CMS forward pixel detector

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— For Run 2 the Large Hadron Collider will run at a much higher instantaneous luminosity, which requires an upgrade of the CMS pixel detector. The detector consists of rectangular silicon sensors, segmented into 100 $\mu$m by 150 $\mu$m pixels, bonded to readout chips, with one sensor and a 8x2 array of readout chips forming a module. Due to its high granularity and good spatial resolution, about 10 $\mu$m for a single hit, the pixel detector is used for track reconstruction, pileup mitigation, and b-quark tagging in many physics analyses. Being the innermost sub-detector of CMS it receives the most radiation damage, and therefore needs to be replaced most often. For the phase 1 upgrade an additional disk in the forward region and increased buffer space in the readout chip will improve the pixel performance by increasing efficiency and reducing fake rates. The University of Nebraska-Lincoln is one of the two sites where modules are being assembled. This talk features the steps of the assembly process as well as challenges encountered and overcome during production of over 500 modules.

1The CMS Collaboration