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8.41 The Engineering Challenges And Options For Fielding The Next Generation Gas Cherenkov Detectors At The National Ignition Facility

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Fielding the 3rd Generation Gas Cherenkov Detector (GCD3) onto the National Ignition Facility (NIF) encompassed commissioning of the WellDIM3.9m Insertion Manipulator at Port 64-275 of the NIF Target Chamber. Phase II enhancements include the integration of the Sydor/Kentech/Photek Pulse-Dilation Photomultiplier Tube (PD-PMT) onto the existing detector. Given the 10x measurement bandwidth improvement that the PD-PMT will provide, the next logical enhancement (Phase III) is to increase the detector's sensitivity, i.e., position the detector closer to the Target Chamber Center. Concept options include: a.) Deploying the existing GCD3/PD-PMT Detector on the Target and Diagnostic Manipulator (TANDM), b.) Develop an optimized multi-cell Gas Cherenkov Detector ("Super-GCD") also TANDM-based, or c.) Develop an integral Super GCD/Neutron Imaging System diagnostic for TANDM. This poster/paper highlights the engineering design challenges, methodologies, and possible solutions to achieving this goal. LA-UR-18-20260

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