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Direct Search for Dark Photons and Dark Higgs with the SeaQuest Spectrometer at Fermilab SHO UEMURA, KUN LIU, MING LIU, Los Alamos National Laboratory, SEAQUEST COLLABORATION — SeaQuest/E1067 is a direct search for dark sector particles using the SeaQuest spectrometer at Fermilab. The SeaQuest experiment studies nuclear dependent Drell-Yan dimuon production using the high intensity 120 GeV proton beam from the Main Injector on thin fixed targets. An iron-filled magnet downstream of the target, 5 meters in length, serves as the focusing magnet and beam dump. Proton-nucleus collisions, mostly in the beam dump, can produce dark photons and dark Higgs through Drell-Yan like $q + \bar{q}$ (or $g + g$) fusion processes. These will decay to pairs of charged particles that can be detected in the SeaQuest spectrometer. A displaced-vertex trigger was built, installed, and commissioned in 2017. This trigger, which operates parasitically with the primary SeaQuest physics program, is sensitive to dark photons or dark Higgs with mass above the dimuon threshold that travel deep inside the beam dump before decaying. It recorded one week of production data during the last run of the E906 experiment, and will continue to take data during the upcoming E1039 experiment. We present the displaced-vertex trigger upgrade and its performance, the current status of the dark photon search from 2017 data, and projected sensitivity from future running.

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