

## *Set-up of Digital Image Correlation Apparatus*

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Digital Image Correlation (DIC) is a valuable and customizable experimental technique employed to analyze localized strain regions on materials by tracking the displacement of points on the surface of the studied material under applied stress. To investigate materials behavior, it is vital to correctly set-up the DIC apparatus so work has been done to ready the equipment to start measurements on two distinct projects. On the first project, the fatigue crack behavior of a high-strength aluminum alloy will be studied by cyclic loading, testing necessary for the safe design of aircraft parts utilizing this novel alloy. DIC will be carried out ahead of the fatigue crack and to accomplish this, a MATLAB code was developed to synchronize the loading machine with the DIC equipment and camera, and to automate the capture of images. On the second project, electronic microscopy will be utilized to carry out DIC at high resolutions to study the relationship of the microstructure of structural alloys and the strain fields generated on the material. A gold nanoparticle speckling method was adapted from literature to create a speckle pattern on the specimens with the desired length scale and density for this study. A satisfactory conclusion of the preparatory work of the DIC equipment and protocols will enable the testing to start for the two projects aforementioned.