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|  | SPC | New Methodology |
| Prediction | A ***predicted image*** is created by using the McEwen BRDF to calculate illumination values for every point on the maplet surface. | A ***template*** image is rendered into the camera frame via ray tracing. The McEwen BRDF is then used to calculate illumination values for each pixel in the template. If the ray does not intersect the maplet, then that pixel is removed from the ***intersection mask***. |
| Extraction | An ***extracted image*** is created by projecting the illumination values from the collected image on the maplet surface. A simple method is then used to identify shadows and obstructed regions. | All of the pixels in the collected image that are of space are removed from the ***space mask***. The image is then cropped to only contain the region where the landmark is expected to be for each potential alignment, creating the ***cropped image***. |
| Registration | Cross-correlation between the ***predicted image*** and the ***extracted image*** takes place on the maplet surface. Regions where shadows are expected to be, or pixels in the image detected to be in shadow (due to being below a certain threshold), are ignored in the correlation. | Cross-correlation between the ***template*** and ***cropped image*** takes place in the image frame. The ***intersection mask*** and ***space mask*** are combined so that only relevant portions of both the template and image are correlated. Importantly, shadows are included in the computation of the correlation surface. |
| Registration Location | Because the cross-correlation takes place on the maplet surface, the amount that the ***predicted image*** can be shifted by is limited by the size of the template. | Because the cross-correlation takes place in the image frame, the only limit on shifting the ***template*** is the size of the image itself. This can be potentially beneficial if a priori knowledge in the spacecraft pose is poor. |