the point cloud data. This stage also involves frontier detection, which identifies the boundaries between traversable and non-traversable areas within the map.

In the **Planning** stage, candidate goals are defined for each frontier. These goals are ranked based on their utility, which is calculated using Level 1 utility ($u_1 = (\Delta E, \rho)$) and Level 2 utility ($u_2 = tr(I_p)$). The best selected path is then determined from the ranked list of goals, taking into account additional mission constraints.

This framework ensures that the rover can navigate safely while exploring new terrain, optimizing both efficiency and safety.