their descriptors, which are not designed to be robust w.r.t. spherical distortions. Indeed, typical laser scanner acquisition systems are usually composed by a fixed platform and a rotating head, which are naturally modelled by simple spherical projections. The resulting acquired images are then obtained by mapping spherical images onto single image planes. The meridians of a spherical image are mapped to vertical viewing planes, and the parallels are mapped to viewing cones with the vertex in the sensor position.

In order to reduce the distortion induced by the spherical projection we compute the above mentioned feature descriptors on an atlas of rectified images (shown in Fig. 4). This is possible since both the spherical projection and the atlas perspective projections will share the same point of view.

To recover the set of rectified images we initially select a field of view value $\alpha_{fov}$ (in our