Obstructive Sleep Apnoea is interrupted cessation of breathing for at least 10 seconds during sleep. This has a significant negative effect of the overall wellbeing of the individual and increases the risk of hypertension, stroke, traffic accidents, and many more diseases. For severe sleep apnea surgical intervention to reduce the number of interrupted cessation experienced during sleep. Before a surgery is done, a patient has to undergo a sleep endoscopy studies in which the patient is sedated and an endoscopy is inserted into the airway to assess whether the severity of the sleep apnoea can be reduced with surgical intervention. The key challenges to this approach are that the assessed sleep study does not represent natural sleep at home; required patient to be sedated; and records less that 30 minutes of data which is not s sufficient representation of a patient’s sleep. The first section of thesis explore different camera and holder design for intra oral upper airway imaging during ‘natural sleep’. Five different camera models with their respective camera holder was design and tested for home sleep on a volunteer to assess the suitability, image/video quality, and practical feasibility.