The proposed research is intended to investigate if wall suction in the boundary layer over a rotating disk will transform the absolute instability cross-flow mode into a global mode as postulated by Davies and Carpenter (2003). Previously, Lingwood (1997) predicted that the cross-flow instability that exists in the boundary layer on a rotating disk became absolutely unstable above a critical Reynolds number of 507. She postulated that this was the primary mechanism of transition to turbulence of the boundary layer. However, when Davies and Carpenter (2003) performed numerical simulations to solve the linearized Navier-Stokes equations governing the rotating disk flow, they found that at Reynolds numbers in the absolute instability region, the absolute instability did not lead to a sustained temporal growth, but was eventually overcome by the convective instability which dominated the turbulent transition process. This was confirmed in an experiment by Othman and Corke (2006) who introduced temporal disturbances and followed their development in space and time. More recently, numerical simulations by Thomas (2007) determined that wall suction applied in the absolute instability region of the rotating disk could cause the absolute instability to become a global mode. This has yet to be validated experimentally. Such experimental validation is the object of this research. A new rotating disk facility was designed for the present research. The experiment will document the mean flow and cross-flow instability characteristics with wall suction. The approach of Othman and Corke (2006) will be used to introduce temporal disturbances. Their space-time evolution will be documented to capture the growth of the absolute instability and to determine if wall suction leads to limit-cycle behavior exhibited by a global mode.