Stress can be defined as the mental, physical, and emotional response of humans to stressors encountered in their personal or professional environment. Stressors are introduced in various activities, especially those found in dynamic task conditions where multiple task requirements must be performed. Stress and stressors have been described as activators and inhibitors of human performance. A series of theoretical models discussing the impact of stress on human performance have been developed in previous studies; however these models do not provide precise quantification of stress levels and its impact on human performance. This dissertation research presents a predictive model for acute stress as a function of human performance and task demand.