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Introduction

• Inspired by rescue missions of firefighters
• Intended for healthy users
• Designed, manufactured, and tested by students
• Compete at annual ACE competition
Design Overview

• Solid aluminum frame transfers weight to floor
• Electric linear actuators
• Machine-learning algorithm with EMG sensor input predicts user intent

Figure 2: Electric linear actuators actuate hip and knee joints
Development Tool – Computer-Aided Design (CAD)

Figure 3: Simple CAD simulation to check interferences

Figure 4: Full CAD assembly to test-fit components
Development Tool – Motion Capture Analysis

Figure 5: (Left) Motion capture using greater trochanter (hip) and lateral epicondyle (knee), (Right) Estimation of hip actuator force required at each point in gait cycle
Application for Virtual Humans

• Check for potential safety and discomfort issues
• Opportunity to determine load transferred onto the user prior to physical testing
• Reduce time and cost of development process