AcTeR: Actuated Tensegrity Revolute Joint

Cole Woods and Vishesh Vikas
Agile Robotics Lab
Department of Mechanical Engineering
University of Alabama
Tuscaloosa, AL USA
Email: cswoods.@rimson.ua.edu, vvikas@ua.edu

***Abstract*—The poster discusses design of a tensegrity leg that is composed of two revolute joints that are also passive in the transverse direction. The Actuated Tensegrity Revolute (AcTeR) Joint is able to have a range of motion of approximately 120 degrees. It comprises of two rigid links - one is a semi-circle, while the other is similar to the shape of a horseshoe. The structural integrity of the structure is maintained by strategically routing an elastic string between the two links such that both of them do not touch/interact with each other. This gives the AcTR joint its shape and the passive quality in the transverse direction. The passivity of the joint can be tuned by using different size elastic cables and tightening or loosening the cables. By changing the passivity of the joint, the AcTR joint can be used for different loads.**

The novelty and advantage of the AcTR joint comes from the simplistic fabrication technique that provides it with complex attributes. It is simple in that it composes of two rigid links, one string to connect the links, and one belt and motor to actuate the joint. This bio-inspired structure allows for one to have a revolute joint that can also passively move in the transverse direction where the two rigid elements do not rub against eachother. In this sense the system has an embodied intelligence. The AcTR joint could lead to a system that more closely aligns with biology. This would be very helpful for traversing over unstructured environments.

***Index Terms*—tensegrity, compliant revolute joint, bio-inspiration**