

## Articulated Joint Mechanism for Cable-Based and Tensegrity Structures (#7120)

An articulated joint system for cable-connected and tensegrity structures. Through the use of articulated rod ends and strategically designed cable attachments, the system reduces the movements transmitted by the structure of the joints to virtually zero. In this way, the overall reliability of the joints in the structure is increased. In addition, joints incorporate a simple thread-based mechanism that allows for the fine calibration of tensile stresses on cables in the structure. This, in turn, permits tuning of the structure for a specific performance or functionality. Finally, the system has a modular design that simplifies its manufacturing process, deployment to a variety of geometries, and drastically reduces the associated costs.

### Benefits/Advantages

- System easily scales to a wide range of sizes, making it suitable for a very broad range of applications
- Cables could be either attached to the main structure, or be structural elements themselves
- Accommodates joints with arbitrary number of incident cables

### Potential Commercial Applications

- Cable components
- Bridges - suspension and cable stayed
- Roof structures
- Domes
- Cranes
- Space structures - antennas, satellites and landers
- Wire-suspended architectural and design elements

### Background/Context for This Invention

Present technologies for joining cable-based structures do not ensure that the centerlines of adjacent cables intersect at a single point, thus generating a net force moment at the joints. This, in turn, results on undesired shape changes of the resulting structure, and more importantly, on stress concentration at the joints. This stress concentration could lead to premature failure of the structure. In current approaches, each node has to be designed individually according to the number of adjacent cables, which adds enormous complexity and cost to the design process of cable-based structures.

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**More Information**

**U.S. Number:**

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**Publications**

**For more information about this technology, please visit:**

<https://licensing.research.gatech.edu/technology/articulated-joint-mechanism-cable-based-and-tensegrity-structures>

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