

# Carbon Strand Actuator

The Carbon Strand Actuator, or CSA, is a Frame motivator technology developed by [Noval Heavy Industries](#) in [YE 42](#). It is an application of [Carbon Nanotube Actuator](#) technology that results in a frame-scale, synthetic muscle tissue analog.

Year of Creation	<a href="#">YE 42</a>
Designer	<a href="#">Noval Heavy Industries</a>
Nomenclature	NH-M1-F4200
Manufacturer	<a href="#">Noval Heavy Industries</a>
Fielded by	<a href="#">New Dusk Conclave</a>
Availability	Mass Production
Price	-

## History

During the development of Noval's first Frame, the [Banshee-class Strike Frame](#), the corporation sought to develop a motivator system for the Frame that would use low amounts of energy while providing pilots with a comfortable 'body' to control. Their early efforts using traditional servos yielded mixed results. Servos had excellent response times, but could feel jerky, were subject to friction and wear-and-tear, and required a decent power investment to get a reasonable amount of torque. For their Banshee's prototype models, none of this was a problem - it was, after all, designed purely for space operations.

Over time, however, the wear and tear on the frame's servos from basic use and maneuvering were viewed as problematic. Worse, operators of the development-model Anima Systems reported that the way that the limbs moved could feel unnatural and were affecting their response times. All of these problems could be solved by more expensive parts, better maintenance, or more rigorous software interpolation of the operator's movements, but these 'solutions' were merely band-aids in the long run.

The [Operator](#) project would serve as the spring-board for what would become the 'Carbon Strand Actuator'. Attempts at using the Operators' synthetic muscle tissue at a frame-scale showed promise, but the materials simply weren't designed for use on such a scale. The amount of synthetic muscle required to get an appropriate amount of movement was simply too much. The NDC's use of carbon nanotubes would provide the answer, as [dense layers of aerogel sheets](#) had excellent tensile strength, flexibility, and could operate across a wide range of temperatures with little adverse affect.

The resultant material was bound into thin strings, which were then weaved together to make a resilient strand that could expand and contract with minimal energy investment. Early tests in Noval's frames quickly proved their worth and they have since become a staple of Noval's Frame design.

## Function and Design

Carbon Strand Actuators are powerful, muscle-like carbon nanotube strand clusters. When appropriately

affixed and arranged, the Strands give a Frame an impressive amount of strength, agility, and flexibility by contracting or expanding depending on the current applied to them.

Each strand is coated in a layer of flexible **Madite** to protect against friction and external electrical interference.

Woven into each strand is a hollow cable full of a neon-blue nanite slurry. When a strand is damaged, the hollow cable begins to leak or burst, releasing the nanites onto the strand. They will attempt to repair the strand and nearby systems, with effectiveness varying depending on the severity of the damage.

Continued strain on the joint will significantly reduce the nanites' effectiveness.

Damaged strands should be replaced at the first available opportunity. In contrast to traditional servo-based motion systems, replacing a damaged CSA is usually a trivial matter - they can be disconnected and replaced quite easily once the armor protecting them has been replaced.

## Appearance

Individual CSAs look like flat, tightly-weaved black cables. They are about as thick as an average person's wrist. Each end tapers to a flat, finished end that can be stacked with other similar cables. The ends have simple connectors for mounting and connecting to a Frame's onboard power supply.

A typical joint will be supported by a cluster of at least 6-7 CSA strands. When idle, a cluster looks like a set of cables lined up next to and on top of each other. When exposed to a current, the cables contract and expand.

## OOC Notes

**Whisper** created this article on 2021/04/04 18:43.

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