

## SHAPE MEMORY TUBULAR STRUCTURE

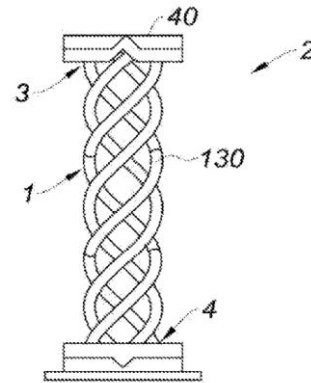
### Technological advantages

#### Innovative :

- 'All in-one' system to deploy / retract a tubular structure.
- Thermal system integration, no external elements.

#### Efficient :

- Reduction in mass and minimal spacing compared to usual techniques.



Retracted antenna with 4 composite strands

- (1) Tubular structure
- (2) Radiofrequency antenna
- (3,4) Structure ends
- (130) Emitting / receiving R/F signal
- (40) Stand

### Invention synthesis

The invention deals with a deployable composite tubular structure using a memory shape effect.

Shape memory polymers return to their initial state when subjected to external constraints (typically thermal). Heating is usually carried out using an external thermal system (remotely using infrared or glued onto the structure). This technique is difficult to set-up, costly and adds overall mass.

The invention is based on a polymer material with a heating envelop composed of electrical resistive braided fibers and impregnated with a shape memory resin. The mechanically constrained structure returns to its original shape when an electric current passes through (Joule effect). The braided fibers also add stiffness and increased mechanical strength.

### Commercial benefits

- Cost effective compact system (mass & reduced footprint).
- Reduction in system failures.

### Potential applications

- Mainly for space applications : deployable structures (antennas, shielding elements, ...)

*Patented invention - under license.*