WHAT IS CLAIMED IS:

1. A deployable antenna structure configured to deploy from an undeployed state to a deployed state, comprising:

a flexible electrical element including at least one antenna membrane on the flexible electrical element;

a plurality of tapes dispensable from a rolled format in the undeployed state to a linear format in the deployed state;

an enclosing structure including a base; and

a plurality of tape dispensers operatively coupled to the base, the plurality of tape dispensers being adapted to transition the flexible electrical element from the undeployed state towards the deployed state,

wherein each of the plurality of tapes is operatively coupled at a first end to the flexible electrical element and at a second end to one of the plurality of tape dispensers, and

wherein the flexible electrical element is folded in the enclosing structure in the undeployed state and is unfolded in the deployed state to form a substantially flat antenna membrane surface, the flexible electrical element extended away from the base by the plurality of tapes when deploying to the deployed state.

2. The deployable antenna structure of claim 1, wherein the plurality of tapes creates distance between the flexible electrical element and the base when deploying.

3. The deployable antenna structure of claim 1, wherein at least one tape from the plurality of tape dispensers is dispensed at a different length as compared to others of the plurality of tapes.

4. The deployable antenna structure of claim 3, wherein the plurality of tape dispensers dispense at least two tapes to a same length.

5. The deployable antenna structure of claim 1, wherein, in the deployed state, the second end of each tape is operatively coupled to the flexible electrical element substantially axisymmetrically about a center of the flexible electrical element.

6. The deployable antenna structure of claim 1, wherein the plurality of tapes dispense from one side of the base but dispense in different directions.

7. The deployable antenna structure of claim 1, wherein the each of the plurality of tapes diverge from one another in at least two dimensions when dispensed.

8. The deployable antenna structure of claim 1, wherein at least one tape of the plurality of tapes is dispensed to a predetermined length.

9. The deployable antenna structure of claim 1, further comprising a pantograph structure, the pantograph structure operatively coupled to the flexible electrical element about a perimeter of the flexible electrical element, the pantograph structure operatively coupled to the plurality of tapes at the first end.

10. The deployable antenna structure of claim 1, wherein the plurality of tape dispensers are coupled to the base at positions substantially axisymmetrical about a center of the base.

11. The deployable antenna structure of claim 1, wherein each tape dispenser of the plurality of tape dispensers comprises:

a tape dispensing cassette having a rotational axis about which one of the plurality of tapes is coiled; and

a mounting standard coupled to the base,

wherein the tape dispensing cassette is coupled to the mounting standard to allow the tape dispensing cassette to rotate about the rotational axis.

12. The deployable antenna structure of claim 1, wherein each of the plurality of tape dispensers comprises a mounting standard coupled to the base, wherein the mounting standard is coupled to the base by one or more flexures, the one or more flexures adapted to facilitate rotation of the each of the plurality of tape dispensers about an axis that is substantially perpendicular to the base.

13. The deployable antenna structure of claim 1, further comprising:

a plurality of doors coupled to the base at edges of the base,

wherein the plurality of doors and the base form the enclosing structure in the undeployed state, and

wherein the plurality of doors folds down during deployment to provide a rigid structure relative to the base when in the deployed state.

14. The deployable antenna structure of claim 13, further comprising one or more lanyards, wherein each tape of the plurality of tapes is operatively coupled to one or more lanyards at the first end, each of the one or more lanyards operatively coupled to no more than one tape of the plurality of tapes, each of the one or more lanyards also coupled to one or more of the base and a door.

15. The deployable antenna structure of claim 14, wherein, in the deployed state, each tape of the plurality of tapes forms a truss like structure with the one or more lanyards.

16. The deployable antenna structure of claim 14, the one or more lanyards are coupled to one or more of the base and a door substantially axisymmetrically about a center of the base.

17. The deployable antenna structure of claim 1, wherein each of the plurality of tapes is a quasi-dual stable tape that exhibits a first stable state when wound, a second stable state when straight, and a propensity towards the second stable state when a portion of the each of the plurality of tapes is in the second stable state.

18. The deployable antenna structure of claim 1, wherein, when in the deployed state, the flexible electrical element defines a polygon-like shape that has catenary-shaped edges.

19. The deployable antenna structure of claim 1, further comprising a feed antenna coupled to the base.

20. The deployable antenna structure of claim 1, further comprising electric motors, wherein the electric motors are configured to engage the plurality of tapes to dampen deployment of the plurality of tapes.