

Claims

1. A deployable reflector for an antenna, the deployable reflector comprising:
a deployable membrane configured to adopt a pre-formed shape in a deployed
5 configuration; and
an electrically conductive mesh disposed on a surface of the membrane such
that in the deployed configuration, the conductive mesh adopts the shape of the
membrane and forms a reflective surface of the reflector,
wherein the electrically conductive mesh is configured to permit relative lateral
10 movement between the electrically conductive mesh and the membrane during
deployment of the reflector.
2. The deployable reflector of claim 1, wherein the membrane comprises an open-
cell woven material.
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3. The deployable reflector of claim 2, wherein the open-cell woven material has a
triaxial weave structure.
4. The deployable reflector of claim 2 or 3, wherein the open-cell woven material
20 comprises a weave of para-aramid fibres embedded in a silicone matrix.
5. The deployable reflector of any one of the preceding claims, wherein the
electrically conductive mesh is arranged to be disposed on a convex surface of the
deployable membrane in the deployed configuration, such that during deployment of
25 the reflector the deployable membrane presses into and deforms the electrically
conductive mesh into the pre-formed shape.
6. The deployable reflector of claim 5, wherein the membrane is formed of
material that is transparent to electromagnetic radiation at radio-frequency
30 wavelengths.
7. The deployable reflector of any one of the preceding claims, comprising:
a plurality of first connecting members connecting the mesh to the membrane.

8. The deployable reflector of claim 7, wherein each first connecting member comprises a flexible connector in the form of a loop wrapped around one or more fibres of the mesh and secured to the membrane.
- 5 9. The deployable reflector of claim 8, wherein each first connecting member is formed of an elastic material capable of stretching to permit relative lateral movement between the mesh and the membrane.
- 10 10. The deployable reflector of claim 8 or 9, wherein a length of the loop in each first connecting member is longer than a minimum distance required to encircle the one or more fibres of the mesh, such that slack in the loop can be taken up during relative lateral movement between the mesh and the membrane.
- 15 11. The deployable reflector of any one of the preceding claims, wherein said membrane is a first membrane, and the electrically conductive mesh is disposed between the first membrane and a second membrane.
- 20 12. The deployable reflector of claim 11, further comprising:
a plurality of second connecting members passing through the electrically conductive mesh, each one of the plurality of second connecting members being connected to the first and second membranes to maintain a spacing between the first and second membranes during deployment of the reflector.
- 25 13. The deployable reflector of any one of the preceding claims, wherein the membrane is configured to provide a continuous three-dimensional curved surface for shaping the electrically conductive mesh in the deployed configuration.
- 30 14. The deployable reflector of claim 13 configured as a shaped reflector for a contoured-beam antenna, wherein in the deployed configuration the three-dimensional curved surface of the membrane includes a plurality of regions of different curvatures so as to produce a beam having an irregular pattern.
- 35 15. An unfurlable antenna comprising the deployable reflector of any one of claims 1 to 14.
16. The unfurlable antenna of claim 15, further comprising:

a backing structure configured to deploy the deployable reflector.

17. A satellite comprising the unfurlable antenna of claim 15 or 16.

5 18. A method of manufacturing a deployable reflector for an antenna, the method comprising:

pre-forming a deployable self-supporting membrane on a mould, such that in a deployed configuration the membrane adopts the shape of the mould; and

10 disposing an electrically conductive mesh on the self-supporting membrane such that in the deployed configuration, the conductive mesh adopts the shape of the membrane and forms a reflective surface of the reflector,

wherein the electrically conductive mesh is configured to permit relative lateral movement between the electrically conductive mesh and the membrane during deployment of the reflector.

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19. The method according to claim 18, wherein pre-forming the deployable membrane comprises:

laying an open-cell woven material on the mould;

20 applying a gel to the open-cell woven material, before or after laying the open-cell woven material on the mould; and

curing the gel to form a solid matrix around the open-cell woven material, whilst the membrane remains on the mould.