

Therefore, at least the following is claimed:

1. A guided surface wave apparatus, comprising:
 - a launching structure or a receiving structure; and
 - an array of anisotropic constitutive parameter (ACP) elements distributed above a terrestrial medium about the launching structure or the receiving structure, the array of ACP elements comprising:
 - a first plurality of radial resistive artificial anisotropic dielectric (RRAAD) elements positioned above the terrestrial medium, the first plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in a first orientation, wherein the first plurality of the RRAAD elements forms a horizontal layer at a height above the terrestrial medium.
2. The guided surface wave apparatus of claim 1, wherein the array of ACP elements is a cylindrical array with each of the one or more series of interconnected RRAAD elements linearly oriented in a ρ -direction.
3. The guided surface wave apparatus of claim 1, wherein the array of ACP elements comprises a second horizontal layer of RRAAD elements positioned above, and substantially parallel to, the horizontal layer of RRAAD elements distributed at the height above the terrestrial medium, the second horizontal layer of RRAAD elements comprising:
 - a second plurality of RRAAD elements positioned above the first plurality of RRAAD elements in the horizontal layer, the second plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in the first orientation.

4. The guided surface wave apparatus of claim 1, wherein the array of ACP elements comprises a second plurality of RRAAD elements positioned above the terrestrial medium, the second plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in a second orientation with respect to the first orientation, wherein the first plurality of the RRAAD elements and the second plurality of the RRAAD elements form the horizontal layer at the height above the terrestrial medium.
5. The guided surface wave apparatus of claim 4, wherein RRAAD elements of the one or more series of interconnected RRAAD elements of the first plurality of RRAAD elements and the one or more series of interconnected RRAAD elements of the second plurality of RRAAD elements are separated from adjacent elements in that series by a defined distance.
6. The guided surface wave apparatus of claim 4, wherein the array of ACP elements is a rectangular array with the one or more series of interconnected RRAAD elements of the first plurality of RRAAD elements linearly oriented in an x -direction and the one or more series of interconnected RRAAD elements of the second plurality of RRAAD elements linearly oriented in a y -direction substantially perpendicular to the x -direction.
7. The guided surface wave apparatus of claim 1, wherein the launching structure is configured to excite the array of ACP elements with an electromagnetic field at a frequency (f_0) thereby substantially mode matching the electromagnetic field to a Zenneck surface wave mode of the terrestrial medium.
8. The guided surface wave apparatus of claim 1, wherein the receiving structure is configured to couple with a Zenneck surface wave propagating along the terrestrial

medium at a frequency (f_0) via the array of ACP elements, wherein the array of ACP elements is configured to concentrate electromagnetic energy from the Zenneck surface wave around the receiving structure.

9. The guided surface wave apparatus of claim 1, wherein individual RRAAD elements of the array of ACP elements comprise a capacitor and a resistor connected in parallel, the capacitor and resistor comprising one or more lumped element components.
10. The guided surface wave apparatus of claim 1, wherein the array of ACP elements comprises a plurality of vertical lossless artificial anisotropic dielectric (VLAAD) elements distributed above the terrestrial medium, the plurality of VLAAD elements positioned above the terrestrial medium, the plurality of VLAAD elements comprising one or more series of interconnected VLAAD elements extending in a second orientation substantially perpendicular to the horizontal layer.
11. The guided surface wave apparatus of claim 1, comprising an array of horizontal artificial anisotropic magnetic permeability (HAAMP) elements distributed about the launching structure or the receiving structure, the array of HAAMP elements comprising a plurality of HAAMP elements positioned above the terrestrial medium.

12. A method, comprising:
- providing a plurality of anisotropic constitutive parameter (ACP) elements about a launching structure or a receiving structure; and
 - configuring the plurality of ACP elements in an array above a terrestrial medium, wherein configuring the array of ACP elements comprises:
 - positioning a first plurality of radial resistive artificial anisotropic dielectric (RRAAD) elements above the terrestrial medium, the first plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in a first orientation, the first plurality of the RRAAD elements forming a horizontal layer at a height above the terrestrial medium.
13. The method of claim 12, further comprising:
- exciting the array of ACP elements with an electromagnetic field produced by the launching structure, the array of ACP elements configured to substantially mode match the electromagnetic field at a frequency (f_0) to a Zenneck surface wave mode of the terrestrial medium; and
 - coupling energy from the launching structure into a Zenneck surface wave propagating along the terrestrial medium via the array of ACP elements.
14. The method of claim 12, further comprising:
- concentrating, via the array of ACP elements, electromagnetic energy from a Zenneck surface wave propagating along the terrestrial medium at a frequency (f_0);
 - extracting power from the concentrated electromagnetic energy from the Zenneck surface wave via the receiving structure; and
 - providing at least a portion of the extracted power to a load.

15. The method of claim 12, wherein the array of ACP elements is a cylindrical array with each of the one or more series of interconnected RRAAD elements linearly oriented in a ρ -direction.
16. The method of claim 12, wherein configuring the array of ACP elements comprises positioning a second plurality of RRAAD elements in a second horizontal layer above, and substantially parallel to, the horizontal layer of RRAAD elements distributed at the height above the terrestrial medium.
17. The method of claim 16, wherein the second plurality of RRAAD elements comprise one or more series of interconnected RRAAD elements extending in the first orientation.
18. The method of claim 16, wherein the second plurality of RRAAD elements comprise one or more series of interconnected RRAAD elements extending in a second orientation with respect to the first orientation.
19. The method of claim 12, wherein the array of ACP elements is a rectangular array with the one or more series of interconnected RRAAD elements of the first plurality of RRAAD elements linearly oriented in an x -direction and the one or more series of interconnected RRAAD elements of the second plurality of RRAAD elements linearly oriented in a y -direction substantially perpendicular to the x -direction.
20. The method of claim 12, wherein configuring the array of ACP elements comprises positioning a plurality of vertical lossless artificial anisotropic dielectric (VLAAD) elements distributed about the launching structure or the receiving structure, the plurality of VLAAD elements positioned above the terrestrial medium, the plurality of

VLAAD elements comprising one or more series of interconnected VLAAD elements extending in a second orientation substantially perpendicular to the horizontal layer.

21. The method of claim 12, can comprise configuring an array of horizontal artificial anisotropic magnetic permeability (HAAMP) elements about the launching structure or the receiving structure, the array of HAAMP elements comprising a plurality of HAAMP elements positioned above the terrestrial medium.
22. A guided surface wave system, comprising:
 - an array of anisotropic constitutive parameter (ACP) elements distributed above a terrestrial medium about a launching structure, the array of ACP elements comprising a first plurality of radial resistive artificial anisotropic dielectric (RRAAD) elements positioned above the terrestrial medium, the first plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in a first orientation, wherein the first plurality of the RRAAD elements forms a horizontal layer at a height above the terrestrial medium, where excitation of the array of ACP elements with an electromagnetic field produced by the launching structure at a frequency (f_0) substantially mode matches the electromagnetic field to a Zenneck surface wave mode of the terrestrial medium; and
 - a receiving structure configured to extract power from electromagnetic energy from a Zenneck surface wave propagating along the terrestrial medium from the launching structure.
23. The guided surface wave system of claim 22, wherein the array of ACP elements comprises a second horizontal layer of RRAAD elements positioned above, and substantially parallel to, the horizontal layer of RRAAD elements distributed at the height above the terrestrial medium, the second horizontal layer of RRAAD elements

comprising a second plurality of RRAAD elements positioned above the first plurality of RRAAD elements in the horizontal layer.

24. The guided surface wave system of claim 22, wherein the array of ACP elements comprises a second plurality of RRAAD elements positioned above the terrestrial medium, the second plurality of RRAAD elements comprising one or more series of interconnected RRAAD elements extending in a second orientation with respect to the first orientation, wherein the first plurality of the RRAAD elements and the second plurality of the RRAAD elements form the horizontal layer at the height above the terrestrial medium.
25. The guided surface wave system of claim 22, wherein the array of ACP elements comprises a plurality of vertical lossless artificial anisotropic dielectric (VLAAD) elements distributed above the terrestrial medium, the plurality of VLAAD elements positioned above the terrestrial medium, the plurality of VLAAD elements comprising one or more series of interconnected VLAAD elements extending in a second orientation substantially perpendicular to the horizontal layer.
26. The guided surface wave system of claim 22, comprising an array of horizontal artificial anisotropic magnetic permeability (HAAMP) elements distributed about the launching structure, the array of HAAMP elements comprising a plurality of HAAMP elements positioned above the terrestrial medium.
27. The guided surface wave system of claim 22, comprising a second array of ACP elements distributed above the terrestrial medium about the receiving structure, the second array of ACP elements configured to concentrate the electromagnetic energy from the Zenneck surface wave around the receiving

structure, wherein the receiving structure extracts power from the concentrated electromagnetic energy from the Zenneck surface wave.