CLAIMS

Therefore, the following is claimed:

1. A system, comprising:

a guided surface waveguide probe configured to launch a guided surface wave along a surface of a lossy conducting medium; and

a receiver configured to receive backscatter reflected by a remotely located object illuminated by the guided surface wave.

2. The system of claim 1, wherein the guided surface waveguide probe comprises a charge terminal elevated over a lossy conducting medium configured to generate at least one resultant field that synthesizes a wave front incident at a complex Brewster angle of incidence ($\theta_{i,B}$) of the lossy conducting medium.

3. The system of claim 2, wherein the charge terminal is one of a plurality of charge terminals.

4. The system of claim 2, wherein the guided surface waveguide probe comprises a feed network electrically coupled to the charge terminal, the feed network providing a phase delay (Φ) that matches a wave tilt angle (Ψ) associated with a complex Brewster angle of incidence ($\theta_{i,B}$) associated with the lossy conducting medium in the vicinity of the guided surface waveguide probe.

5. The system of claim 4, wherein the charge terminal is one of a plurality of charge terminals.

6. The system of claim 5, wherein the feed network is configured to impose a plurality of voltage magnitudes and a plurality of phases on the plurality of charge terminals to synthesize a plurality of fields that substantially match a guided surface-waveguide mode of the lossy conducting medium, thereby launching the guided surface wave.

7. The system of any of claims 1-6, wherein the guided surface waveguide probe is configured to launch a series of guided surface waves having a defined pulse duration at a defined repetition rate.

8. The system of any of claims 1-6, wherein the guided surface wave is a frequency modulated continuous wave.

9. The system of any of claims 1-8, wherein the remotely located object is on the surface of the lossy conducting medium.

10. The system of any of claims 1-8, wherein the remotely located object is above the surface of the lossy conducting medium.

11. The system of claim 10, wherein the remotely located object is a low flying aircraft.

12. The system of any of claims 1-11, comprising a plurality of guided surface waveguide probes configured to launch a plurality of guided surface waves along the surface of the lossy conducting medium.

13. The system of any of claims 1-12, comprising a plurality of receivers configured to receive backscatter reflected by the remotely located object illuminated by at least one guided surface wave.

14. The system of any of claims 1-13, wherein the lossy conducting medium is a terrestrial medium.

15. The system of any of claims 1-14, comprising a mobile vehicle including the receiver.

16. A method, comprising:

launching a guided surface wave along a surface of a lossy conducting medium by exciting a charge terminal of a guided surface waveguide probe; and

receiving backscatter reflected by a remotely located object illuminated by the guided surface wave.

17. The method of claim 16, wherein excitation of the charge terminal generates a resultant field that synthesizes a wave front incident at a complex Brewster angle of incidence ($\theta_{i,B}$) of the lossy conducting medium.

18. The method of any of claims 16 and 17, wherein the guided surface waveguide probe comprises a feed network electrically coupled to the charge terminal, the feed network providing a phase delay (Φ) that matches a wave tilt angle (Ψ) associated with a complex Brewster angle of incidence ($\theta_{i,B}$) associated with the lossy conducting medium in the vicinity of the guided surface waveguide probe.

19. The method of any of claims 16-18, wherein the guided surface waveguide probe is configured to launch a series of guided surface waves having a defined pulse duration at a defined repetition rate.

20. The method of any of claims 16-19, comprising determining a characteristic of the remotely located object based at least in part upon the backscatter.