With reference to Figures 2A and 2B, a drone 102 is maneuvering according to an azimuthal simulation trajectory 104 around radar 101. As mentioned above, according to the simulating vehicle trajectory, drone 102 may maneuvers from a point 110_1 to a point 110_2. At point 110_1 drone 102 is at an azimuthal angle φ_1 (i.e., relative to a reference direction 113) indicated by the double ark. At point 110_2 drone 102 is at an azimuthal angle φ_2. When drone 102 maneuvers from point 110_1 to point 110_2, drone 102 change the azimuth angle thereof by $\Delta\varphi$. The actual distance between point 110_1 and point 110_2 is d. Since drone 102 also employs signal delay and signal characterization to simulate distance and target characteristics, radar 101 receives signals simulating a target maneuvering from point 112_1 to point 112_2, corresponding to points 110_1 and 110_2 respectively. The distance between point 112_1 and point 112_2, is D.

With reference to Figure 2C and 2D, drone 102 is maneuvering according to an elevation simulation trajectory 116. At point 110_1 drone 102 is at an elevation angle of ϕ_1. At point 110_2 drone 102 is at an elevation angle of ϕ_2. When drone 102 maneuvers from point 110_1 to point 110_2, drone 102 change the elevation angle thereof by $\Delta\phi$. At point 110_1, the actual elevation, h, of drone 102, corresponds to an elevation angle of ϕ_1 at distance r'. Since drone 102 also employs signal delay and signal characterization to simulate distance and target characteristics, radar 101 receives signals simulating a target at point 112_1 and elevation H. At point 110_2, the actual elevation h+Δh of drone 102 corresponding to an elevation angle of ϕ_2 (indicated by the double arc) at distance r'. Since drone 102 also employs signal delay and signal characterization to simulate distance, radar 101 receives signals simulating a target at points 112_2 and elevation H+ΔH. In other words the change Δh in the elevation of drone 102 corresponds to a change ΔH in the elevation of the simulated target for a specific signal delay.

simulate effects that specific target characteristics such as Radar Cross Section may have on the amplitude of the signal received by the radar. Doppler shift profile 158 defines the Doppler shift in the frequency of the re-transmitted signal, caused by change in the simulated distance from the radar. In general, the Doppler shift is related to the rate of change (i.e., derivative) of the range the simulated target from the radar. However, since the signal delay is proportional to this simulated distance, the Doppler shift is related to the rate of change of the signal delay as well.

Reference is now made to Figure 4, which is a schematic illustration of a system, generally referenced 200, for simulating a trajectory of radar target, constructed and operative in accordance with a further embodiment of the disclosed technique. System 200 is located on a simulating vehicle 201 such as a drone 201. System 200 includes a receiving transducer 202, a transmitting transducer 204, a receiver 206, a transmitter 208, a processor 210, a memory 212, a position detector 214 and a vehicle maneuver controller 216. Processor 210 includes a signal delay 217 and a signal characterizer 218. Receiver 206 optionally includes an attenuator 205. Processor 210 is coupled with receiver 206, with transmitter 208 with memory 212 with position detector 214 and with vehicle maneuver controller 216. Receiver 206 is further coupled with receiving transducer 202. Transmitter 208 is further coupled with transmitting transducer 204.

Receiving transducer 202 may be an RF transducers (i.e., an antenna) an optical transducers (e.g., a photodiode, a Light Dependent Resistor - LDR and the like) or a sonic transducer (e.g., piezo electric transducer, a capacitive transducer, magnetorestrictive transducers and the like), corresponding to the type of signal employed by the radar. Similarly transmitting transducer 204 may be an RF transducers an optical transducers or a sonic transducer, corresponding to the type of signal

CLAIMS

1. A method for simulating a trajectory of a radar target comprising the procedures of:

determining a simulated trajectory of said simulated target;

determining a simulating vehicle trajectory for a simulating vehicle, said simulating vehicle trajectory being defined according to a simulation profile, said simulation profile at least including a spatial simulation profile and a signal delay profile, said spatial simulation profile including an azimuth simulation profile and an elevation simulation profile;

maneuvering said simulating vehicle according to said spatial simulation profile;

receiving a radar signal by said simulating vehicle; and

re-transmitting a signal toward the radar at least according to said signal delay profile.

2. The method according to claim 1, further including the preliminary procedure of determining the location of said radar in a reference coordinate system.

3. The method according to claim 1, wherein said maneuvering said simulating vehicle according to said spatial simulation profile includes determining motion characteristics of said simulating vehicle and determining motion control commands to said simulating vehicle.

4. The method according to claim 1, wherein said simulation profile further includes a signal characteristics profile,

wherein said re-transmitted signal is further characterized according to the said signal characteristics profile,

wherein said signal characteristics profile includes at least one of:

an amplitude profile which define the amplitude of said re-transmitted signal; and

a Doppler shift profile, which define a Doppler shift of the frequency of the re-transmitted signal.

5. The method according to claim 1, wherein said azimuth simulation profile defines the locations of said simulating vehicle, in a reference coordinate system over time,

wherein said elevation simulation profile defines the elevations of said simulating vehicle over time

wherein said signal delay profile defines the durations the received radar signal is delayed before re-transmitting, over time.

6. The method according to claim 1, wherein said simulating vehicle is an un-manned vehicle selected from the group consisting of:

a drone;

a remote control boat; and

a remote control vehicle.

7. The method according to claim 1, wherein said spatial simulation profile includes one of:

a list of coordinates and elevation of said simulating vehicle in a referenced coordinate system; and

a list of coordinates and elevation changes of said simulating vehicle in a referenced coordinate system.

8. The method according to claim 1, wherein said simulating vehicle trajectory being at a range from said radar smaller than the radar minimum detection range.

9. A system for simulating a trajectory of a radar target comprising:

a simulating vehicle including:

a receiving transducer, receiving signals from said radar and transforming the received signal to an electric received signal;

a receiver, coupled with said receiving transducer, said receiver receiving said electric received signal and at least sampling said electric received signal to produce a sampled received signal;

a position detector, for determining the current position of said simulating vehicle;

a transmitter, converting a re-transmission signal to an analog signal;

a transmitting transducer, coupled with said transmitter, for transforming said analog signal into a transmitted signal; and

a processor, coupled with said receiver, with said transmitter and with said position detector, said processor at least including a signal delay, said processor receiving said sampled received signal and producing said re-transmission signal at a delay defined by a signal delay profile, said processor further determining motion characteristics of said simulating vehicle according to a spatial simulation profile and said current position of said simulating vehicle, said spatial simulation profile defining the trajectory of said simulating vehicle, said spatial simulation profile including an azimuth simulation profile and an elevation simulation profile.

10. The system according to claim 9, further including a vehicle maneuver controller, coupled with said processor, for determining motion control commands to the vehicle maneuvering controller according to said motion characteristics.

11. The system according to claim 9, wherein said processor further including a signal characterizer for characterizing said re-transmitted signal according to a signal characteristics profile,

wherein signal characteristics profile includes at least one of:

an amplitude profile which define the amplitude of said re-transmitted signal; and

a Doppler shift profile, which define a Doppler shift of the frequency of the re-transmitted signal.

12. The system according to claim 9, wherein said azimuth simulation profile defines the locations of the simulating vehicle in a reference coordinate system, over time

wherein said elevation simulation profile defines the elevations of said simulating vehicle over time

wherein said signal delay profile defines the durations the received radar signal is delayed before re-transmitting, over time.

13. The system according to claim 9, wherein said receiver including an attenuator which attenuates the signals received from said receiving transducer.

14. The system according to claim 9, wherein said simulating vehicle is an un-manned vehicle selected from the group consisting of:

a drone;

a remote control boat; and

a remote control vehicle.

15. The system according to claim 9, wherein said spatial simulation profile includes one of:

a list of coordinates and elevation of said simulating vehicle in a referenced coordinate system; and

a list of coordinates and elevation changes of said simulating vehicle in a referenced coordinate system.

16. The system according to claim 9, wherein said simulating vehicle trajectory being at a range from said radar smaller than the radar minimum detection range.