Claims

1. A marine radar apparatus, the apparatus ~~comprising means for generating Doppler information (24) to enable targets of different speeds to be identified the apparatus~~ being arranged to propagate continuously repeating groups of pulses of energy towards targets and to receive groups of pulses of energy reflected back by the targets, in which each group of pulses includes three pulses (A, B, C) of different widths in which there is a spacing between each of the pulses, the shorter pulse (A) enabling detection of close range targets and the longer pulses (B, C) enabling detection of longer range targets wherein the different length pulses are encoded differently from one another; the apparatus comprising means for generating Doppler information (24) from said received groups of pulses of energy so as to enable targets of different speeds to be identified.

2. An apparatus according to claim 1 for displaying signals from smaller marine targets including buoys, pleasure~~s~~ boats and fast attack craft.

3. An apparatus according to claim 1 or 2 in which each group of pulses has three pulses with pulse widths of between 0.1 μs and 33 μs.

4. An apparatus according to any preceding claim in which the shorter pulse (A) has a width of approximately 0. 1 μs.

5. An apparatus according to any preceding claim in which the longest pulse (C) has a width of approximately 33 μs.

6. An apparatus according to any preceding claim comprising a signal processor which generates the Doppler information.

7. An apparatus according to claim 6 in which the signal processor comprises a Doppler filter bank.

8. An apparatus according to claim 7 in which the Doppler filter bank comprises a bank of bandpass filters.

9. An apparatus according to claims 6 or 7 in which the signal processor further comprises an I/Q splitter block, a pulse compressor, and a decimate block.

10. An apparatus according to any preceding claim in which the longer pulses (B, C) are frequency encoded.

11. An apparatus according to any preceding claim in which the longer pulses (B, C) are frequency coded by a non-linear frequency modulation.

12. An apparatus according to any preceding claim in which the shortest pulse (A) is a continuous wave signal and the other two pulses (B, C) have a frequency modulated chirp, one being a chirp up and the other being a chirp down.

13. An apparatus according to any preceding claim **characterised in that** the apparatus is arranged to subject the longer pulses (B, C) to pulse compression on reception and to subject the shorter pulse (A) to low pass filtering.

14. An apparatus according to any preceding claim in which the pulses in each group (A, B, C) have the same amplitude.

15. An apparatus according to any previous claim for use on a vessel, the apparatus having a low output power to reduce the risk of detection of the vessel carrying the radar.

16. An apparatus according to any preceding claim having an output power of approximately 190w.

17. A method of detecting marine targets comprising the steps of transmitting continuously repeating groups of pulses towards targets and receiving radar energy signals reflected by the targets, in which each group of pulses includes three pulses (A, B, C) of different widths with a spacing between each of the pulses, the shorter pulse (A) enabling detection of close range targets and the longer pulses (B, C) enabling detection of longer range targets wherein the different length pulses are encoded differently from one another, the method comprising the further step of processing saidthe received

radar energy signals and generating Doppler information (24) from said received signals so as to enable targets of different speeds to be identified.

18. A method according to claim 17 for receiving radar energy reflected by from smaller marine targets including buoys, pleasures boats and fast attack craft.

19. A method according to claim 17 or 18 comprising the step of generating and transmitting a group of pulses having three pulses with pulse widths of between 0.1 μs and 33 μs.

20. A method according to any preceding method claim comprising the step of processing the received signals with a Doppler filter bank.

21. A method according to any preceding method claim in which the longer pulses (B, C) are frequency encoded.

22. A method according to any preceding method claim in which the longer pulses (B, C) are frequency coded by a non-linear frequency modulation.

23. A method according to any preceding method claim in which the shortest pulse (A) is a continuous wave signal and the other two pulses (B, C) have a frequency modulated chirp, one being a chirp up and the other being a chirp down.