We Claim:

1. A method for detecting a clutter return at a sensor, in particular in a radar system, the method comprising:-

a) receiving a signal comprising
a return from a first range cell (206) and
a return from a second range cell (208);

b) filtering the return from the first range cell (206) according to frequency to determine:

a component (226) of the return from the first range cell (206) that is in a first frequency band and
a component (216) of the return from the first range cell (206) that is in a second frequency band,

c) filtering the return from the second range cell (208) according to frequency to determine
a component (218) of the return from the second range cell (208) that is in the second frequency band,

d) calculating from

I the magnitude of the component (216) of the return from the first range cell (206) that is in the second frequency band; and
II the magnitude of the component (218) of the return from the second range cell (208) that is in the second frequency band,
an estimated clutter residue in the component (226) of the return from the first range cell (206) that is in the first frequency band,

such that the estimated clutter residue in the component (226) of the return from the first range cell (206) that is in the first frequency band may be discarded

further comprising at step d), calculating the estimated clutter residue by determining which of the components in the second frequency band has the maximum magnitude.

2. A method according to claim 1 further comprising:-

at step a) receiving a return from a third range cell;

at step c) filtering the return from the third range cell according to frequency to determine a component of the return from the third range cell that is in the second frequency band; and

at step d) calculating from

III the magnitude of the component of the return from the third range cell that is in the second frequency band,

the estimated clutter residue in the component (226) of the return from the first range cell (206) that is in the first frequency band.

3. A method according to claim 2 wherein the second range cell (208) and the third range cell are immediately next to and either side of, the first range cell (206)

4. A method according to claim 1, 2 or 3 wherein the second frequency band is centred at zero and as such corresponds to zero-velocity clutter.

5. A method according to any one of the preceding claims further comprising at step d), subtracting the clutter residue from the first frequency-band components from the first range cell.

6. A method according to any one of the preceding claims wherein in steps b) and c) the received signal is filtered using at least one Doppler filter to obtain the component in the first frequency band and the component in the second frequency band.

7. A method according to claim 6 wherein the clutter residue for each range cell associated with each frequency component is calculated according to the following equation

$$residue(k_n) = \max [Signal_0(r-N), Signal_0(r-(N-1)), \ldots Signal_0(r)\ldots, Signal_0(r+(N-1)), Signal_0(r+N)] - imp(k_n)$$

where

$residue(k_n)$ is the clutter residue for a Doppler filter k_n

$Signal_0(r)$ is the low frequency component of the signal for the rth range cell
N is the number of range cells, either side of range cell r, that are referenced to calculate the estimated clutter residue in cell r.
$imp(k_n)$ is a predetermined offset for a Doppler filter k_n

8. A method according to any one of claims 1 to 5 wherein in steps b) and c) the received signal is passed through a Moving Target Indicator (MTI) filter.

9. A method according to any one of the preceding claims where, between step a) and step b) the received signals are phase rotated.

10. A method according to any of the preceding claims wherein at step a) receiving a signal involves receiving a burst of signals.

11. A computer program product comprising a computer readable medium, having thereon computer program code means which when loaded onto a computer and executed cause the computer to implement a method of detecting a clutter return at a sensor according to any one of claims 1 to 10.

12. A signal processor (100) for detecting a clutter return at a sensor, in particular in a radar system, the signal processor (100) comprising:

a) A receiver (10) for receiving a signal (1) comprising
a return from a first range cell (206) and
a return from a second range cell (208), the second range cell (208) being proximal to the first range cell (206);

b) a filter (30), operably connected to the receiver (10), for filtering the return from the first range cell (206) according to frequency to output

a component (226) of the return from the first range cell (206) that is in a first frequency band and

a component (216) of the return from the first range cell (206) that is in a second frequency band,

and for filtering the return from the second range cell (208) according to frequency, to output

a component (218) of the return from the second range cell (208) that is in the second frequency band,

c) a false alarm controller (50) comprising

A a residue prediction processor (82), operably connected to the filter (30), for calculating from

I the magnitude of the component (216) of the return from the first range cell (206) that is in a second frequency band; and

II the magnitude of the component (218) of the return from the second range cell (208) that is in the in the second frequency band,

the magnitude of a clutter residue in the component (226) of the return from the first range cell (206) that is in a first frequency band,

B a summer (85), operably connected to the residue prediction processor (82) and the filter (30), suitable for subtracting the estimated clutter residue from the return (226) from the first range cell (206) that is in a first frequency band.

13. A signal processor according to claim 12 wherein the filter (30) is a bank of Doppler filters.

14. A signal processor according to any one of claims 12 to 13 wherein a complex to log modulus processor (40) is interconnected between the filter (30) and the false alarm controller (50).

15. A signal processor according to any one of claims 12 to 14 wherein a processor (20), for compensating for platform and antenna motion is interconnected between the receiver (10) and the filter (30).

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