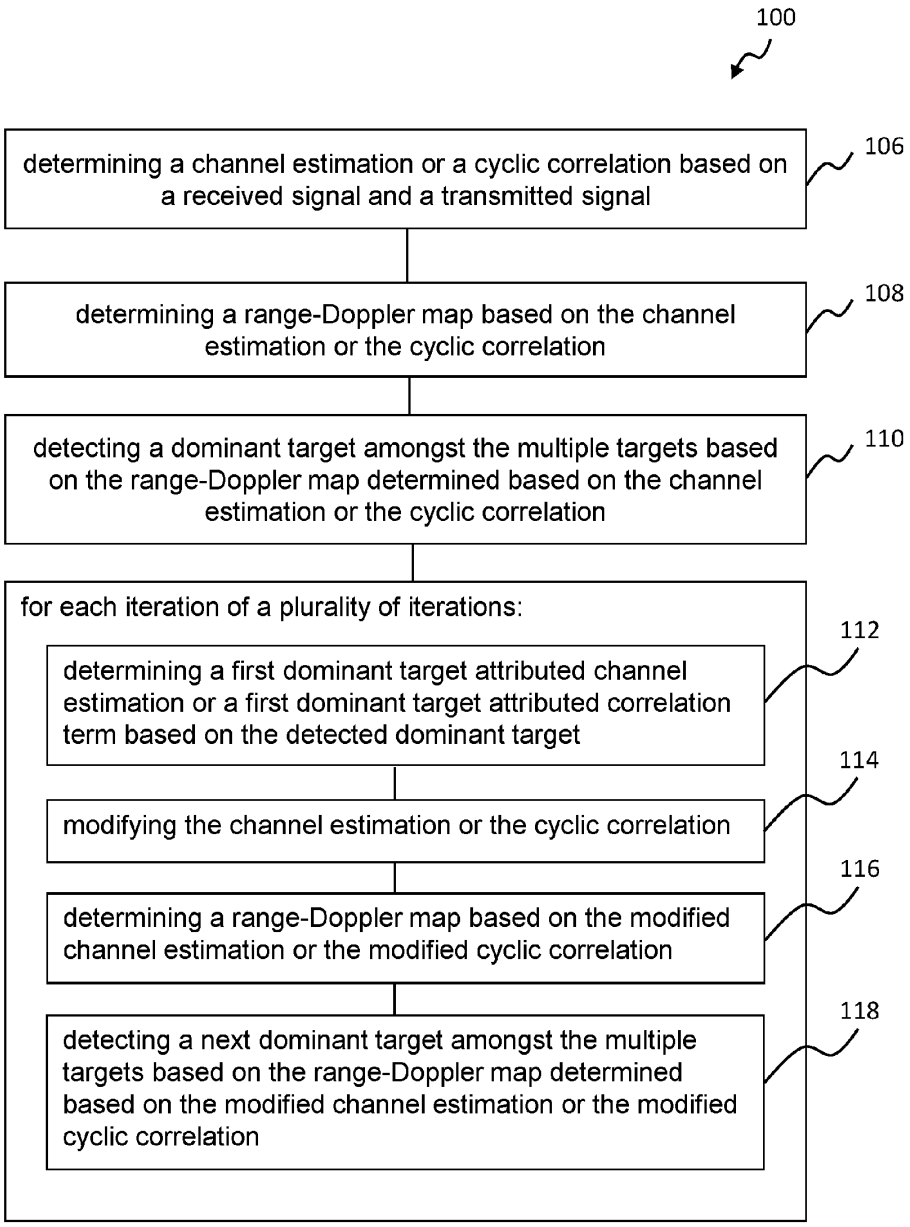
100
determining a channel estimation or a cyclic correlation based on a received signal and a transmitted signal
106
determining a range-Doppler map based on the channel estimation or the cyclic correlation
108
detecting a dominant target amongst the multiple targets based on the range-Doppler map determined based on the channel estimation or the cyclic correlation
110
for each iteration of a plurality of iterations:
determining a first dominant target attributed channel estimation or a first dominant target attributed correlation term based on the detected dominant target
112
modifying the channel estimation or the cyclic correlation
114
determining a range-Doppler map based on the modified channel estimation or the modified cyclic correlation
116
detecting a next dominant target amongst the multiple targets based on the range-Doppler map determined based on the modified channel estimation or the modified cyclic correlation
118

FIG. 1

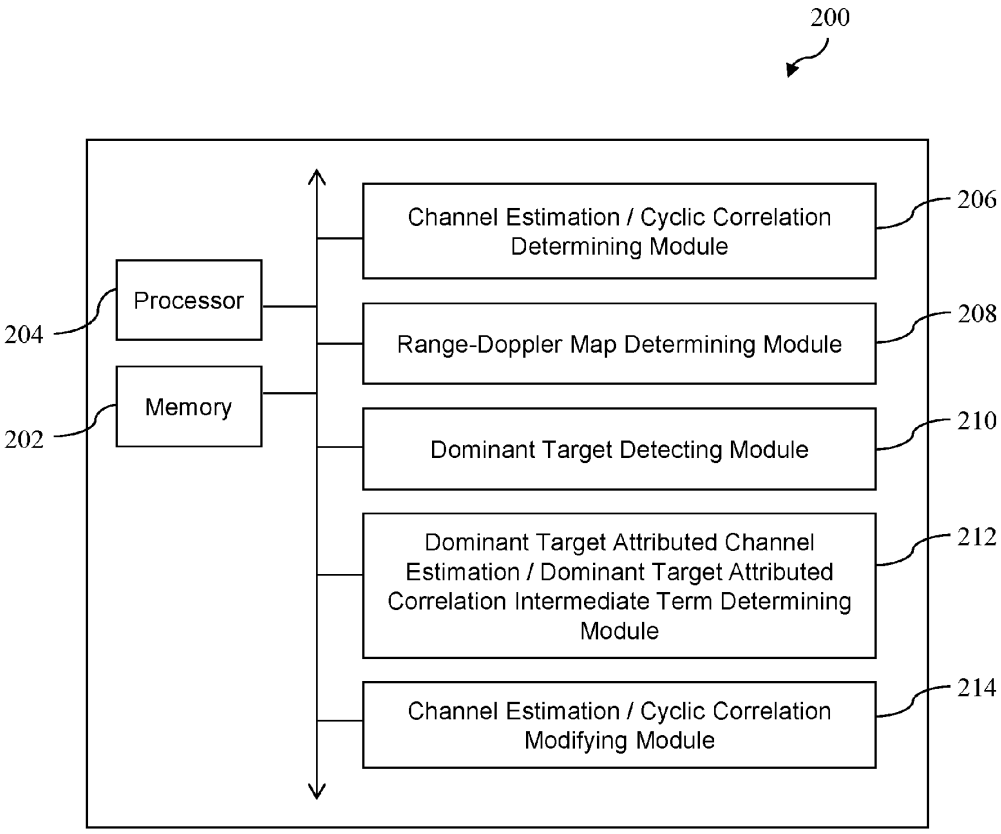
200
Channel Estimation / Cyclic Correlation Determining Module
206
Processor
204
Range-Doppler Map Determining Module
208
Memory
202
Dominant Target Detecting Module
210
Dominant Target Attributed Channel Estimation / Dominant Target Attributed Correlation Intermediate Term Determining Module
212
Channel Estimation / Cyclic Correlation Modifying Module
214

FIG. 2

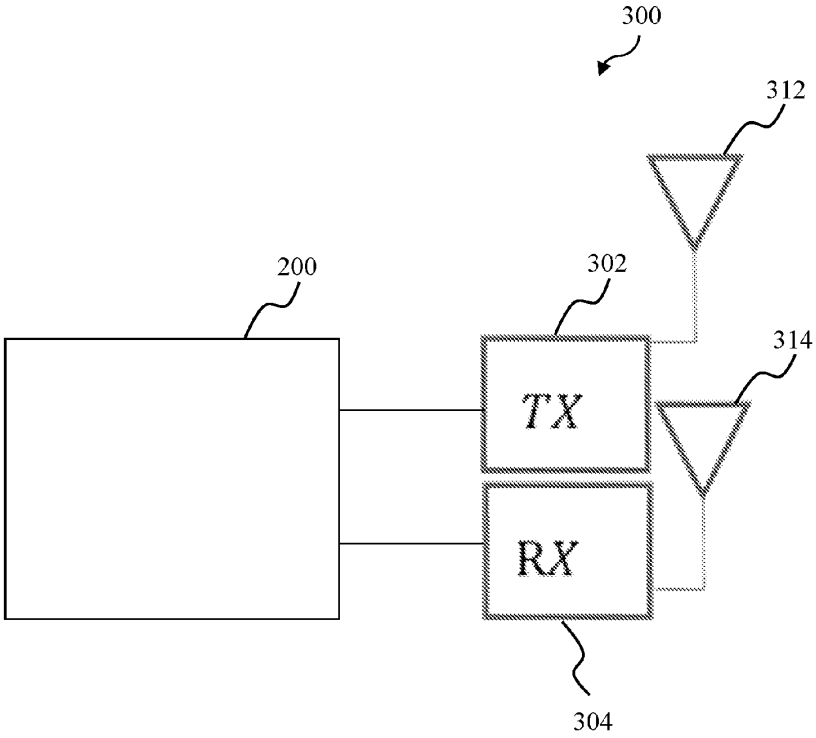

FIG. 3

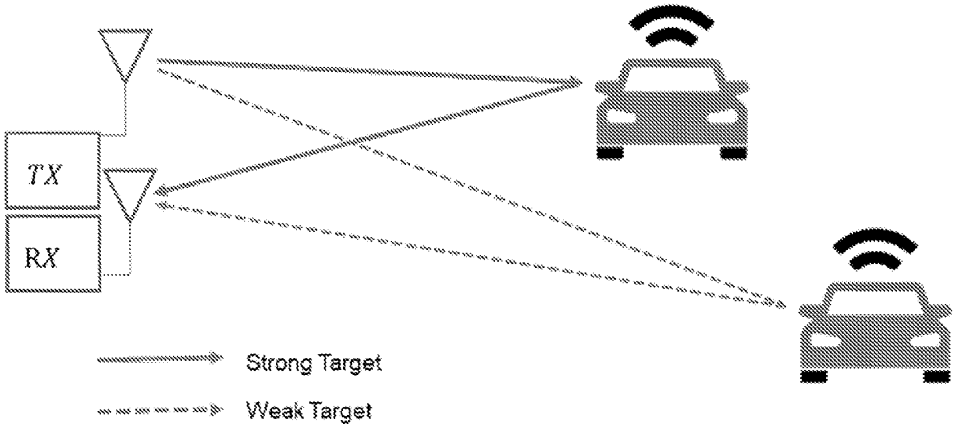

FIG. 4

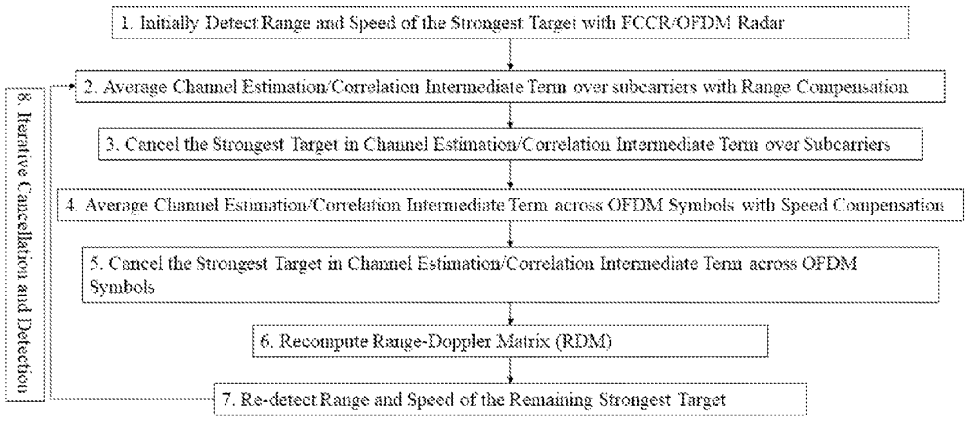
1. Initially Detect Range and Speed of the Strongest Target with FCCR/OFDM Radar
2. Average Channel Estimation/Correlation Intermediate Term over subcarriers with Range Compensation
3. Cancel the Strongest Target in Channel Estimation/Correlation Intermediate Term over Subcarriers
4. Average Channel Estimation/Correlation Intermediate Term across OFDM Symbols with Speed Compensation
5. Cancel the Strongest Target in Channel Estimation/Correlation Intermediate Term across OFDM Symbols
6. Recompute Range-Doppler Matrix (RDM)
7. Re-detect Range and Speed of the Remaining Strongest Target
8. Iterative Cancellation and Detection

FIG. 5

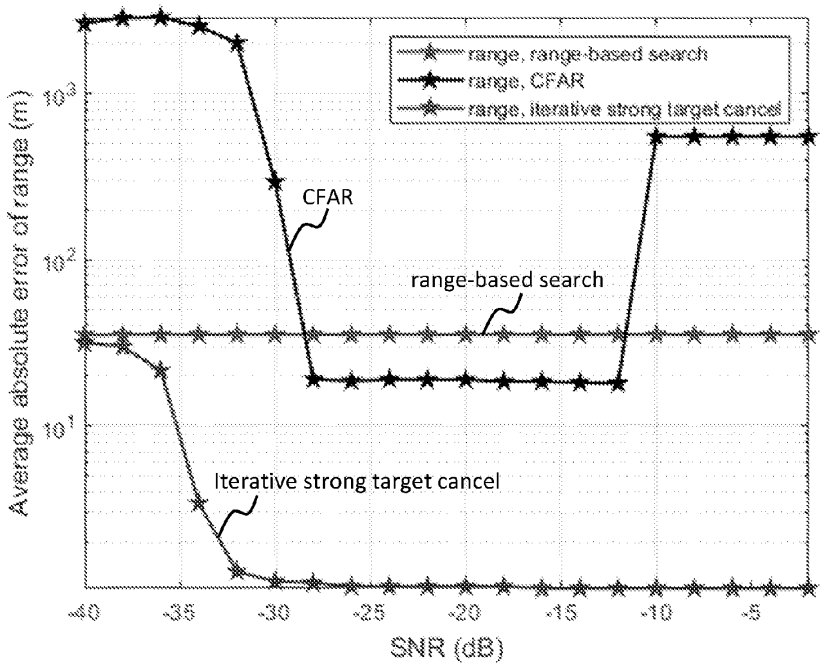
range, range-based search
range, CFAR
range, iterative strong target cancel
Average absolute error of range (m)
10^3
10^2
10^1
CFAR
range-based search
Iterative strong target cancel
-40
-35
-30
-25
-20
-15
-10
-5
SNR (dB)

FIG. 6

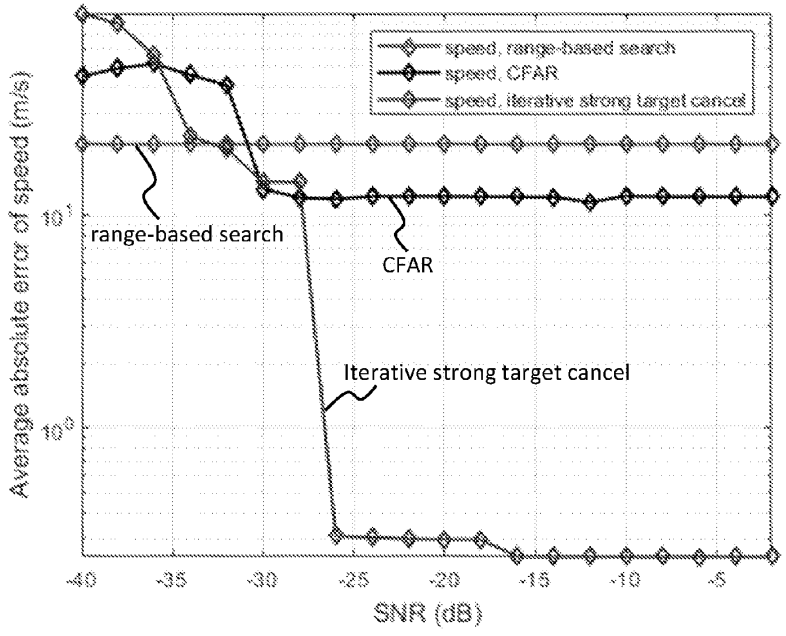
speed, range-based search
speed, CFAR
speed, iterative strong target cancel
Average absolute error of speed (m/s)
10^1
10^0
range-based search
CFAR
Iterative strong target cancel
-40
-35
-30
-25
-20
-15
-10
-5
SNR (dB)

FIG. 7

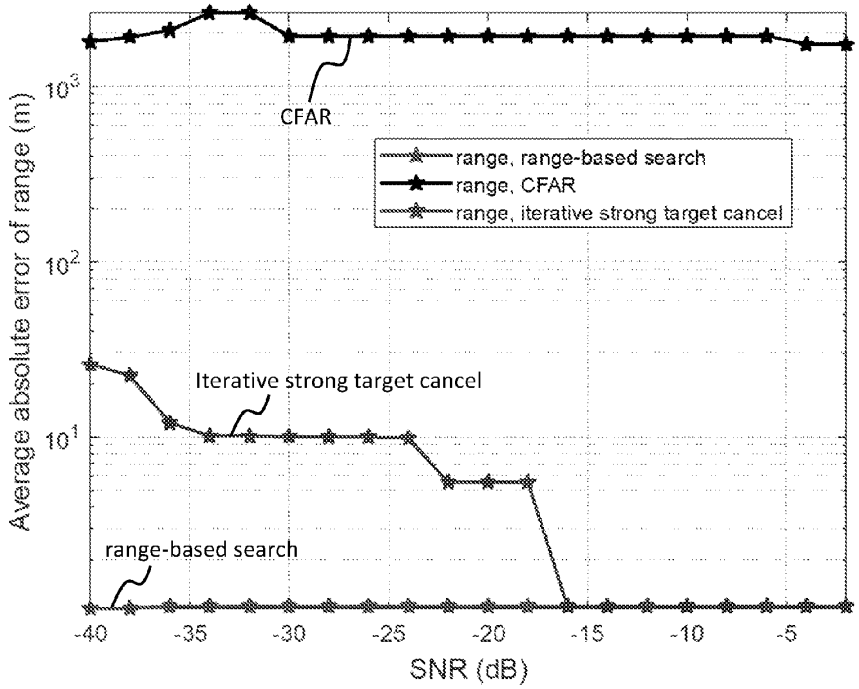
Average absolute error of range (m)
10^3
10^2
10^1
CFAR
range, range-based search
range, CFAR
range, iterative strong target cancel
Iterative strong target cancel
range-based search
-40
-35
-30
-25
-20
-15
-10
-5
SNR (dB)

FIG. 8

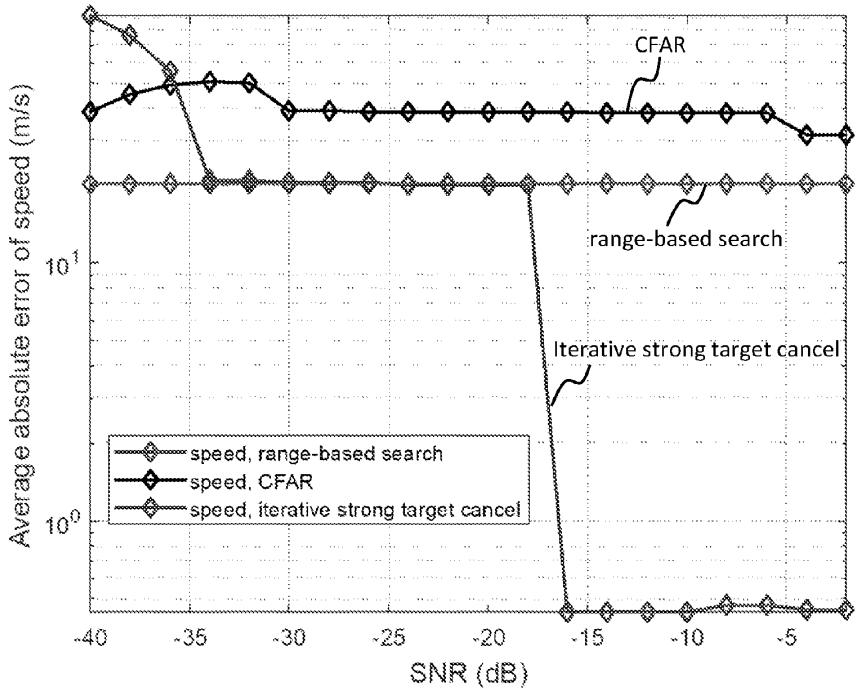
Average absolute error of speed (m/s)
10^1
10^0
CFAR
range-based search
Iterative strong target cancel
speed, range-based search
speed, CFAR
speed, iterative strong target cancel
-40
-35
-30
-25
-20
-15
-10
-5
SNR (dB)

FIG. 9

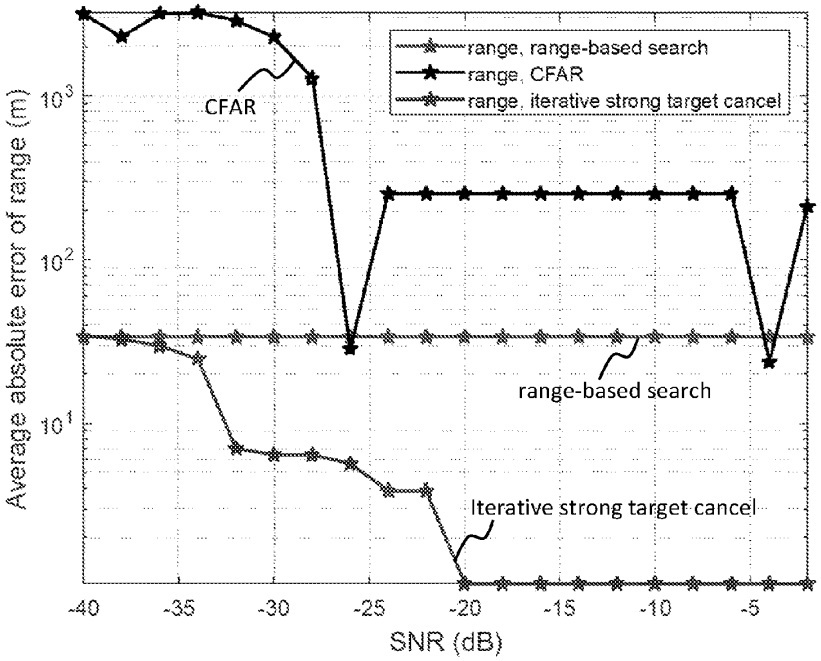
range, range-based search
range, CFAR
range, iterative strong target cancel
CFAR
range-based search
Iterative strong target cancel
Average absolute error of range (m)
SNR (dB)

FIG. 10

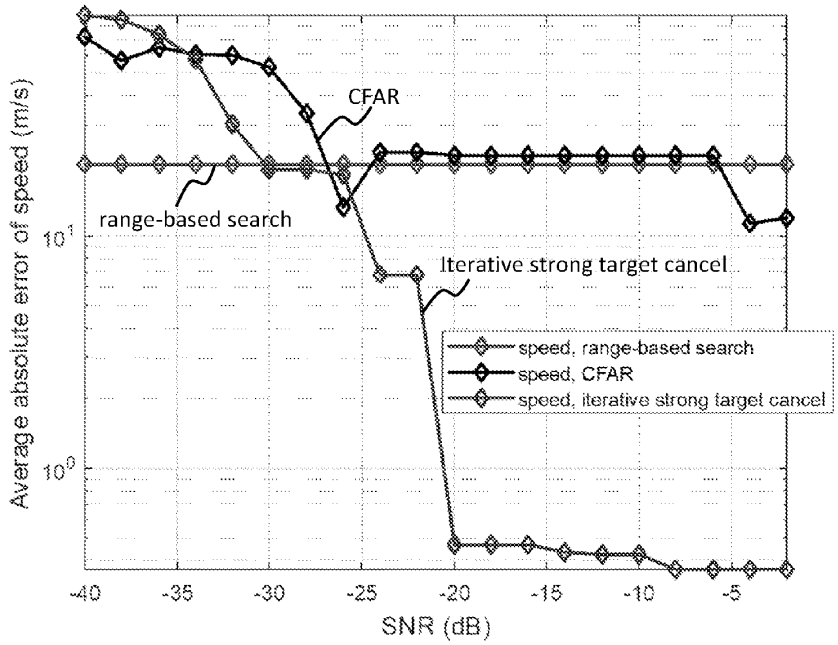
CFAR
range-based search
Iterative strong target cancel
speed, range-based search
speed, CFAR
speed, iterative strong target cancel
Average absolute error of speed (m/s)
SNR (dB)

FIG. 11

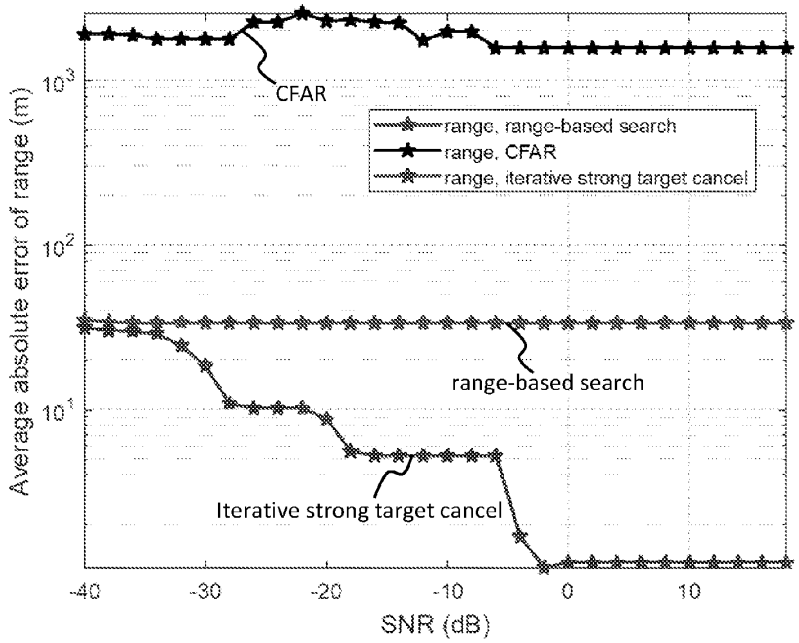
Average absolute error of range (m)
10^3
10^2
10^1
CFAR
range, range-based search
range, CFAR
range, iterative strong target cancel
range-based search
Iterative strong target cancel
-40
-30
-20
-10
0
10
SNR (dB)

FIG. 12

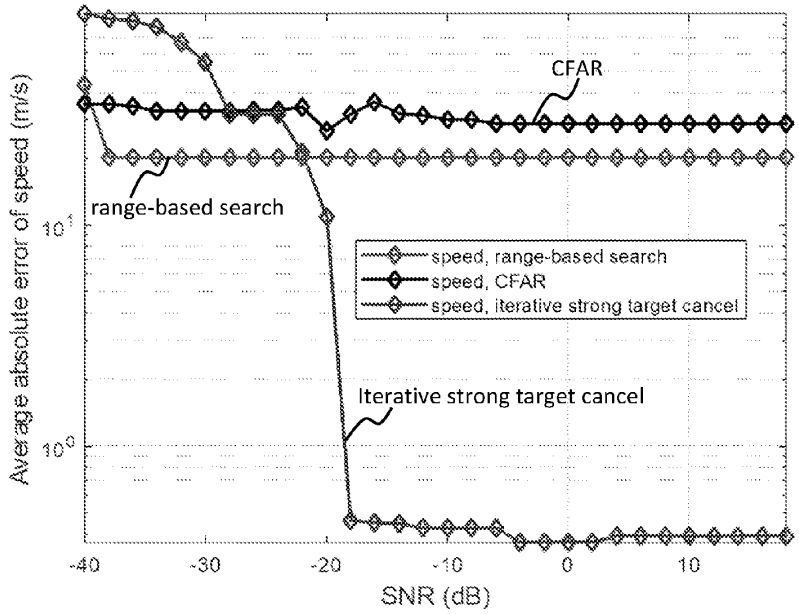
Average absolute error of speed (m/s)
10^1
10^0
CFAR
range-based search
speed, range-based search
speed, CFAR
speed, iterative strong target cancel
Iterative strong target cancel
-40
-30
-20
-10
0
10
SNR (dB)

FIG. 13

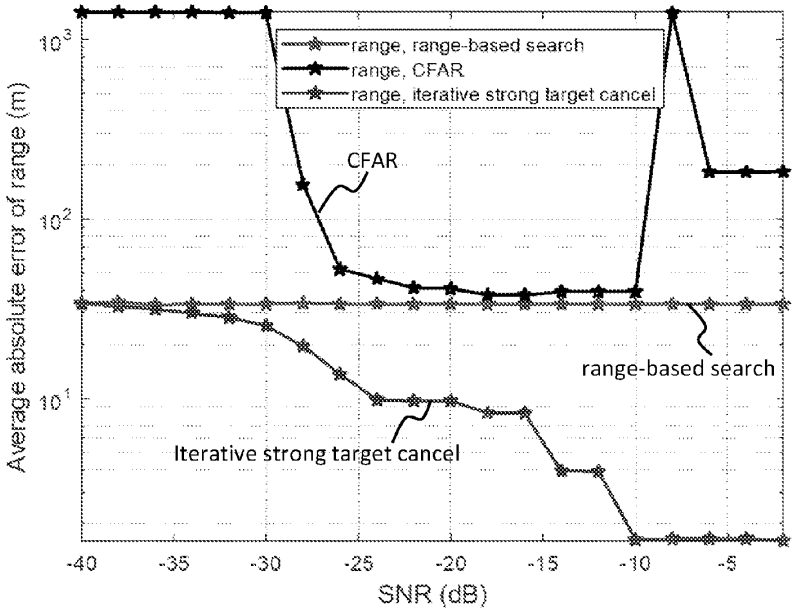
range, range-based search
range, CFAR
range, iterative strong target cancel
CFAR
range-based search
Iterative strong target cancel
Average absolute error of range (m)
SNR (dB)

FIG. 14

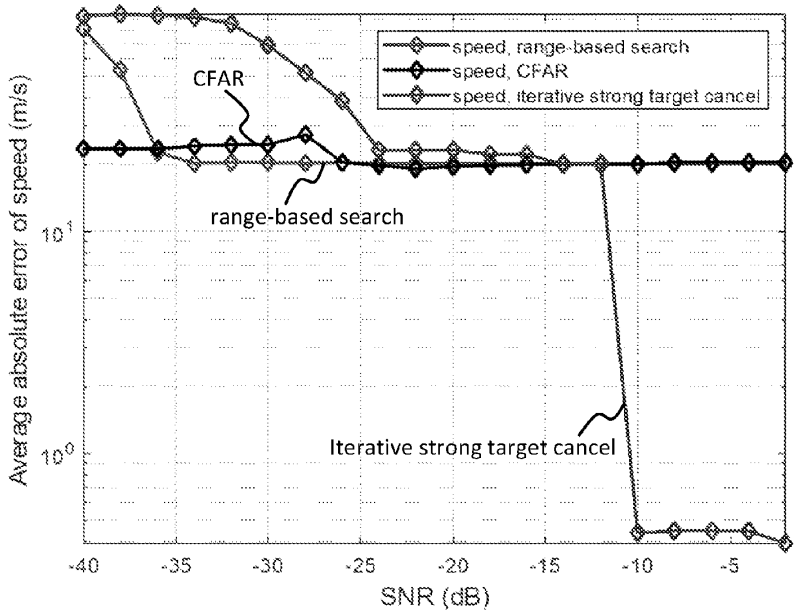
speed, range-based search
speed, CFAR
speed, iterative strong target cancel
CFAR
range-based search
Iterative strong target cancel
Average absolute error of speed (m/s)
SNR (dB)

FIG. 15