

Supplementary Materials (including eight figures)

Autonomous search of radioactive sources through mobile robots

Supplementary Materials 1 : The estimation results of radioactive sources when the number of measurements $N = 5$ and angular velocity $\omega = 0.1\text{rad/s}$.

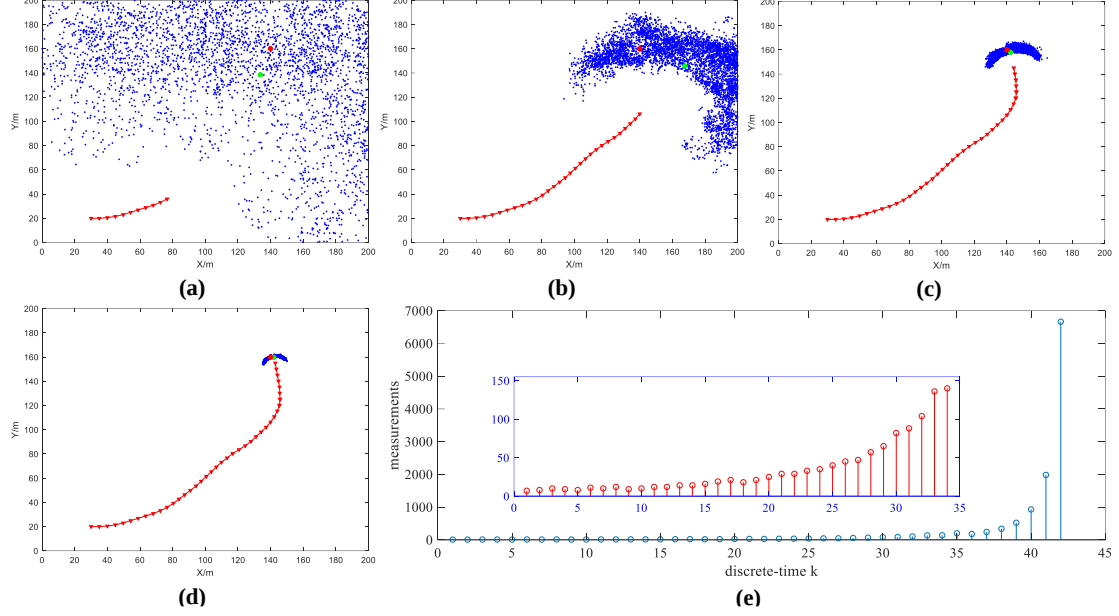


Figure S1. The estimation results of radioactive sources when the number of measurements $N = 5$ and angular velocity $\omega = 0.1\text{rad/s}$ (a) $k = 11$, (b) $k = 30$, (c) $k = 40$, (d) $k = 42$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 2 : The estimation results of radioactive sources when the number of measurements $N = 10$ and angular velocity $\omega = 0.1\text{rad/s}$.

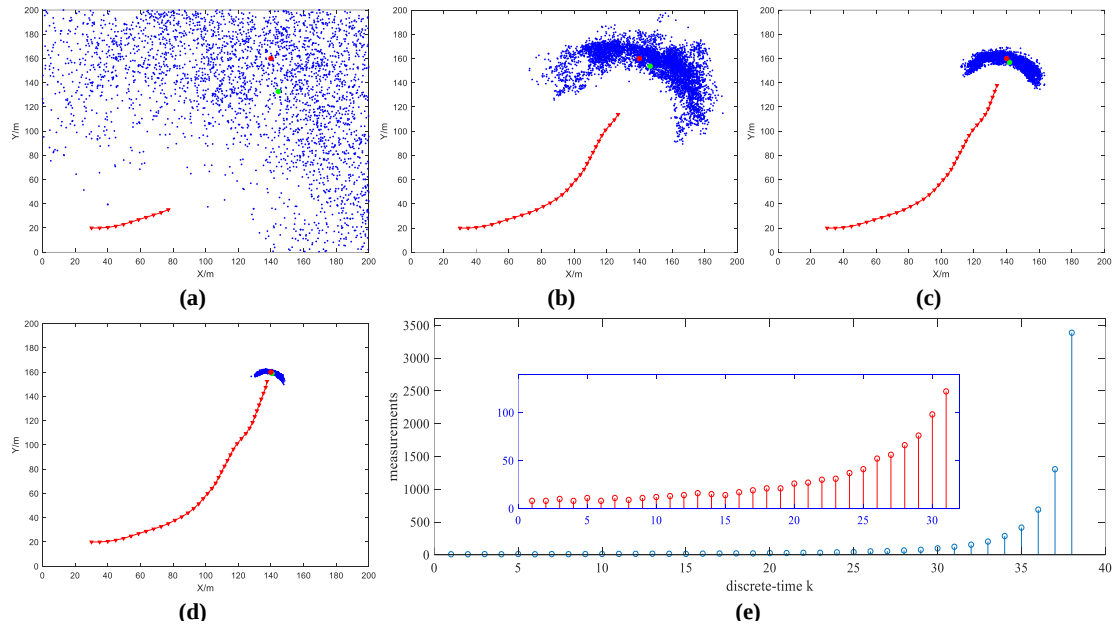


Figure S2. The estimation results of radioactive sources when the number of measurements $N = 10$ and angular velocity $\omega = 0.1\text{rad/s}$ (a) $k = 11$, (b) $k = 30$, (c) $k = 35$, (d) $k = 38$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 3 : The estimation results of radioactive sources when the number of measurements $N = 15$ and angular velocity $\omega = 0.1\text{rad/s}$.

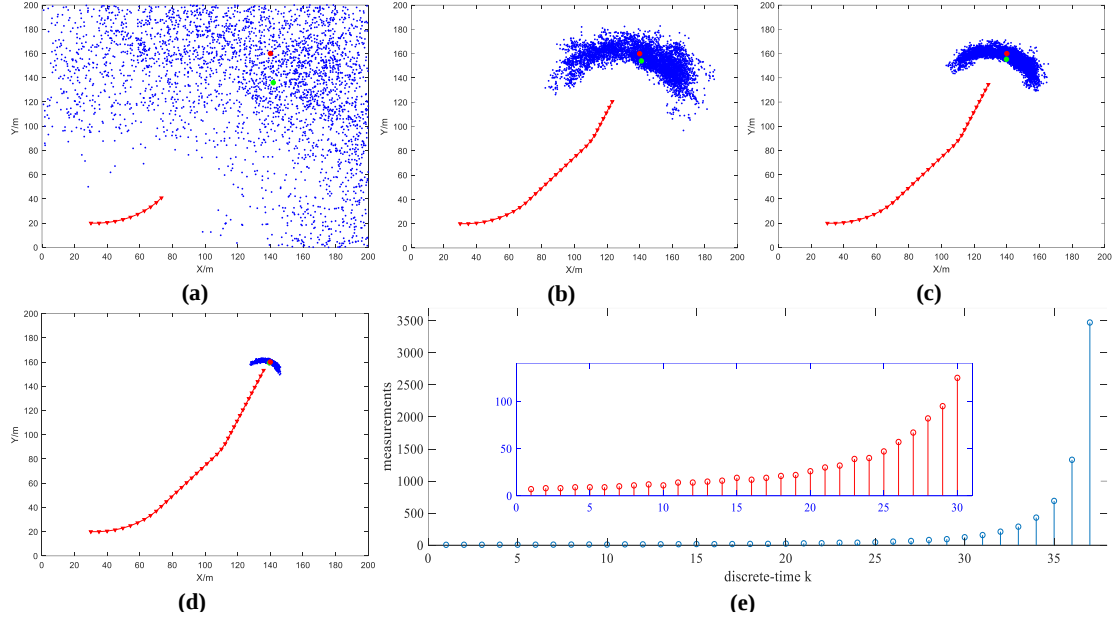


Figure S3. The estimation results of radioactive sources when the number of measurements $N = 15$ and angular velocity $\omega = 0.1\text{rad/s}$ (a) $k = 11$, (b) $k = 30$, (c) $k = 33$, (d) $k = 37$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 4 : The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.1\text{rad/s}$.

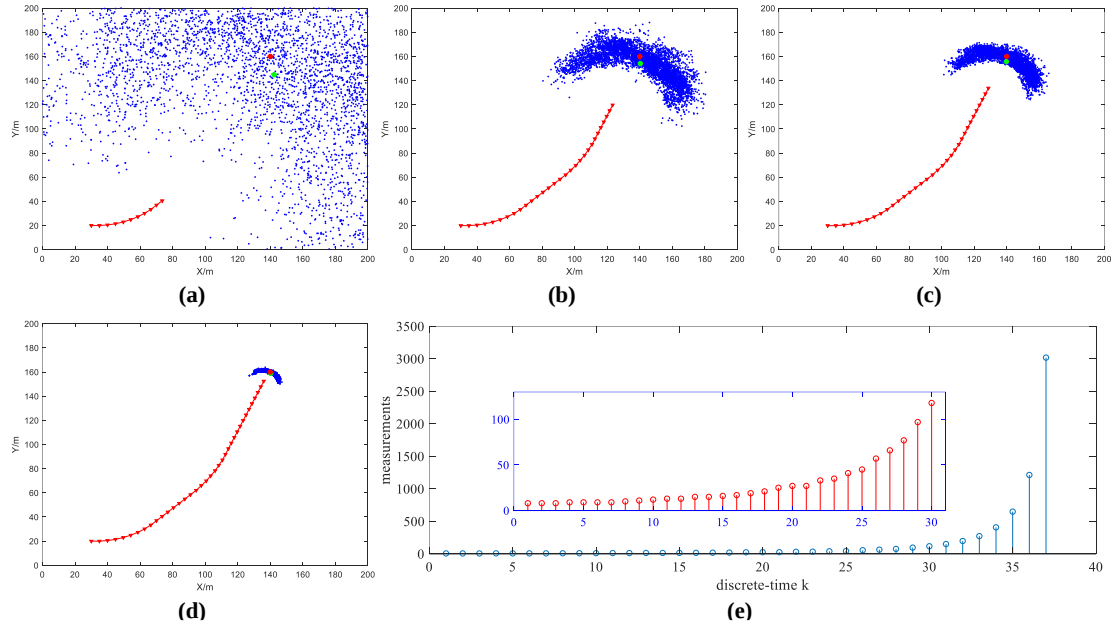


Figure S4. The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.1\text{rad/s}$ (a) $k = 11$, (b) $k = 30$, (c) $k = 33$, (d) $k = 37$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 5 : The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.3rad/s$.

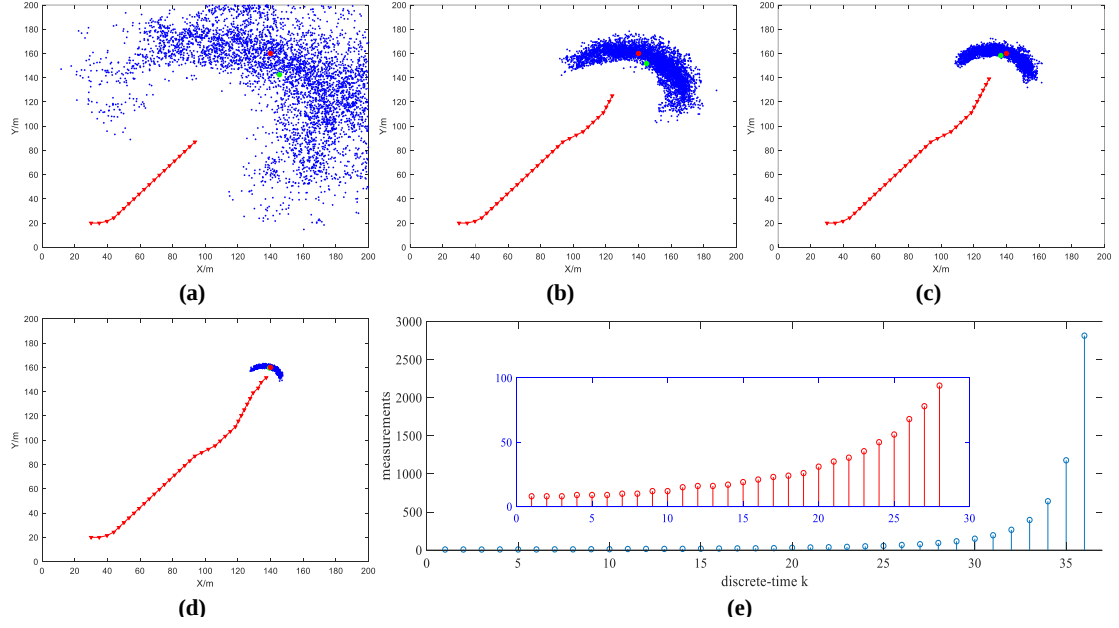


Figure S5. The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.3rad/s$ (a) $k = 20$, (b) $k = 30$, (c) $k = 33$, (d) $k = 36$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 6 : The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.5rad/s$.

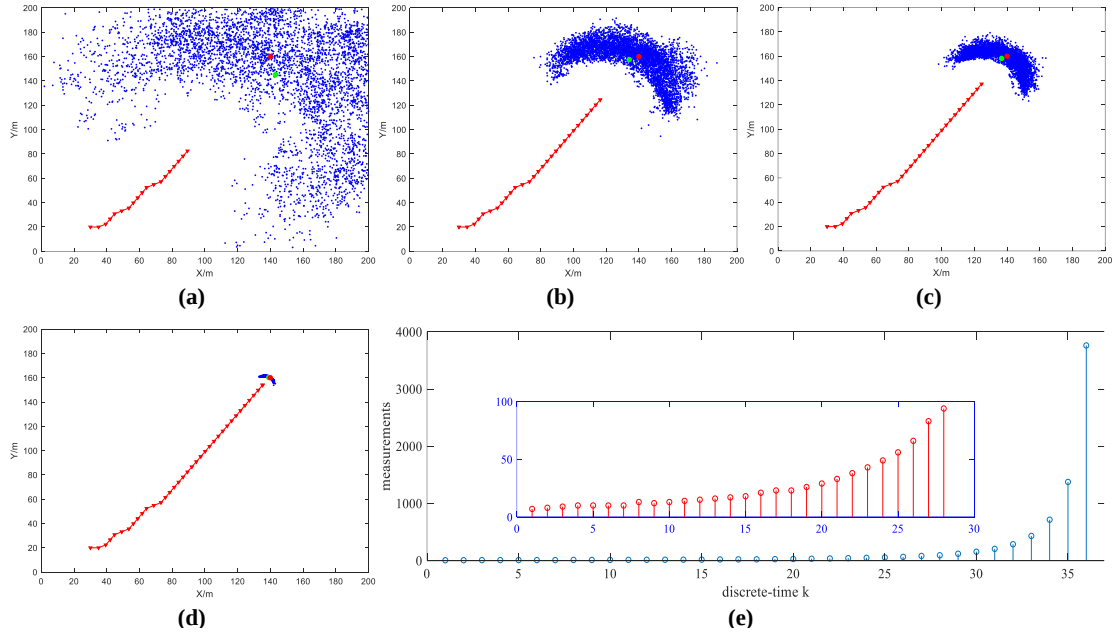


Figure S6. The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.5rad/s$ (a) $k = 20$, (b) $k = 30$, (c) $k = 33$, (d) $k = 36$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 7 : The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.9rad/s$.

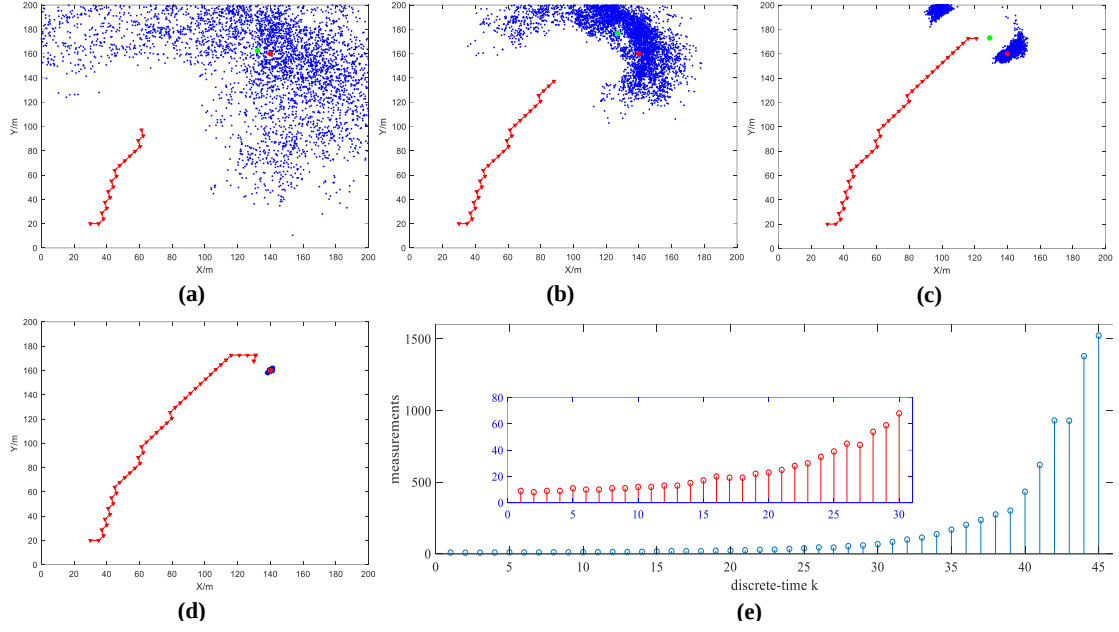


Figure S7. The estimation results of radioactive sources when the number of measurements $N = 20$ and angular velocity $\omega = 0.9rad/s$ (a) $k = 20$, (b) $k = 30$, (c) $k = 40$, (d) $k = 45$. Figure (e) shows the measured value z_k obtained during the search of the radioactive source.

Supplementary Materials 8: Real experiment results

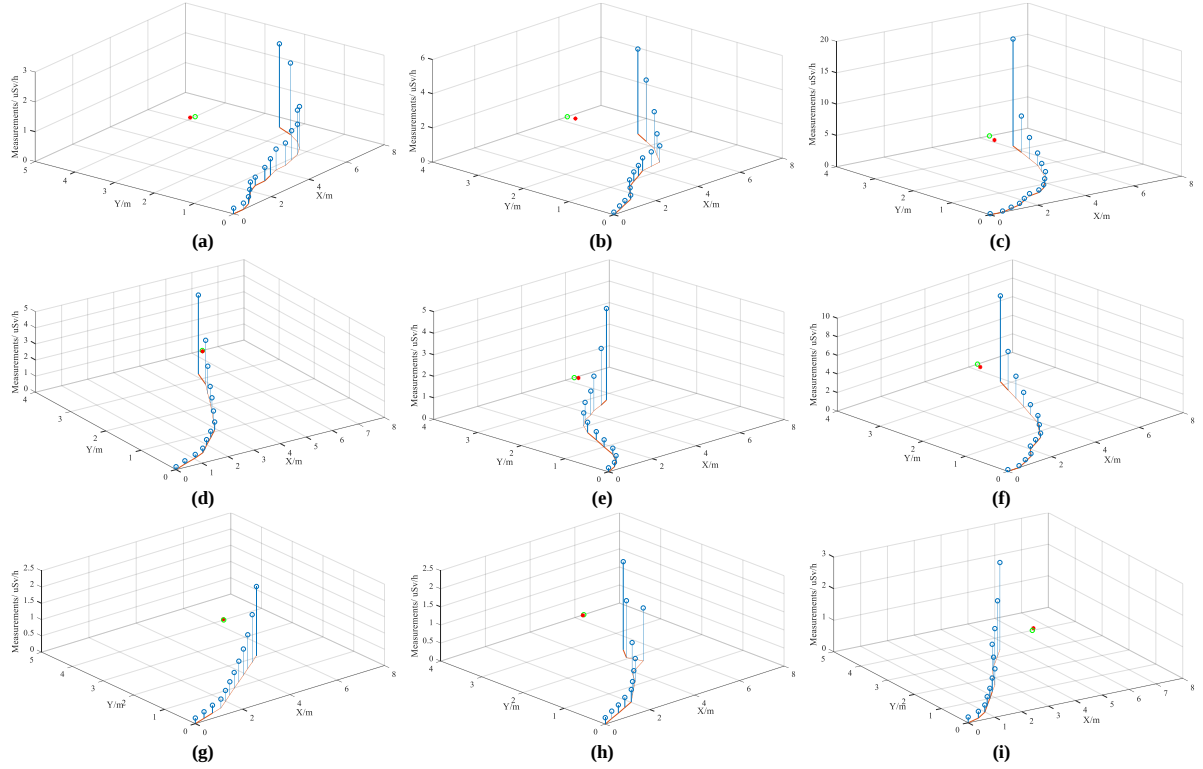


Figure S8. Real experiment results. When angular velocity $\omega = 0.1rad/s$, the results of (a) $N = 1, v = 0.1m/s$, (b) $N = 1, v = 0.15m/s$, (c) $N = 1, v = 0.2m/s$, (d) $N = 2, v = 0.1m/s$, (e) $N = 2, v = 0.15m/s$, (f) $N = 2, v = 0.2m/s$, (g) $N = 3, v = 0.1m/s$, (h) $N = 3, v = 0.15m/s$, (i) $N = 3, v = 0.2m/s$. In the figure, the green circle indicates the true position of the radioactive source, the red “*” indicates the estimated position of the radioactive source, the red line indicates the robot search path.