

Performance analysis of multisite radar systems



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1. Problem

Goal: satisfy requirements of single target localization by radar network for the entire strategic area



Challenges:
- Measurement accuracy
- Minimize number of radars (system cost)
- Multiple parameters of optimization

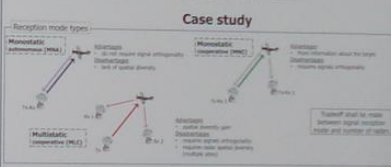
Scope:
- Increase number of radars & use autonomous mode
- Decrease number of radars & use cooperative mode

3. Results

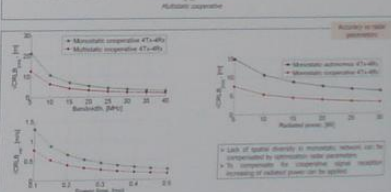
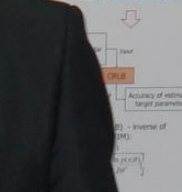
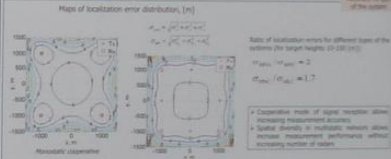
Signal model
$$s(t) = e^{j(\omega_c t + 2\pi f_d t^2 + 2\pi f_d t + \phi)}$$

CRLB for FMCW radar
$$\text{Var}(t) = \frac{3}{8} \frac{1}{\pi^2 f_d^2 SNR}$$

$$\text{Var}(f_d) = \frac{6}{\pi^2 f_d^3 SNR}$$



2. Approach



4. Conclusions

- We have shown that:
1. Multistatic system provides up to 30% better measurement accuracy compared to monostatic one.
2. Cooperative mode of signal reception gives up to 2 times less measurement error compared to autonomous one.
3. Change of parameters of each radar in the network allows increasing of measurement accuracy without changing system reception mode and configuration.

Mission Driven System Design for Reconfigurable Radars and Antennas

