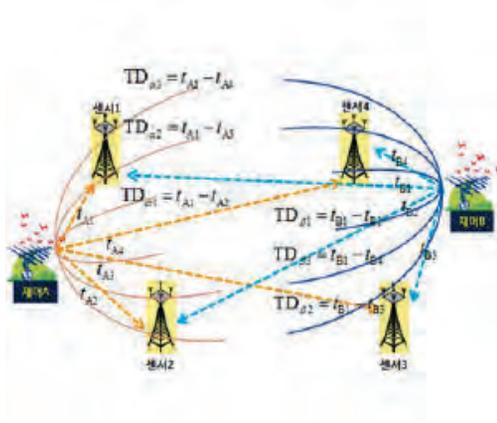


05

Localization method of multiple jammers



Inventor

Senior researcher, Deok-won Lim

Team

Satellite Navigation Team

Status of right

- US : 8587478
- US : 14/763465

Title

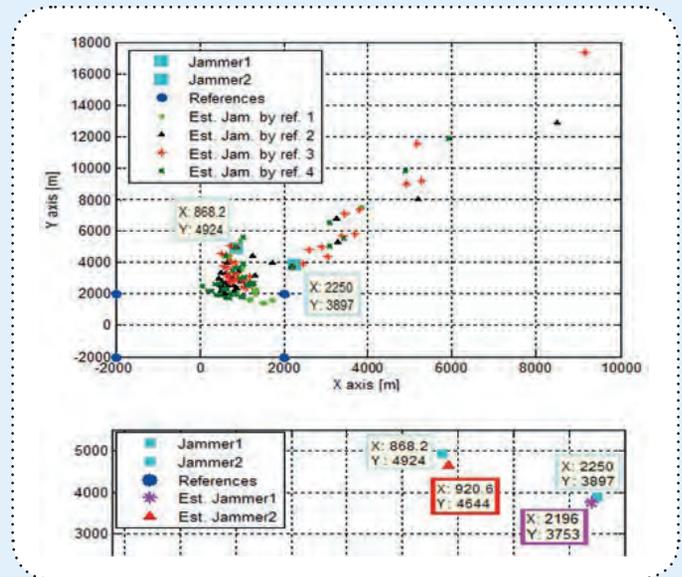
- LOCALIZATION METHOD OF MULTIPLE JAMMERS BASED ON TDOA METHOD
- DISTURBANCE SIGNAL DETECTION APPARATUS AND METHOD

TLO of the KARI

Person-in-charge
 Senior Administrator Moon-Hee, Cho
 E-mail : moonyp@kari.re.kr
 R&D Performance Diffusion Division

Outline of Technology

A device and method capable of localizing multiple jammers using a time difference of signal arrival (TDOA)



Technical features and advantages

Distinctiveness

- A procedure of localizing jammers is reduced by only searching a quadrant having an actual jammer among coordinates where location solutions are shown and excluding other quadrants from the searching range.

Technical features and advantages

Technical effects

- Accurate detection of locations of multiple jammers, and secure operation of a system are possible.

Prior art

All the combinations of true TDOA measured values and false TDOA measured values for estimating locations of multiple jammers → Localization is not possible because the estimated values of locations of jammers do not converge at one location, but are spread broadly.

Subject technology

An average value of true estimated values converges near multiple actual jammers

Flowchart of localization algorithm of multiple jammers

Technical detail

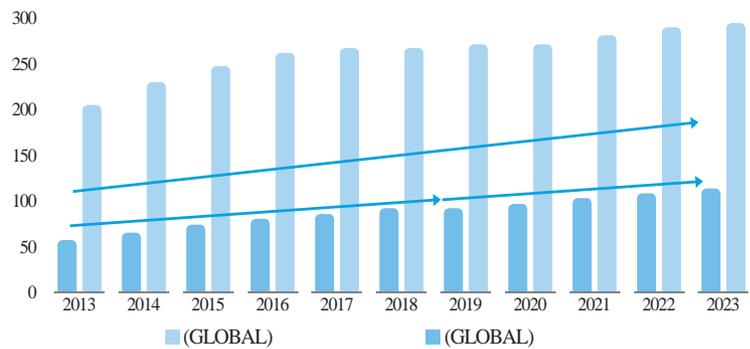
Flowchart of localization algorithm of multiple jammers

1. Multiple sensors for receiving GPS signal are arranged, and TDOA measurements are obtained while a reference sensor is changed in order among the multiple sensors.
2. Location solutions of multiple jammers are estimated using the obtained TDOA measurements.
3. The estimated location solutions of multiple jammers are shown in the coordinates set in reference to each sensor.
4. A searching interval and a searching range with respect to a quadrant having the highest density of the location solutions shown in the coordinates are decided, and a cell including all true location solutions corresponding to the number of sensors is searched while shifting by searching intervals.
5. Each average value of distances between the true location solutions in the searching cells having the true location solutions are calculated to define the number of jammers, and location solutions of the jammers are calculated.

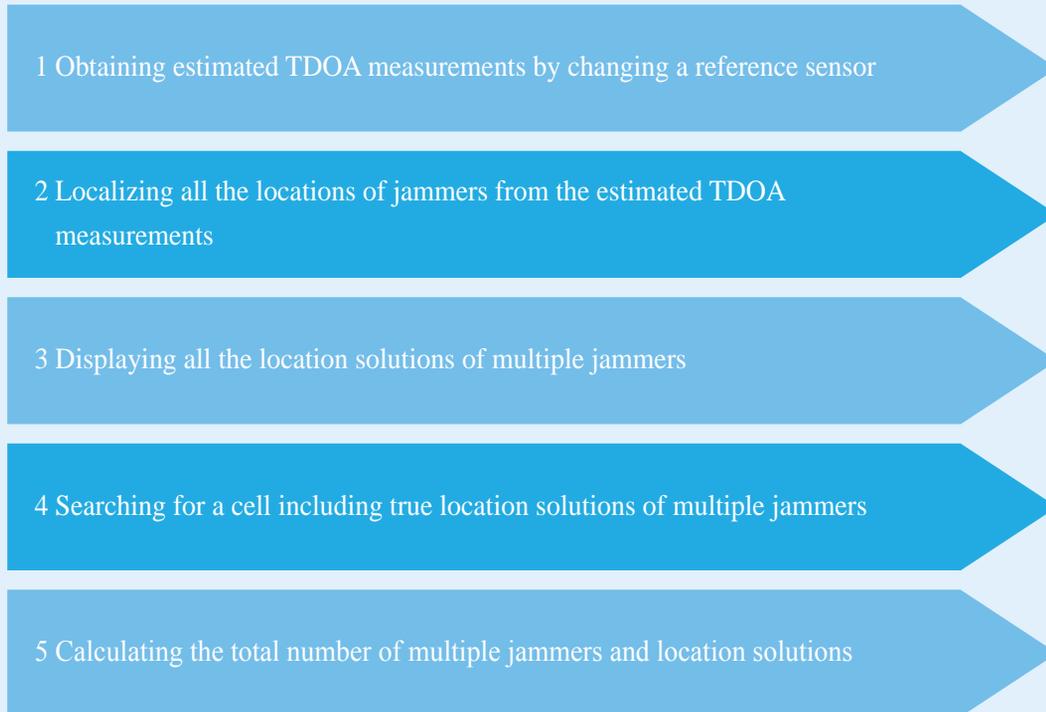
Localization method of multiple jammers

Market and future prospects

- A satellite navigation system is an infrastructure used in transportation, time, national defense, etc. the related market is continuously increasing, and independent satellite navigation systems have been established by the United States and Russia as well, as by Europe, China, India, and Japan.
- The GNSS market is expected to increase 8.3% every year until 2019, and 4.6% until 2023. In 2023, the net sales of GNSS chipset are anticipated to break through 100 billion euros and the sales including smart devices will reach about 300 billion euros.



Source : European GNSS Agency, “GNSS Market Report”, Issue 4, Mar. 2015.



Applications

- Applicable to various fields of mobile communication base stations, national defense equipment, etc.
- A technique of localizing multiple jammers can be utilized in diverse fields using GPS signals such as mobile communication, measurement, emergency rescue, agriculture, traffic safety including aviation/maritime/railroad/highway, infrastructure, and national defense related equipment including military planes.

Demand for technology	Application parts
Defense industry company	Mobile communication field
	Traffic safety field (aviation/maritime/railways, etc.)
Network equipment manufacturer, etc.	National defense field including military planes, tanks, warships, etc.