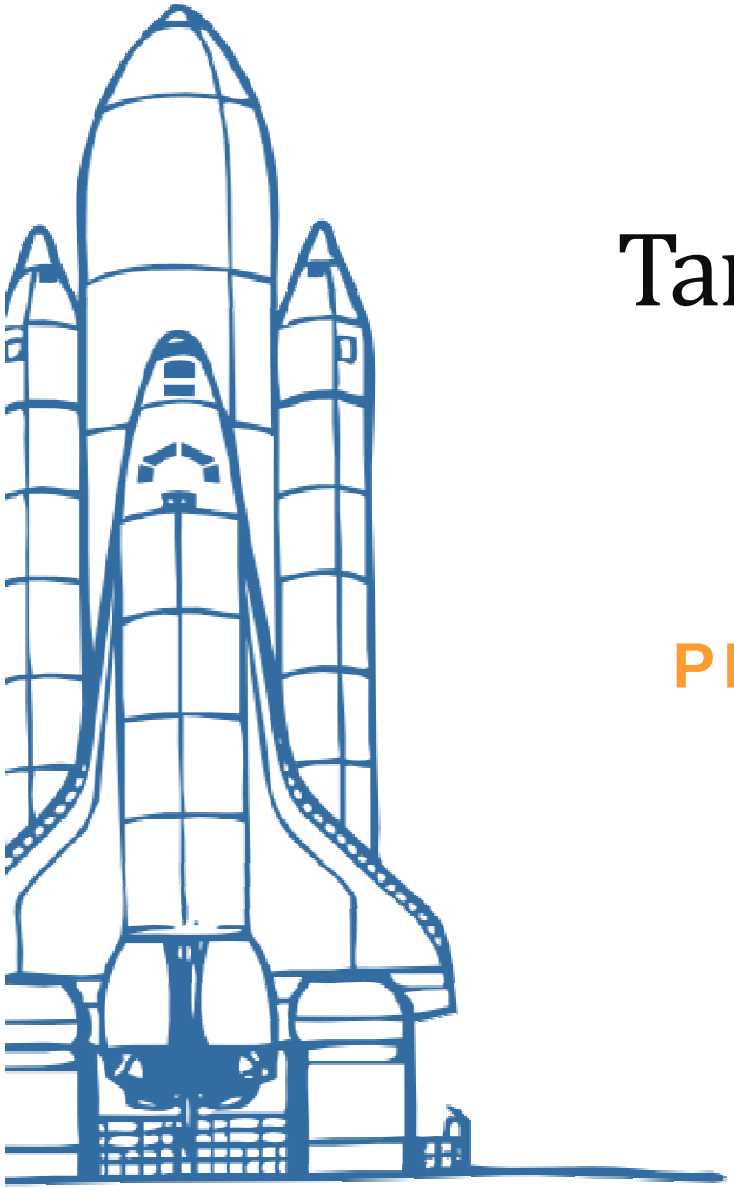
December 20, 2011



Target Tracking by Using Seismic Sensor

PROJECT PRESENTATION

spaceShuttle

Sponsored by aselsan

Outline

- About Team
- Seismic Sensors
- Problem Definition
- Motivation and Goal
- Our Solution
  - Features of the project
  - Components of the project
- Up to now what we did
- Future Work

Our Team - *spaceShuttle*

- Mustafa MIZRAK
- Anıl ERKOÇ
- Hüseyin ÜNAL
- Ali Fatih GÜNDÜZ

Seismic Sensor

- Detects vibrations occurred on the ground
- Very sensitive to 25 meters
- Used to monitor protected areas;

to stop immigration,

to secure border lines,

to protect gas and petroleum energy stations.

Seismic Sensors Are Used at

- Power Stations
- International Borders
- Nuclear Power Plants
- Embassies
- Gas and Petroleum Pipelines
- Research Establishments

Seismic Sensors

- Real time reaction from information acquisition to field operations
  - US Border Patrol
  - British Petroleum
  - NATO
  - Australian Attorney General's Office
  - Duke Energy
  - Egypt LNG

Well…

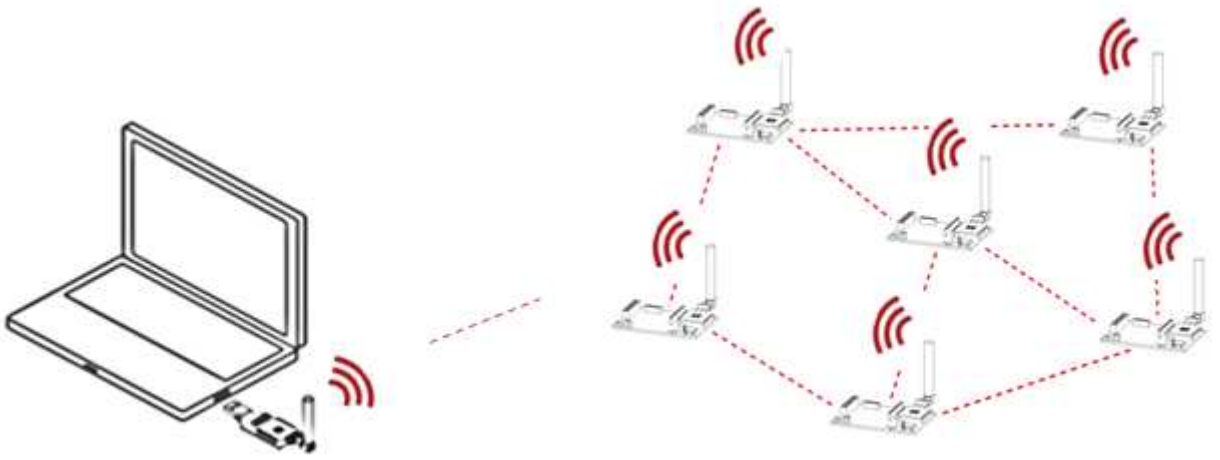
What is the condition in our country?

Problem Definition

- Border crossing of refugee and terrorists
- Cost of monitoring border lines from guard stations
- Terrorist raids to the border military guard stations

About the project

Real time object tracking by analyzing waves of seismic sensors object generates while it moves over the ground



Sensors are previoulsy deployed

Our task in this project

- We will work on sensor part of this huge project

- Sensor part of this project contains three subparts
  - Detection
  - Deployment
  - Target Tracking

We will work on target tracking by seismic sensors.

Our Goal

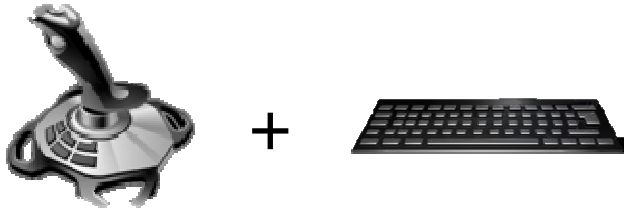
- Implementing a target tracking algorithm
- Implementing a Geographic Information System (GIS) based System Simulator:
  - Manually accepts sensor position and target route
  - Shows present sensors on the map
  - Calculates route of targets using the sensor inputs and show them on the map
- Evaluating the performance of the algorithm with the originally entered route (minimizing error margin)

Features of the project

- Getting signals from seismic sensors previosly deployed

Features of the project

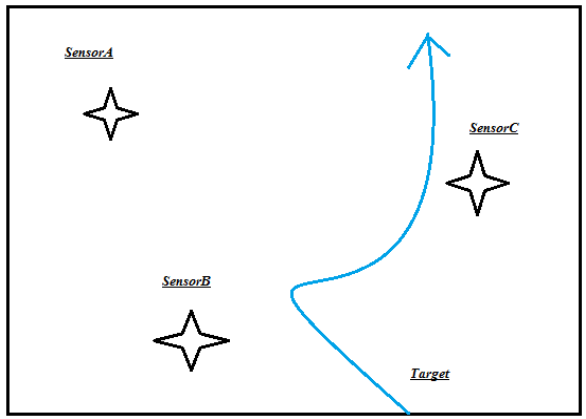
- Or manually accepting route wit
  - Keyboard and
  - Joystick



- Adding sensors manually to the map

Features of the project

- Determining route of targets via Target Tracking Algorithm (extending and optimizing Kalman Filter approach)
- Reducing noise margin

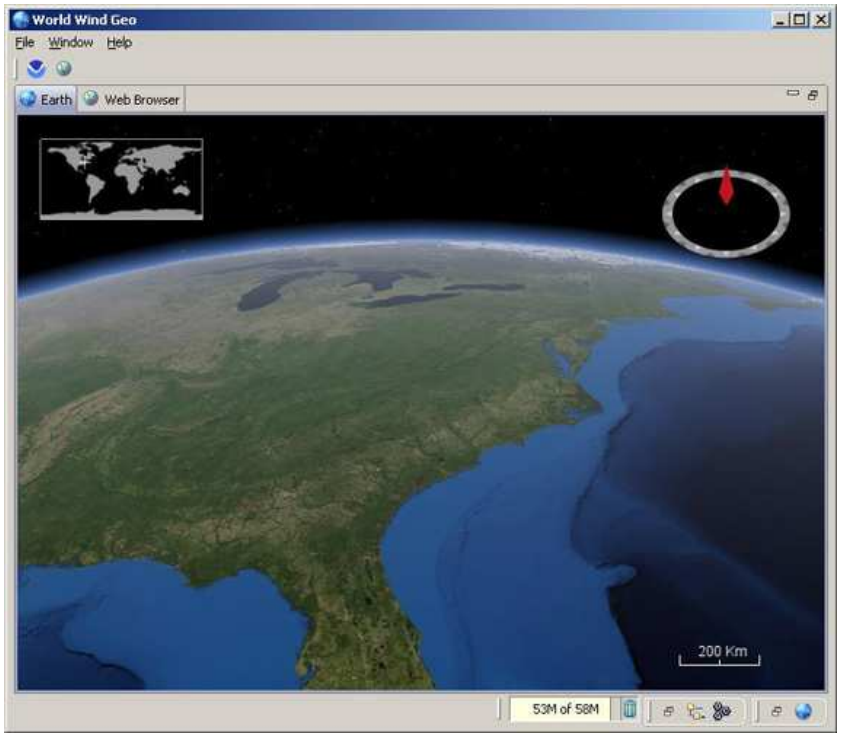


- Showing routes and sensors on the real 3D map (NASA World Wind API will be used)

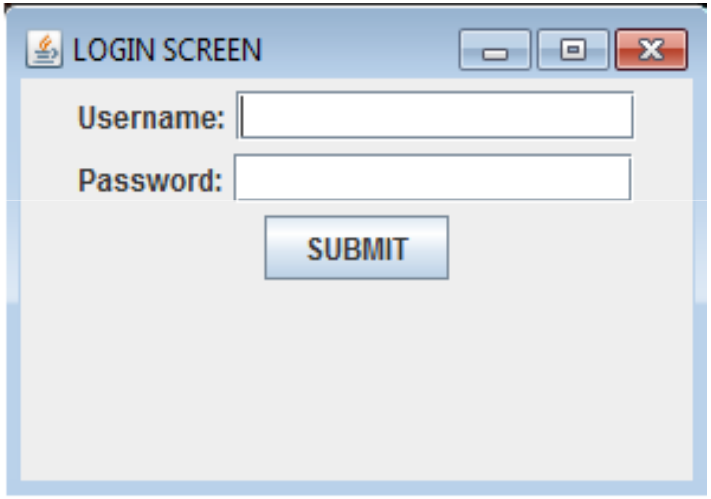
NASA World Wind API

- An open source virtual globe developed by NASA
- Shows meteorological events on world map
- Provides opportunity to develop demo applications on World map

NASA World Wind Snapshots



Snapshots of GUI



Snapshots

Snapshots

Future Work

- Designing and implementing efficient, reduced noise margin Kalman Filter algorithm (extended Kalman Filter)

- Implementing a GUI containing real 3D World map, seismic sensors and joystick

References

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- http://www.agilemodeling.com/artifacts/classDiagram.htm
- http://gislounge.com/geodatabases-explored-vector-and-raster-data/

Questions ?

Thank you...