



# Secure Tracking Service (S-TrackS) Nederlands Instituut voor Navigatie Themamiddag PRS

Accurate and Robust Positioning and Validation  
6 October 2017  
Bas van der Hoeven

**CGI**

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# Agenda

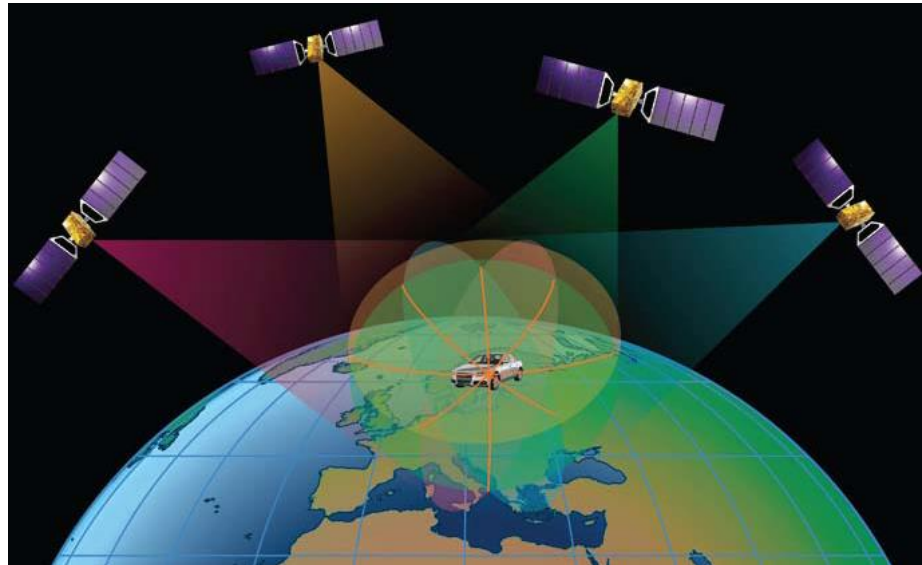
1. Introduction Galileo (PRS)
2. Secure Tracking Service (S-TrackS) – a PRS solution
  - Concept
  - Example
  - Integration
3. S-TrackS versus PRS RT



# Galileo (PRS)

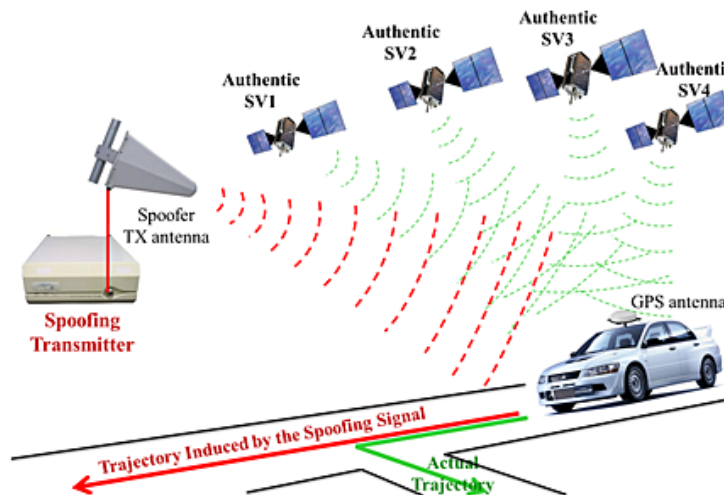
# Galileo

- European Satellite Navigation System with global coverage
- Alternative for systems like GPS
- Interoperable with GPS
- Three different services:
  - Open Service -> public available signal
  - Search and Rescue -> extension of existing SAR
  - Public Regulated Service -> Protected signal



# Galileo – Public Regulated Service

- Reliable and Robust Positioning
- Best protected Civil GNSS Service
  - Better resistant against signal disruption (jamming)
  - Misleading is not possible (spoofing)
- Public Regulated Service
- Selective users (access control)



# Exclusive: Iran hijacked Iranian engineer (Video)

In an exclusive interview, an engineer working to unlock the MQ-170 Sentinel says they expect to land in Iran.

by Scott Peterson, Staff writer  
DECEMBER 15, 2011



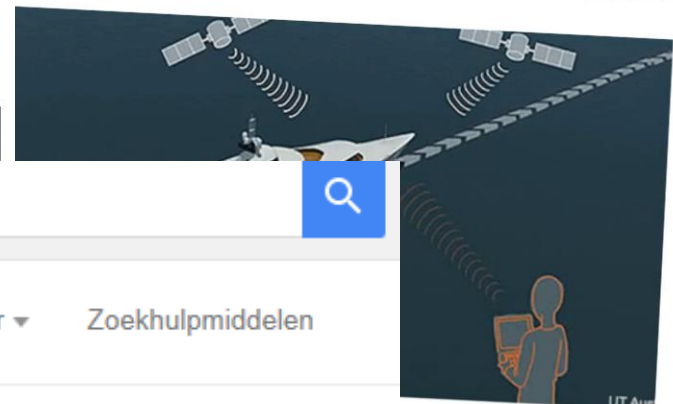
## Sat-nav systems

Jason Palmer science and technology reporter  
Technology that depends on satellite navigation signals is increasingly threatened by attack from widely available equipment, experts say.  
While "jamming" sat-nav equipment with noise signals is the rise, more sophisticated methods allow hackers even to program what receivers display.  
The risk are not only sat-nav but also critical national

## Expensive Hack

August 10, 2015 By GPS World  
Researchers at Qihoo 360 developed a GPS emulator that can fool the system for less than \$100. The system is in the top 10 most downloaded apps on the App Store.  
Forbes. The system is in the top 10 most downloaded apps on the App Store.  
cost thousands of dollars.  
the [read more](#)

# Ships fooled in GPS spoofing attack suggest Russian cyberweapon



built gps spoofer

Alle Afbeeldingen Shopping Video's Nieuws Meer Zoekhulpmiddelen

Ongeveer 482.000 resultaten (0,56 seconden)

## GPS spoofing - Digital Trends

[www.digitaltrends.com](http://www.digitaltrends.com) > Mobile > Vertaal deze pagina

30 jul. 2013 - GPS spoofers trick a navigation system by feeding it counterfeit signals ... The U of Texas students built a GPS spoofing device for about \$3,000 ...

## How to spoof GPS to (potentially) take over a drone - DIY ...

[diydrones.com](http://diydrones.com) / ... / how-to-spoof-gps-to-potentially-ta... > Vertaal deze pagina

1 jul. 2012 - Hackaday found a paper that describes a GPS spoofing technique that may be similar to that used by Iran to bring down a US drone. From the ...

## Spoofing GPS and getting your own UAV | Hackaday

[hackaday.com](http://hackaday.com) / ... / spoofing-gps-and-getting-your-ow... > Vertaal deze pagina

1 jul. 2012 - So, spoof the GPS correctly and then jam the control signals and it ... My guess is that it had an auto-land routine built in for the case of low fuel ...

## Here's how to easily fake your GPS location on Android

[www.phonearena.com](http://www.phonearena.com) > News > Vertaal deze pagina

12 nov. 2014 - Here's how to easily fake your GPS location on Android ... continue to surprise ourselves with the types of functionality it has built-in support for. ... There are many reasons you might have to want to spoof your location (most of ...

potential power

and GPS spoofers to take

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# Possible PRS Users

Critical National Infrastructures



Crisis Management



Emergency Services



Anybody approved by the National Competent PRS Authority



Defence / Intelligence



Transport



Border Control

# A PRS application

Secure Tracking Service (S-TrackS)



# Objectives of the PRS application

- Easy to use
- Low (operational) cost
- Integrated service solution
- Provide the PRS security features:
  - Authentication
  - Anti-Spoofing



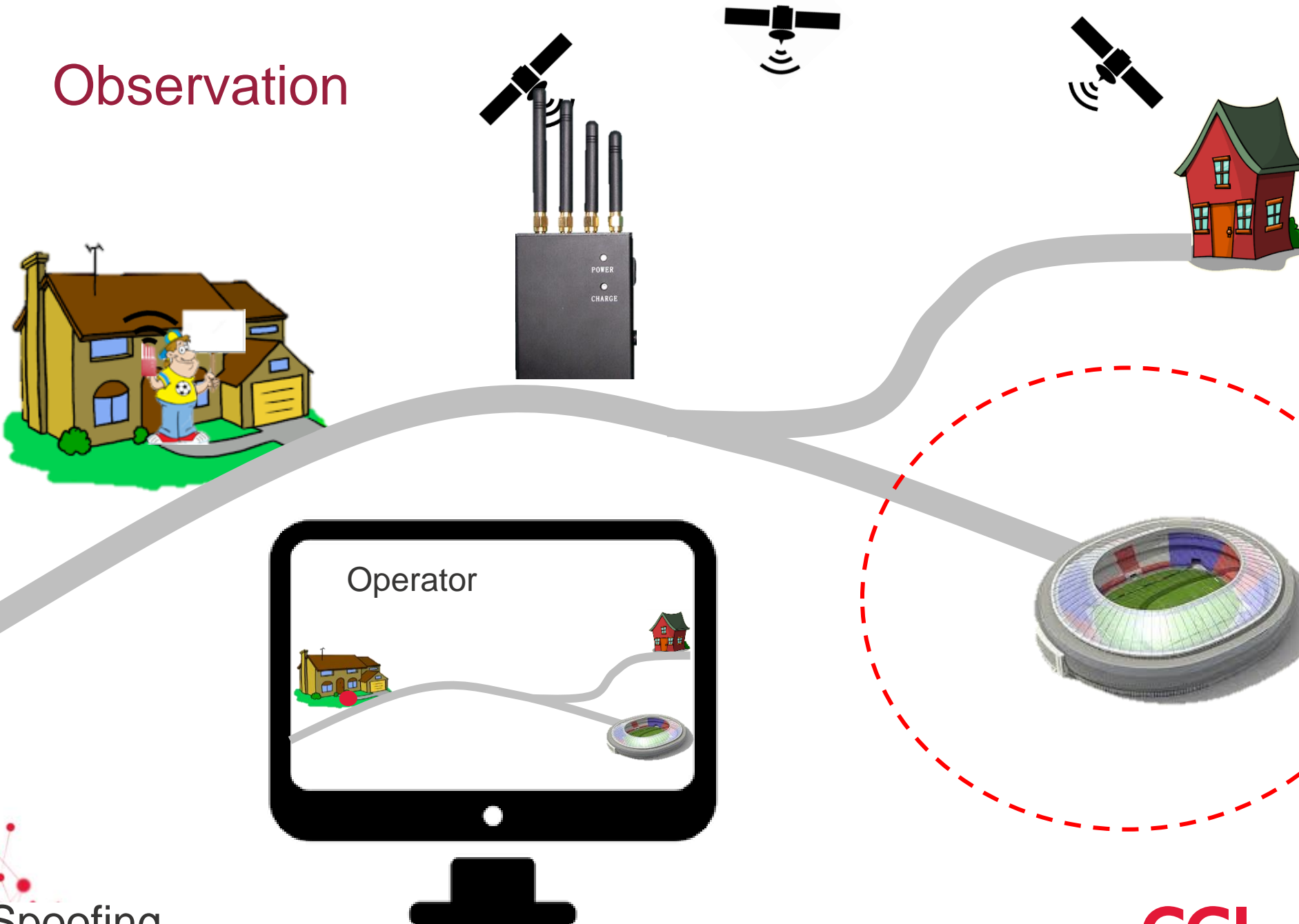
# CONCEPT – S-TrackS

- Uses the European Galileo Public Regulated Service (PRS)
- Records not spoofable unclassified spectrum snapshots
- S-TrackS offers offline:
  - Reliable positions
  - Proven positions
  - Accurate positions
  - Not spoofable / misleading positions



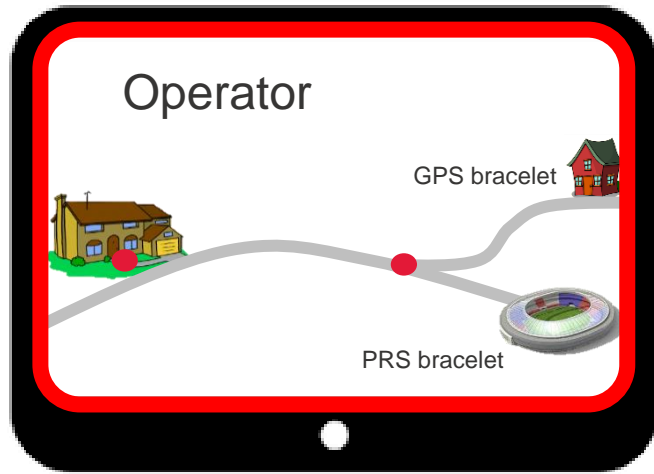
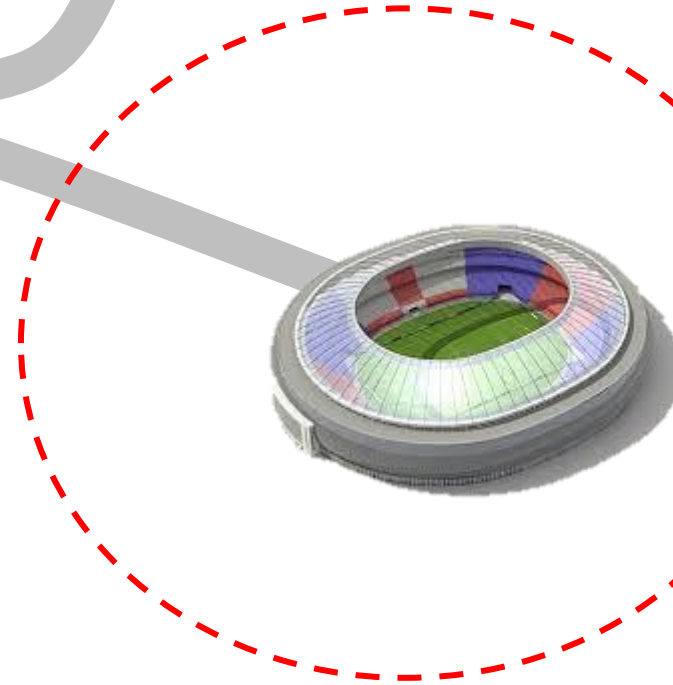
**Legally proven position to demonstrate where an asset or person has (not) been!**

# Observation



 Spoofing

# Observation



# S-TrackS versus PRS RT

	S-TRACKS	PRS
Purpose	Legal proof wrt positioning	Secure Real time navigation
Candidate users	No limitation	Public Regulated
Cost for 'receiver'	<100€	>10.000€
Operational impact receivers	One secure service for multiple recorder	Monitoring & Control is required
Operational impact server	Secure facility, SC people	N.A.
Operation	Validation as a service	Key- and access mngt
Realtime	Near realtime	yes
Purchase receivers	Simple device, aim for standardisation in chipset	Limited # certified suppliers, currently no Dutch industry



Thank you