The background of the slide is a light blue graphic. It features a globe with a grid of latitude and longitude lines. Overlaid on the globe is a large, multi-pointed compass rose. A dollar sign (\$) is also visible on the right side of the globe. The title text is centered over the globe.

It's About Time - Speaking Truth to Power

NOVEMBER 2016

ITSF, Prague



U. S. Naval Observatory
National Time Reference
Rubidium Fountain Clocks



1. Almost Everything Depends upon GNSS



Precise Positioning
& Navigation

Synchronized,
Precise Time,
Freq & Phase

Transport/Navigation



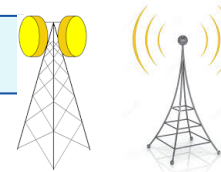
Financial Systems



IT Networks/Data Bases



Telecommunications



Power Grid





All Depends Upon GNSS

Precise Positioning
& Navigation

Synchronized,
Precise Time,
Freq & Phase

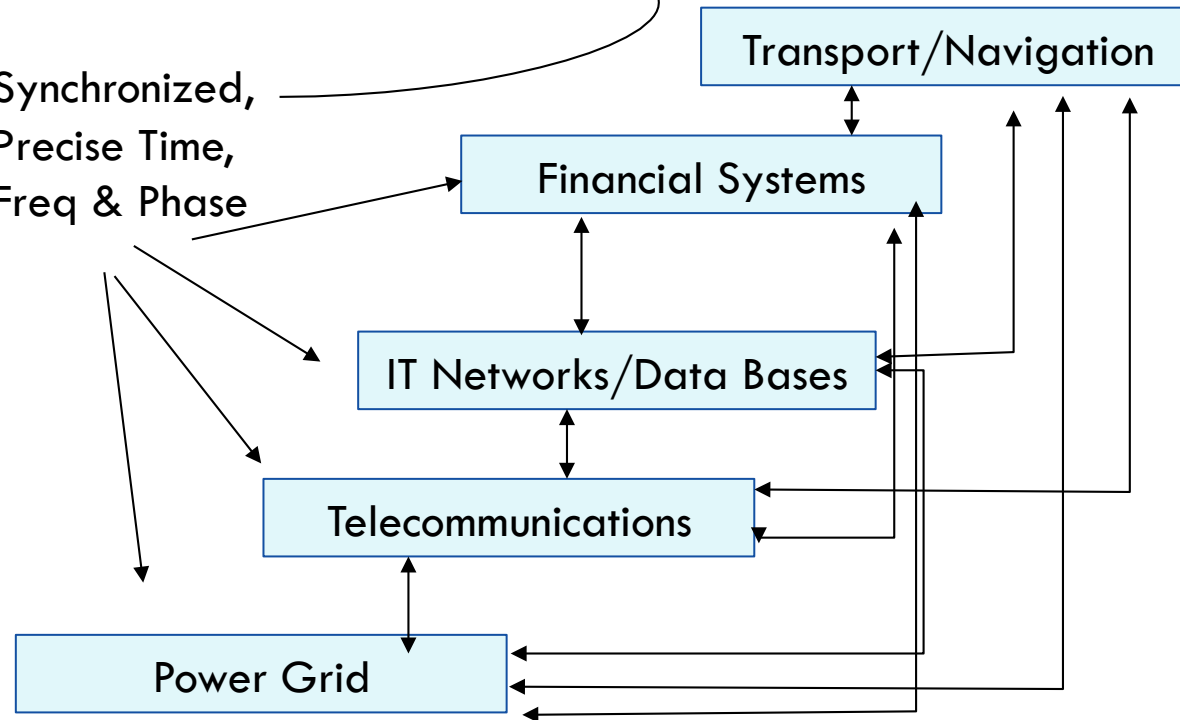
Transport/Navigation

Financial Systems

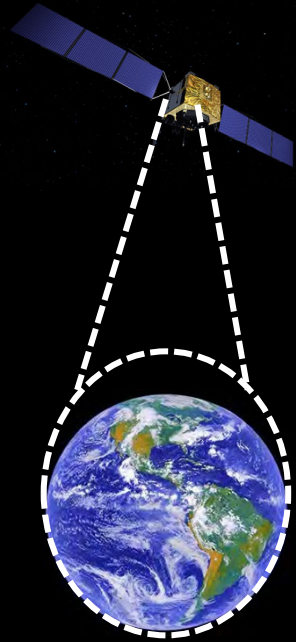
IT Networks/Data Bases

Telecommunications

Power Grid







“...a single point of failure...”

Dr. Brad Parkinson,
“Father of GPS”



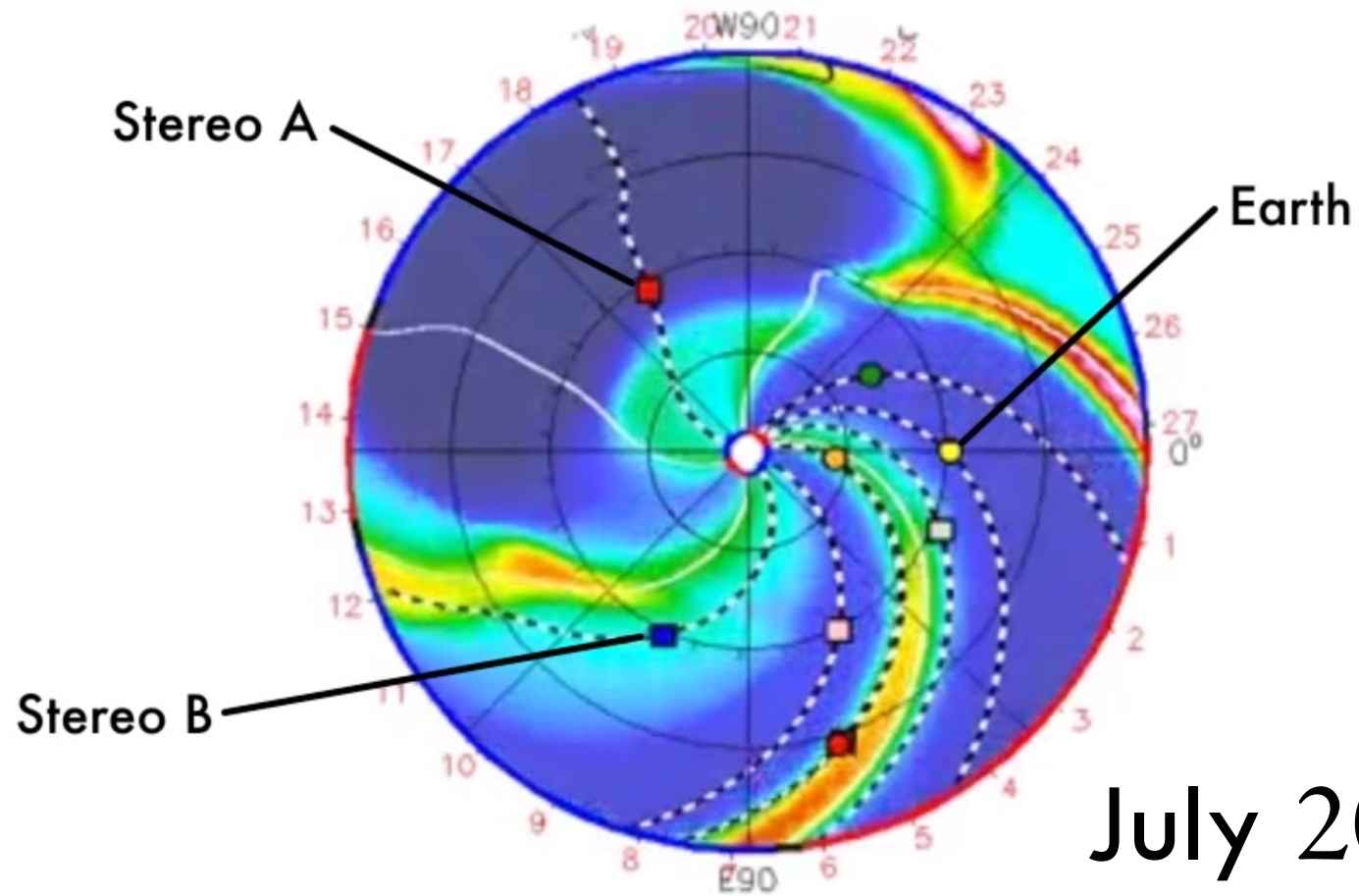
2. GNSS is Very Vulnerable



GPS Significantly Impacted by Powerful Solar Radio Burst

US NOAA News Release 4 April 2007

“The [5 Dec 2006] burst ... swamped
GPS receivers over the entire sunlit
side of the Earth.”





Unlikely, but...



1 April 2014 - 11 Hours

“GPS World
GLONASS Gone...
Then Back**”**

InsideGNSS
Engineering Solutions from the Global Navigation Satellite System Community
“GLONASS Suffers
Temporary System-wide
Outage**”**



1 January 2004 - About 3 Hours



Errors \approx 16 km reported

*"A significant GPS anomaly occurred on
1 Jan 04... resulted in the transmission of
Hazardously Misleading Information."*

US Air Force

January 2016 – 13.7 μ s



BBC



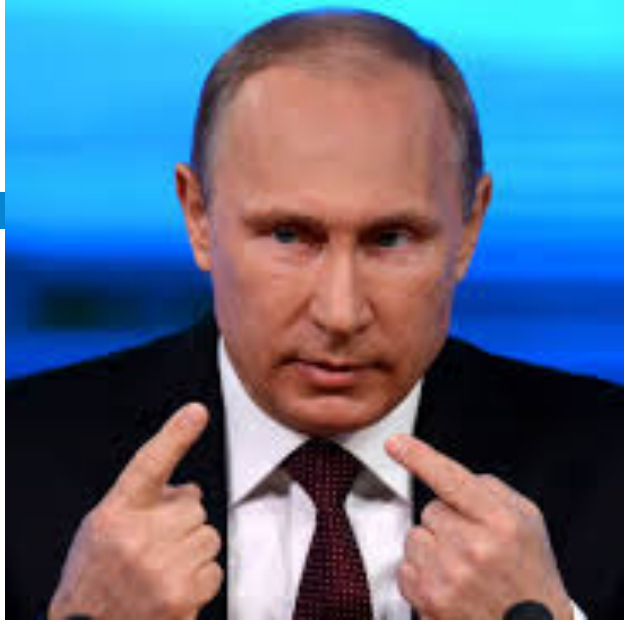


GEN Hyten
US Space Command
1 Dec 2015

“In 2015 U.S. Jammed
its Own Satellites
261 Times!”



3. GNSS is Under Attack - Now





\$5B More for Space Warfare

June 2105

“A potential conflict on Earth that escalates into space has **prompted the Air Force to find an extra \$5 billion to spend on offensive and defensive systems to protect national security satellites.**”

**National
DEFENSE** **NDIA**
National Defense Information Association
*NDIA's Business and
Technology Magazine*



Disruption & Terrorists

2 March 2015 – Greece - Arrests Xiros' Accomplice w/ GPS jammer

9 April 2015 – France - ISIS jams TV5Monde & hacks social media

6 May 2014 – Saudi Arabia - Arrest of 62 w/ jamming equipment

1 Dec 2014 – Syria – US attacks ISIS electronic warfare garrison and separate “jamming system”

25 May 2013 – Ansar al-Mujahideen web site - “All we need to implement this attack is a jamming device for the GPS frequencies...”

Local Disruptions per Day – Tens of thousands





* Only for Legal Use



Free shipping by



or

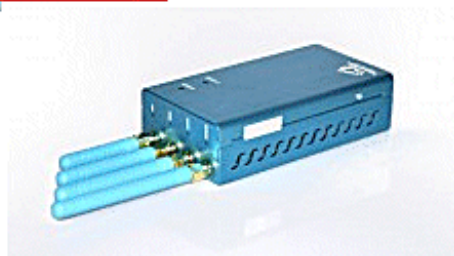


Product Description

Are you sick of being tracked like a criminal? This certain device is a gorgeous GPS jammer which can totally solve your troubles. The can prohibit signals from tracking your current location; pay a private space for you. All of this owes to the **high power portable GPS (GPS L1/L2/L3/L4/L5) jammer**.

High Power Portable GPS (GPS L1/L2/L3/L4/L5) Jammer

Free Shipping



RRP: ~~GBP £110.26~~

Your Price: **GBP £101.43**
(You save GBP £8.83)

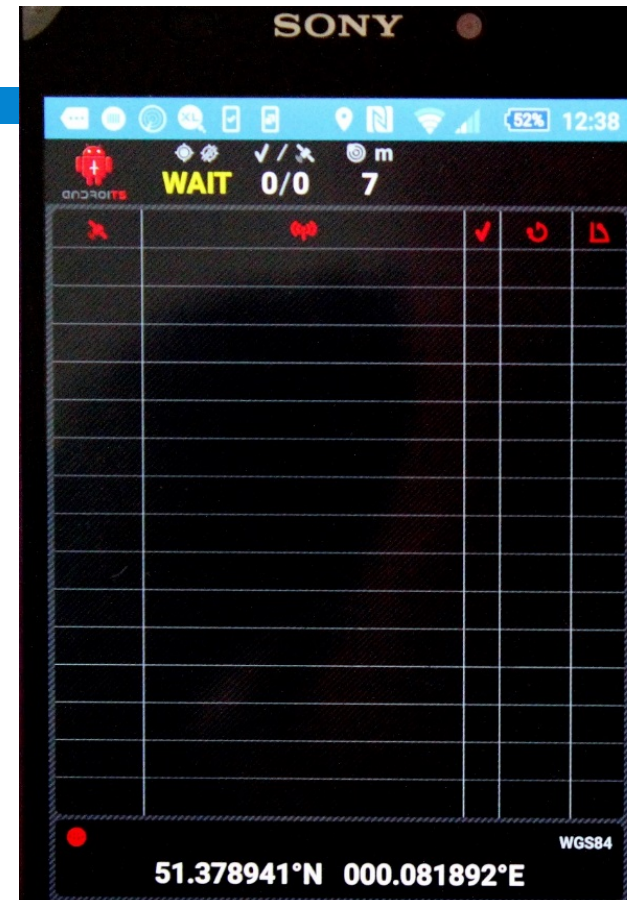
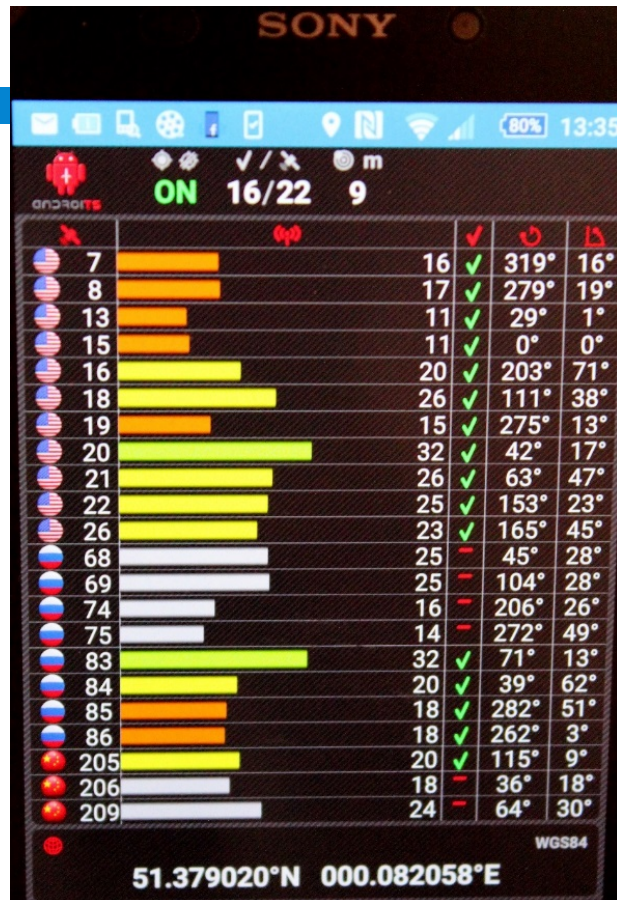
SKU: JM110838

Rating: ★★★★★ ([6 product reviews](#))

Shipping: Calculated at checkout

Quantity:  [Add to cart](#)

Equal Treatment for All



European Commission*

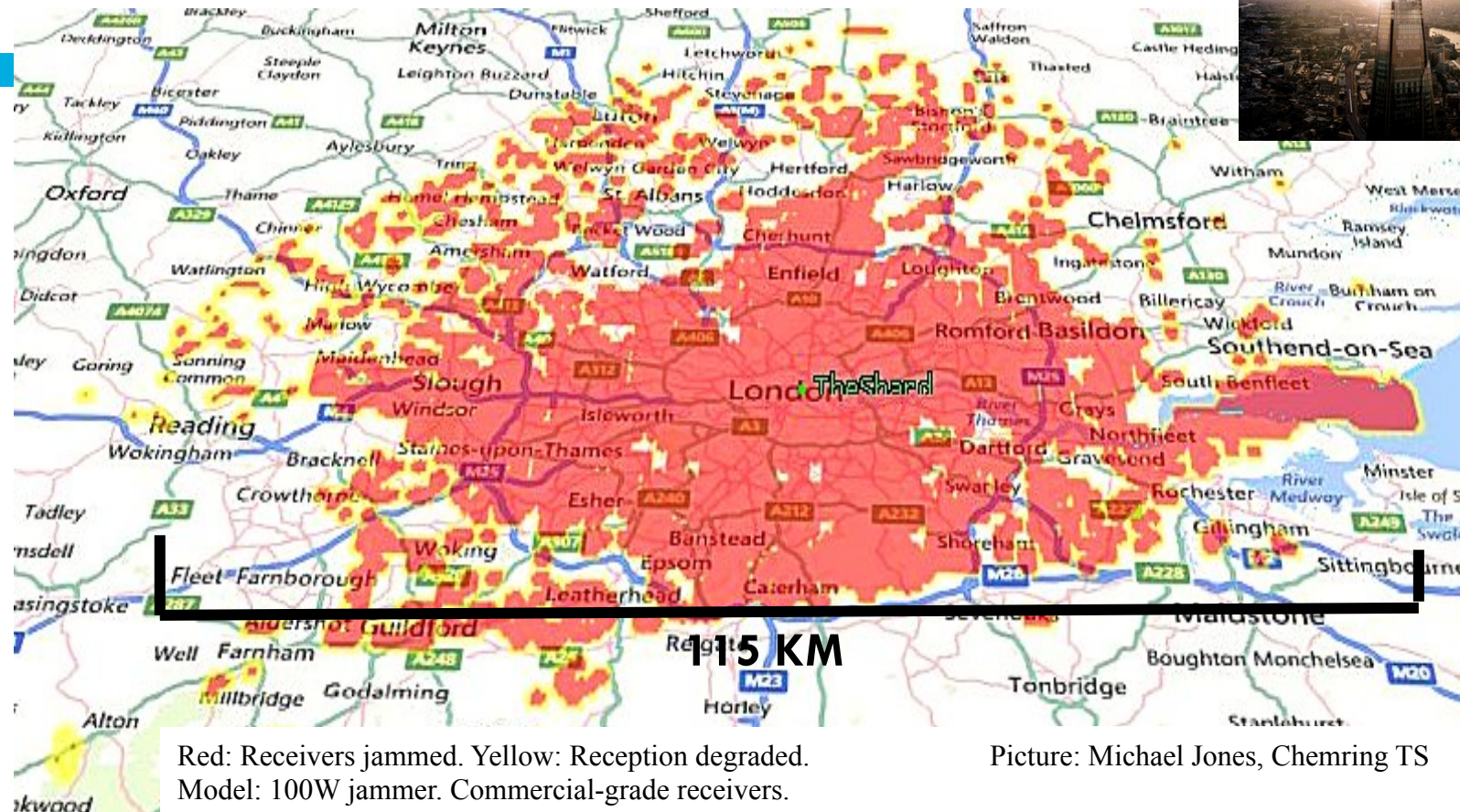
60,000 events in France during sample

Jammer use increasing

Jammers getting more sophisticated

* <http://www.gps.gov/governance/advisory/meetings/2015-10/desmet.pdf>

Local Disruption - Simulation



Picture: Michael Jones, Chemring TS

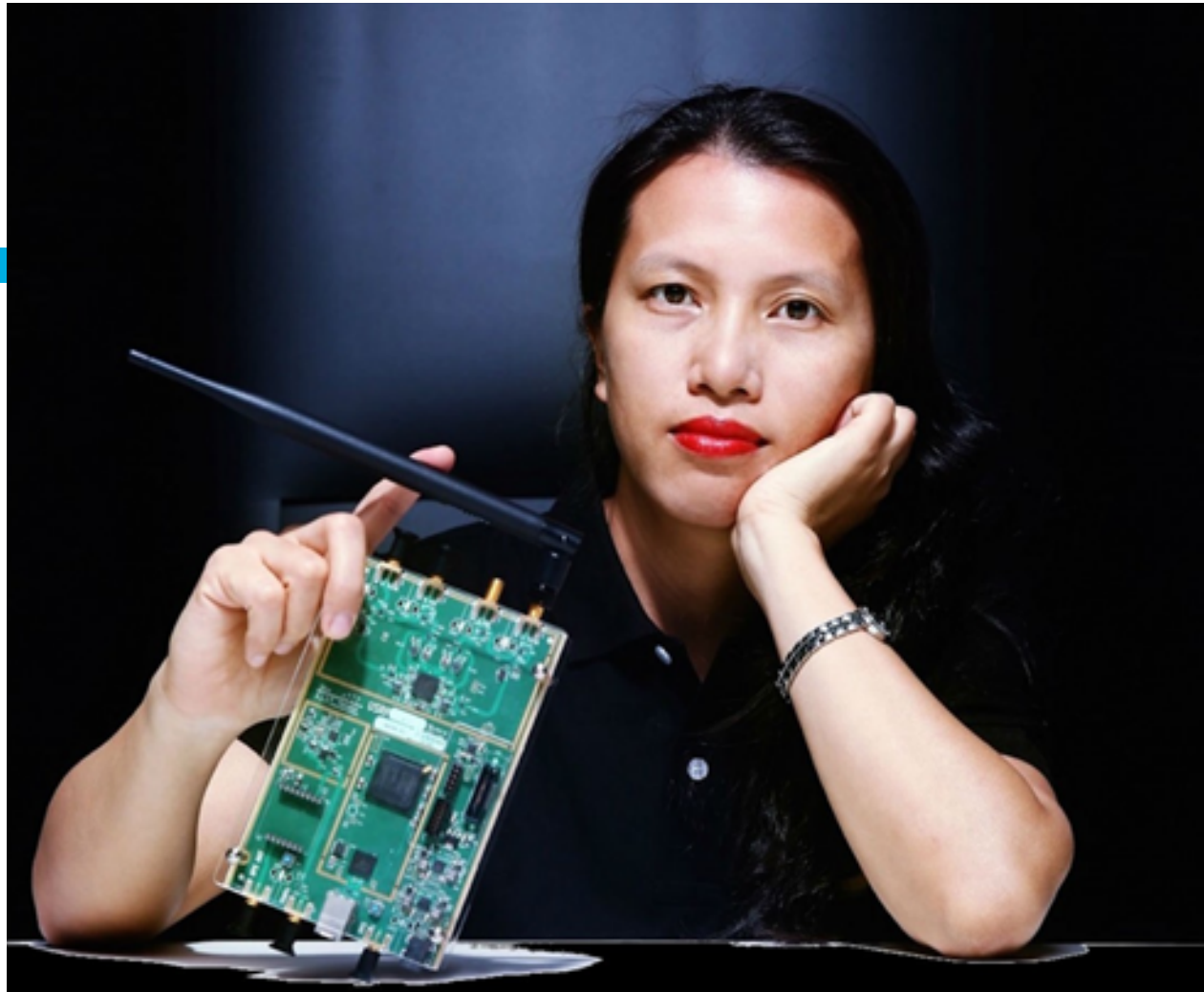
Response	Percentage
Yes, the government is doing a good job	65%
No, the government is not doing a good job	35%




EXCLUSIVE: GPS flaw could let terrorists hijack ships, planes

By John Roberts / Published July 26, 2013 / FoxNews.com





Forbes.com Tech
– Defcon 15
\$300 Spoofer



4. Space is Not Enough

US Mandate for Action

36

**“Acquire a GPS
Backup ...”**



NSPD-39

December 15, 2004

Selected Technology - eLoran

37



High Power (400kw – 1 Mw xmitter)
Low Frequency (100 kHz)

Penetrates:

Indoors

Underwater

Underground

February 2008



Homeland Security 2011

“U.S. critical infrastructure sectors are increasingly at risk from a growing dependency on the Global Positioning System (GPS) for space-based position, navigation, and timing (PNT).”

US Administration Concerned

40

“We have known about the problem since 2001.”

Dept. of Transportation Deputy Secretary 2013



“Interested in eLoran as part of APNT.”

Dept. of Defense CIO 2013

“GPS is a single point of failure for critical infrastructure.”

Dept. of Homeland Security Asst Sec. 2015

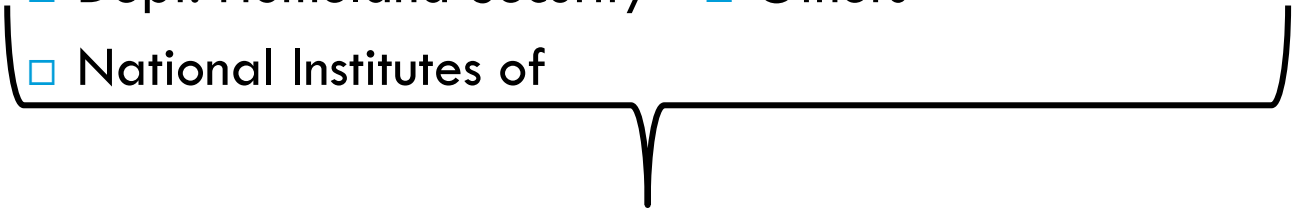




“GPS use by Military... a
Vulnerability” 2014

Complimentary PNT “Tiger Team”

43

- Dept. Defense
 - Dept. Transportation
 - Dept. Homeland Security
 - National Institutes of
 - Standards & Technology
 - Naval Observatory
 - Others
- 

Dec 2014 - ‘eLoran is the answer.

Perhaps supplement w/ LTE.’


US Army – “How much for 50,000 eLoran Receivers?”

44

FedBizOpps.Gov
14 Jan 2015

[Home](#) [Getting Started](#) [General Info](#) [Opportunities](#) [Agencies](#) [Privacy](#)

Buyers: [Login](#) | [Register](#) Vendors: [Login](#) | [Register](#) [Accessibility](#)

**59--Enhanced LORAN (eLORAN) RECEIVERS FOR ARMY PLATFORMS**
Solicitation Number: W56KGY-15-R-ELOR
Agency: Department of the Army
Office: Army Contracting Command
Location: ACC-APG - Aberdeen Division C

[Notice Details](#) [Packages](#) [Interested Vendors List](#) [Print](#) [Link](#)

Original Synopsis
Jan 14, 2015
2:34 pm

[Return To Opportunities List](#) [Watch This Opportunity](#)
[Add Me To Interested Vendors](#)

Solicitation Number: W56KGY-15-R-ELOR
Notice Type: Sources Sought

Synopsis:
Added: Jan 14, 2015 2:34 pm
REQUEST FOR INFORMATION (RFI) FOR:

Enhanced LORAN (eLORAN) RECEIVERS FOR ARMY PLATFORMS

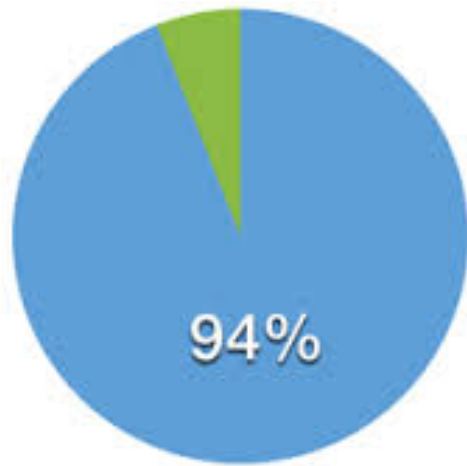
THIS IS A REQUEST FOR INFORMATION (RFI) ONLY. THIS REQUEST IS FOR PLANNING PURPOSES, AND SHALL NOT BE CONSTRUED AS A SOLICITATION ANNOUNCEMENT, INVITATION FOR BIDS, REQUEST FOR PROPOSALS, QUOTES OR AN INDICATION THAT THE GOVERNMENT WILL CONTRACT FOR THE ITEMS CONTAINED IN THIS NOTICE. AFTER REVIEWING THE DESCRIPTIONS CURRENTLY POSTED TO FEDBIZOPS, INTERESTED CAPABLE VENDORS ARE INVITED TO PROVIDE RESPONSES. THE GOVERNMENT WILL NOT REIMBURSE RESPONDENTS FOR ANY COST ASSOCIATED WITH THE SUBMISSION

GENERAL INFORMATION
Notice Type: Sources Sought
Posted Date: January 14, 2015
Response Date: February 13, 2015
Archiving Policy: Automatic, on specified date
Archive Date: March 15, 2015
Original Set Aside: N/A
Set Aside: N/A
Classification Code: 59 -- Electrical and electronic equipment components
NAICS Code: 334 -- Computer and Electronic

RNT Fnd | Jan 2015

US Dept. of Transportation – Request for Comment

We need eLoran'



May 2015 – 94%
March 2007 - 93%

Including:

- The GPS Innovation Alliance
- Radio Technical Commission Maritime
- GMDSS Task Force
- American Pilots Association
- Atlantic Lobstermen's Association
- General Light House Authority
- Australian Maritime Safety Authority

US Congress Concerned

46



‘When space assets are not available – what’s the plan?’

Public Law 113-66
National Defense Authorization Act for 2014

US Law – 18 December 2014

47

Preserve Loran infrastructure
for possible re-use



Government may enter
into a Cooperative Agreement
to build eLoran

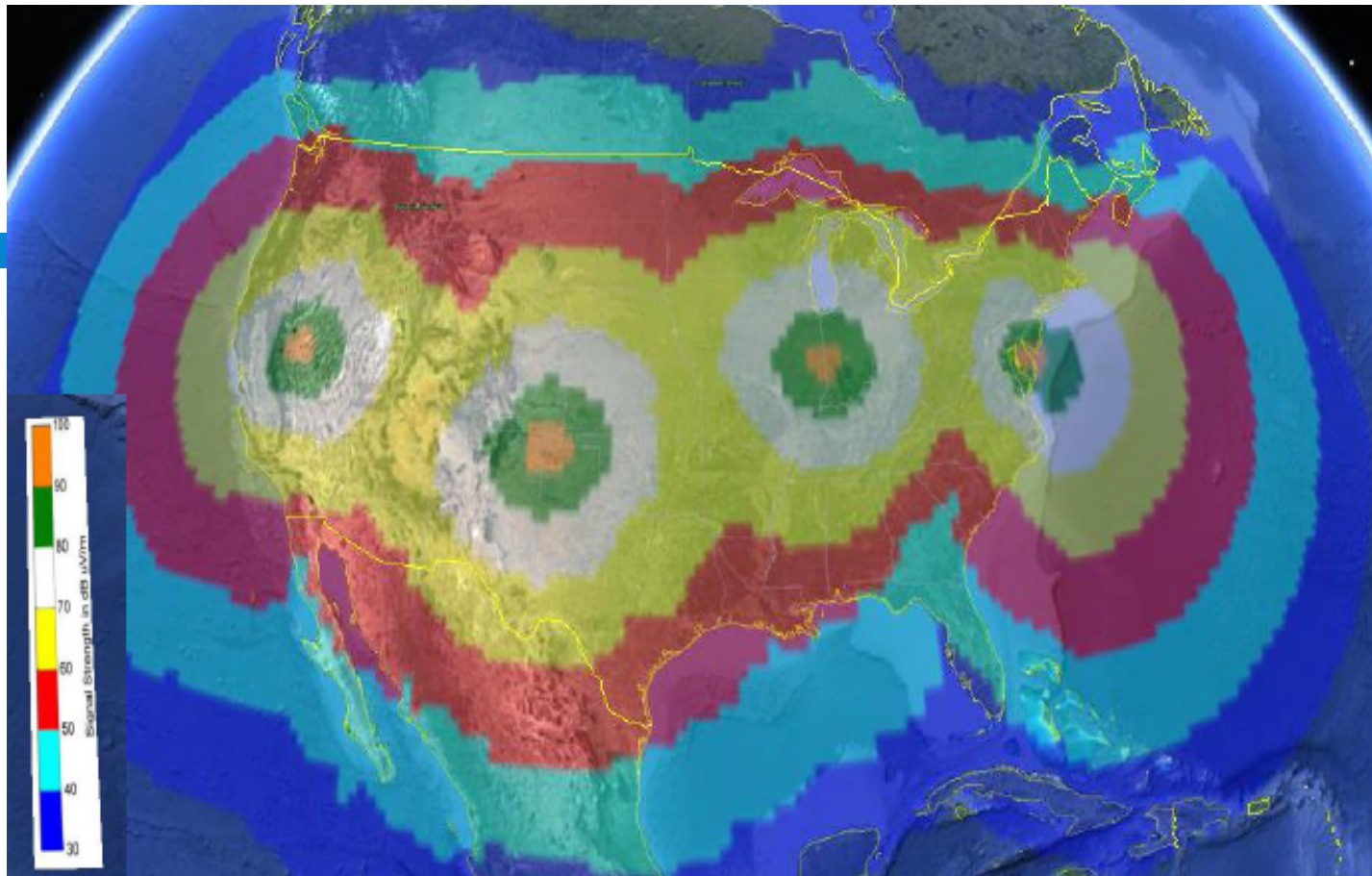
S.2444, Howard Coble US Coast Guard Authorization Act of 2014

Way Forward for US*

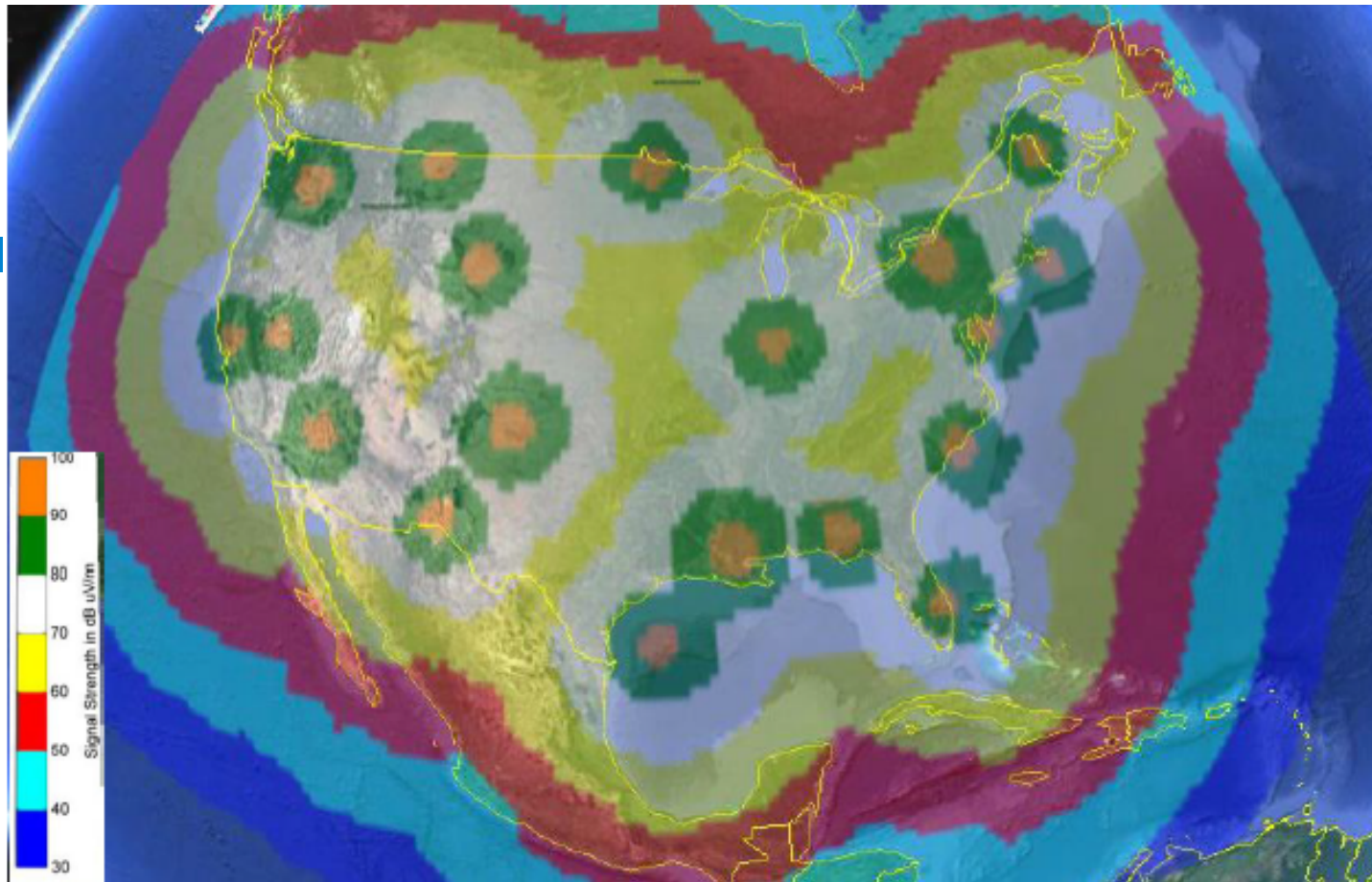
Two Phase Approach:

1. eLoran Timing Network via Public-Private-Partnership
2. Nation-wide PNT Backup & Complementary eLoran Network

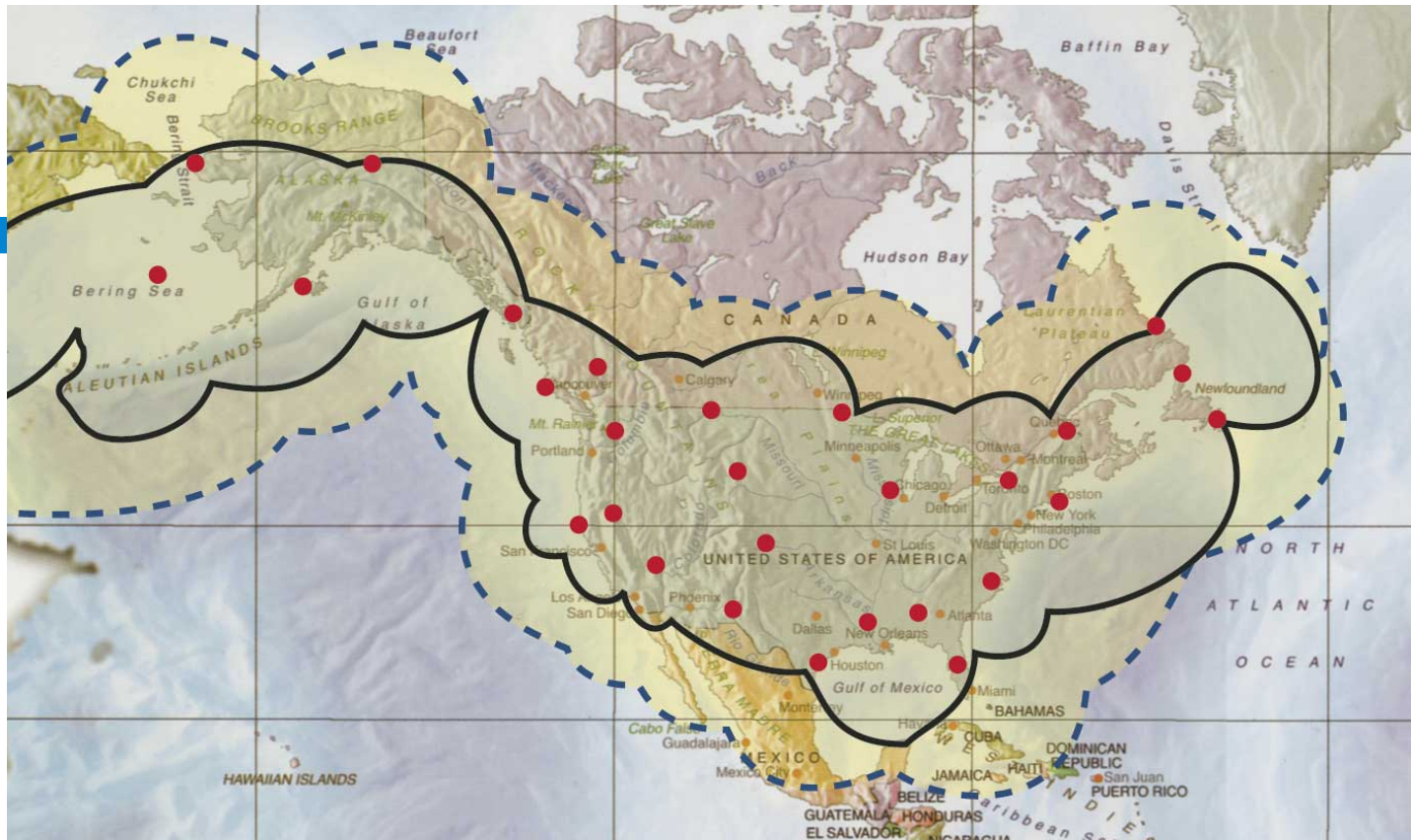
*Letter from Deputy Secretaries of Defense and Transportation to Congress



Phase I (notional) – Timing Continental US, 4 Sites



Phase 2 (notional) - Positioning, Navigation,
Timing Continental US, 19 Sites



Phase 3 (notional) – PNT, Freq, Phase & Data

Pending Legislation

53

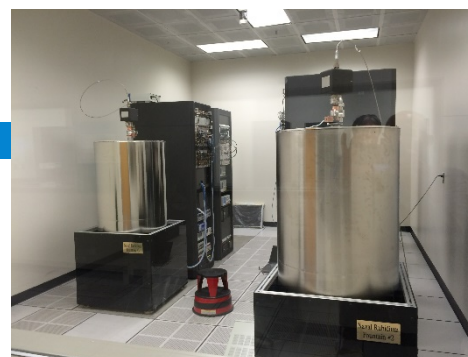


**‘US Coast Guard shall
build eLoran’**

September 2016

H.R. 5978 Passed by House With
Senate for consideration

5. We Have a Duty To Speak



Všechny Boží
děti potřebují
PNT !

