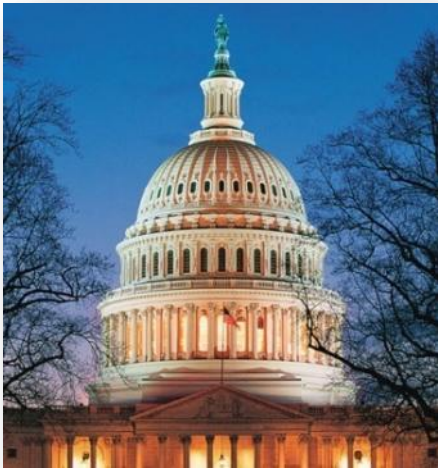


Commerce to Consumers: GPS Technology Market Update

Steve Koenig
Director, Industry Analysis
Consumer Electronics Association



About CEA



- Mission:
 - Grow the consumer electronics industry
- More than 2,000 member companies
- Market research, legislative advocacy, technology standards
- Producer of the International CES[®]



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GNSS MARKET REPORT

ISSUE 3

October 2013

GNSS Market Report – Issue 3



The European GNSS Agency (GSA)

The GSA is the European Union Community Agency formed to accomplish specific tasks related to European GNSS programmes.



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GPS/GNSS Verticals

Military



Commercial



Consumer (Devices and LBS)



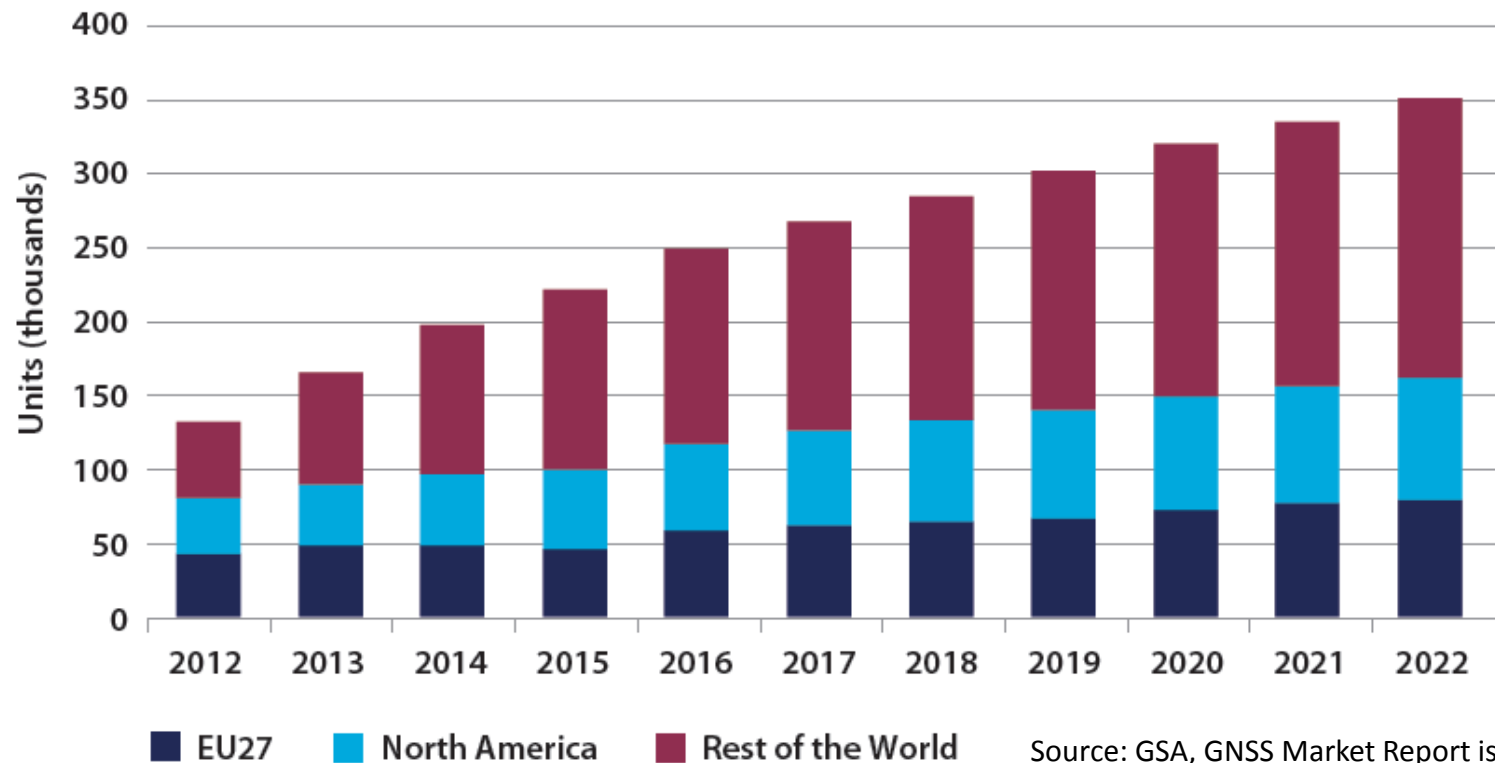


SURVEYING



Surveying – Global Market Building

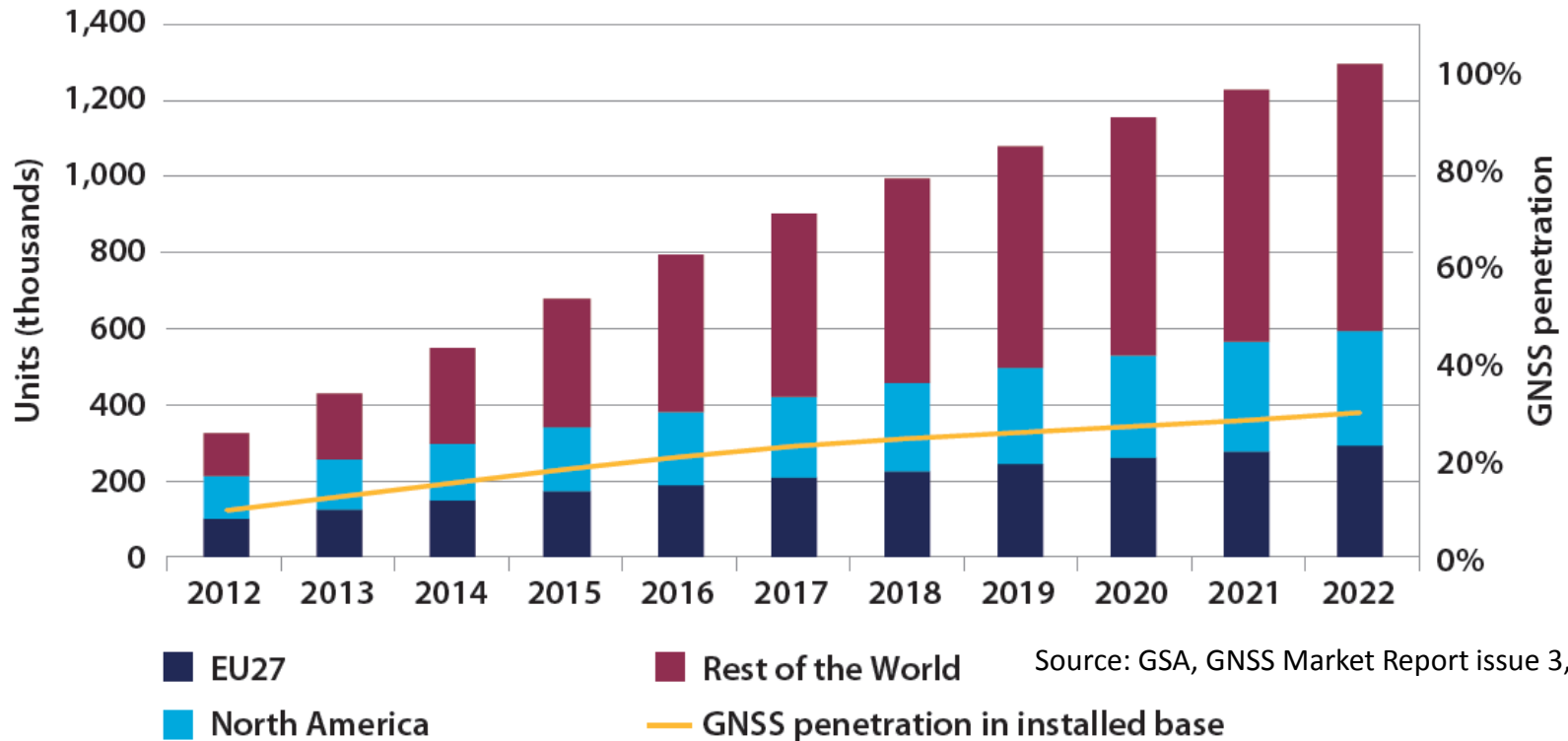
Shipments of GNSS devices by region



Global Market Size (est.)	2014	2020
Annual Shipments (000s)	200	320
Installed Base (000s)	550	1,150

Surveying – Global Market

Installed base of GNSS devices by region



Key Manufacturers

- Ashtech
- Deere & Co
- Hemisphere

- Javad
- Laid

- Leica
- North Surveying
- Novatel

- Pentax
- Pulse Electronics
- Septentrio

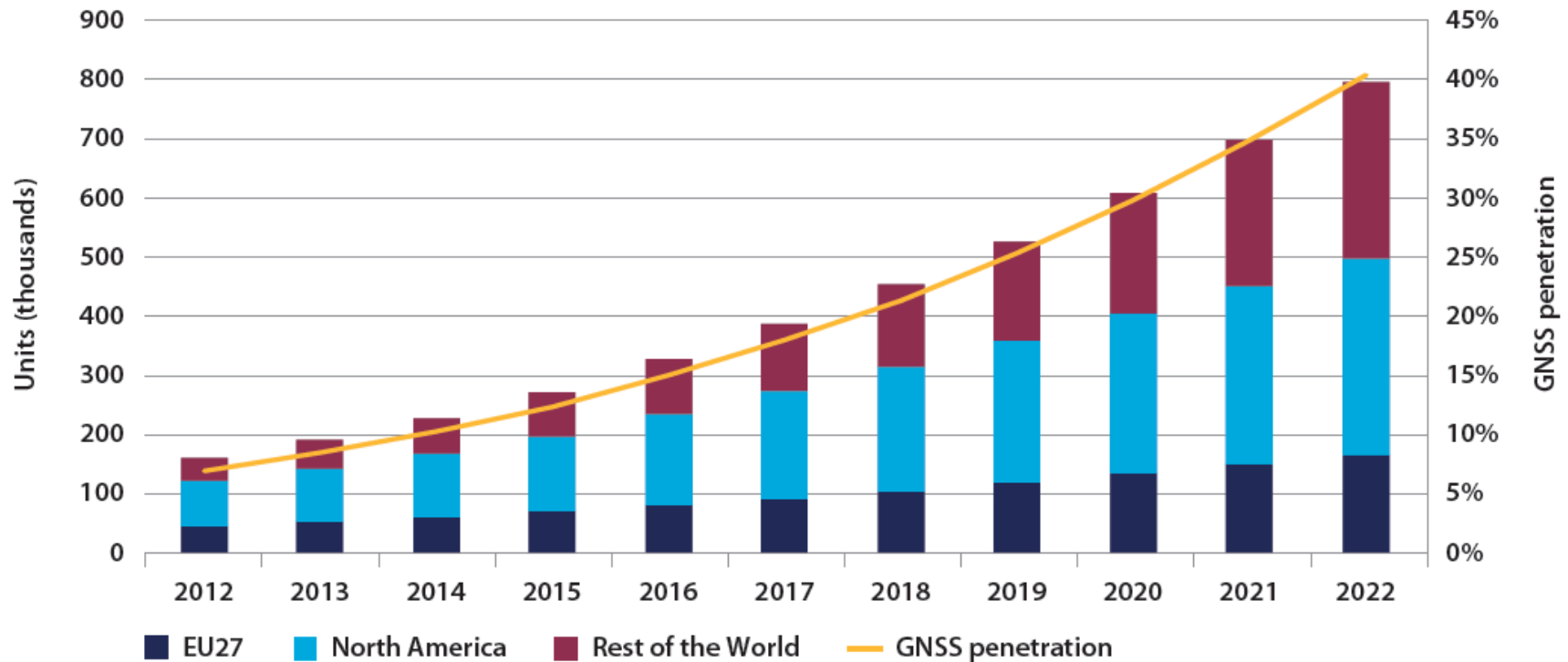
- Topcon
- Trimble
- Yageo Corporation



AGRICULTURE

Future Farms: Automatic Steering / VRT Common

Shipments of GNSS devices by region

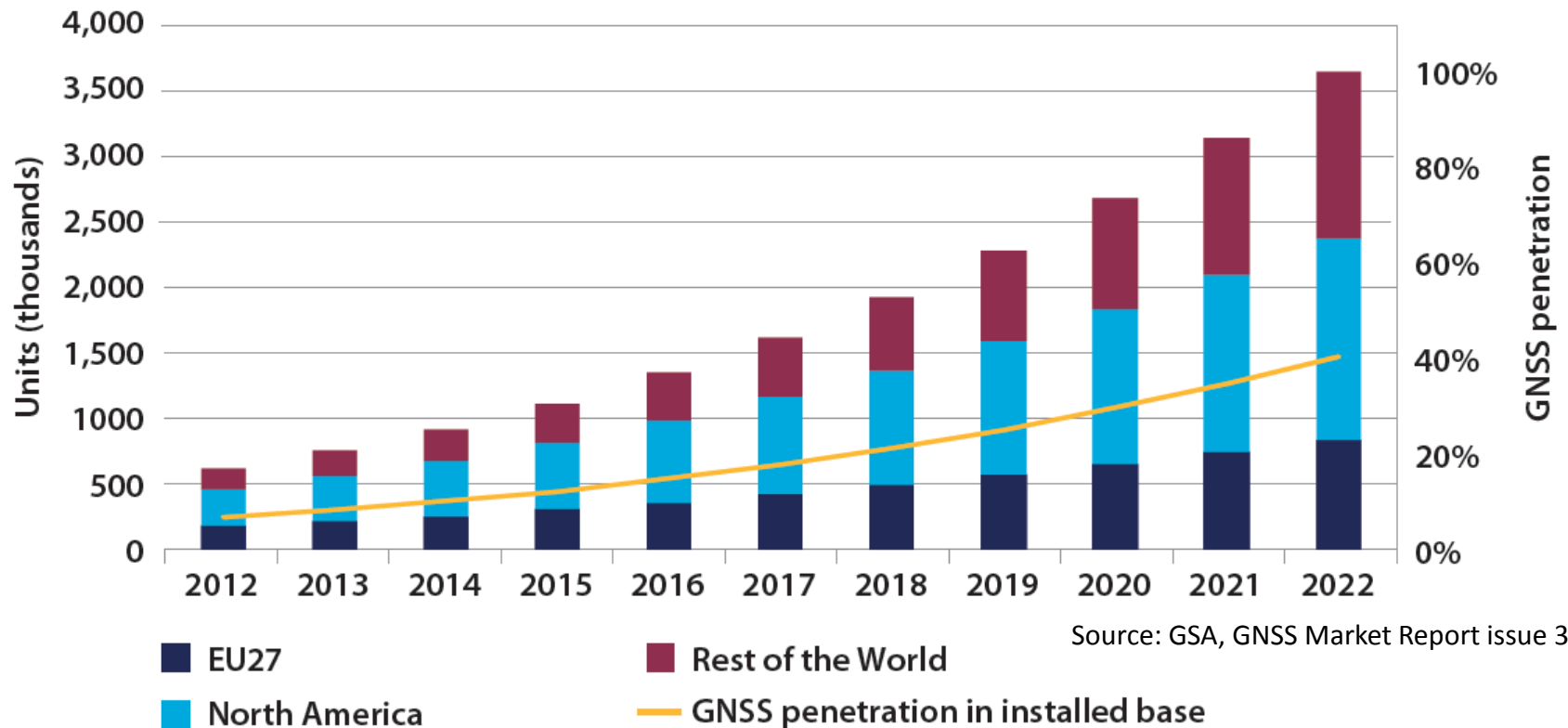


Source: GSA, GNSS Market Report issue 3, 2013

Global Market Size (est.)	2014	2020
Annual Shipments (000s)	220	610
Installed Base (000s)	950	2,650

Precision Farming – Global Market

Installed base of GNSS devices by region



Key Manufacturers

- Hexagon
- Deere & Co
- Topcon
- AGCO Corp

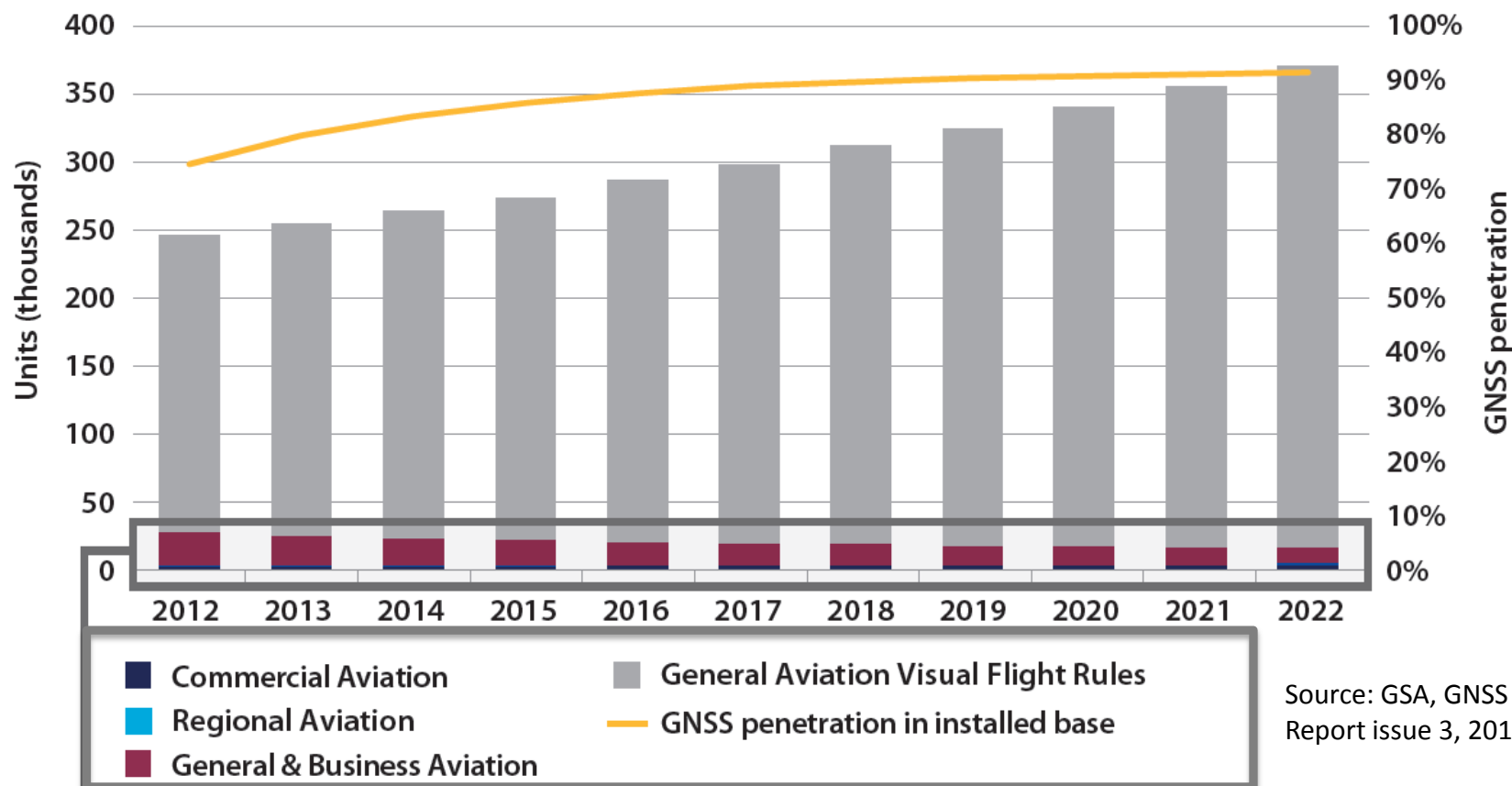


AVIATION



GNSS Aviation: High Degree of Penetration

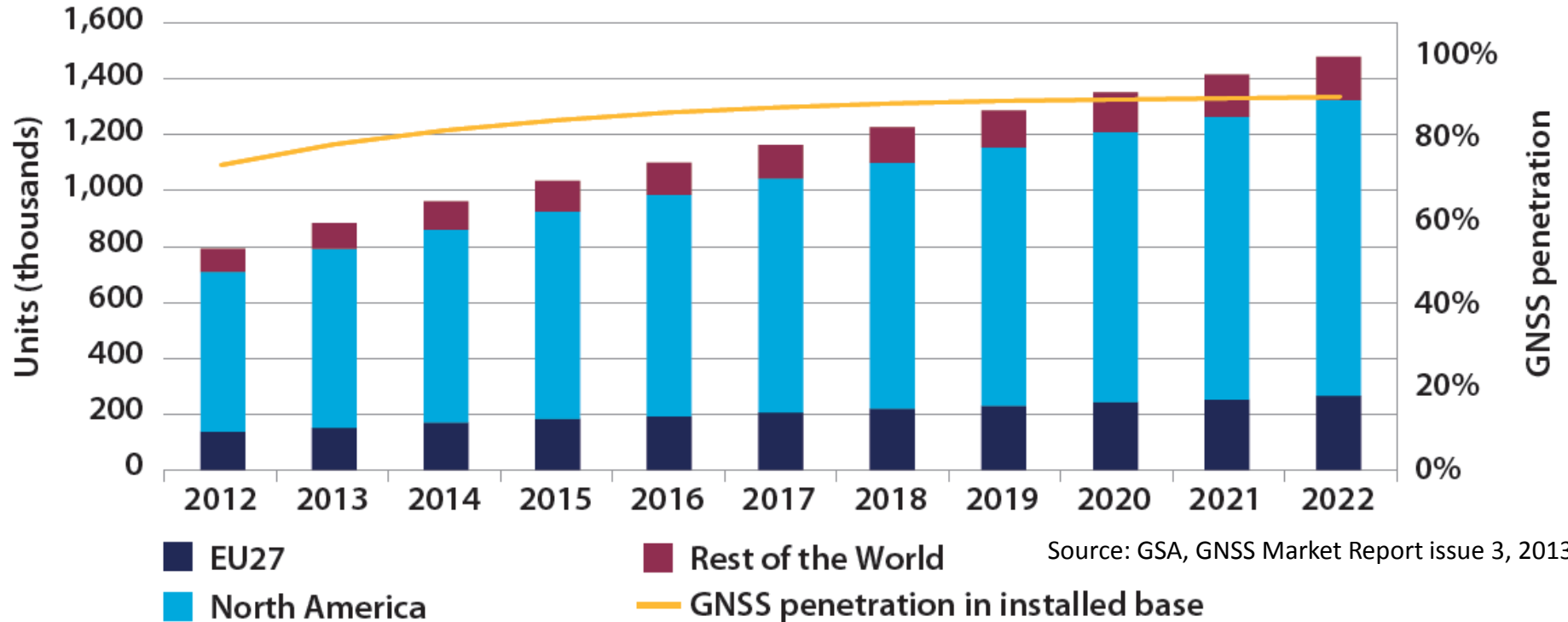
Shipments of GNSS devices by segment



Global Market Size (est.)	2014	2020
Annual Shipments (000s)	260	340
Installed Base (000s)	975	1,325

Aviation - Global Market

Installed base of GNSS devices by region



Key Manufacturers

- Honeywell
- Garmin
- Rockwell Collins
- Thales Avionics
- Universal

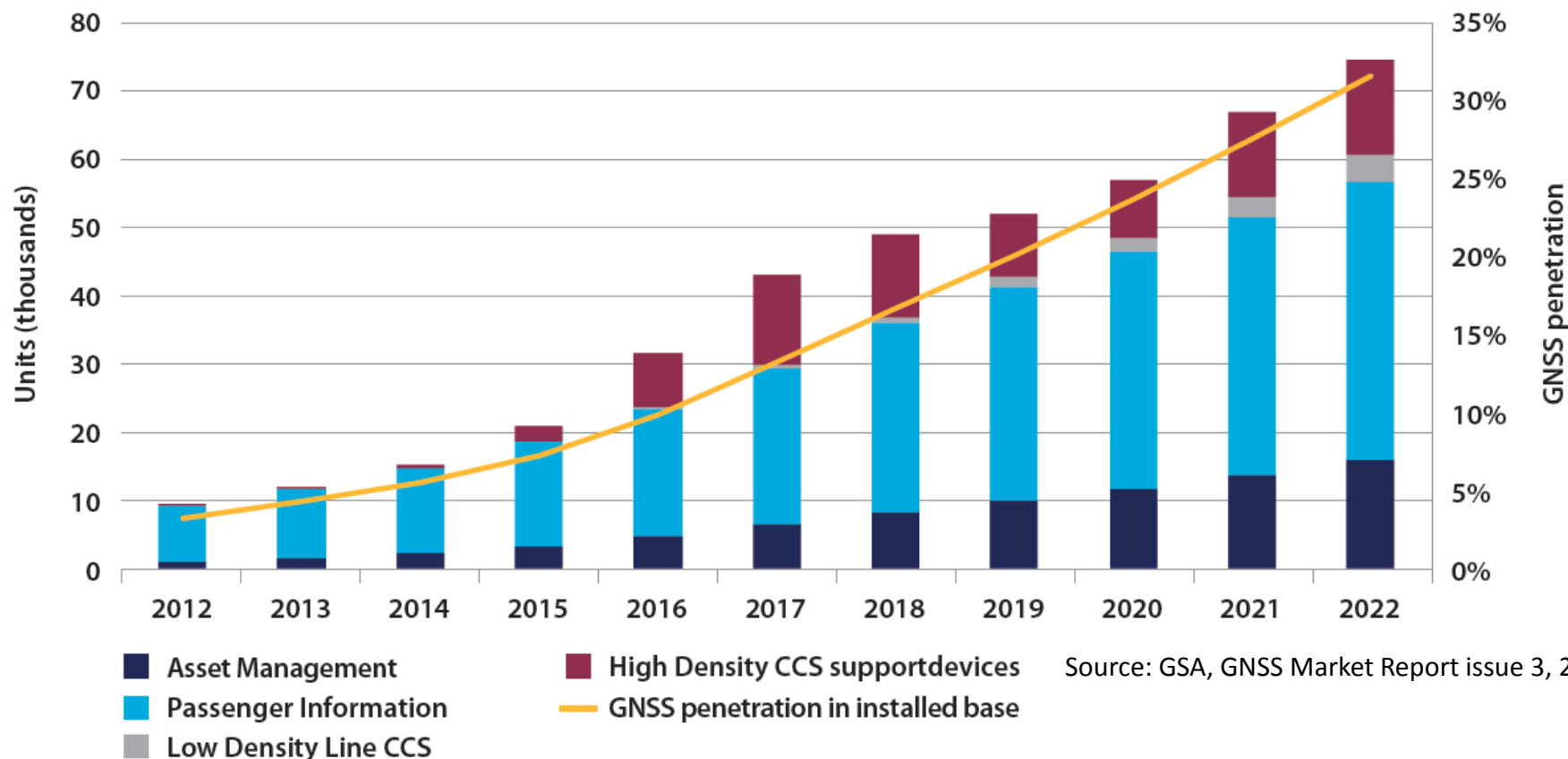


RAIL



GNSS Rail: Low Volumes / Penetration

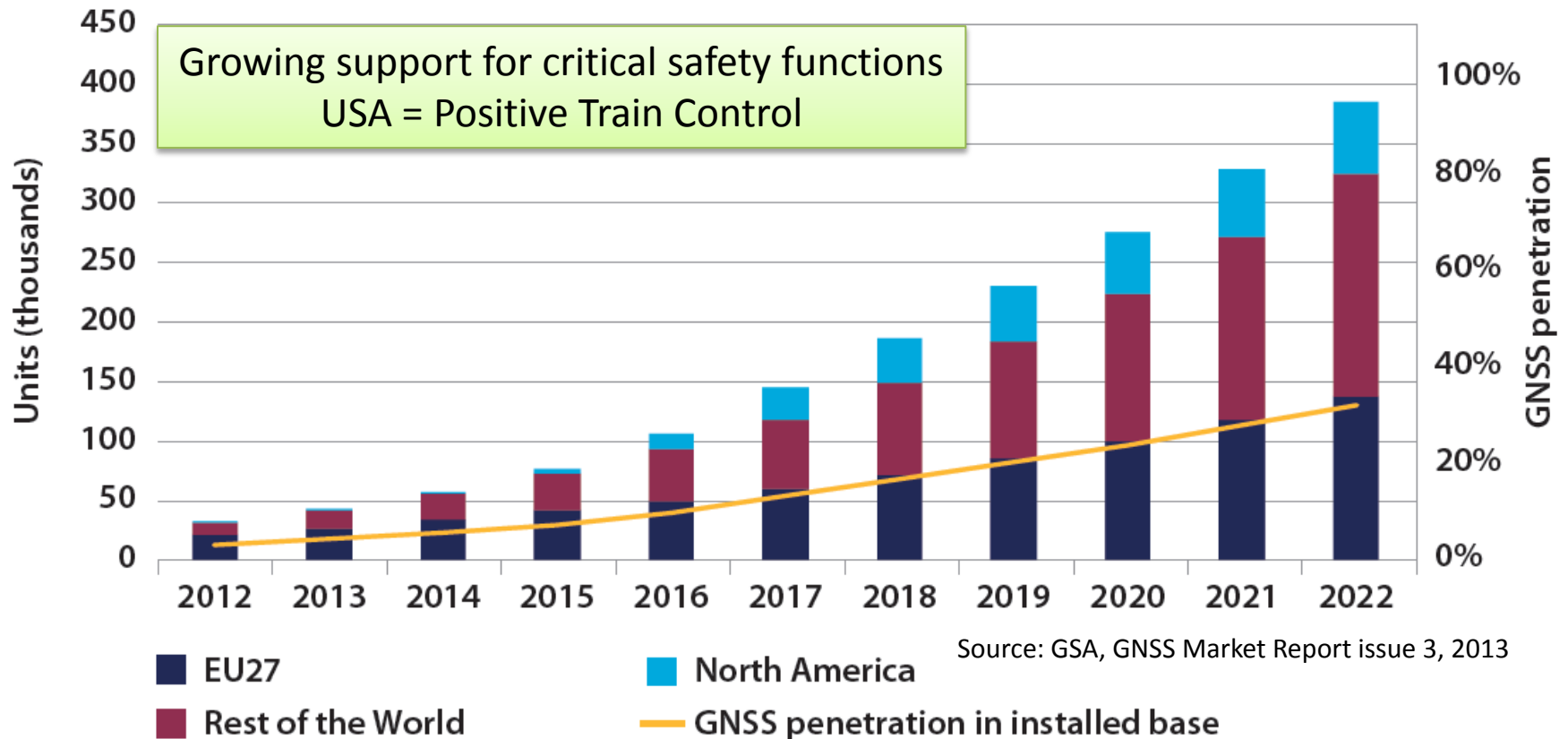
Shipments of GNSS devices by application



Global Market Size (est.)	2014	2020
Annual Shipments (000s)	15	57
Installed Base (000s)	53	270

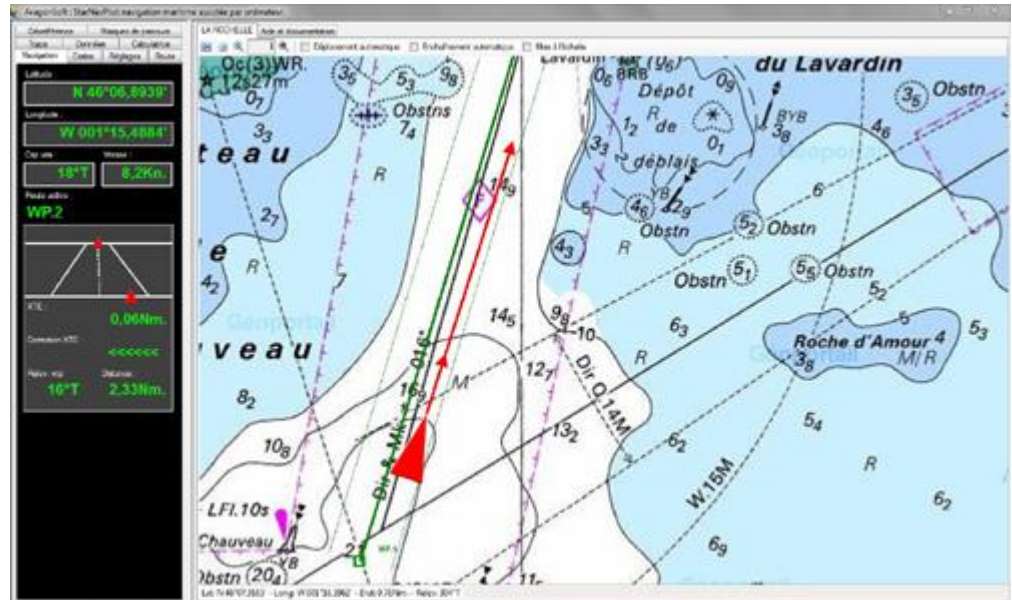
GNSS Rail – Global Market

Installed base of GNSS devices by region



Key Manufacturers

- | | |
|-----------|-------------------|
| ➤ Furuno | ➤ CSR-SIRF |
| ➤ Leica | ➤ Japan Radio Co. |
| ➤ Omnicom | ➤ U-Blox |
| ➤ Trimble | ➤ Septentrio |

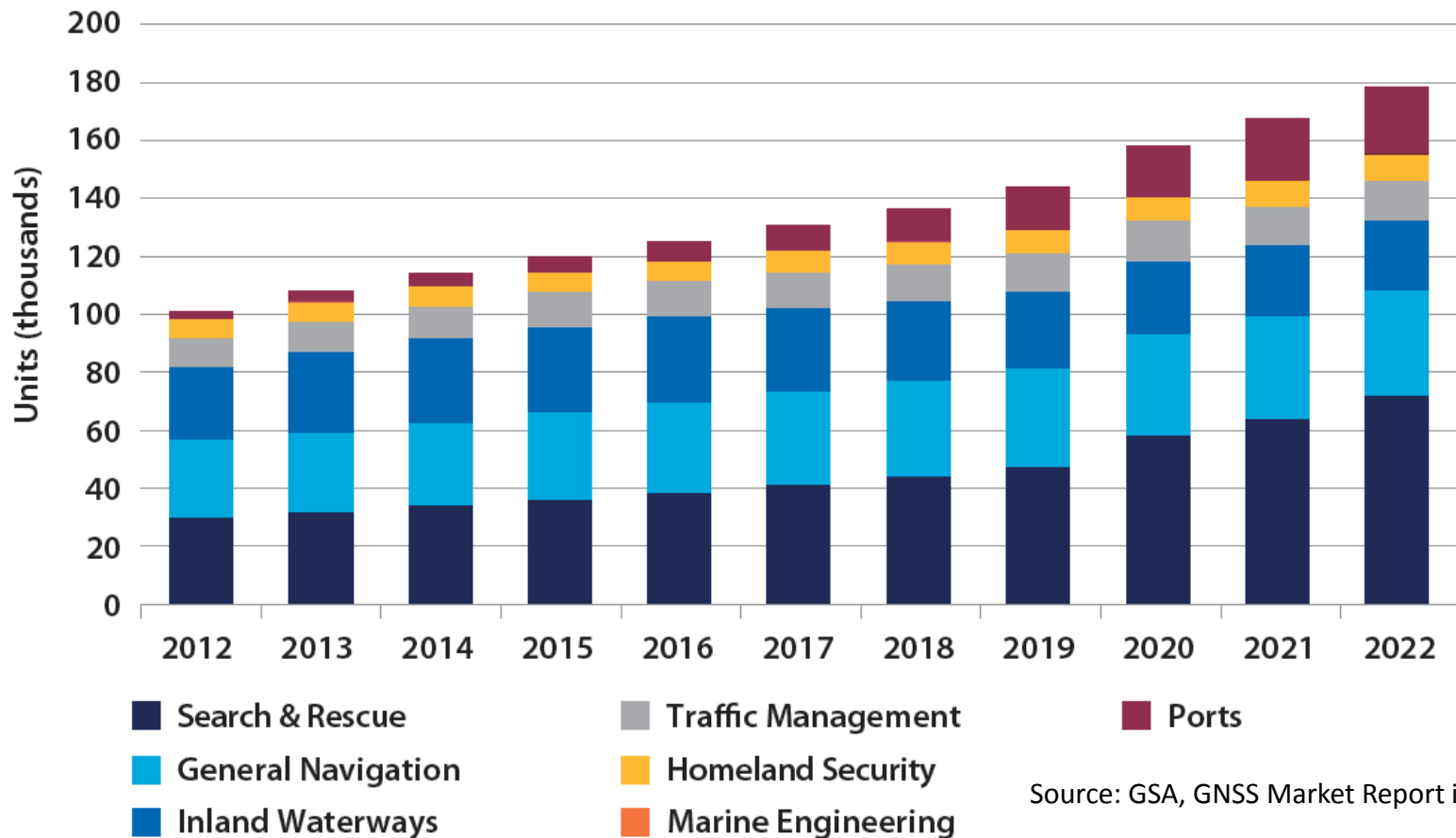


MARITIME



Global Maritime GNSS: Safety First

Shipments of GNSS devices by application

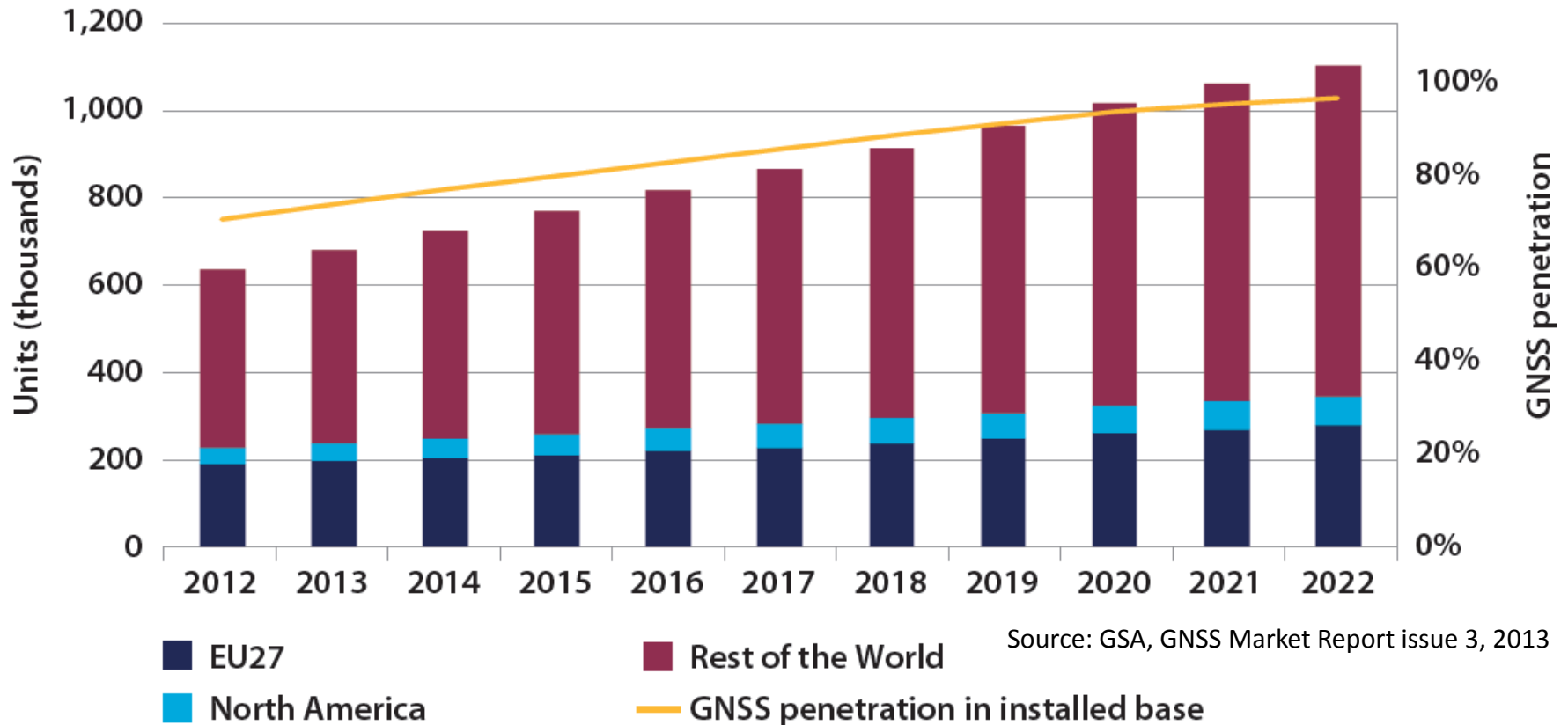


Source: GSA, GNSS Market Report issue 3, 2013

Global Market Size (est.)	2014	2020
Annual Shipments (000s)	117	158
Installed Base (000s)	725	1,050

Maritime – Global Market

Installed base of GNSS devices by region



Key Manufacturers

- Furuno
- Japan Radio
- Laird
- Leica
- Novatel
- Pulse
- Trimble

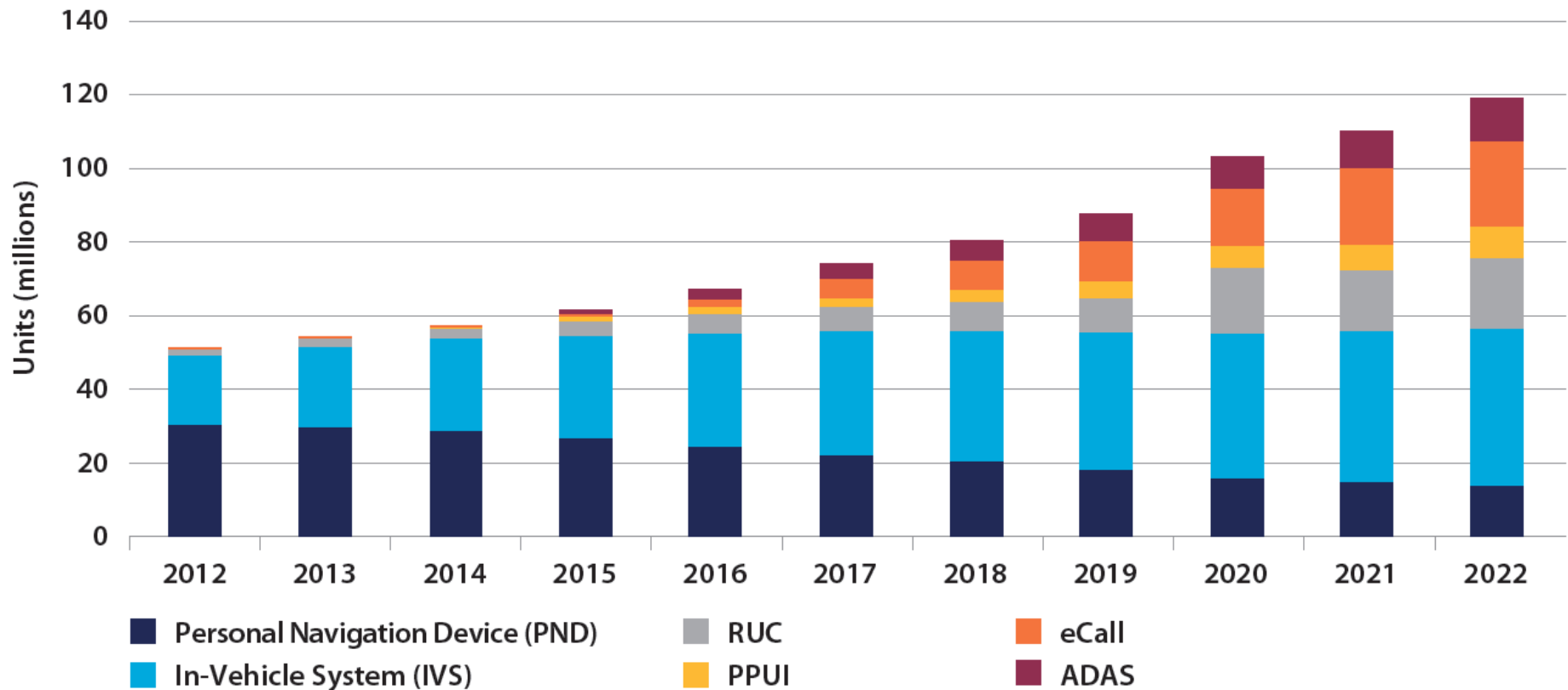


ROADS (VEHICLES)



Road GNSS: New Applications on the Horizon

Shipments of GNSS devices by application

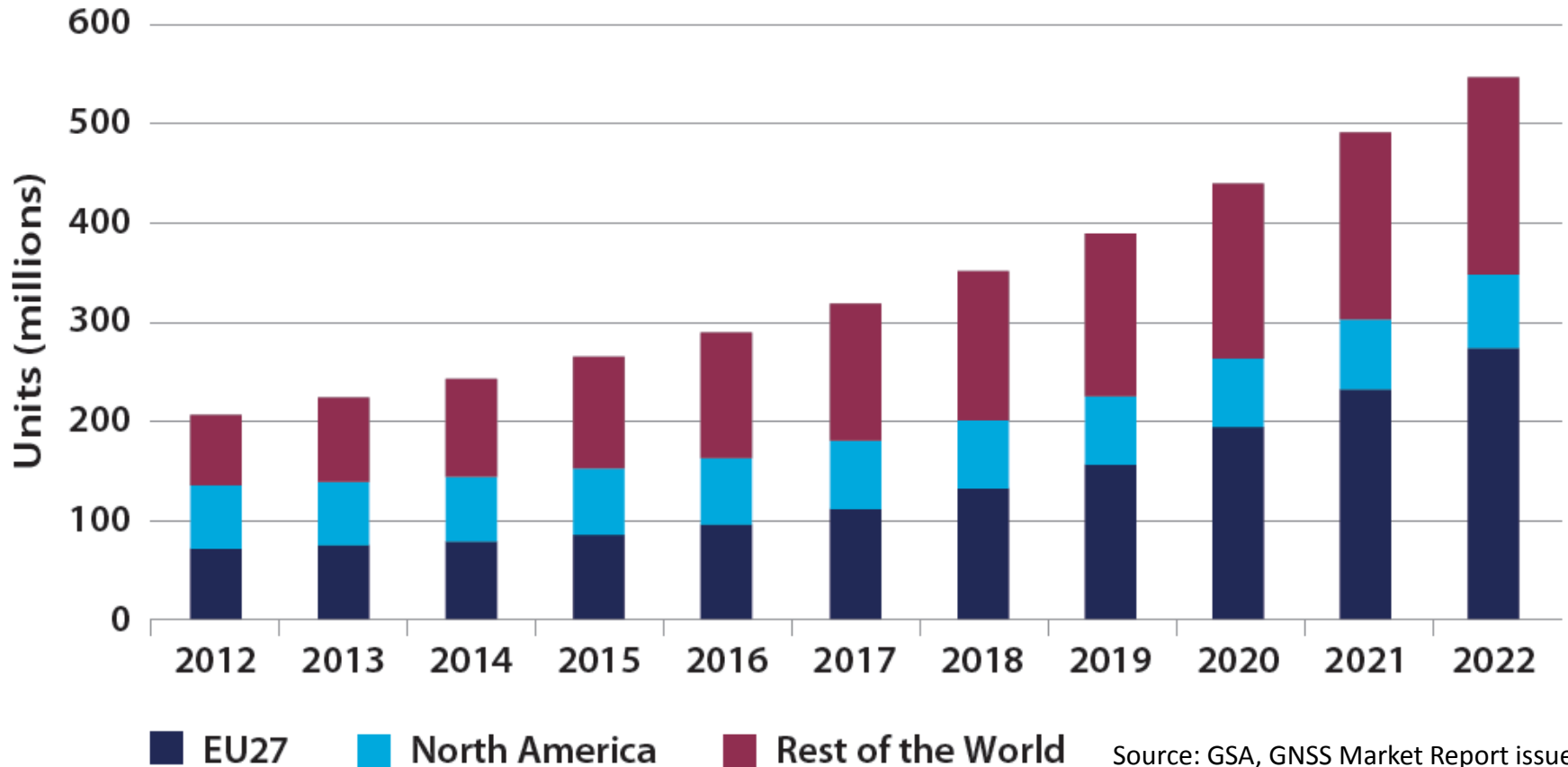


Global Market Size (est.)	2014	2020
Annual Shipments (M)	58	102
Installed Base (M)	240	440

Source: GSA, GNSS Market Report issue 3, 2013

Road GNSS – Global Market

Installed base of GNSS devices by region



Key Manufacturers

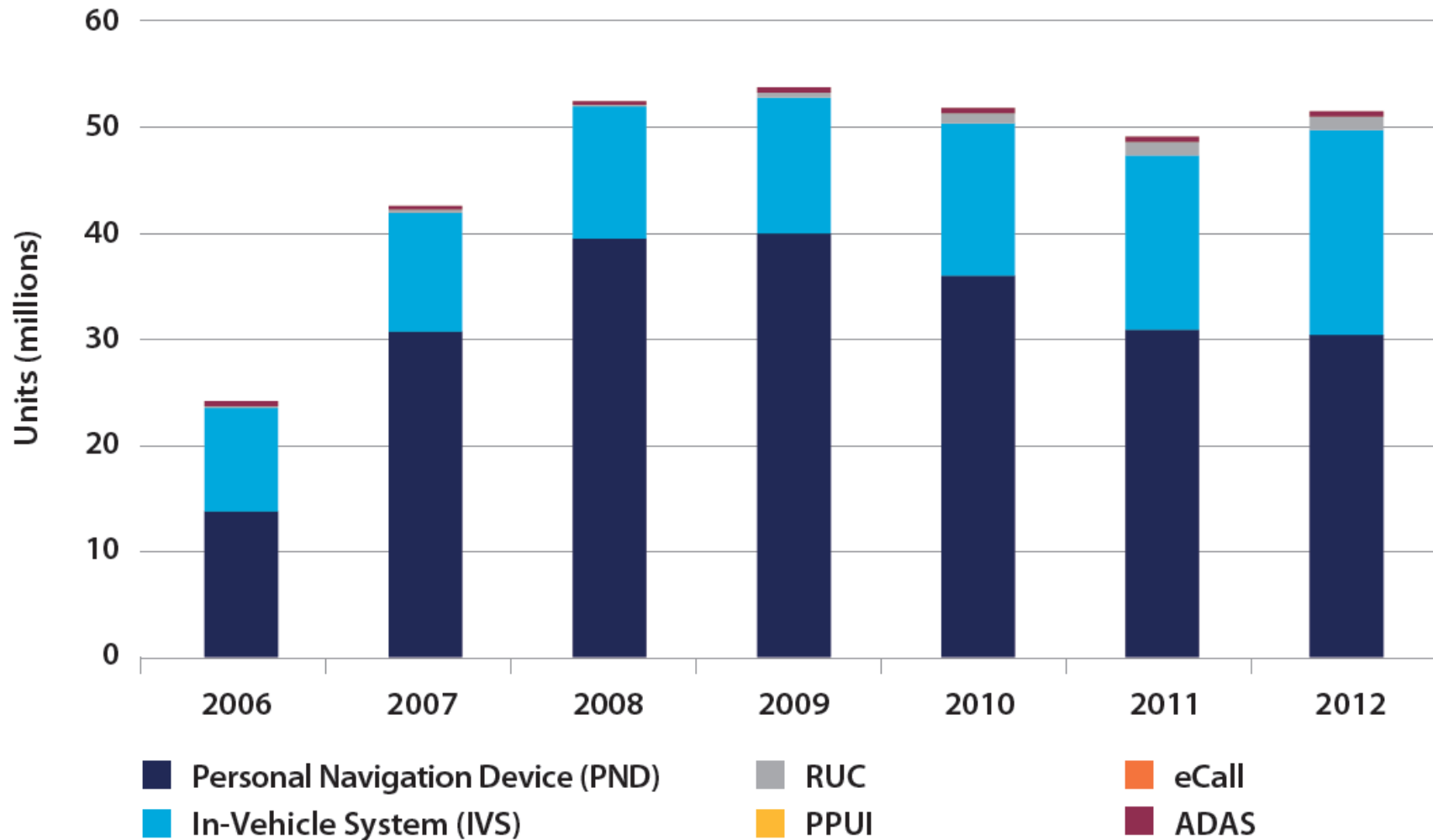
- Broadcom
- CSR-SiRF
- Furuno

- Japan Radio Co.
- Mediatek
- Pulse Electronics

- Qualcomm
- ST Micro
- U-Blox

Recalculating the Opportunity

Shipments of GNSS devices by application

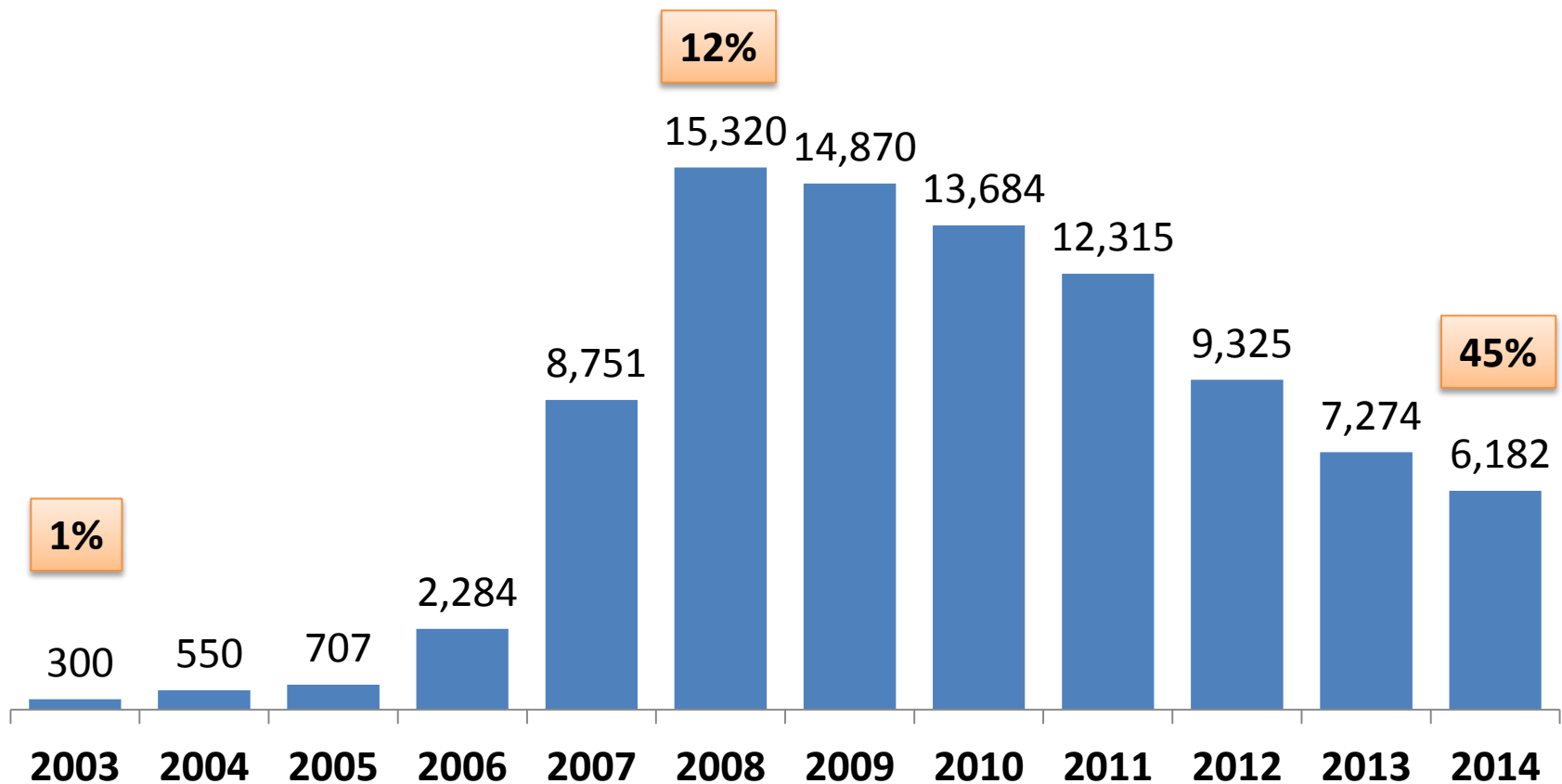


Source: GSA, GNSS Market Report issue 3, 2013

U.S. PND Market Trend

Unit Shipments (000s)

HH Penetration:



Source: CEA



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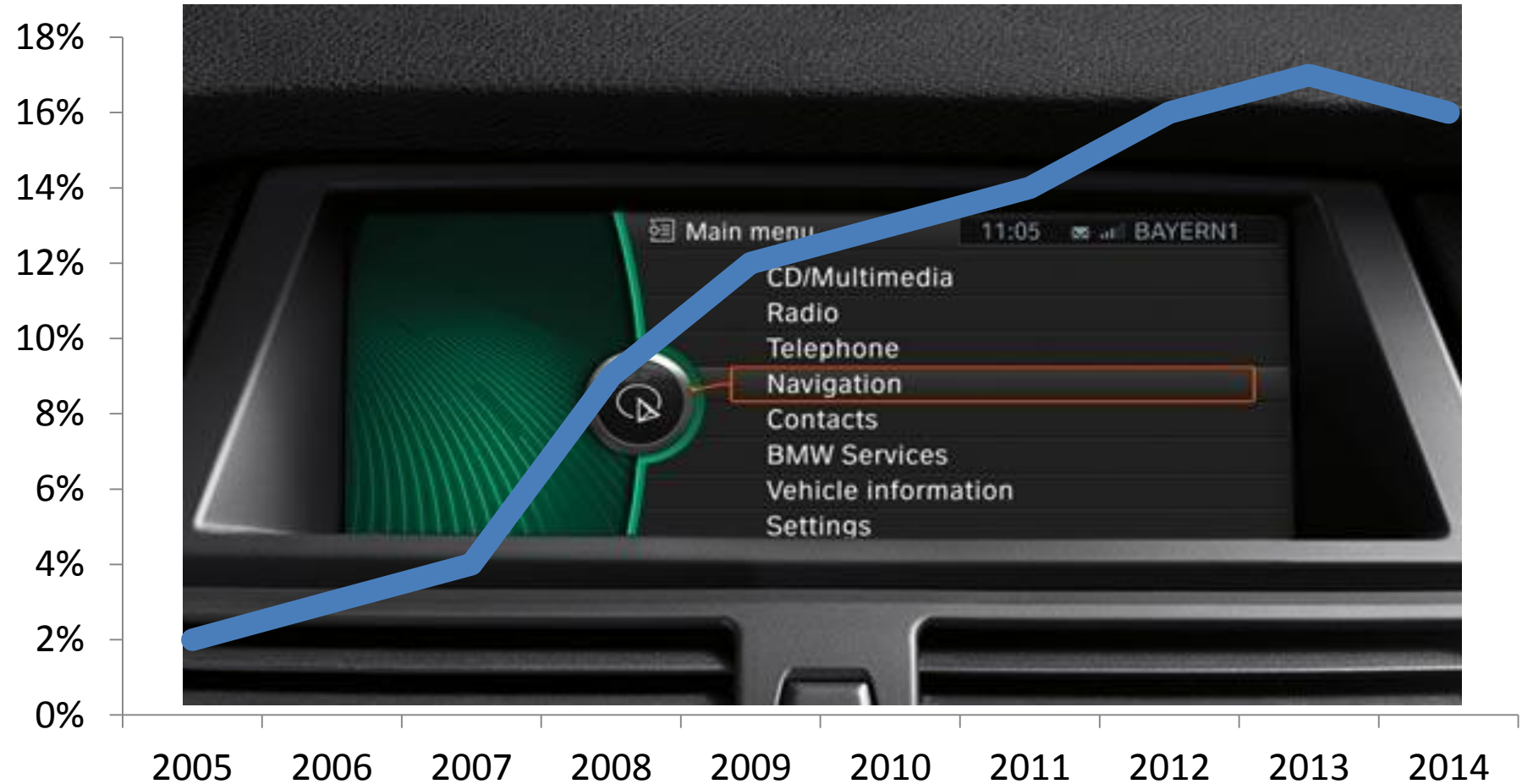
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GPS: In-Vehicle Navigation/Safety

U.S. household penetration rate climbing



Source: CEA



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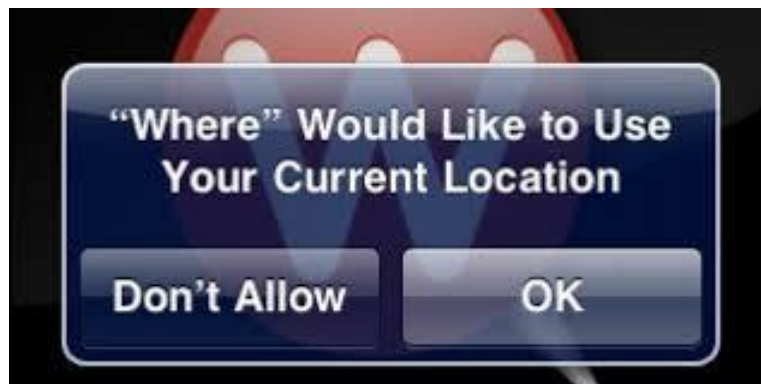
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Autonomous Vehicles

Street Legal Testing in:



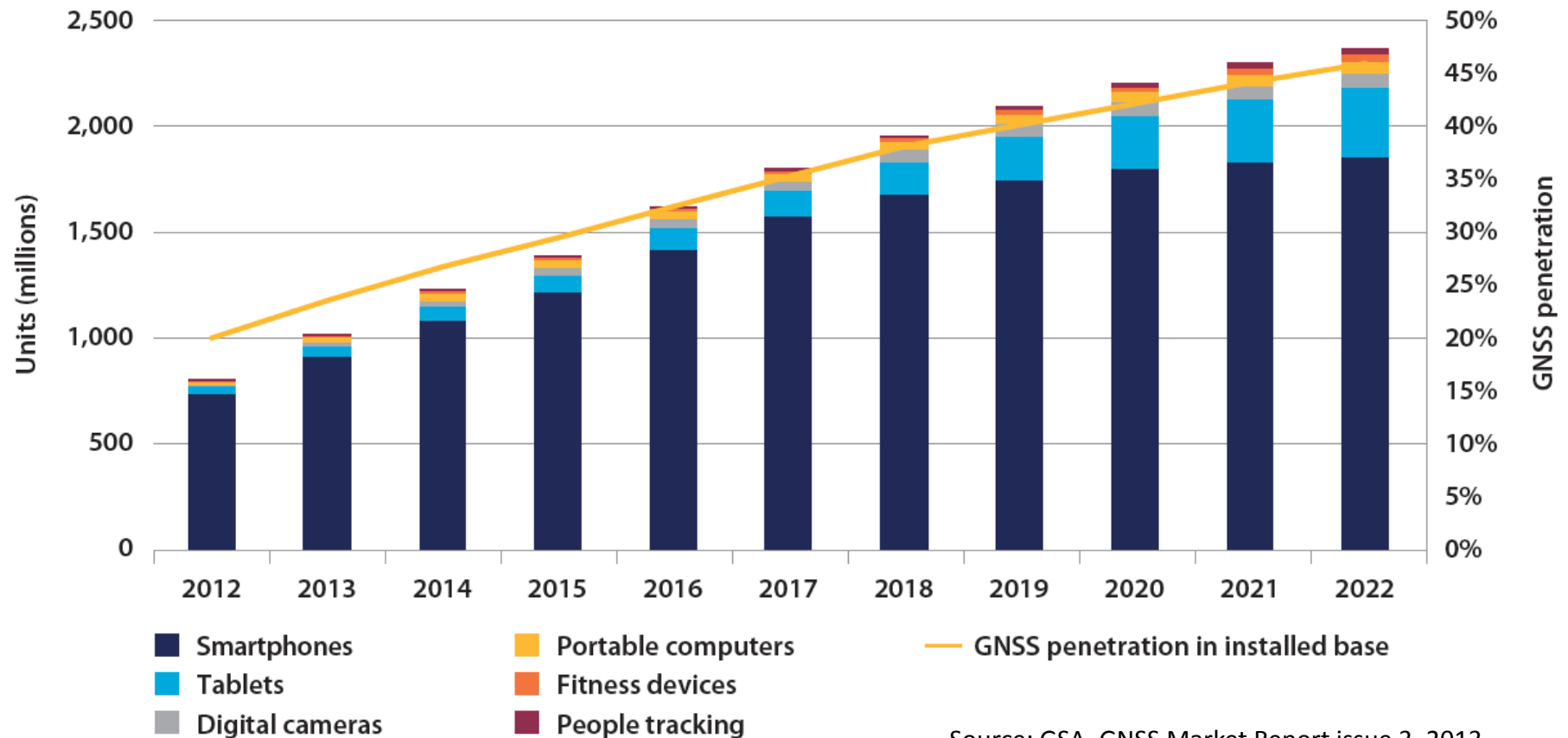


LBS (CONSUMERS)



LBS Device Universe Expanding

Shipments of GNSS devices by platform

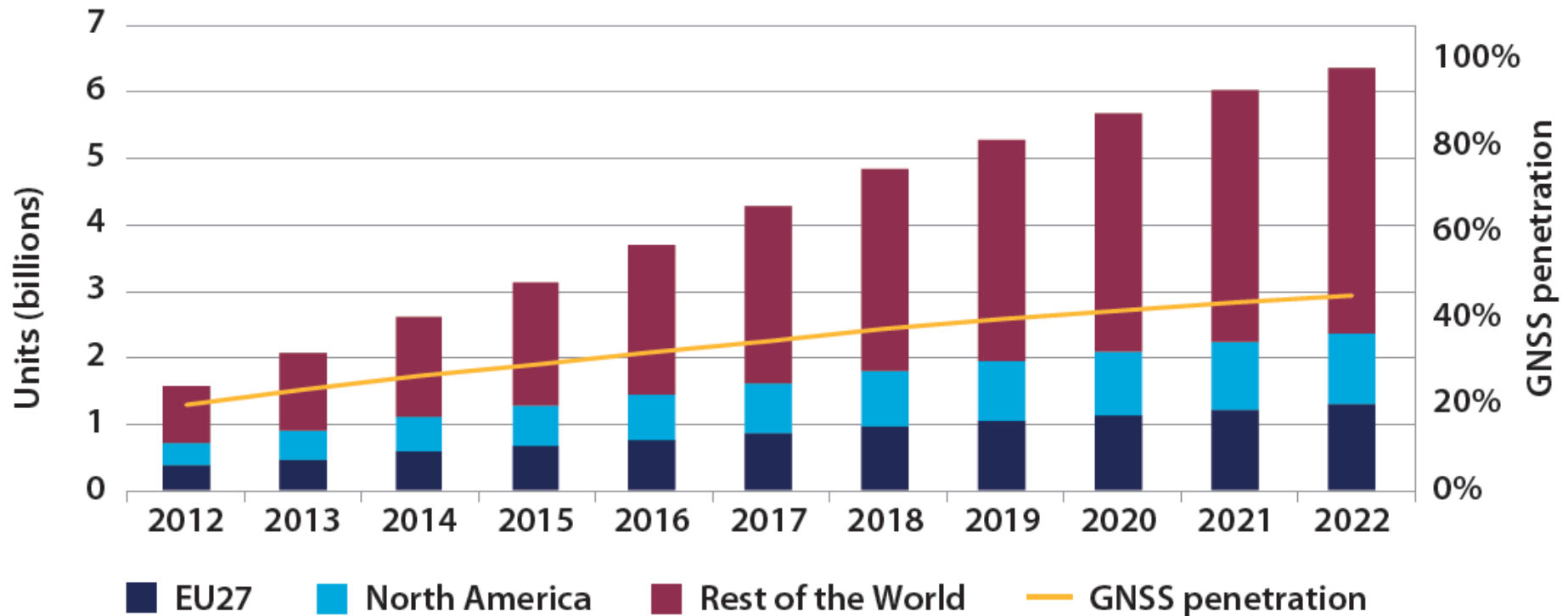


Source: GSA, GNSS Market Report issue 3, 2013

Global Market Size (est.)	2014	2020
Annual Shipments (M)	1,200	2,200
Installed Base (B)	2.6	5.6

LBS GNSS – Global Market

Installed base of GNSS devices by region



Source: GSA, GNSS Market Report issue 3, 2013

Key Manufacturers

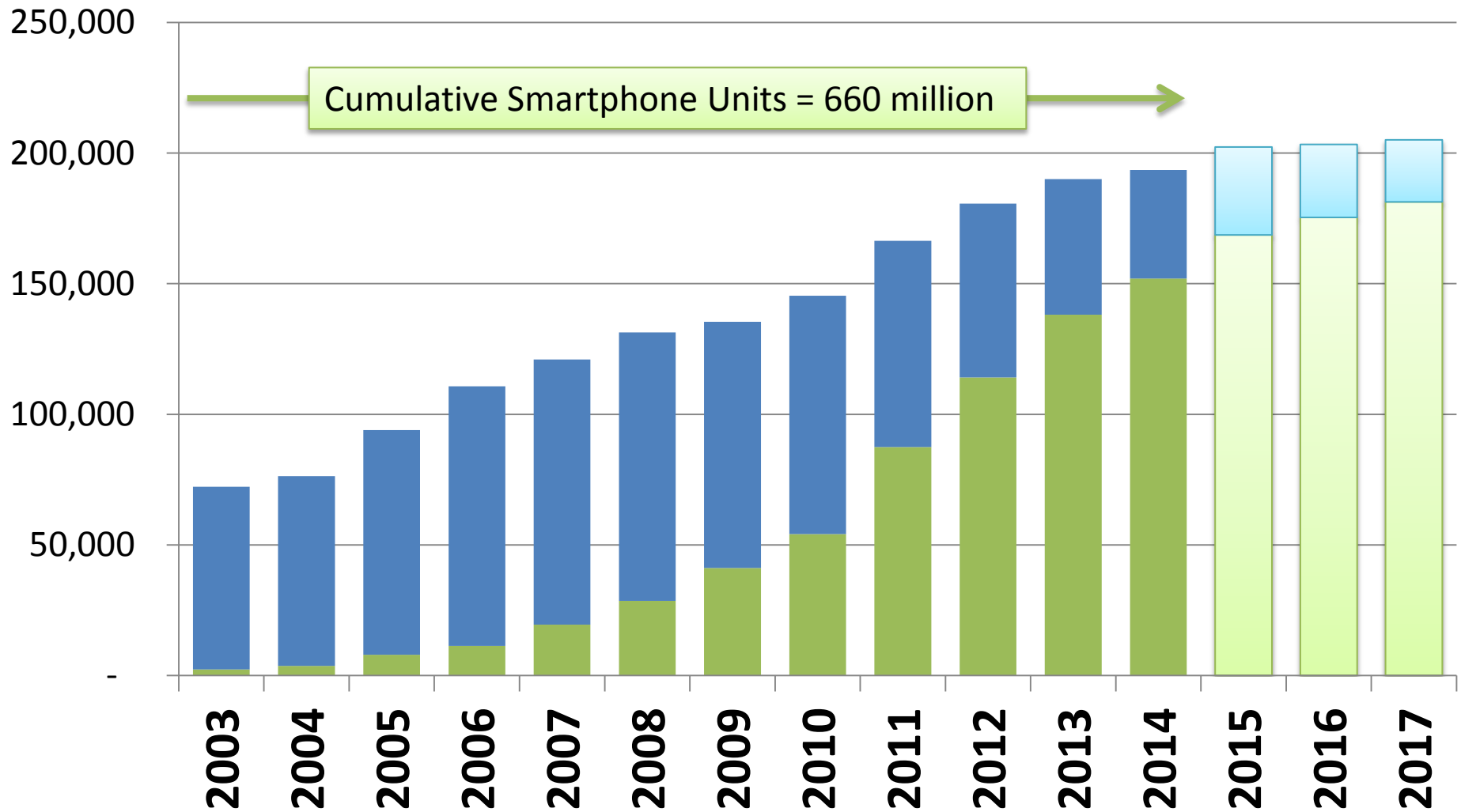
- Broadcom
- CSR-SiRF
- Fujitsu Ltd.
- Intel

- Mediatek
- Qualcomm
- Skytraq

- STM
- Texas Instruments
- U-Blox

U.S. Wireless Handset Volume Trend

(Shipments in 000s)



Source: CEA



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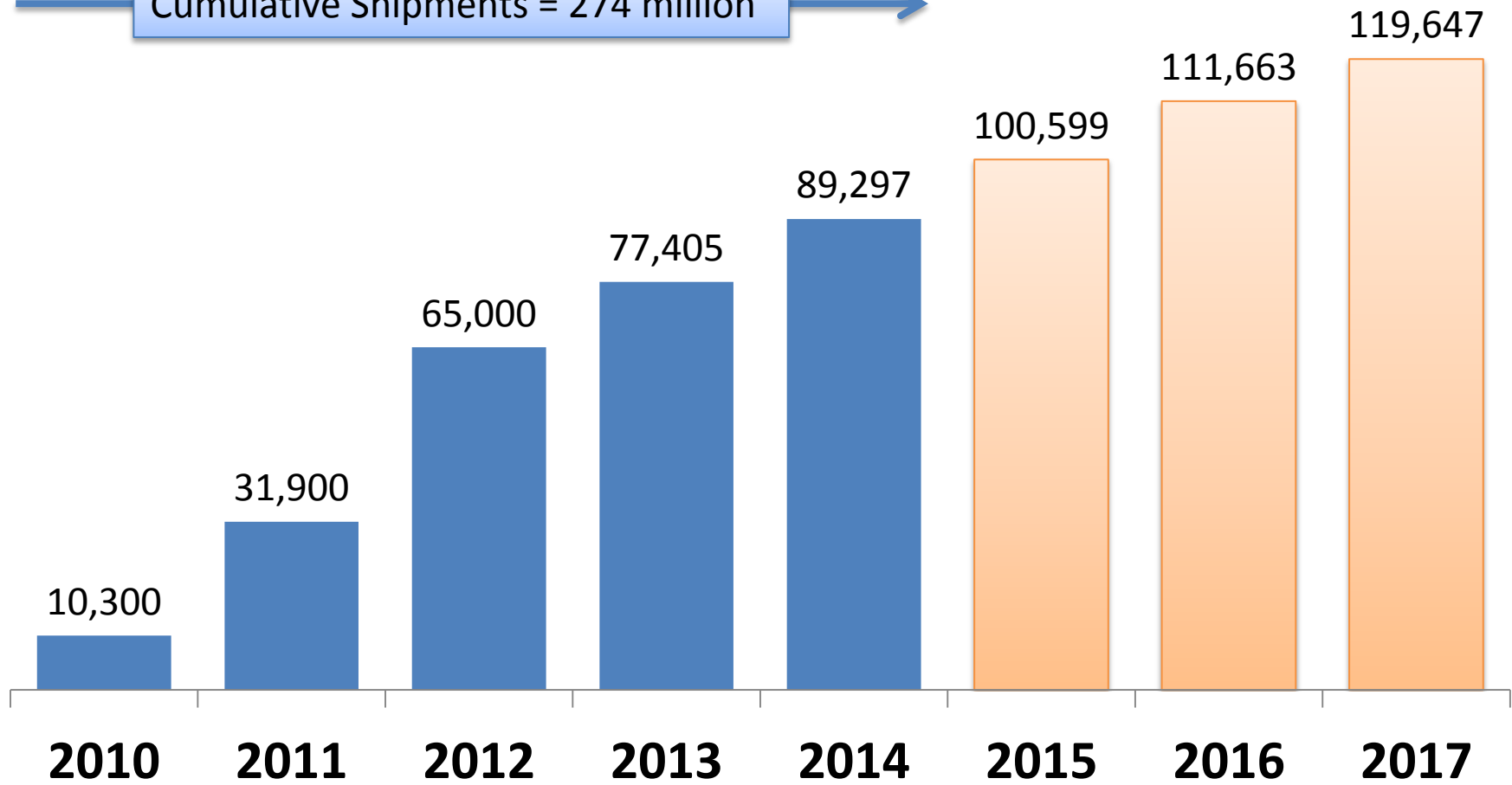
PRODUCER OF



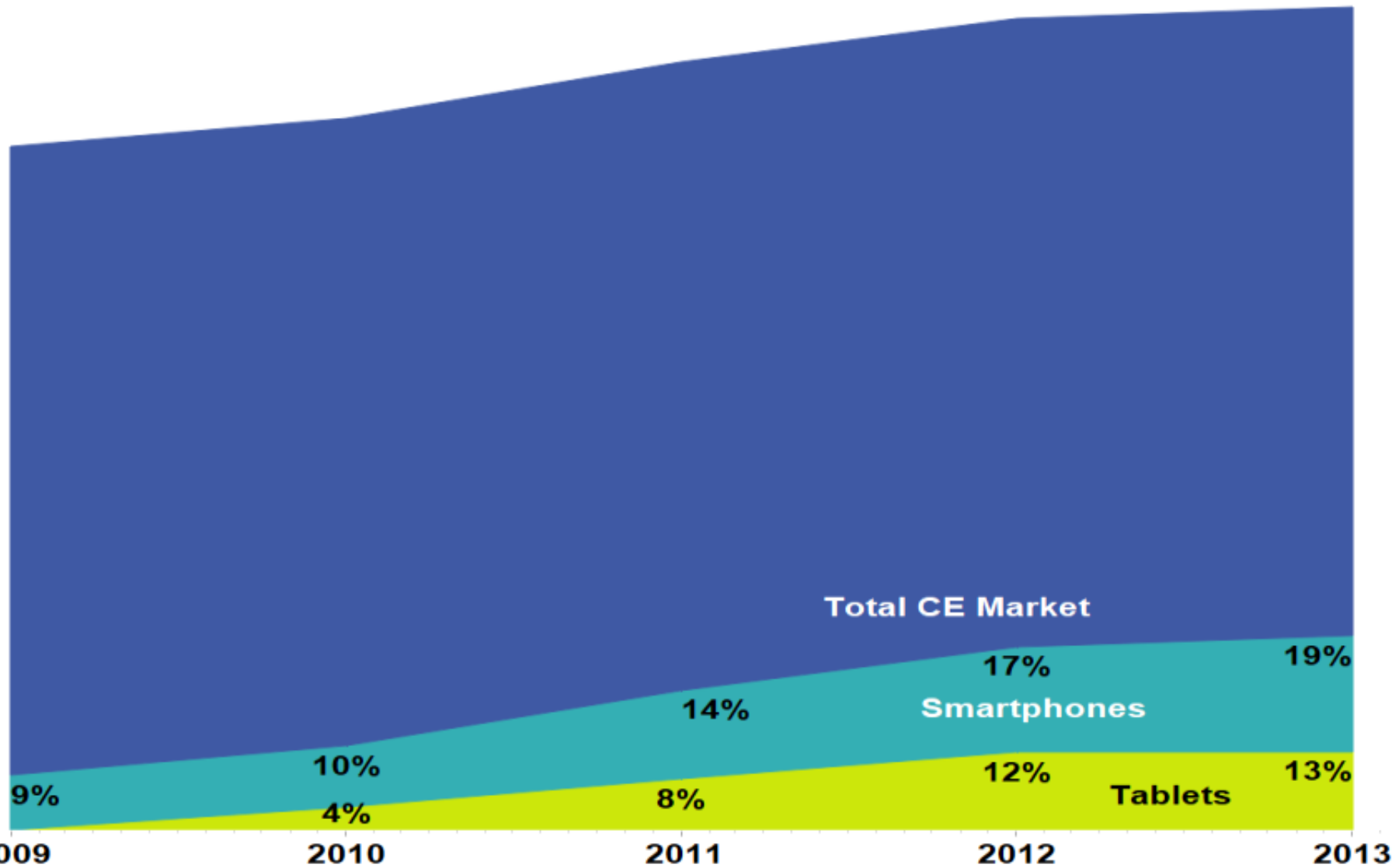
U.S. Tablet Volumes / Forecast

Shipments in 000s

Cumulative Shipments = 274 million



CE Market Revenues, 2009-2013



Source: CEA forecast data



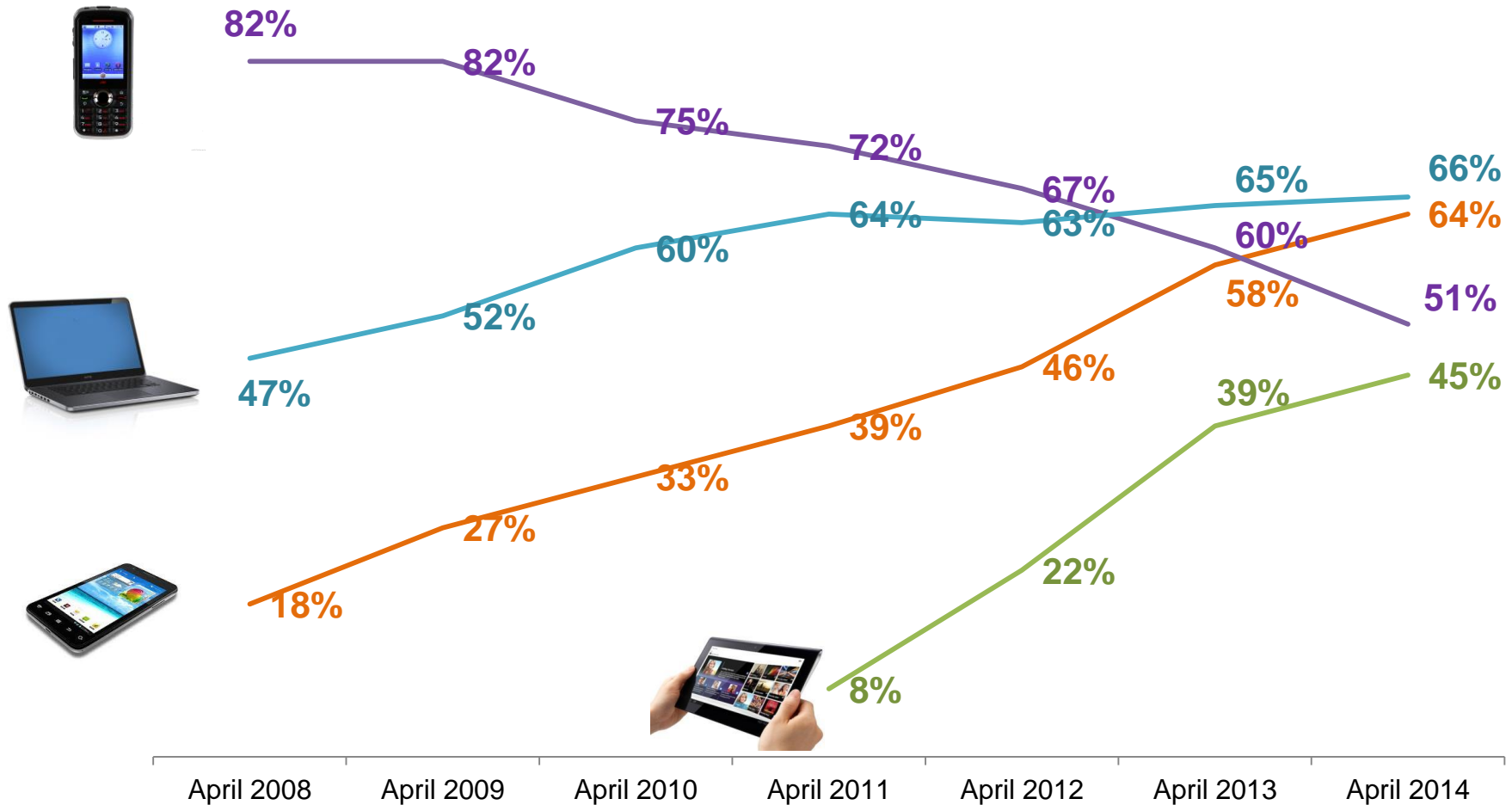
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Source: CEA



U.S. Trends in HH Penetration for Mobile Devices



Source: CEA



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LBS: Gaining Momentum

Key Trends

More Use Cases

Connectivity, Sensors, Ecosystem

Accuracy, Power Management, Cost

Apps

Devices

Smartphones

Technology

GNSS, Wi-Fi, etc.

CE Mega-Trend: Sensorification

- Chorus of sensors in CE



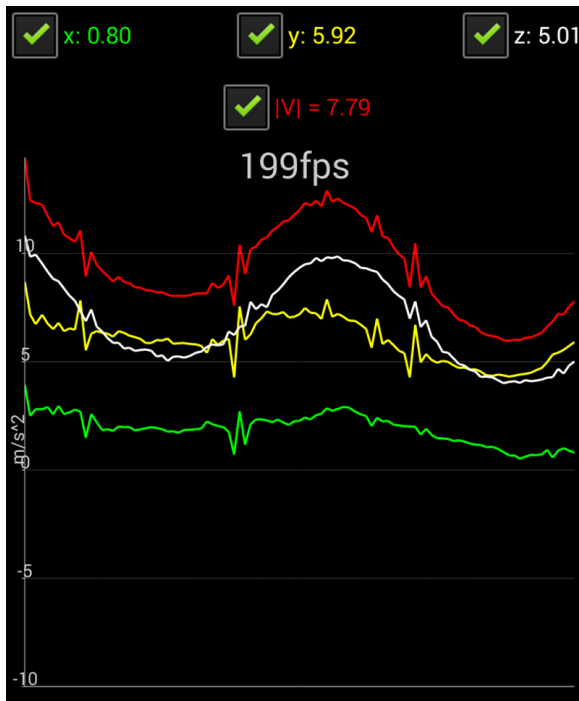
- GPS and Connectivity are crucial



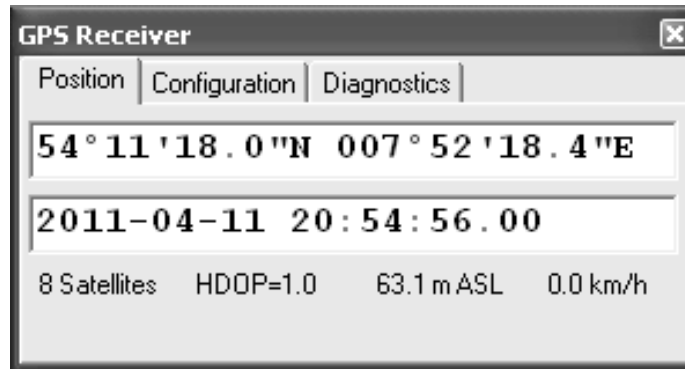
Raw Outputs from Sensors

... not that interesting!

Accelerometer



GPS - GNSS



Gyroscope



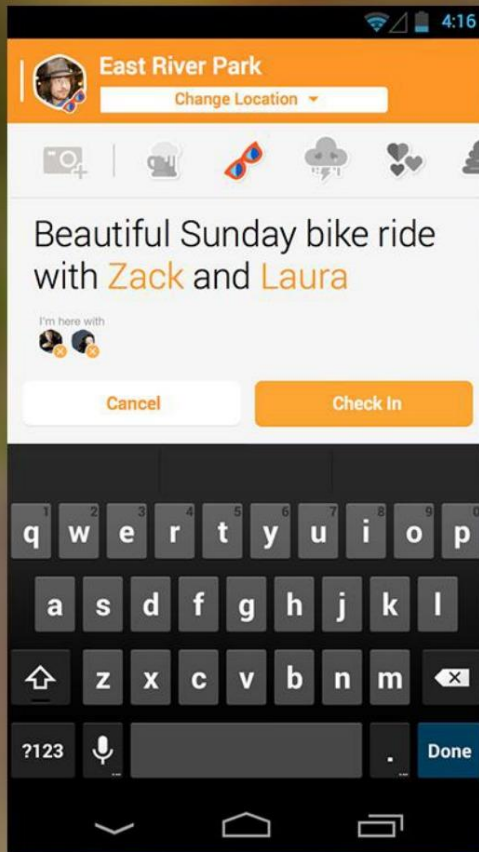
It's All About Context

- The “magic” is made in software
- Combining inputs from various sensors adds context
- CES is full of companies finding **new uses for sensors**
- Basic applications of sensors are old news
 - Complex algorithms determine context and meaning of inputs

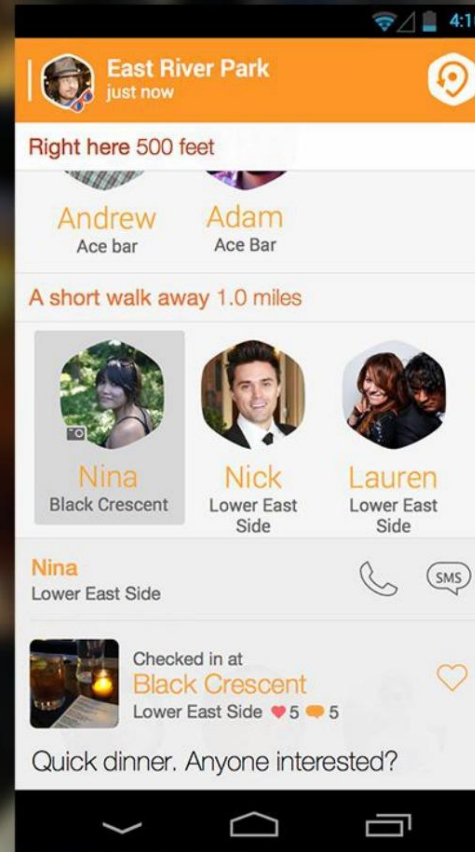
GNSS LBS: Innovation



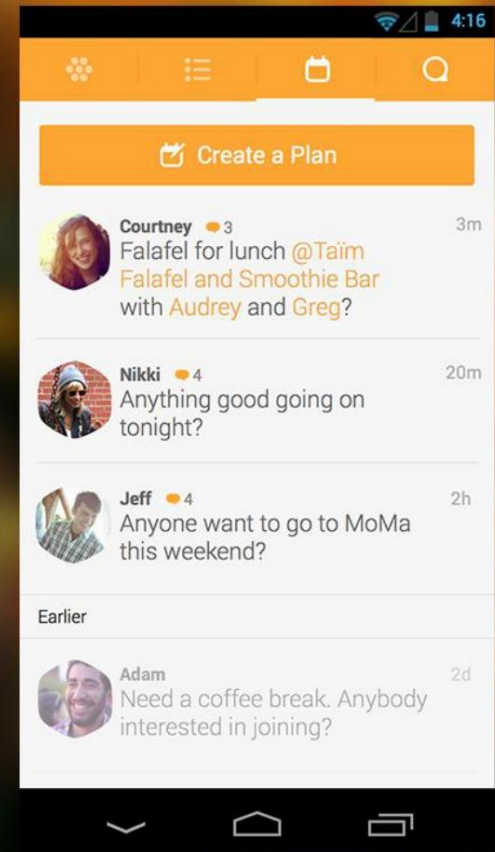
An all-new, super fun way to check in



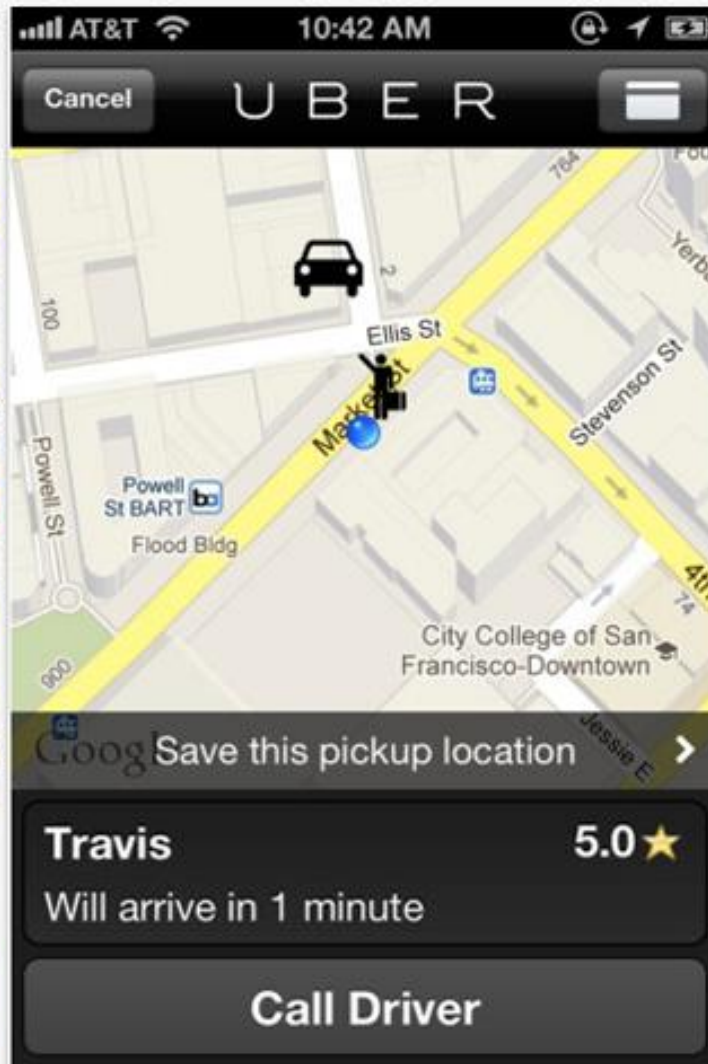
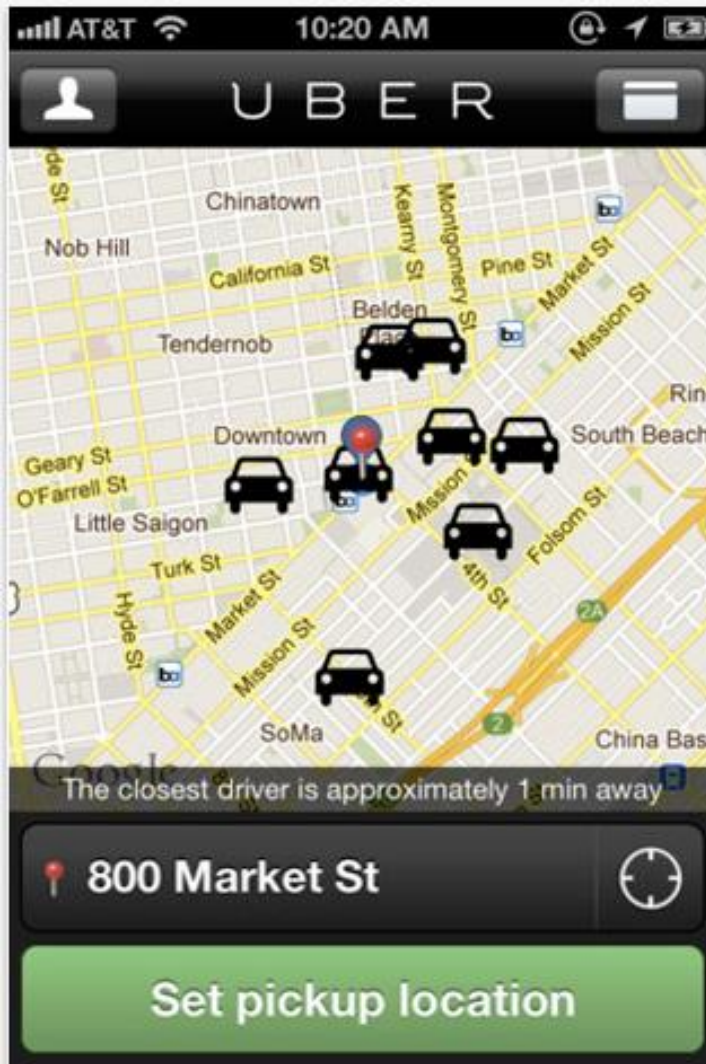
See which of your friends are hanging out nearby



See what your friends are up for tonight



GNSS LBS: Disruption



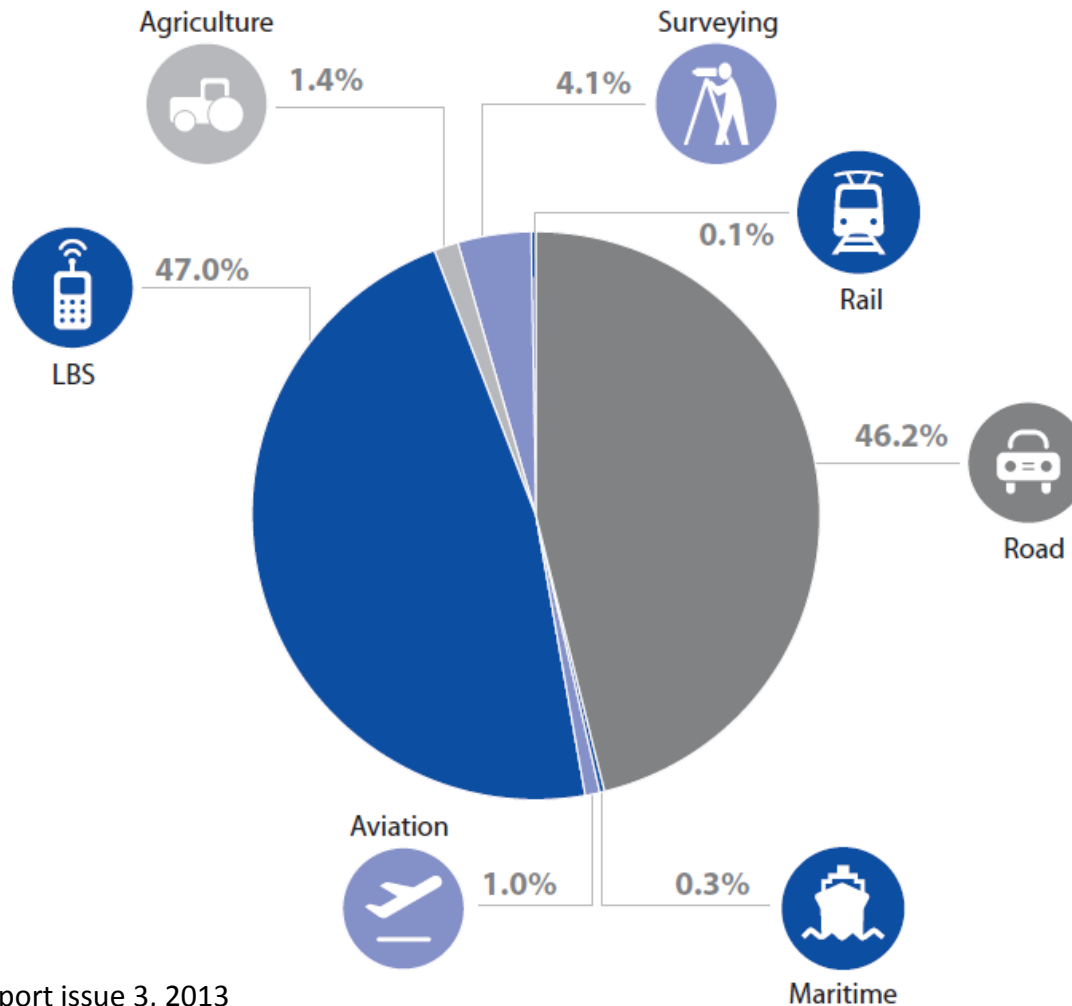
Global GNSS Market Summary

Unit Shipments (000s)

GNSS Market	2014	2020
Survey	200	320
Agriculture	220	610
Aviation	260	340
Rail	15	57
Maritime	117	158
Road	58,000	102,000
LBS	1,200,000	2,200,000

Source: GSA, GNSS Market Report issue 3, 2013

Cumulative Global GNSS Revenues 2012-2022



Source: GSA, GNSS Market Report issue 3, 2013

Summary

- Location is more important than ever.
- GPS/GNSS is an enabling technology for innovation and disruption.
- Consumer market (Road, LBS) represents biggest opportunity.
- Precision verticals have room to grow
 - especially in emerging markets.