PTOLEMUS Consulting Group

Using mobile phone GNSS positioning for 112 emergency calls?

Public hearing organised by the European Commission

Brussels - 7th May 2014

A member of EENA, PTOLEMUS is the 1st strategy consulting firm focused on telematics and geolocation

Our consulting services

Strategy definition
Vision creation, strategic positioning, business plan development, board coaching & support

Investment assistance
Strategic due diligence, market assessment, feasibility study, M&A, post-acquisition plan

Procurement strategy
Specification of requirements & tender documents, launch of tenders, supplier negotiation & selection

Innovation management
Value proposition definition, product & services development, architecture design, assistance to launch

Business development
Partnership strategies, detection of opportunities, ecosystem-building, response to tenders

Implementation
Deployment plans, complex / high risk project & program management, risk analysis & mitigation strategy

Our fields of expertise

Car infotainment & navigation
Connected services, driver monitoring, maps, smartphone integration, smartphone-, PND- or embedded navigation

Usage-based charging
PAYD / PHYD insurance, road charging / electronic tolling, fleet leasing & rental, car sharing, Car As A Service, etc.

Telematics & Intelligent Transport Systems
ADAS, connected vehicle, crowd-sourcing, fleet management, eCall, bCall, SVR, tracking, vehicle data analytics (OBD / CAN-bus), VRM, V2X, xFCD

Positioning / Location enablement
E112, GNSS, cellular network location, WiFi, mass location crowdsourcing, indoor location, etc.

M2M & connectivity

We help all players in the ecosystem, around the world

Telecom operators

vodafone, O2, TIM, Bouygues Telecom, BASE, Telekom Austria Group, Sprint, orange, SFR, telenet, kpn, verizon

Telecom infrastructure suppliers

Nortel Networks, Ericsson, TeleBilling, Orga Systems, andrexen, Alcatel-Lucent

Consumer electronics makers

NOKIA Connecting People, VIZIO, MOTOROLA

Positioning solution providers

SYSNAV, cnes, TechnoCom, TruePosition, Navizon, ANDREW, ThalesAlenia Space

OEMs & telematic vendors

Agero, TomTom, Toyota, Qualcomm, Harman, Philips, Magneti Marelli, Lysanda, Danlaw, Mitsubishi Electric, gmv, QOROS, Peugeot, Orion, evogi, Citroën, Telit, cobra, Valeo, Coyote, SafeFleet, LoJack, Arkan, Movelo, Sierra Wireless, OCTO, simobil, Queclink, Michelin, intel

Insurers, aggregators & assistance providers

Aioi Nissay Dowa Insurance, MS&AD Insurance Group, Allianz, AXA, Desjardins, covea, europ assistance, Generali, Google, The Hartford, HUK, Inter Mutuelles Assistance, Liberty Mutual, Menora Mivtachim, OUT Surance, Quindell, RSA, Sompo Japan, youi, Zurich

Content & application providers

ESRI, ORACLE, commedi, Dailymotion, tdf, ArchiFiles, BMJ Group, INTERMAP, RoadPilot, NAVTEQ, Tele Atlas, sas, Cognizant

ITS operators & regulators

Nomad Digital, ERTICO, egis, AnsaldoSTS, European Commission, SOFICO

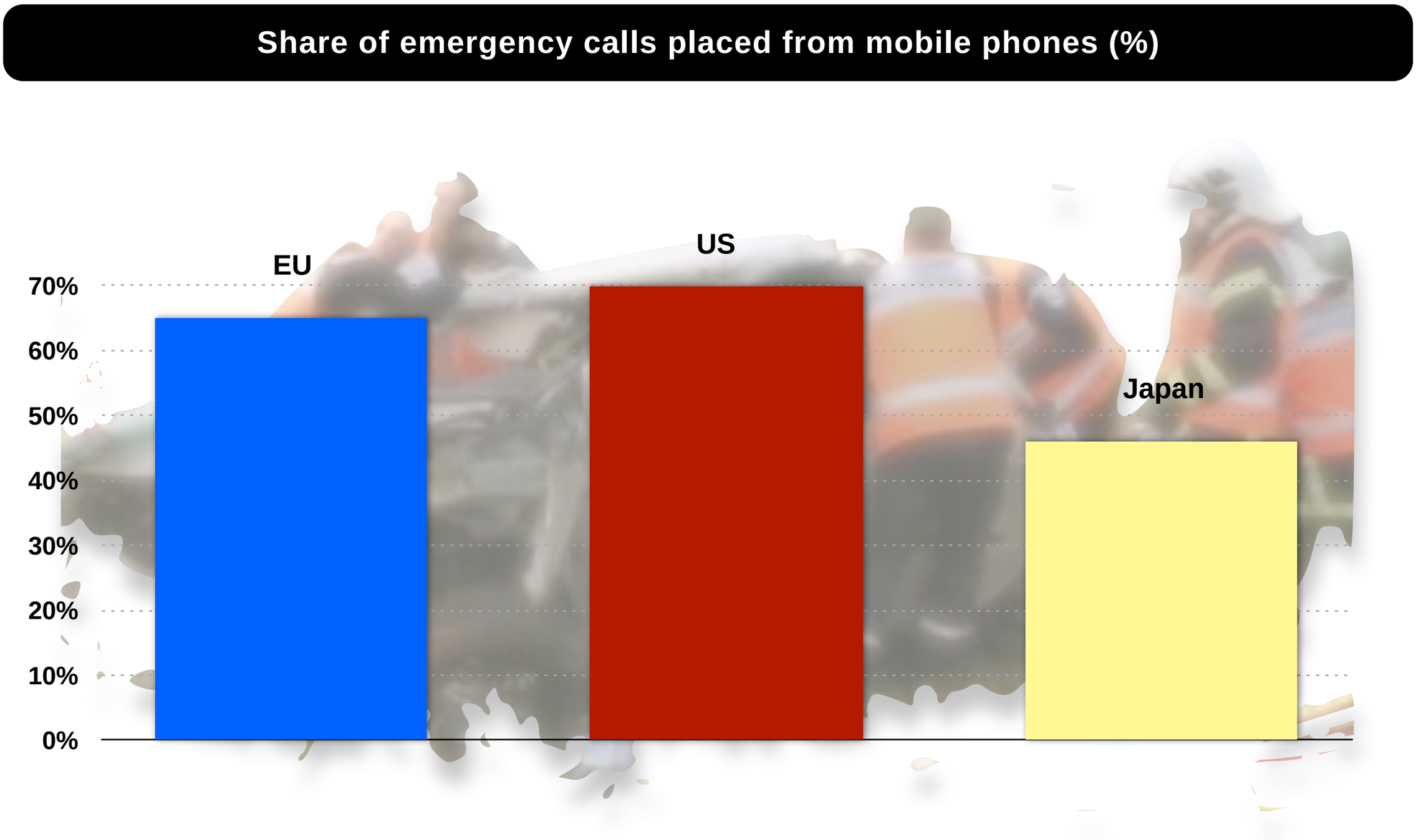
Fleets

ARVAL BNP Paribas Group, EUROMASTER, TOYOTA TSUSHO

Financiers

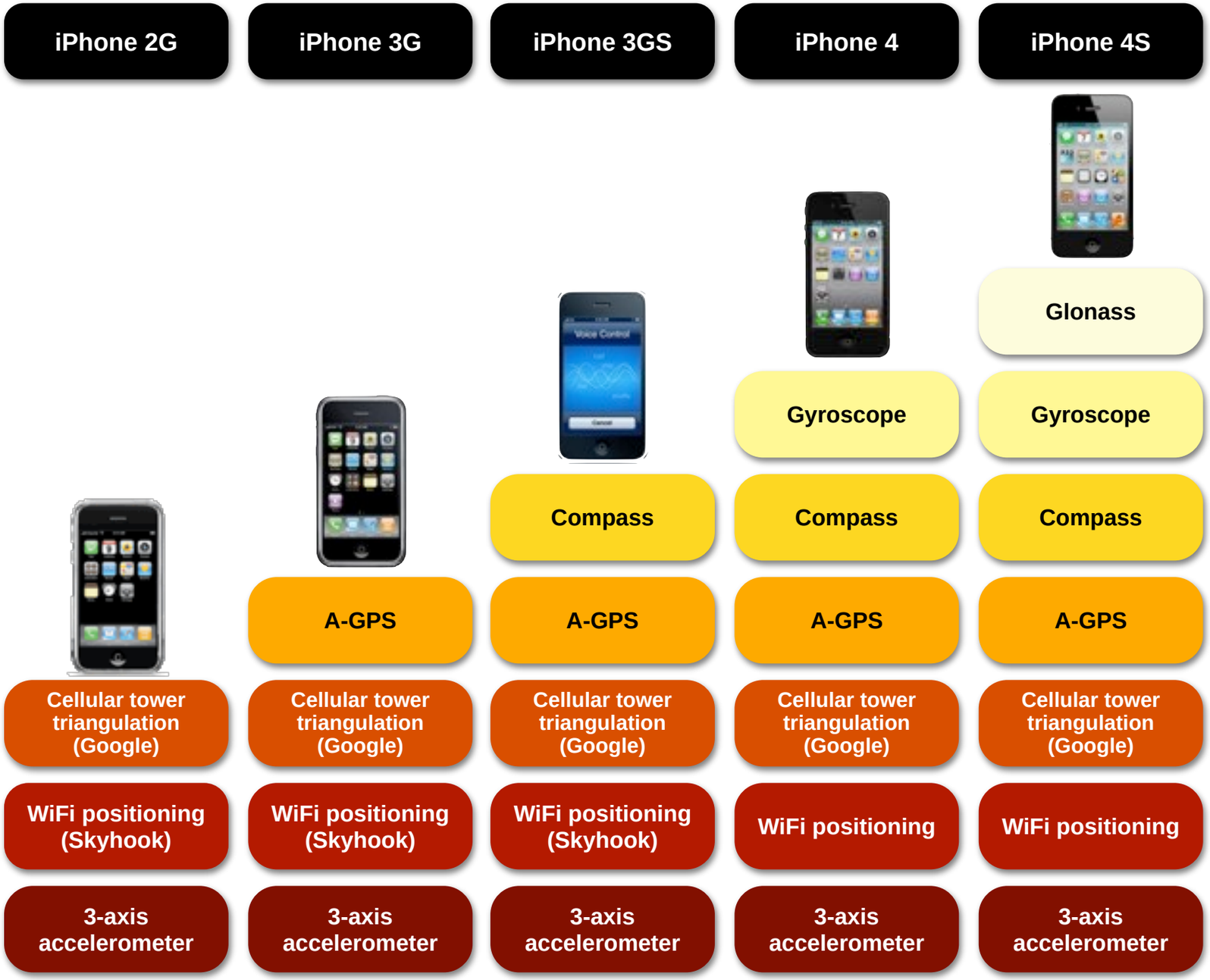
Amadeus Capital Partners Limited, zouk, Leonardo & Co., Goldman Sachs, NOMURA, Cinven, Montezemolo & Partners, CVC Capital Partners, INTEK GROUP, DISRUPTIVE

The accuracy of mobile caller location has become essential



Source: EENA, FCC, Eurotechnology

A paradox: why can't we accurately locate emergency callers if mobile phones already allow it?



Optimal geo-location relies on the use of multiple technologies

Source: PTOLEMUS

The European roadmap on emergency services has been lagging the US by 5-12 years depending on topics

Original FCC 911 order 1996

911 provision deadline 1997

E911 provision deadline 1998

Caller location within 125 meters 67% of the time 2001

Requirement for **interconnected VoIP** providers to provide E911

Achieve 95% of GPS-enabled handsets for relevant carriers 2005

Accuracy requirement to be met with all PSAP service areas 2012

Proposed rules to enhance E911 indoor location accuracy & strengthen Phase II E911 location accuracy rules

1990-94 | **1995-99** | **2000-2004** | **2005-09** | **2010-14**

Council Decision 1991

Introduction of 112 by 1997

ONP Directive 1997

112 available free of charge from fixed and mobile phones

Universal Service Directive 2002

- Caller location information
- Information of EU citizens about existence and use of 112

24th July 2003

Revised Universal Service Directive 2009

ITS Directive including **eCall 2010**

25th May 2011 *27th Feb. 2012*

Source: NENA, European Commission

Despite significant work, no decision has been made to improve mobile caller location

Historic development of emergency-related obligations in Europe

Universal Service Directive

Commission recommends push method in location transmission

EENA complains against EC for mal administration on the 112 issue (condemned by European Ombudsman)

MEP report pushing implementation of eCall

Viviane Reding calls members states to improve their 112 systems

Relaunch of eCall plan by Viviane Reding

Written declaration of European parliament on 112, urging Commision and MS to implement 112 **(signed by 530 MEPs)**

Revised Universal Service directive

- 112 information required for travelers
- Equivalent access for disabled users
- Caller location free of charge, instantaneous
- 112 mandated for VoIP providers and MVNO

ITS directive giving the green light to the Commission's plan for **eCall**

eCall impact assessment by the Commission

2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013

Final report CGALIES

- Best practices and methods for communicating with emergency services
- Development of a common European emergency access interface
- Providing input on a set of criteria for "efficient & effective implementation of 112"

- **Recommends best effort approach** (Operators pass best location info available to them, with further performance improvement depending on commercial development; PSAPs and EAs upgrade their information systems to be able to receive and use the location information provided

High Level Operational Requirements for Access to Emergency Services made by the **Expert Group on Emergency Access (EGEA)**

- Create interfaces into the National Emergency Systems that are harmonized across the EU

Revised terms of reference EGEA group

- Best practices and methods for communicating with emergency services
- Development of a common European emergency access interface
- Providing input on a set of criteria for "efficient & effective implementation of 112"

Revised terms of reference of EGEA group

- Use of new technologies for communication with emergency services.
- Effective use by emergency services of the information received via new technologies.
- Providing input to COCOM's information-gathering exercise on the effective implementation of 112

EC Public consultation on Universal Service principles in e-Communications

eCall implementation trials

Commission urged by 150 MEPs to propose an action plan for 112

Source: PTOLEMUS

USA: A step-by-step approach has been taken, with effects on both mobile operators & handset vendors

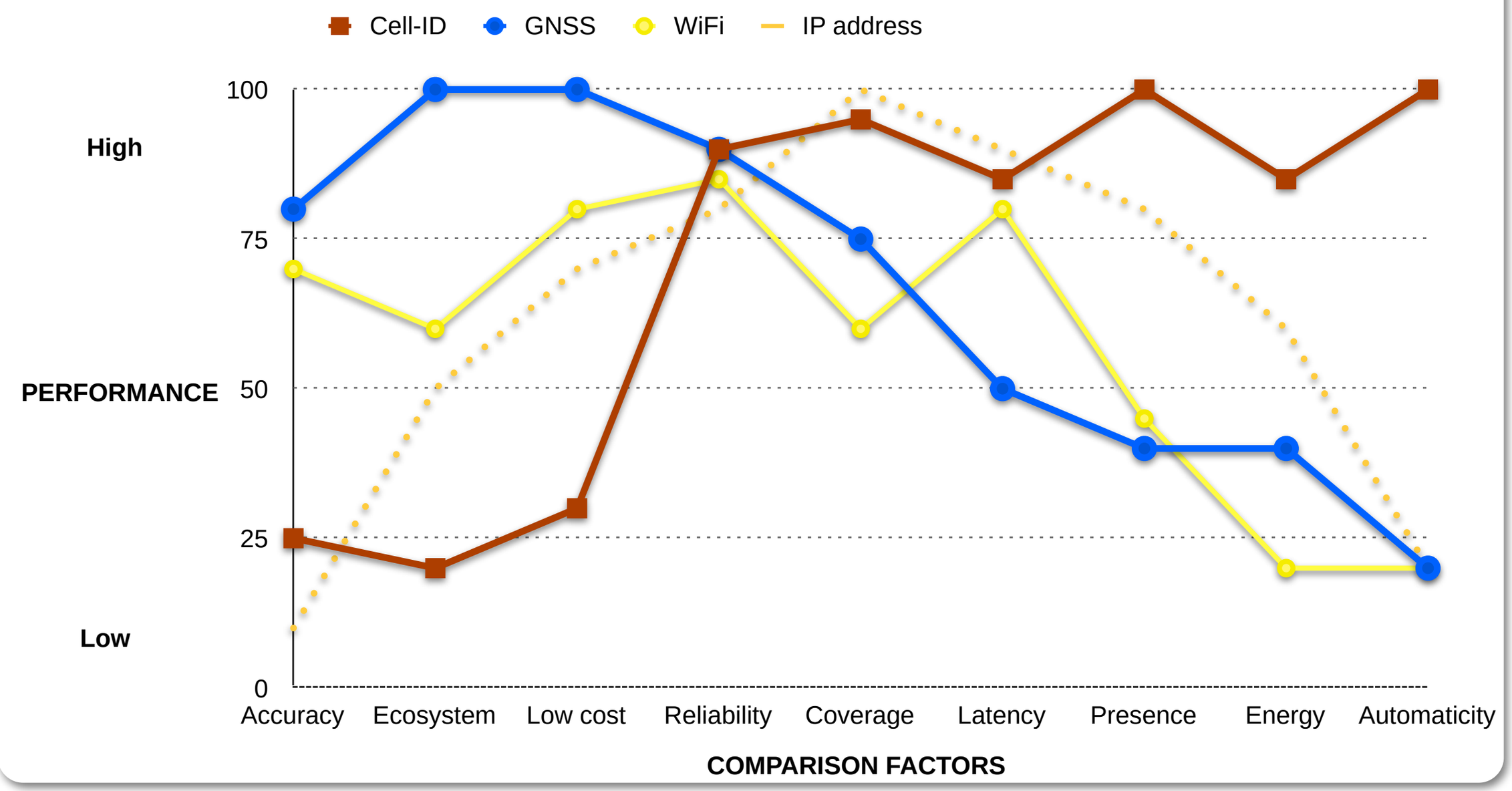
Positioning accuracy requirements* for emergency caller location

	Phase I	Phase IIa	Phase IIb	Phase III
Requirement date	1998	2001-2005	2019	*Proposed legislation*
Requirements	• Deliver the telephone number of the wireless 911 caller • Deliver the **location of the cellular network site or base station** that received the call	• For **network-based technologies**, within 100 meters for 67% of calls, and 300 meters for 90% of calls • For **handset-based technologies**, within 50 meters for 67% of calls, and 150 meters for 90% of calls *Constraints driven by readiness of PSAPs*	• For **network-based technologies**, 85% of counties or PSAP service areas by January 2019 • For **handset-based technologies**, 90% requirement for placement of location within 150 meters by that same date extends on a **per county or per PSAP basis**, with a 15% exception based on heavy forestation	• **Horizontal location (x- and y-axis)** information within 50 meters of the caller for 67% of 911 calls placed from indoor environments within 2 years, and for 80% of indoor calls within 5 years • **Vertical location (z-axis)** information within 3 meters of the caller for 67% of indoor 911 calls within 3 years, and for 80% of calls within 5 years

Source: FCC, PTOLEMUS - Note: Requirements triggered by a PSAP's ability to effectively use the data

There is no perfect location technology

The performance of positioning technologies compared



Source : PTOLEMUS European Location Study - Energy: stands for energy consumption

Possible scenarios include

1. Do nothing
2. The mandate of GNSS including Galileo on all mobile phones in Europe
3. The mandate of a minimal location accuracy depending on the area:
   - For urban environments:
     - Less than 20 meters in more than 90% of cases
     - Less than 100 meters in more than 95% of cases
   - For suburban & rural environments:
     - Less than 30 meters in more than 90% of cases
     - Less than 100 meters in more than 95% of cases

Scenario 2 appears to us as sub-optimal vs. scenario 3 but is much easier & faster to implement

Advantages & disadvantages of each approach

		Pros	Cons
1	**Do nothing**	• No work to do!	• No improvement of emergency services • Lives lost, increased injury damages & related social costs • Economic cost (Emergency services) • Europe not leveraging its Galileo satellite constellation
2	**Mandate GNSS including Galileo on all mobile phones in Europe**	• Simplicity of the requirement • Promotes European business interests for Galileo ecosystem expansion • Decrease in cost of GPS-Galileo chipsets due to scale effects • Relatively inexpensive • Easy to control	• Means-focused, not result-orientated • Increase the price of entry-level phones • Marginal cost of Galileo inclusion • Limited efficiency in urban and indoor environments, where most emergency calls are made
3	**Mandate area-dependent location accuracy requirements**	• Result-driven • Improves caller location in all environments • Promotes European business interests for Galileo ecosystem expansion • Requires permanent monitoring of positioning performance (as in the US)	• Burden assumed by mobile network operators, which will require investment without higher revenues • Could result in Galileo not being adopted by handset makers

Source: PTOLEMUS

We recommend scenario 2 as an immediate first step and scenario 3 in the European 3-5 year roadmap

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1	Do nothing	• No work to do!	• No improvement of emergency services • Lives lost, increased injury damages & related social costs • Economic cost (Emergency services) • Europe not leveraging its Galileo satellite constellation
2	Mandate GNSS including Galileo on all mobile phones in Europe	Recommended 1st step	
3	Mandate area-dependent location accuracy requirements	Recommended 2nd step	

Source: PTOLEMUS

We see a GNSS/Galileo mandate as an easy-to-implement first step towards improved emergency caller location

Thank you!

- A GNSS mandate is not ideal but...
- More than 70% of Western European (35% of Eastern European) phones are equipped with GNSS today - probably 100% in the EU by 2020
- **GNSS mandates are already imposed in the US, Japan and Russia**
- The European Commission can use an existing Directive & implement a stepwise approach
- Further, the marginal cost of integrating Galileo in GPS chipsets is limited to a few Euros
- Overall, the **cost of this life-saving feature appears limited** for EU citizens, PSAPs, handset makers, MNOs, Member States and the European Commission
- **The benefit is clear - More Europeans will be saved by E112 than by eCall!**

Source: PTOLEMUS, GSMA, STMicroelectronics

PTOLEMUS Consulting Group

Strategies for Mobile Companies

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