

FACT SHEET NO.: 7 / 1

PERFORMED BY: NEA

A GENERAL INFORMATION		
A 1	Category	Research and Innovation
A 2	Subcategory	Technology - transport infrastructure / system
A 3	Transport policy measure (TPM)	GALILEO
A 4	Description of TPM	A Global Navigation Satellite System (GNSS) consisting of 30 orbiting satellites, with continuous global coverage. Each location is covered by at least 6 satellites, resulting in highly accurate positioning data also in cities with high-rise buildings ("urban canyons"). Compatible with other GNSS like GPS (from USA), GLONASS (from Russia) and new systems developed by China. GALILEO provides applicable positioning data -- more accurate than GPS -- for all types of civilian applications: including car navigators, mobile phones, maritime, road, rail and air transport. Furthermore, GALILEO makes Europe autonomous and fully independent of the GPS signals. [2] The two first GALILEO satellites have been launched in late 2011. Due to delays and cost overruns, the initial launch plan (30 operational satellites by 2014) has been reduced. The current plan involves launching a total of 24 instead of 30 satellites by 2015.
A 5	Implementation examples	Satellite navigation applications have become very important in the European Union. It affects our daily lives. Various services depend on it to save lives (e.g. urgent ambulance calls) or to run their business efficiently. GPS signal loss can therefore be disastrous. The GALILEO infrastructure offers (due to superb location coverage) highly accurate positioning, and is very unlikely to have "no signal" available. Services that depend on navigation will benefit from this. GALILEO makes satellite navigation services suitable for safety-critical applications, like flying and landing aircraft or navigating ships through narrow channels. Other suggested implementation examples are: tracking/tracing in the medical sector (e.g. ambulances, organ transport) and/or in security and safety sector (e.g. missing children), road tolling and charging, pay-as-you-drive insurance, unmanned vehicles, precision steering guidance when sowing or harvesting crops, etc. [3] [5] [6]
A 6	Objectives of TPM	The aim is a radical improvement of location accuracy and compatibility with other GNSS. Furthermore, enhancing Europe's technological navigation independence through GALILEO's satellite infrastructure, in order to guarantee the provision of services that are nowadays central to our economy and on which our quality of life and safety depend. Another objective is becoming independent of the GPS time signal. GPS satellites generate an accurate time signal. This signal is used by the Synchronous Digital Hierarchy (SDH) network, an overarching network used in Europe for highspeed telecommunications. It provides support for all optical and electrical networks, and is indispensable for all of today's digital electronic communications. A sudden loss of the GPS time signal will be catastrophic to Europe as e.g. GSM, broadband internet, digital television, radio broadcasting, banking systems, pay terminals, security systems rely on the GPS time signal. When this GPS time signal is lost, the services depending on it, will cease to operate or function. Becoming independent of GPS and its time signal is important to Europe's economy. [2] The issue is, besides economic benefits (e.g. job creation due to the development role), to have full control over the system on which our safety and economy depend. These concerns systems that are essential to us. Reliance on systems from non-European countries, will eventually lead to problems of sovereignty and security. Furthermore, Europe should not be at risk from future changes in the provided service, or from excessive future fees. [1]
A 7	Key changes concerning:	
A 7.1	- Choice of transport mode / Multimodality:	No impact
A 7.2	- Origin and/or destination of trip:	No impact
A 7.3	- Trip frequency:	No impact
A 7.4	- Choice of route:	No impact
A 7.5	- Timing (day, hour):	No impact
A 7.6	- Occupancy rate / Loading factor:	No impact
A 7.7	- Energy efficiency / Energy usage:	No impact
A 8	Main source	In numerical order: [1] [2] [3] [4] [5] [6]

B IMPACTS																																																																					
B 1	OVERVIEW ON IMPACTS	<table border="1"> <thead> <tr> <th colspan="14">AFFECTED SEGMENTS</th> <th colspan="2">Geographical level</th> <th colspan="2">Source</th> </tr> <tr> <th colspan="5">Passengers</th> <th colspan="5">Transport operators</th> <th rowspan="2">Employees in transport</th> <th rowspan="2">Residents</th> <th rowspan="2">Economy</th> <th rowspan="2">Public bodies</th> <th rowspan="2">Society</th> <th rowspan="2">1st level</th> <th rowspan="2">2nd level</th> <th rowspan="2">Source of assessment</th> <th rowspan="2">Spatial level of source</th> </tr> <tr> <th>Road</th> <th>Rail</th> <th>Air</th> <th>Public transport</th> <th>Slow modes</th> <th>Road</th> <th>Rail</th> <th>IWW</th> <th>Air</th> <th>Maritime</th> <th>Public transport</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	AFFECTED SEGMENTS														Geographical level		Source		Passengers					Transport operators					Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source	Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport																			
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B 1.1	Summary	<p>GALILEO provides high accuracy positioning data, without signal loss. That is advantageous for many applications, especially for critical navigation applications in e.g. aeronautics, inland shipping in narrow waters and/or foggy circumstances and security tasks. Signal failure can be hazardous. Also residents living in "urban canyons" benefit, as emergency services (e.g. ambulance, security) or delivery vans can now easily locate the address. GALILEO also offers accurate time signals necessary for the Synchronous Digital Hierarchy, making Europe also independent of GPS time signals. Networks like GSM, radio broadcasting, banking systems, pay terminals, security systems depend on such time signals. These systems will not operate or function properly without it. Loss of signal can therefore result in chaos.</p>																																																																			
B 1.2	Summary: Income groups	No specific change																																																																			
B 1.3	Summary: Age groups	No specific change																																																																			
B 1.4	Summary: Disabled people	No specific change																																																																			
B 1.5	Summary: Gender groups	No specific change																																																																			
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		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport									
B 3.1	Transport costs																				
B 3.2	Private income / commercial turn over																				
B 3.3	Revenues in the transport sector																				
B 3.4	Sectoral competitiveness																				
B 3.5	Spatial competitiveness																				
B 3.6	Housing expenditures																				
B 3.7	Insurance costs																				
B 3.8	Health service costs																				
B 3.9	Public authorities & adm. burdens on businesses																				
B 3.10	Public income (e.g.: taxes, charges)																				
B 3.11	Third countries and international relations																				
B 3.I	Overall impacts on social groups																				
B 3.II	Implementation phase																				
B 3.III	Operation phase																				
B 3.IV	Summary / comments concerning the main impacts	Improved location accuracy and the absence of signal loss will, in general, have a positive effect on transport operations. For example, it enables ambulances or commercial trucks to find their way even in cities with many high rise-buildings. Inland navigation can continue under foggy circumstances, etc. [2] GALILEO also provides time signals, making Europe independent of GPS time signals. Time signals are the base of Europe's Synchronous Digital Hierarchy network. Networks like GSM, broadcasting, banking systems, security systems depend on this time signal and will not operate properly without it, resulting in chaos. [2]																			
B 3.V	Quantification of impacts	No available details. However, no economic chaos should GPS fail, as GALILEO makes Europe independent of satellites from outside the European Community.																			

B 4	SOCIAL IMPACTS	AFFECTED SEGMENTS														Geographical level		Source			
		Passengers					Transport operators						Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport									
B 4.1	Health (incl. well-being)																				
B 4.2	Safety																				
B 4.3	Crime, terrorism and security																				
B 4.4	Accessibility of transport systems																				
B 4.5	Social inclusion, equality & opportunities																				
B 4.6	Standards and rights (related to job quality)																				
B 4.7	Employment and labour markets																				
B 4.8	Cultural heritage / culture																				
B 4.I	Overall impacts on social groups																				
B 4.II	Implementation phase																				
B 4.III	Operation phase																				
B 4.IV	Summary / comments concerning the main impacts	Availability of location data without signal loss, even in "urban canyons", make it certain that e.g. ambulance services reacting to an emergency call can find the accident location. Health and safety will therefore certainly benefit from GALILEO. As GALILEO also provides time signals, Europe's Synchronous Digital Hierarchy network (forming the base for crucial networks like GSM, broadcasting, banking, security) will therefore not suffer from GPS signal loss. Loss of time signals will lead to network failure, resulting in chaos and creating room for criminal activities.																			
B 4.V	Quantification of impacts	No available details.																			

B 5	ENVIRONMENTAL IMPACTS	AFFECTED SEGMENTS														Geographical level		Source			
		Passengers					Transport operators						Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport									
B 5.1	Air pollutants																				
B 5.2	Noise emissions																				
B 5.3	Visual quality of the landscape																				
B 5.4	Land use																				
B 5.5	Climate																				
B 5.6	Renewable or non-renewable resources																				
B 5.I	Overall impacts on social groups																				
B 5.II	Implementation phase																				
B 5.III	Operation phase																				
B 5.IV	Summary / comments concerning the main impacts	Satellite navigation does not have an impact on the environment																			
B 5.V	Quantification of impacts	None.																			

C REFERENCES		
C 1	Other TPMs of this subcategory	
C 2	References	<p>International</p> <p>[1]= Communication from Commission, 1999: Galileo involving Europe in a New Generation of Satellite Navigation Services (COM1999/54final)</p> <p>[2]= European Union [2011]: Why we need Galileo (ISBN: 978-92-79-19524-2)</p> <p>[3]= European Union, 2010: Key results of satellite navigation research under the sixth framework programme (ISBN 978-92-79-13756-3)</p> <p>[4]= European Commission, 2008: Europe's Satellite Navigation Programmes GALILEO and EGNOS (ISBN 978-92-9206-001-5)</p> <p>[5]= Galileo Services, 2012: Horizon 2020 & Space Reseach (panel presentation by Axelle Pomies on 5Jun2012, European Parliament)</p> <p>[6]= European GNSS Supervisory Authority, 2008: Galileo and EGNOS playing a key role in Europe's global monitoring programme</p> <p>National</p> <p>-</p> <p>Regional / Local</p> <p>-</p>