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Secure trade and 100% scanning of containers

Summary and conclusions

The European Union shares the concerns of the United States about the security of the supply chain and is strongly committed to implementing measures enhancing security in line with agreed international standards.

The United States legislation "Implementing Recommendations of the 9/11 Commission Act of 2007" unilaterally introducing a 100% scanning requirement for US-bound maritime cargo at export, to be implemented by 1 July 2012, does not meet this requirement and may become a new trade barrier.

In April 2008, the European Commission, with support from EU Member States and the business community, carried out a preliminary impact assessment of 100% scanning. This was sent to US Customs Border Protection (CBP) and included in the report of the Department of Homeland Security to the US Congress in June 2008. The paper pointed out that, if 100% scanning at export was implemented in European ports, it would be excessively costly, would be unlikely to improve global security, would absorb resources currently allocated to EU security interests, and would disrupt trade and transport within the EU and worldwide. As an alternative, priority should be given to investing in enhancing multilayered risk management systems for targeting and inspecting dangerous cargo, and to strengthening international cooperation to facilitate this process.

The Commission has considered necessary to back this preliminary assessment with hard data. It has conducted three complementary studies on the expected impact on EU customs, on maritime transport and on trade. The studies have confirmed that implementation by the EU would have serious repercussions for European and, indeed, global maritime transport and trade as well as welfare:

Firstly, European port procedures and regulations would have to be fundamentally re-designed with a significant financial burden:

- *A total of €430 million would be required for investments for scanning and radiation detection including significant changes in infrastructure to create space for extra facilities for ports and terminals involved in US bound container traffic.*

- *Operational costs in European ports would rise by more than €200 million annually, including expenditure for 2200 extra staff.*

Secondly, transport would be disrupted and costs would increase significantly:

- *Direct transport costs of US-bound consignments would increase by about 10%.*

- *Ports unable to implement 100% scanning would lose access to the US market; this would tend to increase congestion and environmental costs for other ports.*

Thirdly, the annual welfare loss from trade disruption could be high. The 100% scanning requirement could lead to a loss of some € 10 billion for the EU and US combined. Further rough calculations suggest that the worldwide loss due to the scanning law could be in the order of €17 billion. Moreover, if, following the US model, 100% scanning were replicated on a world scale to address the 'bomb in the box' as a worldwide threat, the annual welfare loss for the world might reach €150 billion.

In the absence of a convincing demonstration that 100% scanning at export will produce significant global supply-chain security benefits, incurring such costs is not justified.

In addition, there are other fundamental questions and difficulties to take into account:

- *Scarce European financial and human resources would have to be diverted away from European security objectives and measures to satisfy US requirements; this disruption of security policy would be difficult to justify to European citizens.*

- *Authorities might focus excessively on satisfying the 100% scanning requirement; this could lead to a false sense of security and to neglecting other security risks (chemical, biological …) as well as the use of other modes of transport.*

- *The EU would adhere to a unilateral US requirement without a reciprocal commitment by the US.*

Even on the hypothetical assumption that 100% scanning was positive for US security, it would be extremely difficult to argue the case for European security.

The EU does not contemplate implementing 100% scanning of containers at export. It advocates shifting the policy focus towards developing a package of measures to cope with the wide diversity of security risks and address supply chain security not only from a national perspective but also as a global and complex challenge.

The alternative package should be based on the principle that <u>all</u> exports, as well as imports, undergo comprehensive and effective multi-layered risk management processes using a range

of methods and technologies commensurate to the risks associated with specific consignments. No consignment should go unchecked.

Following the "security amendment" of the European Community Customs Code, the EU has the legislative and administrative framework required for the implementation of this policy. This combines electronic systems and practical tools of collection of information prior to arrival to and departure from the EU; enhancement of risk analysis and risk management procedures; development of new technologies; coordination of enforcement by customs authorities in all EU Member States. These tools will be deployed fully by the end of 2010; they supplement the enforcement by the EU of one of the strictest legislations worldwide in maritime security.

Moreover, as an integral part of the multi-layered risk management policy, it is appropriate to intensify international cooperation to maximise effectiveness and efficiency. Jointly, the EU and the US can play an important role: they are one another's main trading partners and account for more than one third of world trade and investment; they have a responsibility and interest in promoting multilateral cooperation to develop more effective global customs security standards and policies.

We may also consider strengthening bilateral cooperation on a number of issues:

- *Ensuring effective collection of quality data;*
- *Exchanging relevant security information;*
- *Implementing mutual recognition of trade partnership programmes and, later, of other security controls;*
- *Developing and spreading utilisation of new security technologies, including scanning;*
- *Building capacities and training of staff for effective implementation.*

The European Commission looks forward to a constructive dialogue between the EU and the USA.

1. A false sense of security at high costs

On 3 August 2007 the US enacted the "Implementing Recommendations of the 9/11 Commission Act of 2007". The act introduced a 100% scanning requirement for US-bound maritime cargo at export with implementation as of 1 July 2012. This requirement came in addition to existing US security measures applied at arrival.

The European Union is resolutely opposed to carrying out 100% scanning at export in European ports. The European Commission, the EU Member States, port operators and the entire trade community are very concerned about the high costs involved and the serious disruption this legislation will cause to security policies worldwide, and to transport and international trade flows.

Shortly after the adoption of the US legislation, with support from EU Member States and the business community, the European Commission made a preliminary assessment of the impact of the 100% scanning requirement. The Department of Homeland Security included the Commission paper in its report to the US Congress in June 2008[1].

More recently, the Commission has conducted three complementary technical studies[2] with a view to obtaining a better picture of the impact of the US legislation on the EU customs and security measures, on maritime transport, and on trade. These studies have confirmed the preliminary assessment made in 2008. The results of the studies are outlined below.

a) An unnecessary economic burden for European ports

The Study on the Impact of Security Measures on the EU Economy and Trade Relations focused on estimating the investment and operational costs required to implement 100% scanning in European ports. The study has shown that the great majority of EU ports are not prepared to implement 100% container scanning[i]. Neither the terminal operators[ii] nor the customs authorities would be ready to bear the additional costs.

At present, a majority of EU ports have scanning devices on their premises, mainly used to scan imported containers (and in some cases exported ones). The share of containers scanned ranges from 0.1% in bigger ports to 3% in smaller ones. The control of the movement of goods in international trade takes place mainly at the import point. Procedures, regulations

[1] U.S. Customs and Border Protection Report to Congress on Integrated Scanning System Pilots (Security and Accountability for Every Port Act of 2006, Section 231)

and routines have been developed over years and have been implemented on the basis of this principle. Scaling up to 100% scanning of container shipments within all European ports shipping containers to the US would be a massive quantitative and qualitative challenge. 100% scanning of outbound containers would shift the control of goods to the export point and would require reconfiguring ports and terminals, finding more space to accommodate the extra facilities, re-designing the established procedures and introducing revised regulations. Without substantial changes in ports infrastructure, in procedures and in organisation, along with sizable investment in equipment and new technology[iii], it would be impossible to implement 100% scanning in European ports. Additional terminal operation[iv], needed to perform radiation detection and scanning[v] would also entail significant increases in operational costs.

More specifically, the study found that the investment costs for 100% scanning and radiation detection at the European ports with US bound container trade would amount to about € 280 million for 2012[vi]. Taking into account investment for additional terminal operation the investment needed would increase to € 430 million in 2020[vii].

The additional operational costs would also be substantial. Implementing 100% scanning would call for significantly more personnel, not only directly and indirectly related to scanning operations but also for additional terminal operations. The extrapolation of the human resource requirements to all European ports with projected US-bound container trade showed that the human resources required for performing 100% scanning and radiation detection would be 1750 in 2012 and 2220 in 2020.[viii]

The new staff requirements and other expenditures including depreciation, maintenance and energy consumption would generate significant increases in annual operational costs in the order of € 180 million in 2012 and € 225 million by 2020[ix]

The study has confirmed that, if it were implemented, 100% scanning would represent a significant economic and organisational burden for European ports.

b) An expensive disruption of European transport

The Study on the Impact of 100% Scanning of US-bound Containers on Maritime Transport has shown that the 100% scanning initiative would have serious repercussions for the EU-US maritime transport and trade.

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[2] Study on the Impact of Security Measures on the EU Economy and Trade Relations; Study on the Impact of 100% Scanning of U.S.-bound Containers on Maritime Transport; Study on Non-Tariff Measures in EU-US Trade and Investment – An Economic Analysis.

The 100% scanning requirement would have a differentiated impact on European transport determined to a very large extent by local conditions: the lay-out of the port and container terminal, the availability of green field areas, the split between various transport modes of the transported container volumes from the hinterland to the port, the number, profile and location of the road and rail accesses to the port, the volume of US-bound containers handled, the importance of the transhipment throughput, and the prevailing liability regime and labour laws.

To obtain an overview of the potential impact of 100% scanning on transport costs, the study used a limited number of representative scenarios[x] and a cost model presenting a sample of the most typical situations. It has found that 100% scanning would add around 10% to direct transport costs per consignment[xi]. If, for example, all containers that were shipped from the EU to the US in 2007 had been subject to scanning, the total extra transport bill would have amounted to between €243 million and €440 million. This estimate does not include the extra operational scanning costs (see section 1.a) and the indirect costs.

The study did not calculate the indirect costs but has noted that they would be significant. The indirect costs relate in particular to the loss of handling capacity on terminals as a result of longer dwell times[xii]; increases in the turnaround time of feeder vessels[xiii] and of the inland transport modes delivering U.S.-bound containers to the port terminals[xiv], increases in external costs[xv] due to the potential shift from the rail and barge modes to the truck mode and increased cargo inventory costs[xvi].

Given the substantial volumes of the US bound cargo involved, the more important discriminatory effects would arise for the main EU ports. The study has shown that implementation of the 100% scanning rule would affect the competitiveness of the more prominent ports with significant US-bound exports - with some gaining and others losing market share due to the US legislation.

At the same time, for ports with small US-bound export volumes, the study has concluded that it would often be economically non-viable to invest in the required infrastructure and equipment. Ports with US-bound export trade amounts of less than 50000 containers per year would be at risk of losing this part of business as the 100% scanning requirement would tend to transform such ports into 'black points' for clients.

Finally, the 100% scanning requirement would thwart European transportation, health and environmental protection efforts aiming to promote multimodality in transport and a better use of maritime capacities in order to reduce road congestion, high carbon footprint, pollution and accidents[xvii]. Implementation of 100% scanning would tend to increase reliance on truck transport to bring the US-bound containers to the loading terminals from the more distant

hinterland. Such reliance on the road and additional congestion inside and outside ports could be the result of the extra costs[xviii] added to the total transport bill by at least two additional horizontal moves and two vertical moves compared to the situation where containers are delivered by rail or barge. For many shippers, and operators deciding on the inland transport mode, this could be a sufficient reason to revert back to the use of the truck mode to avoid the extra costs.

c) A potential new trade barrier

While the transport sectors and sectors that ship goods via containerized transport would be affected directly, the implementation of 100% container scanning would also affect indirectly many other sectors in the economy. Higher transport costs passed on to consumers through prices of final products would have negative effects on disposable household incomes in the EU and US, causing the effects of this legislation to spread economy-wide. The costs incurred would be added to the final bill the US importers of European components will have to pay whilst putting up with longer delays and possible higher inventories.

The study on Non-Tariff Measures in EU-US Trade and Investment – An Economic Analysis[xix] has estimated the macro-economic gains for the EU and the US from removing the 100% scanning requirement if it were to be implemented as foreseen in the US legislation[xx]. These gains would amount to close to € 10 billion for the EU and the US combined.

Additional estimates undertaken on behalf of the Commission have concluded that the annual worldwide welfare loss due to the US 100% scanning requirement could amount to some €17 billion, with an important share borne by the EU, but also by the US through increased transport cost and reduced benefits from trade.

According to the same estimates, if Europe were to follow the same approach as the US and responded by requiring 100% scanning at export for all Europe-bound maritime containers, the annual worldwide welfare loss would almost double.

Similarly, if the US security model of 100% scanning of containers at export were to be replicated worldwide, the rough annual welfare loss to world GDP could be close to € 150 billion.

d) A diversion from EU security priorities

It might be argued that cost, however high, should not be a decisive issue: this could be the price to pay for increased security. However, such a line assumes that 100% scanning is demonstrably superior to alternative measures for improving security.

No such demonstration exists. On the contrary, there are valid reasons to believe that the implementation of the 100% scanning rule would not improve security.

Firstly, the technological difficulties in ensuring 100% scanning are considerable. The US legislation envisages both 100% radiation detection and 100% scanning, for which different technologies are available, each of them having varying capabilities[xxi]. Neither the US legislation nor international standards specify what equipment should be used in which circumstances. Without international standards for equipment and inspection processes (which are pre-requisites for keeping international trade flows unburdened) the implementation of 100% scanning at export would be very difficult.

Moreover, current technology cannot fully meet all 100% scanning requirements. In particular, the systematic scanning of barges and transhipment containers creates logistical headaches. Terminal operator representatives from one of the biggest European ports indicated that at this moment they did not see a possible solution to scan barge and transhipment containers. This means that all these containers would have to be taken out of the stack and brought to the x-ray scanner[xxii].

Additionally, the performance of 100% scanning does not eliminate the possibility of tampering with cargo after the scan was performed. The reliability of the scanning results would depend, crucially, on the reliability of the security systems of port authorities applying 100% scanning at export, which could vary throughout the world.

Furthermore, the 100% scanning requirement focuses on maritime containerised cargo only, whereas weapons of mass destruction may be transported by other means. Apart from containerised shipments (which account for about one quarter of cargo shipped worldwide)[xxiii], there are considerable quantities of other cargo shipped to the US, e.g. general cargo, ro-ro cargo (cars, trucks, coaches, other rolling equipment), break bulk and bulk (liquid and solid) cargo, and project cargo (plant, machinery and/or components /modules), which cannot be containerised due to their size or weight, or would be uneconomical for containerised shipment. Thus, a major part of cargo would not be subject to scanning.

Last but not least, 100% scanning does not address biological and chemical threats.

It is, therefore, difficult, if not impossible, to make a case that 100% scanning would be more effective than risk targeted controls in detecting a weapon of mass destruction. With varying degrees of probability, such a weapon, or components thereof, might pass undetected through a scan or bypass scanners or go through trade flows not covered by US legislation. Consequently, 100% scanning in foreign ports cannot substitute for a fully fledged

multilayered risk-management system at home. Therefore, security checks at import would remain indispensable. By overly focusing on a single risk and a single tool 100% scanning in non-US ports may tend to create complacency and instil a false sense of security amongst authorities and traders.

From the perspective of the EU the negative security implications are even more evident. Implementing 100% scanning would disrupt existing customs security policies in the EU and other countries. Significant resources within EU customs authorities, including scanning and radiation experts are currently employed on activities necessary to provide security for supply chains in, to, and from Europe, developing and implementing sophisticated risk management systems both for imports and for exports. Implementing 100% scanning would entail switching resources and expertise to invest in implementing the US legislation. It would mean diverting scarce resources away from what the EU perceives as risks and essential security priorities, including by employing highly skilled officials trying to make meaningful interpretation of the millions of images of innocent cargo. Reciprocity and sovereignty issues aside, this could hardly be an effective use of European taxpayers' money.

Finally, the 100% scanning requirement at export undermines the multi-layered risk-based approach actively promoted by the EU and the international community worldwide. If it were to be imposed unilaterally, there would be little point in continuing with ongoing efforts to develop international risk-based security standards to improve supply chain security and facilitate trade through a multilateral approach. Such efforts underpin two major World Customs Organisation (WCO) initiatives, the WCO SAFE Framework to Secure and Facilitate Global Trade containing international standards for both customs administrations and the business community to improve supply chain security and facilitate legitimate international trade, and the Revised Kyoto Convention promoting trade facilitation and effective controls through simple and efficient procedures. The resulting barriers to trade and disruption of international trade could be serious as countries decided to introduce incompatible security requirements and controls.

2. The alternative way forward: Addressing supply chain security as a global challenge

Supply chain security is a major concern for all of us. All countries must take the strongest possible measures to guarantee their national security. National policies will, however, be ineffective unless they are supported by enhanced international cooperation to guarantee their coherence and compatibility. Terrorists will focus attention to 'the weakest links' in the international supply chain; it is a joint responsibility of the international community to strengthen all elements of the supply chain in order to diminish the chance of an attack.

The results of the studies carried out show that the 100% scanning legislation is not only unilateral, expensive and trade disruptive, but also unable to meet the security challenges of the 21st century.

Bearing in mind that the objective aimed at by the 100% scanning requirement is to deter and detect a nuclear device in outbound export containers, an alternative strategy to combat this threat should be further enhanced and implemented. The idea is to address the security of the international supply chain as a global and complex challenge, and to offer a range of global security options which, if implemented together, form a more effective and flexible multi-layered risk management strategy. The EU approach builds on an enhanced domestic risk management system based on effective information exchange and the use of modern technologies, supported by international cooperation. It will allow the EU and its trading partners to cope with the wide diversity of security risks.

a) Implementing multilayered risk management: the domestic dimension

The EU's multilayered risk management strategy is based on the principle that all exports, as well as imports undergo comprehensive and effective multi-layered risk management processes using a range of methods and technologies commensurate to the risks associated with specific consignments. No consignment should go unchecked. This principle is to be applied to all consignments, not just containers, and regardless of the transport mode used when crossing the EU border.

This strategy requires a combination of different technologies with traditional control methods and risk management based on reliable and adequate information. The improvement of cargo and container integrity during the whole transport cycle is another key layer where modern technology such as sealing, tracking and tracing, positioning or scanning technology can help. The European Commission has carried out several pilot projects on the use of new technologies such as eSeals, smart box technology and exchange of advance information.

The EU has put in place a strong legislative and administrative framework required for the implementation of this policy. The security amendment to the European Community Customs Code, adopted in 2006 and fully implemented by end 2010, allows:

- Improved targeting of illicit consignments through the availability of advance cargo information (electronic pre-arrival and pre-departure declarations), a new risk management framework and an EU-wide electronic and secure system for exchanging risk information;

- Better intelligence gathering and sharing of information amongst the EU customs community;
- Better coordination with the business community through relevant measures including the Authorised Economic Operator programme;
- In addition, promotion and financial support, in particular through R&D funding, for the diffusion of modern technologies to secure global supply chains and the EU territory.

The EU Modernised Customs Code adopted in 2008 takes these measures further by overhauling control procedures, techniques, resources and legislative tools with a view to better responding to the challenges posed by security and facilitation concerns. IT-supported risk management systems will enable customs to act more efficiently. The EU's Electronic Customs (e-Customs) initiative will help to further develop the security system, by creating a single access point and introducing an efficient export control/outbound inspection mechanism for high risk consignments.

The Authorised Economic Operators (AEO) programme is a cornerstone of the EU's supply chain security policy. The system focuses specifically on public-private partnerships to provide cross border benefits to authorised operators and enables Customs to concentrate on the unknown entities and high-risk consignments. The programme was launched in January 2008. More than 1700 European companies were authorised by November 2009.

The EU legislation on enhancing maritime security ensures compliance with the International Ship and Port Facility Security (ISPS) Code. Member States carry out systematic checks on port facilities, vessels and their cargos, in ports throughout the Union. Since 2004 the EU has been implementing one of the strictest legislations in maritime security. The effectiveness of national quality control systems and maritime security measures, procedures and structures has been checked by Commission's inspectors at Member State, port facility and shipping company level. More than 400 inspections have been carried out (including 200 inspections concerning ports and port facilities) which demonstrated that the Member States ensure a high and comparable level of security in all European ports.

b) Securing trade through international cooperation

International cooperation must be an integral part of our efforts to secure trade and developed in parallel and in harmony with relevant domestic measures. The Word Customs Organisation (WCO) is a key forum to promote customs reforms and enhance cooperation at international level. The development and adoption of worldwide security standards has been a major achievement of the WCO. The SAFE Framework of Standards focuses on three elements, which will contribute to building a robust international customs security environment: the availability of reliable data, the promotion of open standards for new security technologies, as well as mutual recognition of security standards and trade partnership programmes.

Exchange and proper use of reliable data is an indispensable element of an effective risk management system. A specific set of data elements for security and safety has been developed and reviewed regularly in the WCO SAFE Framework. This multilateral approach ensures a robust global cross-border security standard for governments and provides trade with predictability. The EU and the US have also taken concrete steps to address poor goods descriptions on Customs declarations and have provided economic operators with lists of unacceptable and acceptable goods descriptions for security purposes. This concern could be further addressed by the mandatory inclusion of the six digit Harmonized Commodity Description and Coding System (HS) code in advanced security declarations.

The EU also supports WCO efforts to strive for world-wide open standards regarding the use of modern technologies to help ensure coherent policy implementation and compatible protection of international supply chains. Such use should encompass technologies and techniques for advanced and high speed data analysis, for ensuring container integrity (e.g. eSeals, Radio Frequency Identification Devices (RFID) and smart container applications), for supervision and monitoring (tracking/tracing) of consignments moving along the international supply chain as well as detection and radiation equipment.

Mutual recognition of Authorised Economic Operator (AEO) security trade partnership programmes is another key element. The objective is to enhance end-to-end supply chain security and to facilitate legitimate trade by focusing scarce resources on risks while providing for benefits in terms of facilitation to reliable operators.

The EU and the US have a common interest in preserving and strengthening this international framework of cooperation, which will help create a coherent security environment while preserving free trade. This framework will also contribute to building the capacity of third countries to properly implement international rules and standards.[xxiv]

c) Strengthening transatlantic supply chain security

Accounting for more than one third of international trade, the EU and the US are the world's two largest economic powers. They have a common interest and joint responsibility to promote security cooperation and lead the international efforts to address the global and complex security challenges. The EU and the US administration share a common vision of supply chain security based on a multilayered risk management approach.

Strengthening bilateral cooperation on security based on multilayered risk management is therefore a high priority. The EU-US customs cooperation agreement, in force since 1997, and its amendment adopted in 2004, allowing EU participation in the Container Security

Initiative (CSI), provides a strong legal basis for enhanced customs cooperation on security.[xxv] The following areas could be envisaged:

- Implementing mutual recognition of trade partnership programmes. The EU and the US are committed to achieving mutual recognition of their respective trade partnership programmes (US C-TPAT and EU Authorised Economic Operator) according to the agreed roadmap. Reaching an agreement on mutual recognition in early 2010 would be a concrete step towards enhancing end-to-end transatlantic supply chain security.[xxvi]

- Ensuring effective collection and exchange of reliable data. Customs authorities could work together in reaching out to the trade community in order to improve the quality of the information collected. Mutual recognition of C-TPAT and AEO will also support this objective.

- Exchanging relevant security information and intelligence. The development of common risk rules and exchanges of officials are essential elements.

- Developing and spreading the use of new security technologies, including scanning. The EU and the US could further intensify their sharing of R&D results, building on efforts from the Science and Technology Department from DHS and EU funded R&D programmes.

- Building capacities and training of staff for effective supply-chain security. The EU and the US could share best practices on security awareness and the training of staff.

The European Commission looks forward to a constructive dialogue between the European Union and the United States of America.

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[i] None of the ports visited had prepared detailed concepts for the implementation of the 100% container scanning law, except Southampton.

[ii] Port authorities and terminal operators, however, indicated that they are willing to perform the additional terminal operation as long they can charge the additional costs.

[iii] Investment in equipment necessary to perform terminal operations required for 100% scanning and radiation detection of US-bound containers ranges from € 1.4 to € 1.9 million for a EU low-transhipment port, € 1.9 to € 2.4 Million for a transhipment port, 2 to € 2.2 million for the Mediterranean port, € 6.7 to € 8 million for the Northwest European port, € 9.8 to € 10.8 million for the North Sea port.

The investment for scanning and radiation equipment, space preparation and buildings necessary to perform 100 % scanning and radiation detection per port type expressed in actual monetary terms comes to around € 5 million for the low-transhipment port, € 7 million for the transhipment port, € 9.5 million for the Mediterranean port, € 36.2 million for the Northwest European port and € 51.5 million for the North Sea port. (Investment is estimated based on the actual figures provided by producers and responses given by ports or national customs authorities.)

[iv] Additional terminal operations are those required to be performed due to the 100% scanning legislation. Their annual costs take into account the depreciation of the investment for additional equipment (type of equipment depends on the handling system in ports), the maintenance of this equipment, the additional energy consumption and the cost of the additional personnel.

[v] The annual costs for the additional terminal operation as a result of 100% scanning can be estimated at € 1.6 million for the low-transhipment port, € 2.7 million for the transhipment port, € 2.1 million for the Mediterranean port, € 8.7 million for the Northwest European port and € 12.9 million for the North Sea port, without taking into account productivity decreases caused by traffic or space bottlenecks.

The annual operation cost for performing 100% scanning and radiation detection varies in the port types and amounts to € 2.2 million for the low-transhipment port, € 3. million for the transhipment port, € 4.1 million for the Mediterranean port, € 14.5 million for the Northwest European port and € 20.4 million for the North Sea port.

[vi] € 325 and € 352 million for 2018 and 2020 respectively. Forward projections are based on experiences, assumptions and assessments as presented in the Study on the impact of Security Measures on the EU Economy and Trade Relations.

[vii] € 338 million in 2012, € 399 million in 2018

[viii] Approximately 12% of the required personnel should possess high customs education, approximately 65% should possess middle customs education and approximately 23% should be skilled in technical aspects (middle or high education). The image interpreters will need specialised training. Experts involved in scanning of import containers consider training on the job to be the most efficient form of training. The period necessary to gain sufficient experience is reported as one year.

[ix] Based on container volume forecasts for 2012 and 2020.

[x] Three scenarios were constructed for two different transport options. The latter refer to the transport distance: a first option for a long inland transport distance of 500 kilometres before and after the maritime leg and a second option for a short inland transport distance of 100 kilometres. The retained scenarios consider the three possible inland transport modes (road, rail and barge).

[xi] According to the distance covered before and after the maritime transport, it has been estimated that the direct transport costs will increase between 8,5% and 12,5%.

[xii] Estimated in a range between 2 and 3 extra days.

[xiii] If feeder vessels take more time at berth, they would have to pay higher berth charges as these are calculated on time spent at berth and the vessel's transport capacity would be reduced resulting in higher slot costs.

[xiv] The 100% scanning operation will typically add at least between one and two hours to the total travel time of the truck.

[xv] CO2 emissions, air pollution, noise pollution, safety and use of space.

[xvi] An extended transit time would result in an increase in inventory costs, a delay of just one day the additional inventory cost, calculated on the basis of a 5% opportunity cost of the capital tied up, would amount to € 6 575 342 per annum. A two day delay could be catastrophic in the case of a Just-in-Time consignment which fails to meet the deadline; the indicative inventory cost increase calculated above, may still be a very serious underestimate of the real loss the importer in the U.S. could experience.

[xvii] If all US-bound containers were to be transferred from the terminal to an off-terminal scanning site, the total external cost for EU ports relating to health and environment (CO2 emissions, air pollution, noise pollution, safety and use of space) would amount to almost € 4 million per annum.

[xviii] € 50 to € 70 per container.

[xix] The study is based on a multi-pronged approach using literature review, business survey, econometric analysis (gravity, Computable General Equilibrium), extensive consultations with regulators and businesses associations and industry federations on both sides of the Atlantic, and inputs by sector experts. The Study uses a baseline year of 2018 for calculating the benefits that a reduction of a certain NTM or regulatory divergence between the EU and US would create. Through economic modelling, the effects of the estimated cost increases for EU-US and US-EU trade and investment flows are calculated up to 2018, allowing then to explore the effects if NTMs are reduced. The general equilibrium looks at the economy-wide effects of reduction of NTMs, including not only the direct and indirect costs affecting trade flows across the Atlantic, but also indirect national income effects and overall competitive impacts.

[xx] Since the 100 % scanning legislation is not yet implemented, the study goes from the assumption that the legislation would indeed be implemented in 2012 as planned, and then estimates the benefits of removing that NTM by 2018. As a mirror image of these benefits we can see the costs created by not removing this NTM.

[xxi] The specific application and its location are important considerations when selecting the most appropriate system. For example, some types of scanning equipment are not suitable to scan huge volumes of containers within very short time period and in addition to deliver high quality scans. Some of them are re-locatable, others have a high throughput.

[xxii] Eight extra moves would be needed to move transhipment units and units arriving by barge to the x-ray scanner. Another solution for transhipment would be to equip each automated stacking crane with a scanner, but this would not be financially viable.

[xxiii] Although growing at a fast pace, containerised cargo is not yet predominant in world shipping. The share of containerised cargo in the world's total dry cargo (in tonnage) is estimated by Clarkson Research Services at 24%. Overall, dry cargo (76% of which –bulk and break bulk cargo– currently escape scanning) represents two thirds of total cargo, the rest being oil and related products (see UNCTAD Review of Maritime Transport 2007).

[xxiv] Via tools such as the WCO SAFE Framework of Standards and the Columbus Programme

[xxv] Agreement between the European Community and the United States of America on customs cooperation and mutual assistance in customs matters, Official Journal L 222, 12/08/1997 & Agreement between the European Community and the United States of America on intensifying and broadening the Agreement between the European Community and the United States of America on customs cooperation and mutual assistance in customs matters, Official Journal L 304/34, 30/09/2004.

[xxvi] The European Union has already concluded mutual recognition agreements with Switzerland and Norway and is also aiming to achieve mutual recognition with the US, Japan, China and other main trade partners.