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<b>Author(s):</b>	<b>JL Szabo</b>
<b>Contractor(s)/Member(s) Contributing:</b>	<b>All the members</b>

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<b><u>Project Co-ordinator</u></b>	
<i>Company name:</i>	CEA/ DRT/ List/Detecs
<i>Name of representative:</i>	Szabo Jean-Louis
<i>Address:</i>	Commissariat à l’Energie Atomique Centre de Saclay Bât 451 91191 Gif-sur-Yvette Cedex France
<i>Phone number:</i>	+33 1 69 08 33 71
<i>Fax number:</i>	+33 1 69 08 78 19
<i>E-mail:</i>	<a href="mailto:jean-louis.szabo@cea.fr">mailto:jean-louis.szabo@cea.fr</a>
<i>Project Website address:</i>	<a href="http://www.euritrack.org">http://www.euritrack.org</a>



## Change Control

Version #	Date	Author	Organisation
A	23/11/04	JL Szabo	CEA

## Change History

**Contract number** : 511471  
**Project acronym** : EURITRACK  
**Project name** : EURopean Illicit TRAfficking Countermeasures Kit  
**6 FP priority** : FP6-2003-IST-2

**Participants** : Commissariat à l’Energie Atomique, CEA, France  
Istituto Nazionale Di Fisica Nucleare, INFN, Italy  
Ruder Boskovic Institute, IRB, Croatia  
Joint Research Center, JRC, Belgium  
Andrzej Soltan Institute for Nuclear Studies, IPJ, Poland  
Kunglika Tekniska Hogskolan, KTH, Sweden  
Société Anonyme d’Etudes et Réalisations Nucléaires, SODERN, France  
Costruzioni Apparecchiature Elettroniche Nucleari, CAEN, Italy  
Saphymo, SAPHYMO, France  
Direction Générale des Douanes et Droits Indirects, DGDDI, France

**Total cost** : 4,198,566.00 Euros

**Commission funding**: 2,450,000.00 Euros

**Project main goals** :

The overall objectives of the project are:

- To develop open platforms, integrated systems and components for improved risk management, civil security applications
- To foster the emergence of a European info-structure and service platforms which will facilitate the use of interoperable components and sub-systems.

Addressing the key question of the improvement of civil security in the prevention and the management of terrorist threats, the project aims at providing national authorities with new and innovative tools for securing seaports by quickly and automated scanning the shipping containers.

The EURITRACK project consists in:

- developing an innovative “two in one” system allowing the characterisation of shipping containers by non expert controllers;
- improving the quality of information given by X-ray imaging systems;
- opening the system to other potential sensors such as electronic seal ensuring the tamper resistance of the container;
- allowing standardised databases used by international custom organisations;
- de facto strengthening European cooperation in crisis management by providing Governments with technical tools in their combat against illicit trafficking.

In order to achieve these objectives, the EURITRACK project will develop an innovative Tagged Neutron Inspection System (TNIS) to determine non-intrusively an assay of the chemical composition of suspect contents located by X-Ray radiography. The combination of the two techniques as well as an embedded information system will be validated in the largest French container seaport (Le Havre) by the end-users themselves : French customs as leaders of a European Custom Expert Group.

**Key issues** :

The significant achievements will consist in a field test performed at the seaport Le Havre during at least 3 months. Some containers chosen by the French customs and their operators will undergo an X-ray radiography before being controlled by the Euritrack system.

The success of the Euritrack project would be measurable by comparing the performance of the system against the expectation of detecting 100 kg of TNT placed inside a container in less than 10 minutes, when the absorption of the primary neutron beam hitting the sample due to the material inside would not be larger than a factor 2

Consequently, it can be foreseen that a complete combined inspection X-rays + neutrons will not take longer than 15 minutes per container.

The key milestones are as follows:

- Detection performance assessment: 18<sup>th</sup> month
- Delivery of the prototype: 27<sup>th</sup> month

**Technical approach** :

The advances of the state of the art that EURITRACK aims to achieve are the following:

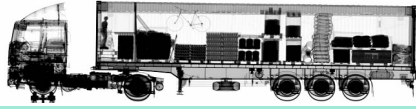
- It is planned to develop a pixelized fast alpha particle detector for a “smart” electronic collimation of the neutron beam based on the information from conventional X-ray imaging of the container. This pixelized alpha particle detector will allow to obtain easily very accurate voxel inspection, optimising the signal-to-noise ratio, and measuring on-line the background gamma-ray spectrum that might derive from the benign items surrounding the suspect one. Such neutron source with “variable electronic collimation” does not exist at the moment and will be also useful in several applications
- The spectrum of 14 MeV neutrons transmitted through the container will be used to ascertain the attenuation of the primary neutron beam in reaching the suspect voxel, giving the possibility of adjusting automatically the interrogation time for a given level of explosive material to be detected and even to declare immediately, in case of the presence of large quantity of neutron shielding material (as hydrogen rich materials) the impossibility of performing the inspection.
- This “smart” neutron analysis will require an important development of control software tools and automated tools for analysing the gamma ray spectra and extract the information relevant for the decision taking of the custom inspectors. Such features of the EURITRACK sensor will be extremely useful to allow a user-friendly impact in current custom operations.

The Associated Particle Imaging system that will be specifically developed in the framework of the EURITRACK project for the purpose of container inspection will be called TNIS (Tagged Neutron Inspection System) as already mentioned.

Moreover, the proposed system based on the use of tagged neutrons is compact in size and does not require the sizeable space and special infrastructure as some other already available systems. Consequently, it can be considered as an up-grade to the existing X-Ray inspection system already in operation in all major seaports in Europe.

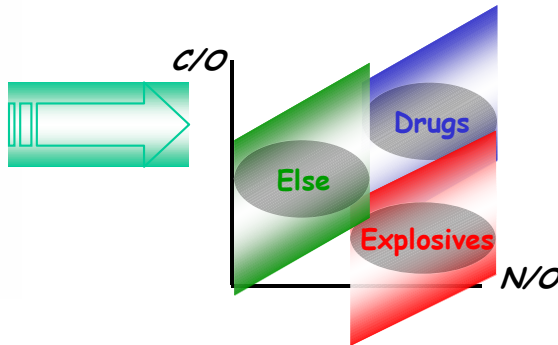
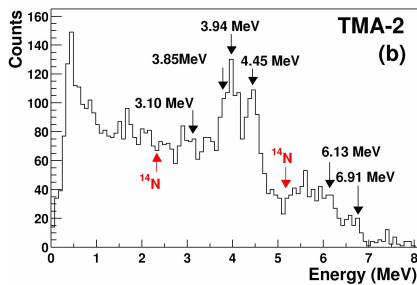
The results from the EURITRACK project will be immediately usable in all EU countries.

The following figures illustrate the expected results :



**X-ray Radiography & Imaging**

**Neutron Inspection & Explosives & Chemical substances**



#### Expected achievements/impact:

With the support of the solution EURITRACK, the contribution of the customs service in the harbour security will highly be optimised by the combination of X-ray and Neutronic Technology associated with the knowledge of the customs intelligence service in order to fight against fraud and to secure the flow of goods.

EURITRACK will allow to provide countermeasures kit to improve port security, security plans for port perimeters and improve the exchange of information between EU customs.

It will also reinforce the competitiveness of the European Union thanks to a better security of seaports, a key issue in the international trade with its world-wide partners.

#### Coordinator contact details::

M. Jean-Louis SZABO  
 CEA/Saclay  
 DRT/List/Detecs Bât 451  
 91191 Gif-Sur-Yvette Cedex  
 Phone : +33 1 69 08 33 71  
 Fax : +33 1 69 08 78 19  
 e-mail : [jean-louis.szabo@cea.fr](mailto:jean-louis.szabo@cea.fr)

**Web address:** <http://www.euritrack.org>

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