EUROPEAN COMMISSION
DIRECTORATE-GENERAL
JOINT RESEARCH CENTRE
Directorate B - Resources
Recruitment and Training

2014-IPR-G-000-3077 **Simulation of "carousel" cases with Petri Nets**

Position for: Trainee	**<u>Short description of activity</u>** As a result of a recent research project carried on at the JRC-Ispra during 2013, a model of fraud patterns with Petri Nets was produced. This model represents a typical fraud pattern against the European Union: the *carousel*. The use of the combinatorial techniques implicitly contained in the Petri Nets formalism allowed for a clear representation of the *carousel*. Moreover, the report showed that the model can be used for discovering both the general indicators of a potential *carousel* and for evaluating the real traffic of goods when feeded with real data. Unfortunately, the available simulators for Petri Nets do not allow for a complete simulation of the carousel as modelled. The reason is basically in the different goals of the existing simulators (detection of blockage situations or high level design of control systems) while, in our case, specific indicators of traffic of goods should be looked for. The development of a simulator tailored to our specific needs of analysis is envisaged in the report mentioned above. Under supervision of training adviser the trainee should complete the work initiated with the research project mentioned above in respect to the Petri Nets modelling component. The aim is at showing that the modelled carousel situation is indeed a general situation and that a specific simulator can reveal similar patterns of fraud. The work to be done is directly related to modelling and simulating a situation of *carousel* expressed with the formalism of Petri Nets and not to the direct analysis of data concerning the movement of goods and related frauds. This work will be performed in the "Critical Infrastructure Protection (CIP)" group within the Security Technology Assessment Unit. This group is dedicated to providing scientific and technical support to the European Commission in the area of the protection of critical European infrastructures. Use of modelling techniques and simulation is part of the basic competence for the group. **<u>Qualifications:</u>** The candidate should have or should be close to

	finishing a university degree in computer science. He/she should also have good analytical skills. Competence in computer programming is required. Familiarity with the basic concepts of distributed systems theory is desired. A good level (level B2) of spoken and written English is desired as well. **For general eligibility requirements, please read the rules- see below.**
Institute **Unit**	IPSC G06 Further information: http://ipsc.jrc.ec.europa.eu
Indicative duration **Preferred starting date**	5 months As soon as possible
JRC Site **Country**	Ispra Italy
Rules, general eligibility requirements	Trainees: http://ec.europa.eu/dgs/jrc/index.cfm?id=5860