

## **CENTRE DE RECHERCHE CLAUDE DELORME APPLIED MATHEMATICS GROUP – OPERATIONS RESEARCH**

### **POST-DOCTORAL RESEARCH OFFER BULK DISTRIBUTION OPTIMIZATION WITHIN VMI INDUSTRIAL**

#### **CONTEXT**

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Air Liquide has developed an optimization tool to optimize daily bulk deliveries around the world. The tool is based on a subsequent model that solves an Inventory Routing Problem (IRP). The algorithm decides when and how much product to deliver to each customer in a dispatch zone and builds routes for the necessary deliveries. This tool allows Operations teams to optimize the liquid distribution by minimizing different costs and taking into account several specific constraints related to Air Liquide business while ensuring a good customer service level.

#### **OBJECTIVES AND ORGANIZATION**

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The objective of the postdoctoral mission is to challenge the current algorithm. In fact, it's based on a heuristic approach that runs within a limited computational time in order to find a feasible solution of good quality. Air Liquide wants to develop an exact (or pseudo-exact) method and lower bounds to qualify the convergence and the optimality of the current heuristic.

The postdoctoral mission will be jointly managed by Air Liquide R&D team (CRCDD - Operations Research Group) and by AOC team (Algorithms and Combinatorial Optimization) of Computer Science Lab of Paris Nord University represented by Pr. Roberto Wolfler Calvo.

The mission will last one year, preferably to be started in September 2012. It will be organized as the following:

- Problem analysis and on-board on the existing model and code (developed in C#) – 3 months
- Research and Design of alternative methods to solve the IRP problem within specific requirements related to Air Liquide Operations. IT implementation of the chosen approach by using columns generation technique and/or relaxation and/or approximated methods to identify good lower bounds – 6 months
- Testing and validation on real test cases from production – 3 months

#### **REQUIRED PROFILE**

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- PhD scientist / researcher specialized in Vehicle Routing Problem with few years experience in the field of transportation and logistics optimization
- Recognized competency in Operations Research and Computer science
- Proficiency of English – all documentation will be in English.

#### **CONTACTS**

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Applicants should send by email curriculum vitae, a cover letter and the names of references.