International PhD Summer School, 6-9 July 2015

Electric and Fuel cell systems for transport

SUMMARY

From 6 to 9 July 2015, the CNRS research federation FCLAB and the CNRS research groups SEEDS and HySPAC organize in Belfort- France, an International PhD Summer school on the topic of fuel cell and electrical systems in transport. The summer school is intended for national and international PhD students and engineers interested in the latest developments in future transport systems.

MOTIVATION AND OBJECTIVES

Fuel Cell (FC) based transport systems are considered, by public and private research organizations, as one of the most suitable solution for clean transportation. Indeed, the use of the hydrogen produced by the water electrolysis using renewable energy sources, combined with a FC, allows a completely green energy cycle. The hydrogen production and its distribution technologies, as well as FC ones, are now enough mature to be economically feasible.

In the area of road vehicles, many automakers as Honda and Hyundai propose fuel cell vehicles whose performances are comparable to the classical ones. At French level, one of the recent and most important experiences in terms of Fuel cell vehicles is the MobyPost EU project (http://mobypost-project.eu/). This European project aims at developing a sustainable mobility concept by delivering a complete solar energy-to-wheel solution. The first core element of this environmentally friendly project is the development of ten electrical vehicles that are powered by hydrogen and specifically designed for postal delivery use. The hydrogen part of the drive train of Mobypost vehicle was designed, tested and mounted by a FCLAB research federation team.

Furthermore, the integration of fuel cells in other transport systems arose for over 20 years worldwide. For example the German military submarine “U31” was designed at the end of 1970s. It was developed to be commercialized in 2004. Another more recent example is the French cruise ship "Green Creeks" equipped in 2013 by two fuel cells for completely green propulsion. Regarding the aeronautical application, the concept of “fly by wire” is taking more space and specialists suggest an increasing use of the fuel cells. For trains also, the manufacturers are very interested by the use of the fuel cells, as an auxiliary power unit or as a main power source for traction in the end of lines.

For whole the above applications, the Fuel cell, associated with a hydrogen tank, converts the chemical energy into electrical and thermal forms. How is it possible? Which methods are used? How is the produced heat managed inside these systems? What about safety and availability? What are the materials considered in the embedded hydrogen storage, for electric safety and for the valorization of the thermal energy? This international PhD summer school will propose answers to those questions. During four days, the knowledge acquired by the lecturers through their academic and industrial research projects in the field of electric and fuel cell transport, will be transmitted through seminars, courses, tutorials and practical demonstrations. Experimental systems dealing with transport issues (hybridized sources, EMC, hydrogen vehicles) will be used during these days to illustrate the theoretical knowledge taught.
**KEY INFORMATIONS**

- **When:** July 06-09, 2015
- **Where:** UTBM, Belfort - France
- **Who:** PhD Students, young researchers, R&D staff
- **What:** Panel sessions, lectures, trainings, interactive, social event “Gala diner”

**Registration fees:**
- €200 (early bird, before May 31st, 2015)
- €250 (standard registration, after May 31st 2015)
- Including:
  - all lectures and meetings participation
  - PhD School bag with USB proceedings
  - lunches and coffee breaks
  - banquet

**Contacts:**
- **PhD School Chair:** Dr. Abdesslem Djerdir – abdesslem.djerdir@utbm.fr
- **Website:** https://xxxxxx (under construction)

**Scientific committee**
- **Chair:** Dr. Abdesslem Djerdir (FC LAB, GdR SEEDS).
- **Co-chairs:** Dr. Philippe Degobert (GdR SEEDS), Dr. Daniel Hissel (GdR HySPAC).
- **Industrial relations:** Mr. Michel Roman (Coordinator of the project MobyPost)
- **Members:** David Bouquain, Mickael Guariscou, Abdoul N’Diaye, Didier Garret, Youcef Ait-Amirat, Raphael Gouriveau, Daniel Depernet, Denis Candusso, Fabien Harel.

*) The registration will open on 15th April 2015 on the website)
### Day 1
#### 06/07/2015
- **Panel Session 1:** Midropost project
  - 08:00 Opening session (Pr. Pascal Brochier) and General Midropost project presentation (Ike Poste - UTBM - SE2)
- **Panel Session 2:** Transportation Power Systems
  - 08:00 Thermal energy valorization in transport systems (Mr. Fabrice Chopard Hutchinson)
  - 08:15 Vehicle ECU technology (Dr. Adil ALIF - FAAR) and Training: Train powertrain and grid (Mr. Vincent Fitzon - AUTOM)
  - 08:30 Training: Vehicle ECU technology and ECU Diagnosis (Dr. Adil ALIF - FAAR industry)
- **Courses Session 1**
  - 08:45 Mobility - Infrastructure
    - 09:00 Mobility - Infrastructure
    - 09:15 Coffee - Break
  - 10:00 Mobility - Vehicle (Ducati Energia - Majo - Mahytelec - La Poste - UTBM)
    - 10:15 Coffee - Break
    - 10:30 Mobility - Vehicle (Ducati Energia - Majo - Mahytelec - La Poste - UTBM)
    - 10:45 Lunch

### Day 2
#### 07/07/2015
- **Panel Session 2:** Transportation Power Systems
  - 08:00 Course: Train powertrain and grid (Mr. Vincent Fitzon - AUTOM)
  - 08:15 Vehicle ECU technology (Dr. Adil ALIF - FAAR industry)
- **Courses Session 2**
  - 08:30 Training: Train powertrain and grid (Mr. Vincent Fitzon - AUTOM)
  - 08:45 Training: Vehicle ECU technology and ECU Diagnosis (Dr. Adil ALIF - FAAR industry)
  - 09:00 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 09:15 Coffee - Break
  - 09:30 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 09:45 Coffee - Break
  - 10:00 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 10:15 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 10:30 Lunch

### Day 3
#### 08/07/2015
- **Courses Session 3**
  - 08:00 Training: Chip powertrain and grid (Dr. Adil ALIF - FAAR industry)
  - 08:15 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 08:30 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 08:45 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 09:00 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 09:15 Coffee - Break
  - 09:30 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 09:45 Coffee - Break
  - 10:00 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 10:15 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 10:30 Lunch

### Day 4
#### 08/07/2015
- **Courses Session 4**
  - 08:00 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 08:15 Coffee - Break
  - 08:30 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 08:45 Coffee - Break
  - 09:00 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 09:15 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 09:30 Electric/Magnetic Compatibility (Mr. Fabrice Chopard Hutchinson)
  - 09:45 Course: Electrical Isolation in the Planes (Pr. Béatrice Bouriot)
  - 10:00 Lunch

### Courses Session 1
- **Mobypost - Courses**
  - 14:00 Mobility - Courses (Dr. Alexandre Ravet - FC LAB)
  - 14:15 Mobility - Courses (Dr. Damien Guillaud - FC LAB)

### Courses Session 2
- **Mobypost - Training of Course 1**
  - 15:30 Mobility - Training of Course 1
  - 15:45 Mobility - Training of Course 1

- **Mobypost - Training of Course 2**
  - 16:00 Mobility - Training of Course 2
  - 16:15 Mobility - Training of Course 2

### Half Day Break
- 14:00 Lunch

### Courses Session 5
- **Mobypost - Visit and Driving Vehicles**
  - 10:00 Gala Dinner

### End of Summer School