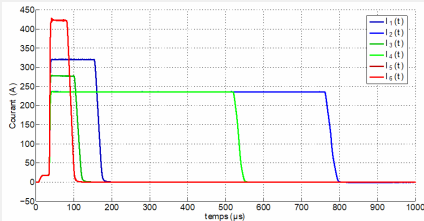




## HIGH CURRENT ULTRA-FAST PULSE GENERATOR



### Background

Different applications in material characterisation and processing require very high currents to be applied in a controlled manner for a very short time (from microseconds to milliseconds) otherwise overheating problems may occur. Unfortunately, there only exist a few commercial models of current sources that can provide these specifications, yet they have many drawbacks including noise and stability problems and especially high price point (sometimes above 100,000\$). In some cases, there simply doesn't exist any commercial device that can supply a high enough current or short enough pulse.

### Technology

The invention consists in an innovative design for affordable current sources generating ultra-short and high-intensity current pulses (from 5 A to > 3000 A). So far, the technology has been implemented in two different models: a first generator for pulses in the millisecond range (1 ms pulse rise time) and a second for pulses in the microsecond range (1 microsecond pulse rise time). In all cases, the shape of the current pulse (square, sinusoidal, etc.) can be arbitrary defined by the user. To make it even more versatile, the design was made to be modular: the main module can be combined with different types of slave modules to optimize the source characteristics for a desired application.

### Application

This type of pulse generator can have various applications in:

- Pulsed electroplating;
- Characterisation of wide-bandgap semiconductors;
- Metal processing (soldering & forming) using intense magnetic fields;
- Thin-film deposition by magnetron sputtering or cathodic arc deposition;
- Characterisation of superconductors...

### Competitive Advantages

The main strength of our design comes from the high precision in the shape of the generated current pulse and the versatility it offers. Furthermore, the noise generated by the sources is very low. In terms of pulse length, our microsecond generator is simply unrivaled with pulses an order of magnitude shorter than the competition.

### Patent

- Design of the source kept as trade secret;
- Proprietary software developed to operate the device;
- Patent application to be filed.

### Next Steps

We are looking for partners interested in collaborating to test the device for their specific application.

### Contact

Chloe Archambault, Eng.  
Project Manager, Business Development,  
Sciences and Engineering,  
Univalor  
+1 (514) 340-8523  
[chloe.archambault@univalor.ca](mailto:chloe.archambault@univalor.ca)

Frederic Sirois, Ph.D.  
Professor,  
Department of Electrical Engineering,  
Polytechnique Montreal  
+1 (514) 340-4711 ext. 3607  
[f.sirois@polymtl.ca](mailto:f.sirois@polymtl.ca)

