

Synchrotron SOLEIL

Galil Controllers Manipulate Beamline Instrumentation



Saint Aubin, located on the Plateau de Saclay, about 20 kilometers southwest of Paris, is the home of the French national synchrotron facility called Synchrotron SOLEIL. SOLEIL, which is the French word for sun, is a research center that produces and uses synchrotron radiation for analyzing inert or living matter. The objective of the SOLEIL facility is to produce knowledge and study the interaction of light and matter.

On average, over three thousand researchers come from public and private research laboratories every year to use the twenty-six beamlines available at SOLEIL (soon to be twenty-nine beamlines). Each beamline constitutes a single laboratory used for many fields of research such as chemistry, biology, earth sciences, physics, life sciences and more. Depending on the application, different types of energy are used from infrared to X-ray and ultraviolet.

Within the beamlines, which can be up to 160-meters long, optical instruments provide the beam with the characteristics required for the experiment. These instruments direct the beam, select a wavelength, and concentrate the greatest number of photons on the target of the experiment. SOLEIL standardized on Galil's DMC-2182 motion controllers to manipulate the beam along its path. The DMC-2182's are used to control the angular position of the crystals within the monochromator to vary the wavelength and select the one to make the sample react. The motion controllers are also used to position the mirrors that focus the light on the sample.

In total there are approximately three hundred DMC-2182 controllers, with two-thousand axes connected to Phytron stepper drives, or piezo motors manufactured by Nanomotion, PI and SmartAct. Each beamline has approximately two hundred motors and ten controllers.

The DMC-2182 controllers are housed in 19" 3U racks with 20 meter cables going from D-Type connectors to encoders, or TrimTrio connectors to motors in the beamline.

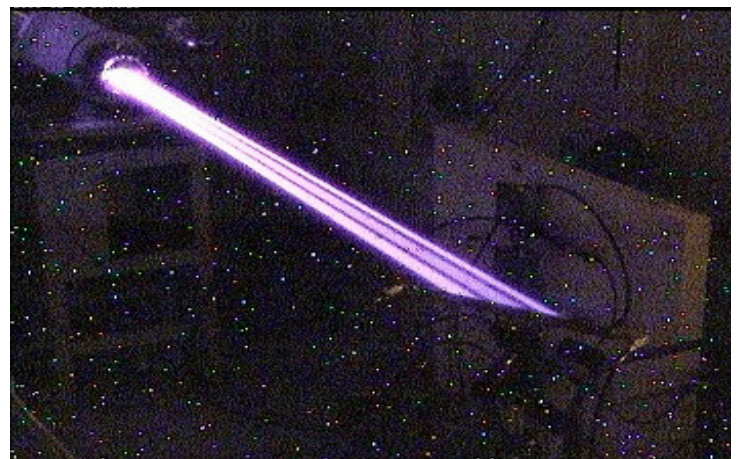
The motors are positioned using Tango software that runs on a PC. Tango is an open source device-oriented toolkit typically used for controlling synchrotrons and large scientific facilities. At SOLEIL, Tango acts as the software interface for all the devices on the beamline that command motion and manage data acquisition.

Specifically for the Galil controllers, Tango receives commands and translates them to Galil DMC code which is fed to the controllers to move the various instruments on the beamline. It is also used to extract important motor and I/O data from the controller so the scientist using the beamline knows the status of the system.

Galil's French distributor, A2V Mecatronique, acted as the local consultant for this implementation. A2V Mecatronique engineers' also participated in the development and implementation of much SOLEIL's control architecture.

With the objective of producing knowledge and studying the interaction of light and matter, SOLEIL is one of the pillars of France's regional and national commitments to the pursuit of scientific knowledge.

"We chose Galil's motion controllers because they allow us to easily develop user applications. The controllers are very versatile, work with many types of motors and encoders, and are easy-to-program" said Dominique Corruble, the engineer in charge of SOLEIL's motion control.



Synchrotron SOLEIL
Saint Aubin, France

