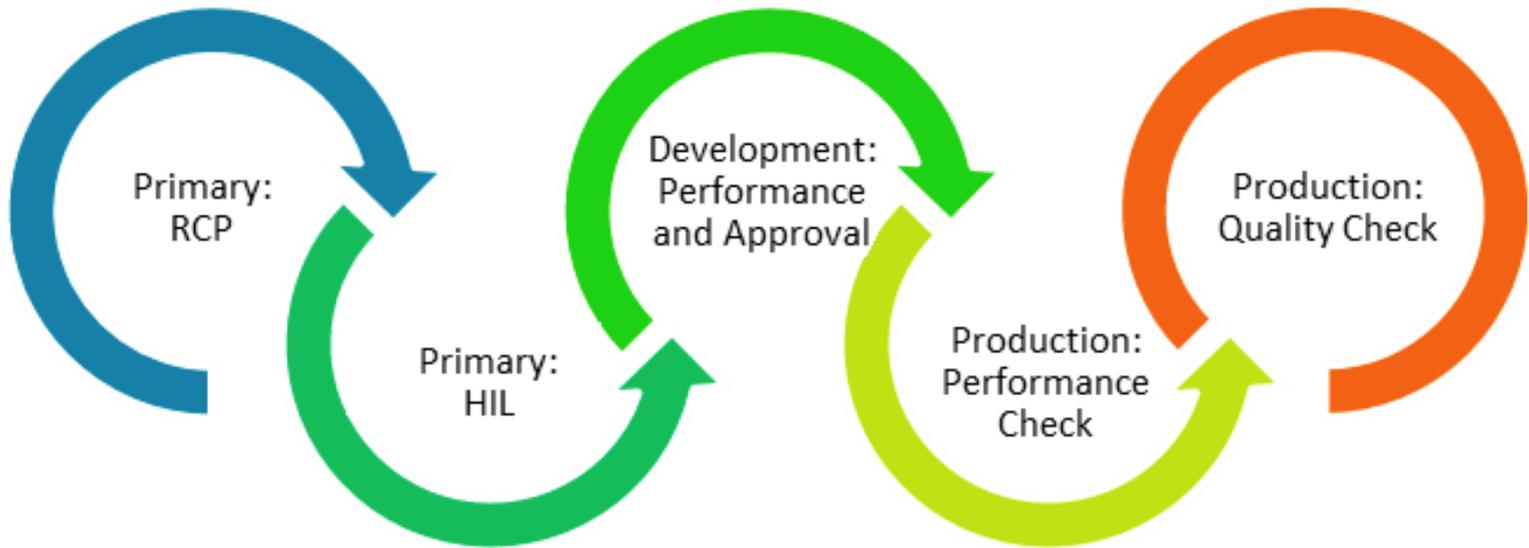


# Household Apps

IRS solutions for Household Appliances design, manufacturing and testing



## IRS profile

IRS aims to be the company leader in design and development of test, measurement and control systems. Thanks to technological innovation, advanced modeling and design as well as professional production and after sales service, IRS systems represent the real added value for customer needs.

IRS is an Engineering, Research and Development company founded by a group of engineers in 1993. Some IRS milestones must be highlighted:

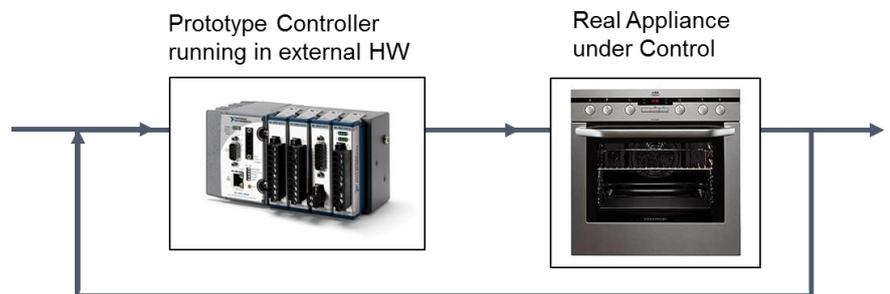
- **1994: IRS became National Instruments Alliance member**, the most important worldwide supplier of data acquisition and software tools;
- 2003: UNI EN ISO 9001:2000 certification;

Since the beginning IRS has been cooperating with universities and research centers in Italy and foreign countries.

## Primary: RCP solutions

IRS RCP (Rapid Control Prototyping) solutions allow the design and test of the complete features of the appliance before the execution of the design phase and implementation of its electronic control.

In fact, the appliance control task is performed by the RCP designed in a high level programming environment and where the control functions applied to the target (made without any control) are performed in real time and using the actual sensors and actuators existing in the real appliance.

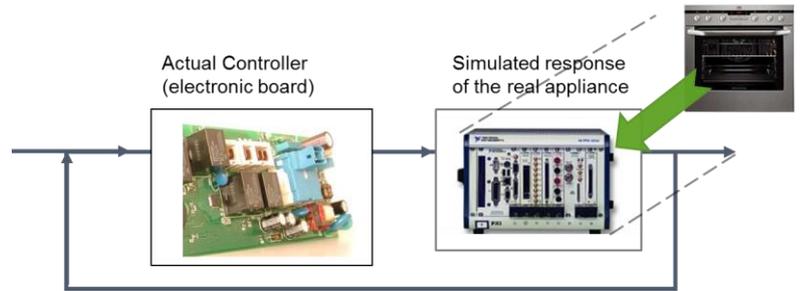


In addition, control algorithms decisions can be logged, plotted and saved to improve real-time analysis of the system. The final result is the collection of a valuable technical project design documentation and the important reduction of the time needed for the development of the controller.

## Primary: HIL solutions

IRS HIL (Hardware-In-the-Loop) solutions permit the design and test of the appliance controller without the necessity of the use of the real hardware of the machine. A specific designed external electronic hardware and software replaces the actual modules of the machine, including sensors and actuators, and works together with the electronic control, simulating the appliance response to the controller outputs.

Since the functional time response (behaviour) of the appliance is simulated by the external modules, it can be done faster or slower than the real behaviour of the appliance. This feature allows for instance the execution of hundreds of washing machine cycles during one night or the cooking evolution of a pizza that lasts hours to allow to analyse the control response carefully.



## Development: Performance and Approval

The development of a household appliance project requires the execution of many tests, according to the specific standards, to improve machine performance. These tests need the setting of special test stations with the accurate selection of the proper sensors and transducers, instruments, data acquisition system and supervising software. Such a software not only takes care that the highly automated test complies to the standard, it also implements the test report automatically and generates test data to perform statistics.

The approval tests are also strictly related to standards and the solutions given by IRS fully comply to them, providing fully automated test stations with high accuracy sensors, instruments and data acquisition systems. Automatic reporting and data base storage complete the suite of features that make the approach widely used in several test laboratories around the world.



## Production: Performance Check



Modern production lines are made with highly automated assembly stations and production capacity is continuously increasing to exploit the factory investments efficiently. As a consequence of that, the production times are shorter, the assembly quality slightly decreases and the time available for product tests are small. That's the reason why a fast and reduced functional test is generally performed on the 100% of the production to check that the used components work correctly and the assembly operations have been done properly.

In addition, the testing system must be adaptable to face the production of different products in the same production lines.

Fast test execution, accuracy, flexibility and statistical feedback for production assessment are the key factors of this solution provided by IRS.

## Production: Quality Check

Moreover, the fast production levels of modern production lines require the accomplishment of fully performance test run statistically on an important quantity of samples. The solutions given by IRS for these testing stations are able to fully test the produced appliances in a reduced time, with good accuracy and giving the results in a such way to enable the suitable feedback to the process.

The importance of the statistical test resides in the fact that it is the last filter between the factory and the final user and is also the mechanism that scores the product quality in terms of production process.

