

Movicon technology leaves its mark in radiopharmaceutical sector



*One of the Comecer's machines,
using an HMI workstation based on
Movicon X*

Nuclear medicine is among one of the most innovative and powerful in the medical practise. PET technology – Cyclotron (PET stands for Positron Emission Tomography) is the most recent innovation which offers new scanning techniques crucial for diagnosing a variety of diseases; by detecting premature cancers, examining cancer therapy effects by characterizing biochemical changes in cancer, evaluating cardiac and cerebral diseases. The PET scan is a diagnostic examination that involves the acquisition of physiologic images based on the detection of radiation from the emission of positrons. Positrons are tiny particles emitted from a radioactive substance produced by a Cyclotron. This is a machine that is capable of accelerating nuclear particles that are administered to the target where radioactive atoms are produced upon impact and are used for the radio-synthesis of radiopharmaceuticals for diagnosis and radiotherapy.

Comecer Spa, an Italian company located near Bologna, has been a leader in Europe in high technology Hot Lab applications such as Hot Cells for radiopharmaceutical manipulation, Research & Development, Automatic Fractionating Systems and Production Lines, for over 30 years. It is also one of the European leaders in the market for producing radiation protection machines and systems for medical, research and industrial applications. Since the 70s this company has orientated its work towards a priority aim: to develop technologies and materials that are absolutely safe for the operators who use them.

Many of Comecer's production systems are a result of completely innovative project studies without past reference. In the hot cell field such as in the Isolation technology, the highest functionality levels have been designed with ergonomics in mind to simplify work for technicians, enhancing modularity to make systems more flexible in adapting to their working environment. Some of the automatic systems designed by COMECER are based on computerized man-machine interfacing, based on standard PCs and designed with the uppermost userfriendliness possible.

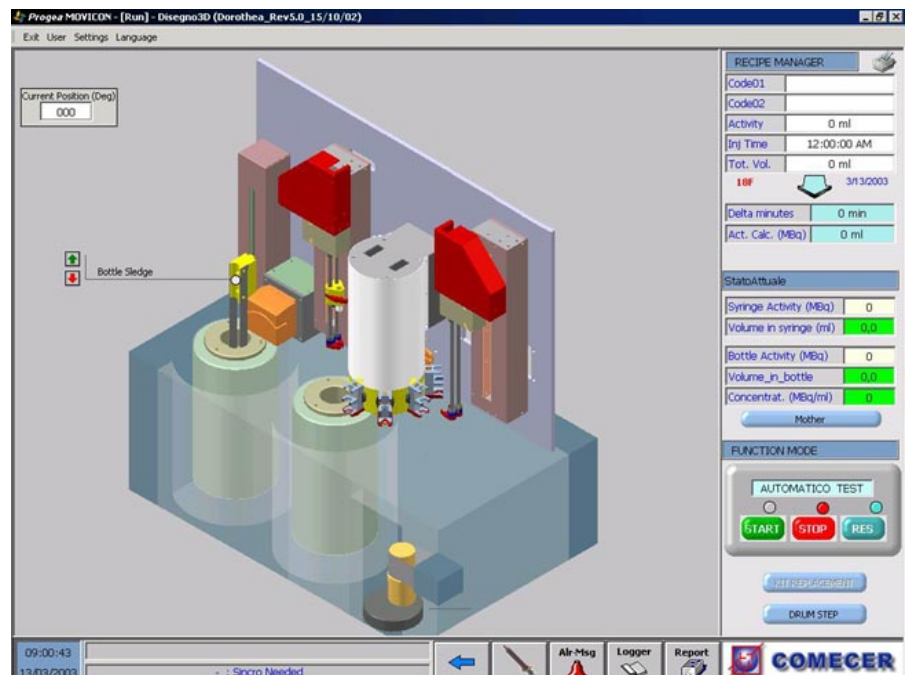
The automation technology adopted by Comecer is based on fieldbus, PLC Siemens and HMI stations based on PCs with the Movicon Scada/HMI platform designed by Progea, Italy.

The Dorothea is one of the Automatic systems for Fractionating and packaging FDG syringes. This machine has been designed by Comecer to produce 8-dose syringes filled and calibrated in

sterile conditions and placed in protection shielded containers ready for distribution. This system, housed inside a laminar flow (class A) shielded container, guarantees that injected doses to be administered to patients are prepared with the highest precision while ensuring that all operators are fully protected from radiation at the same. The control system (PLC) is linked to the HMI workstation and I/Os through the Siemens MPI fieldbus. The operator manages the machine using PC graphic interfaces to control and supervise the filling and calibration procedures. By using the Movicon screens the operator is computer aided with visual displays where s/he can interact on the system's working process and get realtime or recorded data on each of its phase, actuator positions and alarms and view historicals on the operations executed.

HMI guided technology

The Comecer machines are designed to be simple and intuitive for the operator made possible by the carefully programmed HMI system.



One of the Movicon's screen pages through which the operator can manage the machine.

The operator prepares and positions the sterile kits and empty 30 ml vial through the cell hand holes. Then the 8 perforable plug syringes are positioned in the centre of carousel conveyor while the syringe holder is positioned at the bottom of an elevator in extractable container drawers. The empty vial is deposited on a pneumatic lift, which is then linked to the synthesis module (radiopharmaceuticals) for calibration. The empty vial is placed inside the dose calibrator's ionization chamber by mechanical pliers and filled with the measure totals retrieved from the synthesis activity. The doses are then fractionized by a peristaltic pump according to the preset values defined in the Movicon HMI recipe management. This is followed by the filling stage, which is the most delicate part of the process: a mechanic arm inserts an injector needle into the syringe's perforable plug, previously placed on the carousel conveyor. The syringe is then transferred to the second dose calibrator, which continually measures the activity inside the syringe while being filled. The PLC control system uses data from the HMI, I/Os distributed through the fieldbus, and retrieves the fractionizing activity set for each single dose. The system constantly monitors the volumes withdrawn and dilutes the radiopharmaceutical with a physiological solution when the volume is insufficient for the injection amount needed. When this has been completed the syringes are loaded onto the conveyor and

transferred to the area below and placed into shield-protected containers one at a time. Once the syringes are in the shielded containers, the system automatically prints the sticky product labels, which are mechanically stuck on to each container separately. These labels show the following standard data, which can be easily customized using Movicon:

- Date and time syringe was prepared
- Patient's name
- Patient's code
- Activities required at time of injection
- Time of injection

All Comecer machine productivity is stored on historical logs in the database, on the managerial PC, and contains all the data on the production batches produced and recorded at the end of each cycle. Each production Batch can be personalized for each individual patient with a specified time. Movicon has made Comecer's security, machines and systems much more flexible, easier to manage with improved performances, which are absolutely crucial to end product quality especially in an important but dangerous sector of the medical world such as this one, which needs protection against radioactivity while working with radiopharmaceuticals.

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