

Heart Turcica Centrifugal – Development of the First Miniature & Implantable LVAD Heart Pump System in Turkey

In collaboration with



Supported by



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Motivation:

Heart diseases are one of the most dangerous causes of death. In Turkey, there are about 500 000 patient having heart failure and every year 2000 to 3000 of them need urgent heart transplantation due to left ventricular (LV) heart problems. With these LV problems, health of the patient are very poor, their lives are shortened significantly. They need hear transplantations. However, only about 20 heart transplantations can be held each year in Turkey, because of the difficulties of finding donors. The situation in the world in general is not in desired level either. In order to improve lives of patients and to be a bridge up to transplantation, recent trends in the developed countries is the artificial heart pump systems. More than 5000 LVAD systems are used in the world (4 in Turkey) as a bridge to heart transplantations. There are people living with the LVAD systems more than 7 years.

The last alternative to left ventricular heart problems is implementing an artificial heart pump system into the body. The left ventricular assist devices and systems (LVAD) are quite expensive. Our purpose in this Tubitak supported project is to develop the first prototype of implantable, miniature artificial heart assisting system as the LVAD in Turkey. This LVAD system is named as 'Heart Turcica'.

Research:

Mainly, this research is aiming to design, analyze and manufacture the complete miniature and implantable LVAD system (including the mechanical, electrical and control systems). Heart Turcica System can assist the heart in its function as a blood

pump. The system consists of a centrifugal pump, control unit and peripheral equipments.

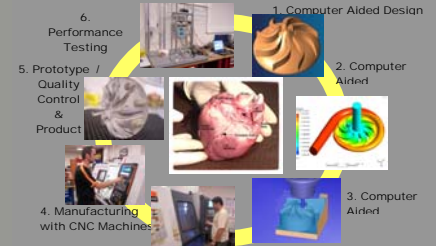


Figure 1: HTC development cycle

The complete and detailed computer aided design (CAD), analysis and engineering (CAE), manufacturing (CAM), monitoring and control system development of Heart Turcica Centrifugal (HTC) are being performed at the Manufacturing Automation and Research Center.

Currently, in vitro test are performed in the MARC. In vivo test will be performed in 2008 in selected animals. It is expected to the Heart Turcica Centrifugal LVAD system will be completed in 2009.

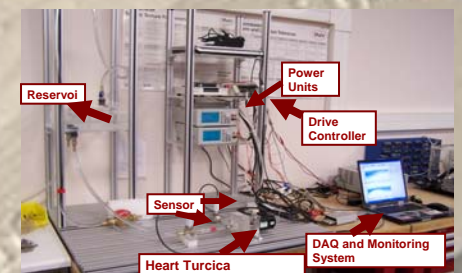


Figure 2: HTC LVAD performance test platform



Figure 1: Illustration of LVAD system