

# PERFORMING IMAGE REGISTRATION AT THE CLEVELAND CLINIC WITH THE CARTOMERGE™ IMAGE INTEGRATION SOFTWARE MODULE

*As more electrophysiologists integrate the CARTOMERGE™ Image Integration Software Module into their EP procedures, they are refining the registration process to suit their particular techniques. This is one in a series of White Papers that have been prepared in order to share the experts' methods.*

As of October 2005, Dr. Andrea Natale and other electrophysiologists at the Cleveland Clinic in Cleveland, Ohio, have used the CARTOMERGE™ Module in 50 to 60 procedures. After familiarizing themselves with the system, they preferred the Landmark Plus Surface Registration Technique over the Visual Alignment and Surface Registration Technique. Using this technique they assigned different points for landmark registration and evaluated each for accuracy. Points were placed on the left atrial roof, the appendage, as well as the anterior and posterior pulmonary vein (PV) antrums. Intracardiac echocardiography (ICE) was used, as per their standard protocol, to confirm each anatomic location. After evaluating several landmark point combinations, they determined that using the posterior upper corner of each PV antrum demonstrated the greatest accuracy and most reliable registration.

"We place the Lasso® Circular Mapping Catheter at the ostium of each pulmonary vein under intracardiac echocardiographic guidance," describes Andrea Natale. "We then place the mapping catheter at the most superior-posterior point of the Lasso® Circular Mapping Catheter and take that point." He also commented that points taken in this area are easier

to define on the CT image as well as pinpoint on the fluoroscopic and echocardiographic image thus making registration more accurate. Natale stated "After attempting to use other locations, we have found that using the posterior superior antrum of each vein as landmarks to be the most consistently accurate when registering."

When performing surface registration during the procedure, this group found that it did not always improve their accuracy. "In fact," stated Natale, "sometimes, changes in atrial pressure distort the chamber and can change its geometry making it less accurate." They continue to do surface registration, using up to 40 points to register. According to Natale, this strategy should only take approximately 2 minutes at the beginning of each case. Natale continued to state that "Using approximately 40 points for surface registration throughout the atrium has proven to be the minimum number of points necessary for best results."

Natale stated that the CARTOMERGE™ Module provides valuable information. He said that "This is especially important for people who are not as experienced, as it may help them learn the procedure quicker and shorten their learning curve." Natale also stated that "All physicians can benefit by using it to achieve improved efficiency and confidence."



*Using echo guidance to place the Lasso® Circular Mapping Catheter at the ostium in order to take a landmark point.*



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