

Innovative Treatment Option for Lung Cancer Patients

Ken Tumblison

The Dynamic Thorax Phantom, a high-quality, cost-effective device has been produced for the treatment of lung cancer. This latest innovation in lung cancer radiation treatment was developed by CIRS, along with aid from BBG to manufacture the device. BBG was most crucial in the development of the control unit after enlisting Buckeye Shapeform to create custom enclosures.

The Challenge

Given that lung cancer is the leading cause of cancer deaths among American men and women, researchers are constantly seeking to develop more effective ways to treat lung cancer. One of the latest innovations in lung cancer radiation treatment is the Dynamic Thorax Phantom developed by [Computerized Imaging Reference Systems, Inc.](#) [1] (CIRS). The device is designed to simulate the human body during radiation treatment, including the movement of the body that occurs through simple acts like breathing. Such movement during radiation treatment can mean that healthy cells are unnecessarily exposed to radiation. The CIRS device allows doctors to accurately pinpoint the tumor they wish to treat while simultaneously accounting for the movement of the patient that occurs during radiation treatment. Likewise, the movement of the tumor is detected within the lung, allowing the proper amount of radiation to reach cancer cells while minimizing the radiation healthy cells receive.

CIRS enlisted [BBG, Inc.](#) [2] to help build the device. One essential component of the device is the control unit. The control unit takes information recorded from the patient's actual movement, and controls the device's movements to accurately simulate the patient's movements. The data is then used by doctors to accurately give radiation doses during treatment. As part of the device's design, BBG needed to design the control unit so all of its components were housed in a customized enclosure built to endure an indefinite number of uses in a harsh clinical environment. Since no off-the-shelf enclosures suited for the device's specific needs were available, BBG solicited the help of [Buckeye Shapeform](#) [3].

"Not only did we need the most cost-effective way to house the device's sensitive controls, but we needed a one-stop shop that could handle all the enclosure customization," says Jim Black, president and senior engineer of BBG. "We knew that Buckeye Shapeform had an excellent reputation for their ability to customize enclosures, so we selected them to handle all the customization instead of subbing out the different aspects of customization to separate shops."

The Solution



Buckeye Shapeform's custom DII enclosure

Based on the control unit's requirements, BBG and designers at Buckeye Shapeform decided that the most cost-effective way to fit the needs of the control unit would be to customize Buckeye Shapeform's existing DII case. Several aspects of the standard DII case needed to change, however, to meet the needs of the control unit.

First, the unit needed to be deeper than the standard DII case—a cinch for Buckeye Shapeform. Second, previous versions of the control unit were anodized prior to punching the necessary holes in the enclosure. Anodizing is a process that strengthens the aluminum and protects it from corrosion. One company would anodize the case, and then another company would punch the holes in the case. Buckeye Shapeform reworked the process by combining all the customization under one roof, first by punching holes in the case, followed by the anodizing process.

"The reversal of the process—completing all modifications first and anodizing last—effectively eliminates potential weakening of the enclosure due to post-anodization modifications," states Carl Estock, Buckeye Shapeform project manager. "Reversing the process and completing all the customization under one roof seem like such little things, but they go a long way toward delivering a higher-quality, more cost-effective product for the benefit of lung cancer patients receiving treatment with the help of the Dynamic Thorax Phantom."

The Results

The ability of Buckeye Shapeform to perform all the necessary design and fabrication customizations for the Dynamic Thorax Phantom control unit under one roof resulted in cost and time savings for BBG, a higher-quality product for CIRS, and ultimately, another innovative treatment option for lung cancer patients.

"Every patient deserves the most innovative treatment, and Buckeye Shapeform provided us with an economical and effective way to house the components of one of the latest treatment options," Black notes. "Their team has an amazing ability to envision the big picture and to create effective solutions to difficult challenges."

In addition to the control unit enclosure, Buckeye Shapeform was also involved in the design and production of the Dynamic Platform, another component supporting

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the Dynamic Thorax Phantom simulator. The Dynamic Platform, made of stiff, low-density plastic, provides a sturdy base on which the Dynamic Thorax Phantom is mounted.

“Buckeye Shapeform has handled every job we have given them with expertise and professionalism,” adds Black. “Their enclosures help make our products successful, which in turn have a crucial impact in the lives of lung cancer patients.”

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