GEOMETRIXDESIGN
mechanical design solutions
through inventive engineering

Case Study: Digital Imaging System Integrated Housing Enclosure

Client: Medical technology system developer

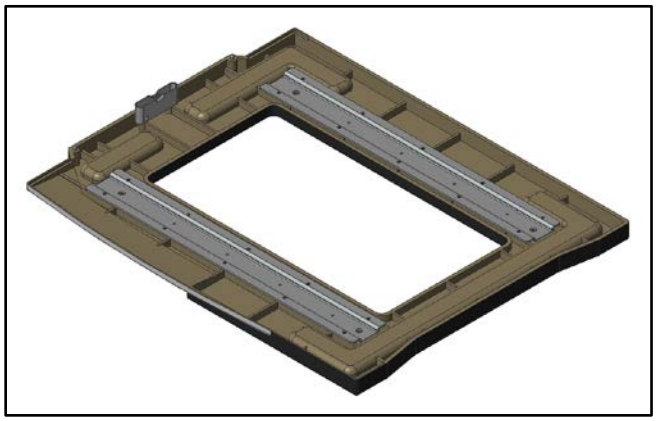
Client Problem: Needed to develop housing enclosure including frame, housing covers, loading station, and LCD display for an automated digital imaging system for pathological analysis. The housing enclosure was to provide a structural frame for mounting the imaging system, removable access covers, cooling for the electronics, self opening loading door, and LCD touch screen display.

GEOMETRIXDESIGN Solution: Design an integrated structural frame with molded plastic housing components to provide an overall system solution for the enclosure. The combined use of metal frame components with molded plastic housing panels provided an efficiency of components resulting in a strong and cost effective enclosure.

Design Details: The automated digital imaging system was preconfigured with the loading door position, power and I/O location, LCD display location, and cooling air flow channel. The housing enclosure was designed to these component and position requirements.

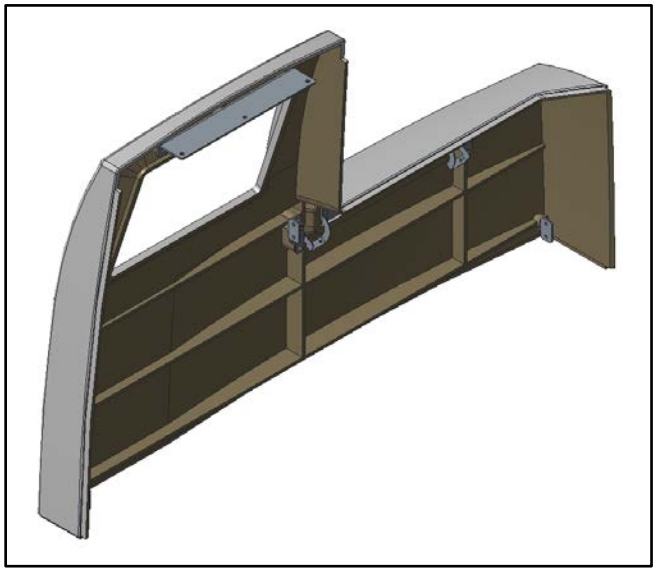
The housing enclosure was designed to support the digital imaging system. An integrated base frame that included two structural metal frame rails attached to a molded plastic base panel provided the structure for mounting the digital imaging system. The combined use of metal with plastic reduced the cost and weight of the base frame and provided features that would be difficult to implement in just metal, such as handles for securely lifting the system and pins and locks for insertion of the enclosure side panels.

The front panel and large top cover were designed as plastic molded components with structural ribs that provided strength and rigidity to the shape of each panel. The non-removal front panel used small metal brackets for attachment to the digital imaging system chassis. The top cover used a metal bracket with tabs for insertion into slots with a lower lock to attach to the base frame.



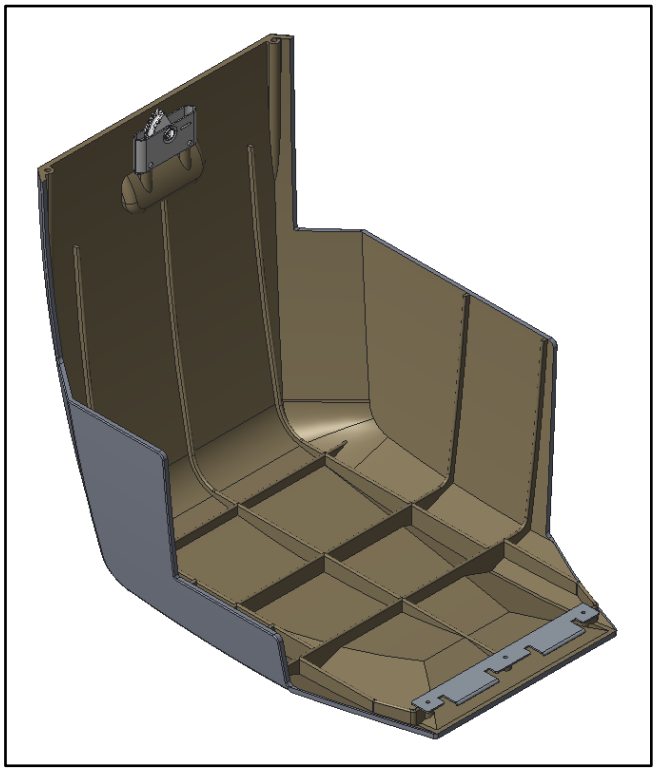
Base frame of enclosure with integrated metal rails and plastic base panel

The smaller top panel was secured to the digital imaging system chassis and used metal brackets with slots for insertion of the large top cover and removable side panel. Keys locks on the lower edge of side panel



Front panel with molded-in ribs for strength and metal brackets for mounting to the system chassis

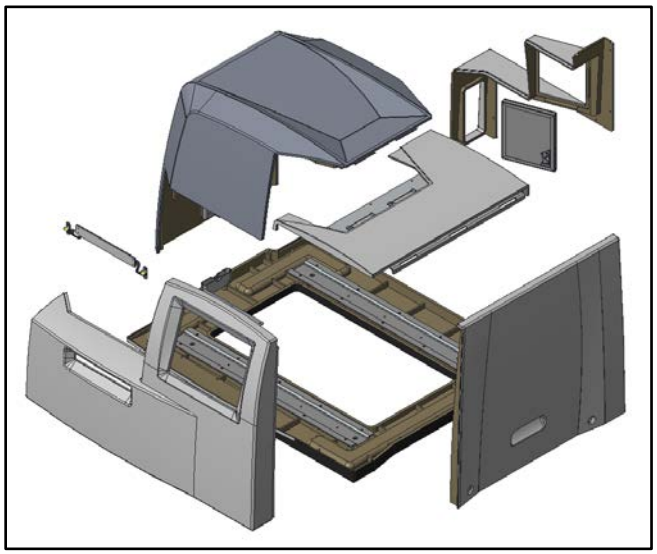
secured it to the base frame. The back panel was mounted directly to the digital imaging system chassis.



Top cover (shown inverted) with molded-in ribs for strength and rigidity. The tabbed bracket and lock are shown.

All the plastic components were molded in the RIM process using a two part polyurethane. RIM is a lower pressure injection molding process that uses an expanding polyurethane to fill the long flow paths required by these housing enclosure components. RIM requires painting to acquire a high quality finish and each enclosure component was painted in a single color.

The loading door was designed to rotate down as the digital imaging system loading tray extracted from the front panel. The door was mounted with metal rotating clips that used a spring force to close when the loading tray retracted into the housing.



Exploded assembly of all digital imaging system housing enclosure components showing relative position and attachment

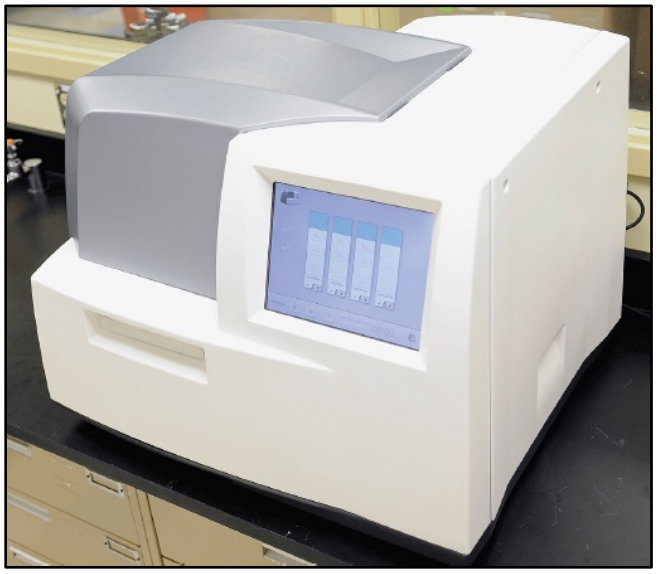


Photo of Digital Imaging System

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