



PROJECT PORTFOLIO

ENGINEERING SOLUTIONS INTO REALITY

CUSTOM ENGINEERING | PRODUCT DEVELOPMENT
REVERSE ENGINEERING | SPECIALTY FABRICATION



Tunnel to Towers
Foundation



CHRISTIANA CARE
EXECUTIVE BOARDROOM



LUTRON
EXHIBIT ENGINEERING



ACCUSHIELD
PRODUCT DEVELOPMENT



RUNOFF MARINE
MARINE INNOVATION



LOWE'S
REVERSE ENGINEERING



REAL
PROBLEMS



PRACTICAL
SOLUTIONS



MANUFACTURING
THAT WORKS

ABOUT EX3D

EX3D specializes in solving practical design and fabrication challenges through custom engineering, 3D modeling, additive manufacturing, and product development.

Our work ranges from detailed architectural display models and custom exhibit components to functional mechanical assemblies, equipment modifications, and original product designs.

We approach each project from an engineering perspective, considering not only how a part will look, but how it will function, how it will be manufactured, how it will assemble, and how it will perform in its intended environment.

EX3D combines decades of hands-on engineering and technical experience with modern CAD design, advanced 3D-printing technology, and an understanding of real-world installation and manufacturing requirements.

The following projects illustrate our ability to take an idea, a photograph, an existing component, or a specific problem and develop a practical, finished solution.

MECHANICAL ENGINEERING & HYBRID FABRICATION

Designing Complete Mechanical Solutions, Not Just Printed Parts

One of EX3D's core strengths is the ability to combine additive manufacturing with conventional mechanical components to create durable, functional assemblies.

With nearly four decades of engineering and technical experience, I approach each project by evaluating how the finished product must function, how its components interact, and where material or mechanical limitations need to be addressed.

Morey's Piers | Custom Microphone Push-to-Talk Components

When repeatedly failing microphone components required replacement, I redesigned the original mechanism rather than simply reproducing it. Recognizing that a plastic axle would remain a potential failure point, I incorporated a stainless-steel pin into a custom-designed solid ABS component.

I also developed a dedicated assembly jig to accurately position and install the pin using a tight interference fit, creating a mechanically secure assembly without relying on a printed axle. The replacement components were manufactured in different colors to identify their respective rides.

Custom Boardroom Cable Retractors | Mechanical Integration

The custom cable retractor assemblies demonstrate the same engineering approach on a larger scale. These designs integrate printed structural components with conventional bearings, shafts, heat-set threaded inserts, fasteners, and electrical hardware to create complete mechanical systems.

Rather than relying exclusively on printed features, each component is selected and integrated according to its mechanical requirements, serviceability, and intended use.

The objective is never simply to produce a printable model. It is to engineer a complete solution that functions reliably in the real world.

01 | TUNNEL TO TOWERS FOUNDATION

Custom Architectural Display Model & Presentation Assembly

Project Type: Original Design, Scale Modeling, Multi-Component Fabrication, Packaging Engineering

EX3D was approached with photographs of a large Tunnel to Towers exhibit and asked to recreate the concept as a compact, approximately 12 × 12-inch presentation model.

Every physical component of the miniature exhibit was developed specifically for the project, including:

- Detailed World Trade Center Twin Towers, including architectural features and rooftop antenna.
- A custom firefighter figure approximately 7.5 inches tall.
- Two removable flagpoles designed to display actual fabric American flags.
- A custom presentation base incorporating the Tunnel to Towers Foundation branding.
- Mechanical mounting provisions and assembly hardware.
- A purpose-built packaging and assembly system.

The firefighter was particularly challenging. AI-assisted model generation provided an initial starting point, but extensive manual reconstruction and modification were required to correct excessive detail, eliminate problematic overhangs, and produce a model suitable for reliable 3D printing.

The flagpoles presented another unique design challenge. Rather than producing plastic flags, EX3D developed a concealed mounting arrangement using commercially available fabric flags. The original flag sticks were modified to fit inside the printed flagpoles, with custom finials securing the flags in place.

Packaging was engineered as part of the product, not as an afterthought.

A custom printed organizer fit inside the shipping carton above the protected display base. Individual compartments securely accommodated both towers, the firefighter, flagpoles, mounting hardware, and a custom 3D-printed Allen key bearing the customer's name. Protective foam and an instruction card completed the presentation.

Eight fully assembled prototype models were produced to validate the design and assembly process.

The proposed larger production run did not proceed due to the customer's organizational and financial circumstances. The project nevertheless progressed through complete design, fabrication, assembly, and prototype packaging.



02 | CHRISTIANACARE

Executive Boardroom Integration & Custom Table Components

Project Type: Custom Mechanical Engineering, AV Integration, Functional Fabrication

A large executive boardroom installation required audiovisual connections to be integrated into a conference table while preserving the appearance and functionality of the furniture.

EX3D developed custom components and integration solutions for the table-mounted connection system, including retractable HDMI and USB power interfaces.

The design required careful attention to available space, equipment clearances, user accessibility, and the relationship between the electrical components and the existing furniture.

Rather than accepting a standard tabletop configuration, the integration was designed around the actual installation requirements, with connection access incorporated into the side of the conference table.

This project demonstrates EX3D's ability to design functional components around existing equipment, solve dimensional and mechanical challenges, and coordinate custom fabrication with a finished architectural environment.



03 | LUTRON EXHIBIT

Custom Magnifier Assembly for Trade Show Display

Project Type: Exhibit Engineering, Mechanical Design, Custom Fabrication

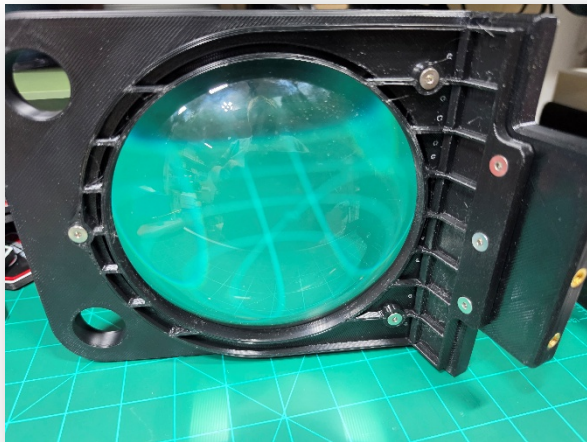
EX3D designed and fabricated a custom magnifier assembly for a Lutron exhibit presented at CEDIA.

The application required a specialized mechanical assembly that would integrate with the exhibit structure while maintaining the intended visual presentation.

The design incorporated custom structural components, mounting provisions, and a finished assembly engineered around the physical constraints of the exhibit.

The completed component was fabricated and delivered for installation, and photographs of the finished exhibit were subsequently provided.

This project illustrates our ability to translate exhibit concepts into physical assemblies that accommodate both aesthetic and functional requirements.



04 | ACCUSHIELD

Original Product Engineering & Protective Accessory System | accushieldusa.com

Project Type: Product Development, Mechanical Design, Prototype Fabrication, Packaging Engineering

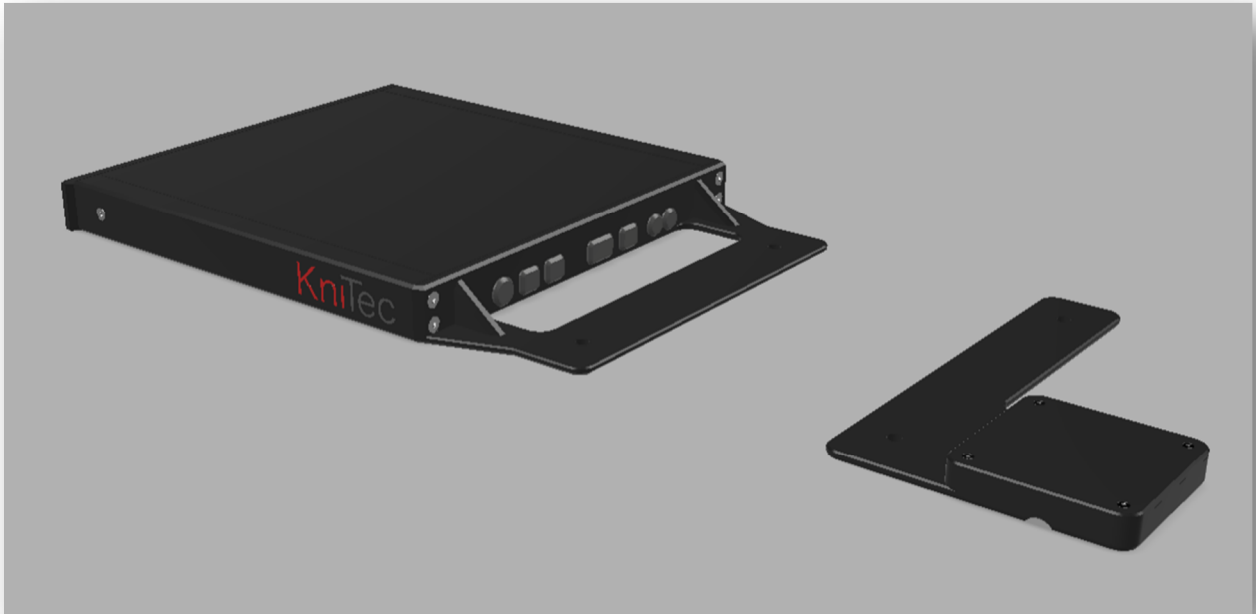
AccuShield is an original product-development project involving a custom protective accessory system.

EX3D developed the physical design, mounting configuration, associated components, and packaging arrangement with an emphasis on practical installation, repeatable fabrication, and efficient handling.

The design process considered how the individual parts would interact, how they would be installed, and how the completed product could be organized for shipment.

The accompanying photographs illustrate both the product design and the custom packaging configuration, including the organized placement of the primary components and accessories.

This project demonstrates our experience extending beyond one-off fabrication into complete product development, where manufacturing, assembly, presentation, and packaging must all work together.



05 | RUNOFF MARINE

Original Marine Product Development | runoffmarine.com

Project Type: Original Product Design, Functional Engineering, Prototype Development

Runoff Marine represents EX3D's work in developing original products intended to address practical challenges in marine environments.

The project involves translating a specific operational need into a manufacturable product concept, with attention to mechanical functionality, component geometry, material selection, and the conditions in which the product will be used.

The work reflects EX3D's broader engineering approach: understanding the problem first, developing a practical mechanical solution, and refining the design with manufacturing in mind.



06 | LOWE'S EXHIBIT

Custom Replacement Hinge Assemblies

Project Type: Reverse Engineering, Mechanical Design, Rapid Fabrication

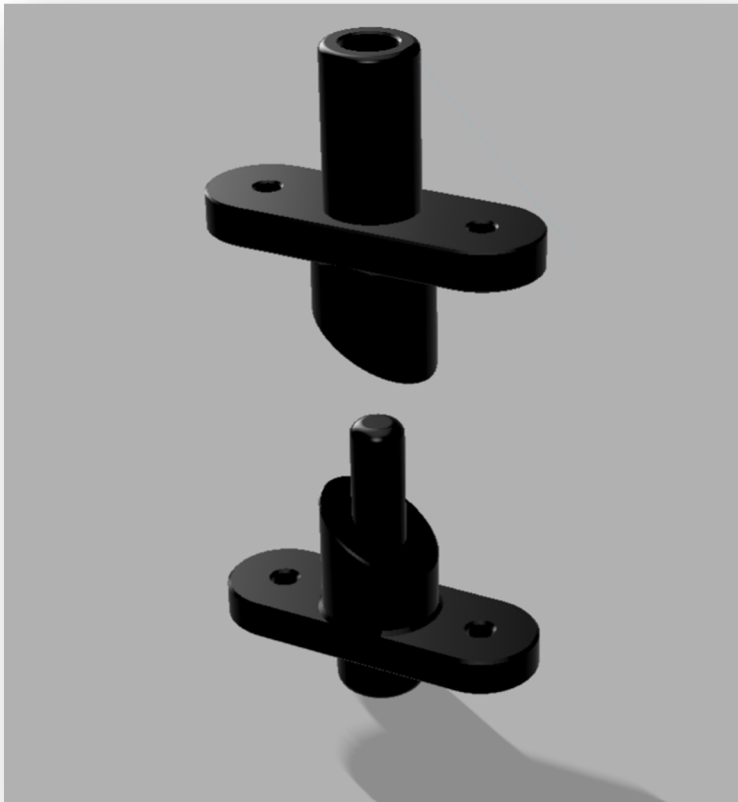
EX3D was tasked with developing custom hinge components for a Lowe's exhibit under an extremely compressed production schedule.

The project required the design and fabrication of replacement mechanical components that could satisfy the dimensional and functional requirements of the existing exhibit.

Working from the required geometry and mechanical arrangement, EX3D created the hinge design and produced functional 3D-printed components within approximately 24 hours.

The finished components were shipped directly for use in the exhibit.

This project demonstrates the value of in-house CAD development and additive manufacturing when conventional sourcing or manufacturing lead times cannot meet the project schedule.



07 | UNDER THE WILDWOOD BOARDWALK

Custom Electrical Enclosure Cover

Project Type: Replacement Component Design, Site-Specific Fabrication

An existing electrical installation beneath the Wildwood Boardwalk required a replacement enclosure cover.

EX3D developed and fabricated a custom white cover designed to fit the existing enclosure and mounting arrangement.

The solution addressed the physical requirements of the installation without requiring wholesale replacement of the surrounding equipment.

This is an example of a straightforward but valuable application of custom manufacturing: producing a specific component when the required fit, configuration, or replacement part is not readily available.



08 | MOREY'S PIERS

Custom Microphone Repair Components

Project Type: Replacement Part Engineering, Rapid Manufacturing, Color-Coded Fabrication

EX3D developed custom replacement components to repair microphone equipment used at Morey's Piers.

The components were designed to restore the required mechanical function while providing a practical alternative to replacing larger equipment assemblies.

At the customer's request, the parts were produced in different colors to correspond with individual rides.

The project demonstrates our ability to manufacture functional replacement parts with application-specific modifications, including custom colors and configurations.



09 | AVENUE NORTH BOARDROOM

Custom Camera Mount Adapter

Project Type: Retrofit Engineering, Custom Mounting Hardware, Architectural Integration

During an audiovisual upgrade at Avenue North, the replacement camera required a smaller mounting plate than the previously installed camera.

Removing the original mount would have left an exposed area requiring wall repair and refinishing.

EX3D designed a custom adapter plate that covered the existing mounting footprint while integrating with the new camera bracket.

The finished installation preserved the appearance of the wall, avoided unnecessary patching, and provided the required mechanical interface for the replacement equipment.

This project illustrates how a relatively small custom-engineered component can eliminate additional labor, reduce disruption, and improve the overall installation.



10 | CUSTOM EVENT DESIGN, ENGINEERING & PRODUCTION

Private Special Event | 342 Custom-Fabricated Models

Creative Collaboration • Custom Fabrication • Mechanical Engineering • Electronics • Production & Digital Integration

EX3D was engaged to design and manufacture a comprehensive collection of custom decorative elements, interactive displays, and guest keepsakes for a professionally coordinated private event. Working closely with the event decorator, EX3D translated creative concepts and presentation requirements into original, purpose-built products.

The project involved the design and production of 342 individual models and components, ranging from intricate tabletop decorations to a large, electronically controlled centerpiece. All elements were developed around a consistent visual theme and manufactured to meet the event's fixed installation deadline.

Major Project Components:

Interactive Three-Tier Centerpiece

A custom-engineered display featuring a transparent central section designed to simulate moving water through coordinated lighting and mechanical motion. The assembly incorporated counter-rotating discs, geared motors, electronic controls, custom lighting, and integrated power distribution, all housed within specially designed and fabricated components.

100 Illuminated Guest Keepsakes

Designed and manufactured 100 custom seashell-themed guest gifts, each incorporating an individual light. The keepsakes were prepared with accompanying instructions and packaging, creating a complete take-home experience rather than simply a decorative item.

Custom Table Centerpieces & Venue Decorations

Developed and manufactured coral formations, seahorses, and other themed decorative elements for guest tables, surrounding displays, and the overall event environment. Designs were coordinated with the event decorator to maintain a consistent appearance throughout the venue.

Dessert Buffet & Food Presentation Accessories

Created matching decorative components for the dessert buffet, including custom scallop-shell-shaped food identification holders and other presentation accessories.

Digital Integration | EX3D Connect

The project also inspired the development of EX3D Connect, a proprietary dynamic QR code platform connecting physical products with digital content.

Initially created to provide guests with instructions for their illuminated keepsakes and access to event information, EX3D Connect allows the destination of a printed QR code to be updated without changing the physical code itself.

The technology has since evolved into a reusable EX3D capability for integrating digital instructions, product information, and interactive content into custom-fabricated products and displays.

Capabilities Demonstrated

This project required the coordination of original design, mechanical engineering, electronics, material selection, production scheduling, assembly, packaging, and creative collaboration.

It demonstrates EX3D's ability to manage a substantial volume of custom-manufactured components while maintaining consistency across multiple unique designs and delivering a complete, coordinated presentation.

342 custom-fabricated models. 100 illuminated keepsakes. One integrated event environment.



OUR TECHNICAL CAPABILITIES

CAD Design & Engineering

- Original mechanical and product design
- 3D CAD modeling and component development
- Reverse engineering from existing parts, photographs, and measurements
- Multi-component assemblies and mechanical interfaces
- Dimensional adaptation and retrofit engineering
- Design for additive manufacturing and assembly

Additive Manufacturing & Fabrication

- Functional prototypes and production components
- Multi-part architectural and exhibit models
- Engineering-grade thermoplastics and specialty materials
- Custom mounting brackets, enclosures, and mechanical components
- Color-specific and application-specific fabrication
- Short-run manufacturing and repeatable production workflows

Product & Exhibit Development

- Concept-to-prototype development
- Custom exhibit mechanisms and structural components
- Display models and presentation assemblies
- Integration of purchased hardware and specialty components
- Assembly planning and installation considerations
- Custom shipping protection, packaging, and component organization

Practical Problem Solving

EX3D frequently works on projects where a conventional off-the-shelf solution does not exist, where an existing product must be modified, or where a project schedule makes traditional manufacturing impractical.

Our approach combines engineering judgment, hands-on fabrication experience, and the flexibility of additive manufacturing to produce practical solutions without unnecessary complexity.

OUR APPROACH

From Concept to Finished Product

A successful custom fabrication project involves more than producing an attractive 3D model.

It requires understanding how the finished product will be used, identifying the mechanical and dimensional requirements, selecting appropriate manufacturing methods, and anticipating assembly, handling, transportation, and installation.

Our process is built around five principles:

Understand the Application

Establish the actual requirements, physical constraints, and intended use before committing to a design.

Engineer for Manufacturing

Develop components that can be fabricated reliably, assembled efficiently, and reproduced consistently.

Solve the Details

Address the mounting hardware, mechanical connections, clearances, material selection, and other details that determine whether a design will work in practice.

Validate the Result

Use prototypes, fit testing, and physical evaluation to refine the design before larger-scale production.

Consider the Complete Deliverable

Account for assembly, packaging, transportation, and final presentation, not simply the individual printed components.

WHY EX3D

The projects presented here are different in size, application, and complexity, but they share a common requirement: each demanded a custom solution to a problem that could not be addressed adequately with a standard component.

From a fully developed architectural presentation model to an engineered exhibit assembly or a small replacement part, EX3D applies the same fundamental process.

We design with the finished product in mind.

Our experience includes original design, detailed modeling, functional engineering, fabrication, assembly, and packaging. Equally important, we understand the practical challenges that arise when a custom component must fit into a larger project with real schedules, real budgets, and real installation requirements.



REAL PROBLEMS. PRACTICAL SOLUTIONS.
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