



Accessible and Modular Prosthetics (AMP)

Switch up how you think about prosthetics

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Executive Summary

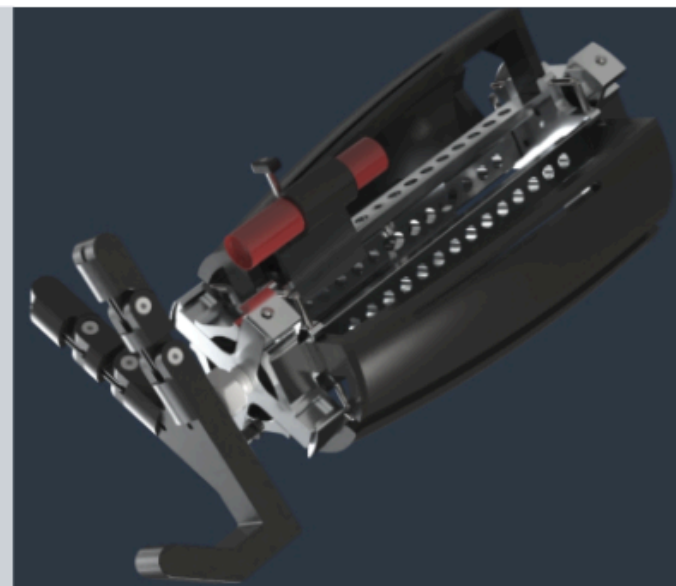


The Accessible and Modular Prosthetic (AMP) is a prosthetic arm that aims to increase the capability of people with an upper limb difference to either increase or exceed the capabilities beyond that of a normal person. It features a proprietary terminal device (below the wrist) a quick disconnect (QD) at the joints (elbow and wrist) and a proprietary rail system for tool holding. Through preliminary research it was discovered that many people with upper limb differences still need to execute daily functions and with the mechanical options that are currently in common use this can be a difficult task.

There are over 1.7 million people within the US that suffer from upper limb differences and about 6,000 people just within the western catchment of the Veterans Affairs. Recently in Colorado, House Bill 23-1136 was passed which forces insurance companies to pay for a recreational option of a prosthetic as well as an everyday use prosthetic. This bill is also a nationwide effort to help people who use prosthetics.

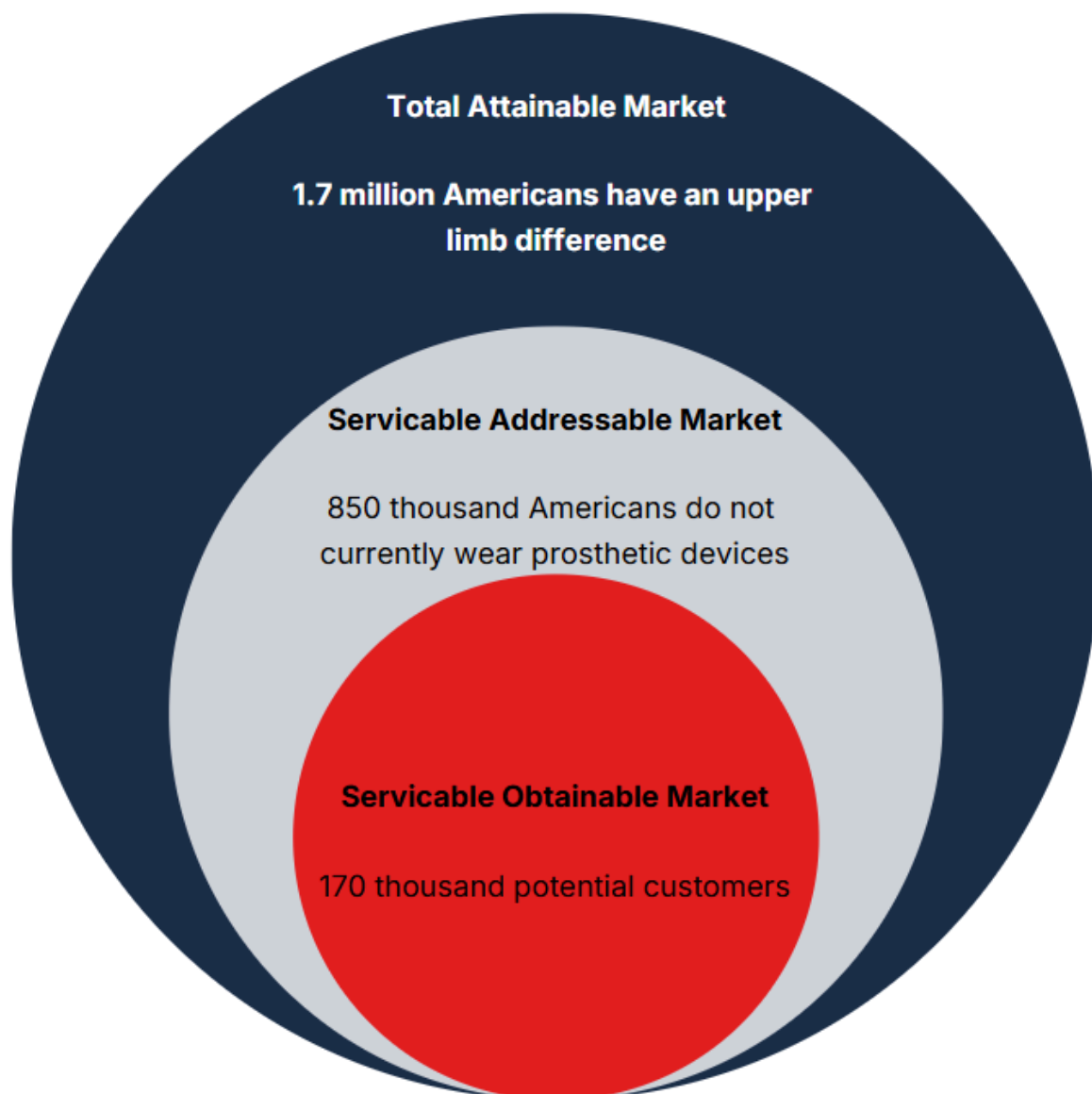
Introduction

The Accessible and Modular Prosthetic (AMP) system is engineered to deliver high-fidelity prosthetic solutions while maintaining economic feasibility. By leveraging a modular architecture compatible with industry-standard terminal interfaces, the system optimizes functional integration and user versatility. A core strategic objective involves collaboration with the Department of Veterans Affairs (VA) to enhance prosthetic provision for service-connected individuals.





Market Analysis

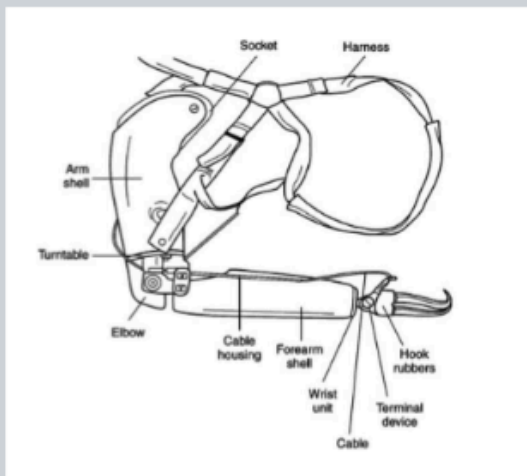
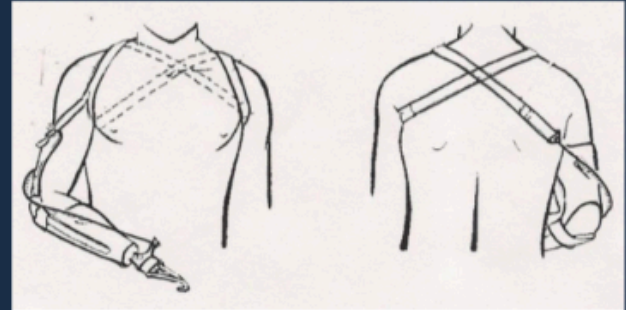


Background



Cable Interface

Typical mechanical prosthetics are articulated through the abduction or adduction of the users shoulder blades. the user can choose how they would like to articulate the terminal device.



Parts of a Prosthetic

Mechanical prosthetics feature a plastic arm shell which holds the arm together and connects the harness to the bicep and the bicep to the forearm and the forearm to the terminal device

Current Terminal Devices

The most commonly used terminal device is the Hosmer hook, which allows for some fine articulation but not macro or circular holding / grabbing



Overview



Triclaw

It enables interaction with everyday objects through a hand-like terminal device. Two phalanges form a versatile gripping mechanism, complemented by a hooked thumb that allows objects to be carried easily. The design adapts to a wide range of shapes and sizes and is manufactured from Onyx, a carbon fiber-reinforced nylon, providing strength and durability. The hooked thumb can support loads of up to 50 lbf.



Quick Disconnect (QD)

It enables rapid interchange of prosthetic attachments while maintaining a secure and rigid connection during use through spring plungers. At the same time, the design allows for quick and effortless disengagement when needed, and it is compatible with terminal devices already available on the market.

Swiss Arm

It provides immediate access to multiple tools integrated within the forearm, with a sliding mechanism that allows tools to engage and disengage quickly. This design increases versatility and functionality for daily tasks, while 3D-printed tool holders enable customizable tool configurations to suit individual needs.





Future Outlook



Additional Attachments

Additional modular attachments will be developed to expand the range of possible use cases, enabling the device to better support a variety of daily, recreational, and specialized tasks. By introducing interchangeable tools tailored for specific activities, users will be able to adapt the prosthesis to their individual needs and preferences, increasing overall functionality, independence, and ease of use across different environments.

Adjustable Position Lock for Triclaw

An adjustable position lock for the Triclaw will allow users to set and maintain the desired orientation of the device during use, improving stability and control across a variety of tasks. This feature will enable fine-tuned positioning based on user preference and activity, enhancing precision, reducing fatigue, and providing greater confidence when handling objects in different scenarios.

Increased Customizability

Customizable housing walls will allow users to personalize the appearance and feel of the device to better reflect their preferences and identity. By offering options in colors, textures, and possibly patterns or interchangeable panels, the design can enhance user satisfaction and comfort while also enabling easy updates or replacements as needs and tastes evolve over time.

Additional Weight Reduction

Further design optimization will focus on reducing overall weight while improving the form and ergonomics of the device. By refining geometry, selecting efficient materials, and eliminating unnecessary mass, the design can enhance user comfort and reduce fatigue during extended use. At the same time, improving the overall form will ensure a more natural appearance and better integration with the user's body, leading to increased usability and satisfaction.

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