

Project Title: [Modular Attachment Adapter for Utility Terrain Vehicle](#)

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Sponsored By: [American LandMaster](#)

American LandMaster of Columbia City, Indiana is a business that focuses on the design and manufacturing of gas and electric powered utility vehicles. These utility vehicles are an essential tool on farms and ranches, as they can be used for a variety of tasks. These tasks include towing, hauling, accessing hard-to-reach places, and even recreational use. American LandMaster is now expanding the versatility of these utility vehicles by designing various additional attachments, which when connected allow the utility vehicle to accomplish tasks that it previously could not complete. These attachments include a plow, a bucket, and a pallet lift, which can be used to plow snow, haul and dump material, and transport pallets. American LandMaster currently has an adapter mechanism, which is used to connect the plow to the utility vehicle and allows the plow to rotate horizontally and vertically. However, this current adapter can only connect to the plow attachment.

Since American LandMaster now offers multiple attachments, they would like to redesign the current adapter mechanism to achieve a modular concept. The objective of this project is to create a modular attachment adapter, which allows all three attachments to connect to the utility vehicle through a single design. The design must allow the plow and pallet lift attachments to rotate horizontally and vertically, while the bucket attachment must rotate vertically and tilt forward. Additionally, the adapter must be capable of handling a minimum load capacity of 250 pounds, and the attachments must detach from the adapter in under 30 seconds utilizing one person. The adapter is constrained dimensionally, as it must remain within 20 inches from the front of the vehicle, and the adapter with the attachments must remain between 60 and 72 inches in width. The redesign must fulfill the requirements and specifications by altering the design variables, such as the actuation mechanism, location of the actuation devices, material, bearings/pivot points, geometrical configuration of components, connection mechanism, and attachment design. Lastly, American LandMaster will provide a budget of \$1000 and manufacturing support at its facilities for the construction of a prototype.