The drivetrain is essential for the buggy to move. It includes all the components that transfer movement from the engine to the tires. The main design component of the drivetrain is the gearbox. This year the gearcase, gears, and shafts were redesigned to create a smaller gearbox, to reduce weight, lower the center of gravity, and create a better angle for the CV axles. The team decided to use constant velocity (CV) axles as they retain more efficiency from the gearbox to the wheel than shafts.

To achieve the goal of a smaller gearbox the team decided on a 8:1 gear ratio to reduce the size of gears, which reduces the sizes of the shafts, and overall size of the gearbox. The 8:1 gear ratio will also still deliver the desired amount of power from the engine to the wheels. As shown in Fig. 2, the smaller gearbox is fits in line with engine and lowers the center of gravity. Custom hubs and bearing carriers were also designed to reduce weight and be more cost effective.

The gearbox reduced weight from the 2018 gearbox by 19 lbs to overall weight loss of the buggy. The custom hubs and bearing carriers also contributed to the overall weight loss. The output gear diameter reduced from 7.5 in. to 5.375 in., saving 1.063 in. for vehicle travel. The vehicle accelerated 100 ft in 4.9 s, missing the goal by 0.3 s. This is likely due to improper clutching and is being addressed by the club before the competition. Incidentally, this time is still faster than the 5.12 s the 2018 vehicle achieved at the Oregon competition.

The performance and results of the vehicle shall make us competitive in the SAE BAJA competition. We expect to perform to the best of our abilities and represent USU with great results.

Interested in BAJA? Please feel free to ask questions about our vehicle.

Figure 1. Components of the Gearbox

Figure 2. Lower center of gravity

Figure 3. Custom Bearing carriers (a) and rear hubs (b)