# Engineering Performance Report: The Geiser Gen 2 Rebuild Project (“The Reaper”)

## 1. Project Overview and Structural Foundation

The strategic decision to utilize a 2011 Geiser Gen 2 chassis as the architecture for "The Reaper" project was predicated on the platform's renowned torsional rigidity and the opportunity for a comprehensive modernization. In the Trophy Truck Spec class, converting a legacy chassis into a competitive professional racing asset requires a ground-up reconstruction that exceeds standard maintenance. By stripping the vehicle to the bare frame and executing a 100% rebuild, this project mitigates the accumulated mechanical fatigue and structural work-hardening inherent in a decade-old frame. The resulting platform offers the structural predictability of a zero-hour chassis, providing the necessary rigid foundation to optimize the high-stress powertrain and suspension loads detailed in this report.

| Component | Specification / Status |
|---|---|
| **Chassis Platform** | Geiser Gen 2 |
| **Class** | Trophy Truck Spec |
| **Original Build Year** | 2011 |
| **Rebuild Scope** | 100% Ground-up Reconstruction |
| **Current Status** | Zero-Hour; Rebuilt to Professional Racing Standards |

This rigid structural foundation is the critical prerequisite for managing the kinetic energy and high-frequency vibrations generated by the modernized drivetrain, ensuring that the updated Geiser Bros geometry operates within its intended performance envelope without deflection-induced handling variances.

## 2. Powertrain and Drivetrain Engineering

In the Trophy Truck Spec class, competitive advantage is derived from the integration of a sealed, high-reliability power plant that balances sustainable output with drivetrain longevity. The engineering strategy for "The Reaper" prioritizes a robust torque curve and a drivetrain capable of sustaining extreme thermal loads during endurance cycles.

The "Turn Key LS3 sealed" unit has been dyno-verified to ensure peak performance and class compliance:

- **Rear Wheel Horsepower:** 383 HP
- **Rear Wheel Torque:** 338 FT-LBS
- **Unit Status:** Sealed and race-ready, optimizing reliability for multi-day desert stages.

The drivetrain architecture is engineered for maximum power transfer and component commonality:

- **Transmission:** Turbo 400 210 Ratio, custom-built by Automatic Transmission Design (ATD).
- **Torque Multiplication:** Tubeworks underdrive system.
- **Final Drive Assembly:**
  - **Housing:** Tubeworks heavy-duty rear-end housing.
  - **3rd Member:** Tubeworks-built unit featuring a 4:11 gear ratio and a Tubeworks bearing carrier.
  - **Driveline:** Drivelines Inc. custom drive shaft.
  - **Hubs and Drive Plates:** Geiser Bros front and rear.

**Drivetrain Engineering Evaluation:** Utilizing a 4:11 gear ratio in conjunction with the Tubeworks bearing carrier is critical for managing the rotational mass of 37-40" tires. This configuration reduces the torsional stress on the ring and pinion, while the Tubeworks carrier optimizes heat dissipation and maintains gear alignment under the extreme deflection forces encountered in heavy "whoops." Furthermore, the utilization of Geiser Bros hubs and drive plates ensures race-proven metallurgy and logistics-friendly parts commonality across the vehicle.

# 3. Suspension Geometry, Steering, and Braking Systems

Modernizing a legacy chassis necessitates a sophisticated dampening and steering suite to manage technical high-speed terrain. The suspension modernization on "The Reaper" utilizes updated geometry to bridge the gap between 2011 design constraints and current Trophy Truck performance requirements.

The dampening architecture features a professional Fox Racing Shox configuration:

| Front Suspension Shocks | Rear Suspension Shocks |
|---|---|
| Fox 4.0 Bypass | Fox 4.0 Bypass |
| Fox 3.0 Coilover | Fox 3.0 Coilover |
| Fox Bump Stop | Fox Bump Stop |

**Mechanical Linkage and Steering Detail:** The front-end modernization is anchored by Geiser Bros updated geometry A-Arms and Uprights, while the rear utilizes new Geiser Bros trailing arms with only three races of recorded wear, significantly reducing the risk of structural fatigue in high-stress pivot points. The steering assembly has been fully modernized with a comprehensive **Power Steering Solutions** suite, including:

- **Steering Rack:** Power Steering Solutions high-volume unit.
- **Pump:** Power Steering Solutions race pump.
- **Servo:** Power Steering Solutions tuned servo.

This steering configuration is essential for reducing driver fatigue and ensuring precise wheel placement at high speeds. Deceleration is managed via a premium **Brembo** system (front/rear) and a Geiser/Brembo hand brake. The integration of a **Geiser Brake Bias adjuster** allows for real-time optimization of vehicle dynamics, enabling the operator to shift pressure to accommodate changing soil density and traction levels. This mechanical precision is seamlessly integrated with the vehicle's electronic telemetry suite.

# 4. Integrated Electronics, Navigation, and Cockpit Systems

Modern desert racing is a data-driven discipline. The modernization of this platform includes a total overhaul of the electronic architecture, utilizing professional-grade wiring and redundant navigation systems to ensure 100% uptime in high-vibration environments.

**Electronics Hierarchy:**

- **Primary Harnessing:** Professional chassis wiring harness by Javi Valenzuela of Vildosila Racing.
- **Engine Management:** Dedicated high-temperature engine harness by James Linn Motorsports.
- **Control Interface:** Dual PDM Pad controls for driver and passenger.
- **Communication Suite:** PCI base unit and intercom, Kenwood Head Unit, and Rugged Radios "Mac Air" helmet pumpers.

**Navigation System Redundancy:** The cockpit utilizes a dual-operator GPS configuration. The driver is equipped with a 7-inch Lowrance unit for immediate course reference, while the co-driver manages a 12-inch Lowrance unit supplemented by a dedicated iPad mount running LeadNav software for high-fidelity waypoint tracking.

**System Engineering Evaluation:** The integration of **Starlink (Star stream)** and dual GoPro cameras transforms the vehicle from a standalone racer into a connected data-gathering platform. This enables real-time telemetry streaming and remote media management, allowing the chase team to monitor vehicle health and course progress. These electronics are protected from thermal saturation by the vehicle's dedicated environmental and cooling systems.

# 5. Thermal Management, Fueling, and Auxiliary Systems

Thermal failure is the primary cause of DNFs in desert racing. "The Reaper" utilizes a high-capacity cooling architecture engineered to maintain engine and transmission fluids within optimal viscosity ranges regardless of ambient temperature.

- **Cooling Solutions:**
  - **Engine:** CBR Radiator equipped with dual 16" Spal fans.
  - **Transmission:** CBR Transmission cooler equipped with dual 14" Spal fans.
- **Fuel Architecture:** 90-gallon Harmon fuel cell featuring an **inboard fuel pump configuration**. This inboard placement utilizes the fuel's thermal mass to cool the pumps while protecting them from external debris and mechanical impacts.

- **Fluid Delivery:** Aeromotive fuel rails and high-flow filters.

**Lighting and Survival Systems:** The lighting package is a precise Baja Designs configuration designed for high-speed night navigation:

- **Roof Bar:** 12x Baja Designs Baja Racers on a Mason Motorsports-designed actuator for real-time beam adjustment.
- **Bumper:** 4x XL80 corner lights and a 30-inch center bar (inside amber, outer clear).
- **Work/Rock Lights:** White Baja Designs rock lights positioned in all four wheel wells, the engine bay, and the center chassis over the drive shaft.
- **Cockpit Lighting:** Baja Designs dome lights (including red light functionality) for both driver and passenger.

Mechanical recovery is facilitated by **36" Howe Jacks** integrated with a **Mason Motorsports pump and tank**, allowing for rapid tire changes and field repairs.

# 6. Performance Summary and Market Valuation

"The Reaper" represents a zero-hour, race-ready asset that bridges the gap between the proven reliability of the Geiser Gen 2 chassis and modern engineering standards. Having been completely stripped and reconstructed to professional specifications, it offers the performance of a brand-new vehicle without the multi-month lead times of a fresh build.

**Final Technical Takeaways:**

1. **Zero-Hour Reconstruction:** 100% ground-up rebuild ensures absolute structural and mechanical integrity.
2. **Verified Performance:** 383 HP and 338 FT-LBS of torque at the wheels, verified by rigorous dyno testing.
3. **Elite Component Integration:** Fully modernized with Fox, Brembo, Tubeworks, Power Steering Solutions, and Baja Designs hardware.

**Market Position:** The vehicle is currently offered for sale at **$425,000**. This valuation reflects the premium componentry and the "zero-hour" nature of the build. It is an immediate podium-capable solution for professional racing teams or privateers seeking an elite Trophy Truck Spec entry.

**This vehicle is in "Race-Ready" status and is available for immediate podium competition.**

## DISCLAIMER — ENGINEERING PERFORMANCE REPORT

The information contained in this Engineering Performance Report for the Geiser Gen 2 Rebuild Project ("The Reaper") is provided for general informational and promotional purposes only. All specifications, measurements, dyno figures, and evaluations are approximate and subject to change without notice.

This document is not a certification, warranty, inspection report, engineering guarantee, or representation of mechanical condition. Statements regarding performance or race readiness are opinions and not guarantees.

Motorsports vehicles are inherently dangerous. The operator and purchaser assume all responsibility for inspection, safety compliance, and operation.

All sales are AS-IS, WHERE-IS, WITH ALL FAULTS unless stated otherwise in writing.