White Paper: The Autonomous, Height-Adjustable Chicken Coop Drivetrain

Pioneering Poultry Farming for the Modern Age

Executive Summary

Daily coop relocation is a grind. That's why EDISON BROTHERS, LLC and ELM SPRINGS FARMS, LLC have partnered to create a revolutionary solution: an autonomous, height-adjustable drivetrain for 4x8 ft chicken coops. This innovative system drastically cuts labor by 20-30%, significantly boosts animal welfare with consistent access to fresh pasture, and champions sustainable agriculture. It moves coops 20-50 feet daily, adjusts height 1-2 feet for diverse terrain or access, and uniquely enables overwintering via deep bedding, eliminating seasonal coop changes entirely. Designed for easy retrofitting or new builds, our system targets a $1.2 billion market (5.4% CAGR). We're seeking $50,000-$150,000 in USDA SBIR grants to bring this essential technology to every farmer.

The Challenge: Manual Labor & Stagnant Technology

While chicken tractors are great for soil health and egg production, they're a daily chore, demanding 1-2 hours of manual labor. Current automated systems often fall short, lacking critical height adjustment and year-round adaptability. Farmers need a smarter, more efficient way to manage their flocks.

Our Solution: The Smart Drivetrain System

Our Arduino Mega 2560-controlled drivetrain offers unmatched versatility and rugged reliability. It's designed for simple integration, whether you're updating an existing coop or building a new one:

* Autonomous Mobility: Twin DC geared motors (or cost-saving recycled wheelchair motors) handle daily movement, ensuring your flock always has fresh ground.

* Dynamic Height Adjustment: Four powerful linear actuators raise and lower the coop, effortlessly adapting to uneven terrain or allowing for easy access and deep bedding for winter insulation.

* Intelligent Monitoring: Integrated sensors—ultrasonic for obstacle detection, GPS for precise navigation, and temperature/humidity for coop health—ensure optimal operation and flock well-being.

* Sustainable Power: A 12V 100Ah battery, continuously charged by a 200W solar panel, ensures self-sufficiency and eco-friendly operation.

* Seamless Integration: Our retrofit kits bolt on in just 1-2 hours, while new coop designs can integrate the system modularly.

Unlike limited competitors, our system's height adjustment, overwintering capability, and dual-purpose design truly meet the unmet needs of modern poultry farming.

Transformative Benefits for Farmers

* Boosted Efficiency: Save 20-30% of the time currently spent on coop relocation.

* Enhanced Animal Welfare: Provide continuous access to fresh pasture, promoting healthier, happier, and more productive flocks.

* True Sustainability: Embrace solar power and regenerative grazing for an environmentally friendly operation.

* Unrivaled Versatility: Adapt to any poultry type, terrain, or season, ensuring year-round functionality.

The Future is Smart Farming

Future upgrades, including a Raspberry Pi and camera, will unlock advanced AI features like terrain mapping, predator detection, hen health monitoring, and remote streaming. This positions our system as a leader in smart agriculture.

Market Opportunity & Call for Funding

The chicken coop market is rapidly expanding, projected to hit $1.2 billion by 2030. Our system, retailing for $1,000-$1,500, promises a healthy 20-40% profit margin per unit. We're seeking USDA SBIR grants ($50,000-$150,000) to fuel:

* R&D & Fabrication: EDISON BROTHERS, LLC will lead design refinement and manufacturing scaling.

* Field Testing: ELM SPRINGS FARMS, LLC will conduct rigorous real-world validation in Sweet Springs, MO.

* Market Entry: Preparing for wider distribution via co-ops, farm shows, and online platforms.

Join us in revolutionizing poultry farming and cultivating a more sustainable agricultural future.

Drivetrain System Components: Shopping List

Here’s an estimated cost breakdown for the core components of one complete drivetrain system:

* Motors (2x DC Geared / Used Wheelchair): $80 - $150
* Wheels (2x 10-12”): $20 - $40
* Motor Driver (Cytron MD30C): $40 - $50
* Linear Actuators (4x 12V, 400 lb force, 6” stroke): $480 - $640
* Limit Switches (for actuators): $5 - $10
* Ultrasonic Sensors (2x): $6 - $10
* GPS Module: $15 - $20
* Temperature/Humidity Sensor: $5 - $10
* Photoresistor: $1 - $2
* IP65 Enclosures (for sensors): $10 - $15
* Battery (12V 100Ah): $150 - $200
* Solar Panel (200W): $100 - $150
* DC-DC Converter: $5 - $10
* Arduino Mega 2560: $35 - $45
* CNC-Cut Brackets & ½” Bolts (Retrofit Kit): $25 - $40

Estimated Component Cost Total (Per Unit):

$987 (Low End) to $1,402 (High End)