CLAIMS:

1. A primary controller configured for controlling operation of a drive system comprising a prime mover, a generator, and a motor, wherein the prime mover is configured toS provide energy to the generator, which is configured to drive the motor, the controller comprising:

- a speed controller configured for determining a target speed of the motor dependent on externally-supplied speed input; and
- a torque controller configured for determining a target torque of the motor based on externally-supplied torque input and on parameters of the vehicle;

wherein the primary controller is configured to:

- simultaneously determine the target speed and the target torque; and
- simultaneously control the prime mover, generator, and motor to operate the motor at the target speed and the target torque.

2. The primary controller according to Claim 1, wherein:

- the speed controller is further configured to determine the target speed dependent on the power output of the prime mover and on the measured actual speed of the motor; and
- the torque controller is further configured to determine the target torque based on the measured actual speed and the measured actual torque of the motor.

3. The primary controller according to any one of the preceding claims, wherein said torque controller is further configured to determine the target torque dependent on the target speed.

4. The primary controller according to any one of the preceding claims, wherein said externally-supplied speed input comprises a desired user-supplied desired vehicle speed.

5. The primary controller according to any one of the preceding claims, wherein said externally-supplied torque input comprises information regarding maximum and minimum design torques.

6. A primary controller according to any one of the preceding claims, wherein said prime mover is an engine, said primary controller being configured to control the prime mover at least by affecting its speed.

7. A primary controller according to any one of the preceding claims, being further configured to mitigate effects on the prime mover, the motor speed, and the motor torque due to force disturbances on the vehicle when driven by the drive system.

8. A primary controller according to Claim 7, wherein said disturbances are selected from the group including slopes, wind, and rolling friction.

9. A primary controller according to any one of the preceding claims, wherein said drive system is configured to drive the vehicle when subject to a load, said primary controller being configured to reduce the resonance of the load during operation of the vehicle subject to said load.

10. A primary controller according to any one of the preceding claims, wherein said drive system is an electric drive system.

11. A primary controller according to Claim 10, wherein said prime mover is selected from the group consisting of a diesel engine, one or more batteries, and one or more fuel cells.

12. A primary controller according to any one of Claims 10 and 11, wherein said generator is an electric generator.

13. A primary controller according to any one of Claims 10 through 12, wherein said motor is an electric motor.

14. A primary controller according to any one of Claims 1 through 9, wherein said drive system is a hydraulic drive system.

15. A primary controller according to Claim 14, wherein said prime mover is a diesel engine.

16. A primary controller according to any one of Claims 14 and 15, wherein said generator is a hydraulic pump.

17. A primary controller according to Claim 16, being configured to control the hydraulic pump at least by affecting its displacement.

18. A primary controller according to any one of Claims 14 through 17, wherein said motor is a hydraulic motor.

19. A primary controller according to Claim 18, being configured to control the hydraulic motor at least by affecting its displacement.

20. A primary controller being configured for controlling operation of a vehicle driven by a drive system, the controller comprising:

- a speed controller configured for determining a target speed of the vehicle dependent on externally-supplied speed input; and
- a traction force controller configured for determining target traction force and acceleration of the vehicle based on externally-supplied traction input and on parameters of the vehicle;

wherein the primary controller is configured to:

- simultaneously determine the target speed, acceleration, and traction force; and
- simultaneously control a prime mover, generator, and motor of the drive system to drive the vehicle at the target speed, acceleration, and traction force.

21. The primary controller according to Claim 20, wherein:

- the speed controller is further configured to determine the target speed of the vehicle dependent on the power of prime mover and on the measured actual speed of the vehicle; and
- the traction force controller is further configured to determine the target traction force of the vehicle based on the measured actual speed and the traction force of the vehicle.

22. A primary controller according to Claim 21, wherein the measured actual speed of the vehicle is measured by measuring the angular velocity of wheels of the vehicle.

23. A primary controller according to any one of Claims 20 and 21, being configured to:

- influence the speed of the vehicle at least by affecting the speed of the motor; and
- influence the traction force of the vehicle at least by affecting the torque of the motor.

24. The primary controller according to any one of Claims 20 through 23, wherein said traction force controller is further configured to determine the target traction force dependent on the target speed.

25. The primary controller according to any one of Claims 20 through 24, wherein said externally-supplied speed input comprises desired vehicle speed.

26. The primary controller according to any one of Claims 20 through 25, wherein said externally-supplied traction input comprises information regarding maximum and minimum design vehicle traction forces.

27. A primary controller according to any one of Claims 20 through 26, wherein said prime mover is an engine, said primary controller being configured to control the prime mover at least by affecting its speed.

28. A primary controller according to any one of Claims 20 through 27, being further configured to mitigate effects on the speed and traction forces due to force disturbances on the vehicle.

29. A primary controller according to Claim 28, wherein said disturbances are selected from the group including slopes, wind, and rolling friction.

30. A primary controller according to any one of Claims 20 through 29, wherein said vehicle is configured to carry a load, said primary controller being configured to reduce the resonance of the load during operation of the vehicle subject to said load.

31. A primary controller according to any one of Claims 20 through 30, wherein said drive system is an electric drive system.

32. A primary controller according to Claim 31, wherein said prime mover is selected from the group consisting of a diesel engine, one or more batteries, and one or more fuel cells.

33. A primary controller according to any one of Claims 31 and 32, wherein said generator is an electric generator.

34. A primary controller according to any one of Claims 31 through 33, wherein said motor is an electric motor.

35. A primary controller according to any one of Claims 20 through 30, wherein said drive system is a hydraulic drive system.

36. A primary controller according to Claim 35, wherein said prime mover is a diesel engine.

37. A primary controller according to any one of Claims 35 and 36, wherein said generator is a hydraulic pump.

38. A primary controller according to Claim 37, being configured to control the hydraulic pump at least by affecting its displacement.

39. A primary controller according to any one of Claims 35 through 38, wherein said motor is a hydraulic motor.

40. A primary controller according to Claim 39 being configured to control the hydraulic motor at least by affecting its displacement.

41. A vehicle comprising a primary controller according to any one of the preceding claims.

42. A vehicle according to Claim 41, being configured to tow an aircraft.

43. A vehicle according to Claim 42, being configured to receive a landing gear of the aircraft.

Claims:

1. A vehicle configured to tow an airplane driven by a drive system, the vehicle comprising:

a primary controller being configured for controlling operation of the vehicle for towing the airplane, the primary controller including:

a speed controller configured for determining a target speed of the vehicle dependent on externally-supplied speed input, the power of the prime mover, and the measured actual speed of the vehicle; and

a force controller configured for determining target traction force and acceleration of the vehicle based on externally-supplied traction input, parameters of the vehicle, the measured actual speed, and the traction force of the vehicle;

wherein the primary controller is configured to:

simultaneously determine the target speed, acceleration, and traction force;and

simultaneously control a prime mover, generator, and motor of the drive system to drive the vehicle at the target speed, acceleration, and traction force.

2. A primary controller configured for controlling operation of a vehicle for towing an airplane driven by a drive system comprising a prime mover, a generator, and a motor, wherein the prime mover is configured to provide energy to the generator, which is configured to drive the motor, the controller comprising:

a speed controller configured for determining a target speed of the motor dependent on externally-supplied speed input, the power output of the prime mover, and the measured actual speed of the motor; and

a torque controller configured for determining a target torque of the motor based on externally-supplied torque input, parameters of the vehicle, the measured actual speed, and the measured actual torque of the motor;

wherein the primary controller is configured to:

simultaneously determine the target speed and the target torque; and

simultaneously control the prime mover, generator, and motor to operate the motor at the target speed and the target torque.

3. The primary controller according to claim 2, wherein said torque controller is further configured to determine the target torque dependent on the target speed.

4. The primary controller according to claim 2, wherein said externally-supplied speed input comprises a desired user-supplied desired vehicle speed.

5. The primary controller according to claim 2, wherein said externally-supplied torque input comprises information regarding maximum and minimum design torques.

6. The primary controller according to claim 2, wherein said prime mover is an engine, said primary controller being configured to control the prime mover at least by affecting the speed of the prime mover.

7. The primary controller according to claim 2, being further configured to mitigate effects on the prime mover, the motor speed, and the motor torque due to force disturbances on the vehicle when driven by the drive system.

8. The primary controller according to claim 7, wherein said disturbances are selected from the group including slopes, wind, and rolling friction.

9. The primary controller according to claim 2, wherein said drive system is configured to drive the vehicle when subject to a load, said primary controller being configured to reduce the resonance of the load during operation of the vehicle subject to said load.

10. A primary controller being configured for controlling operation of a vehicle for towing an airplane driven by a drive system, the controller comprising:

a speed controller configured for determining a target speed of the vehicle dependent on externally-supplied speed input, the power of the prime mover, and the measured actual speed of the vehicle; and

a force controller configured for determining target traction force and acceleration of the vehicle based on externally-supplied traction input, parameters of the vehicle, the measured actual speed, and the traction force of the vehicle;

wherein the primary controller is configured to:

simultaneously determine the target speed, acceleration, and traction force; and

simultaneously control a prime mover, generator, and motor of the drive system to drive the vehicle at the target speed, acceleration, and traction force.

11. The primary controller according to claim 10, wherein the measured actual speed of the vehicle is measured by measuring the angular velocity of wheels of the vehicle.

12. The primary controller according to claim 10, being configured to:

influence the speed of the vehicle at least by affecting the speed of the motor; and

influence the traction force of the vehicle at least by affecting the torque of the motor.

13. The primary controller according to claim 10, wherein said force controller is further configured to determine the target traction force dependent on the target speed.

14. The primary controller according to claim 10, wherein said externally-supplied speed input comprises desired vehicle speed.

15. The primary controller according to claim 10, wherein said externally-supplied fraction input comprises information regarding maximum and minimum design vehicle fraction forces.

16. The primary controller according to claim 10, wherein said prime mover is an engine, said primary controller being configured to control the prime mover at least by affecting a speed thereof.

17. The primary controller according to claim 10, being further configured to mitigate effects on the speed and traction forces due to force disturbances on the vehicle.

18. The primary controller according to claim 10, wherein said vehicle is configured to carry a load, said primary controller being configured to reduce the resonance of the load during operation of the vehicle subject to said load.