CLAIMS:

1. A gearbox system for a waterborne vessel with a hydrofoil, the gearbox system comprising:
a housing having an interior surface defining an interior space of defined dimension;
a gearing system comprising a propeller shaft engagement portion, the gearing system located within the interior of the housing; and
an engine located within the interior space of the housing and in mechanical communication with the gear box;
wherein the housing is water-tight and wherein the gearing system and engine are in thermal contact with the interior surface of the housing.

2. A gearbox system as claimed in claim 1, wherein at least a portion of the housing is integral with the hydrofoil.

3. A gearbox as claimed in claim 1, wherein the housing is mounted on the hydrofoil.

4. A gearbox system as claimed in any preceding claim, wherein the gearing system and engine are a close fit within the interior space of the housing.

5. A gearbox system as claimed in any preceding claim, wherein the housing further comprises a power train engagement portion.

6. A gearbox system as claimed in claim 5, wherein the power train engagement portion is located distal to the propeller shaft engagement portion.

7. A gearbox system as claimed in any preceding claim, wherein the gearing system is an epicyclic gearbox.

8. A gearbox system as claimed in any preceding claim, wherein the engine is a MGU (Motor Generator Unit).

9. A gearbox system as claimed in any preceding claim, wherein the housing comprises one or more of the group comprising stainless steel, titanium alloy, aluminium (aluminum), composite material including Aramid fibre and carbon reinforced resin.

10. A hydrofoil system for a waterborne vessel, the hydrofoil system comprising:
- a controller;
- a foil for engagement with the waterborne vessel, the foil comprising a plurality of adjustment members operable to vary the lift characteristics of the waterborne vessel;
- a propeller mounted on the foil; and
- a gearbox system as claimed in any preceding claim, wherein the propeller is mechanically engaged with the propeller shaft engagement portion and the gearbox system is in mechanical communication with the propeller.

11. A hydrofoil system as claimed in claim 10, the hydrofoil system further comprising:
- a plurality of sensors in electrical communication with the controller, each sensor configured to monitor flight parameters of the waterborne vessel and generate measured flight parameter data,
- wherein the controller is in communication with the adjustment members, the engine and the sensors and wherein the controller is configured to receive measured flight parameter data from the sensors and to control the operation of the engine and the position of the adjustment members in dependence upon the received measured flight parameter data.

12. A hydrofoil system as claimed in claim 10 or claim 11, wherein each of the adjustment members is operable to vary one or more of pitch, roll, heave, and yaw of the waterborne vessel.

13. A hydrofoil system as claimed in any one of claims 10 to 12, wherein each adjustment member comprises a flap and an actuator, wherein the flap is moveable relative to the foil on activation of the actuator by the controller.

14. A hydrofoil system as claimed in any one of claims 10 to 13, wherein the propeller is located adjacent the gearbox, distal to the engine.

15. A hydrofoil system as claimed in any one of claims 10 to 14, wherein the measured flight parameter data comprises one or more selected from the group comprising acceleration data, vessel position data (pitch, heave, yaw, roll), actuator positional data, external environmental factors, and the environment the vessel is moving in.

16. A hydrofoil system as claimed in any one of claims108 to 15, wherein the controller is located within the hull of the waterborne vessel and the foil is located beneath the floating waterline on the hull exterior of the waterborne vessel.

17. A hydrofoil system as claimed in any one of claims 10 to 16, further comprising a battery system in electrical communication with the engine and optionally the actuator, wherein the battery system is operable to provide power to the engine and optionally the actuator.

18. A waterborne vessel including a hydrofoil system as claimed in any one of claims 10 to 17.

CLAIMS:

1. A waterborne vessel (10) including a hydrofoil having a gearbox system , the gearbox system comprising:
   a housing (60) having an interior surface defining an interior space of defined dimension;
   a gearing system comprising a propeller shaft engagement portion, the gearing system located within the interior of the housing; and
   an engine (42) located within the interior space of the housing and in mechanical communication with the gearing system;
   wherein the housing is water-tight, wherein the gearing system and engine are in thermal contact with the interior surface of the housing, and wherein the gearing system is an epicyclic gearbox (44).

2. The waterborne vessel of claim 1, wherein at least a portion of the housing is integral with the hydrofoil.

3. The waterborne vessel of claim 1, wherein the housing is mounted on the hydrofoil.

4. The waterborne vessel as claimed in any preceding claim, wherein the gearing system and engine are a close fit within the interior space of the housing.

5. The waterborne vessel as claimed in any preceding claim, wherein the housing further comprises a power train engagement portion.

6. The waterborne vessel of claim 5, wherein the power train engagement portion is located distal to the propeller shaft engagement portion.

7. The waterborne vessel as claimed in any preceding claim, wherein the engine is a MGU (Motor Generator Unit).

8. The waterborne vessel as claimed in any preceding claim, wherein the housing comprises one or more of the group comprising stainless steel, titanium alloy, aluminium (aluminum), composite material including Aramid fibre and carbon reinforced resin.

9. A hydrofoil system in a waterborne vessel, the hydrofoil system comprising:
- a controller (12);
- a foil (18) for engagement with the waterborne vessel, the foil comprising a plurality of adjustment members (19) operable to vary the lift characteristics of the waterborne vessel;
- a propeller (32) mounted on the foil; and
- a gearbox system as claimed in any preceding claim, wherein the propeller is mechanically engaged with the propeller shaft engagement portion and the gearbox system is in mechanical communication with the propeller.

10. A hydrofoil system as claimed in claim 9, the hydrofoil system further comprising:
- a plurality of sensors in electrical communication with the controller, each sensor configured to monitor flight parameters of the waterborne vessel and generate measured flight parameter data,
- wherein the controller is in communication with the adjustment members, the engine and the sensors and wherein the controller is configured to receive measured flight parameter data from the sensors and to control the operation of the engine and the position of the adjustment members in dependence upon the received measured flight parameter data.

11. A hydrofoil system as claimed in claim 9 or claim 10, wherein each of the adjustment members is operable to vary one or more of pitch, roll, heave, and yaw of the waterborne vessel.

12. A hydrofoil system as claimed in any one of claims 9 to 11, wherein each adjustment member comprises a flap (20) and an actuator (22), wherein the flap is moveable relative to the foil on activation of the actuator by the controller.

13. A hydrofoil system as claimed in any one of claims 9 to 12, wherein the propeller is located adjacent the gearbox, distal to the engine.

14. A hydrofoil system as claimed in any one of claims 9 to 13, wherein the measured flight parameter data comprises one or more selected from the group comprising acceleration data, vessel position data (pitch, heave, yaw, roll), actuator positional data, external environmental factors, and the environment the vessel is moving in.

15. A hydrofoil system as claimed in any one of claims 9 to 14, wherein the controller is located within the hull of the waterborne vessel and the foil is located beneath the floating waterline on the hull exterior of the waterborne vessel.

16. A hydrofoil system as claimed in any one of claims 9 to 15, further comprising a battery system (16) in electrical communication with the engine and optionally the actuator, wherein the battery system is operable to provide power to the engine, or wherein the battery system is operable to provide power to the engine and the actuator.

17. A waterborne vessel (10) including a hydrofoil system as claimed in any one of claims 9 to 16.