CLAIMS

1. An engine system with advance detection of detonation and / or pre ignition, the system comprising:

An engine, operative for propulsion of a vehicle by generating rotational motion, whose rotational velocity over time is monitored; and

A detonation and / or pre ignition detector, activated only if the throttle's range is above a predetermined threshold, which is operative to provide an alert for impending detonation and / or pre ignition of the engine, if the rotational velocity fluctuates over time with a frequency which is predetermined to be unsafe.

2. A system according to claim 1 wherein a rotational velocity fluctuation pattern is predetermined to be safe if local fluctuations of the rotational velocity never exceed a threshold value.

3. A system according to claim 1 wherein a rotational velocity fluctuation pattern is predetermined to be unsafe if local fluctuations of the rotational velocity exceed a threshold value at least a predetermined number of times within a predetermined time window.

4. A system according to claim 2 wherein said threshold value comprises 60 rpm.

5. A system according to claim 3 wherein said predetermined time window comprises 10 sec.

6. A system according to claim 2 wherein a rotational velocity fluctuation pattern is predetermined to be safe if fluctuations of the rotational velocity within a time slot whose size is 770 milliseconds +-25% , never exceed a threshold value.

7. A system according to claim 3 wherein a rotational velocity fluctuation pattern (RPM fluctuation pattern) is predetermined to be unsafe if fluctuations of the rotational velocity (RPM)

16. A system according to claim 15 and also comprising an external monitor recording the rotational velocity of the engine for provision to the detonation and / or pre ignition detector.

17. A system according to claim 16 wherein said external monitor comprises an on-board computer controlling a vehicle motorized by the engine.

18. A system according to claim 16 wherein said external monitor comprises a computerized control center, which is remote from and which controls a vehicle motorized by the engine, and wherein said computerized control center receives engine rotational velocity information from an on-board RPM sampler.

19. A system according to claim 13 wherein said aircraft comprises a UAV (unmanned aerial vehicle).

20. A system for advance detection of detonation and / or pre ignition in an engine, the system comprising:

a detonation and / or pre ignition detector operative to provide an alert for impending detonation and / or pre ignition of an engine generating rotational motion whose rotational velocity over time is monitored, if the rotational velocity fluctuates over time [to an extent] with a frequency which is predetermined to be unsafe.

21. A system according to claim 20 and also comprising an engine generating rotational motion whose rotational velocity over time is monitored.

22. A system according to claim 21 and also comprising a vehicle propelled by the engine.

23. A method for advance detection of detonation and / or pre ignition in an engine, the method comprising:

providing an alert for impending detonation and / or pre ignition of an engine generating rotational motion whose rotational velocity over time is monitored, if the rotational velocity fluctuates over time with a frequency which is predetermined to be unsafe.

24. A method for operating aircraft with advance detection of detonation and / or pre ignition, the method comprising:

Providing an engine airlifting a structure capable of being airborne by generating rotational motion whose rotational velocity over time is monitored; and

Providing an alert for impending detonation and / or pre ignition of the engine, if the rotational velocity fluctuates over time with a frequency which is predetermined to be unsafe.

25. A system according to claim 1 wherein said engine comprises a Rotax 914 engine.

26. A system according to claim 22 wherein the detonation and / or pre ignition detector resides on-board the vehicle.

27. A system according to claim 21 wherein the engine is operative to propel a vehicle, the system also comprising a vehicle control station remote from the vehicle and wherein said detonation and / or pre ignition detector resides within the vehicle control station.

28. A system according to claim 1 and also comprising an aircraft control station operative to control the structure capable of being airborne from the ground, and wherein said detonation and / or pre ignition detector resides within the aircraft control station.

29. A system according to claim 28 wherein the aircraft control station comprises a UAV ground control station operative to control a UAV and wherein the engine is operative for airlifting the UAV by generating rotational motion whose rotational velocity over time is monitored.

30. A system according to claim 21 wherein said engine comprises an internal combustion engine.

31. A system according to claim 30 wherein said internal combustion engine comprises a piston engine.

32. A computer program product, comprising a computer usable medium having a computer readable program code embodied therein, said computer readable program code adapted to be executed to implement a method for advance detection of detonation and / or pre ignition in an engine, the method comprising:

Providing an alert for impending detonation and / or pre ignition of an engine generating rotational motion whose rotational velocity over time is monitored, if the rotational velocity fluctuates over time with a frequency which is predetermined to be unsafe.

33. A system according to claim 16 wherein the detonation and / or pre ignition detector resides on a computer which generates RPM and throttle information.

34. A system according to claim 33 wherein the computer which generates RPM and throttle information comprises an engine controller.

35. A system according to claim 3 wherein said threshold value comprises 60 rpm.

36. A system according to claim 20 and also comprising an aircraft control station operative to control a structure capable of being airborne from the ground, and wherein said detonation and / or pre ignition detector resides within the aircraft control station.