**CLAIMS:**

**1.** An ejection module for ejecting a projectile, the module comprising:

- a module forward end comprising a central axis and a module interface, the module interface configured for selectively enabling the module to be selectively affixed to the projectile in a load-bearing manner, and for enabling selective disconnection between the module and the projectile; and
- a module aft end comprising a module propulsion system, the module propulsion system comprising a plurality of rocket motors and a source of rocket propellant, wherein:
    - each said rocket motor is laterally spaced with respect to the central axis,
    - each said rocket motor has a respective fixed thrust vector non-parallel with respect to the central axis,
    - each said rocket motor is configured for generating a controllable level of respective thrust along the respective said thrust vector, independently of the respective level of thrust generated by the other said rocket motors along their respective thrust vectors;

  wherein the module propulsion system is configured for enabling independently controlling the respective said level of thrust of each said rocket motor.

**2.** The module according to claim 1, wherein said source of rocket propellant includes a predetermined quantity of propellant not greater than that required to enable the module to propel the projectile from a launch site to a predetermined range and predetermined altitude with respect to the launch site, wherein said predetermined range and said predetermined altitude correspond to a minimum safe range and a minimum safe altitude with respect to the launch site.

**3.** The module according to claim 2, including at least one of the following:

- wherein said minimum safe range and said minimum safe altitude ensures or minimizes potential damage to the launch site in event of the projectile failing to operate after disconnection from the ejection module and falls back to Earth under gravity;
- wherein said predetermined safe range is between 50m and about 70m;

- wherein said predetermined safe altitude is between about 30m and about 20m.

**4.** The ejection module according to any one of claims 1 to 3, configured for providing any desired tilt after launch at least between 90° and 0° in elevation.

**5.** The ejection module according to any one of claims 1 to 4, configured for providing any desired azimuth after launch at least between 0° and 360°.

**6.** The ejection module according to any one of claims 1 to 5, wherein each said thrust vector converges towards the central axis at a respective intersection point aft of the module aft end.

**7.** The ejection module according to claim 6, wherein the respective intersection points of the thrust vectors are the same point.

**8.** The ejection module according to any one of claims 1 to 7, including one of the following

- wherein each said thrust vector lies on a respective plane, and wherein said central axis lies on each said plane;
- wherein each said thrust vector lies on a respective plane, and wherein said central axis lies on each said plane, and, wherein each said thrust vector defines a respective thrust angle on the respective plane with respect to the central axis;
- wherein each said thrust vector lies on a respective plane, and wherein said central axis lies on each said plane, and, wherein each said thrust vector defines a respective thrust angle on the respective plane with respect to the central axis, and, wherein the respective thrust angles of said rocket motors are equal in magnitude to one another;
- wherein each said thrust vector lies on a respective plane, and wherein said central axis lies on each said plane, and, wherein each said thrust vector defines a respective thrust angle on the respective plane with respect to the central axis, and, wherein each said thrust angle is in the range of between about 10° and about 30°.

**9.** The ejection module according to any one of claims 1 to 8, including at least one of the following:

- wherein said rocket motors are configured as liquid fuel rocket motors, and wherein said source of rocket propellant includes at least one liquid fuel tank and at least one oxidizer tank;
- further comprising a control unit operatively coupled to the module propulsion system, the control unit being configured for enabling independently controlling the respective said level of thrust of each said rocket motor.

**10.** The ejection module according to any one of claims 1 to 9,

- configured for providing a forward velocity to the projectile at least sufficient to enable the projectile to steer via fins;
- configured for providing a forward velocity to the projectile at least greater than 20 m/s.

**11.** The ejection module according to any one of claims 1 to 10, further comprising a control unit operatively coupled to the module propulsion system, the control unit being configured for enabling independently controlling the respective said level of thrust of each said rocket motor, and including one of the following:

- wherein the control unit is accommodated in the ejection module;
- wherein the control unit is accommodated in the projectile;
- wherein said control unit is configured for operating the module to provide sufficient thrust to launch the projectile;
- wherein said control unit is configured for operating the module propulsion system such that the plurality of said rocket motors provide equal thrust to enable the module to provide a net thrust co-axial with the central axis;
- wherein said control unit is configured for operating the module propulsion system to provide any desired tilt maneuver;
- wherein said control unit is configured for operating the module propulsion system to provide any desired tilt maneuver, and, wherein said control unit is configured for operating the module propulsion system such that at least one said rocket motor generates less thrust than at least one other said rocket motor.

**12.** The ejection module according to any one of claims 1 to 11, including one of the following:

- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein each said rocket motor comprises a respective exhaust nozzle fixedly mounted to the rocket motor in alignment with the respective said thrust vector;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for selectively causing the

module to execute a first acceleration maneuver, wherein said first thrust, said second thrust and said third thrust are equal to one another;

- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for selectively causing the module to execute a first tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, wherein said first thrust corresponds to a nominal maximum thrust level for the said first rocket motor, and wherein said second thrust and said third thrust are each nominally zero;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor

concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for executing said first tilt maneuver for a first time period, and for subsequently implementing a first righting maneuver for a second time period wherein for said second time period the said first thrust is less than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust, followed by implementing a second righting maneuver for a third time period, wherein for said third time period said first thrust, said second thrust and said third thrust are equal to one another;

- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for enabling the module to execute a second tilt maneuver, wherein said first thrust is less than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a

corresponding module thrust vector, and, operable for enabling the module to execute a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust;

- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for enabling the module to execute a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust, and, wherein said first thrust corresponds to a nominal maximum thrust level for the said first rocket motor, and wherein said third thrust is nominally zero, and wherein said second thrust is intermediate in magnitude between said first thrust and said third thrust;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for enabling the module to execute a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust, and, wherein said first thrust corresponds to a nominal maximum

thrust level for the said first rocket motor, and wherein said third thrust is nominally zero, and wherein said second thrust is intermediate in magnitude between said first thrust and said third thrust, and, wherein the control unit is configured for executing said third tilt maneuver for a first time period, and for subsequently implementing a first righting maneuver for a second time period wherein for said second time period said first thrust, said second thrust and said third thrust are each nominally zero, followed by implementing a second righting maneuver for a third time period, wherein for said third time period said third thrust is greater than said second thrust, and said second thrust is greater than said first thrust, followed by implementing a third righting maneuver for a fourth time period, wherein for said fourth time period said first thrust, said second thrust and said third thrust are equal to one another;

- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for enabling the module to execute a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is less than said third thrust;
- wherein said module propulsion system comprises a first said rocket motor, a second said rocket motor and a third said rocket motor, wherein said first rocket motor, said second rocket motor and said third rocket motor are uniformly spaced circumferentially with respect to the central axis, and, wherein the control unit is configured for operating the module propulsion system such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second

thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector, and, operable for enabling the module to execute a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is less than said third thrust, and, wherein said third tilt maneuver is configured to provide a desired change in azimuth during execution of said third tilt maneuver.

**13.** A projectile assembly, comprising:

- a projectile having a projectile propulsion system and an aft projectile end, the aft projectile end comprising a projectile interface;
- an ejection module as defined in any one of claims 1 to 12;

wherein the projectile interface is configured for being selectively and reversibly coupled with respect to the module interface, such that when thus coupled the module is reversibly affixed to the projectile in a load-bearing manner, and such that when the projectile interface is decoupled with respect to the module interface, the module is disconnected from the projectile.

**14.** The projectile assembly according to claim 13, wherein the projectile comprises a plurality of fins.

**15.** A launch system comprising:

- a projectile assembly as defined in any one of claims 13 to 14;
- a launch tube configured for accommodating the projectile launch assembly therein at least in a launch-ready configuration, and for enabling selective launch of the projectile launch assembly from the launch tube.

**16.** The launch system according to claim 15, wherein said launch tube has a closed bottom end, and wherein said launch tube includes an excess pressure venting arrangement configured for enabling venting of the launch tube responsive to a pressure within the launch tube exceeding a predetermined threshold pressure.

**17.** A method for launching a projectile, comprising:

(a) providing a launch system as defined in any one of claims 15 to 16;

(b) selectively launching the projectile launch assembly from the launch tube by operating the module propulsion system to generate thrust sufficient to at least eject the projectile launch assembly outside of a control zone around the launch tube;

(c) decoupling the module from the projectile according to predetermined criteria including a first criterion, wherein said first criterion requires the projectile launch assembly to be outside of said control zone.

**18.** The method according to claim 17, wherein at least during step (b) the projectile propulsion system is not operated.

**19.** The method according to any one of claims 17 to 18, wherein the module is as defined in claim 12, and wherein the module propulsion system is operated such that the first rocket motor generates a first said thrust, the second rocket motor concurrently generates a second said thrust, and the third rocket motor concurrently generates a third said thrust, such that the first thrust, the second thrust and the third thrust together provide a module net thrust and a corresponding module thrust vector.

**20.** The method according to claim 19, including one of the following:

- wherein said first thrust, said second thrust and said third thrust are equal to one another;
- wherein the module executes a first tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust;
- wherein the module executes a first tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust, and, wherein said first tilt maneuver is executed for a first time period, and further comprising;
    - (I) subsequently implementing a first righting maneuver for a second time period wherein for said second time period the said first thrust is less than said second thrust or said third thrust, and wherein said second thrust is equal to said third thrust,

(II) (II) subsequent to step (I) implementing a second righting maneuver for a third time period, wherein for said third time period said first thrust, said second thrust and said third thrust are equal to one another;

- wherein the module executes a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust;
- wherein the module executes a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust, and, wherein said first thrust corresponds to a nominal maximum thrust level for the said first rocket motor, and wherein said third thrust is nominally zero, and wherein said second thrust is intermediate in magnitude between said first thrust and said third thrust;
- wherein the module executes a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust, and, wherein the third tilt maneuver is executed for a first time period, and further comprising:
  (i) subsequently implementing a first righting maneuver for a second time period wherein for said second time period said first thrust, said second thrust and said third thrust are each nominally zero,
  (ii) subsequent to step (i), implementing a second righting maneuver for a third time period, wherein for said third time period said third thrust is greater than said second thrust, and said second thrust is greater than said first thrust,
  (iii) subsequent to step (ii), implementing a third righting maneuver for a fourth time period, wherein for said fourth time period said first thrust, said second thrust and said third thrust are equal to one another
  - wherein the module executes a third tilt maneuver, wherein said first thrust is greater than said second thrust or said third thrust, and wherein said second thrust is greater than said third thrust, and, wherein said third tilt maneuver is configured to provide a desired change in azimuth during execution of said third tilt maneuver.