CLAIMS:

1. A wing system for an air vehicle, the air vehicle having a fuselage including a fuselage section and a fuselage longitudinal axis, the wing system comprising at least one wing deployment module, each wing deployment module comprising:

a set of wing elements, including at least a first said wing element having a first wing element longitudinal axis, and a second said wing element having a second wing element longitudinal axis;

each said wing deployment module configured for selectively transitioning between a respective stowed configuration and a respective deployed configuration;

wherein in the stowed configuration, the first wing element and the second wing element are in overlying relationship such that the first wing element longitudinal axis and the second wing element longitudinal axis are nominally parallel with one another; and

wherein in the deployed configuration, the first wing element is oriented with respect to the second wing element such that the first wing element longitudinal axis is non-parallel with respect to the second wing element longitudinal axis.

2. The wing system according to claim 1, wherein in the stowed configuration, the first wing element and the second wing element are configured in said overlying relationship for being oriented with respect to the fuselage section such that the first wing element longitudinal axis and the second wing element longitudinal axis are each nominally parallel with the fuselage longitudinal axis.

3. The wing system according to claim 1 or claim 2, including at least one of:

- wherein in the deployed configuration, the first wing element is oriented with respect to the fuselage section such that the first wing element longitudinal axis is non-parallel with respect to the fuselage longitudinal axis;
- wherein in the deployed configuration, the first wing element is oriented with respect to the fuselage section such that the first wing element longitudinal axis is orthogonal with respect to the fuselage longitudinal axis.

4. The wing system according to any one of claims 1 to 3, including one of:

- wherein in the deployed configuration, the second wing element is oriented with respect to the fuselage section such that the second wing element longitudinal axis is non-parallel with respect to the fuselage longitudinal axis;
- wherein in the deployed configuration, the second wing element is oriented with respect to the fuselage section such that the second wing element longitudinal axis is orthogonal with respect to the fuselage longitudinal axis.

5. The wing system according to any one of claims 1 to 4, wherein in the deployed configuration, the first wing element longitudinal axis is nominally parallel with the pitch axis of the air vehicle.

6. The wing system according to any one of claims 1 to 5, wherein each wing deployment module is configured for having the first wing element relatively outboard, and the second wing element relatively inboard, with respect to the fuselage section.

7. The wing system according to any one of claims 1 to 6, wherein each wing deployment module in the stowed configuration comprises a first wing root of the first wing element in overlying relationship with respect to a second wing root of the second wing element.

8. The wing system according to claim 7, wherein each wing deployment module comprises a first wing tip of the first wing element, and a second wing tip of the second wing element, and wherein each wing deployment module is configured such that in the stowed configuration the first wing tip is forward of the first wing root, and/or the second wing tip is forward of the second wing root, with respect to the air vehicle.

9. The wing system according to any one of claims 1 to 8, wherein each wing deployment module in the stowed configuration is configured for providing the first wing element and the second wing element in overlying relationship with respect to the fuselage section.

10. The wing system according to any one of claims 1 to 9, wherein for each wing deployment module:

each said first wing element is configured for being transitioned between the stowed configuration and the deployed configuration by:

- pivoting said first wing element about a first module pivot axis by a non-zero first module angular displacement, and
- pivoting said first wing element about a first wing element pivot axis by a non-zero first wing element angular displacement;

each said second wing element is configured for being transitioned between the stowed configuration and the deployed configuration by:

- pivoting said second wing element about a second module pivot axis by a non-zero second module angular displacement.

11. The wing system according to claim 10, wherein for each wing deployment module, each said second wing element is further configured for being transitioned between the stowed configuration and the deployed configuration by:

- pivoting said second wing element about a second wing element pivot axis by a non-zero second wing element angular displacement.

12. The wing system according to any one of claims 10 to 11, including at least one of the following:

- wherein at least one of said first module pivot axis and said second module pivot axis is parallel to a pitch axis of the air vehicle;
- wherein at least one of said first wing element pivot axis and said second wing element pivot axis is parallel to a roll axis of the air vehicle.

13. The wing system according to any one of claims 11 to 12, wherein said first wing element pivot axis and said second wing element pivot axis are parallel to one another.

14. The wing system according to any one of claims 10 to 13, wherein said first module pivot axis and said second module pivot axis are co-axial.

15. The wing system according to any one of claims 10 to 14, wherein said first module angular displacement is between 80° and 100°.

16. The wing system according to any one of claims 10 to 15, wherein said first module angular displacement is about 90°.

17. The wing system according to any one of claims 10 to 15, wherein said first module angular displacement is such as to enable the first wing element to adopt a non-zero incidence angle in the deployed configuration.

18. The wing system according to any one of claims 10 to 17, wherein said second module angular displacement is between 80° and 100°.

19. The wing system according to any one of claims 10 to 18, wherein said second module angular displacement is about 90°.

20. The wing system according to any one of claims 10 to 19, wherein said first module angular displacement and said second module angular displacement are equal to one another.

21. The wing system according to any one of claims 10 to 20, wherein said wing deployment module is configured for pivoting as a unit about at least one of said first module pivot axis and said second module pivot axis.

22. The wing system according to any one of claims 10 to 21, wherein said first wing element angular displacement is between 70° and 110°.

23. The wing system according to any one of claims 10 to 22, wherein said first wing element angular displacement is about 90°.

24. The wing system according to any one of claims 11 to 23, wherein said second wing element angular displacement is between -20° and +20°, and wherein optionally said second wing element angular displacement is any one of about 15° and about 0°.

25. The wing system according to any one of claims 1 to 24, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by:

(a) concurrently pivoting the first wing element about the first module pivot axis by said non-zero first module angular displacement and the second wing element about the second module pivot axis by said non-zero second module angular displacement;

(b) subsequent to step (a), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement.

26. The wing system according to claim 25, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by:

(c) subsequent to step (a), pivoting said second wing element about the second wing element pivot axis by said non-zero second wing element angular displacement.

27. The wing system according to any one of claims 1 to 24, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by:

(a) concurrently pivoting the first wing element about the first module pivot axis to a first partial first module angular displacement, and the second wing element about the second module pivot axis to a first partial second module angular displacement;

(b) subsequent to step (a), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement, while concurrently pivoting the first wing element about the first module pivot axis to a second partial first module angular displacement, and the second wing element about the second module pivot axis to a second partial second module angular displacement;

(c) subsequent to step (b), concurrently pivoting the first wing element about the first module pivot axis to said first module angular displacement, and the second wing element about the second module pivot axis to said second module angular displacement;

wherein said second partial first module angular displacement is less than said non-zero first module angular displacement and greater than said first partial first module angular displacement, and

wherein said second partial second module angular displacement is less than said non-zero second module angular displacement and greater than said first partial second module angular displacement.

28. The wing system according to any one of claims 1 to 24, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by:

(a1) pivoting the first wing element about the first module pivot axis to a first partial first module angular displacement;

(b1) subsequent to step (a1), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement, and pivoting the first wing element about the first module pivot axis to a second partial first module angular displacement;

(c1) subsequent to step (b2), respectively pivoting the first wing element about the first module pivot axis to said first module angular displacement;

wherein said second partial first module angular displacement is less than said non-zero first module angular displacement and greater than said first partial first module angular displacement.

29. The wing system according to any one of claims 1 to 24 or 28, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by:

(a2) pivoting the second wing element about the second module pivot axis to a first partial second module angular displacement;

(b2) subsequent to step (a2), pivoting the second wing element about the second module pivot axis to a second partial second module angular displacement;

(c2) subsequent to step (b2), pivoting the second wing element about the second module pivot axis to said second module angular displacement;

wherein said second partial second module angular displacement is less than said non-zero second module angular displacement and greater than said first partial second module angular displacement.

30. The wing system according to any one of claims 27, 28, or 29, configured for deploying the wing deployment module from the stowed configuration to the deployed configuration by further including in step (b) (b1) or (b2) respectively:

(d) pivoting said second wing element about the second wing element pivot axis by said non-zero second wing element angular displacement.

31. The wing system according to any one of claims 1 to 30, wherein each said wing deployment module is configured for being mounted to a lateral side of the fuselage section.

32. The wing system according to any one of claims 1 to 31, wherein each said wing deployment module is configured with a respective maximum width in the stowed configuration correlated with a fuselage height of the fuselage section.

33. The wing system according to any one of claims 1 to 32, comprising two said wing deployment modules, including a first said wing deployment module configured for being mounted to the air vehicle at a port side of the fuselage section, and a second said wing deployment module configured for being mounted to the air vehicle at a starboard side of the fuselage section.

34. The wing system according to any one of claims 1 to 33, including one of the following:

- wherein the wing system is configured as an empennage for the air vehicle;
- wherein said fuselage section is an aft fuselage section of the air vehicle;

- wherein the wing system is configured as an empennage for the air vehicle and, wherein said fuselage section is an aft fuselage section of the air vehicle.

35. The wing system according to claim 34, including one of:

- wherein for each said wing deployment module, the first wing element is configured as a horizontal stabilizer, and the second wing element is configured as a vertical stabilizer;
- wherein for each said wing deployment module, the first wing element is configured as a horizontal stabilizer, and the second wing element is configured as a vertical stabilizer, and, wherein for each said wing deployment module, the first wing element comprises an actuable elevator, and the second wing element comprises an actuable rudder.

36. A wing system configured as an empennage for an air vehicle, the air vehicle having a fuselage including a fuselage section and a fuselage longitudinal axis, the wing system comprising at least one wing deployment module, each wing deployment module comprising:

a set of wing elements, including at least a first said wing element configured as a horizontal stabilizer and having a first wing element longitudinal axis, and a second said wing element configured as a vertical stabilizer having a second wing element longitudinal axis;

each said wing deployment module configured for selectively transitioning between a respective stowed configuration and a respective deployed configuration;

wherein in the stowed configuration, the first wing element and the second wing element are in overlying relationship such that the first wing element longitudinal axis and the second wing element longitudinal axis are nominally parallel with one another;

wherein in the deployed configuration, the first wing element is oriented with respect to the second wing element such that the first wing element longitudinal axis is non-parallel with respect to the second wing element longitudinal axis;

wherein each said first wing element is configured for being transitioned between the stowed configuration and the deployed configuration by:

- pivoting said first wing element about a module pivot axis by a non-zero module angular displacement, and
- pivoting said first wing element about a first wing element pivot axis by a non-zero first wing element angular displacement;

wherein each said second wing element is configured for being transitioned between the stowed configuration and the deployed configuration by:

- pivoting said second wing element about said module pivot axis by said non-zero module angular displacement.

37. An air vehicle comprising a wing system as defined in any one of claims 1 to 36.

38. The air vehicle according to claim 37, further comprising a deployable wing arrangement, including at least one aerodynamic lift generating wing, deployable from a stowed wing configuration to a deployed wing configuration, the deployable wing arrangement being mounted in one of above and below with respect to the fuselage section, wherein said at least one aerodynamic lift generating wing is configured for generating sufficient aerodynamic lift for aerodynamic flight for the air vehicle.

39. The air vehicle according to claim 38, wherein the deployable wing arrangement is mounted below with respect to the fuselage section, and wherein in the stowed configuration the first wing element and the second wing element of each wing deployment module are configured such as to avoid projecting in a downwardly direction past the wing arrangement.

40. The air vehicle according to any one of claims 37 to 39, configured for being accommodated in a fairing when the wing system is in the stowed configuration.

41. A method for providing stability and control for an air vehicle, comprising:

- providing an air vehicle as defined in any one of claims 37 to 40;
- deploying each said wing deployment module from the stowed configuration to the deployed configuration;

- actuating the first wing element and the second wing element of each wing deployment module to provide control moments to the air vehicle.

42. A method for operating a wing system for an air vehicle, comprising:

(A) providing an air vehicle as defined in any one of claims 37 to 40;

(B) deploying each said wing deployment module from the stowed configuration to the deployed configuration.

43. The method according to claim 42, wherein step (B) comprises:

- pivoting said first wing element about a first module pivot axis by a non-zero first module angular displacement,
- pivoting said first wing element about a first wing element pivot axis by a non-zero first wing element angular displacement;
- pivoting said second wing element about a second module pivot axis by a non-zero second module angular displacement.

44. The method according to claim 43, wherein step (B) further comprises:

- pivoting said second wing element about a second wing element pivot axis by a non-zero second wing element angular displacement.

45. The method according to claim 42, wherein step (B) comprises:

(a) concurrently pivoting the first wing element about the first module pivot axis by said non-zero first module angular displacement and the second wing element about the second module pivot axis by said non-zero second module angular displacement;

(b) subsequent to step (a), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement.

46. The method according to claim 45, further comprising:

(c) subsequent to step (a), pivoting said second wing element about the second wing element pivot axis by said non-zero second wing element angular displacement.

47. The method according to claim 42, wherein step (B) comprises:

(a) concurrently pivoting the first wing element about the first module pivot axis to a first partial first module angular displacement, and the second wing element about the second module pivot axis to a first partial second module angular displacement;

(b) subsequent to step (a), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement, while concurrently pivoting the first wing element about the first module pivot axis to a second partial first module angular displacement, and the second wing element about the second module pivot axis to a second partial second module angular displacement;

(c) subsequent to step (b), concurrently pivoting the first wing element about the first module pivot axis to said first module angular displacement, and the second wing element about the second module pivot axis to said second module angular displacement;

wherein said second partial first module angular displacement is less than said non-zero first module angular displacement and greater than said first partial first module angular displacement, and

wherein said second partial second module angular displacement is less than said non-zero second module angular displacement and greater than said first partial second module angular displacement.

48. The method according to claim 42, wherein step (B) comprises:

(a1) pivoting the first wing element about the first module pivot axis to a first partial first module angular displacement;

(b1) subsequent to step (a1), pivoting said first wing element about the first wing element pivot axis by said non-zero first wing element angular displacement, and pivoting the first wing element about the first module pivot axis to a second partial first module angular displacement;

(c1) subsequent to step (b1), pivoting the first wing element about the first module pivot axis to said first module angular displacement;

wherein said second partial first module angular displacement is less than said non-zero first module angular displacement and greater than said first partial first module angular displacement.

49. The method according to claim 42 or claim 48, wherein step (B) comprises:

(a2) pivoting the second wing element about the second module pivot axis to a first partial second module angular displacement;

(b2) subsequent to step (a2), pivoting the second wing element about the second module pivot axis to a second partial second module angular displacement;

(c) subsequent to step (b), pivoting the second wing element about the second module pivot axis to said second module angular displacement;

wherein said second partial second module angular displacement is less than said non-zero second module angular displacement and greater than said first partial second module angular displacement.

50. The method according to any one of claims 47, 48, 49, further including in step (b), (b1), (b2), respectively:

(d) pivoting said second wing element about the second wing element pivot axis by said non-zero second wing element angular displacement.