CLAIMS

1. A gaseous matter capture system, comprising:

   (i) at least one high-altitude aerial unit configured to be airborne;
   (ii) at least one non-aerial unit;
   (iii) at least one gas separation means configured to be carried by the high-altitude aerial unit and further configured to be operable while the aerial unit is airborne at high altitude;
   (iv) storage means configured to be carried by the high-altitude aerial unit;
   (v) a controller configured to control the system's operation; and
   (vi) an energy source configured to enable the system's operation,

   wherein the at least one gas separation means is configured to separate at least at least one designated gaseous matter from the air,

   wherein the at least one separated gaseous matter is configured to be stored within the storage means, and

   wherein the high-altitude aerial unit is configured to transfer the stored separated gaseous matter to the non-aerial unit.

2. The system of claim 1, wherein the at least one gas separation means is operable while the high-altitude aerial unit is airborne at an altitude range of 5-15 km.

3. The system of claim 1, wherein the gas separation means comprises at least one pressure increasing apparatus.

4. The system of claim 1, wherein the gas separation means comprises chemical catalysts configured to utilize gas separation procedure.

5. The system of claim 4, wherein the chemical catalysts are based on sorbents for carbon dioxide.

6. The system of claim 1, wherein the gas separation means comprises biologicalenzymes configured to utilize gas separation procedure.
7. The system of claim 1, wherein the aerial unit is a high-altitude balloon.

8. The system of any one of claims 1 or 7, wherein the aerial unit is configured to be tethered to the non-aerial unit.

9. The system of any one of claims 1 or 7, wherein the aerial unit further comprises self-steering means.

10. The system of claim 1, wherein the aerial unit is configured to be retrofitted to an aerial vehicle.

11. The system of claim 10, wherein the aerial unit is integrated into the propulsion means of the aerial vehicle.

12. The system of claim 1, wherein the storage means is at least one compressed gas container.

13. The system of claim 12, wherein the at least one compressed gas container is configured to be released from the aerial unit and reach the non-aerial unit.

14. The system of claim 13, wherein the non-aerial unit comprises a designated landing area configured to capture the at least one compressed gas container.

15. The system of claim 12, wherein the at least one compressed gas container comprises guidance means configured to guide the at least one compressed gas container from the aerial unit to the non-aerial unit.

16. The system of claim 1, wherein the non-aerial unit is configured to utilize the stored designated gaseous matter captured by the aerial unit.

17. The system of claim 1, wherein the non-aerial unit is configured to be located on the ground.

18. The system of claim 1, wherein the non-aerial unit is configured to be located on a body of water.

19. The system of claim 18, wherein the non-aerial unit further comprises a docking area.

20. The system of claim 1, wherein the non-aerial unit is configured to be located on a vessel.

21. The system of claim 1, wherein the controller is further configured to generate navigation commands in order to control the aerial unit.

22. The system of claim 1, wherein the gas separation means further comprise an air compressor configured to increase air pressure flowing within to 6-10 Bar above the ambient air pressure.

23. The system of claim 1, wherein the designated gaseous matter is carbon dioxide.

24. The system of any one of claims 1 or 2, wherein the airborne aerial unit is configured to exploit the low temperatures at high altitudes in order to liquefy or solidify the designated gaseous matter.

25. The system of any one of claims 1 or 2, wherein the at least one gas separation means carried by the airborne aerial unit is configured to exploit high altitude wind in order to harness an incoming airflow pressure for the purpose of gas separation.

26. The system of any one of claims 3 or 22, wherein the potential energy stored within the compressed air may be further utilized by the gaseous matter capture system.

27. The system of claim 23, wherein the aerial unit is configured to capture carbon dioxide by using a phase transition process at a temperatures range of -100° to -10° and pressures range of 0.2-10 Bar.

28. The system of claim 1, wherein the energy source is based on solar energy.

29. The system of claim 1, wherein the energy source is based on wind energy.

30. The system of claim 1, wherein the energy source is a prestored power reservoir.

31. The system of claim 1, wherein the energy source is configured to power the aerial unit by using a wired connection.

32. A method for gaseous matter capture using a gaseous matter capture system, comprising the steps of:
(i) separating at least one designated gaseous matter from the air using at least one gas separation means carried by a high-altitude airborne aerial unit,

(ii) storing the at least one separated gaseous matter within storage means carried by the high-altitude airborne aerial unit,
(iii) transferring the stored separated gaseous matter to a non-aerial unit.

33. The method of claim 32, wherein the at least one gas separation means is operable while the high-altitude aerial unit is airborne at an altitude range of 5-15 km.

34. The method of claim 32, wherein the aerial unit is a high-altitude balloon.

35. The method of claim 32, wherein the storage means is configured to be released from the high-altitude aerial unit and reach the non-aerial unit.

36. The method of claim 35, wherein the non-aerial unit comprises a designated landing area configured to capture the at least one storage means.

37. The method of claim 32, wherein the storage means comprises guidance means configured to guide the storage means from the aerial unit to the non-aerial unit.

38. The method of claim 32, wherein the gas separation means further comprise an air compressor configured to increase air pressure flowing within to 6-10 Bar above the ambient air pressure.

39. The method of any one of claims 32 or 33, wherein the airborne high-altitude aerial unit is configured to exploit the low temperatures at high altitudes in order to liquefy or solidify the designated gaseous matter.

40. The method of claim 32, wherein the designated gaseous matter is carbon dioxide.

41. The method of claim 40, wherein the aerial unit is configured to capture carbon dioxide by using a phase transition process at a temperatures range of -100° to -10° and pressures range of 0.2-10 Bar.

42. The method of any one of claims 32 or 33, wherein the at least one gas separation means carried by the airborne aerial unit is configured to exploit high altitude wind in order to harness an incoming airflow pressure for the purpose of gas separation.

43. The method of claim 38, wherein the potential energy stored within the compressed air may be further utilized by the gaseous matter capture system.