Text for Potent Voyager launch vehicle 120 degree cross-sectional view

10. Re-enforcing of the outer envelope temperature management system acting as additional heat shielding on the leading edge of the outer envelope temperature management system. This can be constructed in a similar manner to SIAD supersonic inflatable aerodynamic decelerator, which has been tested successfully by NASA, at supersonic velocities, except where SIAD uses nitrogen, it is preferrable helium would be used instead, along with a more aerodynamic profile. See NASA websites for more information. This is just one of several possible options available. *1.

12. The outer envelope of an aerodynamic shaped gas impermeable balloon, acting as a temperature management system, and as structural support. This can be constructed using aluminium-ised BoPET (Biaxially-oriented polyethylene terephthalate) more commonly known as Mylar, Melinex and Hostaphan set to reflect heat outwards . This may have to be laminated, with other fabrics using similar techniques that are used to make space suit fabrics, for protection against rips, punctures and tears, for structural strength and safety according to the flight profile required. Other materials may also be considered, for production models. The process required has to take into consideration the thermal transfer properties of the materials used. *1.

14. The inner envelope of a gas impermeable balloon, acting as a temperature management system, and used as structural support, and also as a fuel container for the lighter than air combustible gas and/or gasses. This can be constructed in a similar manner to as that of the outer envelope(12), but with an emphasis on thermal temperature transfer without the need for as much structural strength. With the aluminium-ised BoPET set to reflect heat inwards. *1.

16. Helium gas will be used to inflate features 12 and 14 at a pressure to provide structural strength, when needed, and to safely transfer frictional heat energy, due to drag, to feature 18 . As part of the temperature management system. *1

18. Primary lighter than air gaseous fuel eg. H_2(Hydrogen) and/or CH_4(Methane). To be used to passively and actively lift the vehicle.

20. Fuel line for primary lighter than air gaseous fuel displaced by pressure differentials into the engine. This can be constructed from H.D.P.E. (High-density polyethylene).

21. The outer hull of the structure containing the payload and ballast/secondary fuel tanks(which can be made from H.D.P.E.), can be constructed from carbon fibre, which can be glued and/or welded to the outer envelope (12).

22. Payload

24. Safety valve options could include examples in figs 11 and 12 or a more traditional type depending on empirical testing. This can be an integral part of a 3D printed alumina engine. *2.

26. Ballast fuel coolant eg.H.T.P.(Rocket grade hydrogen peroxide),and/or H_2O*2.

28. Hydrogen and/or methane branch pipe. This can be an integral part of a 3D printed alumina engine.

30. H.T.P. and/or H_2O downpipe. This can be an integral part of a 3D printed alumina engine.

32. Air scoops for combined atmospheric air intake and compression. This can be an integral part of a 3D printed alumina engine, possibly reenforced with carbon fibre.

34. H_2O(Water) ballast for engine coolant and additional thrust from the steam produced by its use as a coolant preventing the engine from overheating, which assist in the active lift of the vehicle *2.

36. Engine expanded details shown in figs 3,4 and 5. This can be a 3D printed alumina engine

38. Bell engine exhaust chamber. This can be an integral part of a 3D printed alumina engine, possibly reenforced with carbon fibre.

*1 These features maybe optional if a suitable material can combine strength, gas impermeability and heat energy transfer in a light weight structural layer.

*2 These features maybe optional depending on the flight profile required *3.

*3 Features 26 and 34 are interchangeable features that can also be used in combination.

Note: Not all outlets and inlets shown.