Heavy Lift Design for Mining/Cargo Propulsion

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Using the "heavy lift" design, a feasibility study was performed that could help to calculate for a thrust/framing design for heavy cargo use, such as would be used for a "mining vessel".

The vessel fuselage, fuel cell assembly, and cryogenic supply system was examined. The "framing" was originally designed with GeneriCAD software that is no longer available, but successfully fully translated all of the structural components into AutoCad (2004).

The work performed (mostly at nights) involved a temperature distribution analysis for the system using a 4−loop heat "space−radiator" that provided cooling around the nuclear detonation "dome", that can be viewed in 3D perspective.

The solid model animation of this design can be seen here: (use your mouse to move it around!)

https://home.comcast.net/~samuel_ransom/3D_object.htm

The "design" consisted of a 3−D structural code constructed for a space frame program in Fortran. The iteration method used estimates sizing of the stringers based upon the maximum loading requirement.

This was completed in about two years time. Purely an exercise in "pelletized propulsion", the study offered all of the main ingredients: pellet storage and feed lines, ejector, and laser ignition.

The design parallels the British Interplanetary's design for Daedalus, with the exception that it's been modified for use as an interplanetary cargo vessel.

A great deal of research was used to back up the design − including "ablation studies" (originally w/ '50s Orion project).

The cargo vessel "heavy lift" design utilized a "basic" approach with nuclear propulsion. Each spherical fuel pellet used for the propulsion system consisted of 3 sub−spherical parts:

For the first sub−sphere, a DT (deuterium Tritium "gas" core surrounded by a thin shell of Plutonium−239, surrounded by Beryllium, which is all surrounded by a chemical "lasive" explosive, encased in metal combed cladding. For the second sub−sphere, a miniature U−235 core surrounded by D3He, with a 1 mm thick boron−lithium nanofibre shell casing.

These shell casings are themselves clad in U−235 metal, and the U−235 metal clad unit itself is surrounded by metal combed cladding, which is itself encased in U−238 metal.

The entire U−238 metal sub−sphere is itself coated with a 1 mm sputter deposited boron−lithium nanofibre over the entire surface.

The third sub−sphere consists of a chemical explosive, encased in a 1mm thick shell of sputtered boron−lithium nano−fibre, with its shell tangent chemical "wick" open to the 3−spherical chemical explosive, all encased again in a 1mm thick shell of sputtered boron−lithium nanofibre.

The chemical explosive is designed to be laser ignitable, and each entire 3−sphere of encased pellets have an O.D. of 3.94 cm.

Current nuclear technology prevents the accidental ignition of a nuclear device by lightning, so that the chemical explosive can only be detonated by a "tuned" laser. Other "non−sensitive" detonation techniques, such as a rifle bullet or secondary ex−plosive (incl. fire or other incendiary device) are non−resistant to the metal combed cladding. In addition to these measures electro−mechanically preset codes prevent each pellet from being detonated until the pellet's transducer receives the the correct code.

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