PROPULSION ASSEMBLY FOR A ROCKET

Technological advantages

- **Simplified architecture with no auxiliary pressurized tanks**
- **Safe system using a cool inert gas for pressurization**

Invention synthesis

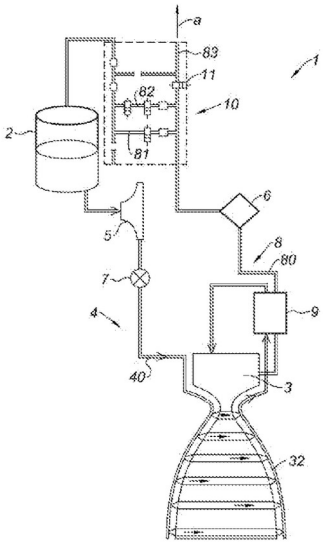
The invention deals with the pressurization management in a space launcher liquid propellant tank. Usually, pressurization in liquid propellant tanks is based on external pressurized tanks.

The invention proposes the partial use of the exhaust gases from the combustion chamber to feed and pressurize the liquid propellant tank.

The liquid propellant is fed into the combustion using a turbo-pump with a controlled mass flow and pressure. Part of the gases generated by the liquid propellant in the combustion chamber is fed back into the liquid propellant tank in an exhaust line with a controlled mass flow and temperature (using a heat exchanger). The liquid propellant is a metastable poly-nitrogenated mono-propellant such that the combustion produces an inert gas (mainly nitrogen). This suppresses risks to the chemical reactions with the exhaust gases fed back into the liquid propellant tank.

Potential applications

- Space launchers



Schematic view for the rocket propulsion assembly

(1) Propulsion assembly
(2) Liquid propellant tank
(3) Combustion chamber
(4) Feeding lines
(5) Turbo-pump to pressure the liquid propellant
(6) Turbine in the combustion chamber exit line
(7) Flow rate control valve
(8) Exhaust gas line
(9) Heat exchanger
(10) Expansion assembly

Commercial benefits

- Increased launcher payload
- Reduction in launch risks (simplified architecture)
- Reduction in production costs

Patented invention - under license.

For more information :

Valo-TT@cnes.fr