

Development of a 1 N Bipropellant Thruster

Customer: European Space Agency (ESA)
Project partner: IC2MP, University of Poitiers, France
FHWN/FOTEC core tasks: Development, test and characterization of a low thrust engine suitable for non-toxic and non-carcinogenic propellants. Development and testing of high performance catalysts.

Presently, chemical propulsion for space application relies nearly fully on propellants which are highly toxic and in most cases carcinogenic. This included fuels such as hydrazine, monomethyl hydrazine (MMH), unsymmetrical dimethylhydrazine (UDMH) and oxidizers such as mixed oxides of nitrogen (e.g. MON-3) and nitrogen tetroxide (NTO). Although those propellants have very good performance and in particular have an extensive flight history, their handling requires complex and costly precautions to protect human operators and the environment. Alternatives, so-called green propellants for in-space propulsion (orbital insertion and control as well as attitude control) are currently intensively investigated worldwide. FHWN together with FOTEC develops a bi-propellant thruster concept which is based on the utilization of highly concentrated and stabilized Hydrogen Peroxide (87.5%wt solution) in combination with Kerosene or Ethanol. A thrust level of 1N (and a specific impulse of up to 300 s) was selected as baseline with the purpose to provide precise pulse bits for attitude control.



Smallest Bipropellant 1N Engine operating with green propellants →

← Thermal Analysis of the engine main body

