

IAF SPACE PROPULSION SYMPOSIUM (C4)  
Interactive Presentations - IAF SPACE PROPULSION SYMPOSIUM (IPB)

Author: Dr. Volodymyr Shulha  
Yuzhnoye State Design Office, Ukraine, shulgaysdo@gmail.com

Mr. Alexandr Prokopchuk  
Yuzhnoye State Design Office, Ukraine, OleksandrProkopchuk.iac@gmail.com

Mr. Sergey Shokod'ko  
Yuzhnoye State Design Office, Ukraine, kukhta\_a@mail.ru

Mr. Dmytro Khromiuk  
Yuzhnoye State Design Office, Ukraine, 1979khromiuk1979@gmail.com

DESIGN EVALUATION OF THE PERFORMANCE CAPABILITIES AND SCHEMATIC FOR THE  
LOX/LNG LIQUID-PROPELLANT ROCKET ENGINE

**Abstract**

Specialists of Yuzhnoye State Design Office are developing a number of advanced LOX/kerosene liquid-propellant rocket engines. In parallel, their interest is turning to the use of methane as a propellant for space launch vehicles, spurred by the new trends and approaches to launch vehicle development, which bring forward requirements such as launch services cost reduction, launch site environmental safety, as well as the desire of space technology developers to have reusable rockets to deliver payloads into space. Liquefied natural gas (LNG) containing up to 98% methane is being used as a propellant. The paper defines the engine performance capability requirements and discusses possible engineering solutions for their implementation. In particular, the performance and balance calculations are shown for the following solutions, with afterburning of – oxidizer-rich generator gas, – fuel-rich generator gas, – both propellants gasified in the combustion chamber. The conclusion compares the performance capabilities and the LRE reliability enhancement capabilities for LOx/LNG and LOx/kerosene configurations.