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THE VALOIS ENGINE AND THE DIAMANT-B LAUNCH VEHICLE FIRST STAGE PROPULSION
SYSTEM

Abstract

On November 26, 1965, France became the third country able to launch its own satellites using its own launch vehicles (the Diamant A). As the launch range was to be closed down and a new one built in South America, it was tempting to improve the launch vehicle's overall performance. This was done by designing a new, more powerful first stage.

Named Améthyste (later L17) and developed by LRBA, this stage was very similar to the Diamant A launch vehicle first stage. It was however larger and slightly more sophisticated. It relied on more powerful propellants : nitrogen peroxide and UDMH, offering a better specific impulse and simplifying the ignition due to their hypergolicity.

Its Valois engine, designed at LRBA, developed a thrust of 35 metric tons. Contrarily to its predecessor on Diamant A, its gas generator used liquid propellants, the combustion gases being mixed with water in order to increase their volume and decrease their temperature. Valois remains the most powerful pressure-fed engine to have flown in space.

This paper will recount the development of this unique engine, its related propulsion system and the overall launch vehicle.