

Application of IM Technology to the Aerojet/ Roxel Rocket Motor for JCM

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Aerojet and Roxel UK are currently teamed to supply Lockheed Martin with a solid propellant rocket motor for Joint Common Missile (JCM). Aerojet is the motor prime contractor and responsible for the case design and manufacture; Roxel UK has responsibilities for the propellant charge and igniter.

The basic motor technical requirements are for a single charge, boost-sustain thrust profile with a high turn down ratio, minimum smoke, wide range of temperature operation (for both fixed and rotary wing), 1.3 Hazard Class propellant and a demanding Insensitive Munitions (IM) capability.

To satisfy these requirements, the rocket motor design features a Roxel dual propellant charge using two minimum smoke non-nitramine filled Cast Double Base (CDB) propellants cast in a single operation into a smokeless inhibitor, subsequently loaded and supported in an Aerojet low mass composite motor case.

The presentation 'Aerojet/ Roxel Min.Smoke 1.3 Hazard Class Rocket Motor for JCM' (Ponzo and Fleming), at the 2004 NDIA IM & EM Technology Symposium, reported successful Type V reactions in fragment impact (FI), maximum 1948 m/s, and fast heating (FH), both at US and UK range facilities.

Since then, the motor has undergone continuing evaluation and testing, including application in a successful missile flight trial (expected range exceeded) and further IM trials conducted by the US Government. Three IM tests have been executed, namely, sympathetic reaction (SR); shaped charge jet impact (SCJI); and FI with the MIL-STD 2105 fast fragment (2530 m/s). The results will be reported in the paper, assuming DoD approval.

DoD assessment of the JCM boost and sustain propellants has demonstrated excellent chemical stability with ageing which augurs well for the maintenance of IM capability through in-service life.