

## **Coatings for high performance in aerospace applications**

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From the satellite launch to landing of a spacecraft, numerous lubrication steps and cold-welding protection must be considered for the success of a space mission. The lubrication of each aerospace device involves a great challenge, because the failure may cause the end of a mission. Basically, the lubrication can be considered in two aspects: (i) Lubricating of closed systems, in which the challenge is to maintain the life of the machines and systems that operate under zero gravity, where the level of gravitational force affects the flow of fluids; (ii) the other aspect is in deep space which endures the interference of atomic oxygen as well as exposure to UV radiation and thermal oscillation between  $-100\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$ . In this context, CVD diamond and DLC films have been extensively studied due to their superior mechanical and tribological properties. From São Jose dos Campos, São Paulo state, Brazil, in addition to space applications, the Nanotecplasma group at UNIVAP is involved in spin-offs. We are expanding our contribution to some near and long-term applications, spreading application areas through the simple CVD synthesis processes in air environment that have become an interesting area of investigation. Specifically, this presentation will lay out the state of the art of an emerging technology area for many applications in order to improve the lifespan of devices. We have been studying adherence, stresses, and tribological behavior of diamond and DLC films in different environments and on various substrates. Emphasis will be given on DLC film deposition and characterization studies. In addition, a comment about other activities of the Nanotecplasma group related to SiC and graphite, with and without nanoparticles, will be presented.