National Aeronautics and Space Administration

Materials and Coatings

Chemical and Topographical Surface Modifications for Insect Adhesion Mitigation

Synergistic method to reduce insect adhesion on aluminum surfaces

NASA Langley Research Center, in collaboration with ATK Space Systems, has developed a method to reduce insect adhesion on metallic substrates, polymeric materials, engineering plastics, and other surfaces. The method topographically modifies a surface using laser ablation patterning followed by chemical modification of the surface. This innovation was originally developed to enhance aircraft laminar flow by preventing insect residue buildup, but the method provides a permanent solution for any application requiring insect adhesion mitigation as well as adhesion prevention of other typical environmental contaminants.

BENEFITS

- Increased ability to mitigate adhesion of insect residue upon impact compared to currently available solutions in order to significantly reduce laminar flow disruptions
- Surface roughness is not affected by the process
- Permanent insect mitigation solution

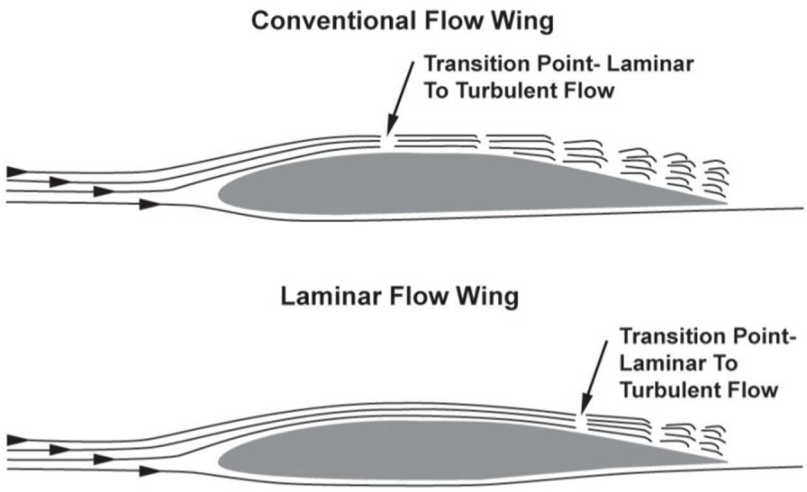
APPLICATIONS

- Aerospace
- Marine
- Automotive
- Wind Energy

technology solution

THE TECHNOLOGY

The technology is a method of mitigating insect residue adhesion to various surfaces upon insect impact. The process involves topographical modification of the surface using laser ablation patterning followed by chemical modification or particulate inclusion in a polymeric matrix. Laser ablation patterning is performed by a commercially available laser system and the chemical spray deposition is composed of nanometer sized silica particles with a hydrophobic solution (e.g. heptadecafluoro-1,1,2,2-tetrahydrodecyltriethoxysilane) in an aqueous ethanol solution. Both topographic and chemical modification of the substrate is necessary to achieve the desired performance.



Insect buildup on wings can disrupt laminar flow

PUBLICATIONS

Patent Pending

More Information

National Aeronautics and Space Administration

The Technology Gateway

Langley Research Center

Mail Stop 151
Hampton, VA 23681
757-864-1178
LARC-DL-technologygateway@mail.nasa.gov

http://technology.nasa.gov/

www.nasa.gov

NP-2015-08-2024-HQ

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

LAR-18127-1