

## SEAM WEBINAR SERIES

# Understanding how much thermally sprayed Thermal Barrier Coatings (TBCs) protect jet engines against major failure: A tutorial presentation

by **Rogério S. Lima, PhD**

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Very people know that each time when anyone travels on a jet-powered airplane, among the many critical components of the aircraft, there is one specifically engineered to impede the catastrophic failure of the turbine engines in flight. This critical component is a thermally sprayed ceramic thermal barrier coating (TBC); just 250-500  $\mu\text{m}$  thick, located in the hot metallic zones of the turbine (e.g., combustion chambers). These types of ceramic TBCs are deposited via air plasma spray (APS). A TBC architecture typically exhibits a bi-layered structure, which includes the ceramic topcoat and a metallic super-alloy bond-coat. The ceramic topcoat (e.g.,  $\text{ZrO}_2\text{-Y}_2\text{O}_3$ , a.k.a., YSZ) provides thermal insulation and reduces the heat flow to the turbine metallic part. The metallic bond-coat (100-200  $\mu\text{m}$  thick) is an oxidation/corrosion-resistant metallic layer; which protects the underlying component and improves the adhesion of the ceramic topcoat on the part. This tutorial presentation (with educational videos) will show to the audience in Layman's terms, how TBCs are important and how they work. It will explore the longevity of TBCs on the engines, the temperatures in which TBCs and the metallic components of turbines work, their thermal gradients and how to simulate and study them in laboratory experiments.

**Dr Rogério S. Lima** is a Senior Research Officer with National Research Council of Canada. He completed his PhD in materials science and engineering from Stony Brook University (USA) in 2001, under the mentorship of Distinguished Professor Chris Berndt (Swinburne). Dr Lima has published 65 refereed journal papers and 63 conference papers. His scientific papers have been cited more than 3000 times and his h-index is 30. Dr Lima is invited regularly to review papers for international materials science journals and has given numerous invited talks. Dr Lima's main research interest is R&D of thermally sprayed thermal barrier coatings (TBCs) and environmental barrier coatings (EBCs) for aerospace applications.



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### DATE

8 September 2020

### TIME

11.00AM - 12.00PM  
Australian Eastern Standard  
Time AEST

### REGISTRATION

Register via this link.

<http://arcse.am/lima2020>

Once registered you will be emailed a link to the event.