

Kratos SRE's Variable Atmosphere Temperature and Pressure (VATP) Facility was built for evaluation of hypersonic vehicle leading-edge materials via mission performance tests in realistic service environments, such as variable temperature, atmosphere, pressure, and load.

### ■ **Intended Applications**

- Oxidation exposure of CMCs to as high as 4000 °F (2204 °C) in partial pressures of pure, dry air as low as 10<sup>-5</sup> Torr with automated, digital control of pressure and temperature.
- Re-entry leading-edge temperature/pressure mission simulation
- Mechanical tests in vacuum and low-pressure air including tensile creep

### ■ **Capabilities in Air via Induction Heating**

1. Zirconia: 4200 °F, 50–760 Torr Heating rate: as high as 3 °F/sec

2. Iridium: 4000 °F, 10<sup>-5</sup>–50 Torr Heating rate: as high as 10 °F/sec

### ■ **Other Capabilities**

1. Quartz Lamp: 2600-3000 °F, 10<sup>-5</sup> Torr Heating rate: as high as 10-30 °F/sec
2. Iridium: 4000 °F, 10<sup>-5</sup> Torr Tensile hardware in development

### ■ **Future Capabilities**

Cryogenic testing to as low as 20 K with a cryo-cooler; utilization of Digital Image Correlation and other non-contact strain methods; elevated temperature refractory metal hardware to conduct mechanical tests in vacuum above 2600 °F

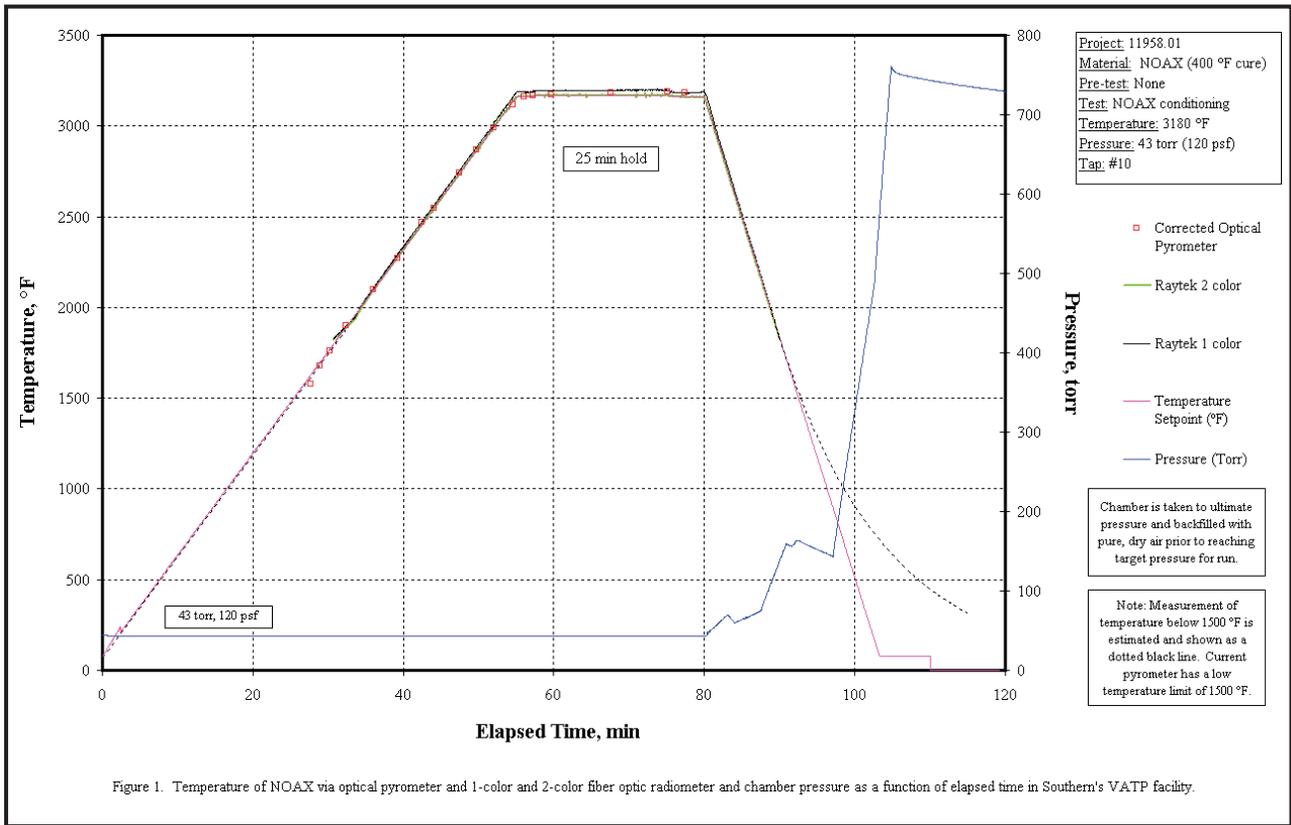


Figure 1. Temperature of NOAX via optical pyrometer and 1-color and 2-color fiber optic radiometer and chamber pressure as a function of elapsed time in Southern's VATP facility.



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