

# Eric John Wernimont

## Contact

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## Degrees

**Bachelor, Aero & Astronautical Engineering**, December 1985

Purdue University at West Lafayette, Indiana

**Master of Science, Aero & Astronautical Engineering**, December 1991

Purdue University at West Lafayette, Indiana

**Doctor of Philosophy, Aero & Astronautical Engineering**, August 1997

Purdue University at West Lafayette, Indiana

Experimental Fuel Regression of Hydrogen Peroxide Hybrid Rockets



## Experience

**Whiskey Yankee LLC**, Oceanside, CA

Founder & Owner

Air Independent Fuel Cell Solutions

2010 - Present

**TEEG LLC**

Oil & Gas - Stimulation R & D

2008 - Present

**General Kinetics LLC/Inc.**, Lake Forest, CA

Co-Owner & Chief Operating Officer: Responsible for Oversight of Design, Fabrication Including Quality and Test for Company Products. Company is an Original Equipment Manufacturer of Hydrogen Peroxide Based Combustion Devices and Catalyst Beds 1 lbf to 35,000 lbf Class.

Major Programs: Airborne Laser (ABL), Tactical High Energy Laser (THEL), Livermore KEW

Company Set Several Public Technical Records:

Largest 98% Gas Generator/Catalyst Bed

Lowest Temp Start Peroxide Catalyst Bed for Fluid & Hardware (Combined & Separate)

Highest Mass Flux Gas Generators: 70%, 90% & 98%

Fastest Thermal Start 90% Hydrogen Peroxide/RP-1

Designed Experiments and Performed Testing on GK Catalyst Beds that Led to Impurity Limits in MIL-PRF-16005, Rev F (active)

Closed Due to Lack of Business from Termination of Laser Programs

May 1998 – March 2012

**Beal Aerospace**, Dallas, TX

Propulsion Lead: Propellant Selection, Catalyst Development

Propellant (Hydrogen Peroxide) Manufacture, Test Stand Fab and Design

Combustion Chamber and Propellant Feed System Design and Analysis.

3 Stage Vehicle Hydrogen Peroxide/Kerosene

250 lbf to 1.5 Million lbf Class

Quit to Go Form General Kinetics  
March 1997 – April 1998

**Orbital Sciences Corp,** Dulles, Virginia

Construction and Operation of Hydrogen Peroxide Vacuum Still  
Design, Construction and Test of 100 lbf Monopropellant Thruster  
Design of 2500 lbf 85% Hydrogen Peroxide/Kerosene Thruster

Bridge Consulting Job between ASRM Cancellation and PhD Start  
Feb 1994 – June 1994

**Aerojet,** Advanced Solid Rocket Motor Division, Iuka, Mississippi

Nozzle Thermal Ablative Analysis Engineer, Aerothermal & Ballistics

Program Cancelled by Act of Congress  
Aug 1992 – Dec 1993

**Thiokol Corporation,** Strategic Motor Performance, Brigham City, Utah

Ballistician Engineer

Set to Return After Master's Complete – President of United States Cancelled Program  
Summer 1991

&

Left to Go to Master's School  
Feb 1989 – June 1990

**United Technologies,** Chemical Systems Division, San Jose, CA

Ballistician Engineer

Should Have Stayed at Thiokol  
June 1988 – Jan 1989

**Thiokol Corporation,** Strategic Motor Performance, Brigham City, Utah

Ballistician Engineer

The Best Job Ever  
June 1986 – 1988

# Skills

## Numerical/Analytical Engineer:

Ballistics – Liquid, Solid & Hybrid Rocket Motors  
Computational Fluid Dynamics – Wrote own Euler Solver, Multigrid in Grad School  
Ablative Materials - CMA  
Liquid/Hybrid Engine Design of  
Fluid System Sizing – Including Components  
Hydrogen Peroxide Catalytic Rocket Chambers

## Test Engineer:

Fluid Management Design & Fabrication, Instrumentation and Data Acquisition Setup, Propellant Handling, Test Procedures and Ops  
Experience up to 1M lbf Thrust and Pressures to 20,000 psig

## Manager:

Chief Operation Officer – Small Company – Manufacture, Quality & Test  
Project Management on Many ~\$1M Projects

# Publications, Conference Papers & Patents

Smith, David Randolph, Wernimont, Eric J. and Ventura, Mark Christopher, “Method and Apparatus to Increase Recovery of Hydrocarbons”, U.S. Patent Application No. 13/573,689 published Jun. 13, 2013

<https://docs.google.com/viewer?url=patentimages.storage.googleapis.com/pdfs/US5727368.pdf>

Wernimont, Eric J., Ventura, Mark C., Grubelich, Mark C, Vaughn, Mark R. and Escapule, William R, “Low Temperature Operation of Hydrogen Peroxide Gas Generators: Verification Testing & Possible Applications”, AIAA 2009-4617, 7<sup>th</sup> International Energy Conversion Engineering Conference, Denver, CA, August 2009

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2009-4617-Low\\_Temp\\_Operation\\_Hydrogen\\_Peroxide\\_Gas\\_Generators-Possible\\_Apps.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2009-4617-Low_Temp_Operation_Hydrogen_Peroxide_Gas_Generators-Possible_Apps.pdf)

Wernimont, Eric J., Ventura, Mark C., Grubelich, Mark C, Vaughn, Mark R. and Escapule, William R, “Low Temperature Start & Operation Capability of 82% Hydrogen Peroxide Gas Generators”, 5<sup>th</sup> International Space Propulsion Conference, Heraklion, Crete, Greece, May 2008

[www.hydrogen-peroxide.us/history-US-General-Kinetics/SP-2008-Low\\_Temperature\\_82percent\\_H2O2\\_Gas\\_Generator.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/SP-2008-Low_Temperature_82percent_H2O2_Gas_Generator.pdf)

Ventura, M., Wernimont, E., Heister, S., Yuan, S., “Rocket Starflyer: Modified NF-104 for Space Tourism”, AIAA 2007-5839, 43<sup>rd</sup> AIAA Joint Propulsion Conference & Exhibit, Cincinnati, OH, July 2007

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5839\\_Rocket\\_Starflyer-Modified\\_NF-104\\_for\\_Space\\_Tourism.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5839_Rocket_Starflyer-Modified_NF-104_for_Space_Tourism.pdf)

Wernimont, E.J. and Ventura, M.C., “Review of US Historical Rocket Propellants: Accidents, Mishaps & Fatalities”, AIAA 2007-5648, 43<sup>rd</sup> AIAA Joint Propulsion Conference & Exhibit, Cincinnati, OH, July 2007

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5648\\_Review\\_of\\_US\\_Historical\\_Rocket\\_Propellants-Accidents\\_Mishaps\\_and\\_Fatalities.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5648_Review_of_US_Historical_Rocket_Propellants-Accidents_Mishaps_and_Fatalities.pdf)

Ventura, M., Wernimont, E., Dillard, J., “Hydrogen Peroxide – Optimal for Turbomachinery and Power Applications”, AIAA 2007-5537, 43<sup>rd</sup> AIAA Joint Propulsion Conference & Exhibit, Cincinnati, OH, July 2007

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5537\\_Hydrogen\\_Peroxide-Optimal\\_for\\_Turbomachinery\\_and\\_Power\\_Applications.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5537_Hydrogen_Peroxide-Optimal_for_Turbomachinery_and_Power_Applications.pdf)

Ventura, M., Wernimont, E., Heister, S. and Yuan, S., “Rocket Grade Hydrogen Peroxide (RGHP) for use in Propulsion and Power Devices – Historical Discussion of Hazards”, AIAA 2007-5468, 43<sup>rd</sup> AIAA Joint Propulsion Conference & Exhibit, Cincinnati, OH, July 2007

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5468\\_Hydrogen\\_Peroxide\\_Myths.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2007-5468_Hydrogen_Peroxide_Myths.pdf)

Wernimont, E. J., “System Trade Parameter Comparison for Monopropellants: Hydrogen Peroxide vs Hydrazine and Others”, AIAA 2006-5235, 42<sup>nd</sup> AIAA Joint Propulsion Conference & Exhibit, Sacramento, CA, July 2006

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2006-5236\\_hydrogen\\_peroxide\\_versus\\_hydrazine.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2006-5236_hydrogen_peroxide_versus_hydrazine.pdf)

Wernimont, E. J., “Monopropellant Hydrogen Peroxide Rocket Systems: Optimum for Small Scale”, AIAA 2006-5235, 42<sup>nd</sup> AIAA Joint Propulsion Conference & Exhibit, Sacramento, CA, July 2006

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2006-5235\\_hydrogen\\_peroxide\\_for\\_small\\_scale.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2006-5235_hydrogen_peroxide_for_small_scale.pdf)

Wernimont, E. J., “Hydrogen Peroxide Catalyst Beds: Lighter and Better Than Liquid Injectors”, AIAA 2005-4455, 41<sup>st</sup> AIAA Joint Propulsion Conference & Exhibit, Tucson, AZ, July 2005

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2005-4455\\_Hydrogen\\_Peroxide\\_Catalyst\\_Beds\\_are\\_Ligher\\_than\\_Liquid\\_Injectors.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2005-4455_Hydrogen_Peroxide_Catalyst_Beds_are_Ligher_than_Liquid_Injectors.pdf)

Wernimont, E. J. and Durant, D., “State of the Art High Performance Hydrogen Peroxide Catalyst Beds”, AIAA 2004-4147, 40th AIAA Joint Propulsion Conference & Exhibit, Ft. Lauderdale, FL, July 2004

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2004-4147\\_State\\_of\\_the\\_Art\\_High\\_Performance\\_Hydrogen\\_Peroxide\\_Catalyst\\_Beds.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2004-4147_State_of_the_Art_High_Performance_Hydrogen_Peroxide_Catalyst_Beds.pdf)

Wernimont, E. J. and Durant, D., “Development of a 250 lbfv Kerosene – 90% Hydrogen Peroxide Thruster”, AIAA 2004-4148, 40th AIAA Joint Propulsion Conference & Exhibit, Ft. Lauderdale, FL, July 2004

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2004-4148\\_Development\\_of\\_a\\_250-lbv\\_Kerosene\\_90\\_Percent\\_H2O2\\_Thruster.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2004-4148_Development_of_a_250-lbv_Kerosene_90_Percent_H2O2_Thruster.pdf)

Wernimont, E. and Ventura, M.C., “Catalyst Bed Testing for Development of a 98% Hydrogen Peroxide Procurement Specification”, AIAA 2002-3852, 38th AIAA Joint Propulsion Conference & Exhibit, Indianapolis, IN, July 2002

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2002-3852\\_Catalyst\\_Bed\\_Testing\\_for\\_Development\\_of\\_a\\_98\\_Percent\\_H2O2\\_Specification-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2002-3852_Catalyst_Bed_Testing_for_Development_of_a_98_Percent_H2O2_Specification-pitch.pdf)

Ventura, M.C. and Wernimont, E., “Review of Hydrogen Peroxide Safety Data Sheets”, AIAA 2002-3850, 38th AIAA Joint Propulsion Conference & Exhibit, Indianapolis, IN, July 2002

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2002-3850\\_Review\\_of\\_Hydrogen\\_Peroxide\\_Material\\_Safety\\_Data\\_Sheets-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2002-3850_Review_of_Hydrogen_Peroxide_Material_Safety_Data_Sheets-pitch.pdf)

Wernimont, E. and Ventura, M.C., “Review of Hydrogen Peroxide Specification MIL-P-16005E”, AIAA 2001-3251, 37th AIAA Joint Propulsion Conference & Exhibit, Salt Lake City, UT, July 2001

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3251\\_Review\\_of\\_Hydrogen\\_Peroxide\\_Specification\\_MIL-P-16005-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3251_Review_of_Hydrogen_Peroxide_Specification_MIL-P-16005-pitch.pdf)

Ventura, M.C. and Wernimont, E., “Advancements in High Concentration Hydrogen Peroxide Catalyst Beds”, AIAA 2001-3250, 37th AIAA Joint Propulsion Conference & Exhibit, Salt Lake City, UT, July 2001

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3250\\_Advancements\\_in\\_High\\_Concentration\\_Hydrogen\\_Peroxide\\_Catalyst\\_Beds-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3250_Advancements_in_High_Concentration_Hydrogen_Peroxide_Catalyst_Beds-pitch.pdf)

Ventura, M.C. and Wernimont, E., “History of the Reaction Motors Super Performance 90% H<sub>2</sub>O<sub>2</sub>/Kerosene LR-40 Rocket Engine”, AIAA 2001-3838, 37th AIAA Joint Propulsion Conference & Exhibit, Salt Lake City, UT, July 2001

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3838\\_History\\_of\\_RMI\\_Super\\_Performance\\_90\\_Percent\\_H2O2-Kerosene\\_LR-40\\_RE-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2001-3838_History_of_RMI_Super_Performance_90_Percent_H2O2-Kerosene_LR-40_RE-pitch.pdf)

Wernimont, E. and Mullens, P., “Capabilities of Hydrogen Peroxide Catalyst Beds”, AIAA 2000-3555, 36th AIAA Joint Propulsion Conference & Exhibit, Huntsville, AL, July 2000

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2000-3555\\_Capabilities\\_of\\_Hydrogen\\_Peroxide\\_Catalyst\\_Beds-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2000-3555_Capabilities_of_Hydrogen_Peroxide_Catalyst_Beds-pitch.pdf)

Wernimont, E. and Garboden, G.L., “Performance of 2500 lbf Hydrogen Peroxide-Polyethylene Hybrid”, AIAA 2000-3545, 36th AIAA Joint Propulsion Conference & Exhibit, Huntsville, AL, July 2000

[www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2000-3545\\_Performance\\_of\\_a\\_2500\\_lbf\\_H2O2\\_Polyethylene\\_Hybrid%20Rocket\\_Motor-pitch.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/AIAA-2000-3545_Performance_of_a_2500_lbf_H2O2_Polyethylene_Hybrid%20Rocket_Motor-pitch.pdf)

Wernimont, E. and Ventura, M.C., “Critical Review of MIL-P-16005E”, 3<sup>rd</sup> International Hydrogen Peroxide Propulsion Conference, Gulfport, MS, Nov, 2000

Wernimont, E.J. and Heister, S.D., “Reconstruction Technique for Reducing Hybrid-Rocket Combustion Test Data”, AIAA Journal of Propulsion and Power, Vol 15, Number 1, Jan-Feb 1999.

<http://arc.aiaa.org/doi/abs/10.2514/2.5401>

Wernimont, E. and Garboden, G.L., "Experimentation with Hydrogen Peroxide Oxidized Rockets", AIAA 99-2743, 35th AIAA Joint Propulsion Conference & Exhibit, Los Angeles, CA, June 1999

Wernimont, E. and Mullens, P., "Recent Developments in Hydrogen Peroxide Monopropellant Devices", AIAA 99-2741, 35th AIAA Joint Propulsion Conference & Exhibit, Los Angeles, CA, June 1999

Wernimont, E., Ventura, M.C., Garboden, G. and Mullens, P., "Past and Present Uses of Rocket Grade Hydrogen Peroxide", 2<sup>nd</sup> International Hydrogen Peroxide Propulsion Conference, Purdue University, IN, Nov., 1999  
[www.hydrogen-peroxide.us/history-US-General-Kinetics/H2O2\\_Conf\\_1999-Past\\_Present\\_Uses\\_of\\_Rocket\\_Grade\\_Hydrogen\\_Peroxide.pdf](http://www.hydrogen-peroxide.us/history-US-General-Kinetics/H2O2_Conf_1999-Past_Present_Uses_of_Rocket_Grade_Hydrogen_Peroxide.pdf)

Caravella, J.R., Heister, S.D., Wernimont, E.J., "Characterization of Fuel Regression in a Radial Flow Hybrid Rocket", AIAA Journal of Propulsion and power, Vol. 14, Number 1, Jan-Feb 1998.

<http://arc.aiaa.org/doi/abs/10.2514/2.5265>

Wernimont, E.J., Meyer, S.E., Ventura, M.E., "Hybrid motor system with a consumable catalytic bed a composition of the catalytic bed and a method of using", US Patent No. 5,727,368 Issued March 17, 1998

[www.hydrogen-peroxide.us/uses-biprop-combustion/US-Patent-5727368-Hybrid-Motor-Consumable-Catalytic-Bed-1998.pdf](http://www.hydrogen-peroxide.us/uses-biprop-combustion/US-Patent-5727368-Hybrid-Motor-Consumable-Catalytic-Bed-1998.pdf)

Wernimont, E., "Experimental Study of Combustion in Hydrogen Peroxide Hybrid Rockets", PhD. Thesis Purdue University, West Lafayette, IN, August, 1997.

<http://docs.lib.purdue.edu/dissertations/AAI9819059>

Wernimont, E. and Heister, S.D., "Experimental Study of Chamber Pressure Effects on Hydrogen Peroxide Oxidizer Hybrid Rockets", AIAA 97-2801, 33th AIAA Joint Propulsion Conference & Exhibit, Seattle, WA, July 1997

Wernimont, E. and Heister, S.D., "Progress in Hydrogen Peroxide Oxidized Hybrid Rocket Experiments", AIAA 96-2696, 32nd AIAA Joint Propulsion Conference & Exhibit, Lake Buena Vista, FL, July 1996

Caravella, J.R., Heister, S.D. and Wernimont, E., "Characterization of Fuel Regression in a Radial Flow Hybrid Rocket", AIAA 96-3096, 32nd AIAA Joint Propulsion Conference & Exhibit, Lake Buena Vista, FL, July 1996

E. Wernimont, S. Heister, "Performance Characterization of Hybrid Rockets Using Hydrogen Peroxide Oxidizer", AIAA 95-3084, 31st AIAA/SAE/ASME/ASEE Propulsion Conference, San Diego, CA, Jul. 10-12, 1995.

E. Wernimont, S. Meyer, "Hydrogen Peroxide Hybrid Rocket Engine Performance Investigation", AIAA 94-3147, 30th Joint AIAA/SAE/ASME/ASEE Propulsion Conference, Indianapolis, IN, Jun. 27-29, 1994.

E. Wernimont, "Design of an Experiment for the Production of a Foamed Tin Sample", NASA Goddard Conference Publication 2401, Get Away Special Experimenter's Symposium, Greenbelt, MD, 1985.

<http://ntrs.nasa.gov/search.jsp?R=19860017833>