

# **60th International Instrumentation Symposium 2014**

**IET Conference Publications 630**

**London, United Kingdom  
24-26 June 2014**

**ISBN: 978-1-63439-107-8**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2014) by the Institution of Engineering and Technology  
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Institution of Engineering and Technology  
at the address below.

Institution of Engineering and Technology  
P. O. Box 96  
Stevenage, Hertfordshire  
U.K. SG1 2SD

Phone: 01-441-438-767-328-328  
Fax: 01-441-438-767-328-375

[www.theiet.org](http://www.theiet.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

<b>Utilising IEC 61850 in Oil &amp; Gas Integrated Control and Safety System.....</b>	<b>1</b>
<i>Laya Sathyadevan</i>	
<b>Securing SCADA in the Cloud: Managing the Risks to Avoid the Perfect Storm .....</b>	<b>5</b>
<i>R.S.H. Piggin</i>	
<b>A Reusable Thermal History Sensor Based on the Oxidation of a Divalent Rare Earth Ion Based Phosphor Synthesized by the Sol-Gel Process.....</b>	<b>11</b>
<i>A. Yáñez González, S. Skinner, F. Beyrau, A.L. Heyes</i>	
<b>Sol-Gel Deposited Thermographic Phosphors As Possible Thermal History Coatings .....</b>	<b>17</b>
<i>D. Stenders, I. Karadagli, C. Pfleisch, B. Atakan</i>	
<b>Thermal History Paints – Principles and Progress .....</b>	<b>23</b>
<i>S. Karmakar Biswas, C.C. Pilgrim, P.Y. Sollazzo, S. Berthier, J.P. Feist</i>	
<b>Sensing with Phosphor-Doped PDMS.....</b>	<b>29</b>
<i>F. Sabri, K. Lynch, R. Wilson, S.W. Allison</i>	
<b>Temperature Sensing inside Thermal Barrier Coatings using Phosphor Thermometry.....</b>	<b>35</b>
<i>A. Yáñez González, C.C. Pilgrim, P.Y. Sollazzo, A.L. Heyes, J.P. Feist, J.R. Nicholls , F. Beyrau</i>	
<b>Precision and Accuracy Considerations for Phosphorescence Lifetime Thermometry Imaging Using Rapid Lifetime Determination.....</b>	<b>41</b>
<i>B. Heeg, J.I. Eldridge, T.P. Jenkins</i>	
<b>Instantaneous Temperature Field Measurement on a Hot Surface Cooled by Impinging Jet Using Thermographic Phosphor Technique .....</b>	<b>46</b>
<i>S.J. Yi, H.D. Kim, K.C. Kim</i>	
<b>Gaseous Oxygen Flowmeters in Autogenous Pressurization Systems .....</b>	<b>50</b>
<i>Y.Q. Peng, H.Q. Zhao, J.B. Zou</i>	
<b>The Purpose for Measurements and Understanding Their Uncertainties (The Basic, ISO and ASME Uncertainty Models Compared) .....</b>	<b>56</b>
<i>Ronald H. Dieck</i>	
<b>A Novel Notation Method for the Representation of Quantized Sampled Data in Measurement Systems .....</b>	<b>62</b>
<i>Wenyi Liu, Qingping Yang</i>	
<b>HIL testing of a compact Beam Position Monitor diagnostic for particle accelerators .....</b>	<b>67</b>
<i>I. Badillo, J. Jugo, C. San Vicente, J. Portilla, J. Feuchtwanger, V. Etxebarria</i>	
<b>Tungsten-Rhenium Thermocouple Sensor for In-situ Ultra-High Temperature Measurement of Hypersonic Aircraft Surface.....</b>	<b>73</b>
<i>L.B. Zhang, Y.Q. Peng, J.B. Zhou, R.H. Zhang, S. Chen, X.F. Yang</i>	
<b>On the Automation of Thermographic Phosphor Calibration.....</b>	<b>78</b>
<i>F.A. Nada, C. Knappe, X. Xu, M. Richter, M. Aldén</i>	
<b>Calibration of YAG: Tm at High Temperatures and Identification of Transition Dynamics for Thermal Measurement of Surfaces .....</b>	<b>84</b>
<i>S.L. Gollub, D.G. Walker, S.W. Allison, J.I. Eldridge, T.P. Jenkins</i>	
<b>Hypochlorite Sensor Based on Spectrophotometry .....</b>	<b>89</b>
<i>P. Letsou, M. Brooks, D. Bonnick</i>	
<b>Derived Once per Rev Signal generation for Blade Tip Timing Systems.....</b>	<b>94</b>
<i>P. Russhard</i>	
<b>Optimized Magnetic Sensors to Measure Speed and Position in Adverse Environments .....</b>	<b>99</b>
<i>R. Przysowa, E. Rokicki, P. Majewski</i>	
<b>A Comparison of Multi Fibre and Single Fibre Optical Probes .....</b>	<b>103</b>
<i>P. Russhard</i>	
<b>Novel Prototype Instruments for Real-time In-process Nanoparticle Detection in Fluid Streams Using Structured Laser Beam Detection and Flexible Algorithmic Diagnostics.....</b>	<b>108</b>
<i>D.C. Carpenter, J. Shamir, M. Archibald, R. Battle, M. Teichner</i>	
<b>Using Artificial Intelligence to Aid Measurement Accuracy and Reliability in Coriolis Gas Flow meters .....</b>	<b>113</b>
<i>Khashayar Behdinan</i>	
<b>UK Nuclear Industry First Wireless Applications .....</b>	<b>117</b>
<i>Tom S. Nobes, Chris Murphy</i>	
<b>Limited QRA in SIS Systems.....</b>	<b>120</b>
<i>Murtaza I. Gandhi</i>	
<b>Thermal Barrier Sensor Coatings – Sensing Damage and Ageing in Critical Components.....</b>	<b>125</b>
<i>C.C. Pilgrim, P.Y. Sollazzo, S. Berthier, J.P. Feist, S. Karmakar Biswas, J.R. Nicholls</i>	
<b>Author Index</b>	