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## John D. Crosby Publication Abstracts

### **Roadway Visibility – How to Protect the Traveling Public from Low Visibility Prone Areas,** QTT Weather and Transportation Workshop, St. Louis, MO, 28-31 August 2006

*Visibility continues to be a major contributor to deadly road accidents and the number of existing fog detection systems do not address the extent of the problem. This presentation will examine the many causes and affects of low visibility on the motorist & include specifics on:*

- *Nature of visibility and how it is measured*
- *Introduction to the EnviroTech Sentry™ Visibility Sensor*
- *Benefits of integrating with QTT road & traffic systems*

*EnviroTech Sensors manufactures cost-effective sensors and partners with Quixote (QTT) to provide complete roadside visibility solutions that address the challenges to protect the traveling public from low visibility prone areas.*

### **Surface Transportation Visibility Observation – Meeting the Needs,** OFCM WG/WIST Meeting, Silver Spring, MD, 13-14 June 2006

*Reduced visibility continues to be a major contributor to deadly road accidents. Poor road visibility caused by dense fog, heavy snow, smoke, and dust results in multi-vehicle accidents all too frequently. But the number of existing fog detection systems is almost insignificant in relation to the problem. To help minimize the problem:*

- *Future fog detectors must be sited more densely and in areas that optimize data representativeness.*
- *A fusion of technologies is needed including additional ground & space based measurements and improved prediction capabilities, and*
- *Driver education is critical since several studies have shown limited success in changing driver behavior in fog, even with appropriate warnings*

### **Visibility Sensor Accuracy: What's Realistic?,** 12<sup>th</sup> Symposium on Meteorological Observations and Instrumentation 2003 American Meteorological Society Annual Meeting, Long Beach, CA, 9-13 February 2003

*Improvements in forward scatter-type visibility sensors in the past decade have resulted in a growing interest in automating this important meteorological parameter. Applications for visibility sensing include airport weather systems (synoptic and runway visual range), road weather systems, air quality studies, and fog warning networks.*

*The lack of industry standards for visibility leads to several problems, including misunderstandings of how to prepare sensor specifications and requirements on the part of the buyer and how to specify accuracy and key parameters on the data sheet on the part of the seller. Being a savvy user of visibility sensors and data begins with understanding what is realistic.*

*This paper will examine several key areas in an attempt to help define the accuracy of visibility sensors. Using these four key areas, the author will propose a reasonable level of accuracy a user can expect from electro-optical visibility sensors and the need for standardization in the testing and reporting.*

**Optical Flow Sensing – A New Approach to an Old Problem**, Presented at PNWIS Air & Waste Management Association Meeting, November 2000

*Airflow sensing in an industrial environment is a difficult challenge. Existing technologies like ultrasonic and Pitot tubes are expensive, require significant maintenance and installation costs, and can suffer from non-representativeness leading to a misreporting of mass flow. For example, Pitot tube devices only measure at one point and may under or over report the true flow. Ultrasonic devices must be installed at 2 levels on the stack leading to high installation costs.*

*The optical anemometer was designed to solve these problems. Optical flow sensing was approved in 1998 as an EPA equivalent Method 14 technology for compliance with the MACT rules. More than 40 optical anemometers are installed at primary aluminum producers around the world. The OFS-2000 Optical Flow Sensor is the latest introduction in the product line and was designed for measuring in the relatively short diameters of stacks and ducts...*

**Optical Communication System Techniques**, Internal publication for Wireless, Inc, Sept 1997

*Communications systems are designed to transfer information between two points. Typical communications include TV and radio broadcasts, microwave links, cellular radios for voice and data, plain old telephone (POTS) lines, fiber optics, and satellite links. In most communication systems, the transfer of information is accomplished by superimposing the information (modulation) on an electro-magnetic field (carrier). The information-laden field is propagated through or across a medium where it is received and demodulated to extract the original information. The transmission medium or channel may be air, free space, or glass fiber...*

**Visibility Techniques Improve RWIS**, Better Roads Magazine, May 1997

*Visibility is one of the key elements of road weather systems. Knowledge of the visibility along a roadway is an issue of safety, protecting the lives and property of the users of our transportation system. Reading the newspaper, we all too often see the grim results of accidents caused by low visibility.*

*The various methods of measuring visibility begin with basic visibility theory, advantages and disadvantages of various types of sensors, and how the Weather Identifier and Visibility Sensor (WIVIS) brings additional value to this all important measurement...*

**Optical Scintillometer to Measure Atmospheric Turbulence and Runway Cross Wind**, FAA  
Wind Shear Conference Proceedings, November 1996 (co-author)

*During the critical takeoff and landing phases, aircraft can be subject to severe atmospheric effects that are often beyond the detection capabilities of existing sensor systems. Some adverse conditions faced by the pilot include wind shear, wake vortex, turbulence, and down drafts.*

*Scientific Technology, Inc. has developed a sensor to measure ground level atmospheric effects using turbulence-induced optical scintillation technology. The Long Baseline Optical Anemometer and Atmospheric Turbulence Sensor (LOA) can measure path-averaged cross wind and turbulence intensity along a runway to provide critical information for low level wind shear, wake vortexes, and down drafts...*

**Good User Documents Are Good Business**, The Columbia Business Monthly, March 1996

*User documentation written in a modular format is easy to write, easy to maintain, and easy for the user to understand! Each subject of the documentation is presented in a 2-page modular format. The module consists of all the text and graphics needed to fully describe the topic. Every figure or table needed for the topic is within the module, without turning the page or going to an appendix...*

**Taking Rain Gauges to Sea**, Sea Technology Magazine, January 1994 (co-author)

*Ocean instrumentation and measurement systems for precipitation parameters are critically needed to satisfy global scale climate monitoring requirements. The major source of data is estimates of rainfall amounts derived from threshold infrared (IR) histograms of geostationary satellite observations. Since these are spaced based indirect measurements, it will be necessary to assess the validity of these estimates through some means using ground based measurements over land and ocean.*

*At the present time, one of the major problems of the global precipitation is the lack of ocean based precipitation data. Reliable precipitation measurements at sea have been almost impossible until the development of non-contacting, electro-optical techniques. This article describes a new sensor, the Optical Rain Gauge (ORG) and its performance as proven in the lab, the field, and the ocean-going platform...*

**ASOS Sensor Performance - An Update** in the Eighth AMS Symposium Proceedings, January 1993 (co-author)

*Sensor performance is the most challenging aspect of the Automated Surface Observing Program (ASOS). While no element of ASOS can be considered simple, the ASOS requirements for sensors have put considerable strain on the technical resources of the sensor vendors. This paper will discuss the status of the testing of the precipitation identification, freezing rain, ambient & dew point temperature, and visibility sensors...*

**Sensor Qualification in the ASOS Environment** in the Seventh AMS Symposium Proceedings, January 1991

*Automated Surface Observing System (ASOS is a joint program of the National Weather Service (NWS), Federal Aviation administration (FAA), and U. S. Navy. Upwards of 1000 systems will be deployed over a 5-year period to modernize the labor-intensive weather observation network. Fielding a sensor in the ASOS program presents many new challenges for the manufacturers of commercially available sensors. This paper presents an overview of the process required to obtain ASOS qualification for a sensor...*

**Visibility Measurement: An Assessment of Two Techniques**, Sensors Magazine, October 1988

*The measurement of how far the human eye can see has been the subject of considerable study and debate since the early days of aviation. The problem is especially complex because it involves both physical and psychological factors.*

*The visibility meter represents an attempt to determine, through instrumentation, the distance at which the human eye can recognize and understand visual information given the subjective quality of individual interpretation of the characteristics of the target and its surroundings as well as such variables as air quality and illumination of the path. This article compares the measurement techniques of two types of visibility meters – transmissometers and forward scatter meters – and discusses the performance of each.*