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**Intelleflex Introduces Cold Chain Technology**

By Robert L. Wallack, American Journal of Transportation, San Francisco, CA

 Intelleflex, a Santa Clara, California based technology company, is testing a pallet-level radio-frequency identification (RFID) system to monitor temperatures in real-time from the produce fields in rural areas to the grocery stores in your neighborhood. This blockbuster new product introduction is bound to further food safety and quality of fresh and frozen produce as well as in pharmaceuticals across global supply chains. The Food Safety Modernization Act (FSMA) signed into law and effective from early 2011 cites modernizing the supply chain with sharing data and technologies for Global Product Safety and Quality.

 Delivered Freshness is a registered trademark of Intelleflex Freshness Management Solutions and the system operates with three components. Battery Assisted Passive (BAP)-RFID readers including the company’s HMR-6100 Fixed, HMR-9090 and CMR-6100 cellular reader which features support from GSM carriers, the re-usable and battery assisted passive XC3 Technology RFID tags placed at the pallet level or in shipping containers, and the cloud based ZEST™ Data Services that can be accessed securely by any supply chain stakeholder. The benefit is to schedule in-transit routing changes before spoilage to food and pharmaceuticals by monitoring temperatures. In-transit monitoring interfaces enterprise resource planning (ERP) software, warehouse management systems (WMS), customer relationship management (CRM) or by mobile and web based applications. In summary, the temperature monitoring RFID tags are placed on the pallet of the temperature sensitive cargo and collects actionable data at any point in the movement of the cargo, then data is transferred via RFID readers to cellular networks, then to the distribution center applications for real-time decision making.

 “Growers ship to retail grocers and need to prove to grocers that produce is in good condition when received. They can use the cellular reader to collect data at the time of unloading or in-transit and the ZEST data services can aggregate, store, and disseminate the data,” stated Kevin Payne, Senior Director, Marketing, Intelleflex. He also said that there are “market pressures to take waste out of the supply chain.”

 The increasing risk of waste in the supply chain is proven by a Food and Drug Administration (FDA) report, “Pathway to Global Product Safety and Quality,” of July, 2011 citing FDA regulated products (food, drugs) account for 10% of all imports into the United States and arriving from 300,000 facilities in 150 countries. The U.S. Government Accountability (GAO) found that 60 percent of fruit and vegetables and 80 percent of seafood is produced from outside the U.S.A. An increasing volume of these shipments are coming from emerging economies. “China and India are expected to see a more than 400 percent increase in their produce exports between now and 2020,” stated the report. The seasonality of the produce is no longer an issue “demand is now year round for the U.S. consumer of fresh seafoods, fruits and vegetables which needs inspections, quality control, and traceability across air, sea and land transport,” said Payne.

 In the past nine months, Intelleflex gave results of two pilot tests that proved the effectiveness of the technology, Delivered Freshness, dynamically routing products in real-time based on remaining shelf life.

 The first test placed the tags in pallets of blackberries in the field in Mexico to packing houses, then onward to distribution centers in Southern California, Texas and Pennsylvania and the second test tracked the temperature and quality of fresh produce from San Diego area farms to distribution centers in Hawaii, and separately tested produce shipments from Taiwan’s Keelung port to distribution centers in Hawaii. “The blackberry pilot led to improvements in the cold chain that directly reduced spoilage and delivery of poor quality products,” said Payne.

 The berries pilot test in Mexico was in two segments: from the tags placed on pallets in the fields once harvested (temperatures varied by time of day) to the pack house and from the pack house in-transit from Mexico to a distribution center in Southern California, Texas and Pennsylvania. “Temperature was recorded by the tags every 15 minutes over a 1-4 hour transit from the field to the pack house and once in the pack house, then the temperature data was downloaded and each pallet’s remaining shelf life index was calculated using ProWare’s FreshAware software, according to an Intelleflex report.

 The final leg of the berries’ journey proves the precision of the new technology over current methods of ambient temperatures within the refrigerated container. The report concluded that “ambient trailer-level temperature monitors indicated an average temperature of 35 degrees in the five day journey, yet over 13 percent of the pallets had temperatures higher than 40 degrees Fahrenheit during the trip which lose as much as nine days of shelf life.” Similarly, the tests proved useful of fresh produce in refrigerated containers from Port of Los Angeles to Hawaii and from Port of Keelung, Taiwan to Hawaii.

 The costs to deploy the system are not high since technology infrastructure costs are significantly reduced by the ability to function at remote worksites. The tag has a two year battery life and the reader can operate with unregulated power sources from 10.5V to 28V DC and another power input can be an automobile battery. In the blackberry test, “the loop 1 from the field to the packing house, the tag would be reused at 10 uses per month and assuming a 4 month harvest for 40 uses for a tag. Hence, a $27 tag used forty times is 68 cents and in two growing seasons a 34 cent tag,” said Payne.

 The cloud-based ZEST Data Services add to the cost-effectiveness of the system since any point along the route of the perishable shipment and at destination can track the temperature from the tags and readers and share the data with retailers without the costly use of databases on servers within corporate firewalls. Moreover, the system provides documentation to growers, freight forwarders and carriers for distributors and retailers to prove the good condition of the perishable shipment which is important for reducing insurance costs and for evidence in any claims. Documenting in transit condition of goods will be equally important for high value shipments of pharmaceuticals and other temperature sensitive goods.

 The Food Safety Modernization Act calls upon the Food and Drug Administration (FDA) to inspect foreign food facilities over the next six years and in the process has to rely on better tools in its international operating model. “The FDA intends to develop a global data information system and networks to proactively share real-time information,” stated the FDA report. Fruit and vegetables are not the only temperature sensitive shipment in need of monitoring. Pharmaceuticals need to be held within a 5 degree Celcius range and if out of that range, then need to capture that difference for deliveries to physicians or health care providers and these shipments are also increasing in imports to the USA market. The numerous handoffs from fields and factories to warehouses to freight forwarders and through government inspections cause temperature variances. Tens of billions of dollars per year are lost to spoiled shipments. “With the passage of the Food Safety Modernization Act new technologies such as RFID tags for tracking and monitoring temperatures of produce shipments will play an increasingly critical role in assuring of the safety of our food supply,” said Ed Steele, EAS Consulting Group and thirty year veteran of the FDA