

# Preventing Fowl-Ups

*Computer vision system detects foreign objects in processed poultry and other food products.*

BY T.J. BECKER

**@ A computer vision system that can detect plastic and other foreign objects in processed food products is under development at GTRI.**

Although metal detectors help commercial food processors keep metal fragments from ending up in finished products, these detectors can't identify plastic and other foreign objects.

And as plastic becomes more widespread, used in everything from conveyor belts to latex gloves, plastic contamination is a growing concern for many food processing operations.

For the past year, John Stewart, a research engineer at the Georgia Tech

Research Institute (GTRI), has been leading a development team in building a computer-vision system that identifies plastic and other unwanted elements in finished food products.

The project is funded by Georgia's Traditional Industries Program for Food Processing with additional support from industrial partners. The system began field-testing this fall.

Incidences of plastic contamination are infrequent, but when they occur, fallout can be extensive. Recalls are expensive, not only in terms of logistics and returned

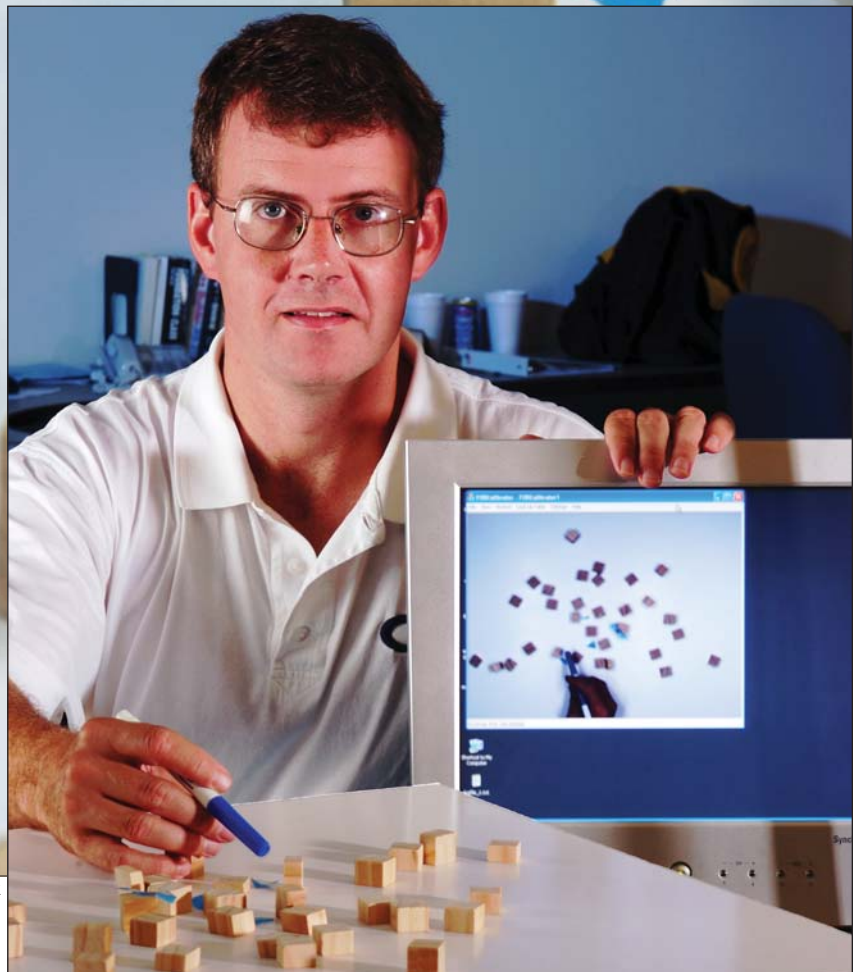
product, but also because recalls can tarnish a company's brand image and reduce consumer confidence.

Even if contamination is caught before a product leaves the factory, it can take a toll, depending on the extent of the problem and when it occurred. "When you have 6,000 to 8,000 pounds of poultry moving along the production line every hour, that's a lot of chicken to reprocess or write-off," Stewart says.

To help food processors ensure product quality, GTRI's innovative

inspection tool combines computer vision technology with sophisticated color discrimination algorithms. The computer-vision system, which sits above the production line adjacent to metal detectors, is first trained to identify the conveyor belt background and desired characteristics for the food product. This information is stored in the computer's hard drive, and as the product moves along the conveyor, the computer-vision

**RIGHT: John Stewart of the Georgia Tech Research Institute is leading development of a computer vision system to detect foreign objects in processed poultry.**



system captures digital pictures and analyzes them. If the system sees an object it doesn't recognize, it records the digital image and activates an alarm and kick-off device that removes the product from the line.

Although this system can determine a full range of color, lab tests have focused on finding blue and green objects. Blue has become a standardized color for plastic used in the food-processing environment. "Few foods are blue, so

food processors hope that line workers will recognize any foreign objects making their way into the product stream," Stewart explains.

Yet humans don't make the

most consistent inspectors. Although

people are easily trained, they are also

easily distracted, says GTRI research engineer Doug Britton, who is also working on the project.

"The product stream is moving very quickly — about 12 feet per second, which is the equivalent of eight miles per hour. If a person blinks or looks away for even a second, they can

miss a problem," Britton explains. "In contrast, machine vision is very diligent. It doesn't get tired or bored."

What's more, line workers see only the top of finished products. GTRI's computer-vision system captures additional views of surface area by taking digital images as products tumble off one conveyor belt and onto another.

"That doesn't guarantee the system will spot every single incidence," Stewart says. "Yet if it misses a fragment on one piece of product, it should stop subsequent products.

The key is to pinpoint where contamination happened and how widespread it is."

In lab tests, the system has been able to identify foreign objects as small as 1.5 millimeters with few false alarms and high accuracy rates (approaching 100 percent),

researchers say. In field-testing, researchers want to see how well the system works in a real-world setting over a long period of time.

The system is designed to operate on conveyor belts moving 12 feet per second. In the lab, top conveyor speeds were

3 feet per second. But researchers simulated factory conditions by using dimmer lights and a longer integration time to produce blur.

The ultimate goal is to make the computer-vision system as fast and accurate as possible without outpricing the technology

for industry users, researchers note. To that end, GTRI has partnered with Gainco Inc., an equipment manufacturer in Gainesville, Ga. Gainco provided feedback during the system's development, and it made the production-scale system being used in field tests.

@ Read more at: [gtresearchnews.gatech.edu/newsrelease/plastic.htm](http://gtresearchnews.gatech.edu/newsrelease/plastic.htm)

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**BACKGROUND:** Georgia Tech Research Institute lab tests have focused on finding blue and green objects in processed poultry. Blue has become a standardized color for plastic used in the food processing environment. The wooden blocks simulate chicken chunks in lab tests.

