Leader

CES2023 Leader Electronics Corporation Exhibit Report

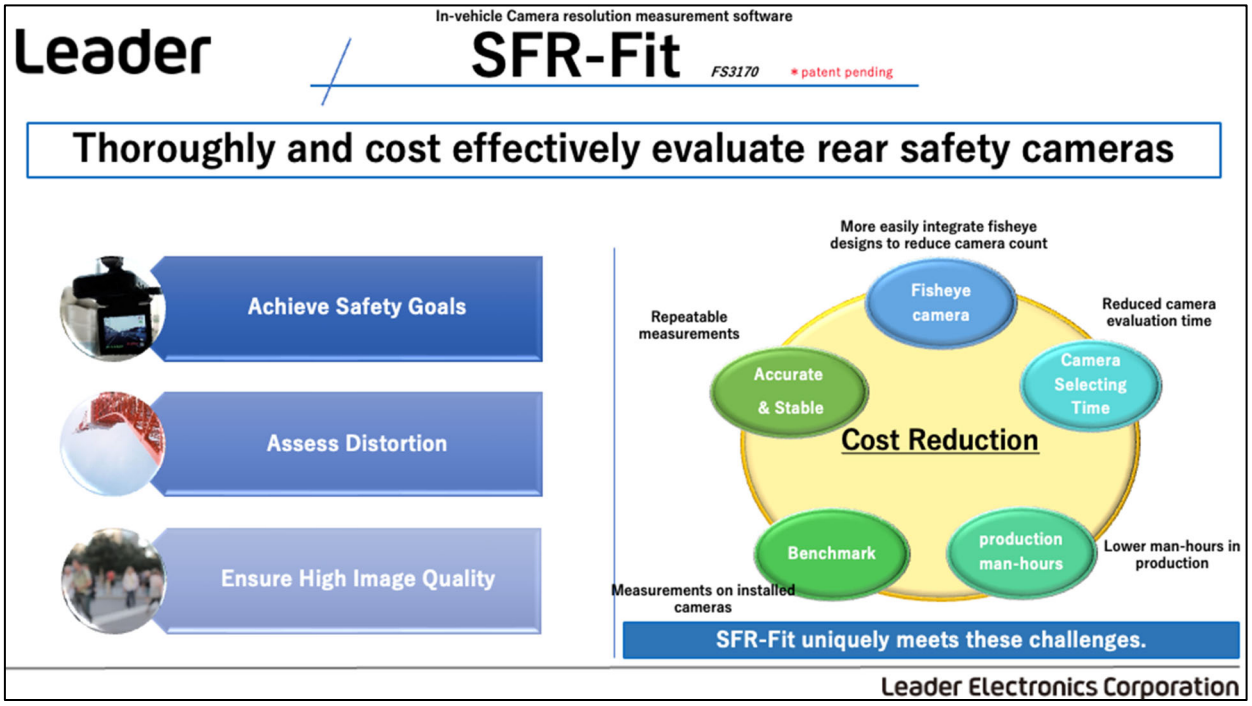
Date: Thursday, January 5, 2023 - Sunday, January 8, 2023
Location: Las Vegas Convention Center North Hall 10174 (LVCC), Las Vegas, Nevada, USA

Leader Electronics Corp. exhibited its new SFR-Fit Product Concept at the annual CES event, held at the Las Vegas Convention Center. SFR-Fit is a revolutionary in-vehicle camera assessment tool.

In addition to SFR-Fit's standard features for camera measurement, Leader exhibited two functions scheduled to be released in February 2023.
(1) CMS* resolution measurement　(*Camera Monitor System)
(2) AWB/AE* responsiveness measurement　(*Auto White Balance / Auto Exposure)

Leader also demonstrated an endoscope camera resolution measurement using a customized jig.　This highlighted SFR-Fit's capabilities beyond the automotive camera industry.　With this exhibit, not only customers in the automotive industry, but those in medical imaging and security also stopped by our booth and we were able to demonstrate SFR-Fit's unique abilities.

We would like to express our deepest gratitude for our customers' visits to the booth**.**



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Exhibition view of the Leader Electronics booth

Demonstration Contents

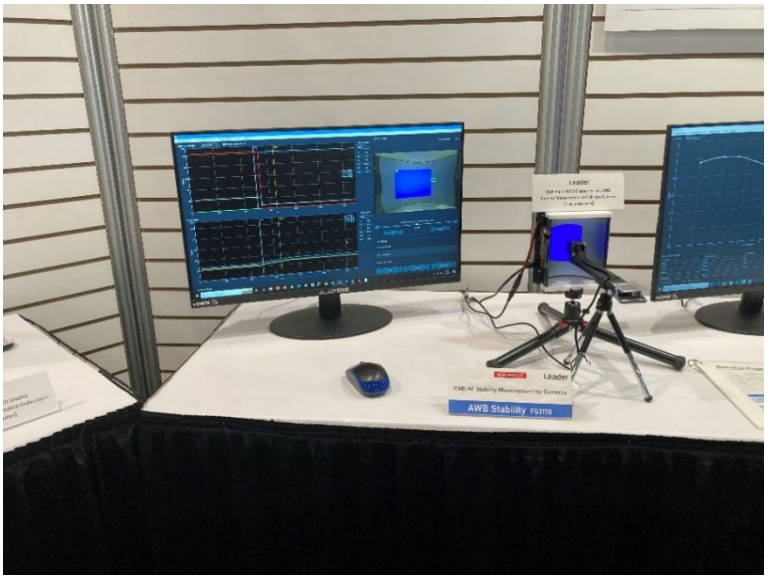
- **Camera resolution measurement**

  An in-vehicle camera module was mounted on a radio-controlled model car to simulate in-vehicle conditions. The in-vehicle camera module was a fisheye camera with a horizontal angle of view of 220 degrees, and a chart display was arranged in front and at high position to show that it can stably measure resolution even on the periphery of picture.

- **Electronic-Mirror resolution measurement**

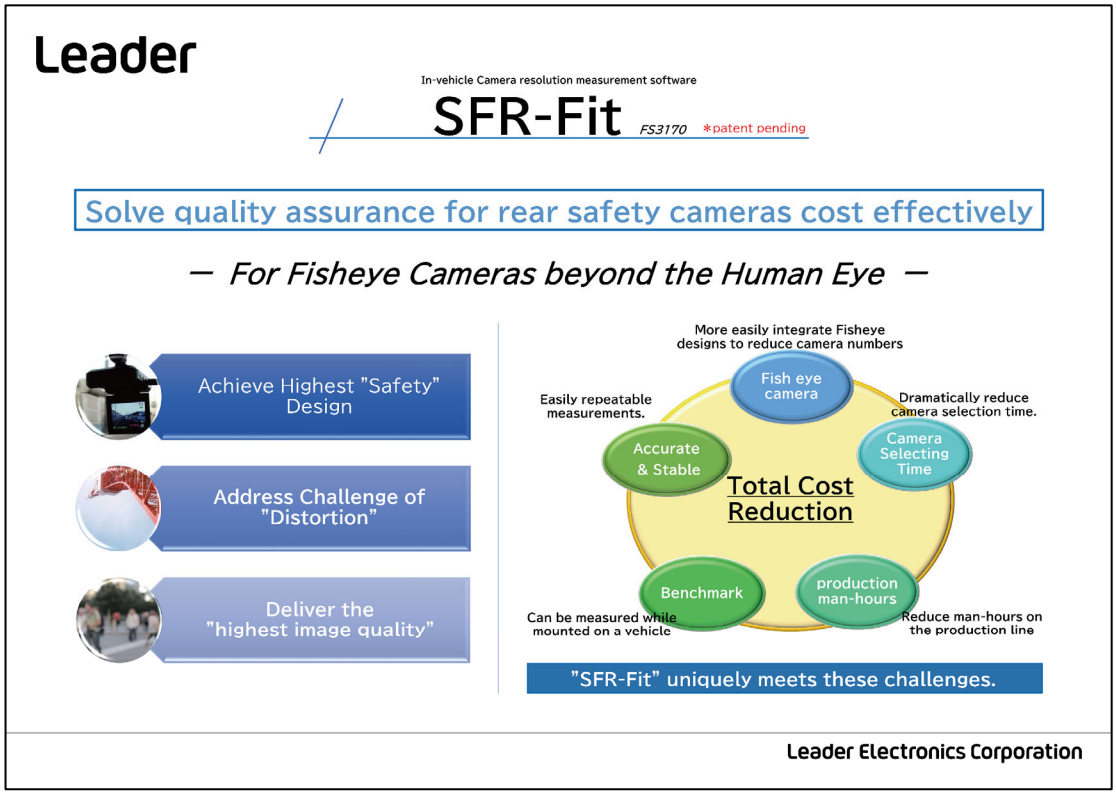
  We presented a measurement functionality scheduled for upgrade release in February 2023. The system was configured with an automotive sample electronic rearview mirror which is commercially available. The camera module was mounted on a radio control model car, and a reference camera for measurement was set up to the electronic mirror. This system can evaluate not only the performance of the camera alone, but also the total system resolution for the camera and monitor installed in the vehicle. It could also be applied to the evaluation of system resolution measurement between rear view cameras and navigation monitors using this same method.

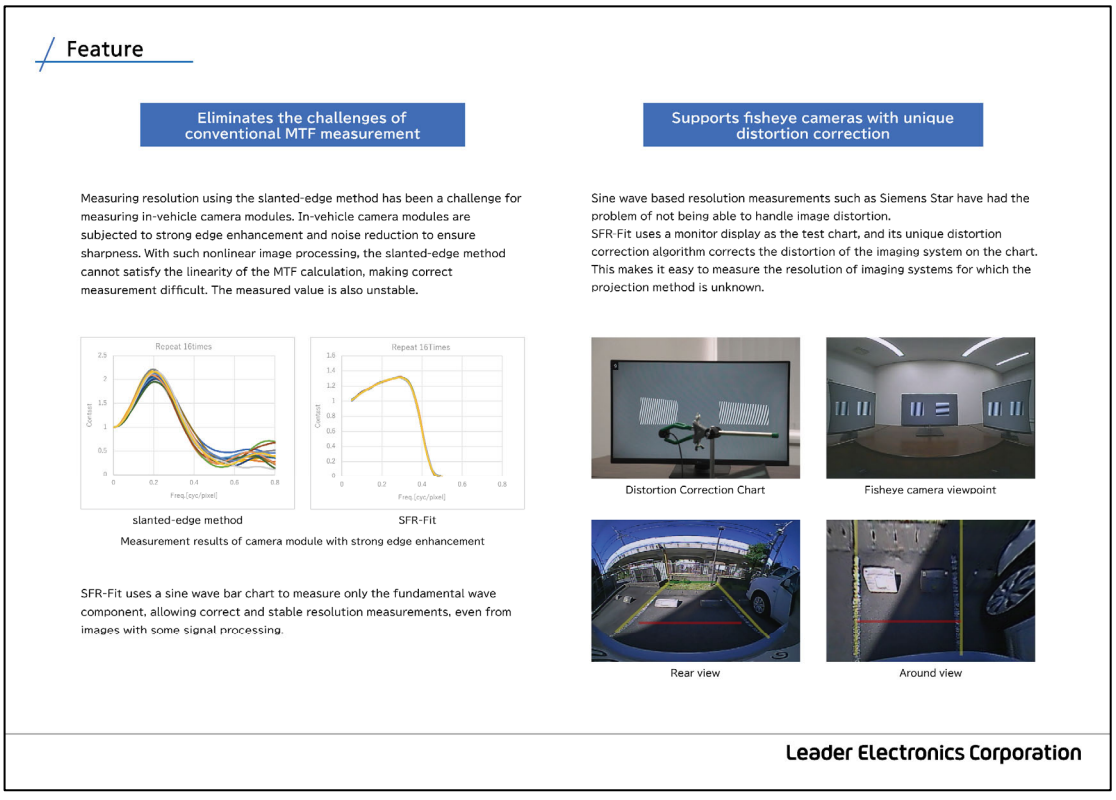
- **AWB/AE response performance**
  This was a demonstration of an additional measurement that is scheduled for release in the February 2023 version of SFR-Fit. A half-pipe curved LCD display was showcased. This demonstration takes advantage of SFR-Fit's strength in supporting fisheye/wide-angle cameras. The half-pipe curved LCD display was mapped over the entire fisheye camera angle of view, enabling evaluation of AWB/AE* responsiveness at any position while switching test patterns in real time. (*Auto White Balance / Auto Exposure)



- **Endoscope camera resolution measurement**
  This demonstration showcased the benefit of the SFR-Fit to categories other than in-vehicle cameras. It included a customized jig that imitates an endoscope’s operation and a dedicated, tiny, high-definition display that is under development. SFR-Fit was able to evaluate an endoscope with this very short working distance easily and accurately.

- **Display panel.**
  The concept and feature of SFR-Fit were explained on panel posters.
  The posters showed the benefits of SFR-Fit to the customers, its advantages compared to conventional measurement methods, and a detailed plan for future updates.





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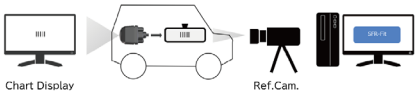
Feature

Highly accurate measurement of electronic mirror resolution

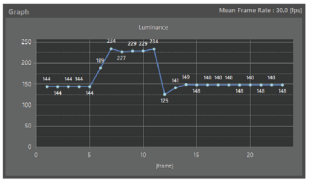
Resolution measurement of electronic mirrors is performed by re-shooting a test pattern displayed on the vehicle display with a reference camera.
However, when measuring the resolution on the display, the MTF value is affected by the pixel structure of the electronic mirror display that is captured at the same time.
The least-squares contrast measurement used in SFR-Fit is robust to image noise, is not affected by the pixel structure of the display and provides stable measurements.



In-vehicle monitor re-shot image

Measuring camera responsiveness with moving test patterns

Since SFR-Fit uses a monitor display for the test chart, the test pattern can be changed dynamically. Using this feature, the response of AWB and AE can be measured on a timeline graph. The position, size, and duration of the color and brightness changes can be freely set, making it easy to modify the system for each vehicle camera.



Example of AE response measurement

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Feature In-vehicle Camera Resolution Measurement Software

SFR-Fit is the only measurement tool that can be used to evaluate in-vehicle cameras.

SFR-Fit is software that solves the problems of ISO 12233 resolution measurement.
By using a monitor display as the test chart and a unique chart generation algorithm, SFR-Fit enables stable MTF measurements for in-vehicle cameras.
SFR-Fit also features the ability to dynamically change test patterns, making it possible to add measurement functions that are useful for evaluating in-vehicle imaging systems.

With SFR-Fit, anyone can easily take accurate measurements.
A trial version of SFR-Fit is available now for evaluation.

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Thank you for your continued support of Leader Electronics Corporation.

Product introduction https://www.leader.co.jp/en/products/other/fs3170/

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