RAMSIS Module Cognitive

Digital ergonomics

Information perception in vehicles and traffic

Using information quickly

Drivers must focus on the road – so they have to read their instruments quickly and accurately. Where field of view and information perception meet, the requirements for visual cockpit design are high. This is where RAMSIS Cognitive helps to find the best possible solutions for your layout.

The RAMSIS module supplements the field of view analysis in RAMSIS Automotive with high levels of detail and realism. Visible areas for the driver inside and outside the vehicle are calculated and it is possible to analyse the readability of display characters and digits. RAMSIS Cognitive doesn't measure whether or not the occupants actually know the numbers and symbols or how focused they are at that moment, but it does show how well they can see the displayed information, depending of course on the display, lighting conditions, positioning and external conditions on the road.

Your advantages with RAMSIS Cognitive
> Simulates information perception in daily traffic on the digital model
> Ensures the perception of basic information
> Optimal design of cockpit displays

ERGONOMICS ANALYSIS

Optimal conditions for the perception of information

RAMSIS Cognitive is a supplementary module for RAMSIS to analyze and optimize the perception and management of information in the vehicle.

Direct and indirect vision

With the **direct vision analysis** function, you can create obscuration areas in the form of analytical geometry as seen from the perspective of the occupants. You can see the areas in the vehicle that are obscured from the direct line of vision by other areas. By analyzing the obscuration areas, not only the impact on the readability of the display can be studied, but also the obscuration of vision fields in the rearview mirror

taking in consideration geometrical objects like the headrests, passengers in the back seat or the road behind the vehicle.

Reflections in the vehicle affect the view of the instrument panel and the view to the outside. RAMSIS Cognitive helps to minimize unwanted reflection – and it also distinguishes between day reflections caused by sunlight and night reflections caused by the display backlights. Reflecting surfaces and cover plates are also taken into consideration. The **reflection analysis** in the RAMSIS Cognitive module answers your questions about the exact range of the reflection on reflective surfaces according to the course of the ray paths and the resulting shadowing effects of cover elements in the vehicle – and that reduces the number of elaborate practical experiments with mock-ups and prototypes.

With RAMSIS Cognitive's **360 degree analysis**, you can simulate the view around the vehicle, by the A, B and C pillars. Quantitative surface size can also be weighted and evaluated – and with these results, you can objectively compare the outer fields of view in different vehicle concepts.

Fig. 1: Analysis of direct vision: view of the switch obscured by the steering wheel rim

Display design

A lot of thought goes into a really good display... and RAMSIS Cognitive can do a lot of your thinking for you in this respect, because the **readability** and **minimum visual range analyses** give you the minimum character size and the minimum distance from the instrument panel. The readability quality of the LCDs in the vehicle depends on the position of the display in relation to the eye of the observer and the optical attributes of the display regarding brightness and contrast. That's why RAMSIS Cognitive geometrically visualizes the limits of the

RAMSIS Cognitive

Fig. 2: Readability analysis
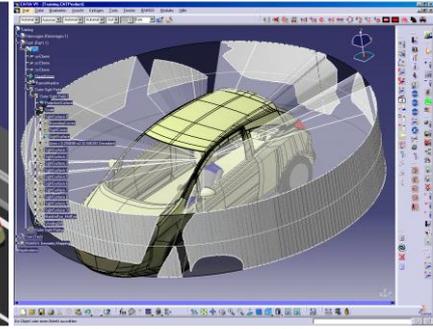

Fig. 3: Creation of a traffic scenario

Fig. 4: Analysis of the external field of view

angle of view in accordance with the specifications of the component and compares them with the eye positions of the vehicle occupants. Areas that are too close and border zones are color-marked.

In the **extended field of view limits analysis,** RAMSIS Cognitive shows the areas upon which the eyes can focus without the need for head movements. Here you can display the geometric boundaries of the optimum vision field and the maximum vision field and consequently determine the relevant location of the instruments. Particularly important displays like the speedometer must be in the centre of the optimum vision field, while less important or less frequently-used displays like the radio or air conditioning may lie at the edge of the optimum vision field or even outside of it. You still get a clear picture with RAMSIS Cognitive, even if the driver's eyesight is impaired. Two selected types of spectacles for close and long range or with bifocals function to address monocular and binocular vision are included in the program – so you can analyze the different fields of view and field of view limits regarding the position of numbers and characters.

If the information is displayed right on the windscreen, the quality of the imaging is critical. The data on a **head-up display** does lie within the driver's primary field of vision, but the display's location and size affect the degree of perception. To prevent this information from becoming a distraction, RAMSIS Cognitive has a special analysis function for head-up displays – giving you images of even the basic projection conditions from every position inside the vehicle.

Simulating the environment

If your CAD image seems a little empty, RAMSIS Cognitive will fill it up for you. You can create various **built-in traffic scenes** including roads, pedestrians, cars and motorcycles to make the view of the outside world more realistic. This makes it crystal clear just how well a curve can be seen, for example, or what happens when the gaze switches to a three-lane highway.

Vision in motion

RAMSIS Cognitive not only shows the single vision situation, it also displays the scenario when the vision is moved to a different target. The spatial position of view-relevant objects in the vehicle also affects the **duration of the vision change**, i.e. the total time needed to move the eye from the road to the instrument and the actual reception of the information. With RAMSIS Cognitive, you can calculate the time needed for the vision change in a particular situation and display it as circles around the fixation point. The program determines the duration of a vision change to a specified target based on the current line of sight – and consequently how long the driver will be distracted. The relevant numerical results are saved in a structure tree allowing you to determine the screen orientation priority by clusters.

And RAMSIS Cognitive can also give you a glimpse of the future! Thanks to **dynamic route calculation,** you can acquire the view a few seconds in advance. This shows you, for example, the people and objects that can still be reached after emergency braking at 100 km/h.

SPECIFICATION

Availability and platforms

RAMSIS Cognitive is a module for RAMSIS Automotive. And you can also import and export data in RAMSIS Cognitive, just like you can in RAMSIS Automotive.

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