ビジョンで示した将来の自動車社会を見据えたとき、カーナビの役割が、どのように変化していくのか考察して下さい。また、その際のカーナビに必要な機能とそれを実現するための必要な要素技術を述べ、そのうちの要素技術の一つについて、現在の具体的な技術開発状況を調べて整理して下さい。

My view of future navigation system change based on current version are as follow:

1, Real-time navigation information

Future navigation information should be real-time, as navigation device today need to be updated frequently to get the latest map information, SLAM, which is short for simultaneous localization and mapping, can help to accelerate the update map information. What's more, the traffic situation is also a huge factor can't be ignored when planning route. With development of Intelligent Transport Systems, Vehicle can communicate with traffic control system, road and other vehicle nearby.

2, High and stable navigation precision

As navigation system today mainly depended on satellite and strap-down inertial navigation, the precision can not meet our need all the time, especially in bad weather or driving among buildings. Then navigation should combine new navigation technology such as version navigation, which can provided a higher precision to meet our requirements in more conditions.

3, Humanize Interaction

New interaction methods should be applied, as current navigation systems' human machine interface are just touch screen and speaker. The speaker just limited information, while the screen might distracting during driving. Head-Up Display (HUD) is a good way to display technology presents data without requiring shifting focus. Which origins from pilot being able to view information looking forward instead of looking on the instruments panel. Part current HUD on vehicle focus on front windscreen, it still cause visual fatigue as driver shifting focus from infinite far to front windscreen, which need to be improved using optics technology such as Fresnel Lens in aircraft HUD. Augmented Reality (AR) technology may be the key part of real-time navigation, as it can enhance information really mattered based on reality while assisting driving. As aircraft can use HUD and sensor system without get enough version information outside the aircraft to realize taking-off and landing normally in extremely low AVR (Asset Visibility Report) situation, future vehicle can also transfer such technology to realized navigating in extremely weather.

[Fig-1 Aircraft HUD View]

[Fig-2 HUD with AR Technology]