

Autonomous driving of sign vehicles (following rotary snowplows)

Conduite autonome de véhicules de balisage (suivant des chasse-neige rotatifs)



Background

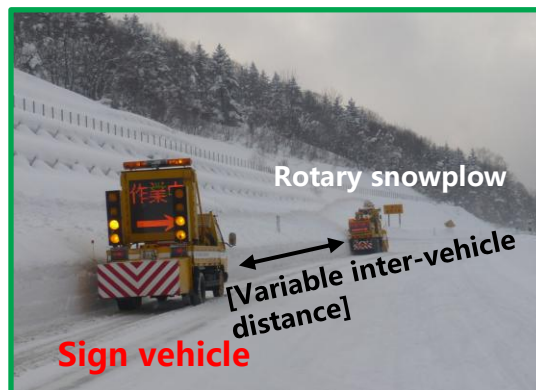
A wide variety of skilled ice operations

Declining workforce and retirement of skilled workers

[Enhancement of Snow and ice operation and further technology development efforts]

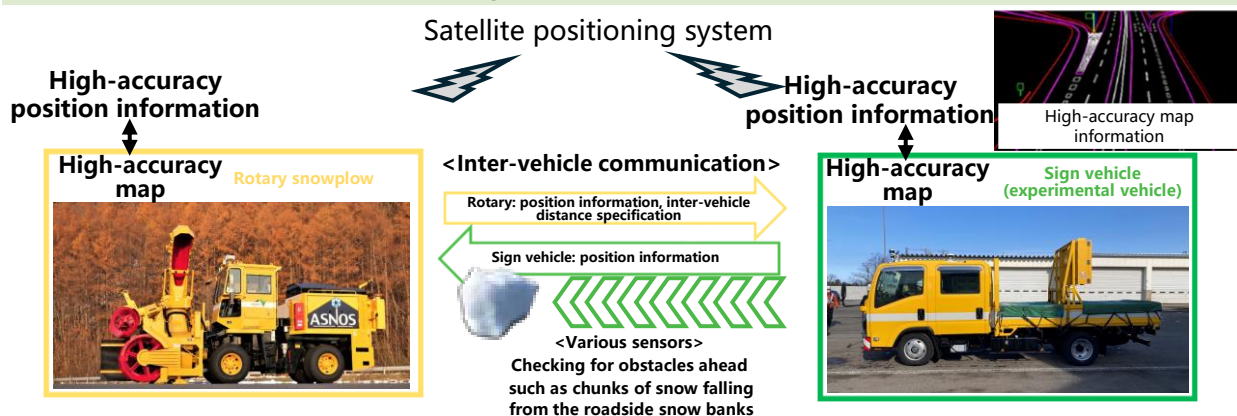


Automation of rotary snowplow operation



A technology is being developed to automate the operation of a self-driving sign vehicle following behind a rotary snowplow.

System overview



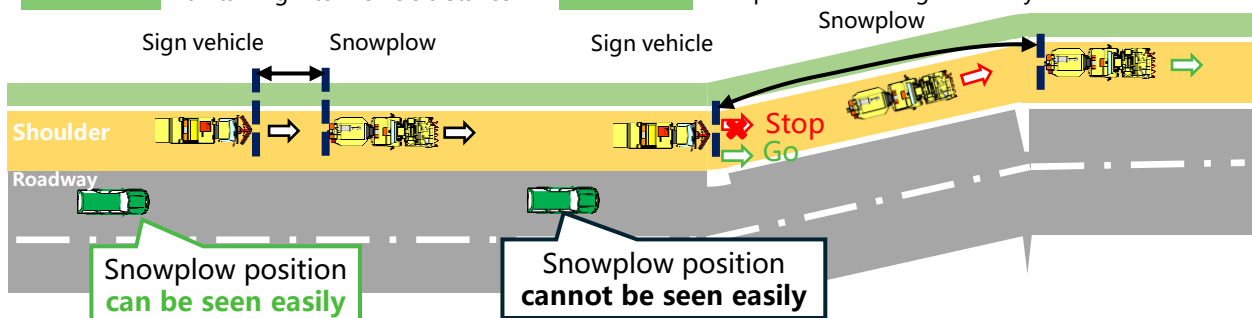
[Inter-vehicle communication] Changes the inter-vehicle distance according to road alignment.

Straight section

tracking the snowplow and enabling autonomous operation while maintaining inter-vehicle distance

Curving section

increase the following distance in low-visibility sections, and restart the sign vehicle when the snowplow enters a high-visibility section



On the roadway of an expressway



View from a trailing sign vehicle

Contributing to labor savings, efficiency improvement, and performance enhancement, this approach addresses the anticipated manpower shortage by reducing the number of operators from two to one.



Automation of Rotary Snowplows using QZSS

Automatisation des chasse-neige rotatifs utilisant le système QZSS



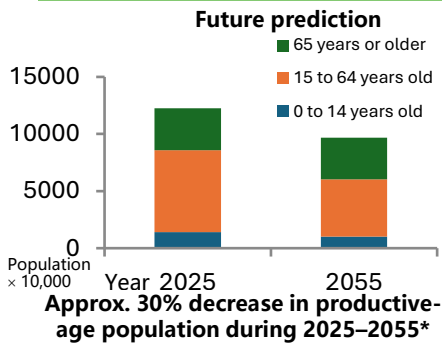
Background

A wide variety of skilled ice operations



A rotary snowplow removing snow from a low speed from the shoulder of the road

Declining workforce and retirement of skilled workers



Development of snow and ice operation technologies to carry out operations safely and reliably without depending on experienced operators in order to enhance the level, efficiency, and safety of winter road management



There are days when visibility is almost completely lost.



“Even when lane marking and roadside structures (e.g., guardrails) are not visible due to snow and blowing snow, the system identifies their positions and automates driving and snow removal.”

Safe and reliable operation is made possible.

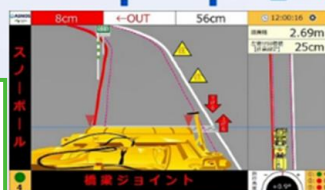
System overview

Quasi-zenith satellite system (QZSS)



High-Precision Maps

Driving Support (Monitor)



Displaying accurate position information on the monitor screen



Automation of rotary snowplow operation



Rotary snowplow in operation

Sharing position information with snowplows and automating their self-driving and snow removal operation

Contributing to labor savings, efficiency improvement, and performance enhancement, this approach addresses the anticipated manpower shortage by reducing the number of operators from two to one.

* Fig. 2-(1)-1 Changes in productive-age population in Japan and future projection, prepared from previous data (<https://www.mhlw.go.jp/stf/wp/hakusyo/roudou/21/backdata/02-01-01.html>)



Centralized Operation Control System for Snow and Ice Operation Vehicles (Integrated control panel)

Système centralisé de commande des véhicules de lutte contre la neige et le verglas (panneau de commande intégré)



Background

Diverse tasks requiring expertise
The burden of learning how to operate different types of equipment

A technology has been developed to control salt application, snowplow operation, and message board operation from a single touch panel installed in the operator's cabin.



Anti-icing agent spraying



Snowplow operation



Sign Control operation



Integrated control panel

The centralized operation system enhances operational efficiency and reduces workload.

System overview

While traveling to a registered location (concept)



Integrated control panel screen

The system keeps track of the vehicle location with the aid of GPS. The operation programmed for the registered location is started.



After arriving at the registered location (concept)



Integrated control panel screen

As the vehicle approaches the registered location, the operation to be performed in the next section is displayed on the monitor screen, and the operation is started upon arrival at the registered location.

Registered location



227.32 KP

Centralized control from the Integrated control panel leads to the standardization of snow removal operation.

→ Reduction of workload

