

# ROARS-Real-time Optimization for Adaptive Removal of Snow

ID# 2018-4798



Snow removal equipment

## Technology Summary

The snow removal industry is one of the biggest growing industries in North America. The size of the private and public snow removal markets in North America is approximately \$22.7 billion and \$4 billion, respectively. While there are many models and heuristics available on optimization of snow plowing, winter road maintenance, workforce planning and shift scheduling for snow and ice removal, none focus on the allocation of equipment in real-time to improve the service level with respect to time or cost. This technology takes into account many factors like amount of snow, obstacle scale on the roads, resource availability, etc., before optimizing the operations. Optimization includes efficient scheduling of available equipment and personnel in different areas to increase the service level and minimize the operation cost.

## Application & Market Utility

ROARS is a real-time solution for allocation of equipment and crew that encompasses all elements of the snow removal operation: weather conditions, road features, & crew/equipment capabilities. Efficient operation allows the user to make changes on the fly before allocating resources. The tool is specifically tailored to the user's operations and objectives, incorporating not only the logistics but also cost concerns associated with the allocation and scheduling solutions. Studies have shown that the tool can result in 28%-53% reduction of time for snow clearing operations.

## Next Steps

The research team seeks collaboration and licensing opportunities.

### TECHNOLOGY READINESS LEVEL

4-7

#### Seeking

Investment | Licensing | Research

#### Keywords

- snow removal
- optimization
- resource allocation
- mixed integer linear programming

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