

Concepts of Operations for Autonomous Vehicle Dispatch Operations

While remote operations centers exist for several modes of transportation—such as air traffic control, flight dispatch, and rail dispatch—limited attention has been given to the design of remote operations centers for highly automated vehicles (HAVs). This research effort describes various Concepts of Operations (CONOPs) that address how dispatch operations for traditional and HAVs could evolve in both public and private settings.

Five different concepts of operations are explored, with a focus on the CONOPs for a regional public safety dispatch center, including how the insertion of HAV tasking would likely change staffing models. A case study was developed that looked at how the arrival of HAVs could impact a regional dispatch center.

FUNCTION/CONOPS	OEM AVs (1)	Robo-Taxis (2)	Autonomous Trucks (3)	Public AVs (4)	State/Regional (5)
Communication	✓	✓	+	+	+
Resource Allocation	✓	✓	+	+	+
Navigation	✓	✓	+	+	+
Contingency Management	✓	✓	+	+	+
Monitoring	✓	✓	+	+	+
Paperwork	✓	✓	+	+	+
Training	✓	✓	+	+	+
Remote Control	✓	✓	✓	✓	(✓)
Passenger Communication	✓	✓		✓	(✓)
Fleet Management	✓	✓	+	✓	(✓)

Functions for Various Dispatcher CONOPs

A discrete event simulation that focuses on dispatcher workload yielded several models that examined both single and two-person dispatcher teams under both typical and emergency operations. These models indicated that even with minimal new tasking caused by

the arrival of HAVs, the additional workload would likely be too much for a single dispatcher, even under a normal operational tempo, and so an additional dispatcher would likely be needed.

It was further demonstrated that in order to ensure dispatchers had enough to do and would not be bored and distracted, in this specific regional dispatch center example, it would be better for dispatchers to share tasks instead of one focusing on typical tasks and one specializing in HAVs. While there would likely be additional training costs including possibly refresher training, the case study demonstrated that teams of two dispatchers sharing tasks provide a level of robustness to emerging events and could prevent workload from rising at untenable rates.

Going forward, companies and government agencies should start developing such models, understanding that they can only provide broad estimates for future operational needs. It is critical that agencies share best practices as well as data from such models and actual operations so that the entire surface transportation network can benefit.

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