Part 573 Safety Recall Report   22E-016

Manufacturer Name :	Pony.ai
Submission Date :	OCT 06, 2022
NHTSA Recall No. :	22E-016
Manufacturer Recall No. :	NR

NHTSA
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION

Manufacturer Information :

Manufacturer Name :	Pony.ai
Address :	3501 Gateway Blvd Fremont CA 94538
Company phone :	9513840

Population :

Number of potentially involved :	3
Estimated percentage with defect :	100 %

Equipment Information :

Brand / Trade 1 :	Pony.ai, Inc.
Model :	Pony.ai ADS software release _v2_20210712_ and subsequent versions through _v2_20210920_RC38_, and v2_20211004_
Part No. :	_v2_20210712 et seq.
Size :	NR
Function :	NR
Descriptive Information :	The subject population includes Pony.ai Automated Driving System ("ADS") with software release _v2_20210712 and subsequent versions through_v2_20210920_RC38, and v2_20211004. At the time of the incident described in the chronology, this totaled 3 ADS units. The recall population was determined through a review of software release records.
Production Dates :	JUL 09, 2021 - OCT 28, 2021

Description of Defect :

Description of the Defect :	In a very rare combination of circumstances, one planning system diagnostic check could generate a "false positive" indication of a geolocation mismatch.
FMVSS 1 :	NR
FMVSS 2 :	NR
Description of the Safety Risk :	An ADS shutdown while the vehicle is moving could increase the risk of a collision.
Description of the Cause :	Former versions of certain ADS software included geolocation diagnostic coding that in rare circumstances could incorrectly interpret small floating-point number rounding errors (or "discrepancies"). As a result, it was possible that one specific diagnostic matching function could incorrectly interpret an inconsequential rounding discrepancy as a geolocation mismatch. During a test run, a Pony.ai AV was running a geolocation diagnostic check when a very

rare combination of factors and conditions generated a floating-point rounding discrepancy that the diagnostic check misinterpreted as a location mismatch. This error caused the diagnostic check to shut down the ADS. That shutdown led to a single vehicle collision with a small street sign on the median and related damage to the vehicle, but no other property damage and no injuries.

Identification of Any Warning that can Occur : NR

Involved Components :

Component Name : NR

Component Description : NR

Component Part Number : NR

Supplier Identification :

Component Manufacturer

Name : NR

Address : NR

NR

Country : NR

Chronology :

Pony.ai, Inc., founded in 2016, is an autonomous driving system ("ADS") developer. It does not presently manufacture for sale, sell, lease, or commercially use its ADS or vehicles equipped with an ADS. It purchases FMVSS-compliant vehicles, installs its ADS and uses those ADS-equipped vehicles (AVs) solely for its own research, development, and testing. Pony.ai's ADS and AVs have not crossed state lines, and the AVs operate entirely and exclusively within the State of California, pursuant to testing permits issued by the State of California.

October 28, 2021: During an AV test run in Fremont, CA, a Pony.ai ADS geolocation diagnostic check erroneously classified floating-point number rounding errors as a geolocation mismatch. There was no location mismatch, but the diagnostic check misinterpreted operationally immaterial floating point number rounding errors. This resulted in a "false positive" determination of a geolocation mismatch, which caused the ADS to shut down.

Less than 2 ½ seconds after the ADS shutdown, the vehicle's momentum caused it to collide with a street sign on the median. There were no injuries or other property damage due to the collision. That evening, Pony.ai

revised the relevant ADS code to correct the coding error and eliminate potential misdiagnosis of floating-point number rounding errors.

November 5: A new binary with the corrected software code replaced binary _v2_20212009_RC38 as the live version for future driverless testing.

February 24, 2022: NHTSA advised Pony.ai that it believed Pony.ai's ADS had a safety defect and requested that Pony.ai file a 49 CFR Part 573 defect report. Pony.ai ne with a street sign on the median. There were no injuries or other property damage due to the collision. That evening, Pony.ai revised the relevant ADS code to correct the coding error and eliminate potential misdiagnosis of floating-point number rounding errors.

Description of Remedy :

Description of Remedy Program :	Pony.ai revised the relevant lines of code in the geolocation diagnostic check to correctly interpret floating-point rounding errors. On November 5, 2022, Pony.ai completed a new binary with the corrected code, to be used in future driverless testing.
How Remedy Component Differs from Recalled Component :	The geolocation diagnostic code now correctly interprets floating-point rounding errors.
Identify How/When Recall Condition was Corrected in Production :	See chronology.

Recall Schedule :

Description of Recall Schedule :	The remedy has already been completed throughout the potentially affected software code population. That code is developed and used only in Pony.ai's ADS, which in turn is used exclusively in Pony.ai's non-commercial, privately owned, never-offered-for-sale, research and development vehicles.
	Pony.ai is the sole owner and possessor of the affected ADS and the vehicles into which that ADS has been integrated. Pony.ai has not sold, offered for sale, introduced or delivered for introduction to interstate commerce the affected ADS. The ADS software has never been transported beyond Pony.ai's direct control. That ADS and Pony.ai's autonomous test vehicles are developed and tested entirely intra-state in California.
	Since Pony.ai, the sole owner of the affected ADS, is aware of the coding

error, and remedied that error in October 2021, there are no other owners to notify. Pony.ai has satisfied any owner notification obligations.

Planned Dealer Notification Date : NR   - NR
Planned Owner Notification Date : NR   - NR

Purchaser Information :

The following manufacturers purchased this defective/noncompliant equipment for possible use or installation in new motor vehicles or new items of motor vehicle equipment:

Name : NR
Address : NR
NR
Country : NR
Company Phone : NR

* NR - Not Reported