

# International LT-series and the International-Navistar CataliST DOE SuperTruck

Peter Lobner, 2 April 2020

## Introduction

With a market share of 13.7% in December 2019, International (<https://www.internationaltrucks.com>) is the fourth largest manufacturer of Class 8 tractor-trailers for the North American market. International is owned by Navistar International. The International flagship Class 8 truck is known as the LT-series. International led one of the teams that participated in the DOE SuperTruck I program, which was conducted from 2010 to 2016. Their SuperTruck I test truck is known as the CataliST. The International-led team is continuing their participation in SuperTruck II, which runs from 2017 to 2022.

## LT-series

The LT-series is the current flagship of International's Class 8 heavy truck product line.



*International LT-series tractor with a Skyrise sleeper cab.  
Source: International / Navistar*

International summarizes their aero package as follows: “We improved the aerodynamic contours of the hood, fenders, wheel openings and chassis skirts. We minimized trim and sealed portions of the hood. A new aero-enhanced three-piece bumper and contoured pedestal mirrors complete the profile.”



*International LT-series tractor aerodynamics illustrated.  
Source: International / Navistar*

You'll find a more complete description of aerodynamic refinements on the International Class 8 trucks here:  
<https://www.internationaltrucks.com/blog/fuel-economy-aerodynamics>

## CataliST SuperTruck

The CatalisST SuperTruck prototype, which was developed under DOE's SuperTruck I project, is a much more refined vehicle than the LT-series production-model trucks.



*CataliST SuperTruck.*

*Source: Both photos, FleetOwner.com, 26 October 2016*



*CataliST SuperTruck.  
Source: Both photos, FleetOwner.com, 26 October 2016*



*CataliST SuperTruck showing the slotted side skirts and the rear boat-tail (flow convergence device).*

*Source: Both photos, FleetOwner.com, 26 October 2016*

At the conclusion of SuperTruck I, International reported that the CataliST met all SuperTruck I goals: “Against a 2009 base line model truck, CataliST achieved fuel efficiency of 13 miles per gallon and demonstrated 50.3 percent Brake Thermal Efficiency (BTE) and a path towards 55 percent BTE.” International also reported that technology innovations achieved through the program already are being implemented in production vehicles.

Lawrence Livermore National Laboratory (LLNL) is a member of the Navistar/International SuperTruck I and II teams, with a primary responsibility for CFD (computational fluid dynamics) analysis. The LLNL team reported,

“...with the aid of experiments and computer simulations (the LLNL team) have developed new generic highly aerodynamic body shapes called Generic Speed Form (GSF) to significantly reduce drag. Aerodynamic drag is caused from pressure differences around the vehicle. Major contributors to the drag are: the gap between tractor and trailer, the vehicle underbody and trailer wake. The LLNL GSF shapes have demonstrated a breakthrough in aerodynamic performance of heavy vehicles.

The (LLNL) team, in collaboration with Navistar, has performed scaled and full-scale tests at the Army's 7-foot by 10-foot wind tunnel and the Air Force's 80-foot by 120-foot wind tunnel at the National Full-Scale Aerodynamics Complex (NFAC) located at NASA Ames Research Center."

You can read more about the CataliST SuperTruck in the following sources:

- SuperTruck I presentation: "Development and Demonstration of a Fuel-Efficient Class 8 Tractor & Trailer Vehicle," 12 June 2015, on the DOE website at the following link:  
[https://www.energy.gov/sites/prod/files/2015/07/f24/vss064\\_zukouski\\_2015\\_o.pdf](https://www.energy.gov/sites/prod/files/2015/07/f24/vss064_zukouski_2015_o.pdf)
- Article by Kevin Jones, "Up Close: Navistar CataliST SuperTruck," FleetOwner.com, 26 October 2016:  
<https://www.fleetowner.com/equipment/media-gallery/21694759/up-close-navistar-catalist-supertruck/slideshow?slide=15>
- Article: Anne Stark, "Lab developed aerodynamic devices improve tractor trailer fuel efficiency," LLNL, 8 May 2017:  
<https://www.llnl.gov/news/lab-developed-aerodynamic-devices-improve-tractor-trailer-fuel-efficiency>
- Article by Jason Cannon, "Test drive: International's CataliST Super Truck," 18 July 2017, at the following link:  
<https://www.ccjdigital.com/international-catalist-super-truck/>
- "Final Scientific/Technical Report For SuperTruck Project: Development and Demonstration of a Fuel - Efficient, Class 8 Tractor & Trailer Engine System," Navistar, Revised March 2018: <https://www.osti.gov/servlets/purl/1460104>
- SuperTruck II presentation: "Development and Demonstration of a Fuel-Efficient Class 8 Tractor & Trailer SuperTruck," 11 – 13 June 2019, on the DOE website at the following link:  
[https://www.energy.gov/sites/prod/files/2019/06/f63/ace103\\_%20Zukouski\\_%202019rev\\_o\\_5.22\\_10.01am\\_jl\\_0.pdf](https://www.energy.gov/sites/prod/files/2019/06/f63/ace103_%20Zukouski_%202019rev_o_5.22_10.01am_jl_0.pdf)

You'll find an interview with Navistar's Chief Technical Engineer for Advanced Technology, Dean Oppermann, in the YouTube video "Check Out The NAVISTAR Super Truck! - Wrenchin' Up," (6:44 minutes) at the following link:

<https://www.youtube.com/watch?v=wqFTWLF40k8>