



New Flyer unveils the Xcelsior AV™ – North America's first automated transit bus

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Level 4 automated bus highlights New Flyer's dedication to innovation and the strength of its partnership with Robotic Research

St. Cloud, Minnesota, USA – January 29, 2021: (TSX: NFI) New Flyer of America Inc. ("New Flyer"), a subsidiary of NFI Group Inc. ("NFI"), one of the world's leading independent global bus manufacturers, today unveiled its Xcelsior AV™ automated transit bus, now in motion at Robotic Research, LLC ("Robotic Research") in Maryland.

The Xcelsior AV™ unveiling follows New Flyer's launch of its Automated Technology Program [first announced in May 2019](#), and the subsequent announcement of partnership with artificial intelligence and automation leader Robotic Research [also announced in May 2019](#).

New Flyer and Robotic Research developed the Xcelsior AV™ – North America's first fully operational heavy-duty automated transit bus – to harness the zero-emission power of New Flyer's Xcelsior CHARGE™ battery-electric propulsion while integrating advanced driver-assistance systems ("ADAS") technology to meet Society of Automotive Engineers ("SAE") Standard J3016 Level 4 technology with the automated vehicle ("AV").

"Our Xcelsior AV represents the anticipated future of safety in public transit and the latest leap forward for New Flyer. We committed to building an automated transit bus and within five years, we've delivered an industry-changing vehicle. The technology is real and it's here," said Chris Stoddart, President, New Flyer and MCI. "In the future, we expect fleets of automated buses to improve road safety and with the potential to shorten commute times, increase energy efficiency, and reduce congestion. As standards and regulations are developed and implemented and automated buses are deployed across North America, we expect our Xcelsior AV to enable meaningful improvements in the public transit user experience, which will hopefully lead to increased ridership. Together with Robotic Research, we are leading clean, accessible, reliable mobility that's safer for all."





Robotic Research is a privately held, U.S.-based innovative engineering and technology company providing software, robotic technology, and automated solutions to commercial and government customers. Its testing facilities are located in Gaithersburg and Clarksburg, Maryland.

"Autonomous technology is not only expected to increase the safety of transit, but is also anticipated to increase the throughput and utilization of vehicles. Automated buses have the potential to improve traffic patterns and reduce stop-and-go traffic, benefiting not only the users of mass transportation, but the whole infrastructure," said, Alberto Lacaze, President of Robotic Research. "New Flyer just introduced the missing piece of a fully integrated, smart transportation solution. This vehicle unlocks a new era of Transportation as a Service, leveraging technological advancements across industries to create a safer, cleaner, more efficient, and more accessible transportation solution for the public."

Xcelsior AV™ capabilities are made possible by two primary technologies. The first is AutoDrive®, Robotic Research's self-driving technology, serving as the "eyes and brain" of the autonomous system and processing the world surrounding the bus, including mapping the environment, making decisions, and navigating the route. The second is Robotic Research's AutoDrive ByWire™ (drive-by-wire system), serving as the "hands and feet" of the automated system and controlling the steering, braking, and throttle, ultimately operating bus movement on its route. This AV technology delivers several capabilities that are expected to be leveraged in making the mobility experience safer. These system capabilities include:

- Visualizing the environment: the bus can visualize its current environment using sensors (such as LIDARs, radars, and cameras) that create a three-dimensional model of the world to navigate through.
- Pedestrian detection and avoidance: the bus can detect the presence of a pedestrian and adjust course to avoid.
- Vehicle detection: the bus uses 360° sensors to detect the presence of other vehicles, responding with course adjustment as appropriate.
- Precision docking: the bus is maneuvered precisely to allow for level boarding from the bus platform for passengers with accessibility needs.
- Vehicle-to-Vehicle (or "V2V"): the bus has the ability to communicate directly with other vehicles, which allows safe platooning.
- Vehicle-to-Infrastructure (or "V2I"): the bus communicates with signalized intersections or other infrastructure-based alerts, such as pedestrian and vehicle alerts (e.g. "Beacon Sense™"). These features will also assist in improving bus depot safety, efficiency and space usage through features such as self-parking, fueling and cleaning.
- Day or night operation: the bus is fully capable of operating day or night, regardless of lighting or weather events, based on its defined Operational Design Domain (or "ODD").
- Safe and redundant system: the bus is capable of running when GPS is unavailable – responding to real-time data and events as they occur, instead of relying only on pre-mapped routes, buildings, and infrastructure.
- Performance analytics: the bus is integrated with nSight end-to-end data collection to analytics technology, lending deep insight on bus performance and its interaction with other vehicles and infrastructure through its route and operation.

The Xcelsior AV™ furthers the Federal Transit Administration ("FTA") Strategic Transit Automation Research Plan to assess potential risks, barriers, and mitigation strategies associated with the implementation of automation technologies in transit buses. In 2020, New Flyer announced [North America's first deployment of automated transit buses](#), into revenue service, in a pilot project with the Connecticut Department of Transportation funded by the FTA's Integrated Mobility Innovation initiative, supporting projects demonstrating innovative and effective practices to enhance public transportation effectiveness, efficiency, quality, safety, and transit rider experience.

According to the National Highway Traffic Safety Administration^[1], AVs offer fourfold potential benefits:

- Economic and societal: AVs save \$242 billion in costs incurred by motor vehicle crashes, including \$57.6 billion in lost workplace productivity, and \$594 billion due to loss of life and decreased quality of life due to injuries;
- Safety: AVs improve safety and use ADAS technology to avoid collisions – of which 94% of serious crashes are caused by human error;
- Efficiency and convenience: roads filled with AVs could smooth traffic flow and reduce traffic congestion, freeing up to 50 minutes per day of non-driving; and
- Mobility, accessibility, and jobs: studies suggest that AVs could create new employment opportunities for approximately two million people with disabilities.

To explore what Xcelsior AV™ technology can offer your city, and to start shaping a safer, more accessible future visit www.newflyer.com/AV. In addition to detailed product specifications, the site also features information on standards development and insight on long-term technology planning.

New Flyer has been leading innovation in mobility for 90 years, and today supports growing North American cities with sustainable buses, technology, and infrastructure. It also operates the [Vehicle Innovation Center](#), the first and only innovation lab of its kind dedicated to advancing bus technology and providing essential workforce development through electric bus training, now available online.

About NFI

Leveraging 450 years of combined experience, NFI is leading the electrification of mass mobility around the world. With zero-emission buses and coaches, infrastructure, and technology, NFI meets today's urban demands for scalable smart mobility solutions. Together, NFI is enabling more livable cities through connected, clean, and sustainable transportation.

With 8,000 team members in ten countries, NFI is a leading global bus manufacturer of mass mobility solutions under the brands New Flyer® (heavy-duty transit buses), MC® (motor coaches), Alexander Dennis Limited (single and double-deck buses), Plaxton (motor coaches), ARBOC® (low-floor cutaway and medium-duty buses), and NFI Parts™. NFI currently offers the widest range of sustainable drive systems available, including zero-emission electric (trolley, battery, and fuel cell), natural gas, electric hybrid, and clean diesel. In total, NFI supports its installed base of over 105,000 buses and coaches around the world. NFI common shares are traded on the Toronto Stock Exchange under the symbol NFI. News and information is available at www.nfigroup.com, www.newflyer.com, www.mccoach.com, www.arbocsv.com, www.alexander-dennis.com, and www.nfi.parts.

About New Flyer

New Flyer is North America's heavy-duty transit bus leader and offers the most advanced product line under the Xcelsior® and Xcelsior CHARGE™ brands. It also offers infrastructure development through New Flyer Infrastructure Solutions™, a service dedicated to providing safe, sustainable, and reliable charging and mobility solutions. New Flyer actively supports over 35,000 heavy-duty transit buses (New Flyer, NABI, and Orion) currently in service, of which 8,600 are powered by electric motors and battery propulsion and 1,900 are zero-emission. Further information is available at www.newflyer.com.

Forward-Looking Statements

This press release may contain forward-looking statements which reflect the expectations of management regarding New Flyer's and NFI's strategic initiatives, plans, business prospects and opportunities, including the future existence and growth of a market for autonomous transit vehicles and the economic, efficiency and safety benefits arising therefrom. The words "believes", "views", "anticipates", "plans", "expects", "intends", "projects", "forecasts", "estimates", "guidance" and "targets", "may", "will", and similar expressions, are intended to identify forward looking statements.

Although the forward-looking statements contained in this press release are based upon what management believes to be reasonable assumptions, investors cannot be assured that actual results will be consistent with these forward-looking statements, and the differences may be material. Actual results may differ materially from management expectations as projected in such forward-looking statements for a variety of reasons, including, market and general economic conditions and economic conditions of and funding availability for customers to purchase autonomous (or automated) vehicles; autonomous technology currently in existence has not yet been fully developed and tested for use in transit vehicle applications; autonomous vehicle regulations and standards have not yet been developed and implemented to permit fully autonomous transit vehicles to be operated in revenue service; the Xcelsior AV™ is a prototype vehicle which is currently being tested on a closed course and thereafter in limited revenue service and therefore the gathering and review of operational and safety data are still in early stages and is not complete; there may not be sufficient customer demand for autonomous transit vehicles, including the Xcelsior AV™, or at all, in order to commence or maintain manufacturing for such products; the expected economic, efficiency improvements and safety benefits described in this release for the communities, customers and passengers that operate and ride on autonomous transit vehicles may not be as great as those anticipated or may not be realized at all; and the other risks and uncertainties discussed in the materials filed with the Canadian securities regulatory authorities and available on SEDAR at www.sedar.com. Due to the potential impact of these factors, NFI disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, unless required by applicable law.

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[\[1\] NHTSA Benefits of Automation](#)