

Safety & Technology OVERVIEW & GLOSSARY

FCA Canada: Proliferating Advanced Driver-Assist Technologies

- **Forward Collision Warning with Active Braking, capable of bringing vehicle to full stop, migrates to new 2016 Jeep® Grand Cherokee and Dodge Durango**
- **System combines radar and camera technologies, a strategy once reserved for luxury brands**
- **Redundancy affords greater precision; resulting protocol – detect, *confirm*, activate**

FCA Canada puts the forwardness in Forward Collision Warning by continuing the technology's proliferation.

Forward Collision Warning with Active Braking, the most advanced system of its kind offered by FCA Canada, will be available on new-for-2016 versions of the acclaimed Dodge Durango and the iconic Jeep® Grand Cherokee, the most-awarded SUV of all time. The system also is available on six additional vehicles, including the Jeep Renegade, on which the advanced feature was a segment-first application.

Forward Collision Warning with Active Braking leverages the attributes of radar and camera technologies – an innovation once reserved for luxury-brand vehicles.

"We are committed to the democratization of advanced safety technologies," says Scott Kunselman, Senior Vice President – Vehicle Safety and Regulatory Compliance. "This strategy is consistent with our vigilance on behalf of customers."

Adds Kunselman: "Third-party organizations are often referred to as 'safety advocates.' And we applaud their enthusiasm. But our engineers also account for a deep share of knowledge, expertise and passion. In our science labs and on our test tracks, we advocate for customer safety every day."

Forward Collision Warning with Active Braking, which helped the 2015 Chrysler 200 achieve Top Safety Pick+ status in rankings determined by the U.S. Insurance Institute of Highway Safety, doesn't just detect potential frontal collision conditions. It detects, then confirms before activation occurs. Confirmation occurs when the two technologies – radar and camera – agree that an obstacle is present, consistently outperforming those systems that employ singular solutions to object-detection.

When Forward Collision Warning with Active Braking activates, it pre-fills the vehicle's brakes and transmits audible and visual warnings for the driver to intervene. No driver response triggers brief brake application as a tactile alert.

If the driver remains unresponsive and the frontal collision risk remains, braking occurs autonomously to slow the vehicle and reduce an impact's severity. However, the system may bring the vehicle to a full stop if a frontal collision appears imminent at speeds below 40 km/h.

For model-year 2016, Forward Collision Warning with Active Braking is available on:

- **Chrysler 200**
- **Chrysler 300**
- **Dodge Charger**
- **Dodge Durango**
- **Jeep Cherokee**
- **Jeep Grand Cherokee**
- **Jeep Renegade**
- **Fiat 500X**

The following is a comprehensive glossary of key safety, security and advanced-technology features on 2016 FCA Canada vehicles:

Driver warning and assist, chassis control and brake systems

1. **Advance Brake Assist:** Works with Forward Collision Warning with Active Braking; increases deceleration if driver does not apply brake with sufficient force to respond to collision condition
2. **Adaptive Cruise Control with Stop:** Helps maintain distance from vehicle ahead; under certain traffic conditions, system can bring vehicle to full stop without driver intervention
3. **All-Speed Traction Control System:** While driving, helps keep wheels from spinning during acceleration from a stop or at speed by applying brakes alone or in combination with engine torque limitation
4. **Anti-lock brake system:** Senses and prevents wheel lockup, offering improved steering control under extreme braking and/or slippery conditions

5. **Blind-Spot Monitoring:** Uses radar sensors to aid driver when changing lanes, passing or being passed; blind-spot vehicle presence noted via illuminated icons in side-view mirrors and driver-selectable audible chime
6. **Brake Assist:** System applies maximum braking power in emergency braking situations, minimizing stopping distance
7. **Brake-lock differential system:** Allows the vehicle to maintain forward motion if one or two wheels lose traction by selectively and aggressively applying brakes to the spinning wheels
8. **Brake-throttle override:** Standard-equipment on every FCA Canada vehicle, it allows driver to stop the vehicle when throttle and brake inputs occur simultaneously; electronic throttle control also reduces engine-power output
9. **Brake/park interlock:** Prevents transmission from being shifted out of “Park” unless the brake pedal is pushed
10. **Brake traction-control system:** Helps to keep wheels from spinning during acceleration from a stop or during slow speeds by applying individual brakes to the slipping wheel(s)
11. **Electronic brake-force distribution:** Optimizes stopping distances and control under all vehicle loading conditions by regulating braking pressure, front-to-rear
12. **Electronic Roll Mitigation:** Uses input from Electronic Stability Control (ESC) sensors to anticipate potential rollover conditions; applies brakes individually and modulates the throttle position to help driver maintain control
13. **Electronic Stability Control:** Enhances directional control and stability of vehicle in various driving conditions; activation occurs when steering wheel angle differs inconsistent with vehicle; automatically reduces throttle input and/or selectively deploys brakes to counteract oversteer or understeer
14. **Forward Collision Warning with Active Braking:** Radar and camera technology combine to determine if frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for driver to intervene; no driver response triggers brief brake application as tactile alert; if driver remains unresponsive and frontal collision risk remains, brakes are applied to slow vehicle before impact; system may bring vehicle to full stop if imminent frontal collision detected at speeds below 40 km/h
15. **Forward Collision Warning:** Radar determines if a frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for driver to intervene

16. **Hill-Start Assist:** Assists drivers when starting from a stop on a hill; maintains brake pressure for short period of time after driver's foot is removed from the brake pedal; if throttle is not applied within short period of time thereafter, brake pressure will be released
17. **Lane Departure Warning with Lane Keep Assist:** Alerts and assists driver; leverages electric power steering (EPS) to deliver subtle steering-wheel input when system detects need for course correction
18. **Parallel and Perpendicular Park Assist:** Features ultrasonic sensors on the bumper to find and guide the driver into an open parking space; guidance system automatically controls the steering angle while driver controls gear position, brake, and accelerator; parallel parking possible on either side of the car; to accommodate perpendicular parking, vehicle is backed into the space
19. **ParkSense® Rear Park Assist Systems:** In reverse, at low speeds, ultrasonic sensors detect stationary objects; if imminent collision is detected, systems with the available Active Braking capability will provide momentary, autonomous brake pulse; below 7 km/h, system will bring vehicle to a stop before releasing
20. **ParkView® Rear Back-Up Camera:** Provides wide-angle view of area immediately behind vehicle, giving driver greater peace of mind before reversing; available dynamic grid lines aid driver when manoeuvring into parking spaces or narrow areas; also assists when lining up trailer to vehicle's hitch, when so equipped; image displayed on the touchscreen when the transmission is shifted into Reverse
21. **Rain Brake Support:** In rainy conditions, occasionally pushes brake pads lightly against brake rotors to keep rotors dry
22. **Ready Alert Braking:** Anticipates situations when driver may initiate an emergency brake stop and uses ESC pump to set brake pads against rotors, decreasing time required for full brake application
23. **Rear Cross-Path detection:** In parking-lot situations, warns drivers of lateral traffic when backing out of parking spaces; automatically activates any time a vehicle is in reverse gear; driver alerted of approaching vehicle(s) via illuminated icons on side-view mirrors and driver-selected audible chime
24. **Trailer-sway Control:** Uses input from Electronic Stability Control sensors to anticipate potential trailer-induced yaw conditions; applies brakes individually and modulates throttle to help driver maintain control

Occupant restraint technology

1. **Active head restraints:** Deploy during collision; designed to help reduce injuries by minimizing gap between occupant's head the head restraint
2. **Advanced multistage driver and front-passenger air bags:** Inflate with force appropriate to the severity of the impact; meet FMVSS 208 advanced air bag requirements for smaller, out-of-position occupants
3. **All-row, full-length side-curtain air bags:** Extend to all outboard front- and rear-seat passengers; housed in headliner above side windows, each side air bag has its own impact sensor that triggers deployment on the side of the vehicle where impact occurs
4. **BeltAlert:** Activates chime and/or illuminates icon in instrument cluster to remind driver and front passenger to buckle up if vehicle is driven without belted front-seat occupants
5. **Child seat anchor system:** LATCH (Lower Anchors and Tethers for Children) designed to ease installation of compatible aftermarket child seats
6. **Constant-force retractors:** Regulates force exerted on occupant by seat belt, then gradually releases webbing in controlled manner
7. **Front seat-belt pretensioners:** During a collision, impact sensors initiate front seat-belt pretensioners to remove slack in the seat-belt system, thereby reducing the forward movement of the occupant's head and torso
8. **Front-seat-mounted side pelvic thorax bags:** Help provide enhanced protection to driver and front passenger in certain impacts; each side air bag has its own impact sensor that triggers deployment on side where an impact occurs
9. **Driver's-side knee blocker air bag:** Deploys with advanced multistage driver air bag; located below instrument panel, device designed to properly position occupant during impact
10. **Height-adjustable seat belts (front-row):** Outboard seat belts feature height adjustment, allowing for seat belt to be placed in optimal position for any driver
11. **Occupant restraint controller:** Detects impact and determines if air bag deployment, and degree of deployment is appropriate; also deploys front seat-belt pretensioners

Structural systems

1. **Energy-absorbing steering column:** Manual-adjust steering column features two hydroformed coaxial tubes that move relative to each other to allow for enhanced energy absorption during an impact; power-adjust steering column employs a calibrated bending element that deforms during column stroke for optimal energy management
2. **Front and rear crumple zones:** Specially formed structural members that crumple and absorb energy in a collision, helping protect the occupant cabin
3. **Laminated glass:** Plastic sandwiched between glass panes to provide added strength; discourages break-ins
4. **Safety cage body structure:** Helps protect occupants by managing and controlling energy in the event of an impact
5. **Side-guard door beams:** Reinforcement beams inside the doors that help provide occupant protection in certain side collisions

Lighting and visibility systems

1. **Active turn signals:** Turn signal flashes three times when stalk is depressed for one second
2. **Auto-adjust-in-Reverse exterior mirrors:** Side-view mirrors automatically adjust to accommodate rear view when vehicle shifted into Reverse
3. **Auto-dimming rearview mirror:** Auto-dimming mirror automatically reduces glare from bright light allowing driver to have a clearer view of the road ahead
4. **Automatic defog:** Automatic temperature control system measures interior humidity and activates defogging system without driver intervention
5. **Automatic headlamps:** Headlamps turn on and off automatically depending on exterior light levels and if windshield wipers are operating
6. **Automatic high-beam headlamps:** Headlamp system adjusts to ambient light and oncoming traffic to deliver maximum lighting
7. **Daytime running lamps:** Low-intensity halogen or signature LED lights that illuminate during daytime conditions, increasing vehicle's visibility to other drivers
8. **Enhanced Accident Response System (EARS):** Makes it easier for emergency personnel to see and reach occupants in the event of an accident by turning on the interior lighting and unlocking doors after air bag deployment; also shuts off flow of fuel to the engine

9. **Heated windshield washer nozzles:** Delivers heated washer fluid to more efficiently clear windshield in inclement weather
10. **High-intensity discharge (HID) headlamps:** Provide approximately three times the light output than conventional reflector lamps
11. **Halogen infrared reflecting bulbs (HIR):** Unique component coating delivers greater light output than conventional bulbs
12. **LED fog lamps:** Provide improved illumination during inclement weather
13. **LED taillamps:** Provide dual-function illumination (brake, stop, turn and running light functions); light-emitting diode technology ensures light output is consistent throughout the taillamp
14. **Rain-sensing windshield wipers:** A driver convenience feature that automatically senses moisture on the windshield and activates wipers

Other features

1. **Auto-reverse sunroof:** Automatically reverses when it senses an obstruction while closing
2. **Auto-reverse windows:** Automatically reverses when it senses an obstruction while closing
3. **Capless fuel-filler door:** Enables fuel-filling simplicity
4. **Child-protection rear door locks:** Disables rear doors' inside-release handle by adjusting a small lever opposite the doorjamb
5. **Electronic locking fuel filler door:** Prevents theft or tampering, which can lead to damage, inefficiency and unwanted fuel vapour release
6. **Express up/down windows:** One-touch express up/down window button located on the front driver and passenger-side door
7. **Intelligent battery sensor:** Continually measures flow of current into and out of battery; if battery is running low, system shuts off less-critical electrical systems to conserve power; icon in cluster denotes activation
8. **Inside emergency trunk-lid release:** Glow-in-the-dark handle enables unlocking from inside trunk
9. **Keyless Enter 'n Go™ with proximity entry:** Electronic sensors detect if unique vehicle key fob is present, which enables passive cabin entry and trunk access; illuminates interior lamps and enables push-button ignition – no need to insert key

10. **Remote keyless entry:** Locks and unlocks doors and turns on interior lamps. If vehicle is equipped with security alarm, remote also arms and disarms system
11. **Remote start:** Fob-activated convenience; starts engine and activates interior climate settings while maintaining vehicle security
12. **Sentry Key[®] antitheft engine immobilizer:** Utilizes engine key with embedded transponder and preprogrammed security code to discourage vehicle theft; when key is inserted into the ignition, controller sends a random number to the transponder and engine is allowed to start; engine will shut off after a few seconds if an incorrect key is used
13. **Speed-Sensitive Door Locks:** System automatically locks doors when vehicle acceleration reaches prescribed threshold
14. **Tilt-and-telescoping steering column:** Allows steering column to tilt and move toward or away from the driver to achieve a safe and comfortable distance from the advanced multistage front driver air bag, if deployed
15. **Tire-pressure monitoring (TPM) system:** Informs driver when tire pressure is too low; pressure-sensor modules within valve stems of all four wheels send continuous radio-frequency signals to a receiver; available systems use graphic display to indicate tire-specific pressure
16. **Voice Command:** Voice-recognition technology enables hands-free control of a variety of systems and functions including radio and available navigation
17. **Hands-free communication with Bluetooth[®]:** Voice-recognition technology enables drivers to use Bluetooth-enabled phones while keeping their hands on the wheel and eyes on the road
18. **Ultrasonic and anti-tilt security system:** Standard security system that uses ultrasonic waves to detect movement in the cabin; alarm also will sound if vehicle is tilted, as happens in towing or when a wheel is removed

About FCA Canada

Founded as the Chrysler Corporation in 1925, FCA Canada Inc. is based in Windsor, Ontario, and celebrates its 90th anniversary in 2015. FCA Canada Inc. is a wholly owned subsidiary of FCA US LLC, a member of the Fiat Chrysler Automobiles N.V. (FCA) family of companies. FCA Canada has approximately 440 dealers and markets Chrysler, Jeep, Dodge, Ram and FIAT brands as well as the SRT performance vehicle designation. The company also distributes the Alfa Romeo 4C model and Mopar products. In addition to its assembly facilities, which produce the Chrysler Town & Country, Dodge Grand Caravan (Windsor), Chrysler 300, Dodge Charger and Dodge Challenger (Brampton),

FCA Canada operates an aluminum casting plant in Etobicoke, a research and development center in Windsor, and has sales offices and parts distribution centers throughout the country.

FCA, the seventh-largest automaker in the world based on total annual vehicle sales, is an international automotive group. FCA is listed on the New York Stock Exchange under the symbol “FCAU” and on the Mercato Telematico Azionario under the symbol “FCA.”

