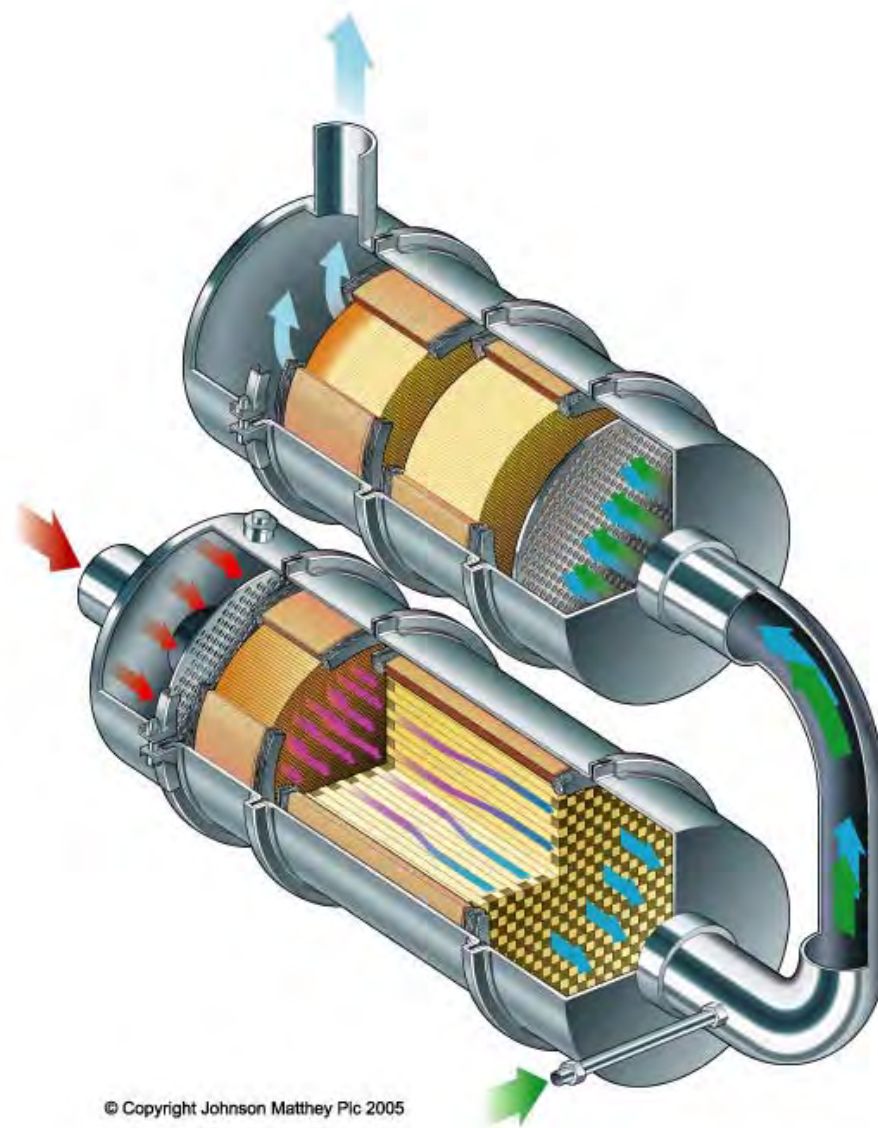


Retrofit SCRT System Description

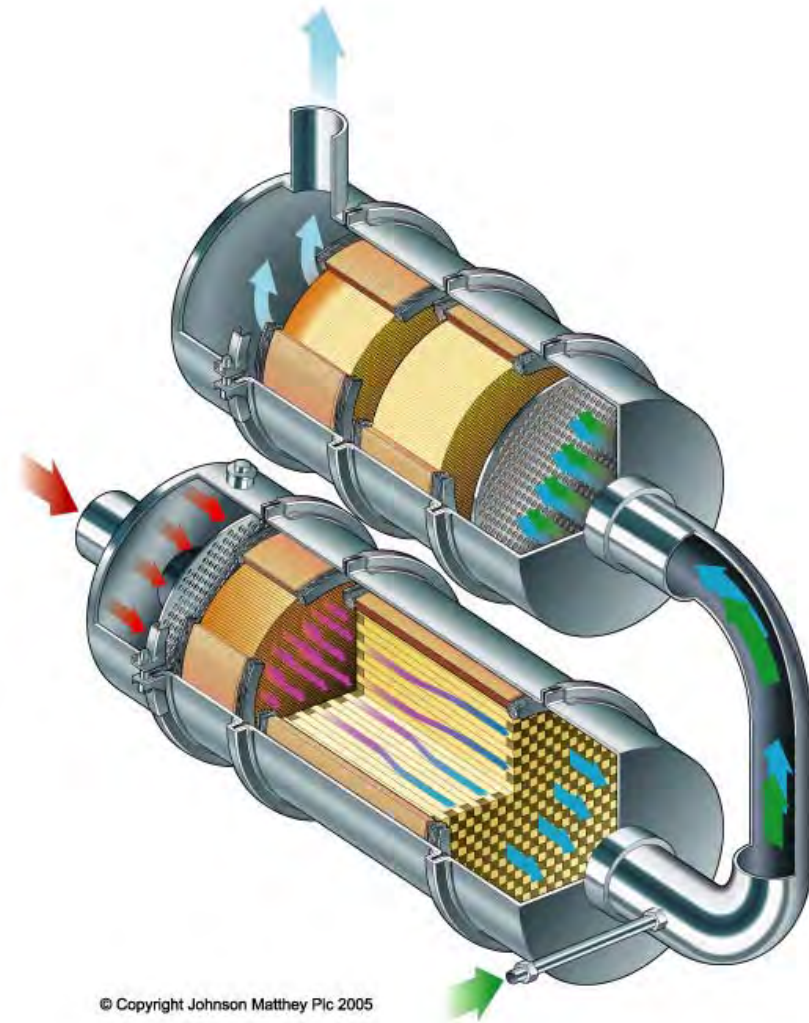


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SCRT System Introduction



- Johnson Matthey is verifying a retrofit SCRT[®] system with that reduces the PM and NOx emissions from diesel engines.
 - CARB and EPA dual verification
- CRT_{dpf} + SCR + Urea = SCRT_{System}
- Emission reduction goals:
 - NOx 60-80%
 - PM > 85%
 - HC >90%
 - CO >90%



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ENVIRONMENTAL CATALYSTS AND TECHNOLOGIES



SCRT System Description



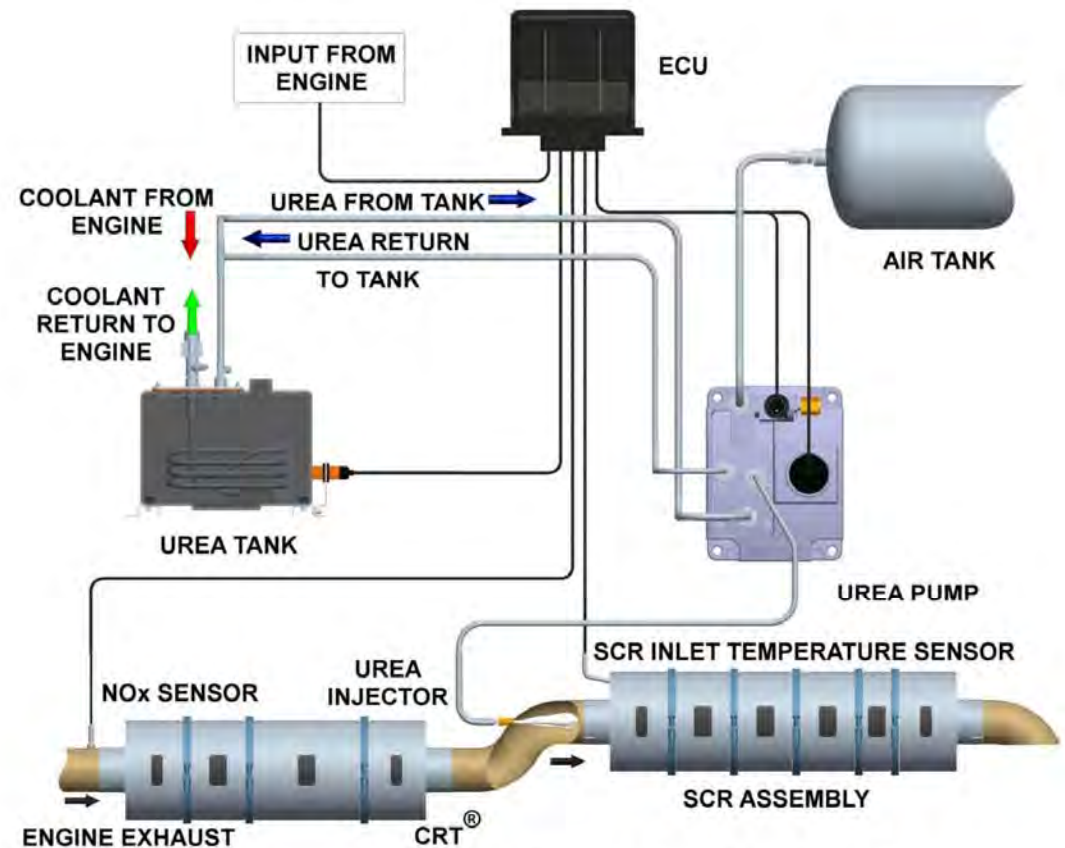
1. CRT® Diesel Particulate Filter

2. Urea delivery system

- Urea tank
- Injection pump
- Nozzle
- Injection controller & wiring harness
- Sensors
- Miscellaneous tubing

3. SCR system

- SCR catalyst
 - 4.0 g NOx System
 - CRT + Vanadium SCR + Ammonia Slip Catalyst
 - 2.5 g NOx System
 - CCRT + Zeolite SCR + Ammonia Slip Catalyst
- NOx sensor(s)
- Temperature sensor
- NH₃ slip catalyst

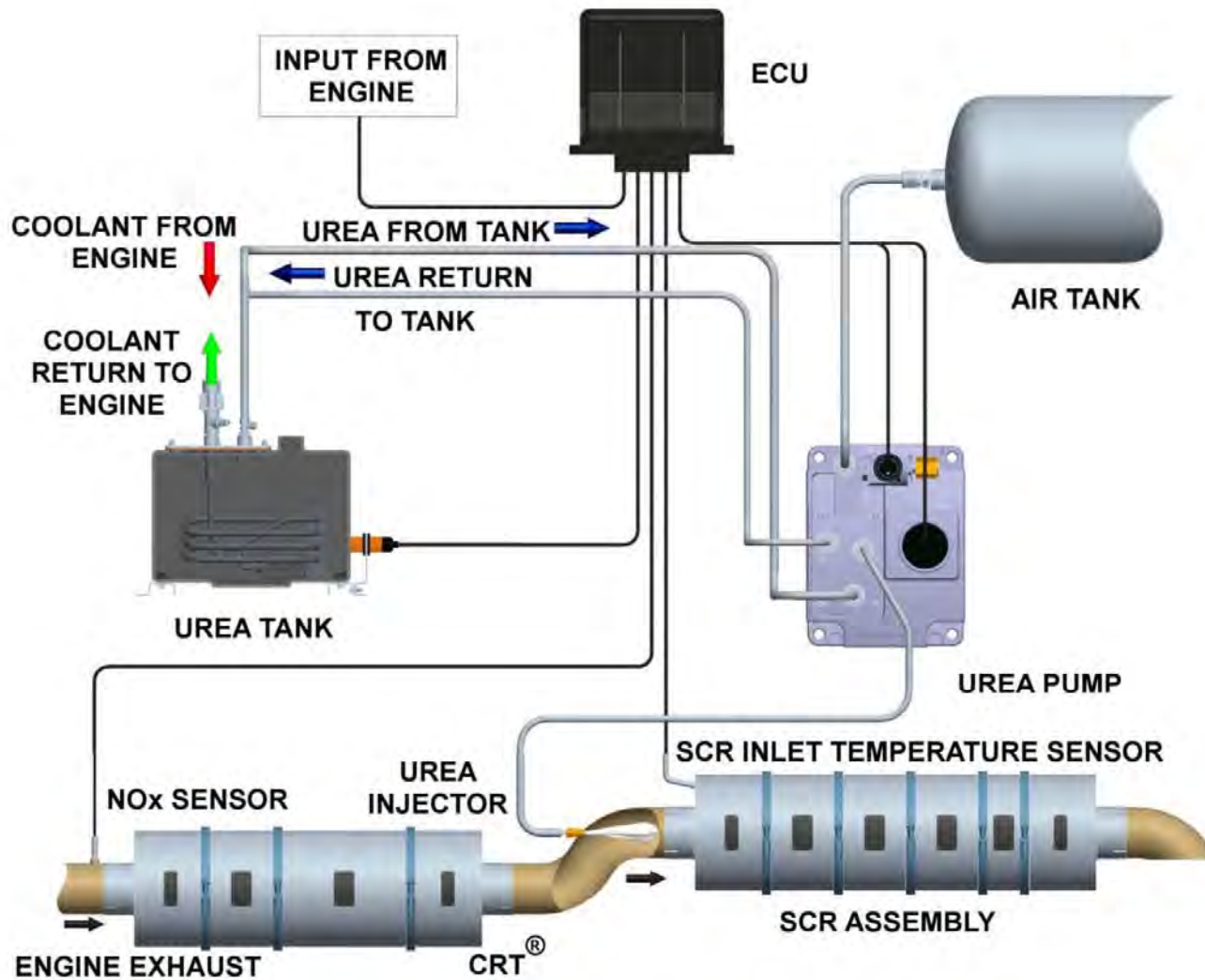


Johnson Matthey SCRT® Retrofit System

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SCRT System Description



Johnson Matthey SCRT[®] Retrofit System

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ENVIRONMENTAL CATALYSTS AND TECHNOLOGIES



•SCRT System - ECU

- Control strategy developed By JM
- Up to 15 control inputs -Analog, Digital and CAN
- Capable of continuous logging of up to 8 system parameters
- Developed and tested to on-road automotive standards
- Can use either a look-up table (map) or algorithm for urea injection



SCRT Urea Injection System

Urea Dosing System



Urea Dosing System

- Precise Air and Urea mixing
- Proven technology
 - Currently in series production for Euro IV
- CAN Communication/Control
- 12 or 24 VDC Supply Voltage



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SCRT System Components

Sensors



- **SCR System Sensors**
 - NOx Sensor
 - Temperature sensors
 - Backpressure sensor
 - Urea Tank Level Sensors



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Examples of SCRT Vehicle Demonstration



Note: Installation configurations are engineered specific to application and space availability



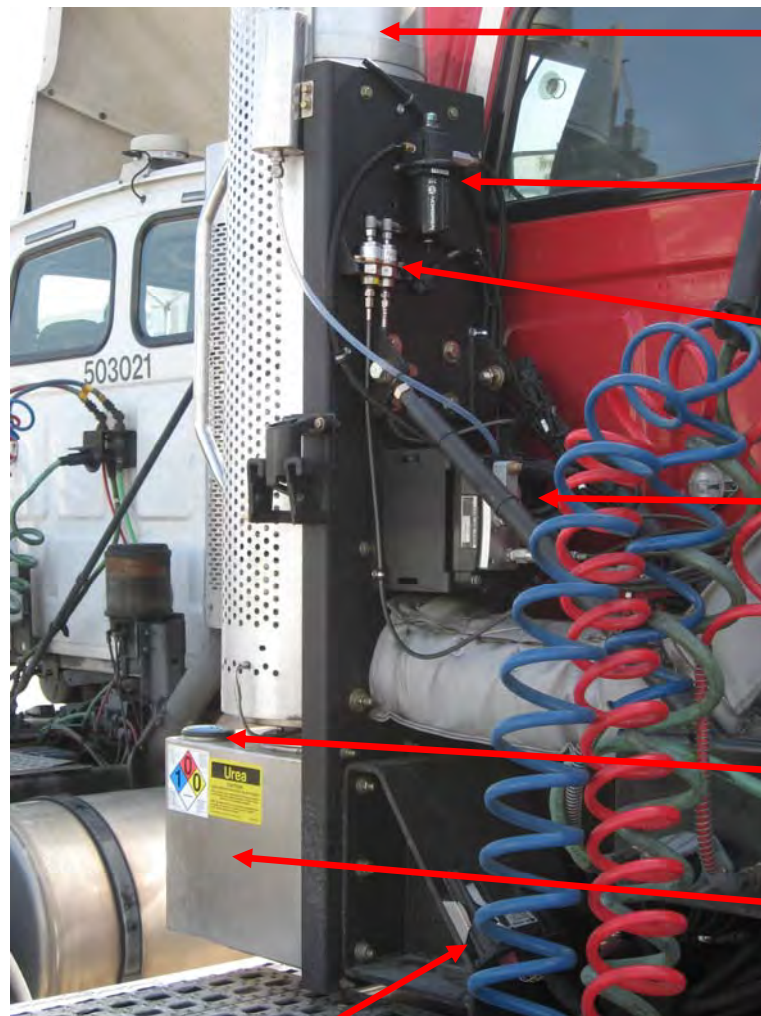
SCR

CRT

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SCRT System – Urea injection and SCR Module



SCR Module

Air Filter/Separator
For air to Urea Pump

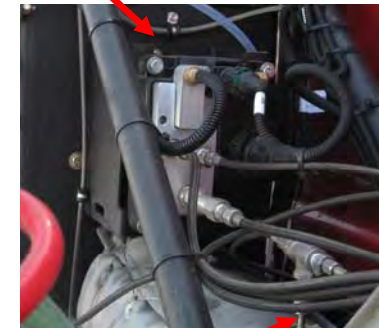
CRT Backpressure and Urea Nozzle
Pressure Sensors

Urea Pump

Urea Fill cap

Urea Tank

System ECU



Urea nozzle

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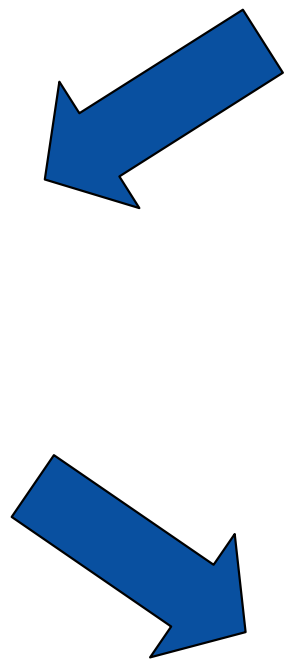
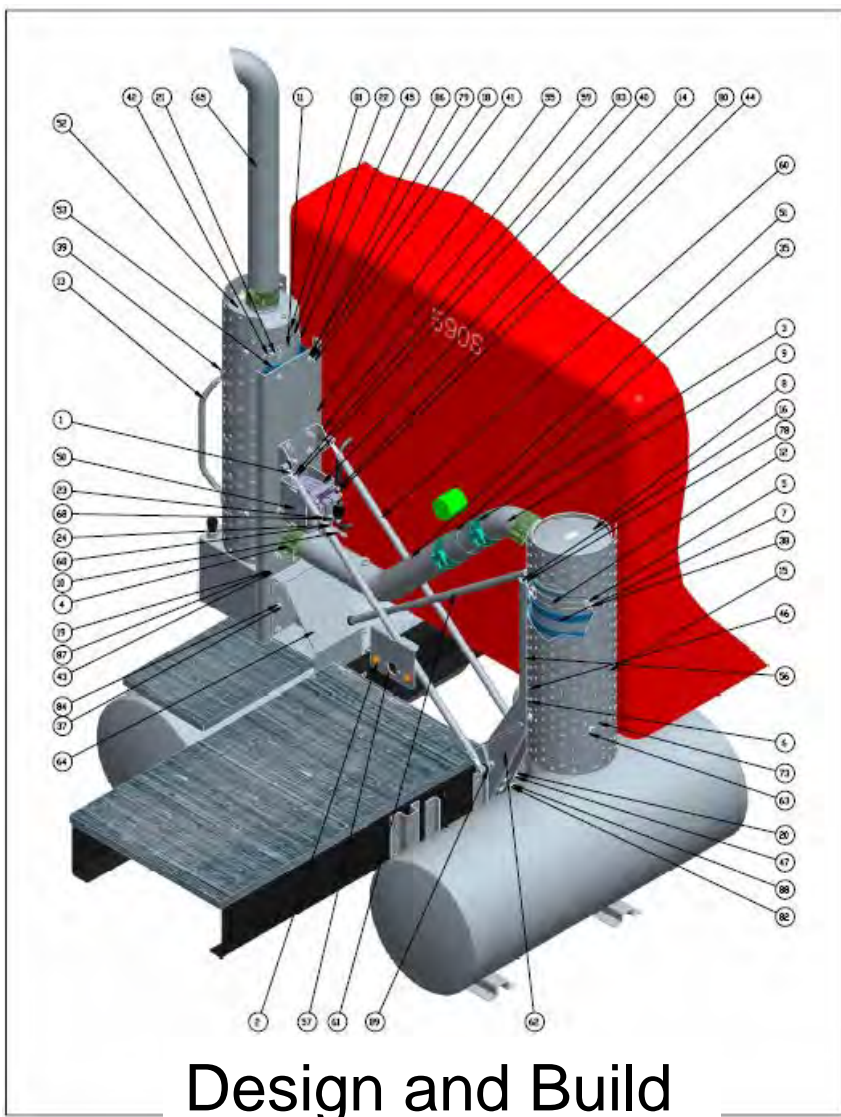
System Installation – Current Steps



- Identify Vehicle
- Evaluate Vehicle
 - Datalog
 - Measure
- Size System
- Design Systems
 - Use universal components as much as possible.
 - Some Custom brackets may be necessary
 - System Can be installed vertically or horizontally
- Order Components
- Ship
- Install

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SCRT Kit Development



Measure Truck

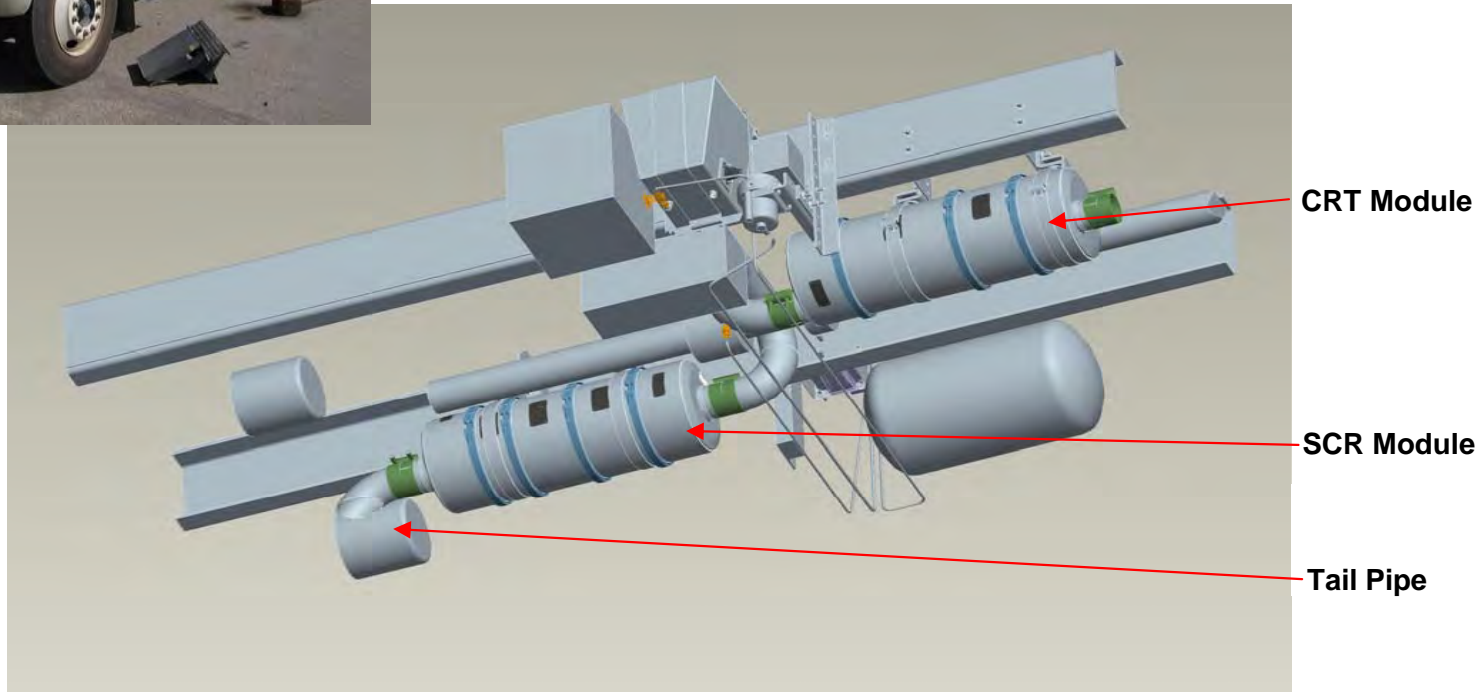


Install

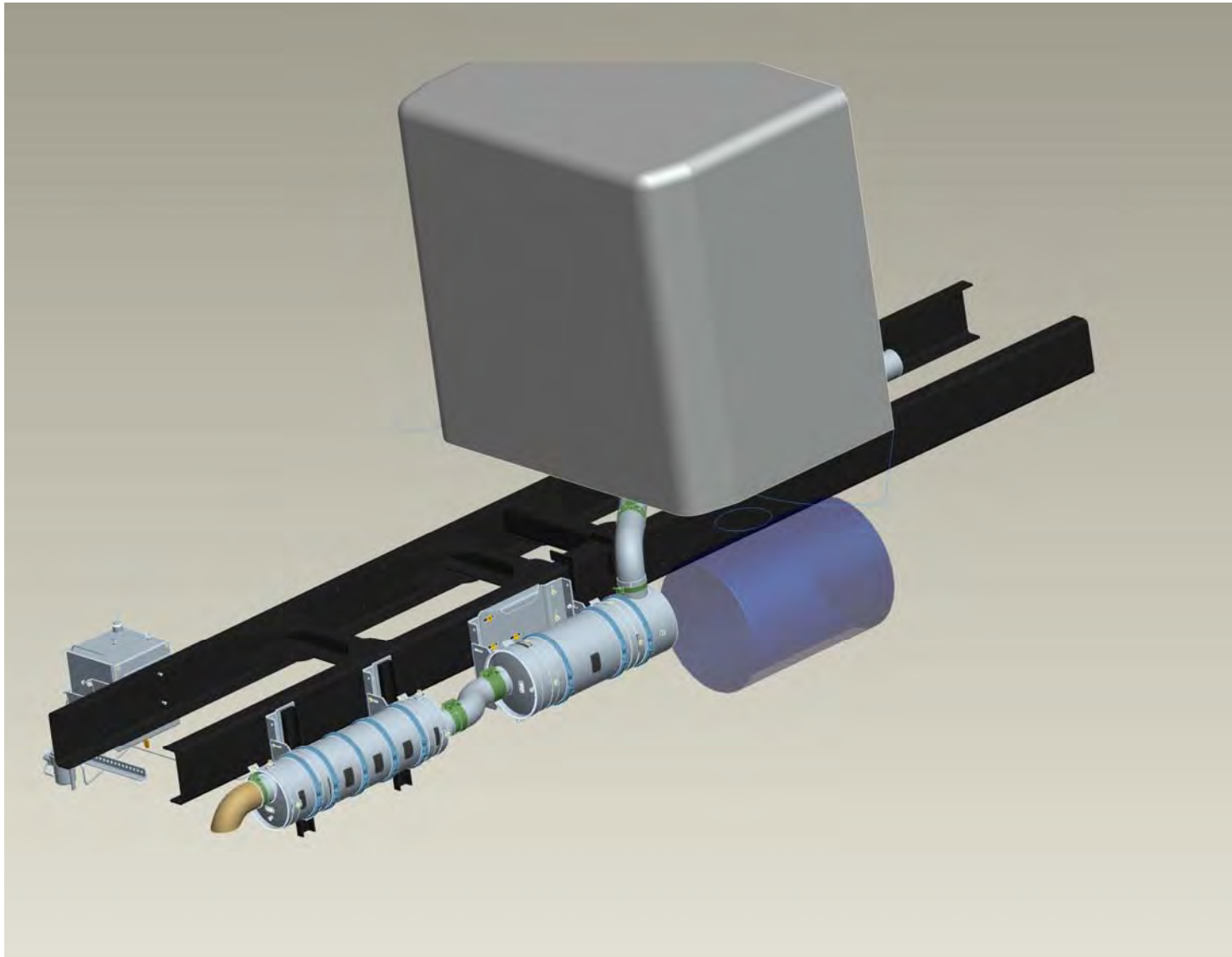
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SCRT Vehicle Demonstrations

Public Works Truck



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