

# Apocalypse

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# Concept

- “Black Box” for vehicles to assist in crash reconstruction
- Records data from various sensors
  - Accelerometers
  - GPS
  - Pressure sensors
  - Proximity sensors
  - Water sensors
  - Light sensors
  - Other existing sensors via OBD

# Concept

- Available both as an aftermarket device or pre-installed in new cars
- Expandable to support additional types of sensors and data sources
- Potentially provide collision warning alerts or other additional features

# Competitive Analysis

- Event data recorders (EDR)
  - Modern cars record some sensor data in the event of a crash
  - Usually only record data from standard vehicle sensors (speed, brakes, etc...)
  - See IEEE 1616-2004 — Standard for Motor Vehicle Event Data Recorders

# Competitive Analysis

- “Vehicle Black Box System”
  - Similar to our project
  - Records data from various sensors
  - Installable in any vehicle
  - Mostly just a research experiment
  - Not available as a commercial product

# Requirements

- Read NMEA sentences from GPS at 5Hz
- Read data from accelerometer, pressure, and proximity sensors at a rate of at least 100Hz
- Continuously save at least the last 20 seconds of sensor data in memory

# Requirements

- If a crash event is detected, the data are frozen and not overwritten
- Automatically switches to battery backup if external supply is interrupted
- Backup supply can power system for at least 10 minutes
- Physically small and robust enclosure

# Technical Specifications

- Atmel microcontroller provides core functionality
- Powered from vehicle supply (7V~14V)
- Sensors connected via respective interfaces (I<sup>2</sup>C, SPI, serial, analog, etc...)
- Development tools include avr-gcc, avrdude, and vim

# References

- A. Kassem, R. Jabr, G. Salamouni, “Vehicle Black Box System”, SysCon — IEEE International Systems Conference, April, 2008.
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- T. Kowalick, “Motor Vehicle Event Data Recorders: All Things Considered”, The 7th International Conference on Intelligent Transportation Systems, October, 2004.