



DAE Systems

Controlling air movement in Military vehicles



DAE Systems have remained unsurpassed in custom, high reliability air management solutions. Today, the company is a world leader for the design and manufacturer of military qualified scalable custom air moving systems.



The movement of air inside a Military Vehicle takes many guises but is essential for the operation, safety and comfort of both personnel and equipment.

Faced by the most challenging applications and severe operating conditions, the expertise within DAE Systems is a sure guarantee of an optimum solution to any Air Movement problem.

DAE Systems originally started as Dynamic-Air Engineering. Founded in Los Angeles, the company launched the world's first fan-forced airborne convection heater for the Army Air Corps in 1942.

Over the years, Dynamic-Air Engineering became DAE Systems adding several divisions with specialised products and services.

Typical applications in which DAE Systems air moving systems are implemented on Mil vehicles include:

Gun Smoke Extract – used to exhaust toxic fumes from the vicinity of machine gun and cannon breaches. These fans can be produced in single, twin or variable speed versions, matching the severity of the pollution, or doubling as vent fans on silent watch.

Ventilation – many vehicles, principally armoured personnel carriers, command and communication vehicles, ambulances, missile carrying vehicles and armoured cars, use brushless DC ventilation fans CBRN Filtration (Dust Blowers) – used to provide the main flow air through a CBRN filter at the same time providing a scavenge flow to particle separators, removing sand and dust. Optimising two fans on the same shaft of a single motor, up to 65Amp DC power capability. Providing crucially filtered air to the crew in a CBRN environment.

Engine Scavenge Fans – used when a vehicle is in a heavy dust environment, a fan in conjunction with a cyclonic filter, ensures that dust and sand are excluded from engine combustion air. Utilising specialist materials and processes to withstand the high erosion environment.



Equipment Cooling – with the ever-increasing electronic equipment within a vehicle the heat load increases, with high temperatures and solar energy adding to the problem, electronics are reaching their upper operating temperatures. Forced air cooling and spot cooling is provided within and without individual electronic components.

Engine Cooling Fans – today's power pack designers face an ever-increasing demand for cooling air through a variety of high-density radiators, including engine radiators, charge coolers, transmission and oil coolers all competing for space in the engine bay. Engine cooling fans can be driven directly by shaft or belt or hydraulic drives. Recent development HVDC fans for Hybrid or Electric Vehicles.

Crew Heaters – used in main battle tanks, light tanks, armoured personnel carriers, these units are designed to raise the ambient temperature in a vehicle sufficient to protect the crew from extreme cold. DAE Systems can offer these units with controllers and harness especially suitable for retrofitting vehicles for cold climates. A fan is coupled to a fixed resistance heater providing a warm air stream for powers up to 3kw.

Fan Types

For all applications the fans are of Axial, Centrifugal or Mixed Flow configuration, where the specified duty point will dictate the type of fan geometry chosen. Providing a fan is always going to be a trade-off between Performance, Size, Weight, Noise, Efficiency, Cost, and Reliability, but a simple generalisation as follows:

Axial Fans for: **Flow**, best power to weight/size ratio

Centrifugal Fans for: **Pressure**, variable resistance applications, robustness

Mixed Flow Fans for: **Combining Flow and Pressure**, low noise, versatile, variable resistance



The most common drive for fans is an electric motor, but all the fan types can be arranged to be driven by a direct shaft or belt driven or with a hydraulic motor. DAE has experience with the following:

- AC supply 400Hz, 60Hz, 50Hz
- AC supply Variable frequency
- DC supply 24 - 28V – Brushed and Brushless motors
- DC supply 270V – Brushless
- HVDC 200 - 800V
- Hydraulic Drive
- Mechanical Drive

Many vehicles in the security industry only have 12 vdc available, also some have highly specialised DC power supplies, consequently DAE Systems can produce motors over the range 12vdc to 800 vdc.



Controllers

Dynamic Air Engineering manufactures Modular Fan Controllers for maximising performance and flexibility, with an input of 24 to 270V DC the fan speed can be regulated single, twin or infinitely to meet the application conditions. They can also provide outputs such as speed, health warning, soft start, locked rotor protection



Intelligent Master Controller (IMC)

The master controller is connected upstream to the vehicle control systems through redundant CAN bus interfaces, and downstream to power relays, fans / blowers and sensors. Redundant vehicle power is run to the master controller and through a relay to all the fans.

For example, the IMC can individually activate or adjust fan performance based on sensor detection of fumes or particulates, or changes in altitude or temperature. The system can also change behaviour based on commands from the vehicle; for example, all the fans can spin at maximum power when the weapon systems are firing or shut down completely via when the vehicles fire suppression system is activated.

The traditional architecture of building fans / blowers into a vehicle focuses on the vehicle's systems directly controlling each fan and blower. This requires cable runs from the vehicles control systems directly to each individual fan. Using the DAE intelligent master controller a complete fan system can be designed into specific areas of the vehicle, i.e. the engine compartment, the turret, the crew cabin. The vehicle systems need only run redundant cable runs for CAN bus to the DAE IMC's, which in turn control all the fan characteristics in that subsystem. This simplifies design and maintenance.

The possibilities are limited only by the sensors available and the needs of the customer.



DAE Systems offers an extensive range of fans providing custom built solutions in a wide spectrum of special applications, backed by a comprehensive expertise in the design and production of integrated air moving systems. The fan is the product but what DAE Systems is really promoting is the capability of solving our customer's problems. We have the expertise and experience to demonstrate our ability to enhance the customer's equipment to perform better, longer, quieter, combining ideas that he has not thought of.



DAE Systems has turned its expertise to other vehicle solutions, such as installation of CBRN systems to give protection in heightened battlefield activity, and more recently developing engine cooling fans suitable for HVDC (200 – 800V DC) operation for modern Hybrid and Electric vehicles.



For all your specialized air moving requirements

Better Solutions & Total Support

For further information – Contact Us



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