



Fairlead's skilled engineers develop innovative power equipment for military and commercial operations and deploying energy technology to reduce massive fuel demands in remote locations. Fairlead is a specialist in power conversion, energy storage, system controls, and mechanical integration, or "Intelligent Power Management." Our products integrate advanced energy storage and power conversion technologies to hybridize military and commercial generators, optimizing system performance, reliability, and efficiency. Our team possesses competencies in engineering design and analysis, and software and product development that can meet full Mil-Spec qualifications.

To date Fairlead has delivered Intelligent Power Management System technology to the United States Army, Navy, Marine Corp, and Air Force and most recently to the Department of Homeland Security (DHS). Fairlead was part of a team contracted by DHS to provide a Forward Operating Base (FOB) Power program in Ajo, AZ. The goals of the program were to reduce both the environmental impact of 24/7 diesel generator use on National Park land and the cost of operation for Customs and Border Protection (CBP). A modular design of solar arrays and batteries were selected to greatly reduce the diesel generator daily run time by as much as 95 percent. The associated reduction in diesel fuel usage and delivery save CBP operating costs, and the reduced use of the diesel generators increase their lifetimes, thus reducing capital equipment costs. Reduction in run time decreases noise and emissions having a positive impact on National Park lands.

FOB Power is an unusual renewable energy application because it is a **large, remote, off-grid** facility. Typically, solar technology is used in on-grid applications, where the local power grid supports nighttime use and absorbs the extra capacity from the solar arrays. An off-grid system had to be developed with a battery array to store the extra solar power generated for nighttime use. The design optimized the solar array and battery array to minimize daily diesel generator use. The system was commissioned in April 2016.

The FOB Power technology is modular and scalable, so CBP can utilize the core design at other FOBs or checkpoints by adding or subtracting solar panels as well as batteries. A suite of system monitoring, weather, load monitoring, and generator usage measurement equipment was installed, with a satellite link for remote data collection.

MIT Lincoln Laboratory provided overall coordination and technical expertise for the FOB Power program. Fairlead Integrated designed and built the battery array and power control system. A local Tucson company, GeoInnovation LLC, designed and installed the solar array, solar parking structure, and the electrical system.

**Fairlead
Integrated
Energy Technology**

SOLUTIONS:

- Power Conversion
- Energy Storage
- Controls
- Mil-Std Electrical Systems

SPECIALIZATION:

- Product Development
- Software Development
- Engineering Design & Analysis
- Mechanical Packaging to Mil-Std

END USER:

- U.S. Army
- U.S. Navy
- U.S. Marine Corps
- U.S. Air Force
- DHS

100kW Mobile Microgrid for the Department of Homeland Security

