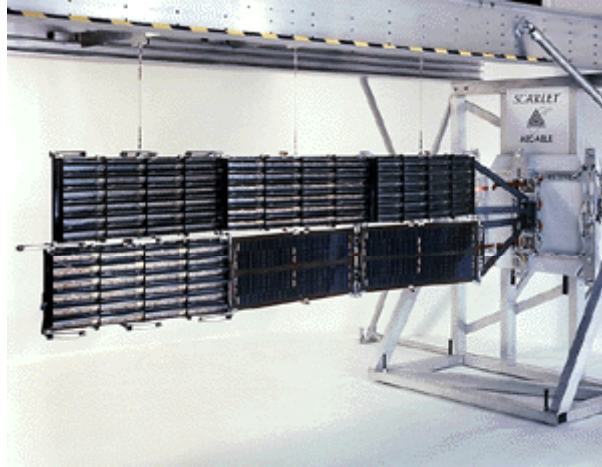


# SCARLET Solar Array Delivered for METEOR Mission



*SCARLET-METEOR solar array flight hardware shown in a deployed configuration.*

Solar Concentrator Array with Refractive Linear Element Technology (SCARLET) is a joint NASA Lewis Research Center/Ballistic Missile Defense Organization program to develop advanced photovoltaic array technology for future space missions. This advanced power system technology uses a unique refractive concentrator design to focus sunlight onto a line of photovoltaic cells located below the optical element. The concentrator design is based on previous work conducted at Lewis under a Small Business Innovation Research Program (SBIR) with Entech, Inc.

SCARLET technology offers a number of advantages for future spacecraft systems. In addition to the potential benefits of providing a high-efficiency array at a low cost, its inherent resistance to degradation in a high-radiation environment makes this technology extremely attractive for a number of future Government and commercial missions. The demonstrated benign behavior of concentrator arrays with respect to plasma interactions also makes SCARLET a desired power source for missions involving electric propulsion technology.

Small prototype samples of refractive concentrator technology had flown previously; however, concentrators had not been demonstrated in space at the "array level." When an opportunity to fly a SCARLET array on the first flight of the Multiple Experiments to Earth Orbit and Return (METEOR) spacecraft arose, an industry team led by AEC-Able Engineering, Inc., was contracted to design, build, and test the array. A major problem presented by this flight opportunity was the tight schedule involved. To meet the original launch schedule, we needed to move the SCARLET-METEOR program from the existing prototype component hardware to a new flight-qualified solar array within a 6-month period. Despite the expected problems associated with the development of new technology, a self-contained, fully deployable array was fabricated, flight tested, and delivered for spacecraft integration within the specified time. The nominal 200-W array

was designed not only to provide valuable in-flight data on SCARLET deployment, performance, and long-term operations, but also to supplement power to the spacecraft bus.

Despite the success of the SCARLET-METEOR hardware development program, failure of the Conestoga launch vehicle on October 23, 1995, prevented actual orbital data from being obtained on this array. However, the development of the METEOR flight hardware provided a basis from which the SCARLET program will continue. The lessons learned and the techniques developed under SCARLET-METEOR will provide invaluable experience as hardware is developed for a variety of future space missions.