In air transportation for the 21st century, security for passengers and crew has become a major concern. The cabin video monitoring system (CVMS) is the Parker state-of-the-art solution for the A380 to enable the cabin crew to observe all areas of the passenger cabin, to detect passenger activity or potential threats to the aircraft.

**System Overview**

Using the CVMS system, the cabin crew can select any camera or group of cameras to be viewed on networked flight attendant displays. On demand, images can be viewed from the cockpit to assist the flight crew in assessing the criticality of an exceptional cabin event. Network ports are available for image sharing with IFE and SATCOM. Any user display can select live digital video images from anywhere on the aircraft, and record one or all cameras throughout the duration of a flight.

CVMS is a digital distributed processing system built around Ethernet networking standards, megapixel color network cameras, and high-performance Pentium®M microprocessors. Every network camera contains its own image server, and provides motion-JPEG compressed images to client displays at up to 30 frames per second. Camera enclosures are designed for easy snap-in installation into cabin bulkheads and galley walls. CVMS can accommodate up to 100 cameras per aircraft, with full 24-bit color streaming video, low-light sensitivity, and optional audio at every camera.

CVMS is designed for airborne environments and can be readily integrated with other aircraft systems. Data reliability and integrity is enhanced since every unit is powered from two sources of 115VAC aircraft power, and is designed to continue to perform even in the presence of faults or physical damage to parts of the system. Ethernet distributed switches are installed with small groups of cameras to help minimize wiring, and reduce weight, cost and complexity of the resulting wire harnesses. Since network communication and data sharing is handled over proven fiber optic networks, connections are simple, reliable, and totally immune to electromagnetic effects (EME) and interference from other aircraft systems. Expansion of the system is simple and pre-planned by simply adding another distributed switch and its cameras into any fiber ethernet link.

**System Features**

The CVMS provides:

- **Complete digital Cabin Video Monitoring Systems for passenger aircraft**
  - Adaptable to cargo aircraft
- **Open network (Ethernet) architecture for configuration flexibility**
- **Designed to allow Cabin Crew visibility into all areas of the aircraft**
  - Option for Cockpit Door surveillance
- **Display digital video at Flight Attendant panels/stations, on Flight Deck, or via SATCOM**
- **Fully networked CVMS products:**
  - Color Ethernet cameras with audio and 5-minute video recording
  - Distributed Ethernet switches
  - Airborne Ethernet Server
  - CVMS display software
- **On-board Digital Video Recording**
- **Designed for DO-178B and DO-160-D requirements**
- **Fiber Optic Ethernet for reliability and data integrity**

*Moving at the Speed of Flight*
**CVMS Specifics**

The CVMS is built around a flexible, expandable distributed architecture. Cameras, Ethernet switches, and file servers are scaled to meet security monitoring needs. Color network cameras provide software-based image steering of a 640 x 480 subarray within a megapixel array, for simple installation and camera alignment.

Image management software performs all digital video functions, and manages the user interface at flight attendant and cockpit displays. Proven, security camera software keeps track of all network cameras, manages streaming video, and responds to operator touchscreen commands. Touch any image to expand to full-screen. Touch again to return to the multi-image view. Digital event recording is built right in, commanded via touch-screen icon. Any image, or multiple image sequences, can be recorded whenever desired – either at the user’s discretion, or in accordance with pre-established scripts. Images are stored as disk files on the optional digital video recorder, and can be played back on any compatible PC, laptop or compatible network client. Software is proven at the highest resolution and frame rate of any software in the industry.

**Ethernet Fiber Optic Network Features**

Fiber optic Ethernet networks provide high throughput, industry standardization, the ability to handle ground potential differences and tamper-resistance.

Key features include:

- Fiber optic Ethernet provides complete EME-immunity.
- No interference with other aircraft systems.
- Compatible with aerospace-qualified multimode fiber optic cables and aerospace connectors.
- Bi-directional communication on a single fiber – for reduced costs and improved reliability.
- Highest error-free data rates.
- Extensive built-in link tests and diagnostics assure integrity of the fiber optic network.
- Excellent optical link budgets.
- Simple network expansion by adding new switch units into the network.

**System Characteristics:**

- **Cameras** - Full 1280 x 1024 pixel array with software steerable sub-arrays (pan-tilt)
- **Alarm Buffer** - Every camera maintains most recent 5 minutes as ‘alarm buffer’ video
- **Lenses** - Multiple field-of-view options with high-quality lenses
- **Enclosures** - Designed for simple installation into galley walls and partitions
- **Networks** - All-digital system with 100 megabit per second Ethernet to every camera
- **Switches** - Distributed Ethernet switch units collect camera traffic and route to a Pentium®M processor running image server software within the avionics bay
- **Avionics Server** - Manages all image streams simultaneously and parcels traffic to display clients and to digital video recorders
- **Capacity** - Up to 100 cameras, with up to 10 distributed switch units, per system
- **Security** - Covert and overt mounted cameras are available for cabin and cargo areas
- **Purpose** - Monitor aircraft for surveillance and security requirements
- **Software** - Proven security software manages all system functions
- **Options** - Motion detection software and alarms to secure unattended aircraft
- **Expandability** - Platform expands to add functions such as additional network cameras, digital video recorders, analog CCTV inputs, and alternate avionics interfaces
- **Image Manipulation** - All frames are protected against alteration to support law-enforcement requirements