**Video Image Tracking Electronics for Advanced Video Guidance Sensor**

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The need to supply and service existing spacecraft and orbital platforms with unmanned vehicles has been recognized as an enabling technology for future NASA and DOD missions, and recent national and international events as well as new technology programs have given much higher impetus to the development of Automated Rendezvous, Proximity Operations, and Mating systems. One of the critical parts of these systems is the sensor that find the target spacecraft and guides the servicing spacecraft into capture and docking, mimicking the eyes and brain and hands of the astronaut or cosmonaut with an Advanced Video Guidance Sensor. The Video Guidance Sensor flight demonstrations (on Shuttle Flights STS-87 and STS-95) used five VME cards and two power supplies to drive and cool the lasers and camera and to capture and process the video frames into reflected spot coordinated. The second generation Advanced Video Guidance Sensor (AVGS) was redesigned from the aspect of the data flow and reformulated pixel-processing algorithms for real-time target spot tracking. Using radiation tolerant FPGAs and modern memory and DSP chips, the AVGS uses just a single power card to power, cool, and drive the lasers and a second single reprogramable image processing electronics card to image and track filtered reflected spots with 3x the resolution and at 15x the frame rate, 45x the data rate of the original sensor with 1/5 the power consumption. This increased data rate is a result of moving most of the repetitive pixel processing into the FPGA, reducing the data into the DSP by a factor of 100 to 10,000. Additionally, this same Image Processing Card will also be used for processing temporal data instead of spatial data for a companion LADAR sensor for extended space rendezvous ranges.