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**Next Generation CMOS Active Pixel Sensors for satellite hybrid optical communications/imaging sensor systems**

R. Stirbl, B. Pain, B. Hancock, T. Cunningham (NASA/Jet Propulsion Laboratory/Caltech)

Given the current choices between 1) an ever increasing population of large numbers of satellites in low-earth orbit (LEO) constellations for commercial and military global coverage systems or 2) the alternative of smaller count geosynchronous satellite system constellations in high-earth (HEO), of much higher cost and complexity, a number of commercial communications and military operations satellite systems designers are investigating the potential advantages and benefits of operating in the mid-earth orbit altitudes (MEO) (between LEO and HEO). At these altitudes both total dose and displacement damage can be traded against the system advantages of fewer satellites required at these higher altitudes. With growing demand for higher bandwidth communication for real time earth observing satellite sensor systems, as well as NASA's interplanetary and deep space virtual unmanned exploration efforts in stressing environments, JPL is developing the next generation of smart sensors to address these new requirements of low-cost, high bandwidth, miniaturized, ultra low-power and environment ruggedness. Active Pixel Sensor CMOS imagers (made in 1.2 micron and .5 micron design processes) can be adaptively windowed with low power, on-chip control, timing as well as digital output to both acquire as well as provide data-channel efficient on-chip compression, high bandwidth optical communications links are being designed & investigated in order to reduce size, weight and cost for common optics/hybrid architectures. This presentation will give the status of the work in the development of low-cost/power active pixel sensor designs for hybrid optical communication/imaging systems.