PART 7. SENSOR WEB/TESTBED INITIATIVES

6. EO-1 GROUND ADAPTIVE ANTENNA ARRAYS

The vision for the EO-1 antenna system research is to find the next generation antenna technology that would eliminate or minimize moving parts and develop a concept of inexpensive, ground antenna arrays that would be placed around the country and perhaps the world to provide as close to total coverage as possible. Using the emerging technology of digital signal processing, software is used to shape the antenna pattern. In essence, if taken to the end goal, the software would shape the antenna pattern to follow the target satellite, in an adaptive manner, without moving parts such as the large motors used to slew the 11 meter dishes at the Ground Network (GN) stations. Furthermore, the software is also able to shape the antenna pattern to optimize the desired signal and minimize the impact of interference. Thus, whereas most antenna systems can have self interference because of the signal bouncing off buildings and other structures, called multipath, adaptive antenna technology can be used to actually enhance the desired signal thus leveraging the multipath. Therefore this technology can be used to create wireless access points for low earth orbiting satellites especially, if in the future, medium to large constellations are launched. This technology will provide a more cost effective means for a ground station to handle multiple satellites simultaneously. NASA's GN ground stations can typically handle only one satellite per ground station and thus act as bottleneck for potential future constellations.

Documentation of efforts to create above described antenna systems, using EO-1 as a testbed, can be obtained from the links contained in the Table of Contents for Part 7, Section 6.