## Feasibility Studies for a Cortical Neural Prosthesis

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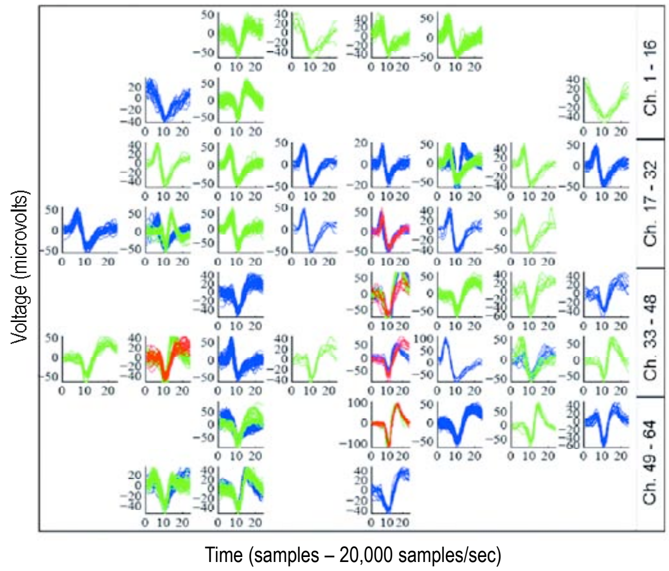
Sixty-four-site microassemblies of Michigan neural probes have been implanted in the motor cortex in a series of eight non-human primates as part of the development of a neural prosthesis targeted at paralysis. These electrodes form the front-end of a wireless implantable microsystem now being completed. Through these implants, a great deal has been learned about implant procedures and electrode design. In the best of these implants, 64 of 64 channels were electrically viable and able to record high-quality local field potentials and neural spikes for in excess of two months. At one month post-op, discernable single- and multi-unit activity was present on 46 of 64 channels, and within these channels, 54 single units were present with a calculated mean signal-to-noise ratio (SNR) of 4.2. Spike amplitudes ranged from $50\mu V_{p\text{-}p}$ to $800\mu V_{p\text{-}p}$ with background noise levels typically below $25\mu V_{p\text{-}p}$. At 67 days post-op, 53 of 64 channels exhibited discernable unit activity with 69 units present. A primate was trained to perform accurate 3-D cursor control in a virtual reality environment and control of a robotic arm using the recorded neural activity. Thus, unit stability was sufficient over a period of two months to drive a neuroprosthetic system.




***Recordings from primate motor cortex, taken one month post-op.***