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ADVANCED MEDICAL TECHNOLOGIES IN SUPPORT OF MANNED COMMERCIAL SPACE FLIGHTS

Abstract

Increasing capabilities of digital electronic devices such as the number of transistors on integrated circuits doubling approximately every two years (Moore's Law), decreased RAM cost, increased RAM size, decreased average microprocessor cost, increased microprocessor clock speed, and increased computing processing power, have had a significant impact on accelerated scientific breakthroughs in medical discoveries and technologies, including neuro-technologies, bio-engineering, virtual medical imaging, regenerative medicine, stem cells therapies, cloning, biomedical devices, micro-electro-mechanical systems, genomics and gene therapies, nano-medicine, medical robotics, engineered replacement organs, networked health care, etc. Several life altering medical breakthroughs on the horizon include: restoring vision to the blind, organs on demand, brain repair and augmentation, elimination of genetic conditions, cures for neurological conditions, prevention of heart attacks, elimination of cancer deaths, development of smart drugs, and vaccines against cancer, etc. The implementation of new advanced medical technologies are rapidly changing the scope and complexity of Aerospace Medicine and its impact on safety in space operations, including: 1) Clinical aerospace medicine aspects such as health monitoring, prevention, screening, diagnosis, treatment and rehabilitation of aerospace personnel and passengers, 2) Space medical certification/licensing implications (fitness for flight) for aerospace personnel, 3) Operational roles and responsibilities of aerospace medical personnel, 4) Aerospace human factors considerations, 5) Human-machines-environment interactions, 6) Post aerospace accident/incident investigation factors and analytical tools, etc.