33rd IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Is Space R&D Truly Fostering A Better World For Our Future? (2)

Author: Mr. Chesler Thomas
University Bourgogne Franche-Comté, France, cheslerthomastk@gmail.com

Mrs. Littisha Lawrance
Laboratoire d'Imagerie Biomédicale Multimodale Paris-Saclay, France, littishalawrance@gmail.com
Dr. Chelsea Thomas
Space Generation Advisory Council (SGAC), India, chelsea.4397@gmail.com
Ms. Felcia Reji
Space Generation Advisory Council (SGAC), Georgia, felciareji00@gmail.com
Prof. Nathalie Lassau
France, nathalie.lassau@gustaveroussy.fr

COMMERCIAL VIABILITY OF LOW-COST PORTABLE MRI SCANNERS USING ADVANCEMENTS IN SPACE TECHNOLOGIES AND OPERATIONS

Abstract

Mortality is the true final frontier humanity is too primitive to conquer, be it due to the superstitions of the Middle Ages, primitive era of Roentgen's nascent discovery of X-Rays or today where even technologies such as quantum computing and stem cell engineering is a reality. A huge population of humanity still lacks basic access to the necessary healthcare diagnostic facilities, the first step to curbing diseases and mortality rates. One such example is the Magnetic Resonance Imaging scanner, a technology discovered in 1950s, miniaturized to fit in 50kg for the International Space Station, yet there are 36000 MRI scanners worldwide, even Japan with most MRI Scanners have only 51 scanners per million people. India, the second largest country in the world, has 1 scanner per million people. The cost of an MRI scan is USD 4000, with nearly 80,000 scans a year in India. The numbers clearly indicate the economic restrictions to diagnostic access, which this work intends to change through commercial viability assessment of leveraging space technology and operational advancements to equalize access to MRI diagnostics, utilizing the support schemes and low cost manufacturing and skilled workforce capabilities inherent to India and other developing nations, coupled with Halbach array electromagnets to provide multi mode imaging capabilities to cater to different imaging performance needs while concentrating maximum field in bore, miniaturized SAR RF systems with satellite SDR kits for generating gradients at lower costs and processing difficulties, eliminating cryogenic fluid requirements to substantially decrease costs and architectural and infrastructural requirements in hospitals and imaging centres, cloud computing to leverage techniques of processing multi node data input terminals powered by deep learning algorithms powering neural networks and AI along with network architectures to ensure fast, safe and redundant data processing and provision to doctors and patients to reduce image processing and radiological comprehension costs and difficulties, amongst other technologies from RD and innovations proven in space, minus the stringent and expensive space grade qualifications, with international business models and SpaceX-inspired supply chain operations strategy of indigenous manufacturing of all components and assembly under one roof for quick time to market, low cost, portability, decreased cost to hospitals and patients without compromising performance, sustainability and commercial viability in a nation lacking such an ecosystem. This work radically catalyses the germination of an MRI ecosystem in India and other developing nations, hence spearheading the mission of equalizing health access using space technologies.