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CELESTIAL DECOLONIALISM: INDIGENOUS KNOWLEDGE AS A CATALYST FOR ASTRONOMICAL INNOVATION

Abstract

The field of modern space exploration is historically grounded and largely practiced in Western, Eurocentric paradigms, often sidelining Indigenous cosmologies and pre-colonial discoveries.

While Western science prioritizes reductionist models, Indigenous knowledge systems, such as the Mori whakapapa (genealogy), contain millennia of holistic celestial observations which interconnect stars, the Earth and its seasons, and living beings. Indigenous epistemologies, such as the Mori whakapapa (genealogy) and Navajo Dily´hé (Pleiades), predate the Big Bang theory and telescopic astronomy, yet remain excluded from mainstream research and mission design.

This work proposes that Indigenous knowledge - spanning Navajo, Polynesian, Mori, and Canadian First Nations traditions - rooted in holistic, place-based wisdom, holds untapped potential to resolve gaps in contemporary space exploration and for advancing astronomical research through new frameworks.

Grounded in ethical collaboration under OCAP® principles (Ownership, Control, Access, Possession), the work explores methodologies to integrate Indigenous frameworks into Western space science. For example, Polynesian star compasses, refined over centuries of Pacific voyaging, have informed resilient navigation algorithms for deep-space probes operating in GPS-denied environments. Similarly, Inuit silaup qaujimajjutiqangit (sky knowledge), which links atmospheric phenomena to seasonal cycles, has shown potential to enhance predictive models for Martian weather systems and lunar habitat planning. Cross-referencing Navajo comet narratives with NASAs Near-Earth Object databases using spectral analysis has revealed undocumented celestial events, recorded before the arrival of settlers.

This work challenges the space sector to recognize Indigenous knowledge not as historical artifact but as living science, offering the CSA, ESA and NASA, and other private space entities a blueprint for equitable collaboration. By harnessing the teachings and insights of Indigenous knowledge of the cosmos, this research offers new perspectives on astronomical phenomena and raw connections unknown to mainstream space science, offering it the potential to evolve into a pluralistic endeavor where Navajo supernova records and Polynesian wayfinding charts inform next-generation of cosmological exploration.