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Request for Information on the National Digital Twins R&D Strategic Plan

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Via FDMS

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Establish a dedicated ethics board comprised of experts from multiple disciplines to develop ethical guidelines and oversight mechanisms for digital twin (DT) development and use, especially when developing DTs for behavioral applications. Invest in privacy-preserving AI techniques like federated learning, differential privacy, and homomorphic encryption to enable DT training while protecting individual data privacy. Mandate human-AI collaboration protocols that clearly delineate the roles of humans and DTs in decision-making processes, with humans retaining ultimate authority and accountability. Develop comprehensive testing frameworks that Involve diverse stakeholders to test DTs across a wide range of scenarios, edge cases, and potential failure modes before deployment. Establish a standard for DT TEVV to assess risks, impacts, and benefits. Foster public awareness and education initiatives to educate the public on the capabilities, limitations, and ethical implications of DTs to promote informed decision-making and critical trust. Establish robust data governance frameworks including standardizing data collection, curation, sharing, and usage protocols to ensure data integrity and security. Develop methods for real-time data integration to maintain the accuracy and relevance of DTs. Create standardized ontologies and data exchange protocols to ensure that DTs from different developers and sectors can work together seamlessly. Establish measures to identify and mitigate harmful biases in data and algorithms used in DTs to help ensure fair and equitable outcomes. Develop DTs with a focus on sustainability, including energy-efficient computational models and workflows as we consider their long-term impact on resources. Plan for the entire lifecycle of DTs, from development to decommissioning, to help manage their environmental footprint. Invest in educational programs that foster cross-disciplinary expertise in areas such as AI, data science, and domain-specific knowledge to advance DT research and application. Encourage diversity in recruitment efforts to facilitate capturing a broad range of perspectives and innovative solutions in digital twin development. Account for a variety of users who will interface with, or be impacted by DTs, including those with neurodiversity, cognitive differences, the aging population, mental health challenges, etc.