2023
Hawai'i Annual Code Challenge (HACC)

Challenge Title	Lahaina Digital Twin (alt title: SimLahaina)
Department / Organization	Maui Institute of Art and Technology LLC
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The Challenge

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Describe situation to be solved	Planning the rebuilding of Lahaina Maui following August 2023 fires will require extensive computer systems support, and public consensus.
Preconditions *(How does it work now)*	1. Community Plans (i.e. West Maui Community Plan WMCP) have been developed as slow multi-year process, with some community workshops and exhibitions, but mostly government/NGO working groups. 2. Use of digital tools (mapping, simulation) have been very limited, especially online tools. Mostly these are done within the Govt./NGO teams and later presented to community. 3. Hawaii Open Data, Maui County Data, etc. are both open and restricted access with early visualization and data dashboard tools
Assumptions/Issues *(list any conditions that could impact the solution)*	1. Lahaina was economic heart of Maui and its devastation by 8 Aug fires has had major impact locally and statewide. 2. It will take years to rebuild housing, economic and commercial areas 3. Significant cultural conflicts exist (native culture, art galleries, restaurants, night clubs, hotel worker housing, etc.) 4. Some software has expensive licensing (i.e. ESRI ArcGIS)
Current Approach *(how is situation currently being handled)*	1. WMCP process is documented, although actual practice and acceptance may be different. 2. Process was offline and limited public interaction 3. Diverse groups are doing their own thing, uncoordinated
Users *(Who would use the application - employees or constituents or both? How many users would there be?)*	Stakeholders include general public, cultural organizations, business groups, land owners, local non-profit groups, county/state/federal government
Business Rules	N/A

Special Requirements	N/A
Technical Platforms *(in use or desired to be used)*	1. Mapping software (GIS) 2. 3d Modeling tools, art sketching for 2d concepts (AI image/model generation for prototyping buildings, landscape) 3. Data Science tools (incl AI analysis and dashboard creation), tables, charts, graphics, CoLab, Jupyter 4. Community Engagement (discussion forums linked to models, surveys, https://pol.is, http://www.hierr.online) 5. Economic and Environmental Simulation/Analysis Tools 6. Online and in-person shared digital spaces (e.g. UH's Sage3)
Data set to be used or collected	1. basic topography and buildings in Area Of Interest (AOI West Maui, south of Kaanapali) 2. demographic data for AOI (population living, commuting, income/expense) 3. visitor statistics (demographics etc.) 4. commercial entities – location, type, gross income, staff, customers etc. 5. environmental data (weather, soils, vegetation, etc.)
Data set calculations or reporting needs	N/A
Solution Road Map	
Basic Flow *(steps of user action/system response)*	1. Users enter website (or in-person room) to view model 2. User engages with Surveys, adding to sentiment, values, 3. User explores virtual Lahaina and data dashboard functions 4. User provides feedback comments, engages with discussions 5. Community immersive events to share scenarios 6. Lahaina economy and housing reopens before 2030
Goal of Solution	• Preliminary prototype for (parts of) Digital Twin system (possibly with civic engagement). • Demonstration of web portal showing visual and data models/dashboard that may or may not incorporate public comment/discussion aspects. • A public exhibition of a room-scale immersive projection video and interactive data dashboard in the month or two after completion of HACC. (Dec2023, early 2024)
Business Value *(potential financial or time savings)*	Public Planning augmented with online tools has shown significant (50-100x) improvement in public engagement with more rapid consensus building. The savings to County could run into the multiple hundreds of millions, and bringing back economy will help stem the tax losses, and the population exodus.
Success Scenario *(how you know a solution is working)*	Public, NGO and Govt become active users and supporters of SimLahaina portal, with multiple concepts moving into higher fidelity modeling and simulation. Funding committed for continued development and enhancement.

	Full success is having Lahaina rebuilt as functional living and economic center before 2030, with the Digital Twin models kept current and used by community and government monitoring and planning groups.
To be completed by the HACC Planning Committee	
Community/Industry Data Available	
Potential Community/Industry Co-Sponsors	