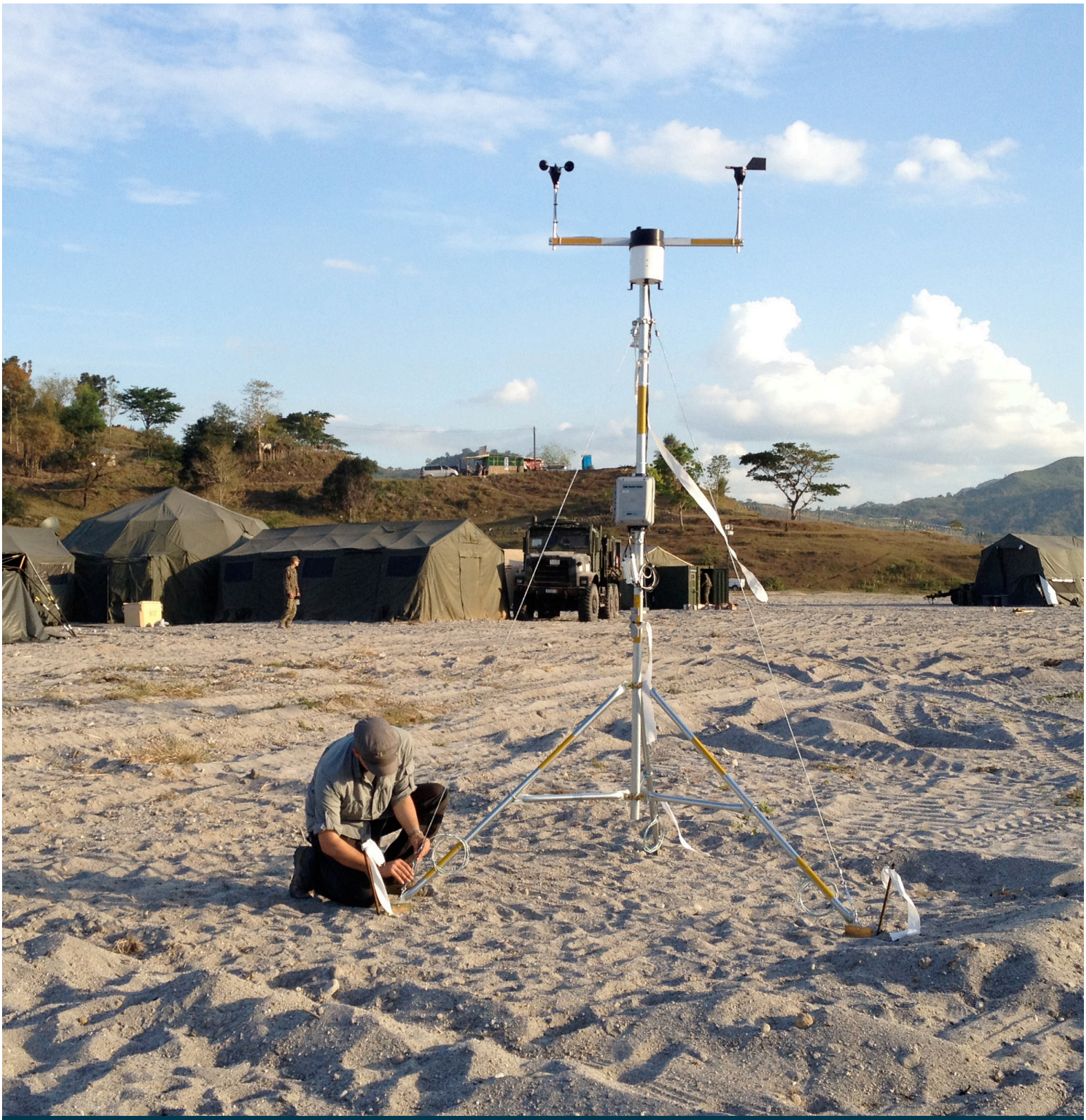

REACHE

A History Report

Prepared by
MKTHINK

MK THINK

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REACHE 1

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REACHE 1

REACHE 1 developed the hypothesis that facility and organizational performance could be improved by understanding the interaction between architectural, environmental and cultural factors.

THE PROBLEM

The Department of Defense (DOD) has a vested interest in reducing energy consumption without compromising its military base activities. Energy not only contributes to the cost of operations, but it also exposes military bases to increased risks. “One out of every eight casualties in Iraq, between 2003 and 2007, came during fuel deliveries.”

In an effort to reduce the cost and risks associated with energy use, the Office of Naval Research (ONR), an executive branch agency of the DOD, partnered with MKThink to develop site-specific, culturally-sensitive energy efficient solutions. MKThink initiated a research project dubbed REACHE (pronounced “ree-shay”) – Renewable Energy Architecture for Cultural and Human Environments.

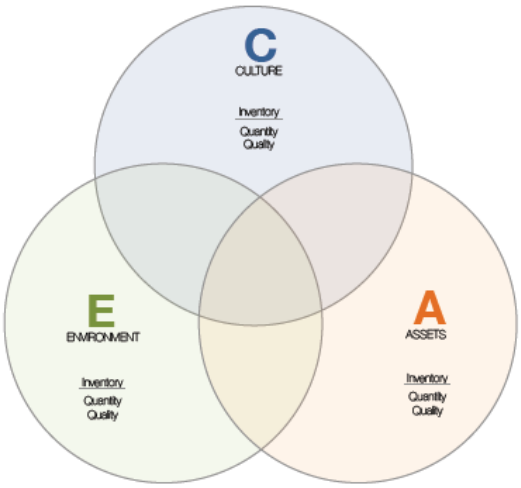
STATEMENT OF WORK

REACHE 1 set out to establish a case for evaluating the relationships between renewable energy technology, energy efficiency, environmentally-responsive architecture, and workplace functionality.

The intent of REACHE research for a military application was to align technology to mission needs, reduce critical resource loads, make on-site renewables more feasible, reduce fuel convoys, and thereby combat exposure time. Furthermore, by understanding the relationships between Architecture, Environment, and Culture, this research effort aimed to improve the environmental conditions within forward-operating spaces, reduce the instances of cognitive decline due to air quality or other environmental issues in order to increase battle-readiness and reduce incidents of short-term memory loss or fatigue.

LOGIC

The REACHE logic identifies three spheres of overlapping importance when considering energy efficient solutions: Assets (A), Environment (E), and Culture (C).



The REACHE logic conjectures that an integrated understanding of the relationships between Architectural Assets, the Environment, and the Culture of users can improve operational and capital planning strategies that reduce energy consumption and optimize for human performance.

ASSETS	Assets refer to architecture and technology and includes all man-made structures on a site.
ENVIRONMENT	Environment refers to resources and conditions and it includes everything the planet naturally produces – energy, water, and other resources – as well as climate conditions.
CULTURE	Culture refers to individuals and groups, their characteristics and behaviors and how they affect a site.

TASK OVERVIEW

RESEARCH POTENTIAL RELATIONSHIPS BETWEEN THE 3 SPHERES OF REACHE

MKThink found several potential relationships between Architecture, Environment and Culture, including:

- Architecture + Environment: buildings impact embodied and operational energy consumption
- Culture + Environment: collective human behavior impacts the environment and the adoption rate of energy-saving technologies, which in turn affects energy consumption
- Culture + Architecture: the ideal level of thermal comfort differs depending on culture, necessitating variable architectural cooling strategies.

DEVELOP KEY PERFORMANCE INDICATORS

In order to test the hypothesis, MKThink identified the following key indicators of optimal performance:

- Human performance or productivity refers to the efficiency with which a task is carried out
- Technology delivery is how well technology is aligned with use
- Capital resource allocation is how business allocate their financial resources and other sources of capital to processes, people, and projects

If any of the performance indicators improve when a strategy integrated the relationships between Architecture, Environment, and Culture is implemented, then the REACHE hypothesis could be proven.

DEMONSTRATE THE VALUE OF THE REACHE LOGIC SET

MKThink determined that an integrated understanding for Architecture, Environment, and Culture impacts the identified key indicators of in the following ways:

- Human performance or productivity refers to the efficiency with which a task is carried out
- Technology delivery is how well technology is aligned with use
- Capital resource allocation is how business allocate their financial resources and other sources of capital to processes, people, and projects

For instance, by understanding how the materials and layout of a building affect embodied and operational energy consumption, facility managers can make informed design decisions that improve energy efficiency.

If we know how people use space – if they cluster in groups or work individually – and understand their thermal comfort preferences, we can design a space, which maximizes for worker productivity.

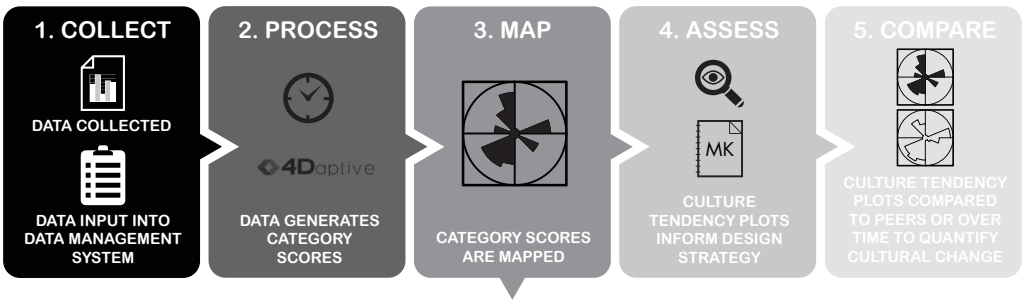
CULTURE CARTOGRAPHY

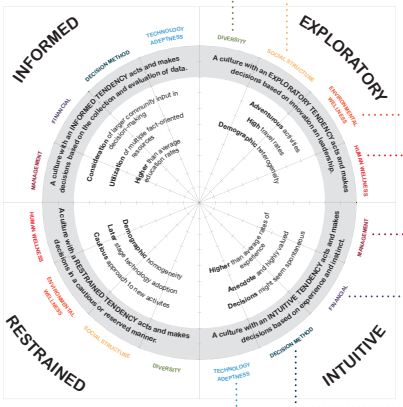
While Architectural Assets and Environmental Resources can be quantified, Cultural factors are more subjective. In an effort to quantify Culture, MKThink developed a Culture Cartography Tool.

The 8-spoked wheel maps an organization's current culture form against an ideal state – either of the organization in the future or of an aspiring peer organization. Data is collected, mainly from surveys, to populate the cultural categories – diversity, social structure, environmental wellness, human wellness, management, financial, decision method, and technology adeptness.

Based on the organization's position on each of the scales they are more broadly categorized as informed or intuitive and exploratory or restrained. Once cultural tendencies are mapped, a comparative analysis between current and ideal states informs design decisions

HOW DOES IT WORK?





DIVERSITY: a culture's human heterogeneity and homogeneity in terms of gender, age, skill set, race, etc.

SOCIAL STRUCTURE: degrees to which a culture inhabits a space in a collective or individualistic way in terms of spatial preferences, proximities, adjacencies, etc.

ENVIRONMENTAL WELLNESS: the sustainability and self-suffiency of a culture's operations; whether the culture imports or exports cultural resources, such as human capital, commute time distance or its members, and operational resource intensiveness

HUMAN WELLNESS: the resilience or fragility of a culture's members in terms of physical, psychological, emotional, and social health

MANAGEMENT: the variety of ways in which a culture's management techniques, procedures, and hierarchy indicate their inclination to be centralized or decentralized, the way in which power is focused or distributed among a culture

FINANCIAL: a culture's financial management practices with respect to risk, in terms of preference and strategy as well as investment and expenditure

DECISION METHOD: the variety of influences on a culture's decision-making processes, in terms of data use, the nature and complexity of its think tanks, the ideational interval from problem to solution, etc.

TECHNOLOGY ADEPTNESS: a culture's technological experience and proficiency; their documented and anticipated technology adoption habits and preference

WHY IS THIS VALUABLE?

CULTURE CARTOGRAPHY is designed to help organizations answer questions critical to the realization of their potential with solutions rooted in their built environments, outlined in the following example:

PROBLEM
Liberal Arts College intuits that its graduates are struggling in the new innovation-based economy.

→

APPROACH
CULTURE CARTOGRAPHY indicates deficiencies in Technology Adeptness and collective Social Structure when compared to a high-performing peer.

→

SOLUTION
Strategic design intervention is developed for effective cultural change and monitored with **CULTURE CARTOGRAPHY** over time.

Who Are You? → Who Do You Want To Be?

CONCLUSIONS

In REACHE 1, MKThink conducted the necessary research to establish an informed hypothesis and developed metrics to test the hypothesis. With the key indicators, performance could be evaluated and the relationships between Architecture, Environment, and Culture could be better understood. The REACHE projects to follow employ the logic developed in REACHE 1 and demonstrate its value.