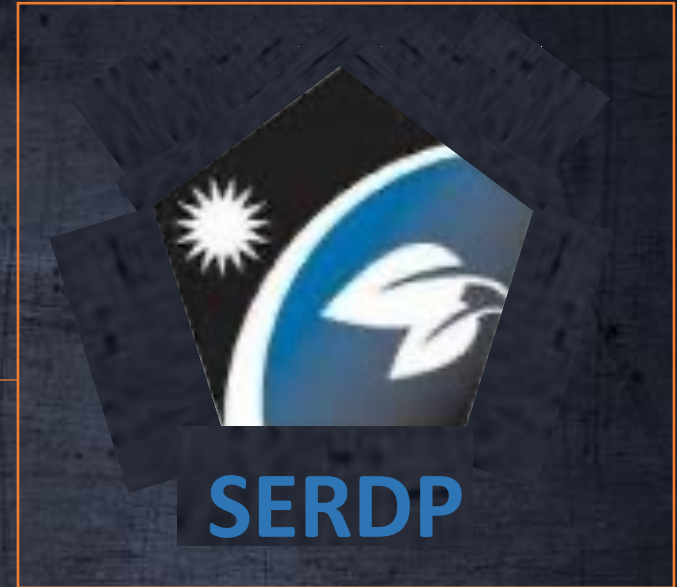# Addressing Compound Threats: Army Installations Strategy as an Enabler to Army Modernization and Multi-Domain Operations

SERDP NICE (RC20-1183) Project Workshop

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1 NOV 2022

Army Modernization, Multi-Domain Operations, and Installations Modernization

"An MDO ready force equipped with the strength, agility, and __resilience__ to retain a competitive advantage against any adversary."

Compound Threat Potentials
to Installation Sustainability and Resilience

Installations must address combinations of threats to sustain mission readiness and operational resilience:

- Global issues, e.g., pandemics, and regional issues, e.g., adjacent community impacts and relations management
- Rogue actor physical / cyber attacks at homeland installations and abroad
- Climate changes to weather extremes, biome shifts, and sea levels, which impact installation natural / built infrastructure conditions and functions
- Delivery of reliable and efficient alternative energy and clean water
- Installation mission competition / conflicts with managing critical habitat lands and their threatened and endangered species
- Installation modernization keeping pace with Army Modernization
- Budget constraints on Army operational readiness for power projection and support of Multi-Domain Operations

Installation Infrastructure Under Compound Threat Potentials

STRATEGIC SUPPORT   OPERATIONAL SUPPORT   TACTICAL SUPPORT

Built Environment   Natural Environment

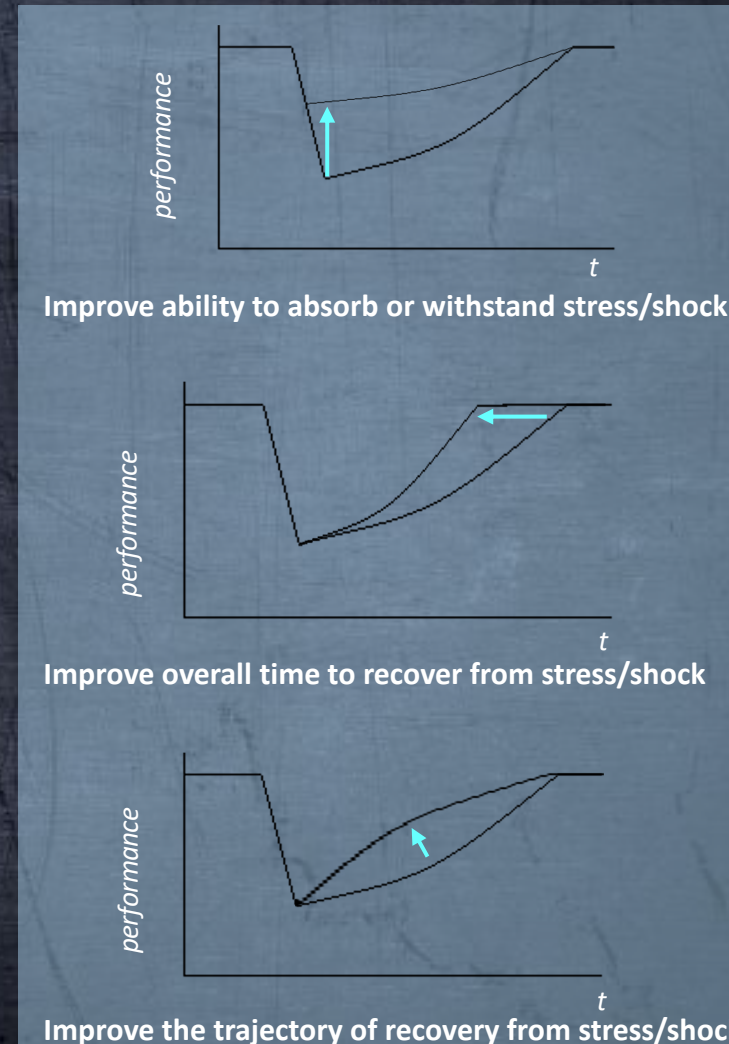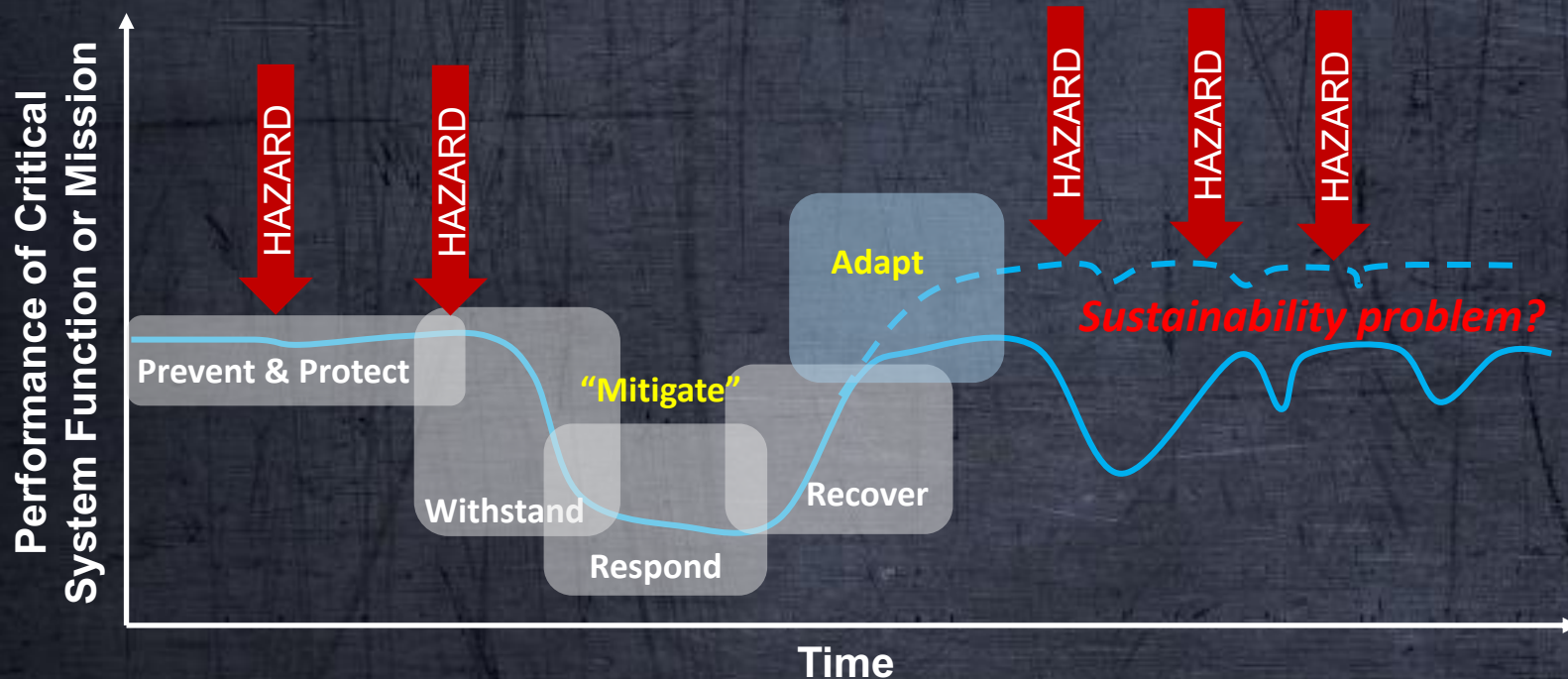| Facilities	Transport	Energy Harvesting & Generation	Energy Management	Data Infrastructure	Water	Waste	Supply Life Cycle	Theater
Housing	Installation transport	Solar	Electrical grids & storage	Broadband networks	Monitoring	Preparation	Class I consumable water use	Intelligence preparation of the battlefield
Non-housing	Military transport	Wind	Distribution	Telecommute software & services	Storage	Reuse	Class III fuel production	Operational environment lands
Resource and services provisioning	Rail infrastructure	Geothermal	Management	Data hubs	Treatment	Recycling	Class IV construction materials use	Tactical environment lands
Systems for efficiency	Aviation infrastructure	Bioenergy	Governance	Power management	Distribution	Biological treatment	Class V munitions use	Deep maneuver terrain assessment
Cultural & natural resources	Water-borne infrastructure	Hydropower			Flood defense	Waste to energy	Class IX repair materials use	Contingency basing
Conservation & restoration practices		Marine renewables			Nature-based solutions	Landfill	Supply chain management	
Urban community interfaces		Nuclear power				Radioactive waste management		

Installations Services

Installations Sustainability and Resilience

Resilience is the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. (DoDD 4715. 21)


RESILIENCE CAN IMPROVE PERFORMANCE IN DIFFERENT WAYS

Improve ability to absorb or withstand stress/shock

Improve overall time to recover from stress/shock

Improve the trajectory of recovery from stress/shock

Linkov et al, Nature Climate Change 2014

Installation resilience is a function of its capacity to prepare for disruptive events, absorb or withstand their impact, respond and recover performance, and adapt to be better prepared for future events. (National Research Council, 2012)

Building Installation Performance Capacity Against Compound Threat Impacts
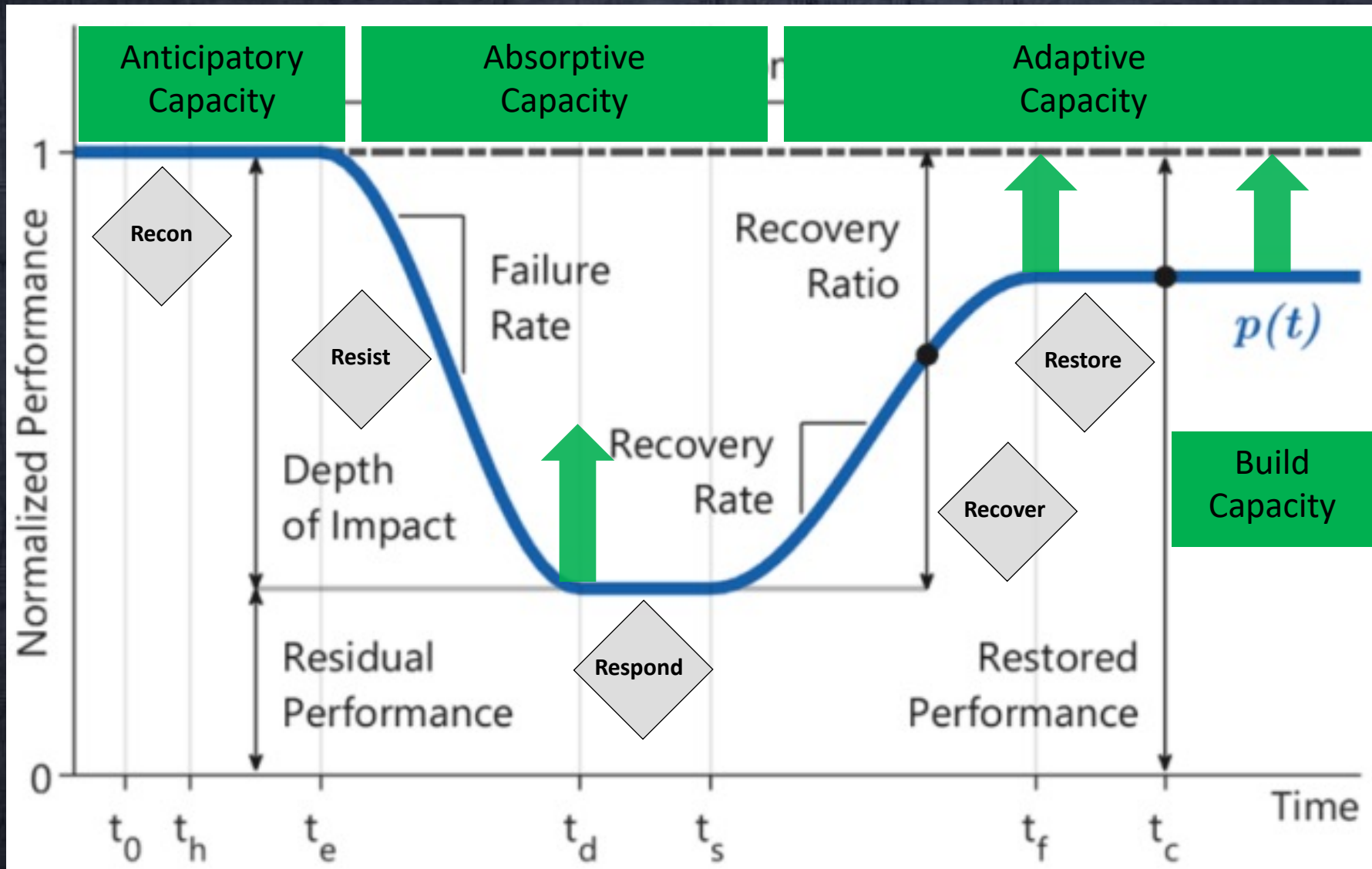
Poulin, C., & Kane, M. B. (2021). Infrastructure resilience curves: Performance measures and summary metrics. *Reliability Engineering & System Safety*, 216, 107926.
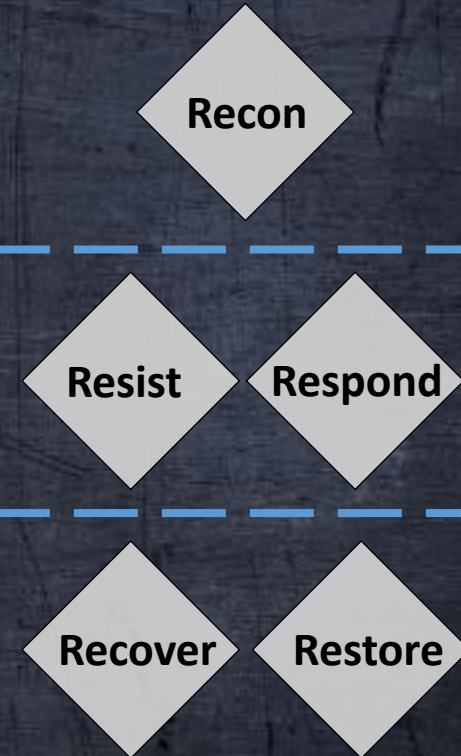
Resilience Capacity Building for Sustainability

- **Anticipatory capacity**: Anticipate and reduce the impact of compound threats through preparedness and planning.

- **Absorptive capacity**: Use available skills, technologies, and resources to face and manage adverse conditions, emergencies, or disasters.

- **Adaptive capacity**: Adapt to multiple, long-term and future compound threat risks, and also to learn and adjust after disasters.

Recon

Resist   Respond

Recover   Restore
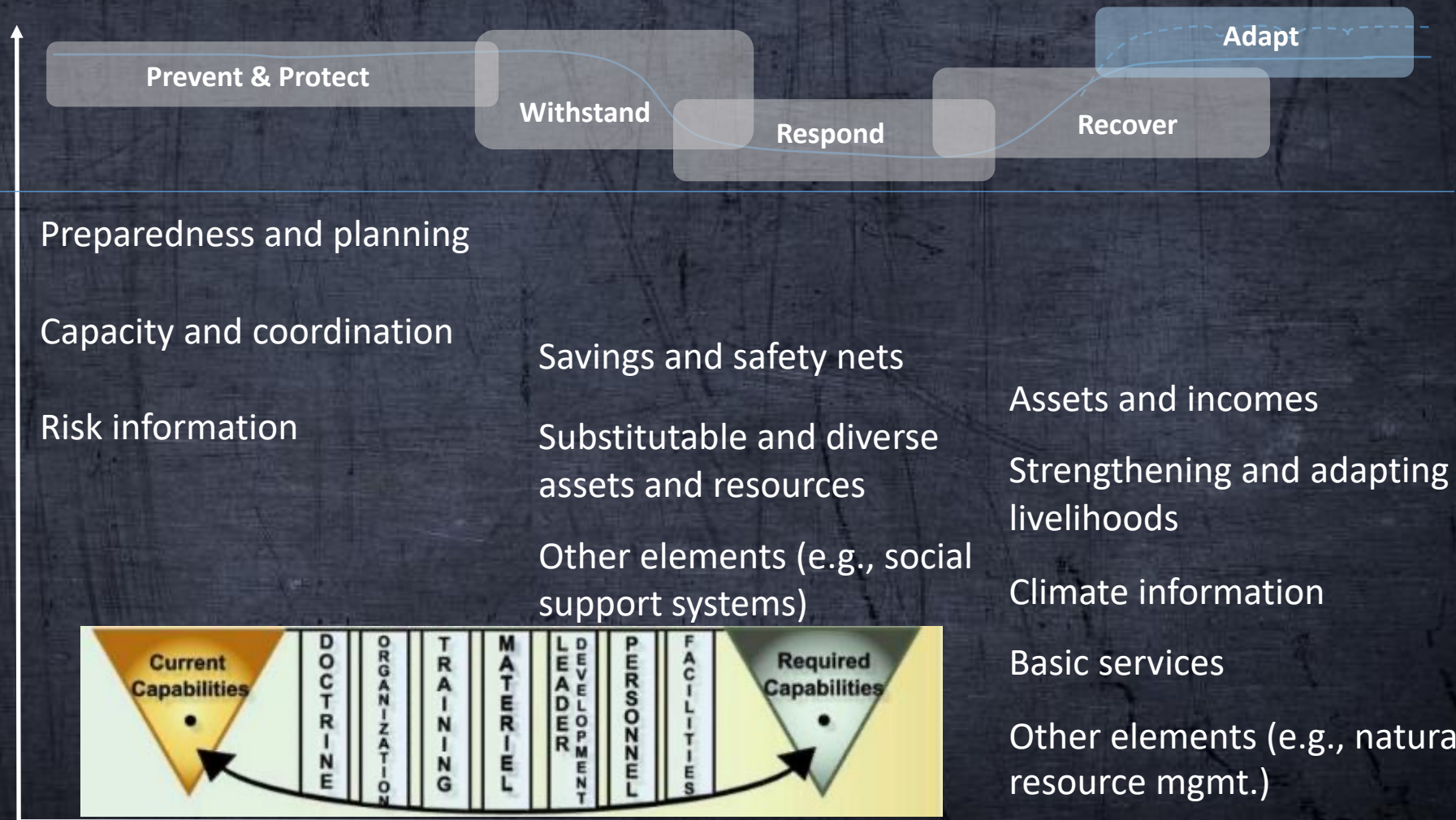
Stages for Building Resilience Capacity

Mission Resilience (vertical axis)

Resilience Timeframe (horizontal axis)

Stages (top): Prevent & Protect → Withstand → Respond → Recover → Adapt

Anticipatory
- Preparedness and planning
- Capacity and coordination
- Risk information

Absorptive
- Savings and safety nets
- Substitutable and diverse assets and resources
- Other elements (e.g., social support systems)

Adaptive
- Assets and incomes
- Strengthening and adapting livelihoods
- Climate information
- Basic services
- Other elements (e.g., natural resource mgmt.)

Diagram: Current Capabilities → DOCTRINE, ORGANIZATION, TRAINING, MATERIEL, LEADER DEVELOPMENT, PERSONNEL, FACILITIES → Required Capabilities

Policy Guidance Informing Installations Sustainability and Resilience

DoD/Army Guidance
National Defense Strategy
Army Strategy and Vision 2018
Army Modernization Strategy
Army Modernization Priorities 2019/2020
Army Acquisition Requirements
Program Executive Requirements

Biden Administration Guidance
Climate Change
Threats to National Security

Installation Guidance
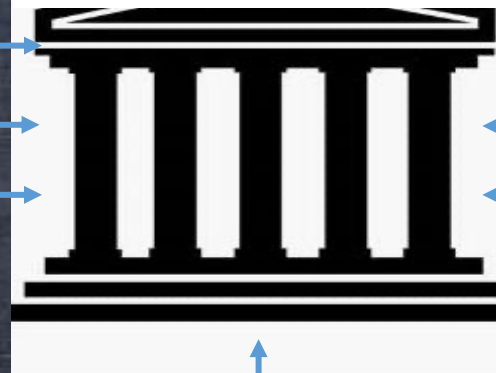Army Installation Strategy
Army Climate Resilience Handbook
Army Installation Energy and Water
Strategic Plan
Army Sustainable Design and
Development Policy

Climate Change Guidance
DOD Climate Adaptation Plan
DOD Climate Risk Analysis
Army Climate Strategy
USACE Climate Action Plan

Strategic Planning and Implementation

Regulatory Considerations
Clean Water/ Air Act
Toxic Substances Control Act
Endangered Species Act
Energy Policy Act
National Environmental Policy
Occupational Safety and Health
Pollution Prevention Act
REACH Regulation

USACE R&D Guidance

Arctic Guidance
NSPD-66 (2009)
National Strategy for the Arctic Region (2013)
DoD Arctic Strategy (2013/2016/2019)
Regaining Arctic Dominance (2021)
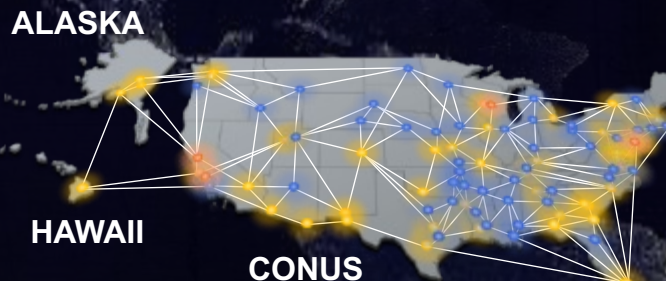IARPC Arctic Research Plan (2022-2026)

POM Guidance
ERDC POM Position
AFC Position
ASA(ALT) - Position

Army Installations Strategy, 2020

SECRETARY OF THE ARMY PRIMARY OBJECTIVES

Modernizing Installations Supporting a Modernized Army in Multiple Domains

EVOLVING OPERATING ENVIRONMENT

(1) Putting Army on a Sustainable Strategic Path

(2) Ensuring Army becomes more data-centric and can operate in contested environments

(3) Continuing efforts to be more resilient with Climate Change

(4) Building positive command climate at scale

(5) Reducing harmful behaviors

(6) Adapting way we recruit and retain talent

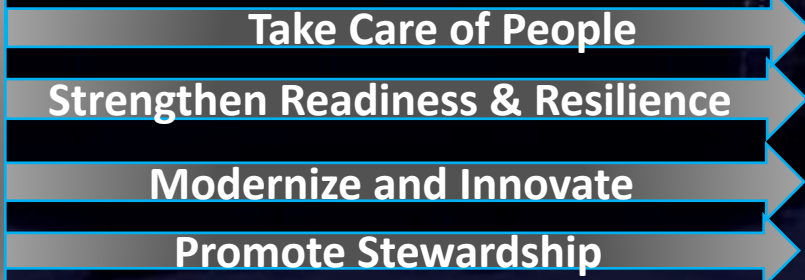**Ecosystem of Installations**

ALASKA

HAWAII

CONUS

- USAR
- ARNG
- Active Army

- Contested Homeland
- Multi-Domain Operations
- Technology
- Pandemic Preparedness
- Humanitarian Missions
- Climate

4 LINES OF EFFORT (LOEs)

- Take Care of People
- Strengthen Readiness & Resilience
- Modernize and Innovate
- Promote Stewardship

PEOPLE   *READINESS*   *MODERNIZATION*
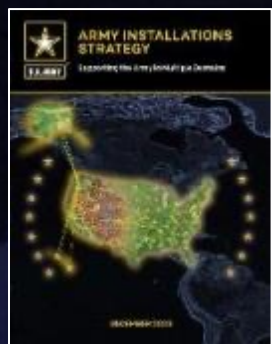
ENDSTATE
Modern, resilient, sustainable installations, enhancing strategic readiness in a contested MDO battlespace, while providing quality facilities, services & support to our Soldiers, Families & Civilians

ARMY INSTALLATIONS STRATEGY FRAMEWORK

|	LINES OF EFFORT	ENABLERS		STRATEGIC OUTCOMES	END STATE
1	**TAKE CARE OF PEOPLE** • Adapt Quality / Functional Facilities • Deliver Modern Services • Conduct Safe Operations	D A T A A N A L Y T I C S	P A R T N E R S H I P S	**Attract, Retain, and Enable People**	Modern, resilient, sustainable installations, enhancing strategic readiness in a contested MDO battlespace, while providing quality facilities, services, and support to our Soldiers, Families, and Civilians.
2	**STRENGTHEN READINESS and RESILIENCE** • Operationalize Installations • Expand Protection • Adopt Resilient Systems ⬅ • Educate / Train the Team			**Project Combat Power and Sustain Operations from a Contested Environment**	
3	**MODERNIZE and INNOVATE** • Modernize and Secure the Information Backbone • Support Army Modernization Initiatives in the AMS • Transform Installation Operations • Reward Innovation			**Modernized Installations Supporting the Modernized Army**	
4	**PROMOTE STEWARDSHIP** • Preserve Natural Resources / Sustain the Mission • Remediate Contaminants • Implement Risk-Informed Metrics and Modern Technologies			**Healthy, Sustainable Training, Working, Living Environment**	

U.S. ARMY
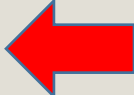
AIS LOE 2: Strengthen Readiness and Resilience, Adopt Resilient Systems

- DoD will carry out military construction projects for installation resilience and ensure readiness of armed forces for military missions by pursuing energy security and resilience (10 U.S.C. 2815 and 2911)
- Army energy and water systems will be resilient, cyber-secure, and efficient
- Electrical, water, and communications systems on Army installations and surrounding communities are essential to mission success, but remain vulnerable to natural and man-made disruptions creating a "weak link" in Army's ability to generate strategic readiness
- Army will act to ensure robustness of infrastructure systems and capabilities, including facility and industrial control systems of all types
- Initial steps will determine risks and costs of:
  - Losing power/water (i.e., putting a 'price' on resilience)
  - Developing appropriate return-on-investment metrics to guide investments
  - Prioritizing investments based on contributions to mission accomplishment

AIS Implementation Plan Governance

- Installations Program Evaluation Group (II PEG) co-chairs (ASA (IE&E), and Commanding General, AMC) will prioritize and synchronize implementation and execution of the AIS and ensure integration into Planning, Programming, Budgeting, and Execution (PPBE) process, Army Campaign Plan, Army Review Council, and other decision forums as required

- G-3/5/7* will validate and approve prioritization requirements derived from Operation Plans (OPLANs) and Posture requirements

- DCS, G-9** will implement/integrate governance activities

- CIO, COE, G-3/5/7, and other providers and stakeholders will attend collective governance forums

* G-3/5/7 – Operations, Plans, and Training   ** G-9 – Installations

Installation Management Enterprise

ASA (IE&E)
- Strategic Direction / Policy Resource Oversight
- Resourcing Strategy

DCS, G9
- Implementation Plans Programs

AMC/IMCOM USAR & ARNG
- Operational Plans Execution

Garrisons Expeditionary / Enduring Bases
- Delivery

Collaboration — USACE

The Assistant Secretary of the Army (Installations, Energy, and Environment) (ASA IE&E) supports the Army's Strategy by providing strategic vision and policy to the installation management enterprise. **USACE provides key support throughout.**

AIS Implementation Plan Execution Timeline

Across Installations Enterprise Wide

ALASKA
HAWAII
CONUS

- USAR
- ARNG
- Active Army
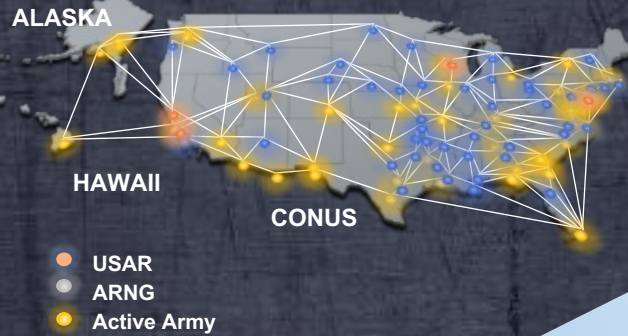
- Meet criteria
- Deploy tech
- Policy adherence
- Modernized construction
- Execution updates
- Funds suffice

Far (2030-2040) Army of 2040

Mid (2025-2030) Planning and Force Development

- Track progress
- Adapt to technology
- Update training
- Apply standards
- Program budget and execute

- Make criteria
- Assess status
- Define doctrine
- Standardize plan
- Plan execution
- Assign resourcing

Near (2022-2024) Planning and Force Employment

AIS Implementation Task of Potential Interest

LOE 2. Strengthen Readiness and Resilience

	Task	Description	Secretariat Oversight	G-9 Integrator	Execution Lead	Target FY to Complete
Strategic Objective: 2C – Adopt Resilient Systems					
9	2.6	**Black Start Exercises.** Develop a POAM before the end of FY22 for conducting five Black Start Exercises per year starting in FY23, and include a process to leverage lessons learned to enhance installation operations doctrine, resilience, and training.	DASA Energy & Sustainability (E&S)	DAIN-OD	LHCs and ASCCs	FY22 (for POAM) FY23 (for documented process)
10	2.7	**Microgrids.** Develop an action plan by FY24 for expanding the use of microgrids that support critical infrastructure on PPP & MFGIs to enhance resilience.	DASA E&S	DAIN-OD	LHCs and ASCCs	FY24 (for POAM)
11	2.8	**Control Systems.** Develop a POAM before the end of FY22 to prioritize and execute mitigations for control systems supporting critical assets and Installation critical infrastructure.	DASA IH&P	DAIN-IT	HQDA G-9	FY22 (for POAM)
12	2.9	**Resilience Return on Investment (ROI) Model.** Develop a ROI model by the end of FY23 that benchmarks insurance industry examples to enable the Army installation enterprise to price the value of resilience investments, including investments that address climate risks.	**DASA Installations, Housing & Partnerships (IH&P)**	DAIN-RD	DASA IH&P	FY23 (for proposed model)

- Intent to optimize time, money, and manpower in PPBE process necessary to reach end state goals by 2035
- Includes data science techniques to include AI/ML, deep learning, oriented to inform resource allocation decisions using measurable outcome-based metrics.
- Will follow Army Business Management Plan, 2021-2025, for Army leaders and managers achieving organizational results, anticipating and responding to needs for rapid change, and to identify and share best practices enterprise wide
- Must leverage Army Analytics Community, align with Army Enterprise and Data Analytics Strategy, 2018-2022, and incorporate cyber-security in data analytics R&D at each stage of system development

AIS Implementation Plan
Critical Enabler – Partnerships

- Partnerships will enable this implementation plan, increasing investment on Army installations, enhancing provision of services, modernizing infrastructure, and improving cooperation with other military service departments and organizations
- HQDA DCS, G-9 Partnerships Office will develop and expand Intergovernmental Support Agreements and other partnership agreements in coordination with Land Holding Commands
- As these programs grow, installations, communities, and private enterprises will gain experience working together and will thereby identify additional strategic partnership opportunities, such as application of SERDP NICE RC-1183 Project capabilities.

AIS Implementation Plan
Critical Enabler – Partnerships: ERDC/NICE

In message from Su Wolters on 31 OCT 22, ERDC Applied Research Planning Support Center (ARPSC):

- Integrating NICE as part of a holistic analytical modeling capability to inject drill down analytics, such as those envisioned for NICE, may fit well into a master planning framework, pursuant to AIS LOE 3: "Modernize and Innovate".

- To support this AIS end-state, ERDC Installations of the Future (IotF) PIs including Richard Liesen met with the NICE team in March and again in June of 2022 to discuss Virtual Testbed for Installations Mission Effectiveness (VTIME) applications such as System Master Planner (SMPL) and Sustainment Management System (SMS) PLANNER as integration possibilities.

Conclusion

- A modern Army for MDO requires installations modernize "at pace" with the Army of 2030 and 2040
- Army developed AIS in direct response to current and emerging challenges and threats, aligning with National Defense Strategy, DoD plans, and Executive Orders and legal authorities
- Army's installation modernization response will sustain mission readiness and operational resilience
- There is potential opportunity space for SERDP NICE RC-1183 Project team to inform AIS LOE 2 implementation through ROI decision science and analytics in installations adoption of resilient systems.