

# ***Headquarters U.S. Air Force***

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*Integrity - Service - Excellence*

## **External Sustainability Factors and Risk Assessment**

***Sustaining Mission – Sustaining Community***

**Year of the Air Force  
Family**



**Greg Riddlemoser  
Marstel-Day, LLC  
17 June 2010**

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- **Sustainable Installation Definition**
  - **Study Methodology**
  - **Solution Architecture**
  - **Current Process**
  - **Literature Search**
  - **Factor Considerations**
  - **Study Products**
  - **Challenges**
  - **Related work: Compatibility issues for ranges and airspace**
  - **Discussion**



# *Sustainability Assessment Process*

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- **Context – AF Definition of a Sustainable Installations:**

**"A sustainable installation efficiently supports current operations with minimal impact on the built and natural environment without compromising the ability to meet future mission requirements."**
- **A sustainable installation is supported by a planning process that takes a holistic view of the interactions and interrelationships of the natural and built environment and considers both **internal and external** (inside and outside the fence) stakeholders and issues**



# Methodology Phases

## Problem Identification

- Define End State
- Develop an Architecture

## Discovery

- Understand the AF “As Is” processes
- Research Similar Systems
- Understand data sources and collection difficulties
- Obtain Approval for Next Steps

## Prototype Output Form and Information

- Identify Key AF Factors
  - Installations
  - MAJCOM
  - HAF Staff
- Identify sustainment factors important to others
- Prepare prototype output
- Identify development limitations and costs

## Obtain Approval to Develop Initial Product Set

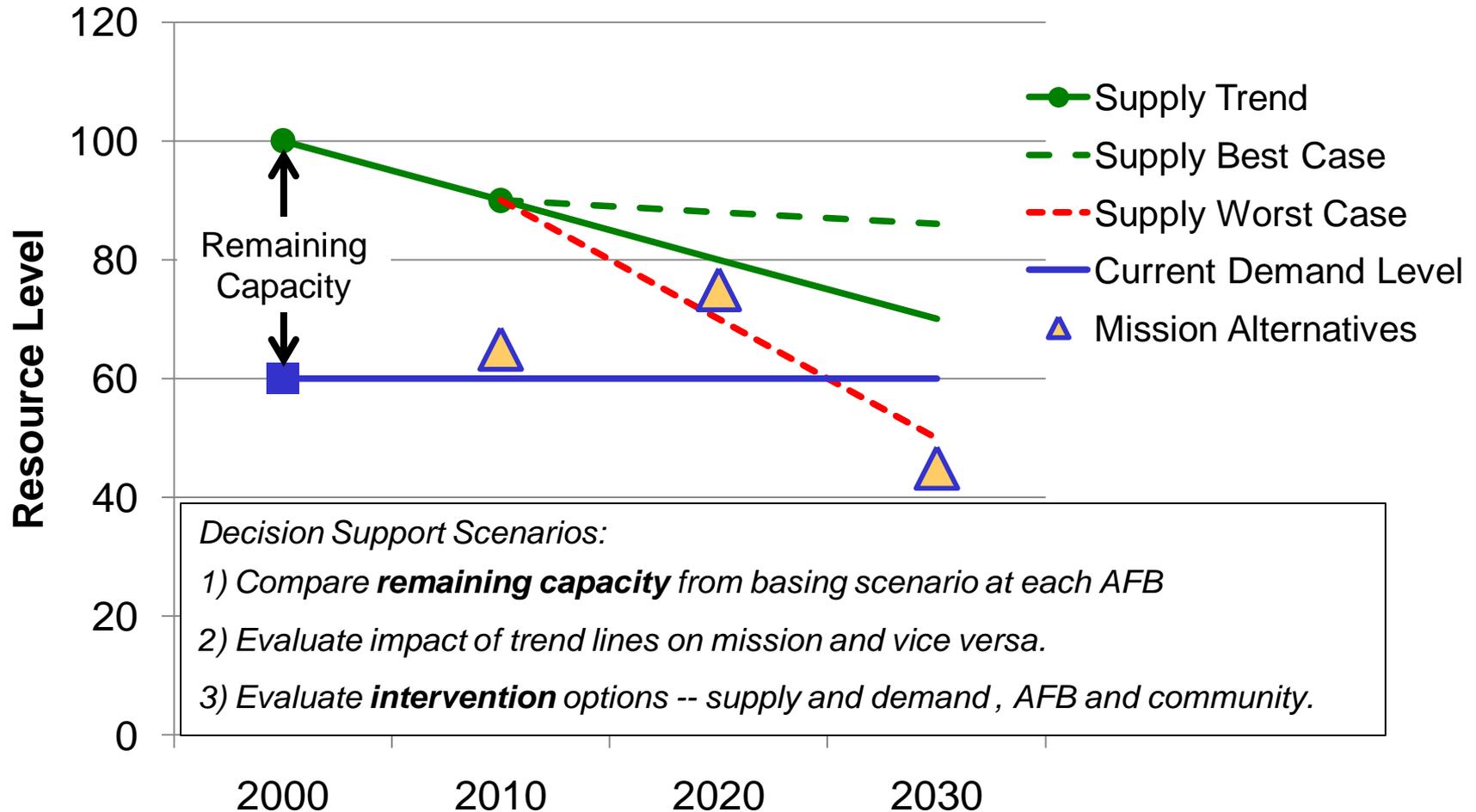
## Production

- 5 Information Papers
- Supporting Analysis
- Recommendations for Way Forward
- Leadership Briefings



# The Ideal End State Analysis Capability

## Evaluating Supply/Demand Scenarios (Notional)





# *Building to the Solution Architecture*

## Current State

- Limited database(s)
- Limited sources of Information that are:
  - Accurate
- Limited analysis concerning external factors enhancing/inhibiting mission impacts
- Profile of selected negative interactions
- No Air Force interface with IT systems

## Transitional State

- National and Air Force database(s)
- Information that is:
  - Accurate
  - Complete
  - Relevant
- Profile of key mission impacts
- Profile of key interactions
- Easily shared with NexGen IT

## End State

- National database(s)
- Information that is:
  - Accurate
  - Complete
  - Relevant
  - Updated
  - Optimal ROI
- Complete profile of mission impacts
- Complete profile of interactions
- Easily shared with NexGen IT

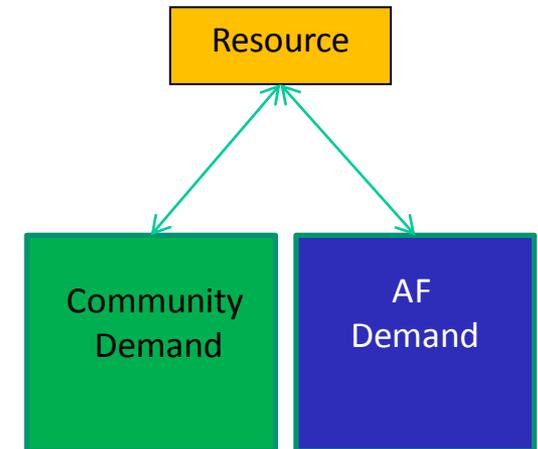


# Resource/Issue Sustainment Scenarios

Alternative Scenarios

Context

Factor Time	Current Supply or Issue	Future Supply or Issue
Current Operations	Scenario 1	Scenario 3
Future Operations	Scenario 2	Scenario 4

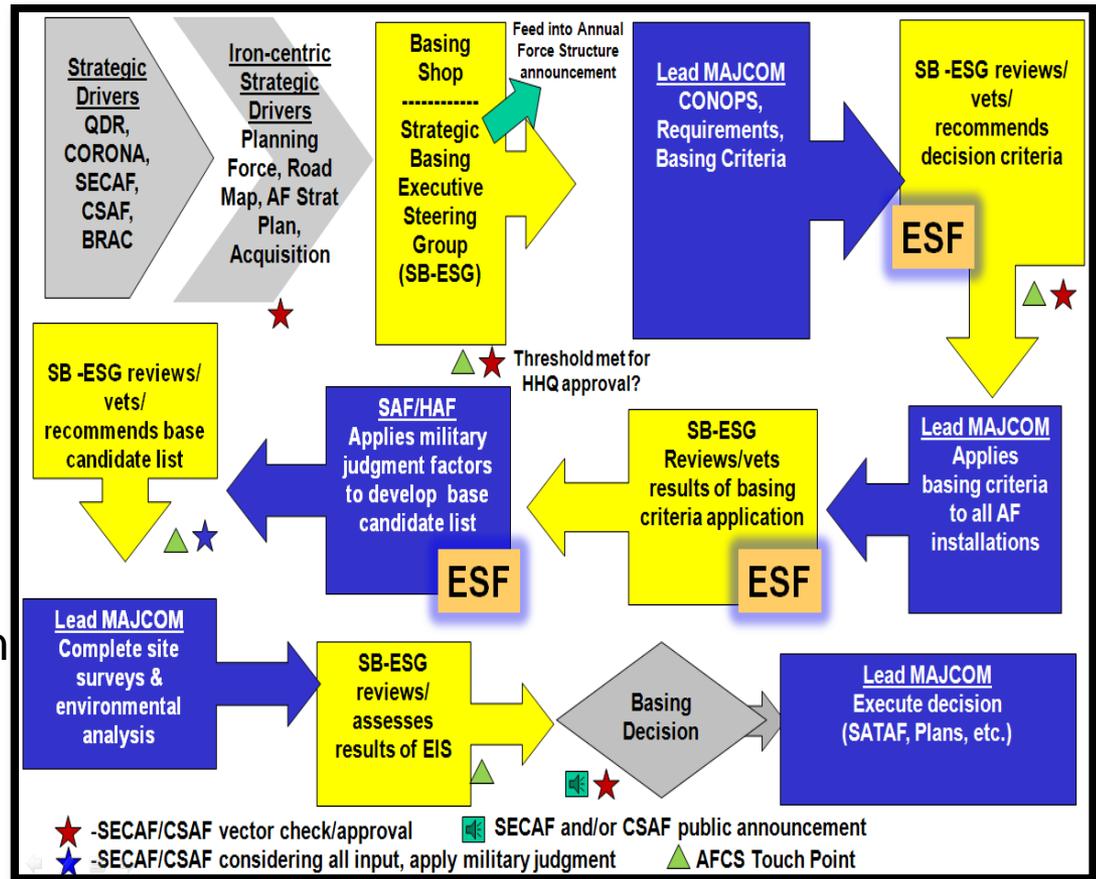




# Current External Factor Considerations

## Current External Factors Considered by A8

- Endangered Species
- Cultural Resources
- Encroachment
  - Noise
  - Accident Potential Zones
  - Imaginary Surface
- Spectrum Availability and Non Interference
- Cost of Living Index
- Selected issues associated with Medical, Schools, Housing, and Services



ESF - External Sustainability Factors

# *Literature Review: Selected Documents*

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## Scope of Work

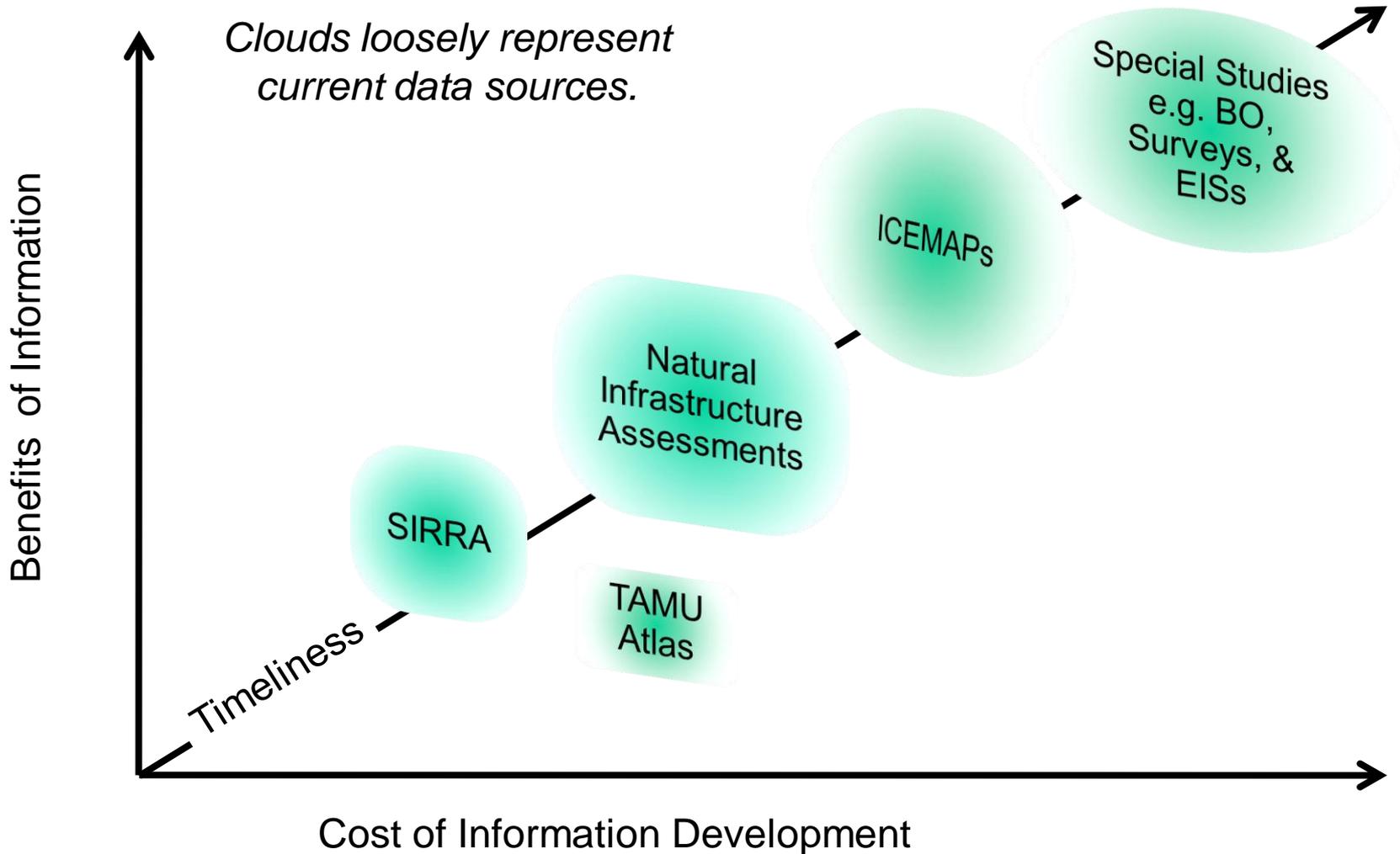
- SIRRA (web-accessible database by CERL)
- Military Installations in Texas: An Atlas
- Selected AF Environmental Impact Statements
- INRMP/ICRMP
- 366 Report to Congress
- Natural Infrastructure Assessment (NIA)

## M-D Additional

- Service Encroachment Control Plans
- Guam Compatibility Sustainability Study and OEA Defense Community Profiles 2009
- 2005 BRAC Files
- Web Search for sustainability assessment systems
- *Sustainability Assessment of a Military Installation (SERDP) and Developing Headquarters Guidance for Army Installation Sustainability Plans (RAND)*
- Military family support sites (QOL)
- Defense Critical Infrastructure Guidance and documents



# Cost v Benefits v Timing



# ***Data Characteristics and Sources***

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## **Characteristics**

- Relevant to decision process
- Available on scale that is useful
- Current (and kept current)
- Accurate
- Comparable among installations
- Uses a known metric
- Authoritative source
- Verifiable
- Cost-effective to obtain and evaluate

## **Sources**

- Federal Agencies: US Census, USGS, EPA, NOAA, DoD....
- Commercial
  - GIS: ESRI, PolicyMap, EarthData, Imagenet....
  - Utilities: Energy, water, telecom
- State Agencies
- Regional Councils
- County Planning Authorities
- Other



# *Identify Key Factors through Consultations*

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- Visit Selected Installations
  - Langley AFB
  - Homestead Air Reserve Base
  - Buckley AFB
  - Patrick AFB
- Visit Selected MAJCOMS
  - ACC
  - AFSPC
- Establish a Headquarters Encroachment Management Committee/Working Groups
- External Sustainability Subject Matter Expert Workshop
- USACE Civil Engineering Research Laboratory (Completed)

# *Information Relationships*

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- **Air Force Core Functions - 12**
- **Category Groupings - 10**
- **Sustainability Factors within the groupings – 41**
- **Factor Score or Indication - 6**



# *Air Force Core Functions*

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- **Nuclear Deterrence Operations**
- **Air Superiority**
- **Space Superiority**
- **Cyberspace Superiority**
- **Global Precision Attack**
- **Rapid Global Mobility**
- **Special Operations**
- **Global Integrated ISR**
- **Command and Control**
- **Personnel Recovery**
- **Building Partnerships**
- **Agile Combat Support**



## ■ Category Groupings

- Military Operations – 4 Factors
- Spectrum – 2 Factors
- Resources – 5 Factors
- Extreme Events – 5 Factors
- Land Use Regulations – 5 Factors
- Support Capacity - 7
- Transportation and Access - 2
- Supply – 4 Factors
- Community Relationship – 4 Factors
- Trends – 3 Factors



# List of Factors Under Consideration

## ■ Factors

- Development Inside 65 DNL Noise Contour
- Incompatible Development in CZ/APZs
- Obstructions – Imaginary Surfaces around airfields
- Obstructions – Other
- Spectrum Interference – EMI
- Spectrum Interference – Physical
- Electric Energy Reliability
- Military Highway System
- Commercial Airport Proximity
- Water Supply
- Receiving Water Quality
- Threatened and Endangered Species
- Air Quality

## ■ Factors (con't)

- Schools Availability and Capacity
- Schools Quality
- Housing Availability
- Hurricanes
- Lightning Density
- Sea Level Rise (Climate Change)
- Seismic Activity
- Tornadoes
- Local Govt Regulated Land
- State Govt Regulated Land
- Federal Govt Regulated Land

## ■ Factors (con't)

- Native American Regulated Land
- Unregulated Land
- Small Businesses
- Skilled Trades
- Technical Schools
- Universities
- Local Ex Officio Membership
- Media Monitoring
- MOU w/ Local Police & Fire Departments
- MOU/Membership with Regional Councils
- Economic Index
- Population Growth Rate
- Unemployment Rate



# Factor Indications

- Identify the factor potential to affect the AF action
- Looks at negative and positive outcomes

KEY	
Factor Indication to Mission	Indicator Color
Significant Threat	Red
Moderate-to-Significant Threat	Orange
Moderate Threat	Yellow
Threat Developing	Light Green
No Threat	Green
Enhances Mission	Purple

# Prototype Installation Fact Sheet

- Display Requirements
  - A satellite map of the installation, with both an internal and external view.
  - Geographic context of the installation.
  - A description of the installation mission.
  - Risk Assessment table for each mission currently undertaken at the installation.
  - Discussion of current encroachment monitoring and management efforts at the Installation .
  - Summary of datasets used to conduct analysis.
- Uses an atlas layout approach
- Eventually must translate into a Heads Up Display

**Geographic Context**

**Local Governments**  
 Cities: City of Hampton, City of Newport News, City of Poquoson, City of Williamsburg  
 Counties: Gloucester County, James City County, York County

**Climate**  
 Langley AFB's climate is temperate, characterized by long hot summers and shorter, usually mild winters. As a coastal climate, it has fairly narrow daily temperature swings compared to other parts of the country due to a high relative humidity.

**Relationship**  
 Langley AFB is highly proactive in connecting with worthwhile causes in the community. In early 2010, for example, Langley's web site listed more than a dozen volunteer opportunities.

**Economics**  
 One billion dollars in payroll & local expenditures generated at Langley AFB in 2008 translated to \$1.2 billion through secondary hiring and business opportunities. An estimated 6,580 secondary jobs were sustained/created by the presence of Langley AFB.

**Current External Encroachment Management Status**

Studies	Completed	Planned or In Progress	Not Applicable
AICUZ	X		
BAICUZ			X
ILIS		X	
Encroachment Assessment		X	
INMAP	X		
NIA	X		

- **State**
  - o Key Legislation: Land Use Planning and Conservation Around Military Installations and the Notification of Military/Naval/Space/Defense Requirements/Noise Pollution/Open Space Conservation and TDR
  - o Virginia Military Advisory Council
- **Regional**
  - o Hampton Roads Planning District - Transportation/Economics/Emergency Management
- **Local**
  - o Hampton Comprehensive Plan/Community Plan/Regulatory Land Use/Zoning/ Director of Federal Facilities Support

**External Sustainability Fact Sheet - Notional for Langley AFB (Excludes Fort Eustis)**

**Proposed Actions**  
 None. This information provides baseline values representing current status of selected external sustainability factors.

**Mission Summaries**

**Administration**  
**Air Combat Command** is the primary force/provider of combat airpower to America's warfighting commands. To support global implementation of national security strategy, ACC operates fighter, bomber, reconnaissance, battle-management and electronic combat aircraft. It also provides command, control, communications and intelligence systems, and conducts global information operations. As a force provider, ACC organizes, trains, equips, and maintains combat-ready forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime air defense.

**Operational**  
**The 1st Fighter Wing**, which is the host unit at Langley Air Force Base, operates and maintains one of the largest fighter bases in Air Combat Command. The wing flies the F-22A Raptor and F-15 Eagle. The 1st Fighter Wing's mission is to "Train, organize and equip expeditionary Airman, deploy, fight and win, provide world class support to Team Langley."

**480th ISR Wing** conducts regionally focused, globally networked Intelligence, Surveillance and Reconnaissance (ISR) warfighting operations, to meet Combatant Command, Component and national needs.

Additionally, the National Aeronautics and Space Administration has a small fleet of aircraft at its NASA LaRC hanger, located on the west end of the base.

**Vicinity Photos**

Factors	Core Functions Supported			Core Functions Supported Future
	Air Superiority	Command and Control	Agile Combat Support	
Threatened and Endangered Species				
Development Inside 65 dB DNL				
Noise Contour				
Incompatible Development in AFZ				
Spectrum Availability and Non-Interference				
Aviation Obstructions (Imaginary Surface)				
Economic Index				
Water Supply				
Receiving Water Quality				
Electric Energy Reliability				
Quality of Life				
Population Density				
Population Growth Rate				
Sea Level Rise (Climate Change)				
Seismic Activity				
Community Relationship Quality				
Air Quality				

Factor	Data Source
Threatened and Endangered Species	U.S. Fish and Wildlife Service
Development Inside 65 dB DNL	National Land Cover Database
Incompatible Development in AFZ	National Land Cover Database
Spectrum Availability/Non-Interference	Natural Infrastructure Assessment
Aviation Obstructions	Federal Aviation Administration
Economic Index	ACCRA Cost of Living Index
Water Supply	Natural Infrastructure Assessment
Receiving Water Quality	Natural Infrastructure Assessment
Electric Energy Reliability	Dominion VA Power / SERC Reliability Corp.
Quality of Life	U.S. Census Bureau
Population Density	U.S. Census Bureau
Population Growth Rate	U.S. Census Bureau
Sea Level Rise (Climate Change)	U.S. National Ocean and Atmospheric Admin.
Seismic Activity	U.S. Geological Survey
Community Relationship Quality	Langley AFB
Air Quality	Natural Infrastructure Assessment

**Notes:**

**Significant Threats**  
 No threats classified to be Significant as of January 22, 2010.

**Moderate-to-Significant Threats**  
 No threats classified to be Moderate-to-Significant as of January 22, 2010.

**NET**

Factor Indication to Mission	Indicator Color
Significant Threat	Red
Moderate-to-Significant Threat	Orange
Moderate Threat	Yellow
Three Developing Threats	Green
Enhances Mission	Purple



# Key Outcomes

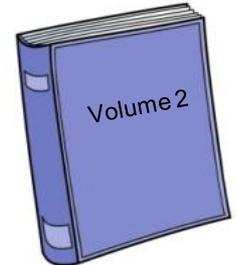
## Volume 1

- Introduction
- Executive Summary
- Installation Fact Sheets
  - Geographic setting
  - Mission description
  - Factor evaluation table
- Supporting Documentation
  - Data sources
  - Installation-specific analysis



## Volume 2

- Introduction
- Factor Selection
- Factor Scaling
- Factor Scoring by Mission
- Installation Selection
- Lessons Learned
  - Level of effort
  - Data characteristics encountered
  - Limitations to methodology
- Way Ahead



- Volume 1 demonstrates evaluation of factors for selected installations
- Volume 2 discusses project purpose, methodology and lessons learned



# *Early Challenges*

- Identifying which external factors have highest value to AF to ensure greatest return on level of effort
- Rating levels of factors consistently in a way that
  - Can be accurately understood
  - Allows meaningful comparisons of installations
- Defining region of influence in a manner that is comparable among installations
- Obtaining data appropriately scaled to the vicinity of installations
- Ensuring that the tool will be used where envisioned (buy-in).
- Ensuring that the efforts mesh constructively with related efforts, such as NIA, AICUZ, JLUS



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## ■ Topical Areas

- **Noise and Safety Compatibility Criteria for Ranges and Air Space: Choice of Land Use Categories**
- **Alternative Energy Impacts on Ranges and Airspace**
- **Purpose is to initiate an AF encroachment research effort and solve AF problems simultaneously**
- **Pursue RDTE and policy research**
  - **Air Force and Army laboratories**
  - **SERDP/ESTCP**
  - **Air Force Academy, Senior War Colleges, FFRDCs, and Science Board**



- Sustainable Installation Definition
- Study Methodology
- Solution Architecture
- Current Process
- Literature Search
- Factor Considerations
- Study Products
- Challenges
- Related work: Compatibility issues for ranges and airspace
- **Discussion**