



Providing Resilient Expeditionary Airfield Infrastructure in Alaska and the Pacific

Matt Kundrot, PE
HDR Engineering, Inc.

February 26, 2025



LEARNING OBJECTIVES

- 1 Understand “The Pacing Threat” and Alaska’s Critical Role in the Pacific Defense Initiative (PDI)
- 2 Understand Factors in Improving and Developing Airfield Infrastructure in Arctic and the Pacific
- 3 Apply Lessons Learned from Airfield Experience in Alaska to the Pacific AOR
- 4 Learn the Practical Operational Requirements for Expeditionary Airfield Development in the Arctic and the Pacific
- 5 Know How to Assist the DOD for Airfield Infrastructure Improvement Efforts in the Arctic and Pacific



Source: DVIDS

AGENDA

- | | | | |
|---|----------------------------------|---|-------------------------|
| 1 | Background | 4 | Arctic Airfields |
| 2 | Alaska's Strategic Role | 5 | Expeditionary Airfields |
| 3 | Critical Airfield Infrastructure | 6 | Ideas and Solutions |
| | | 7 | Summary & Q&A |

1. Background: The Pacing Threat and Pacific Deterrence Initiative (PDI)



The Pacing Threat & Pacific Deterrence Initiative (PDI)



U.S. Adm. John Aquilino, head of Indo-Pacific Command, said “all indications” point to the Chinese military being ready for a potential invasion of Taiwan by 2027, the date China’s leader [Xi Jinping](#) has set for a possible military operation. *March 2024 (SASC)*

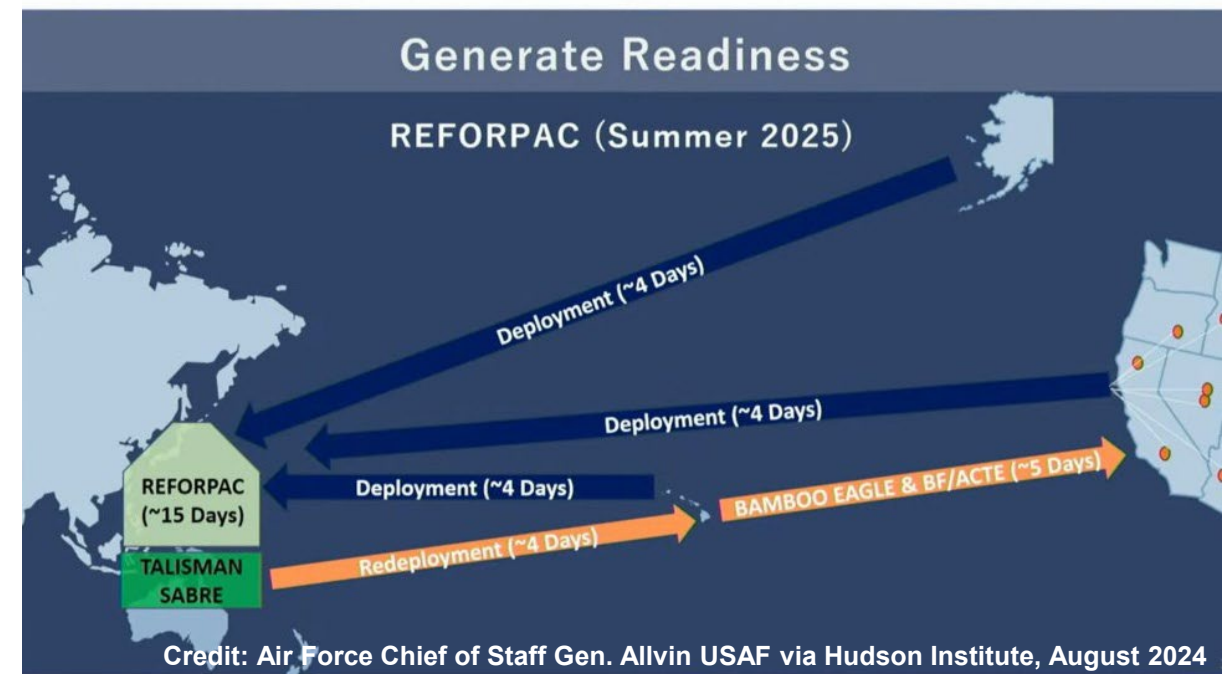
Arctic Bases & Forces are Essential to PDI

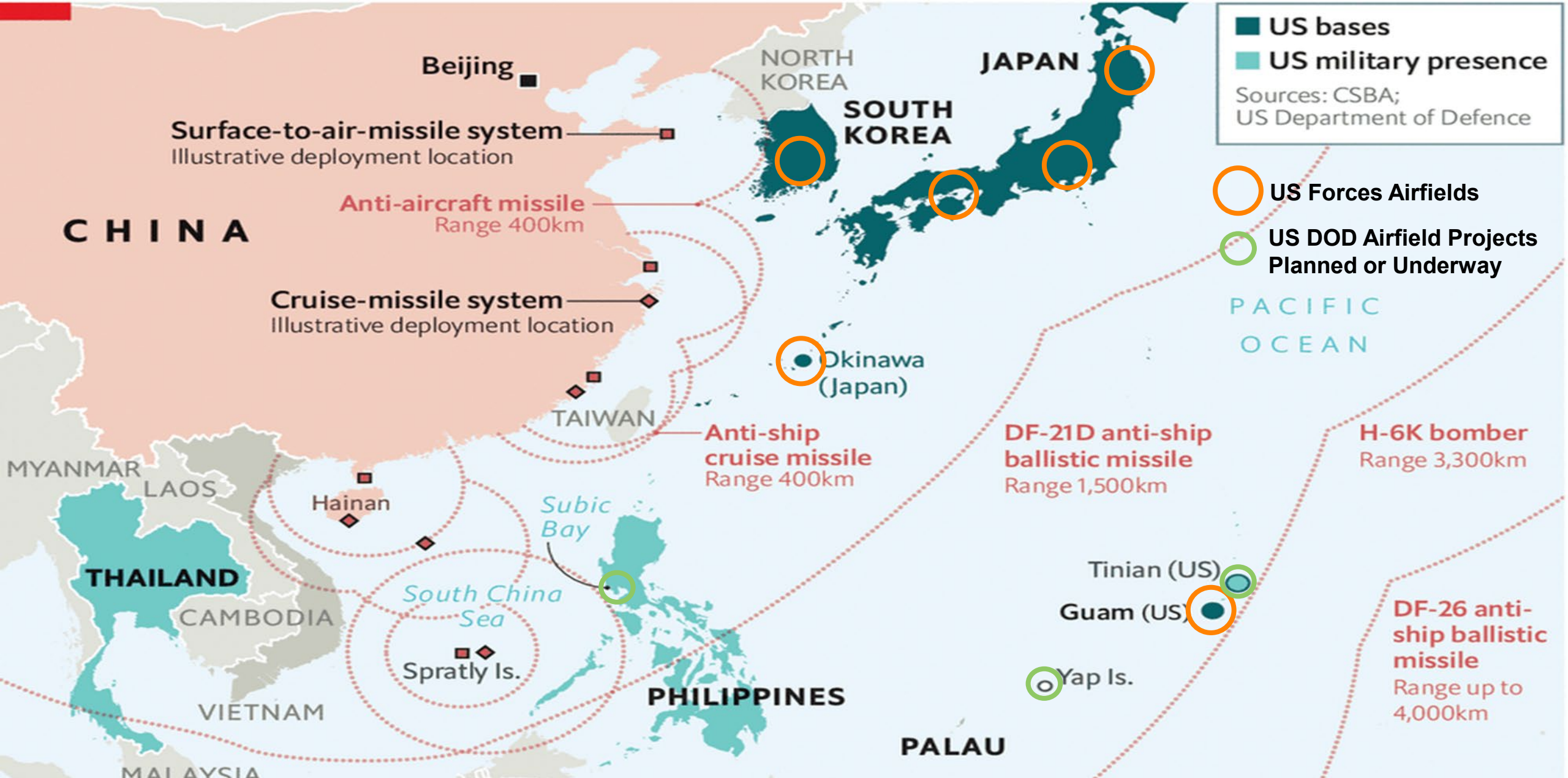
Getting There:

- Closest to respond
- Shortest/Safest routes through
 - Elmendorf
 - Hickam and Wake Island
 - Direct (with Air Refueling)

Going Where:

- Main Operating Bases: **First Island Chain**
- Expeditionary Bases: **Second Island Chain**





Over 10 years of preparations, only one major US DOD capacity enhancement project is under construction.



Source: DVIDS

2. Alaska's Strategic Location & Role

Alaska's Strategic Location & Role



Arctic Airfields and the C-17, Key to Providing Credible Force for the PDI

Crossroads of the Northern Hemisphere. Anywhere in a day.

JBER <> Dover: 2,960 NM
JBER <> Travis: 1,750 NM
JBER <> Ramstein: 4,100 NM
JBER <> Kadena: 3,850 NM
JBER <> Andersen: 4,000 NM

C-17 Planning Considerations

Maximum Payload: 164,900 LBS
Maximum Fuel: 240,000 LBS (Zero Payload)
Maximum Range: 6,200 NM (Zero Payload)
Fuel Burn Rate: Approx 20,000 LBS/HR

C-17 Load & Range Estimates

100 Troops & Gear (40K LBS): 4,000 NM
Patriot Launcher (100K LBS): 3,000 NM
M270 MLRS (70,000 LBS): 3,500 NM

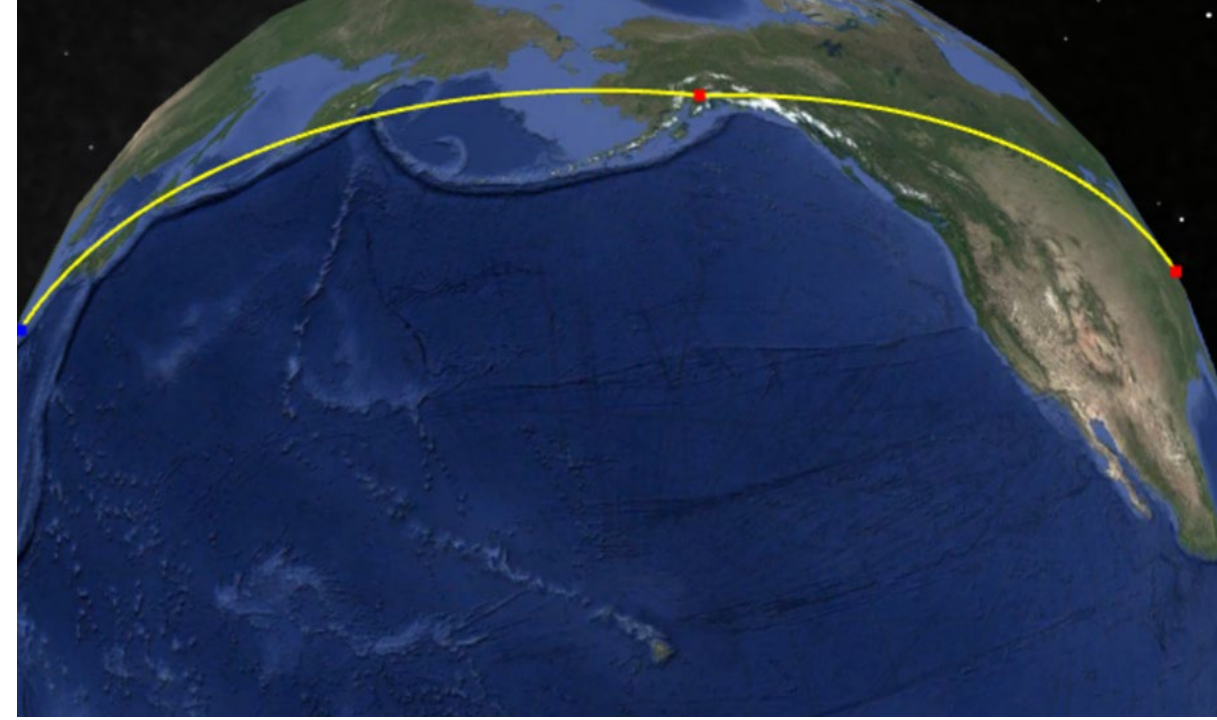
The Quickest Response is Through the Arctic

Quick Reaction Forces

C-17 with 100 Troops (40,000 LBS)

- Pope AAF to Kadena: 6,850 NM
 - Pope to Elmendorf (3,050 NM)
 - Elmendorf to Kadena AB (3,800 NM)

Every Arctic airfield runway 8,000 feet or longer is critical to moving forces to the Pacific

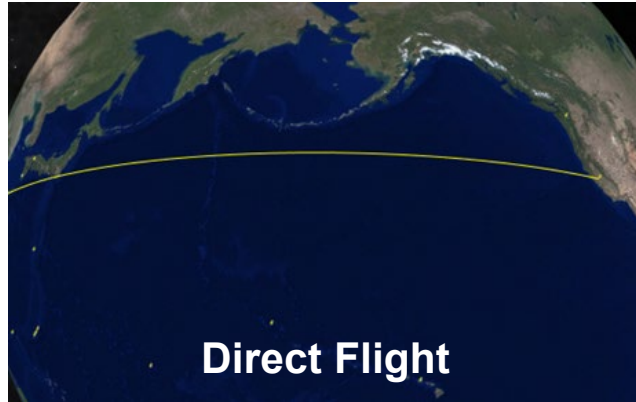


Source: DVIDS



Source: DVIDS

The Shortest Route is Through the Arctic Aleutians



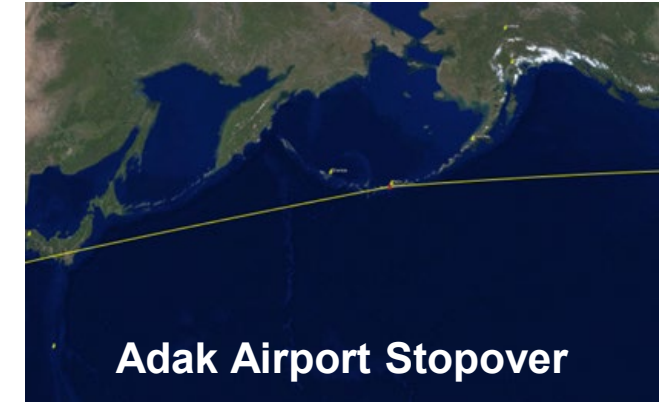
Travis to Kadena Direct: 5,300 NM

- C-17 Payload: Almost none
- With payload, requires aerial refuelings and Arctic alternates



Travis to Elmendorf (1,750 NM) to Kadena (3,850 NM) Total: 5,600 NM

- C-17 Payload: 100 Troops
- Travis is 1,200 miles closer than Pope but no more payload



Travis to Adak (2,400 NM) to Kadena (2,900 NM) Total 5,300 NM

- 300 NM shorter route
- Longest leg 900 NM shorter
- **C-17 payload increase 40,000+ lbs.**

3. Critical Airfield Infrastructure Elements



Elements to Support PDI

- 8,000' -10,000' Runways
- Aprons
- Fuel Storage and Delivery
- Taxiways
- Navigational Aids (NAVAIDS)
- Support Facilities
 - Arresting Gear
 - Maintenance
 - Crew Support
 - Cargo Handling





Elmendorf



Eielson



Adak

Image © 2025 Airbus

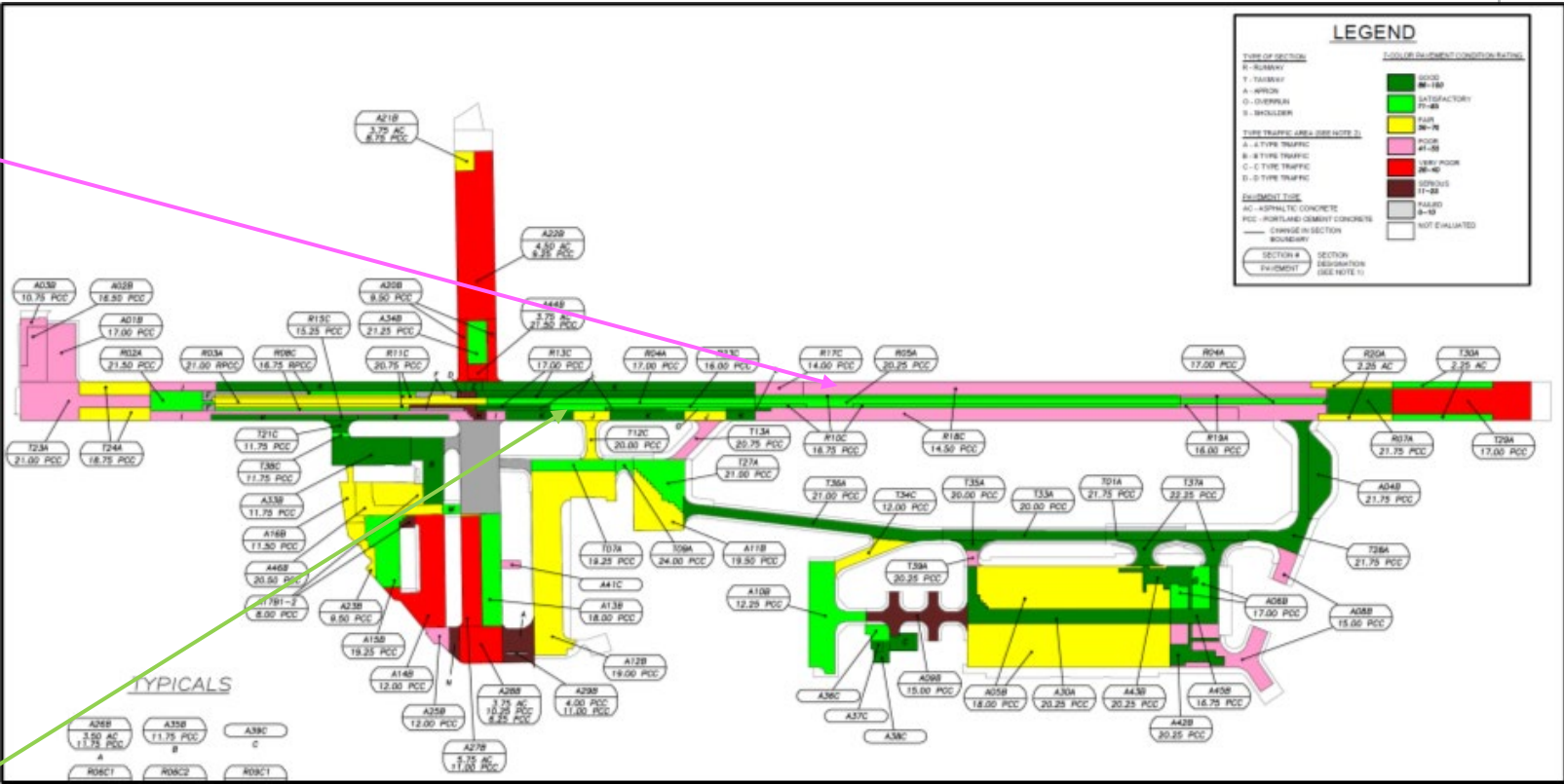


Hickam

Infrastructure Conditions

- US military airfield infrastructure sustainment underfunded and showing
- Each key Arctic and Pacific airfield needs attention
 - Elmendorf
 - Eielson
 - Hickam
 - Wake Island
 - Adak
 - Eareckson (Shemya)

Airfield Pavements: Pavement Condition Index (PCI)



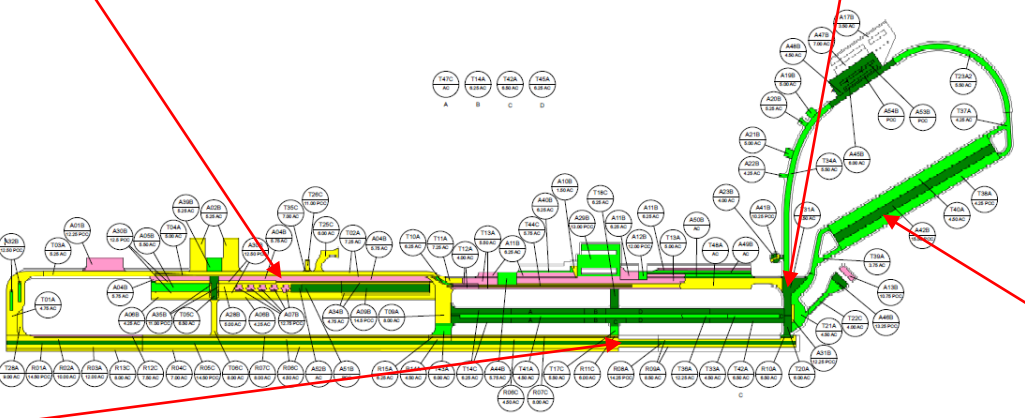
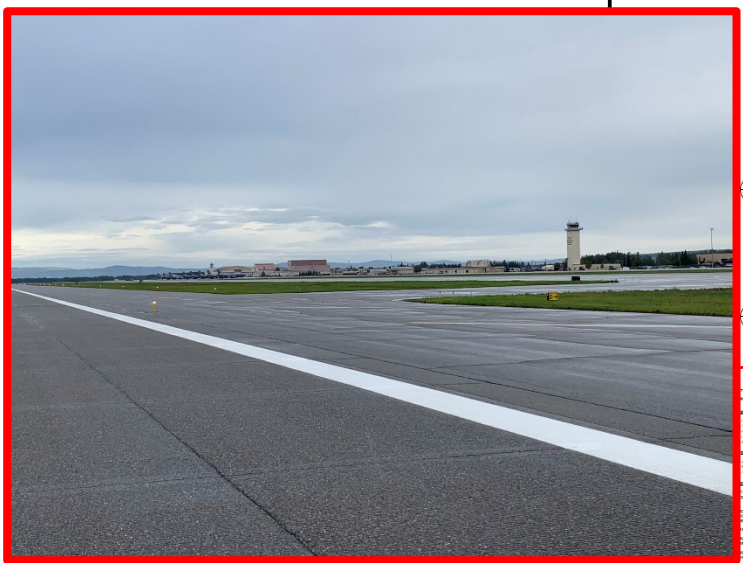
Arctic Airfield Critical Infrastructure



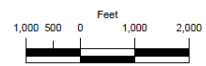
Elmendorf PCI - 2016

AIR FORCE
CIVIL ENGINEER CENTER
TYNDALL AIR FORCE BASE, FLORIDA
7-Color PCI Summary
Map
JB ELEMENDORF-RICHARDSON, AK
DRAWN BY: RODGERS
DATE: 5/29/2016
CHECKED BY: REPPLE
SCALE: GRAPHIC
SHEET 1 OF 10

Arctic Airfield Critical Infrastructure



Eielson PCI - 2019



Legend

7-Color PCI Rating

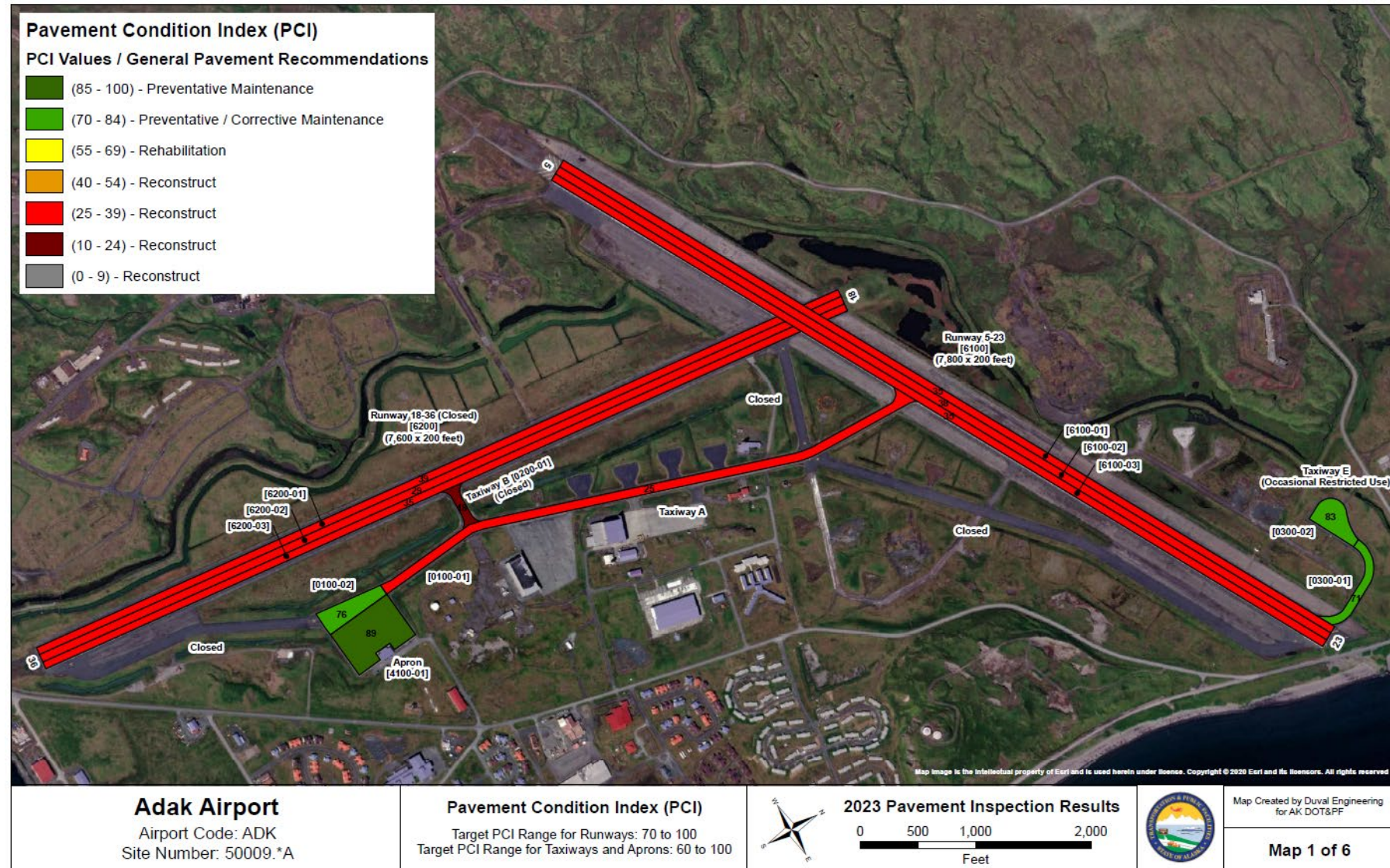
Good	86-100
Satisfactory	71-85
Fair	56-70
Poor	41-55
Very Poor	26-40
Serious	11-25
Failed	0-10
Not Rated	

ORGANIZATION: APPLIED RESEARCH ASSOCIATES 4000 PEMBROKE SQUARE BLVD VICTORIA, BC, CANADA		
AIR FORCE CIVIL ENGINEER CENTER EIELSON AIR FORCE BASE		
PAVEMENT CONDITION Eielson Air Force Base		
PROJECT: Hutchinson	DATE: 05/15/2019	DRAWING NUMBER: ES.2
DRAWN BY: GH	SCALE: 1:18000	SHEET NUMBER: 1 of 1

Arctic Airfield Critical Infrastructure

Adak Airport PCI 2023

- Last rehabilitation in 1990
- Transferred from Navy in 1997
- Runway 18-36 closed
- Runway 5-23 Rehabilitation planning underway for use as a community air service airport
- Repairs to pavements and lighting required



Arctic & Pacific Airfield Infrastructure Challenges

Arctic airfields are critically important to the PDI but suffering from the long-term underfunding of sustainment

The location and environment creates more challenges to sustaining and developing infrastructure in the Arctic and the Pacific

- Alaska: Remote locations, paving materials, harsh climate extremes, short work seasons
- Pacific: Remote locations, paving materials, weather extremes, corrosive environments

Administrative challenges

- Alaska bases are NORTHCOM
- Pacific Bases are INDOPACOM
- The Arctic has not been included in PDI funding

4. Arctic Airfields | Critical to Defense and Deterrence



Arctic Airfields

Alaska has a wide range of airfields that are critical to Homeland Defense and Strategic Deterrence

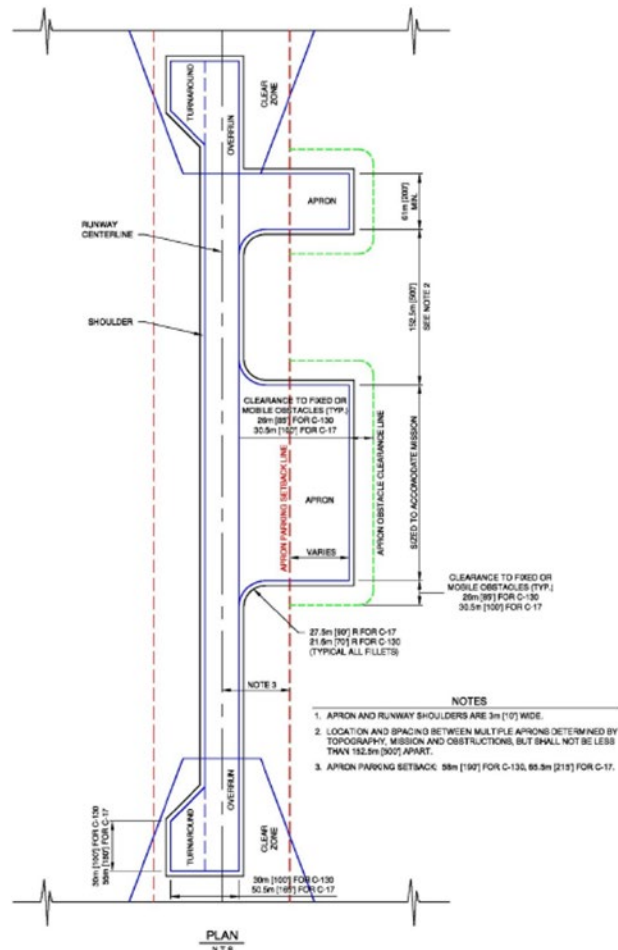


- **Landing Zones**
- **Forward Operating Bases**
- **Main Operating Bases**

Landing Zones: Drop Off or Pick Up and Go

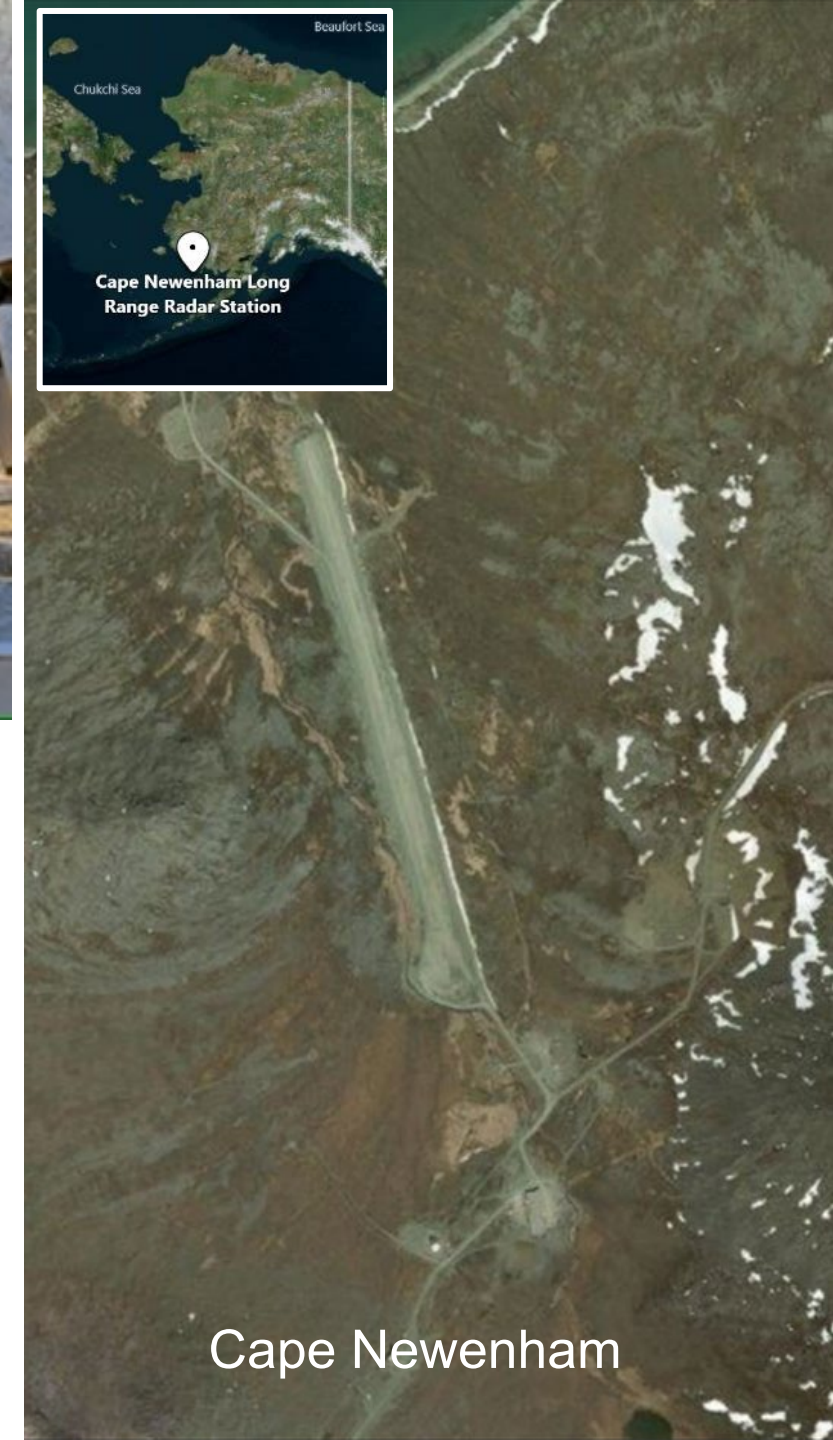
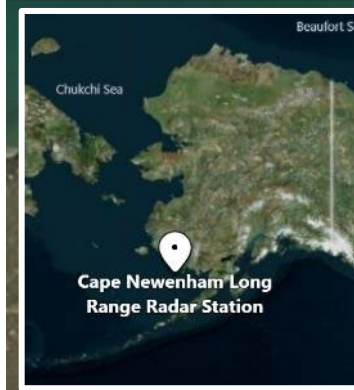
UFC 3-260-01
4 February 2019
Change 1, 5 May 2020

Figure 7-3. LZ with Contiguous Aprons and Turnarounds





Source: DVIDS



Cape Newenham

Landing Zones: 15 Remote Radar Sites

Gravel runways, typically about 4,000 feet long

- Rough with variable widths, ice and snow
- Runway slopes of 7% or more
- One-way obstructed approaches, adverse winds
- Surrounded by terrain
- Many with no "Go Around" option

Forward Operating Bases



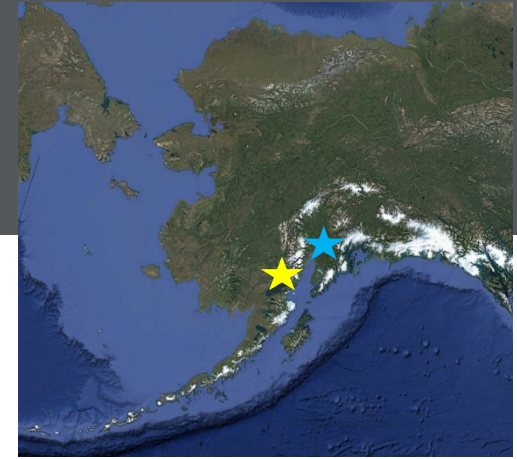
Source: DVIDS

Alternate Bases for Fighter, Transport, Tanker Operations

- Runway
- Apron
- Fuel
- Arresting Gear
- Taxiways
- Services

Forward Operating Base – King Salmon Airport

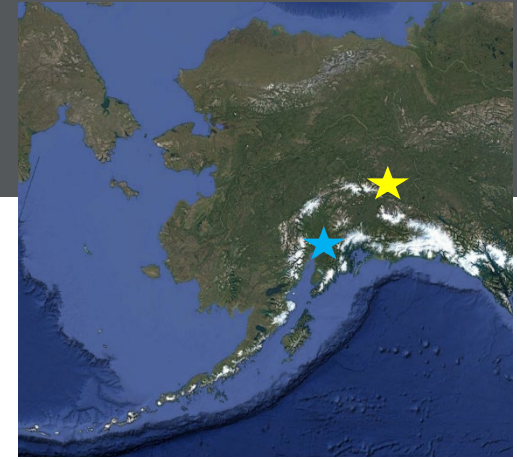
- 250 NM SW of Anchorage
- 8,900 foot long runway



Forward Fighter Alert Base | Weapons handling and storage | Arresting gear | Crew and maintenance facilities | Fuel | Cargo aircraft handling | ARFF

Forward Operating Base – Allen Army Airfield

- 210 NM NE of Anchorage
- 9,000 foot long runway



Improved to serve larger aircraft, diverts, and ACE training for fighters and transports

Runway | Turn arounds | Apron space for joint operations training | C-130/C-17 LZ Training | ARFF

Forward Operating Base – Cold Bay Airport

- 550 NM SW of Anchorage
- 10,000 foot runway built in WW II



US Coast Guard FOL

Runway | Turn arounds | Apron space for joint operations training | Docks/Shoreline | ARFF

5. Expeditionary Airfields



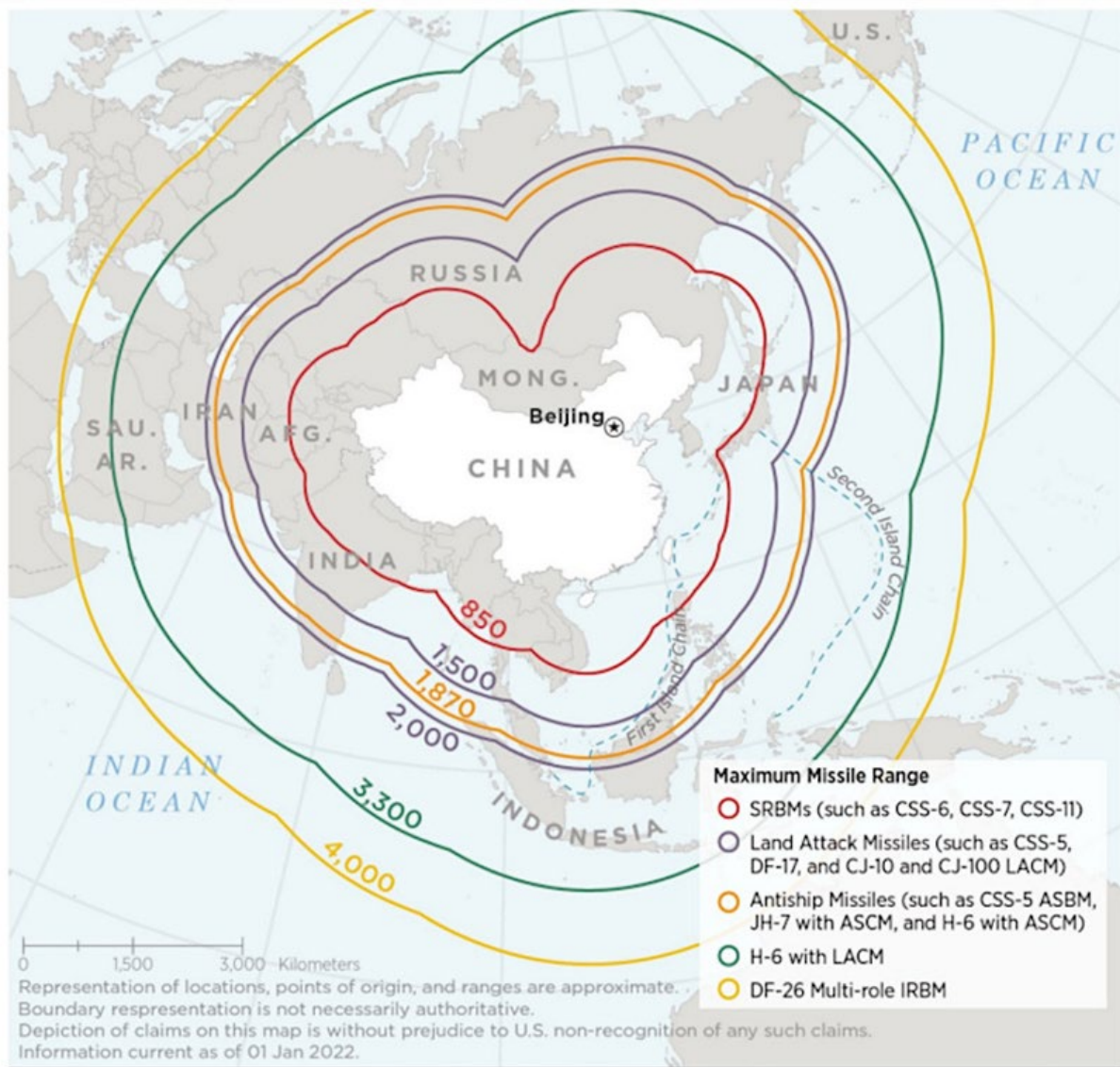
Pacific Expeditionary Airfields

Limited & Threatened Pacific Airfield Footprint

- Develop Expeditionary Airfields in Defensible Locations

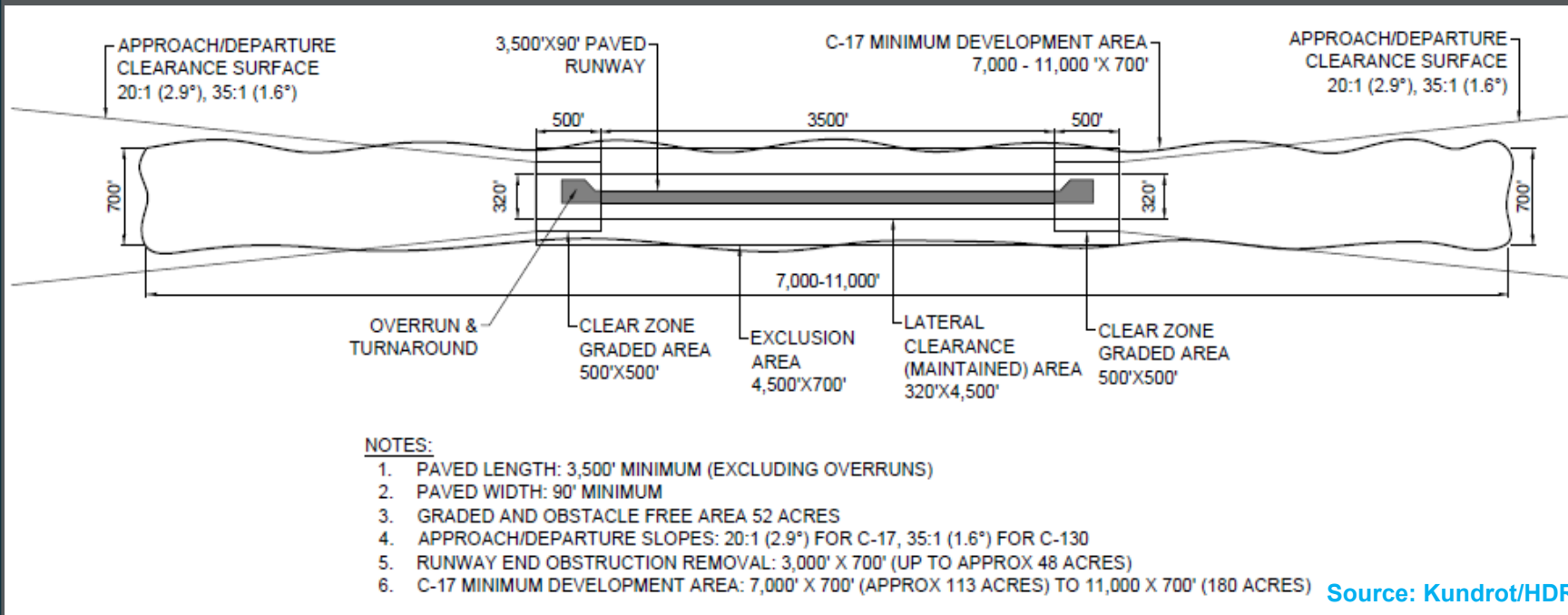
What are Pacific Expeditionary Airfields and what is the requirement?

- Landing Zones to Forward Operating Bases
- Locations to Relocate to or Support Main Operating Base



Expeditionary Airfields Air Force Landing Zones (LZs)

C-17/C-130 LZ FOOTPRINT



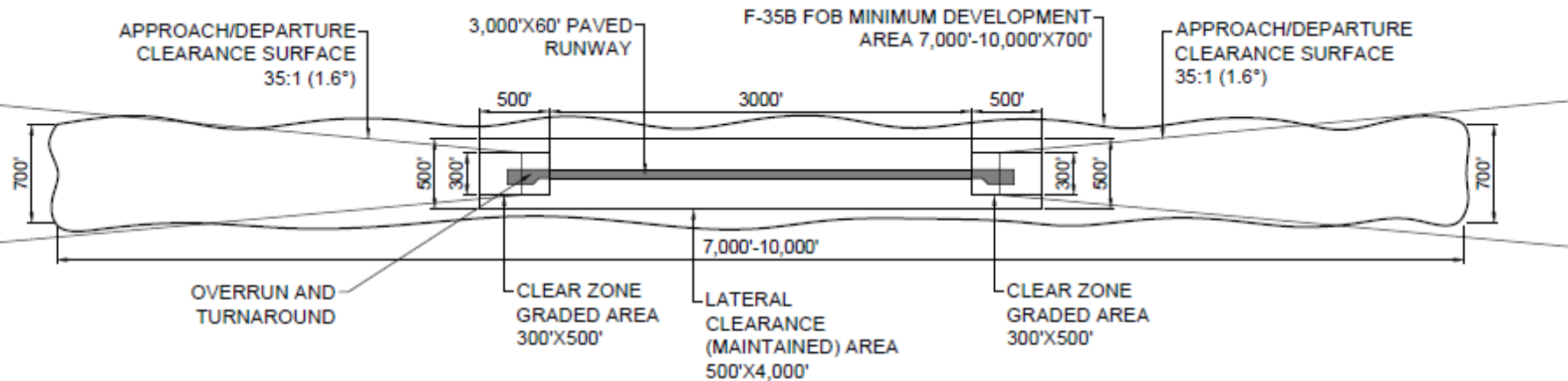
**Requires more than a strip of pavement
- 100 to 200 acres**



Source: DVIDS

Marine Corps Forward Operating Base (FOBs)

USMC FOB FOOTPRINT



NOTES:

1. PAVED LENGTH: 3,000' MINIMUM (EXCLUDING OVERRUNS)
2. PAVED WIDTH: 32' MINIMUM, 60' TYPICAL
3. GRADED & OBSTACLE FREE AREA: APPROX 46 ACRES
4. APPROACH/DEPARTURE SLOPES: 35:1 (1.6°)
5. RUNWAY END OBSTRUCTION REMOVAL: 3,000' X 500" (UP TO APPROX 35 ACRES)
6. F-35B FOB MINIMUM RUNWAY DEVELOPMENT AREA: 7,000' X 700' (APPROX 113 ACRES) TO 10,000' X 700' (APPROX 161 ACRES)

Source: Kundrot/HDR

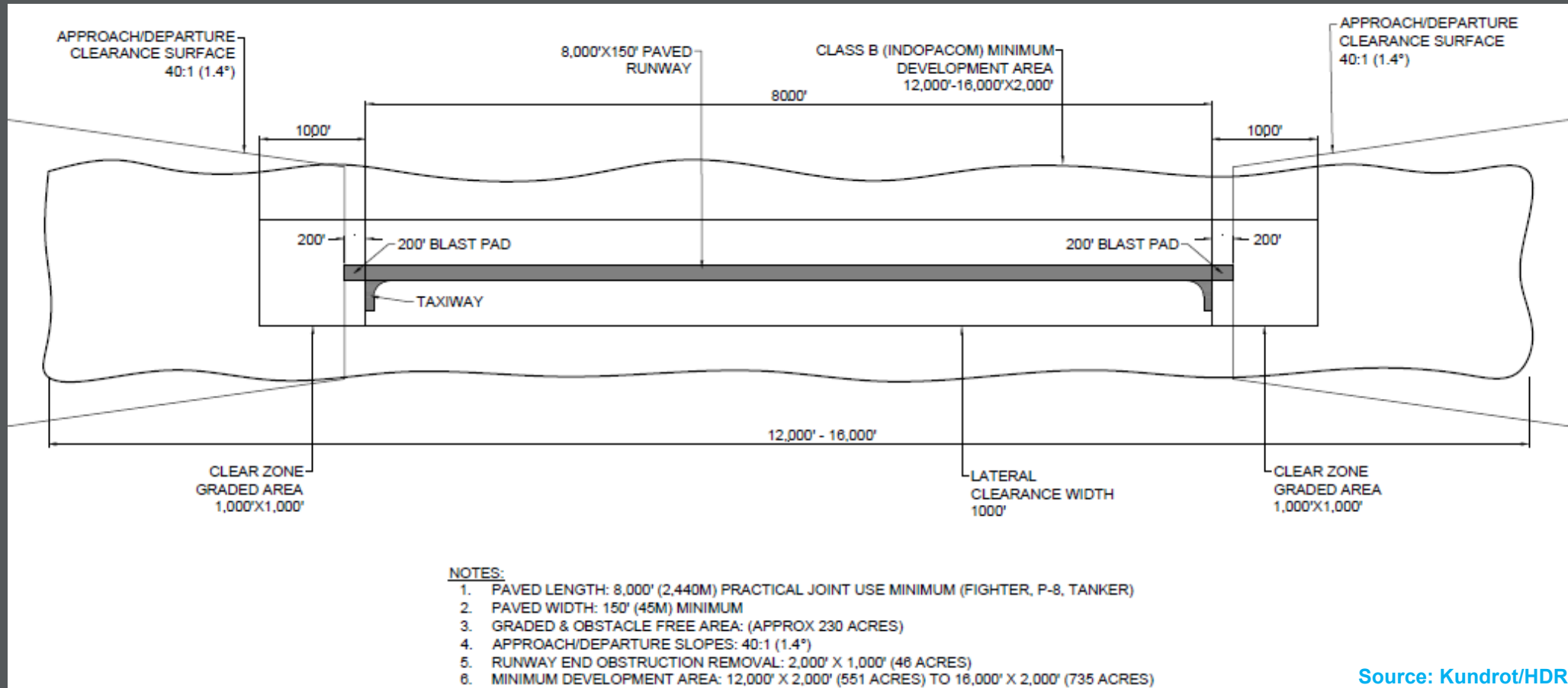
Requires more than a strip of pavement
- Requires 100 to 200 acres



Source: DVIDS

Expeditionary Airfields – High Performance, Joint Missions

- Agile Combat Employment (ACE)
- 8,000 to 10,000 foot long runways. 700 to 1,000 acre footprint





6. Ideas and Solutions for Alaska & Pacific Expeditionary Airfields



Why is Arctic Expeditionary Airfield Experience Required?

Cost and Consequence

- Andersen AFB: Repairs, Airfield Capacity and Infrastructure. **\$11B**
- Yap Island Airport: Joint Mission Improvements. **\$400M+**
- Tinian International Airport: Air Force Cargo and Fuel Capacity. **\$400M+**
- Tinian North Field Restoration: **\$400M+** (Repair funds)
- PDI Funding: \$14B in 2024. Request for **\$10B** in 2025.

Ideas and Solutions From the Arctic for the Pacific



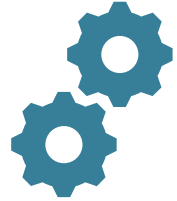
Learn from the lessons in Alaska with similar challenges to achieve capability at best cost.



Common challenges

- A. Logistics
- B. Materials
- C. Environmental Resiliency
- D. Contractors: Alaska Airport and Heavy Construction Contractors

Challenges and Solutions



Logistics:

Factor for planning, design, and construction

- Site access for assessment, planning, design
- Equipment for design investigations: drill rigs, clearing, roads
- Investigate material sources: What do we have on site or local versus what will need to be imported



Air Transport and Ship/Barge Transport

- Many locations have very limited draft port capabilities
- Ships, barges, landing craft
- 100 miles or 2,000 miles, the effort and equipment is nearly the same



Challenges and Solutions

Materials

- Finding and processing local materials as much as possible
- Cheaper to mine and crush locally as much base material as possible than transport
- Even if the local materials are poor, they often can be supplemented and built up and then topped with high quality materials and pavements



Challenges and Solutions – Environmental Resiliency

- Extreme weather
- Corrosive environments
- Limited maintenance resources and expertise



Challenges and Solutions

Contractors

- Limited numbers with capability and capacity
- Complications with larger projects, well over \$100M
- Limited DOD contracting capacity and resources
- Get back to Free and Open competition in bidding as much as possible



7. Summary and Recommendations



Summary and Recommendations



Arctic airfields and those with experience are key to the PDI



Time, resources, and expertise are limited. Apply the lessons learned from the Arctic for expeditionary airfield development and sustainment



Urgency to the need but there are limited resources and time available. Prioritize and build to the immediate operational need



Alaskans provide experience with overcoming challenges of logistics, contractors, materials, and adapting to the environment from the Arctic to the Tropics



Arctic airfields need to be integrated into the PDI airfield development program

- Need for PDI funds and priority to flow to Alaska (NORTHCOM) facilities like Elmendorf and Eielson
- Include additional stopover and divert bases such as: Adak, Cold Bay, King Salmon, and Allen AAF.
- The costs to improve these airfields will be great investments in building the credible deterrent

Thank You.....Questions



Matt Kundrot, PE, HDR Engineering, Inc.

Matt.Kundrot@hdrinc.com

The Alaska Way



Tinian North Field – Our Next Pacific Expeditionary Airfield



2023

2025

Four 8,000' long runways

- Undergoing an: “..... adaptive rehabilitation project to restore the historic site”
- Work underway primarily by PACAF Red Horse teams

