



# ***Disaster Response & Recovery Effort: Super Typhoon Mawar Andersen AFB, Guam***

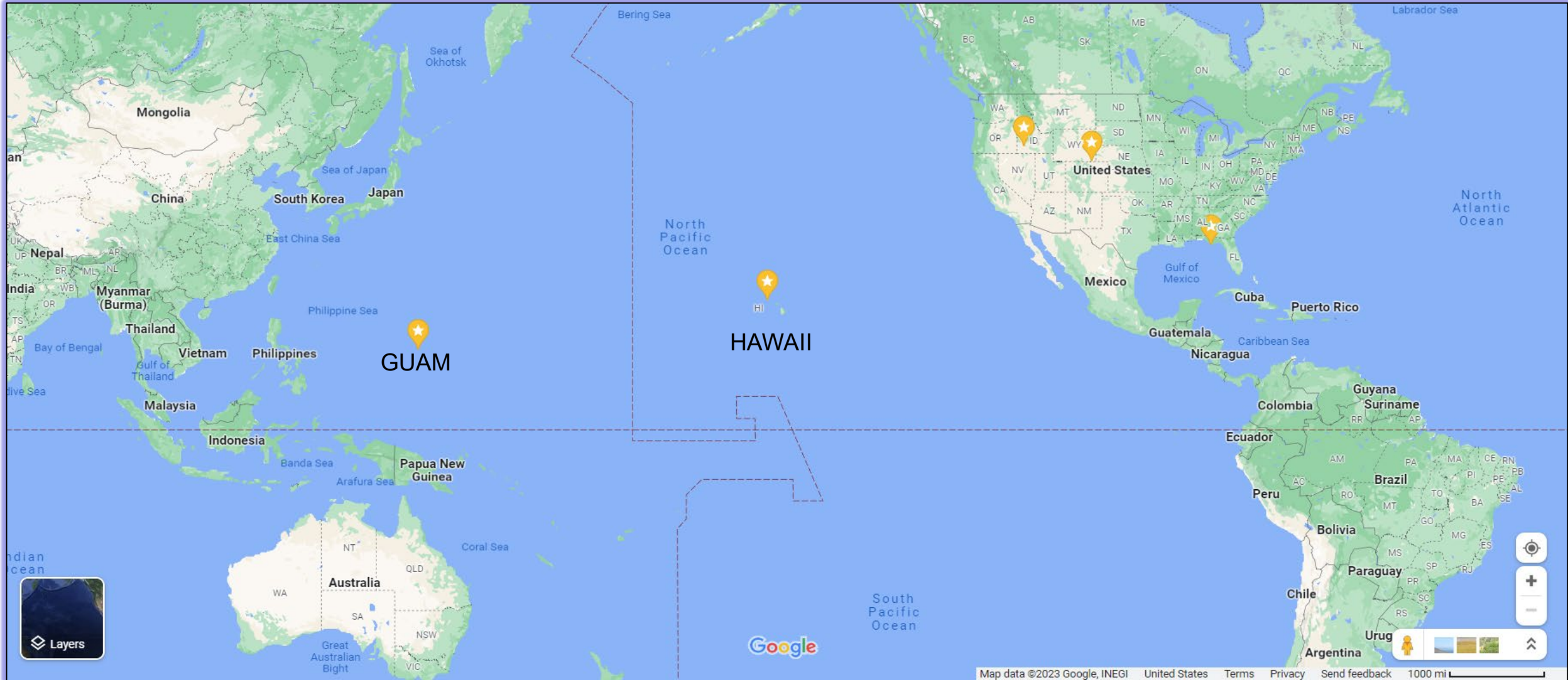
**Bil Hawkins, PE, PMP**

**Air Force Civil Engineer Center**



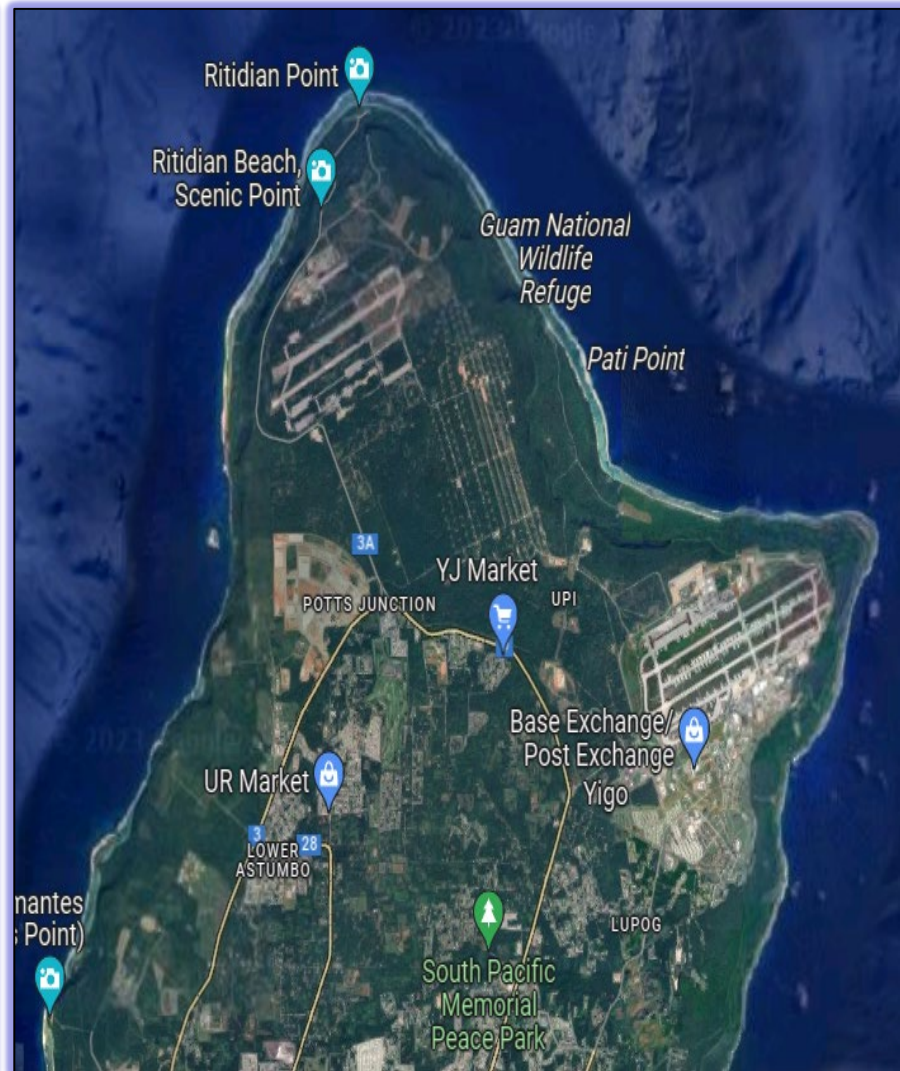


# Where is Guam ?





# Why Guam ?





# ***Typhoon Mawar Impact on Andersen AFB***



**Andersen AFB Climate Resiliency on 24May23:**

**VERY GOOD**

**95% SF Facilities constructed of reinforced concrete  
Primary power placed underground**



# Category V Rated Facilities





# ***Typhoon Mawar Impact on Andersen AFB***



## **Andersen AFB Climate Resiliency on 24May23:**

### **VERY GOOD**

95% SF Facilities constructed of reinforced concrete  
Primary power placed underground

### **GOOD**

Roofing upgrade program to more storm-resistant materials  
**BUILDER Facility Condition Assessment completed Jul22**



# Mawar – Andersen AFB Damage





# ***Typhoon Mawar Impact on Andersen AFB***



## **Andersen AFB Climate Resiliency on 24May23:**

### **VERY GOOD**

95% SF Facilities constructed of reinforced concrete  
Primary power placed underground

### **GOOD**

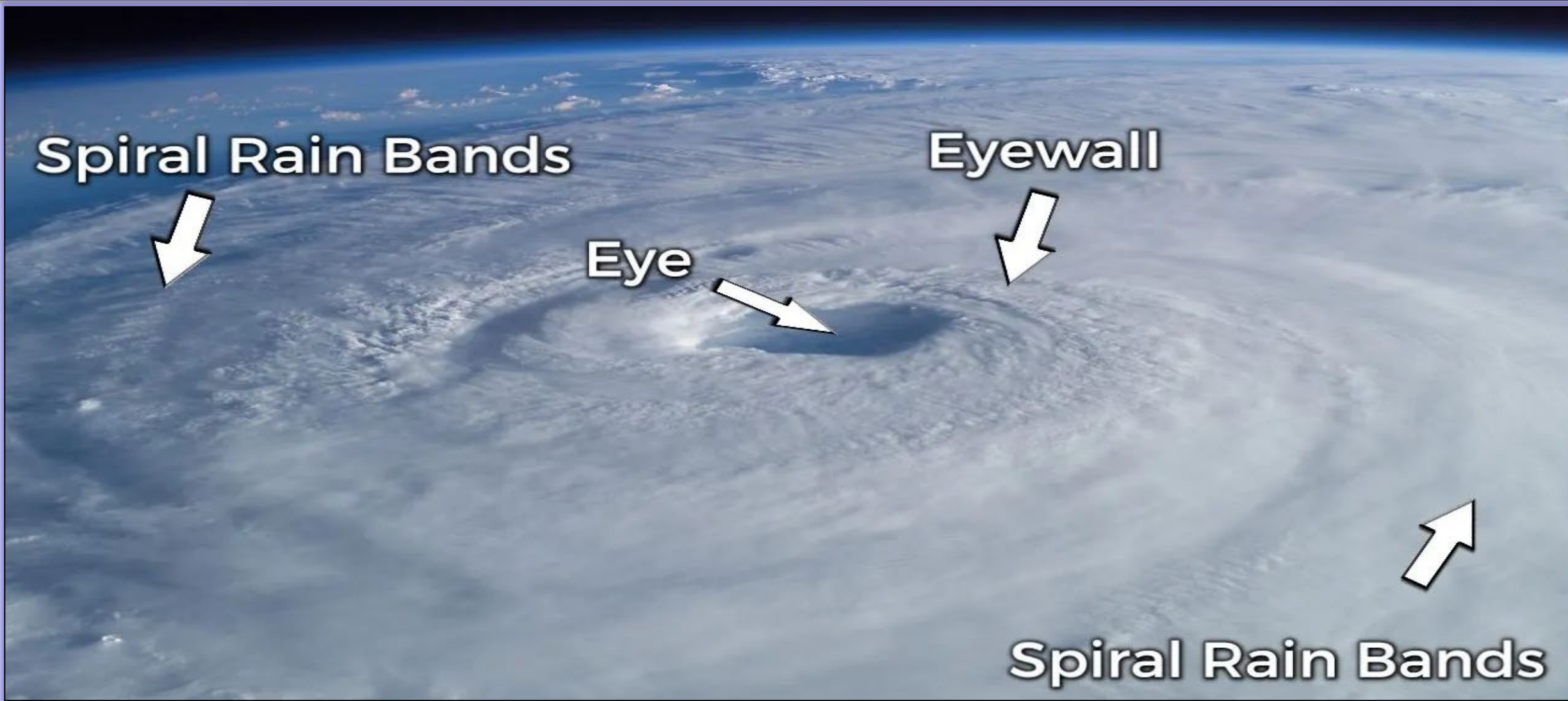
Roofing upgrade program to more storm-resistant materials  
BUILDER Facility Condition Assessment completed Jul22

### **BAD**

**Typhoon Mawar developed an Eyewall Replacement Phenomenon**  
**Asset Management program not fully developed**  
**Inventory, Planning & Preventative Maintenance**

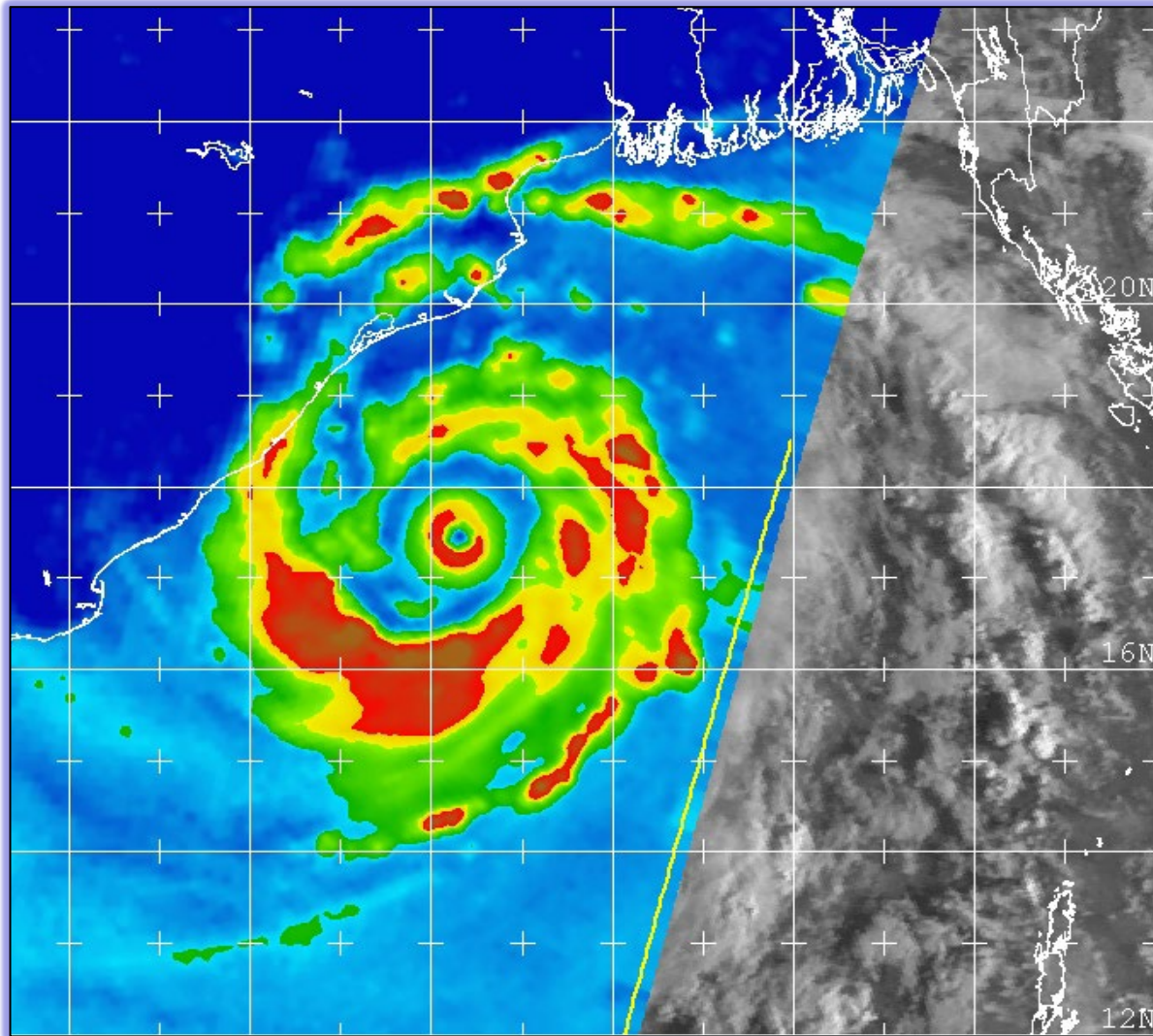


# Typical Typhoon/Hurricane Eye/Eyewall Formation





# ***Typhoon Mawar Eyewall Replacement***



**Hurricane Pilot Observations in 1950's**

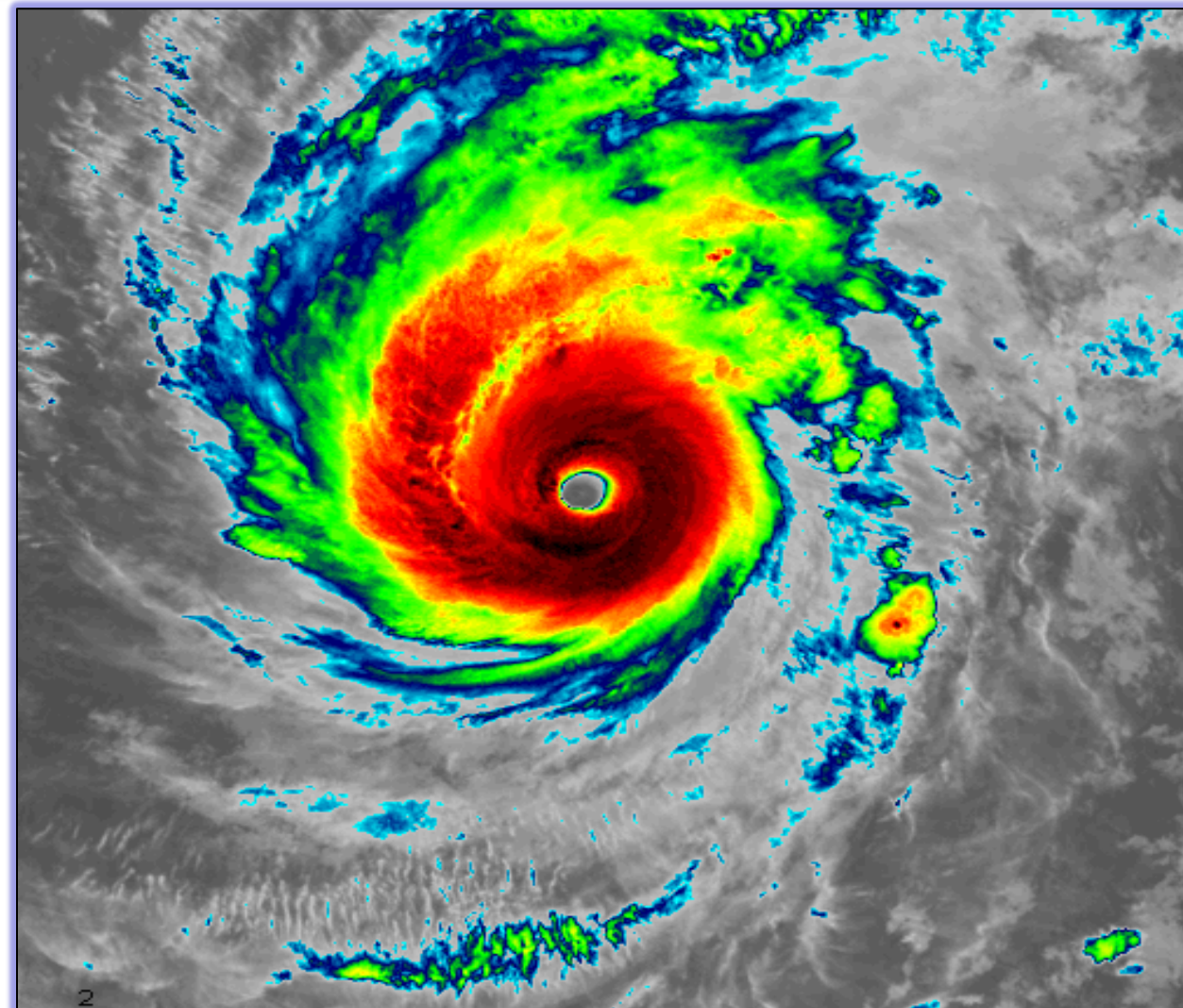
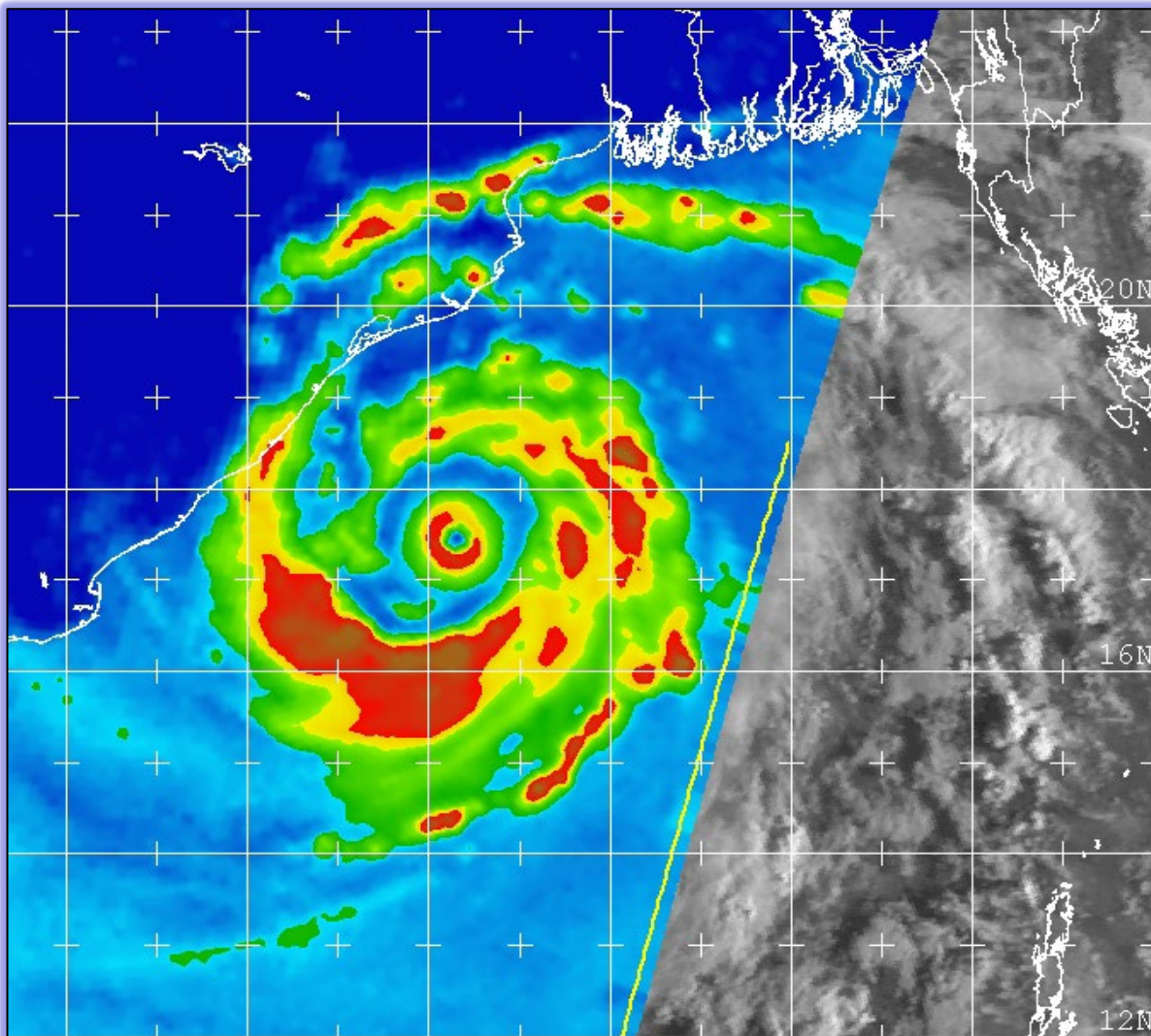
**Typical Satellite and/or Infrared  
historically couldn't detect rapidly  
changing wind currents in the eyewall**

**Microwave Imagery in 1980's  
Proved not rare wind events**

***Chaotic and constantly changing wind***



# Typhoon Mawar Eyewall Replacement





# ***Typhoon Mawar Impact on Andersen AFB***



## **Building Envelope Failures**

**Roofs**

**Roll Up Doors**

**Open Louvers in Walls – Over Pressured Rain (36-inches in six days)**

## **Exterior/Unprotected Equipment**

**HVAC Condensers**

**Lightning Protection Systems**



# Typhoon Mawar Andersen AFB Damage





# Typhoon Mawar Andersen AFB Damage



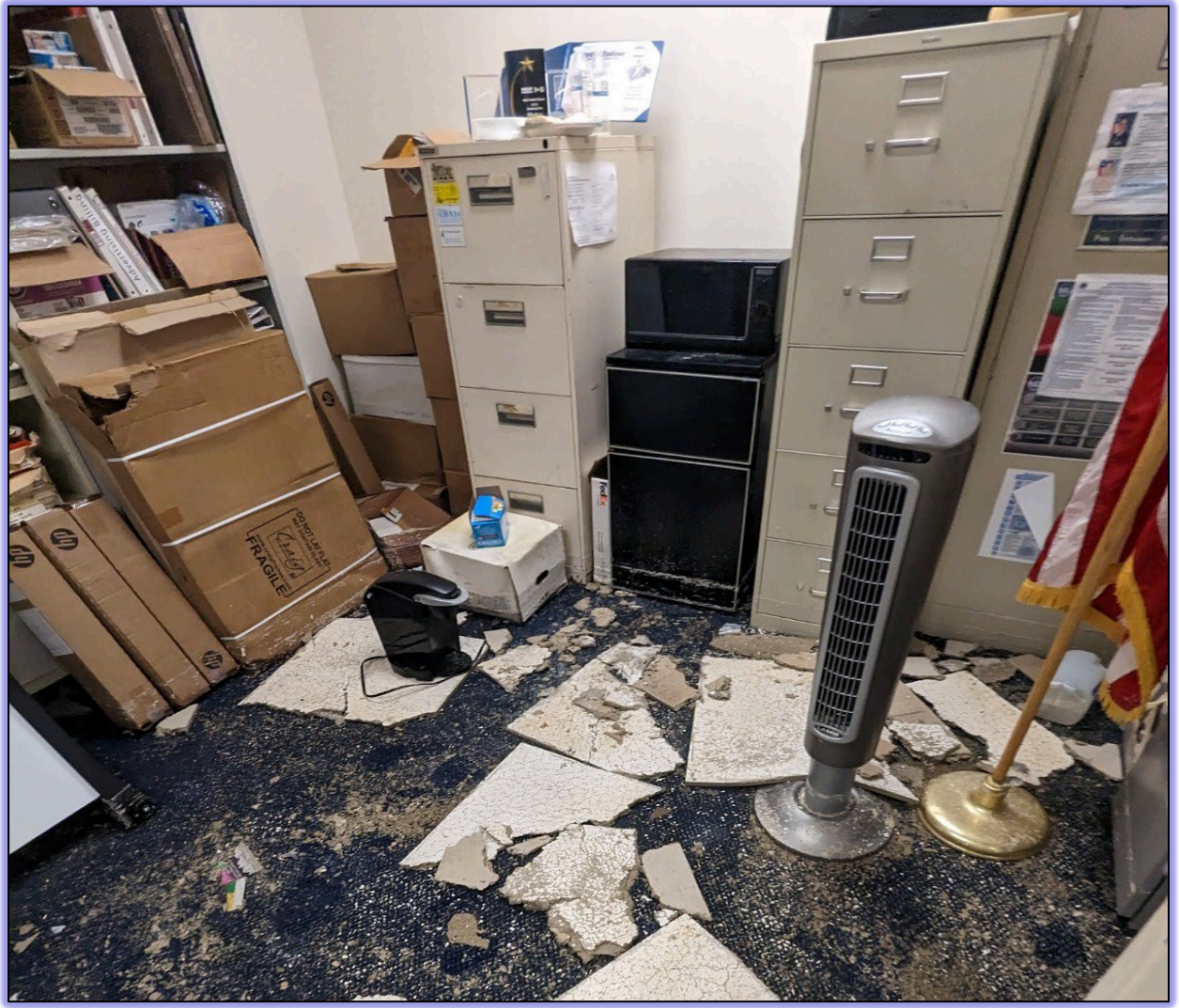


# Typhoon Mawar Andersen AFB Damage





# Typhoon Mawar Andersen AFB Damage



UNCLASSIFIED

*Your Success is Our Mission!*



# Typhoon Mawar Andersen AFB Damage





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# *Typhoon Mawar Andersen AFB Damage*



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# ***Asset Management @Andersen AFB***



**Inventory: USAF RPAD vs USN**

**Recent Transfer of Real Property (End of fiscal year 2021)**

**Assessment: AE Contracted BUILDER Effort – 13Jul23 Sched Final Submittal**

**Pushed to Release Final 3Jun23 Because of Typhoon**

**SOW “Inventory/Assess All “Observable Systems””**

**Roof Access Excluded B30 Inventory/Assessments**

***Quality Assurance – Never Happened...***



# BUILDER Use @Andersen AFB



Andersen AFB - Assessed Facility List - Typhoon Mawar Damage Assessment												
Updated: 0630 Hrs 2Jun23												
Complex	Building Number	Building Name	Quantity	UoM	Year Built	RPA Type	Building PRV	MDI	Critical Facility Priority	Date Assesse	ASSESSMENT COMMENTS	B10 SUPERSTRUCTURE
Andersen Main	02800	TACAN BUILDING	576	SF	2009	B	\$ 903,940	84	3	29-May-23	NO DAMAGE NOTED	
Andersen Main	02861	ILS SYSTEM NORTH RUNWAY (06L/24R)	2	EA	2009	S	\$ 61,432	95	4	29-May-23	NO DAMAGE NOTED	
Andersen Main	18010	UTILITY VAULT (AIRFIELD LIGHTING)	1	EA	2009	S	\$ 81,128	89	8	29-May-23	Damage to Personnel Door - Unsecure	
UTILITIES Main	10001	RUNWAY LIGHTING	11,616	LF	2009	S	\$ 22,771,249	99	9	29-May-23	NO DAMAGE NOTED	
Andersen Main	02661	ILS SYSTEM SOUTH RUNNWAY (06R/24L)	2	EA	2009	S	\$ 61,432	95	10	29-May-23	NO DAMAGE NOTED	
Andersen Main	18015	CONTROL TOWER	7,112	SF	2009	B	\$ 34,748,860	90	14	29-May-23	Minor Impact Damage to Upper Cab - Exterior Door, Catwalk Railing anchor bolts, two (2) 1830 windows broken, two (2) smoke exhaust units, Elevator inoperating, & minor flooding.	
UTILITIES Main	03111	THRESHOLD LIGHTING	1	EA	2009	S	\$ 46,570	64	15	29-May-23	NO DAMAGE NOTED	
UTILITIES Main	10002	TAXIWAY LIGHTING	33,670	LF	2009	S	\$ 66,004,473	99	17	29-May-23	NO DAMAGE NOTED	
Andersen Main	23028	36 MSG HQ BLDG	21,617	SF	2009	B	\$ 30,504,215	59	20	29-May-23	Main Entrance gutter damage. Exposed wires on outdoor lighting. Gutter damage on right side of building. HVAC unit damaged on rear of building. Conduit damaged on rear of	
Andersen Main	02658	ARRESTING GEAR SYSTEM	192	EA	2009	B	\$ 705	48	21	29-May-23	NO DAMAGE NOTED	
Andersen Main	02670	AIRCRAFT ARRESTING GEAR	192	EA	2009	B	\$ 705	48	22	29-May-23	NO DAMAGE	
Andersen Main	02813	ARRESTING GEAR SYSTEM	1	EA	2009	B	\$ 705	48	23	29-May-23	NO DAMAGE	

AF - Final 09 - Building System

Critical Facility List



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# Mawar – Andersen AFB Assessment Summary



RPA Type (Multiple Items)

Count of UoM	Condition Rating										
Complex	MAJOR DAMAGE	MINOR DAMAGE	NO DAMAGE	SING	BIL/KEVIN	CEMIRT	UTILITIES	PLUMBING	COMM	MED	Grand Total
Andersen Main	49	62	385	19	76	35	1				627
Andersen Main Housing Area	2	4	17		8	1					32
Andersen NWF	24	15	58	1	2				1		101
Andy South	9	1	6								16
Barrigada		2	4								6
COMMUNICATIONS									4		4
DeCA			2								2
FUELS			5								5
MEDICAL			2		1					3	6
MUNITIONS AREA	5	78	81		2						166
MUNITIONS AREA 2	2	16	12		4						34
NON-VERTICAL			6								6
PAVEMENTS Main		1	33								34
PAVEMENTS NWF			11	1							12
Santa Rosa		1	1	1							3
Santa Rosa Pavements			1								1
Santa Rosa UTILITIES							1	1			2
Tumon/Tamuning					1						1
TWCF		3			1						4
UTILITIES Andy S	2	1	4			4					11
UTILITIES Main	1	1	69			4	14	1			90
UTILITIES NWF	1		2			1	4				8
Visitors Quarters	133										133
<b>Grand Total</b>	<b>228</b>	<b>185</b>	<b>699</b>	<b>22</b>	<b>95</b>	<b>45</b>	<b>20</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>1304</b>



# Mawar – Andersen AFB Assessment Summary



Count of UoM	Condition Rating			
Complex	MAJOR DAMAGE	MINOR DAMAGE	NO DAMAGE	Grand Total
Andersen Main	49	62	385	496
Andersen Main Housing Area	2	4	17	23
Andersen NWF	24	15	58	97
Andy South	9	1	6	16
Barrigada		2	4	6
DeCA			2	2
FUELS			5	5
MEDICAL			2	2
MUNITIONS AREA	5	78	81	164
MUNITIONS AREA 2	2	16	12	30
NON-VERTICAL			6	6
PAVEMENTS Main		1	33	34
PAVEMENTS NWF			11	11
Santa Rosa		1	1	2
Santa Rosa Pavements			1	1
TWCF		3		3
UTILITIES Andy S	2	1	4	7
UTILITIES Main	1	1	69	71
UTILITIES NWF	1		2	3
Visitors Quarters	133			133
<b>Grand Total</b>	<b>228</b>	<b>185</b>	<b>699</b>	<b>1112</b>

**Assessed “Facilities”  
as of 18Jun23**

**Includes Buildings, Linear  
Facilities, & Structures**

**Total: 1112 of 1304  
Assessments Complete 84%**



# Cost Estimate Requirement



ESTIMATE CLASS	LEVEL OF PROJECT DEFINITION	ESTIMATE METHOD	EXPECTED ACCURACY RANGE
Class 5	0% to 2%	SF, parametric, judgment, or analogy	-30% to +50%
Class 4	1% to 15%	Parametric, assembly models	-20% to +30%
<b>Class 3</b>	<b>10% to 40%</b>	<b>Semi-detailed unit cost with assembly level line items</b>	<b>-15% to 20%</b>
Class 2	30% to 75%	Detailed unit cost	-10% to +15%
Class 1	65% to 100%	Detailed unit cost	-5% to +10%


DoD Guidance Unit Cost (Unified Facility Code 3-701-01) requires Class 5 level at a minimum  
 --Best that can be accomplished during rapid response & recovery type assessments  
 --Accuracy range is 20% confidence level with appropriate contingency added

**35% design required for a typical Class 3 MILCON & FSRM cost estimate certification**



# Repair Project Development




SMS Work Items by Building Report 

Andersen AFB (AJJY) Cost Book: USAF2022

01625 - CHILD DEVELOPMENT CENTER		Andersen Main Housing Area					
Year	System Component	Qty (UM)	Activity	Project	Cost	Status	Score Completion Date
Section Description -- Description							
<b>2023 B20 EXTERIOR ENCLOSURE</b>							
B2010	EXTERIOR WALLS	15,106 (SF)	Paint		\$5,100	Awaiting Funds	47.92
BUILDING-WIDE B201001 EXTERIOR CLOSURE CIP Concrete -- Paint B2010 EXTERIOR WALLS BUILDING-WIDE B201001 EXTERIOR CLOSURE CIP Concrete							
B2010	EXTERIOR WALLS	2,280 (SF)	Repair		\$9,400	Awaiting Funds	54.17
BUILDING-WIDE_CONCRETE B201007 EXTERIOR SOFFITS General -- Repair B2010 EXTERIOR WALLS BUILDING-WIDE_CONCRETE B201007 EXTERIOR SOFFITS General							
B2010	EXTERIOR WALLS	50 (SF)	Repair		\$1,300	Awaiting Funds	55.42
COURTYARD B201001 EXTERIOR CLOSURE Glass Block -- Repair B2010 EXTERIOR WALLS COURTYARD B201001 EXTERIOR CLOSURE Glass Block							
B2020	EXTERIOR WINDOWS	120 (SF)	Repair		\$11,000	Awaiting Funds	54.17
BUILDING-WIDE_ALUMINUM B202002 STOREFRONTS General -- Repair B2020 EXTERIOR WINDOWS BUILDING-WIDE_ALUMINUM B202002 STOREFRONTS General							
B2020	EXTERIOR WINDOWS	54 (EA)	Repair		\$23,000	Awaiting Funds	52.92
BUILDING-WIDE_FIXED B202001 WINDOWS Aluminum Windows -- Repair B2020 EXTERIOR WINDOWS BUILDING-WIDE_FIXED B202001 WINDOWS Aluminum Windows							
B2030	EXTERIOR DOORS	23 (EA)	Replace		\$405,000	Awaiting Funds	67.92
BUILDING-WIDE B203001 SOLID DOORS Aluminum -- Replace B2030 EXTERIOR DOORS BUILDING-WIDE B203001 SOLID DOORS Aluminum							
B2030	EXTERIOR DOORS	17 (EA)	Replace		\$299,000	Awaiting Funds	67.92
COURTYARD_3X7_ALUMINUM B203001 SOLID DOORS Aluminum -- Replace B2030 EXTERIOR DOORS COURTYARD_3X7_ALUMINUM B203001 SOLID DOORS Aluminum							
B2030	EXTERIOR DOORS	7 (EA)	Replace		\$123,000	Awaiting Funds	67.92
COURTYARD_3X7_LOUVER B203001 SOLID DOORS Aluminum -- Replace B2030 EXTERIOR DOORS COURTYARD_3X7_LOUVER B203001 SOLID DOORS Aluminum							

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SMS Work Items by Building Report 

Andersen AFB (AJJY) Cost Book: USAF2022

01625 - CHILD DEVELOPMENT CENTER		Andersen Main Housing Area					
Year	System Component	Qty (UM)	Activity	Project	Cost	Status	Score Completion Date
Section Description -- Description							
B2030	EXTERIOR DOORS	2 (EA)	Replace		\$35,000	Awaiting Funds	70.83
EAST_3X7 B203002 GLAZED DOORS General -- Replace B2030 EXTERIOR DOORS EAST_3X7 B203002 GLAZED DOORS General							
<b>2023 B30 ROOFING</b>							
B3010	ROOF COVERINGS	24,599 (SF)	Replace		\$431,000	Awaiting Funds	72.08
BUILDING-WIDE B301002 LOW SLOPE ROOF SYSTEMS Modified Bitumen -- Replace B3010 ROOF COVERINGS BUILDING-WIDE B301002 LOW SLOPE ROOF SYSTEMS Modified Bitumen							
B3010	ROOF COVERINGS	174 (LF)	Repair		\$1,950	Awaiting Funds	57.50
BUILDING-WIDE B301005 GUTTERS & DOWNSPOUTS Downspouts -- Repair B3010 ROOF COVERINGS BUILDING-WIDE B301005 GUTTERS & DOWNSPOUTS Downspouts							
B3010	ROOF COVERINGS	1,200 (SF)	Replace		\$21,000	Awaiting Funds	72.08
COURTYARD B301002 LOW SLOPE ROOF SYSTEMS Modified Bitumen -- Replace B3010 ROOF COVERINGS COURTYARD B301002 LOW SLOPE ROOF SYSTEMS Modified Bitumen							
B3010	ROOF COVERINGS	144 (LF)	Repair		\$1,450	Awaiting Funds	57.50
COURTYARD B301005 GUTTERS & DOWNSPOUTS Gutters -- Repair B3010 ROOF COVERINGS COURTYARD B301005 GUTTERS & DOWNSPOUTS Gutters							
<b>2023 C10 INTERIOR CONSTRUCTION</b>							
C1010	PARTITIONS	4 (EA)	Repair		\$3,600	Awaiting Funds	47.92
BUILDING-WIDE_4X4_QUADRANT_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows -- Repair C1010 PARTITIONS BUILDING-WIDE_4X4_QUADRANT_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows							
C1010	PARTITIONS	11 (EA)	Repair		\$10,000	Awaiting Funds	47.92
BUILDING-WIDE_4X4_ROUND_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows -- Repair C1010 PARTITIONS BUILDING-WIDE_4X4_ROUND_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows							
C1010	PARTITIONS	5 (EA)	Repair		\$4,550	Awaiting Funds	47.92
BUILDING-WIDE_4X4_SEMICIRCLE_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows -- Repair C1010 PARTITIONS BUILDING-WIDE_4X4_SEMICIRCLE_FIXED_WOOD C101005 INTERIOR WINDOWS Interior Windows							

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# Cost Adjustments



- **Typical Markups for Andersen AFB's Class 5 Estimate**
  - **Area Cost Factor (2.75 or 275%)**
  - **Design Fees (4%)**
  - **Design Contingency (35%) – rapid assessment scope, design uncertainty**
  - **Post Award Contingency (5%) – post award adjustments and unforeseen conditions**
  - **Labor Productivity Reduction (20%)**
  - **Secure area access requirements for work on airfield and ammo storage areas (5%)**
  - **Munitions and Explosives of Concern (MEC) Safety & Environmental Reqs (8%)**
  - **Inflation factor (2%) – Risk Actual Inflation Outpaces DoD SPI Rates**
  - **Contractor General Conditions – Mobilization, Overhead, Profit, and Bonds (11.4%)**
  - **Gross Receipts Tax (5.26%)**
  - **Supervision, Inspection and Overhead (8.1%)**
  - ***FINAL COST FACTOR FOR CLASS III COST ESTIMATE 3.79***



# BUILDER Cost Book

## Post Typhoon Mawar



<b>BUILDER Catalog - with Cost and Design Life</b> Cost Book: USAF2023 Service Life Book: USAF										
Generated From BUILDER SMS on: 6/13/2023 2:14:24 AM										
System	Component	Material/Equipment Category	Component Subtype	UOM	Replace Unit Cost	LOADED RATE	Paint Unit Cost	Remove Unit Cost	SERVICE LI	
271	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203001 SOLID DOORS	3068 DBL	EA	\$5,525.00	\$18,454	\$1.26	\$12.68	20
287	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 10'x10'	EA	\$4,025.00	\$13,444	\$1.26	\$12.68	20
288	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 12'x12'	EA	\$4,725.00	\$15,782	\$1.26	\$12.68	20
289	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 14'x14'	EA	\$6,475.00	\$21,627	\$1.26	\$12.68	20
290	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 20'x12'	EA	\$7,225.00	\$24,132	\$1.26	\$12.68	20
291	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 20'x16'	EA	\$8,975.00	\$29,977	\$1.26	\$12.68	20
292	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203004 OVERHEAD AND ROLL-UP DOORS	Steel Rolling, Electric, 8'x8'	EA	\$3,475.00	\$11,607	\$1.26	\$12.68	20
325	B20 EXTERIOR ENCLOSURE	B2030 EXTERIOR DOORS	B203005 HANGAR DOORS	Steel Bi-Fold	SF	\$81.00	\$271	\$0.12	\$1.18	35
370	B30 ROOFING	B3010 ROOF COVERINGS	B301002 LOW SLOPE ROOF SYSTEMS	Liquid Elastomers	SF	\$2.45	\$47	\$0.12	\$1.18	20
387	B30 ROOFING	B3010 ROOF COVERINGS	B301003 ROOF INSULATION & FILL	Rigid Foamed-In-Place/PUF	SF	\$8.15	\$27	\$0.12	\$1.18	20
408	B30 ROOFING	B3010 ROOF COVERINGS	B301004 FLASHINGS & TRIM	General	LF	\$47.00	\$157	\$0.38	\$3.87	25
411	B30 ROOFING	B3010 ROOF COVERINGS	B301005 GUTTERS & DOWNSPOUTS	Downspouts	LF	\$13.98	\$47	\$0.38	\$3.87	20
418	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 12" Diameter	EA	\$360.00	\$1,202	\$1.26	\$12.68	20
419	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 12" x 12"	EA	\$1,473.00	\$4,920	\$1.26	\$12.68	20
420	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 12" x 24"	EA	\$1,830.00	\$6,112	\$1.26	\$12.68	20
421	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 12" x 36"	EA	\$2,410.00	\$8,049	\$1.26	\$12.68	20
422	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 18" Diameter	EA	\$3,155.00	\$10,538	\$1.26	\$12.68	20
423	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 20" x 72"	EA	\$4,565.00	\$15,247	\$1.26	\$12.68	20
424	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 24" Diameter	EA	\$5,050.00	\$16,867	\$1.26	\$12.68	20
425	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 24" x 72"	EA	\$5,055.00	\$16,884	\$1.26	\$12.68	20
426	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 30" Diameter	EA	\$2,715.00	\$9,068	\$1.26	\$12.68	20
427	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Gravity Ventilator - 36" Diameter	EA	\$2,715.00	\$9,068	\$1.26	\$12.68	20
434	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Hatches	EA	\$2,080.00	\$6,947	\$1.26	\$12.68	75
435	B30 ROOFING	B3010 ROOF COVERINGS	B301006 ROOF OPENINGS AND SUPPORTS	Other	EA	\$4,943.00	\$16,510	\$1.26	\$12.68	75



# Typhoon Recovery Plan Andersen AFB



A	B	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
GROUP	PRIORITY	IMPACTED GROUP	MDI	CRITICAL FACILITY	FACILITY #	FACILITY NAME	PROJECT TITLE	CLASS V ESTIMATE	CLASS III ESTIMATE	PRV	EXECUTION METHOD	DAMAGE	SCOPE OF WORK		
1	1	USSF	75	90	34	SPACE OPERATIONS FACILITY	SPACE OPERATIONS FACILITY REPAIRS	\$19,201,939	\$12,496,530	\$ 17,456,308	AFCAP	MAJOR DAMAGE	REPLACE ROOF AND MISSING EXHAUST VENT COVERS REPAIR/REPLACE/CERTIFY LIGHTNING PROTECTION SYSTEM REPLACE RADON SYSTEM VENTS LOCATED ON ROOF TOP REPLACED DAMAGED RESTRICTED AREA ROLLING GATE ADJACENT TO 36 SFS GUARD SHACK		
2	1	36 MSG	80		1625	CDC	Repair CDC Storm Damage (1996)	\$11,664,675	\$10,604,250	\$ 17,349,546	AFCAP	MAJOR DAMAGE	ALL WORK NECESSARY TO PROVIDE A FULLY FUNCTIONING CDC FACILITY THAT COMPLIES WITH APPLICABLE CODES AND STANDARDS TO INCLUDE FACILITY CRITERIA 4-740-14N SEAL EXISTING ROOF - APPROXIMATELY 25,000 SF INSPECT AND CLEAN (27) 4-INCH DIAMETER ROOF DRAINS REPLACE WATER DAMAGED WALLS (10,500 LF) AND FLOOR COVERING (22,000 SF) REPLACE WIND DAMAGED: (22) - 3068 EXTERIOR DOORS; (45) - 3060 EXTERIOR VERTICAL CASEMENT WINDOWS; (25) 3050 VERTICAL CASEMENT WINDOWS, AND (21) - 6060 SOLID PANE WINDOWS ASSESS/REPAIR/CERTIFY FIRE SUPPRESSION SYSTEM TO US AIR FORCE STANDARDS ASSESS/REPAIR INTERCOM SYSTEM AS REQUIRED REPAIR/REPLACE AHU VFDS REMOVE METAL PLAYGROUND COVER FRAME ON SOUTHWEST CORNER OF FACILITY CLEAR (2) TWO STORM DRAINS IN COURTYARD		
3	1	36 MSG	49	88	18002	36 LRS/DZSP_BASE SUPPLY		\$138,321,362	\$42,427,109	\$125,746,693	AFCAP	MAJOR DAMAGE	ABATE AND DISPOSE ALL EXPOSED ASBESTOS FLOORING, AND ASSOCIATED MASTIC REPLACE MISSING EXHAUST VENTS (26) 3-FOOT DIAMETER REPAIR/REPLACE 1 EACH LOUVER TYPE VENT REPLACE EXTERIOR ROLL UP DOORS; 20X20, 16X8, REPLACE 1 SLIDING DOOR TO A MOTORIZED ROLL UP DOOR; 14X14 REPLACE PARAPET COVERING JOINT BETWEEN SEPARATE BUILDING SECTIONS (300-FEET) WAREHOUSE OFFICE TO BE DEMOLISHED, REMOVED, AND REPLACED WITH SIMILAR OFFICE REMOVE MOLD THROUGHOUT BUILDING REPLACE ENTIRE ROOF REPLACE/REPAIR DRAINAGE/GUTTER SYSTEM AROUND BUILDING SECURE EXISTING LADDER AND PROVIDE SAFETY CAGE SYSTEM REPAIR DAMAGED LOADING DOCK HANDRAIL		
4	1	36 MXG	75	114	18004	MXG AGE SHOP	Repair MXG AGE Shop Storm Damage (1956)	\$3,353,673	\$3,048,794	\$ 27,025,284	AFCAP	MAJOR DAMAGE	FULL ROOF REPLACEMENT AND BUILDING SEAM/JOINT SEALED AND CAPPED REPLACE (8) LARGE, DAMAGED VENT COVERS ON SOUTH SECTION OF FACILITY (4X4 FEET) WITH PERMANENT CAPS REPLACE (3) SMALL, DAMAGED VENT COVERS ON NORTH SECTION OF FACILITY (3X3 FEET) WITH		
5	1	36 MXG	75	114	18004	MXG AGE SHOP	Repair MXG AGE Shop Storm Damage (1956)	\$3,353,673	\$3,048,794	\$ 27,025,284	AFCAP	MAJOR DAMAGE	FULL ROOF REPLACEMENT AND BUILDING SEAM/JOINT SEALED AND CAPPED REPLACE (8) LARGE, DAMAGED VENT COVERS ON SOUTH SECTION OF FACILITY (4X4 FEET) WITH PERMANENT CAPS REPLACE (3) SMALL, DAMAGED VENT COVERS ON NORTH SECTION OF FACILITY (3X3 FEET) WITH		



# Closing...



- **Disaster Response Teams not Trained on Incident Recovery Planning**
  - **Emergency Incident Command Structure**
  - **Rapid Facility Assessment Triage**
  - **Need for Early Cost Estimate Numbers**
- **Rigor of Operating Long Days in Unfavorable Conditions**
- **Well Matrixed Team of 36CES, AFCEC & PACAF**
- **Early Strawman Organization Based on Tyndall Recovery Program**
- **Opportunity to Repair & Make Andersen AFB Better – More Resilient !**

***FINAL RECOVERY COST ESTIMATE – \$4.3B OVER THE NEXT FOUR YEARS***

# Pending Questions



*Your Success is Our Mission!*