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# The Arizona Test Range Complex (AzTRC)



**Lt General John F. Regni, USAF (ret),**  
ACA Technical Advisor for Defense and National Security

- Why This Is Important
- Arizona a Natural for UAS testing
- Arizona's Proposal
  - ACA is The Applicant, AzTRC reports to the ACA CEO
  - 3 Geographic Ranges, 9 Ranges, 21 distinct areas and the 4<sup>th</sup> Virtual Range
  - Research Objectives
- Arizona Test Range Complex—Unique Features
- Some Tough Competition—Nationally and Regionally
- FAA Timeline

# Why Important: Econ Benefit of UAS Civil Applications

Wildfire Mgt, Agriculture, Disaster Mgt, Weather Forecast, Mapping, Environmental Mgt, Media, Real Estate, S&R, Law Enforcement, Freight Transport...and more

- March '13 Assn for Unmanned Vehicles Int'l (AUVSI) Econ Impact Report:

- \$13 B in first 3 years, another \$82 B thru 2025

- 34K manufacturing, 70K new jobs in 3 yrs; 104K by 2025

- Tax revenue of \$636 B through 2025

- *Arizona rated as #5 in USA with 2K Direct, 4K total jobs; \$209 M Direct Spending, \$414 M Econ Impact, \$1.9M sales tax*

- **Step #1:** *FAA build policy for safe integration of UAS into the National Airspace...from data from the 6 Test Ranges*

# Arizona: “The Natural” for Unmanned Aircraft Testing

- 340+ days of sunshine and Visual Flight Rules flying
- Capacity for all research and testing, Groups 1-5, 24/7
- Range areas focused on UAS Groups 1-5, 1-3, 1-2
- From sea level to 5,000 runways; desert, mountains, forests
- 6,700 sq miles of ~zero population, low value of property
- 350 PhDs in Research Consortium...and its Virtual Range
- Easy access via Interstate and state transportation network
- 20 years of military UAS experience to leverage
- Unanimous, bi-partisan political support

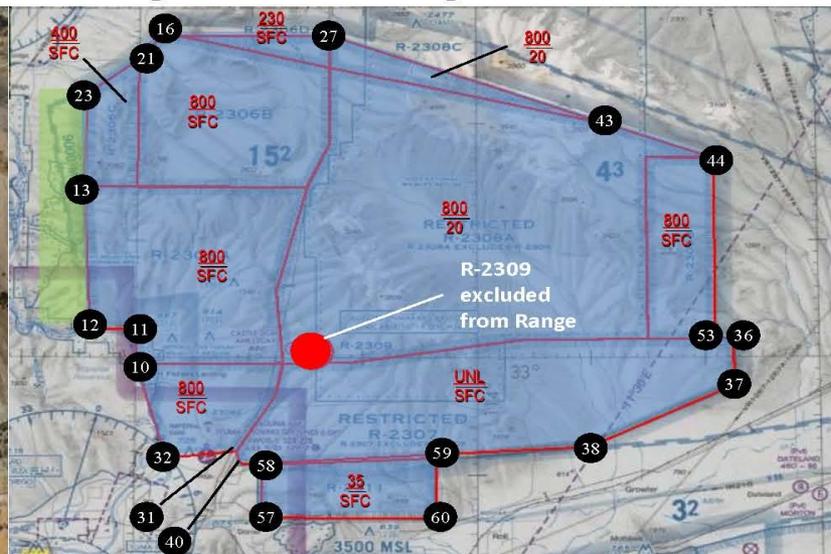
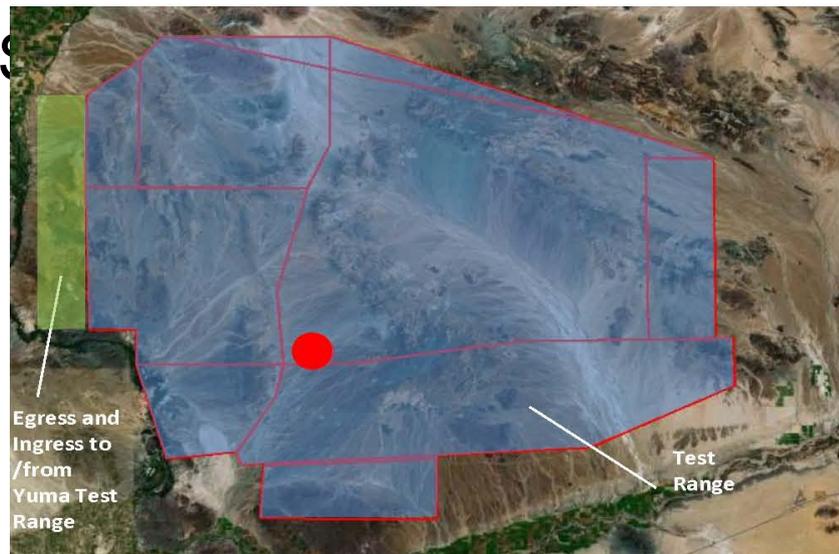
# The Arizona Test Range Complex

Bands together Arizona's enviable natural, national assets; airports, scientists, engineers and academia; state Government, economic development groups...and more

- AzTRC "Hub" a division of the ACA; Dr Steve Shope, Director
- 3 rural areas of the state: Yuma, Benson/Safford, Prescott
- 9 Test Ranges with 21 distinct areas for testing
- Live-Virtual-Constructive Modeling & Simulation Virtual Range
- 6,700 square miles of low population density lands underneath
- Research and Industry Consortia, 23 Team Members
- Focused Research Objectives and SOP for safety throughout

# Southwest Range: 5 Test Ranges, SAA for Groups 1-5

## AzTRC Southwest Range - YPG Test Range



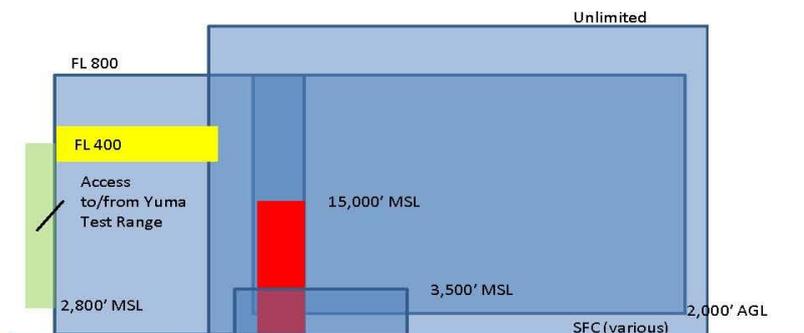
Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013

Test Range Airspace			Test Range Airspace		
10	33.0000	-114.5008	37	32.9828	-113.6231
11	33.0339	-114.5008	38	32.8811	-113.8369
12	33.0339	-114.5675	40	32.8642	-114.3508
13	33.2542	-114.5778	43	33.3389	-113.7958
16	33.4744	-114.4411	44	33.2881	-113.6519
21	33.4406	-114.5008	53	33.0339	-113.6519
23	33.3897	-114.5778	57	32.7794	-114.3211
27	33.4744	-114.2175	58	32.8642	-114.318
31	32.8811	-114.3508	59	32.8642	-114.061
32	32.8642	-114.4647	60	32.7794	-114.064
36	33.0339	-113.6231			

### Notes:

- 1) The YPG Test Range is accessed through the Yuma Test Range.
- 2) The YPG UAS Test Range is overlaid on top of R-2306, 2307, 2308, and 2311 restricted airspace.
- 3) All coordinates are approximate; please refer to official active sectional charts for exact internal and external boundaries.
- 4) Lost link areas will be designated in coordination with YPG range authority prior to each operation.

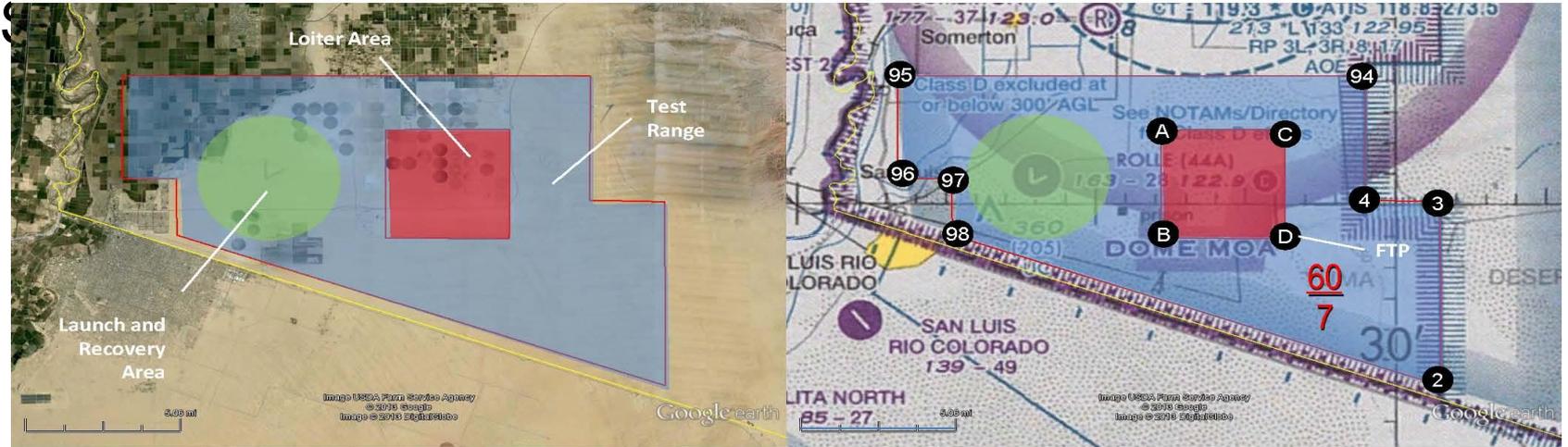
Param.	Typical Range	Param.	Typical Range
Weight	0 – 20,000 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 250 knots	Hours	24x7, SR/SS, 600/2200



Airspace projection seen from the south

# Southwest Range: Rolle Field for Groups 1-3

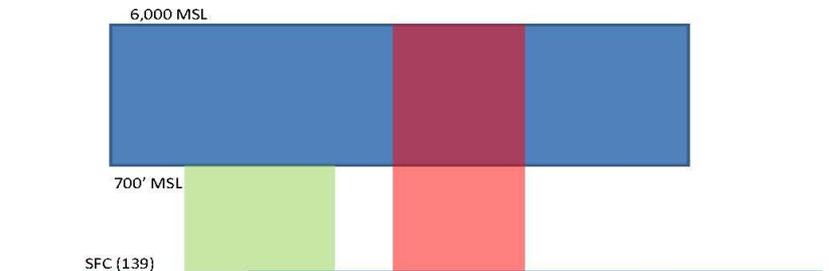
## AzTRC Southwest Range - Rolle Test Range



Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013

Test Range Airspace		Loiter Area 1		Launch & Recovery
2	32.3897 -114.4758	A	32.5382 -114.6311	2 NM radius centered on Rolle Airfield (44A)
3	32.4929 -114.4758	B	32.4802 -114.6311	
4	32.4929 -114.5175	C	32.4802 -114.5625	
94	32.5672 -114.5175	D	32.5382 -114.5625	
95	32.5672 -114.7781			
96	32.5083 -114.7781			
97	32.5083 -114.7478			
98	32.4744 -114.7478			

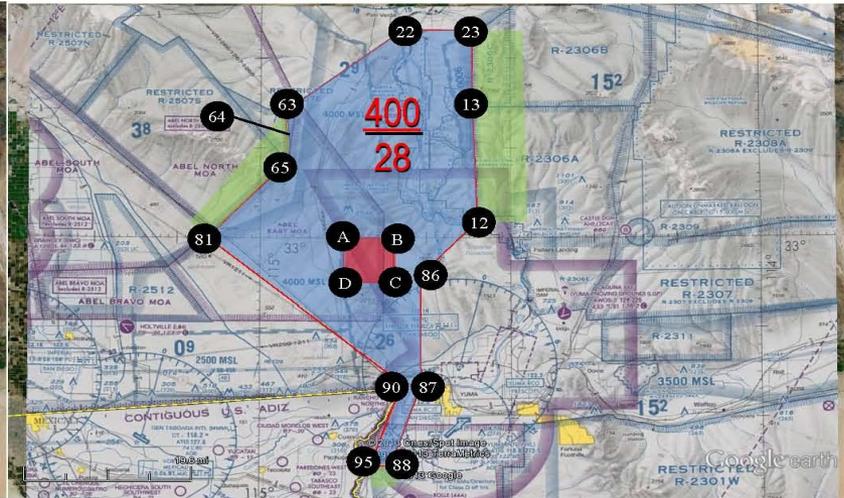
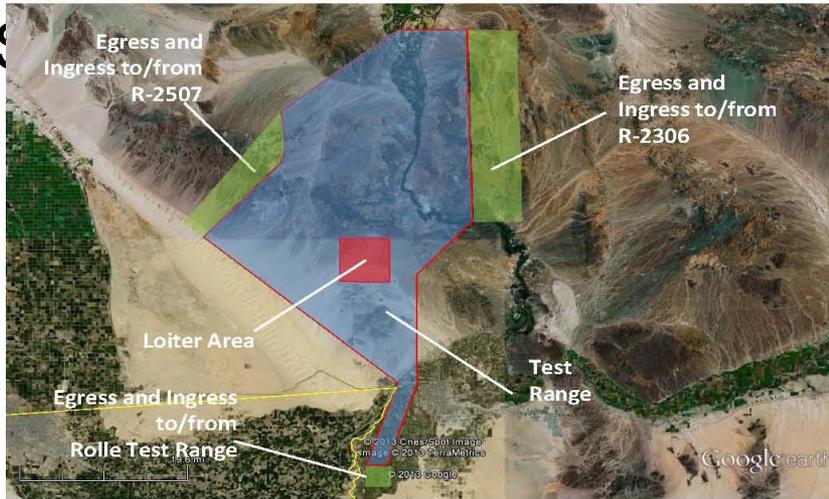
Param.	Typical Range	Param.	Typical Range
Weight	0 – 20,000 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 250 knots	Hours	24x7



Airspace projection seen from the south

# Southwest Range: Yuma Range Connects All, Groups 3-5

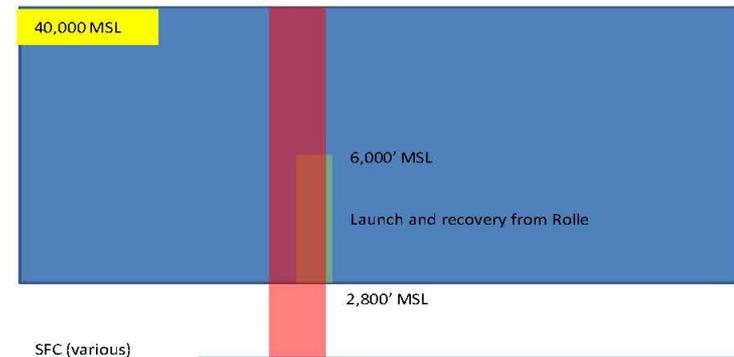
## AzTRC Southwest Test Range – Yuma Test Range



Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013

Test Range Airspace			Test Range Airspace		
23	33.3780	-114.5778	64	33.1742	-114.9399
13	33.2435	-114.5796	63	33.2384	-114.9479
12	33.0339	-114.5675	22	33.3780	-114.7102
86	32.9319	-114.6800	Lost Link Area		
87	32.7286	-114.6800	A	33.0000	-114.8333
88	32.5761	-114.7378	B	33.0000	-114.7333
95	32.5761	-114.7781	C	32.9167	-114.7333
90	32.7286	-114.7164	D	32.9167	-114.8333
81	33.0093	-115.1007			
65	33.1394	-114.9428			

The Yuma Test Range is accessed from the Rolle Test Range. It also connects to the Chocolate Mountains and YPG Ranges.

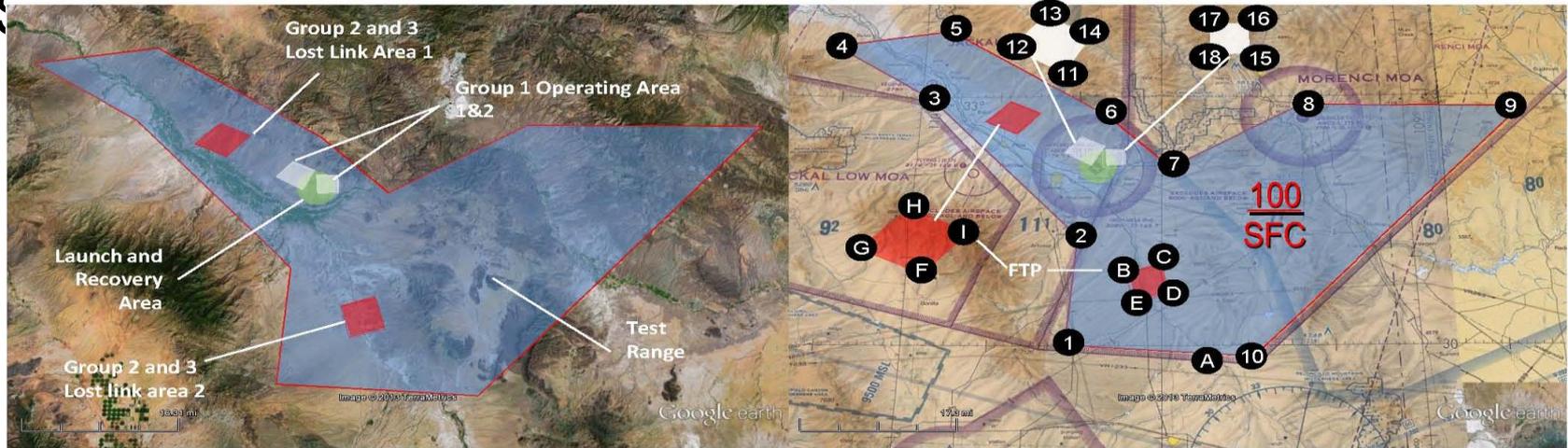


Airspace projection seen from the south

Param.	Typical Range	Param.	Typical Range
Weight	0 – 20,000 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 250 knots	Hours	24x7

# Southeast Range: Two Ranges for UAS Groups 1-3

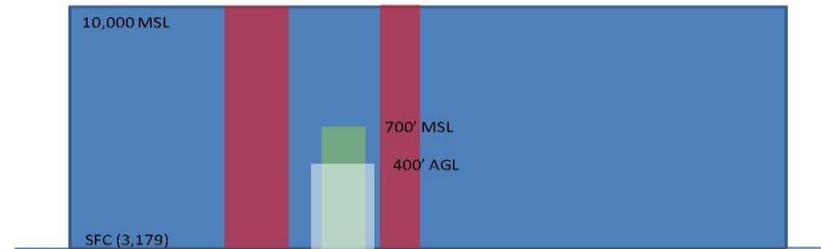
## AzTRC Southeast Range – Safford Test Range



Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013  
Albuquerque Sectional 90<sup>th</sup> edition, effective Oct 2012 thru May 2013

Test Range Airspace		Group 1 Operating Areas		Group 2&3 Lost Link Areas	
1	32.5077 -109.6797	11	32.8625 -109.6496	B	32.6441 -109.5704
2	32.7071 -109.6570	12	32.8868 -109.7018	C	32.6606 -109.5054
3	32.9994 -109.9842	13	32.9152 -109.6701	D	32.6037 -109.4870
4	33.1212 -110.1987	14	32.8969 -109.6245	E	32.5890 -109.5533
5	33.1618 -109.9394	15	32.8539 -109.5806	F	32.9263 -109.8015
6	32.9719 -109.6193	16	32.8892 -109.5815	G	32.9512 -109.8640
7	32.8601 -109.4788	17	32.8900 -109.6207	H	32.9940 -109.8182
8	32.9892 -109.2089	18	32.8543 -109.6204	I	32.9686 -109.7567
9	32.9889 -108.7496				
10	32.4888 -109.3179				

Param.	Typical Range	Param.	Typical Range
Weight	0 – 1,320 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 150 knots	Hours	24x7

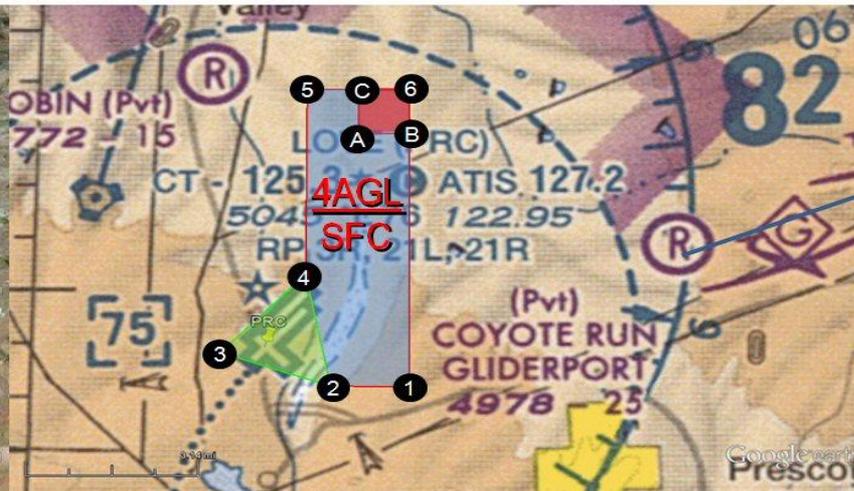
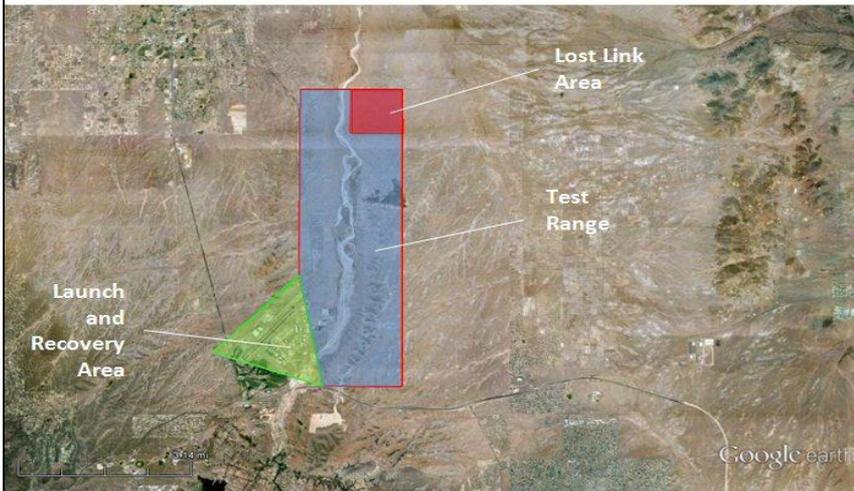


Airspace projection seen from the south

Group 1 Lost Link Areas: 1.5 mile dia. centered at the centroid of respective test areas  
Launch area: 3 mile dia. centered on SAD runway

# Northern Range: Three Ranges for UAS Groups 1-2

## AzTRC Northern Range - Papa

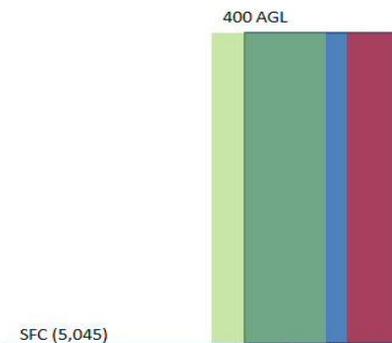


Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013

Test Range Airspace			Loiter Area 1			Launch & Recovery		
1	34.6375	-112.3772	A	32.5592	-114.563	2	34.6375	-112.4029
2	34.6375	-112.4029	B	32.5592	-114.631	3	34.6479	-112.4390
4	34.6719	-112.4112	1	34.6375	-112.3772	4	34.6719	-112.4112
5	34.7309	-112.4112	C	32.4914	-114.63			
6	34.7309	-112.3772						

Note: AzTRC anticipates that most launch and recovery operations will take place at the end of the runways or taxiways adjacent to the operation range

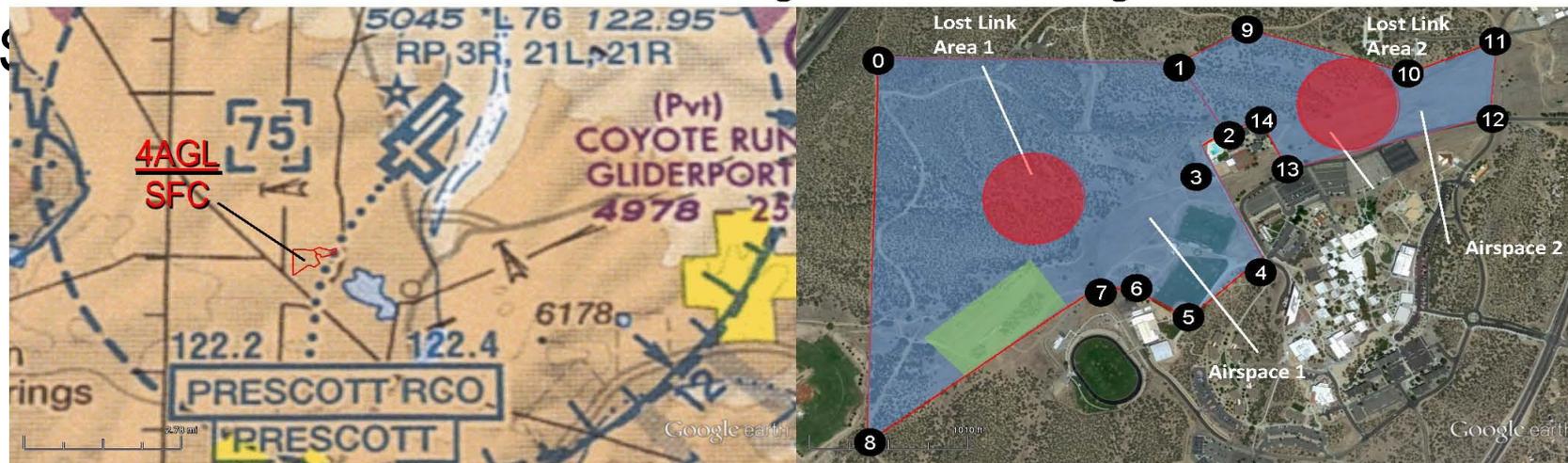
Param.	Typical Range	Param.	Typical Range
Weight	0 – 20 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 40 knots	Hours	600-2200 (tower open)



Airspace projection seen from the south

# Northern Range—Adjacent to Embry-Riddle, Groups 1-2

## AzTRC Northern Range – Romeo Test Range

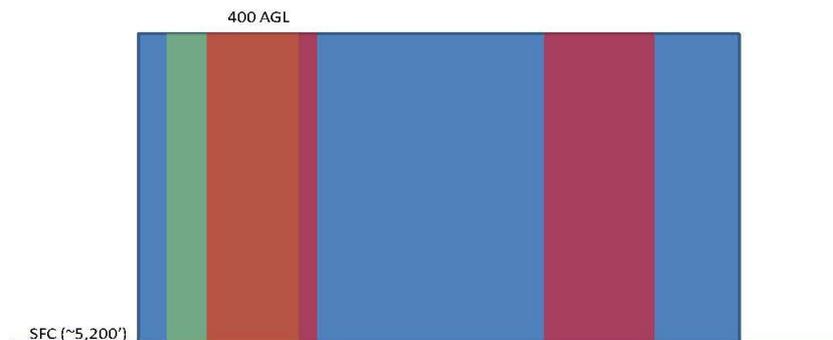


Phoenix Sectional 88<sup>th</sup> edition, effective Oct 2012 thru May 2013

Airspace 1			Airspace 2			Launch & Recovery		
0	34.6203	-112.46	1	34.6203	-112.454	FTP1	34.6175	-112.4569
1	34.6203	-112.454	9	34.621	-112.452	FTP2	34.6195	-112.4499
2	34.6189	-112.453	10	34.6201	-112.449			
3	34.6186	-112.453	11	34.6208	-112.447			
4	34.6163	-112.452	12	34.6192	-112.447			
5	34.6151	-112.454	13	34.6181	-112.451			
6	34.6157	-112.455	14	34.6191	-112.452			
7	34.6157	-112.456	2	34.6189	-112.453			
8	34.6127	-112.46						

Lost link areas 330' diameter circles centered on FTP

Param.	Typical Range	Param.	Typical Range
Weight	0 – 5 lbs	Type	Fixed wing, rotorcraft
Speed	0 – 40 knots	Hours	600-2200 (tower open)

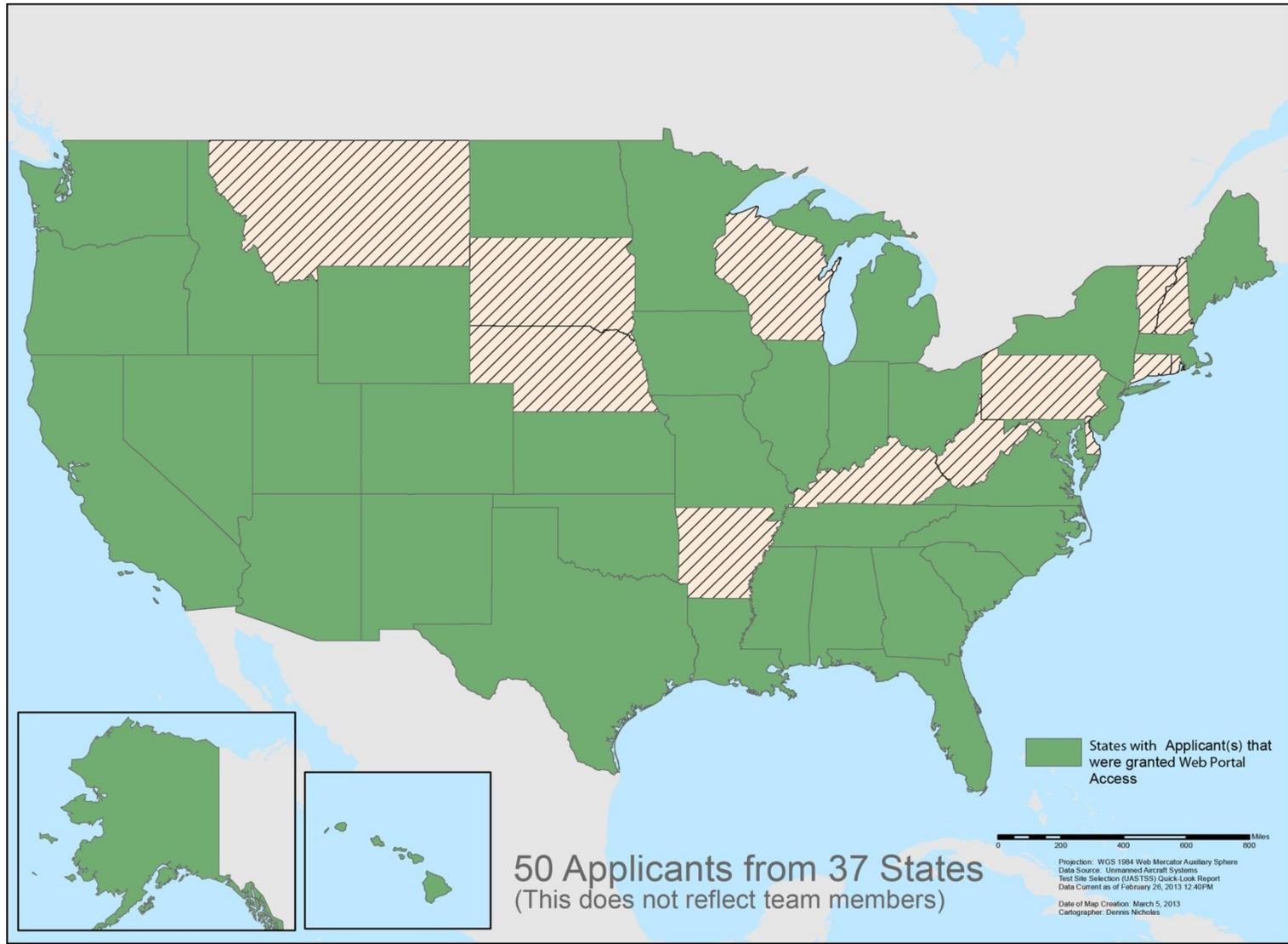


Airspace projection seen from the south

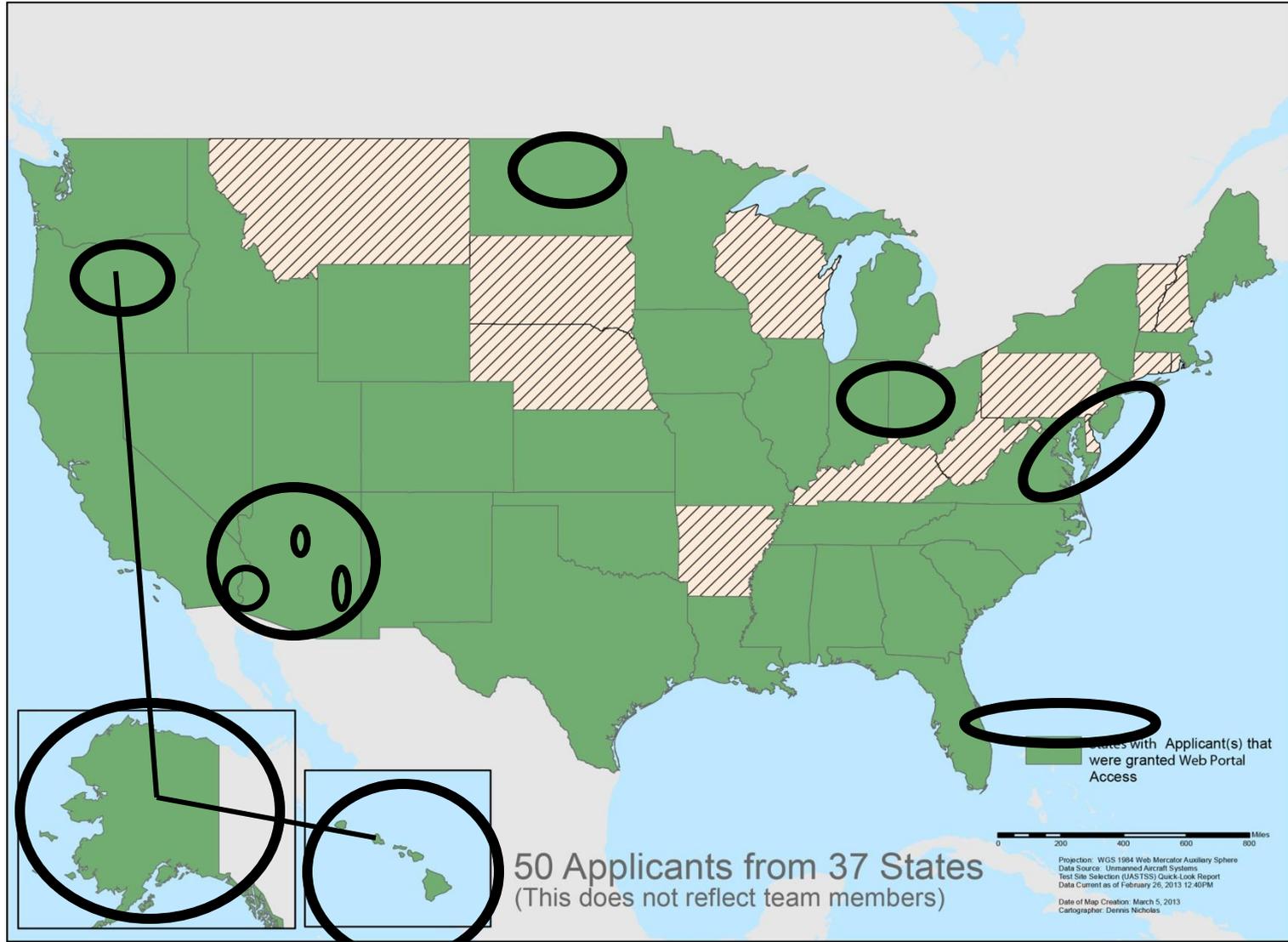
# Research Objectives

- 40 specific research objectives across 9 goal areas
  - Ground control station requirements
  - UAS airworthiness & operator criteria and certification
  - Required, redundant communications
  - Human factors engineering of UAS and ATC systems
  - Frequency Management requirements
  - Safe integration into NAS requirements
    - Sense & avoid, lost-link, traffic flow mgt, ATC, cyber security, multiple UAS aloft
- Compatibility with FAA's next-gen ATC system

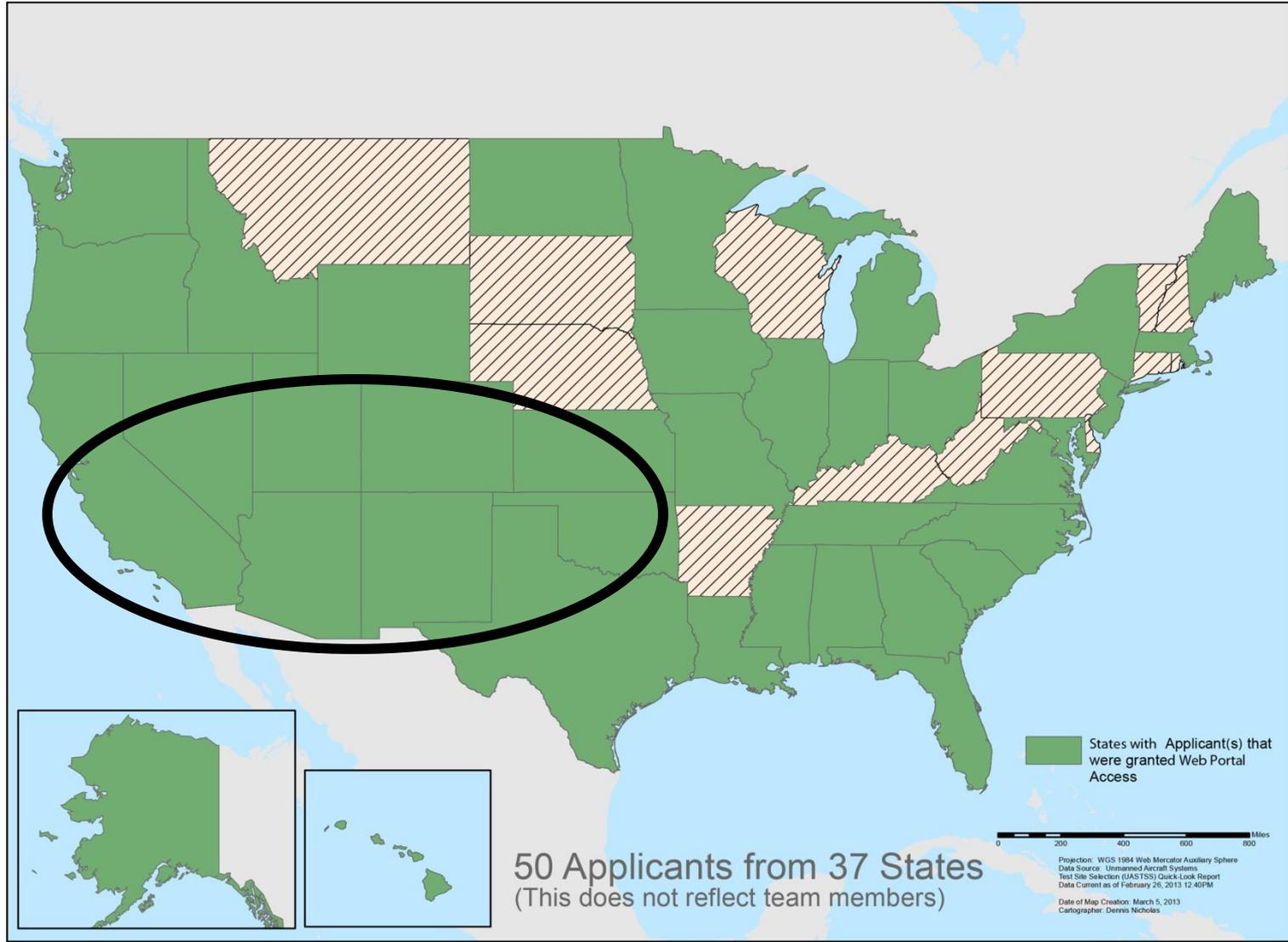
# The Competition Is Keen...



# Geographic & Climate Diversity—One Notional Laydown



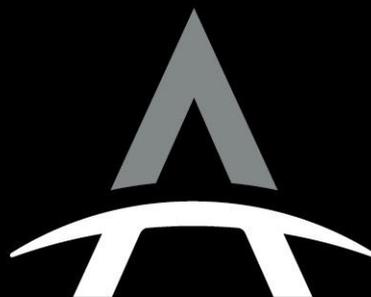
# Southwest Region Competition...



- Original timeline by law: select the 6 ranges in 2012
- February 2013: formal “Screening Information Request”
- 7 Volumes due March 5<sup>th</sup>, March 27<sup>th</sup>, April 11<sup>th</sup>, May 4<sup>th</sup>
- FAA may narrow the field and perform site visits
- Decision by December 31<sup>st</sup>, 2013
- Ranges fully operational by June 30, 2014

# The State of Arizona Has Come Together *To Win*

- ACA Leadership throughout by Sandra and her team
  - ACA Board members support and assistance
  - Herculean effort by ACA: Greg Linaman, Birgitte Santaella, Shawnda Henderson, Marisa Walker, Keith Watkins, and more...
  - ACA Technical Advisors...and GDC4S Ron Wood (!)
- Research Consortium a first for Arizona: SFAz, UofA, ASU, NAU, ERAU, AZ Labs, CAE-USA
- Three Range Managers: Craig Williams (SW), Thompson-Wimmer (SE), Dr. Gary Northam (N)
- Military commanders...
- Unanimous support from Governor, Legislature, federal delegation, Mayors, municipalities, counties, EDs...



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