



**2003 AFCEE Technology Transfer Workshop**

San Antonio, Texas

*Promoting Readiness through Environmental Stewardship*

# **Resource Capability Evaluation Model Pilot Test**

**Measuring the Adequacy of Air, Land, Water, and  
Spectrum Resources to Meet Operational Requirements**

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27 February 2003**

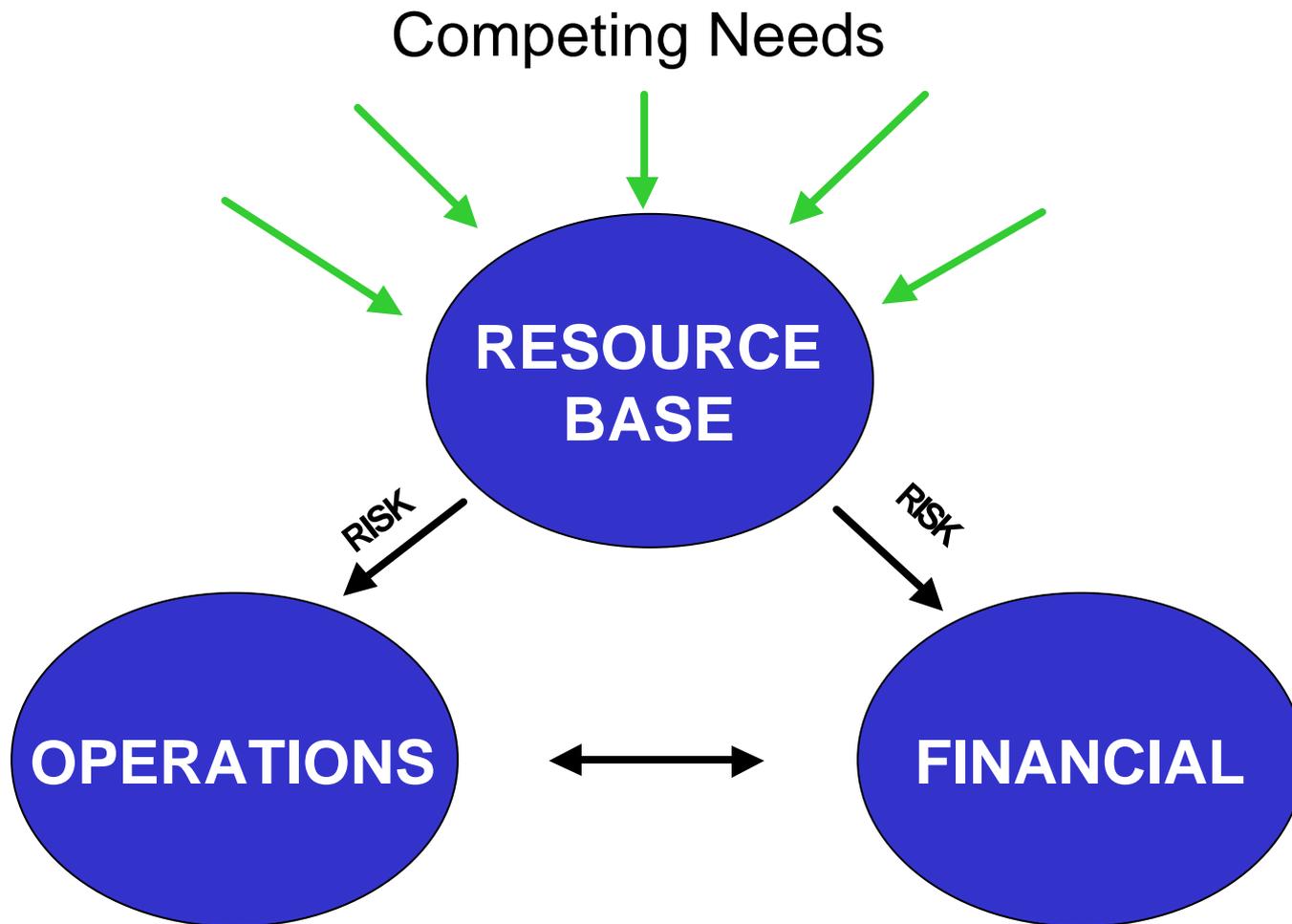


# ***Charter***

- **Develop/pilot test methodology to measure the readiness/adequacy of air, land, water, and spectrum to meet operational needs**
- **Identify/quantify encroachments denying/degrading resource availability**
- **Identify/quantify resource opportunities to support operations**

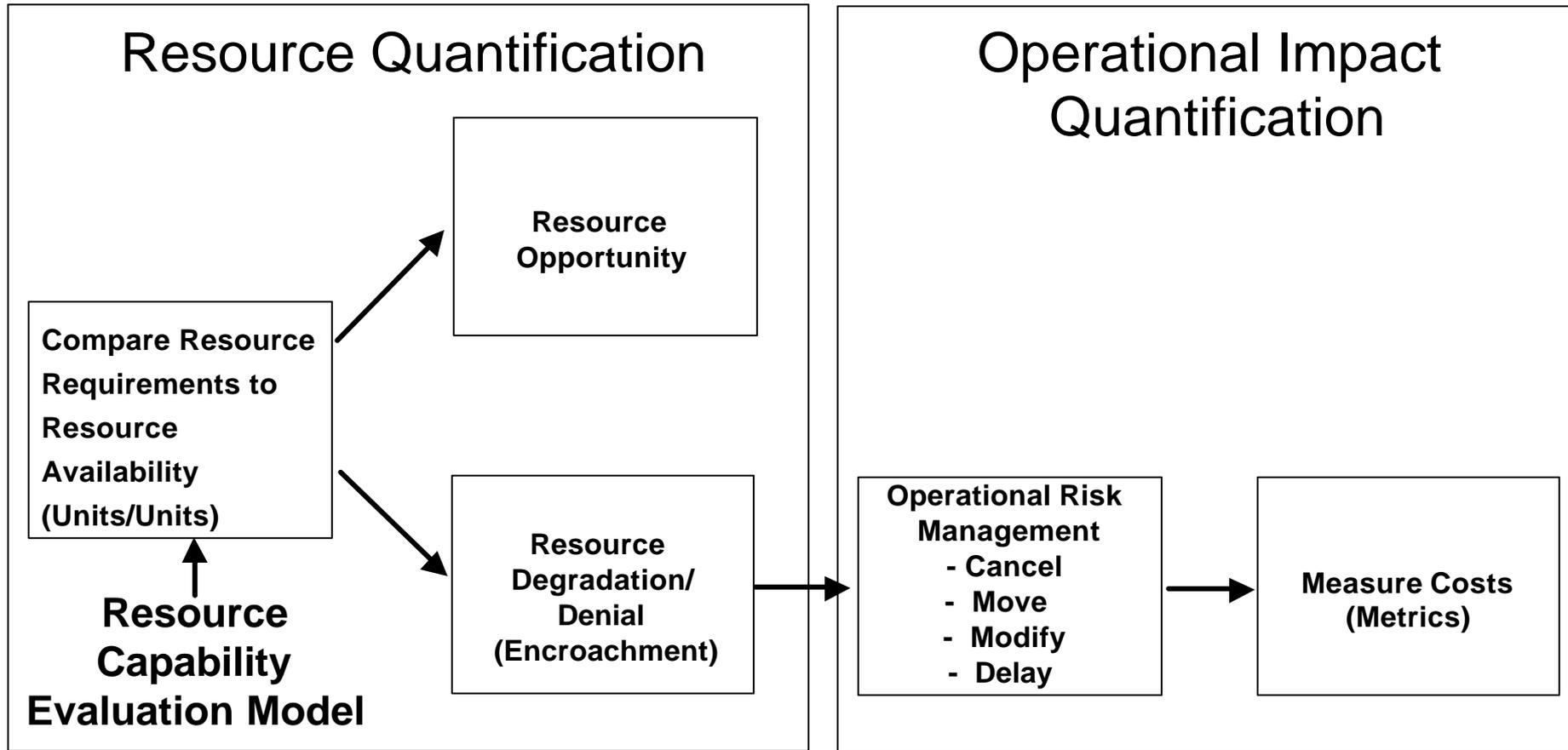


# Encroachment 101



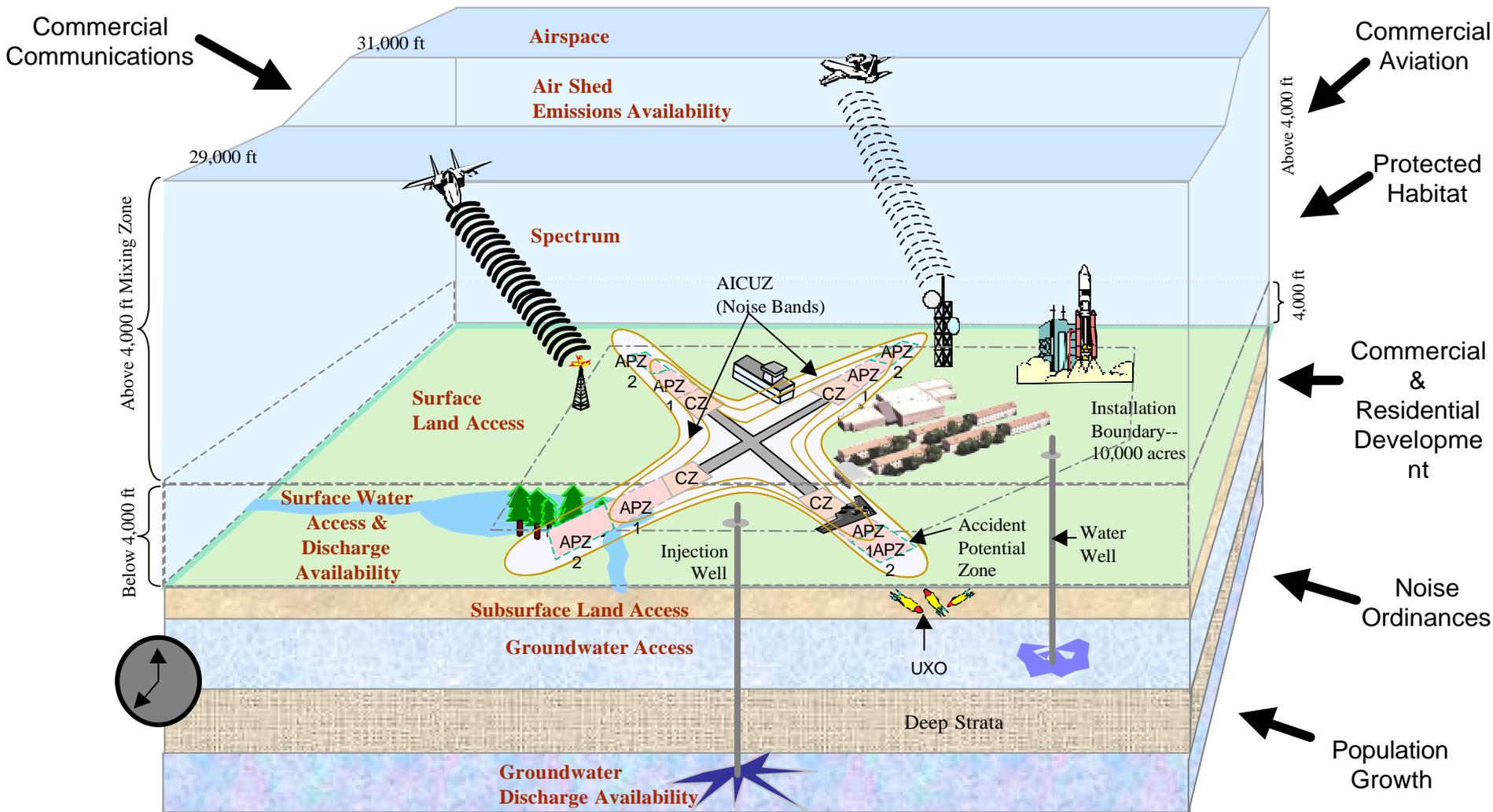


# ***Relationship: Resource Base and Operational Risk***





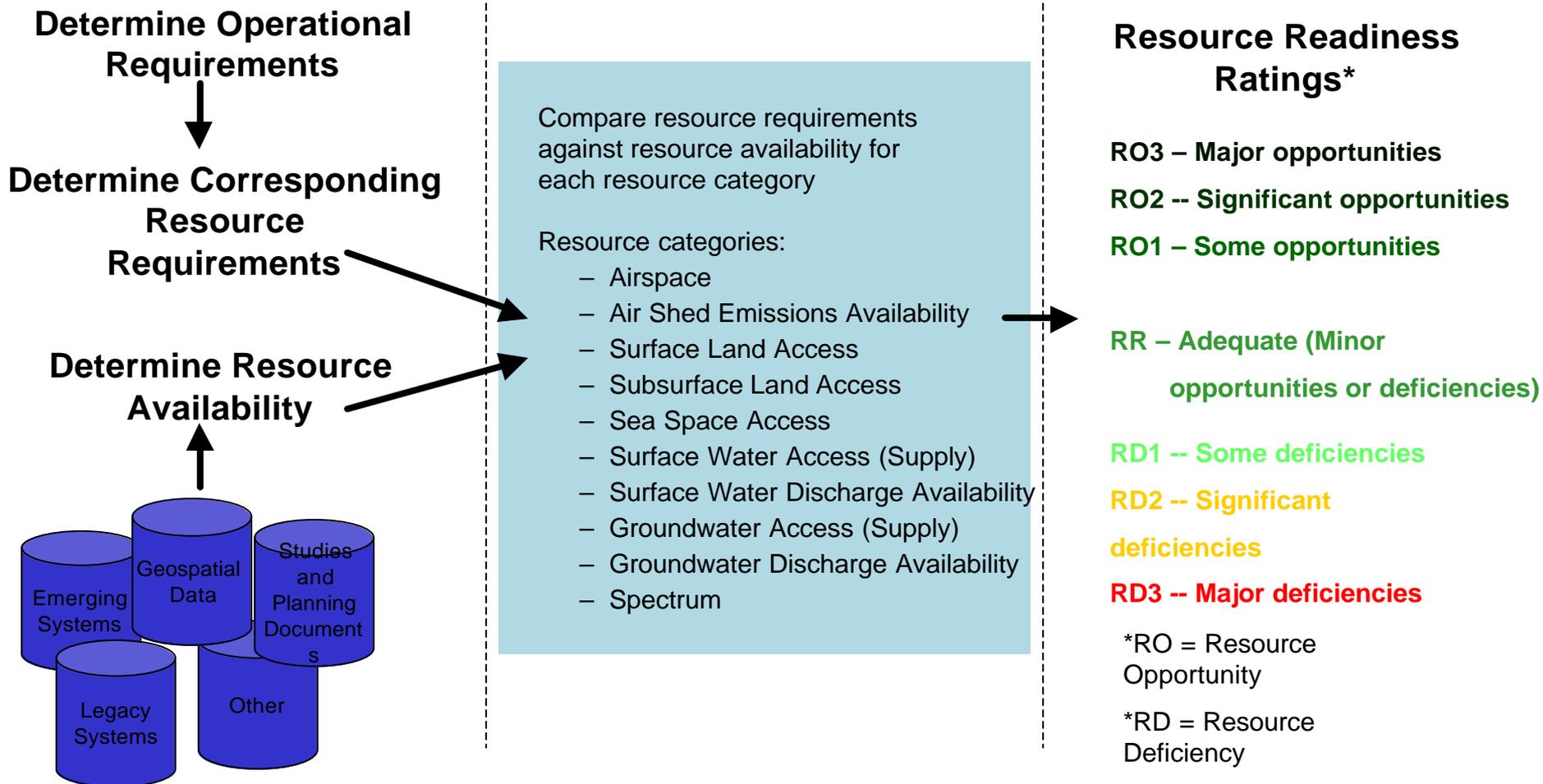
# Depiction of Resources and Encroachment at Installation Level



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# Methodology for Measuring Resource Readiness





# Framework: Availability vs. Requirements Comparison

Resource Category	Requirements		Capacity		Resource Readiness Rating RO 1-3 RR RD 1-3	Competing Needs
	Operational Requirements	Resource Requirements	Resource Availability (currently available)	Operational Capability (currently provided)		
Airspace						
Air Shed Emissions Availability						
Surface Land Access						
Subsurface Land Access						
Sea Space						
Surface Water Access (Supply)						
Surface Water Discharge Availability						
Groundwater Access (Supply)						
Groundwater Discharge Availability						
Spectrum						



# Resource Readiness Ratings\*

Opportunity

↑

Adequate →

↓

Degraded

	DESCRIPTIVE RATING	RATING CODE
> 140%	Dark Green	RO3
> 120-140%	Medium Green	RO2
>110-120%	Light Green	RO1
110 - 90%	Yellow-Green	RR
< 90-80%	Yellow	RD1
< 80 - 60%	Orange	RD2
< 60%	Red	RD3

RO = Resource Opportunity  
RD = Resource Degradation

\* Percentages results from comparison of resource availability to resource requirements, using 100% as the baseline for breakpoints.



# ***Pilot Test Chronology***

- **November 02**
  - Briefed Framework to XOO, XI, ILE, SAF/IE, Navy, OSD
  - Identified pilot test location per XOO
- **December 02**
  - Prepared draft metrics and questionnaire
  - Visited HQ ACC, 17-18 Dec.: DOR, DOT, CEVP, CEVQ, CEO, CEP, SCC, PA
  - Received/reviewed pilot test documents
- **January 03**
  - Updated metrics and questionnaire based on HQ
  - Visited pilot test location to review/populate metrics and questionnaire, 7-9 Jan.
  - Developed executive summary, reviewed with HQ ACC and pilot test location
  - Briefed executive summary to XOO, SAF/IEE, XIC, ESOH Committee, DoD ESOH Policy Board, RRPI Executive Group and WIPT



# ***Current Pilot Test Location Operations and Mission***

- **20<sup>th</sup> Fighter Wing**
  - 78 F-16 CJ aircraft
  - 32,000 airfield operations in FY02
- **Defense Suppression Operations**
  - Anti-radiation missiles
  - Gravity bombs
  - “Maverick” missiles
  - GPS-aided munitions
- **Air-to-Air Operations**



***Provide, project, and sustain combat  
ready air forces***

***Any challenge, Anytime, Anywhere***

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# Metrics Tested

## Key Metrics to be Tested – Page 1 of 2

(Draft – January 7, 2003)

Resource Category	Metric 1*	Metric 2*	Metric 3*	Metric 4*
Airspace	<i>Compatible</i> Volume in MOA, MTR, or WA <b>divided by</b> <i>Required</i> Volume in MOA, MTR, or WA (cubic miles)**	<i>Available</i> Sorties, Hours, Operations (aerodrome) <b>divided by</b> <i>Required</i> Sorties, Hours, Operations Per Year	<i>Optimum</i> Distance of Airspace Unit from Using Installation <b>divided by</b> <i>Actual</i> Distance (miles)	<i>Available</i> width, altitude, and length <b>divided by</b> <i>minimum required</i> length, altitude, width; use most restrictive dimension (miles or feet)
Air Shed Emissions Availability	<i>Available</i> Emissions [Potential to Emit in TPY] <b>divided by</b> <i>Required</i> Emissions [Emissions Inventory in TPY]; use most restrictive pollutant	NA	NA	NA
Surface Land Access	<i>Compatible</i> Surface Land (acres) <b>divided by</b> <i>Required</i> Surface Land (acres)	<i>Developable</i> Surface Land (acres) <b>divided by</b> <i>Total Base or Range</i> Surface Land (acres)	1997 Range Metric Used by ACC (for Poinsett ECR only)	NA
Subsurface Land Access	<i>Compatible</i> Subsurface Land (cubic yards) <b>divided by</b> <i>Required</i> Subsurface Land (cubic yards).	<i>Developable</i> Subsurface Land (cubic yards) <b>divided by</b> <i>Total Base or Range</i> Subsurface Land (cubic yards).	NA	NA
Sea Space Access	<i>Compatible</i> Surface Area (acres) <b>divided by</b> <i>Required</i> Surface Area (acres) Within WA	NA	NA	NA
Surface Water Access (supply)	<i>Available</i> Water from Current Supply <b>divided by</b> <i>Required</i> Water (Average Gallons Per Day)	NA	NA	NA

\*Multiply the Product of each Operation by 100 to convert decimal into a % value.

\*\*Recommended Airspace Metric by ACC (Dec. 2002)



# Metrics Tested, Continued

## Key Metrics to be Tested - Page 2 of 2

(Draft – January 7, 2003)

Resource Category	Metric 1*	Metric 2*	Metric 3*	Metric 4*
Surface Water Discharge Availability	<i>Available</i> Discharges [Potential to Discharge in TPY] <b>divided by</b> <i>Required</i> Discharges [Discharge Inventory in TPY]; use most restrictive pollutant	<i>Available</i> Discharges [Potential to Discharge in gallons and concentrations] <b>divided by</b> <i>Required</i> Discharges [Discharge Inventory in gallons and concentrations]; use most restrictive pollutant	NA	NA
Groundwater Access (supply)	<i>Available</i> Water from Current Supply <b>divided by</b> <i>Required</i> Water (Gallons Per Year)	NA	NA	NA
Groundwater Discharge Availability	<i>Available</i> Discharges [Potential to Discharge in gallons and concentrations] <b>divided by</b> <i>Required</i> Discharges [Discharge Inventory in gallons and concentrations]; use most restrictive pollutant	NA	NA	NA
Spectrum	<i>Available</i> (i.e., requested minus denials) frequency assignments in the VHF band <b>divided by</b> <i>Required</i> (i.e., requested) base frequency assignments in the VHF band. Repeat for the UHF band.	Area Resource Headroom Metric: Total available frequency assignments in the VHF band <b>divided by</b> total frequency assignments within 100 miles of the base in the VHF band. Repeat for UHF band.		

\*Multiply the Product of each Operation by 100 to convert decimal into a % value.



# ***Example: Installation and Surface Land Access (e.g., Noise)***

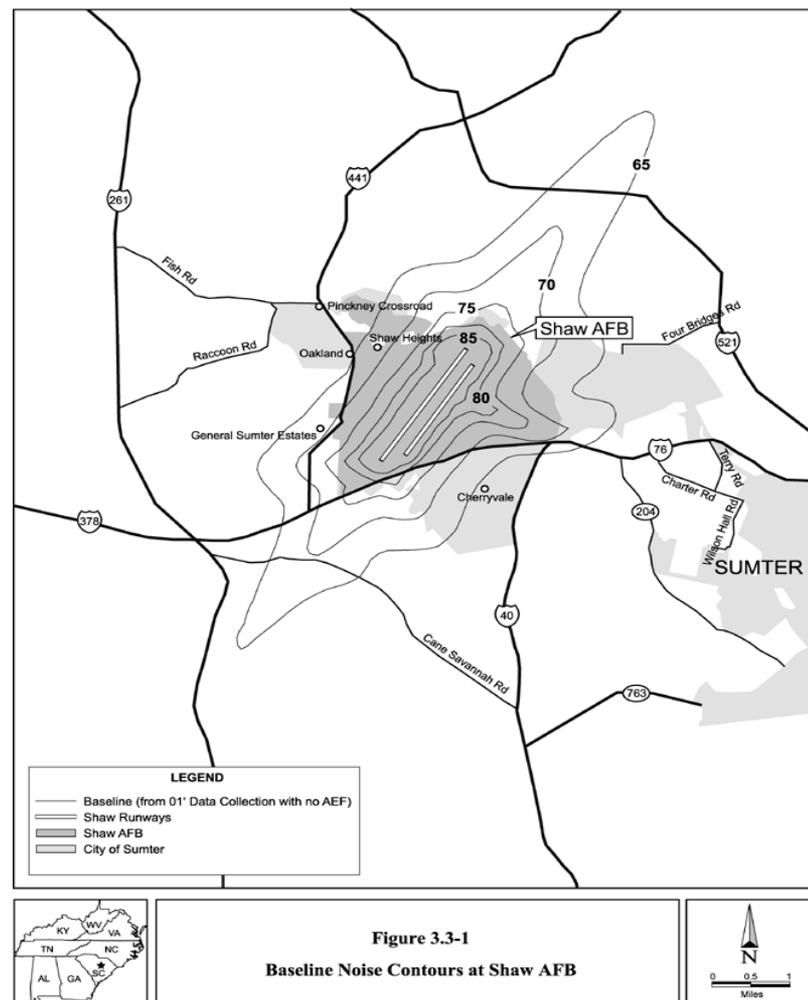
- ***Operational requirements at airfield drive need for surface land access***
  - 32,122 annual airfield operations
  - Aircraft speed, power setting, trajectory
  - Other information in NOISEFILE database
- ***Surface land requirements determined around airfield***
  - Day-night average sound level metric
  - NOISEMAP computer model
  - 65 dB+ noise contours





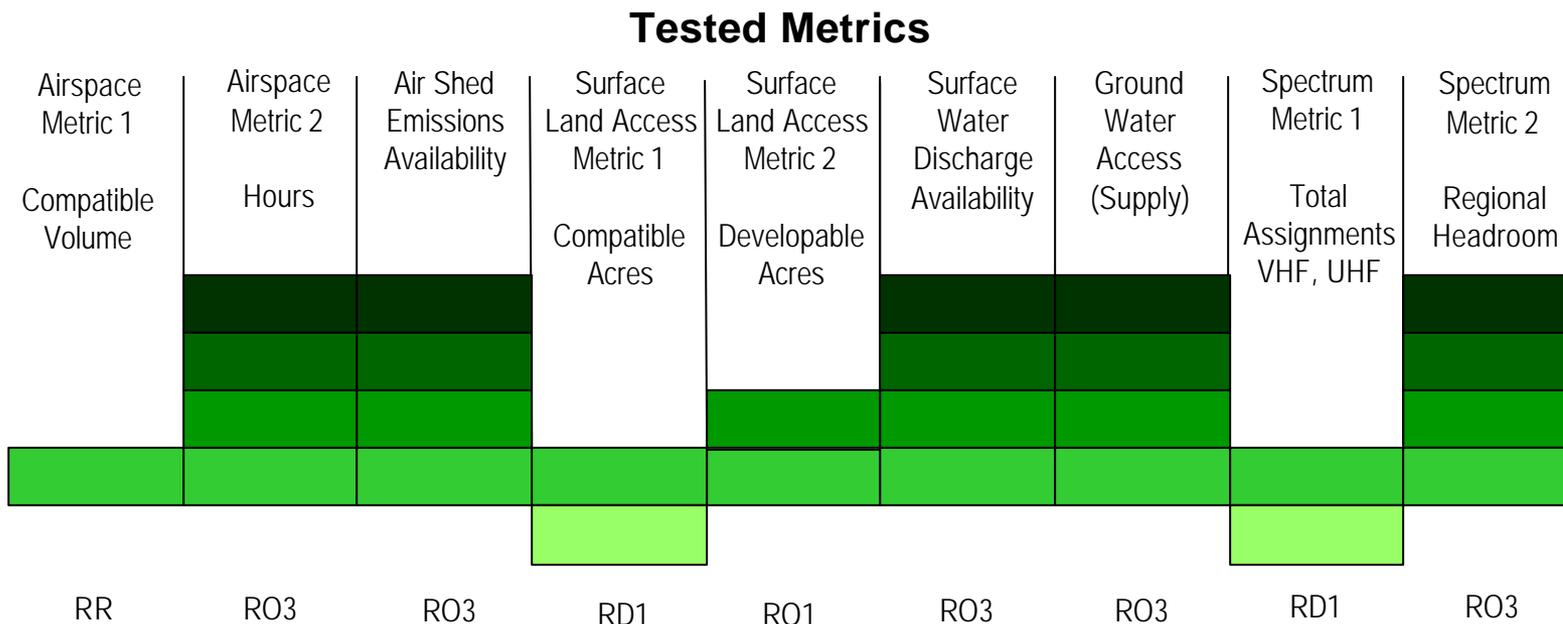
# Surface Land Resource Adequacy Determination (Example)

- **Resource Requirements** defined by acres within 65+ dB contours
  - Total acres = 9600
  - Off-base acres = 6300
  - On-base acres = 3300
- **Resource Availability** defined by “compatible acres”
  - 700 - 945 incompatible acres off-base determined using FAA guidelines
  - 5355 - 5600 compatible acres off-base
  - 85.0-88.8% compatible acres off-base, or 11.2 - 15% encroachment





# Resource Readiness Ratings for the Installation



- Installation has significant resource opportunity
- Approximately 9.9% airspace encroachment in the aerodrome using Metric #1
- Approximately 11-15% off-base surface land encroachment using Metric #1
- Resource Deficiency for Spectrum Metric 1 is due to NTIA denial of four requests for frequency assignments, not encroachment



# Range and Operations

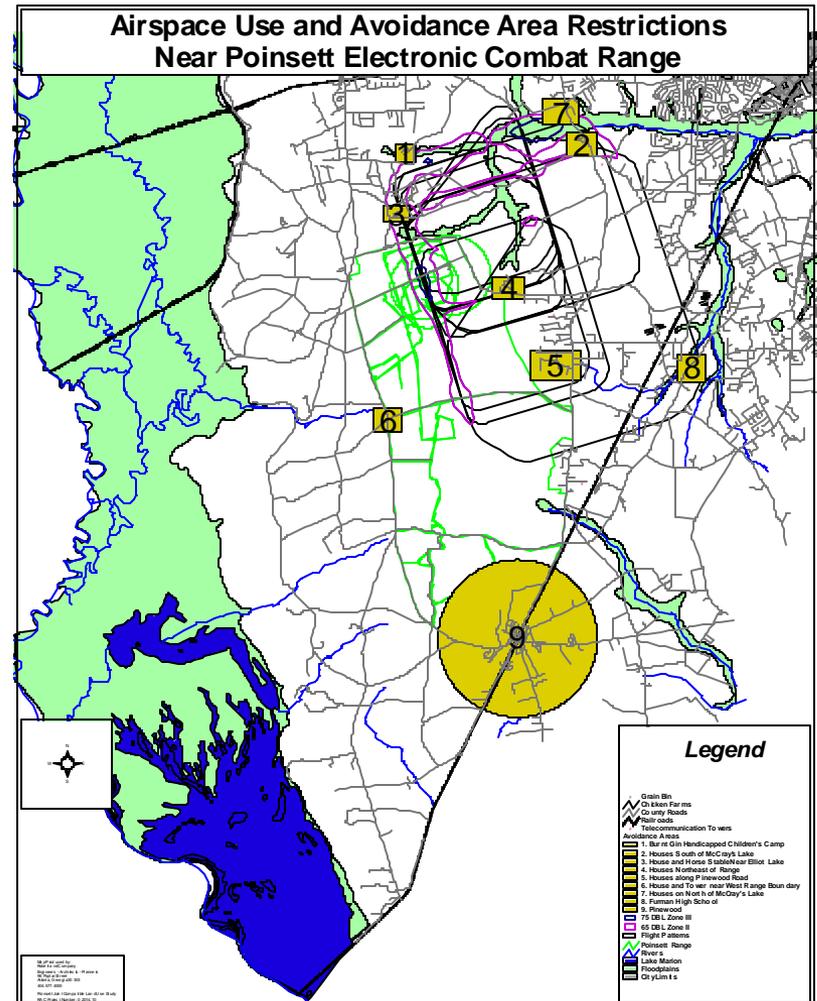
- Range located 15 miles south of the installation
- Used by F-16, A-10, F-15E, F-18
- Operations largely *Basic Surface Attack* and *Close Air Support*, including bombing with practice ordnance, strafing using training munitions





# Tested Airspace Metrics at Range

- Compatible Volume Metric: 346 *total* cubic NM vs. 340 cubic NM *available* (nine **avoidance areas** in yellow)
- Hours Metric: 653 hours *used* per year vs. 4,125 hours *available* per year
- Distance Metric: 15 actual miles vs. 75 maximum desired miles
- Minimum Size Dimensions Metric: 1,755 cubic NM *required* for Basic Surface Attack vs. 340 cubic NM *available*





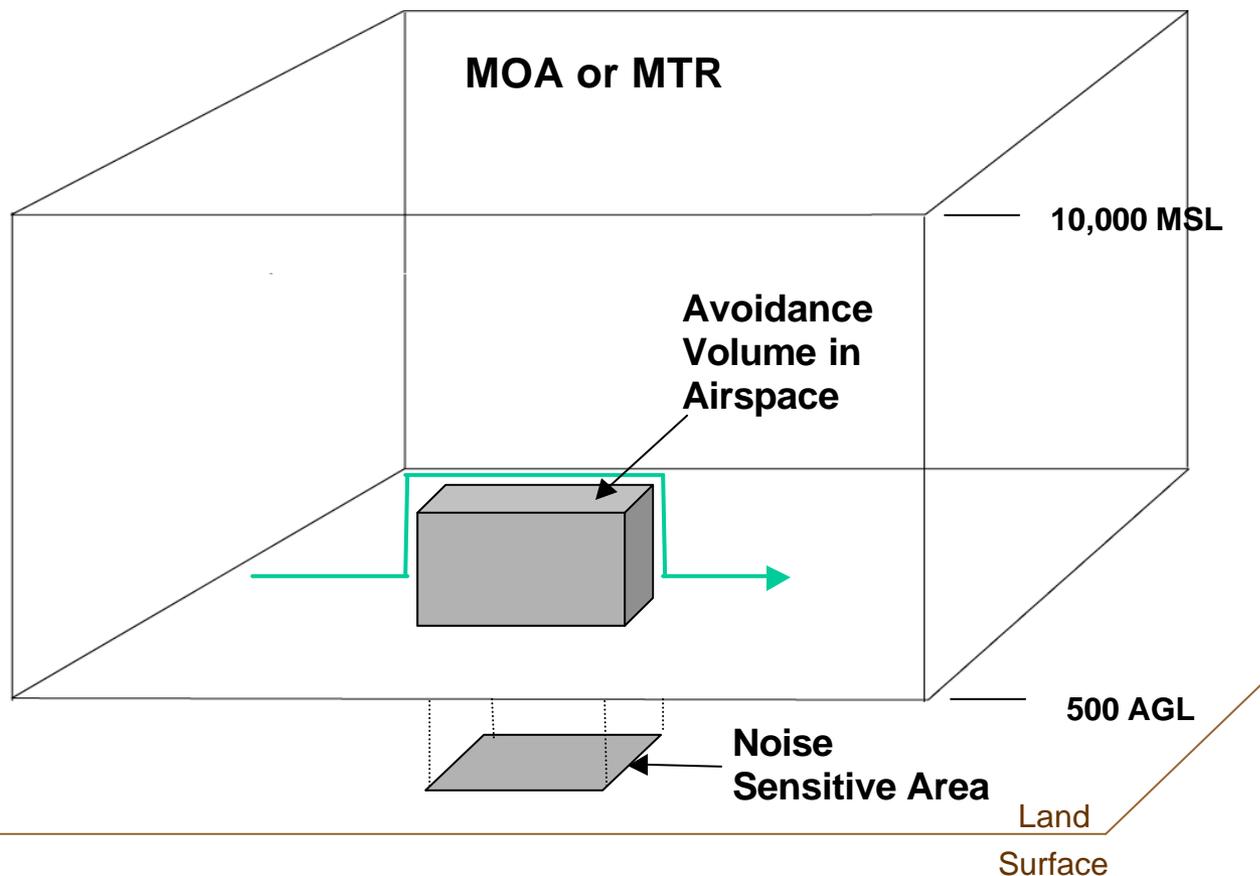
# Illustration of Compatible Volume Metric for Airspace

## Airspace Metric No.1:

Compatible Volume  
vs. Total Volume

**MOA – Military  
Operations Area**

**MTR – Military  
Training Route**



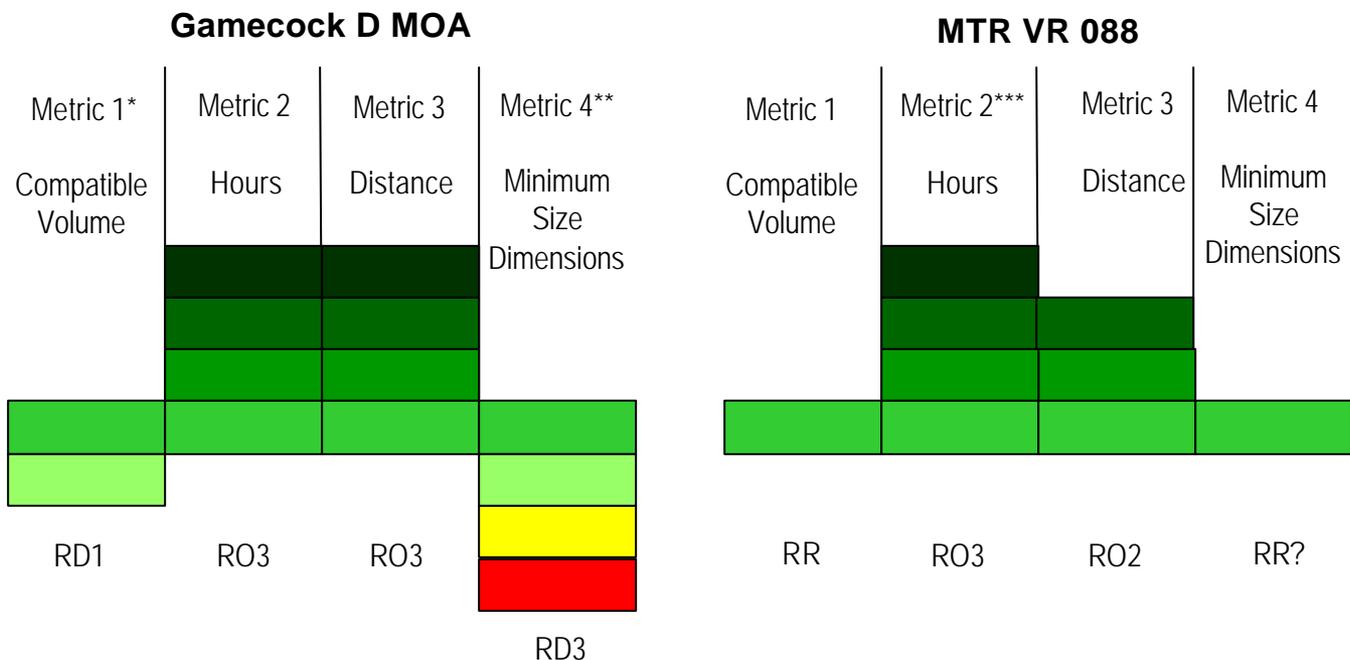






# Resource Readiness Ratings for Selected Airspace Units

## Tested Metrics



\* Jacksonville ARTCC retains 10,000-12,000' per letter of agreement, 83% encroachment using Metric 1

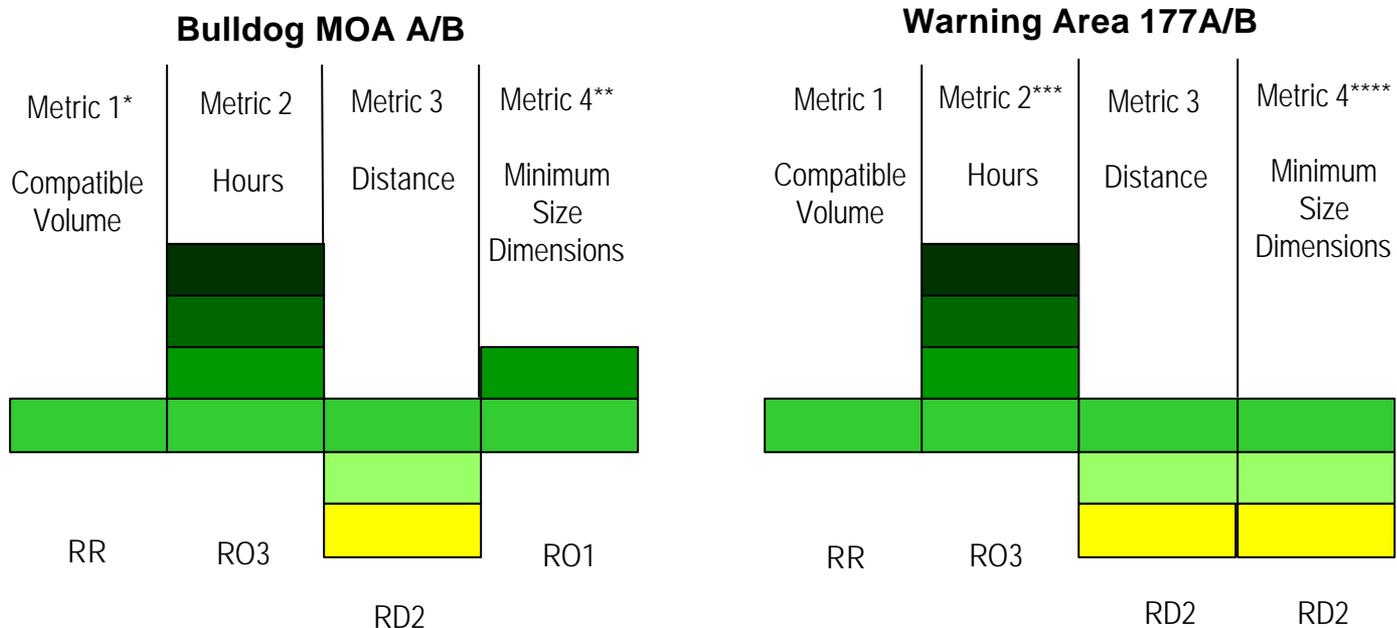
\*\*Metric 4 application based on dimensions calculated by 20 FW staff for Surface Attack Tactics (pilot test purposes)

\*\*\*Hours for Metric 2 estimated by 20 FW staff; hours utilization is not tracked



# Resource Readiness Ratings for Selected Airspace Units

## Tested Metrics



\* Approximately 1.0% airspace encroachment using Metric #1 for Gamecock MOA

\*\*Metric 4 application for Gamecock MOA based on dimensions calculated by 20 FW staff for Surface Attack Tactics (pilot test purposes)

\*\*\*Hours for Metric 2 estimated by 20 FW staff; hours utilization is not tracked for Warning Areas

\*\*\*\*Metric 4 application for Warning Area 177 A/B based on dimensions calculated by 20 FW staff for Air-to-Air sortie operations (pilot test purposes)



# ***Preliminary Conclusions***

- Framework Methodology/Metrics
  - Air, land, water, and spectrum resources are measurable
  - Metrics understood / generally accepted as useful measures by ACC and pilot test location
  - Metrics for airspace and frequency spectrum have strengths and weaknesses
- Pilot Test Results
  - Most data exists in base documents
  - Airspace data collection/resource calculation for Sizing Airspace (Metric 4) not straightforward
  - Airspace and surface land encroachments identified and can be quantified
  - Water supply, water discharge, and spectrum Resource Opportunities identified and can be quantified
  - Opportunity for additional operational capabilities exist
- Changes in operational training requires workarounds, i.e., use of Navy's Mid-Atlantic Electronic Warfare Range



# ***Next Steps***

- Complete full results package (annotated briefing)
- Refine questionnaire with pilot test data
- Finalize general questionnaire and metrics
- Coordinate results
- Consider additional pilot test
- Provide general recommendations
- Institutionalize as part of business transformation



# ***Transformation: Incorporate Resource Base into SRM***

