

FUTURE READINESS ANALYSIS METHODOLOGY AND CAPABILITIES OVERVIEW IN SUPPORT OF DoD 5000.02

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Agenda

- Considerations for Readiness Analysis in support of DoD 5000.2
 - Pre-Milestone A Activities
 - Engineering and Manufacturing Development (EMD) Phase
 - Operations and Support Phase
- Role of Readiness Analysis
- Approach/Methodology
- H-53 Application Example
 - Background
 - Evolution of an Excursion
 - Analytic Trade Space Considerations
 - Analytic Results
- Other Programmatic Examples
- Benefits
- Questions

Purpose of Readiness Analysis

- Provide Readiness impact analysis among interdependent factors in the following areas:
 - Resource Requirements and Utilization
 - Reliability and Maintainability Trade Analysis
 - Integration with Bit Trend Analysis (i.e. “Bad Actor”) Manpower Analysis
 - Operational and Support Scenarios
 - Sortie Generation Rate (SGR) Assessments
 - Maintenance Concept Evaluations
 - Sparing Concept Evaluations
 - Logistics Footprint Development and Analysis

Advantages

- Early engagement with Program/Project
- Ability to grow and evolve with the program/project over time
- Provides analysis in an operation context
- Help reduce/mitigate risk
- Provides requirement verification to meet program/project objectives
- Ability to integrate necessary Subject Matter Expertise on an as needed basis (i.e. cost, BIT Trend Analysis, etc)
- Authoritative and Traceable methodology as basis for cost and investment strategies

Recent Readiness Focus Area's

- Total Ownership Cost (TOC)
 - Development of TOC readiness and sustainment element structures for in-service programs
- Reliability, Availability, Maintainability, and Cost (RAM-C)
 - AIR-4.10 provides a methodology for required readiness metrics and support costs estimates
- Manpower Analysis

Future Readiness In Pre-Milestone A Activities



- **Matériel Solution Analysis Phase:**
 - Forecast the physical and operational maintenance environment of the proposed system
 - Given the forecasted environment, assess the functional characteristics of the proposed system, its complexity and the obstacles and enablers to effective sustainment in that environment
 - Begin compilation of information and requirements for logistics footprint reductions, deployment requirements, and other factors affecting the in-theater operational concept
 - Provide preliminary logistics requirements and capabilities into draft Capabilities Development Document (CDD)
- **Technology Development Phase:**
 - Identify key performance and related support parameters for inclusion in the CDD
 - Description of the product support strategy as documented in the Acquisition Strategy
 - Description of the appropriate logistics metrics, criteria, and funding requirements in the Acquisition Program Baseline (APB)
 - Include appropriate logistics considerations and test points in the Test and Evaluation Master Plan (TEMP)
 - Develop Rough Order of Magnitude (ROM) Life Cycle Cost estimates

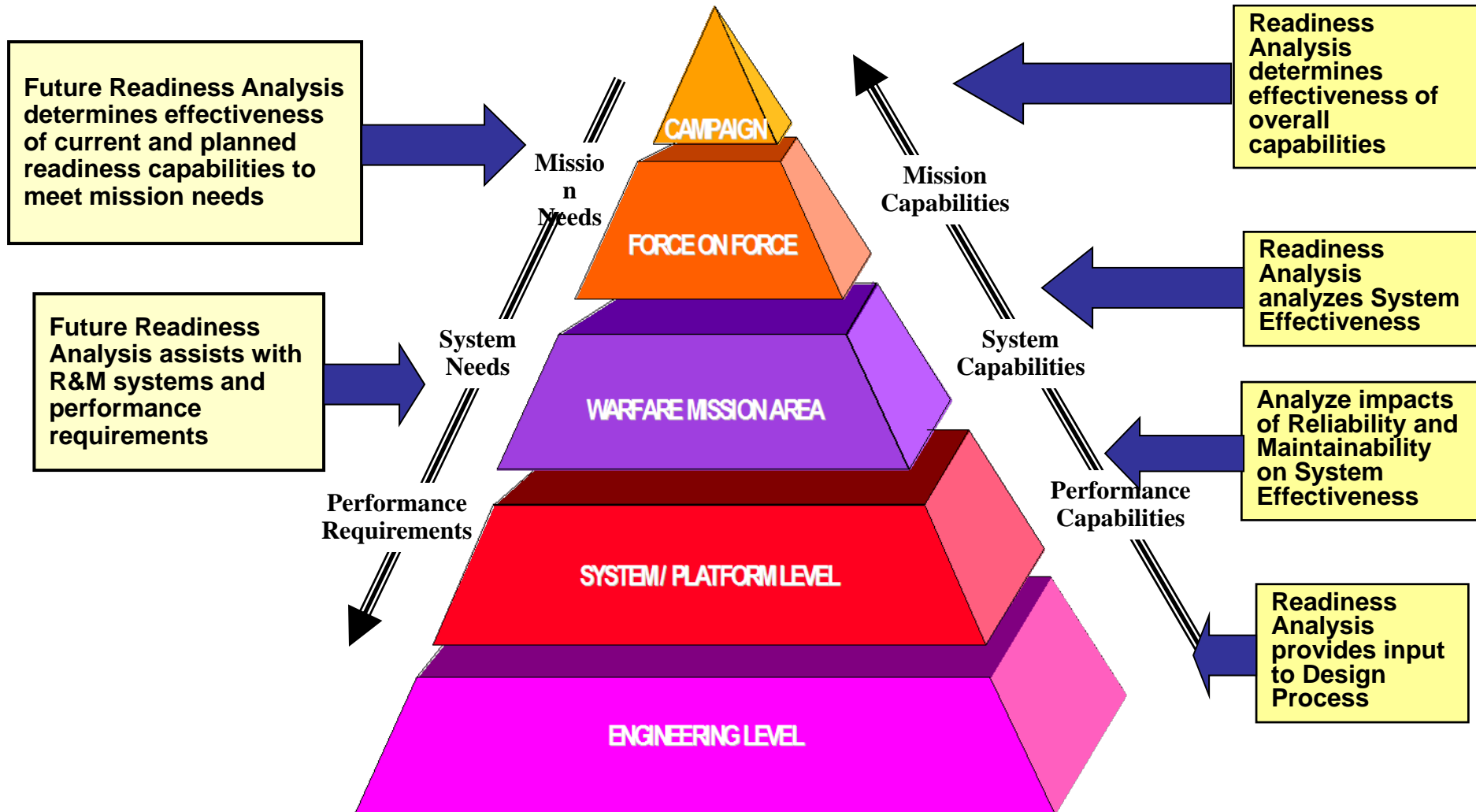
Readiness Analysis in the EMD Phase

- **Engineering and Manufacturing Development (EMD) Phase:**
 - Reliability and Maintainability objectives clearly documented and corresponding Availability metrics clearly defined.
 - Iterative refinement of logistics support considerations corresponding with evolutionary acquisition strategy (when employed)
 - Manpower considerations and analysis
 - Include logistics and overall sustainment requirements in the Capabilities Production Document (CPD)
 - Demonstrate acceptable performance in development, test and evaluation, and operational assessment
 - Demonstrate system affordability and funding throughout the life cycle Production and Deployment Phase
 - Demonstrate satisfaction of sustainment criteria addressed in Initial Operational Test and Evaluation (IOT&E)
 - Ensure performance based logistics agreements are in place
 - Demonstrate a fully funded sustainment program
 - Conduct pre-initial operational capability (IOC) review

Readiness Analysis in the Operations and Support Phase

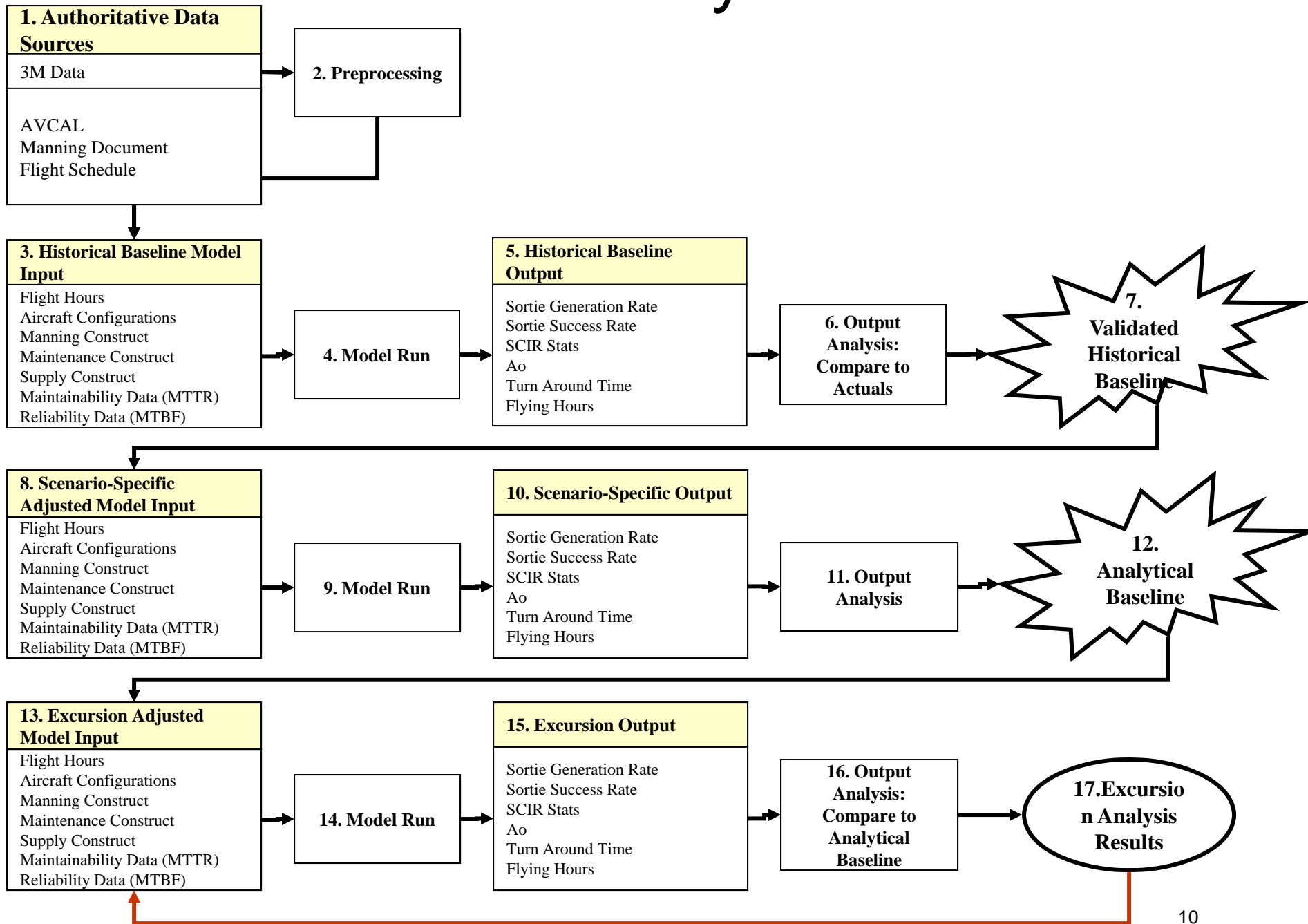
- **Operations and Support Phase**
 - Validate sustainment strategies for iterative production increments in an evolutionary acquisition strategy
 - Participate in post-deployment reviews
 - Evaluate product support integrator/provider performance
 - Fleet requests and inquiry
 - RCM, PBL or ?? Investment Strategy
 - Fleet Support Team (FST) Analysis

Readiness Analysis Role



*Unique for Naval Aviation Applications

Readiness Analysis Process



CH-53K Program Support



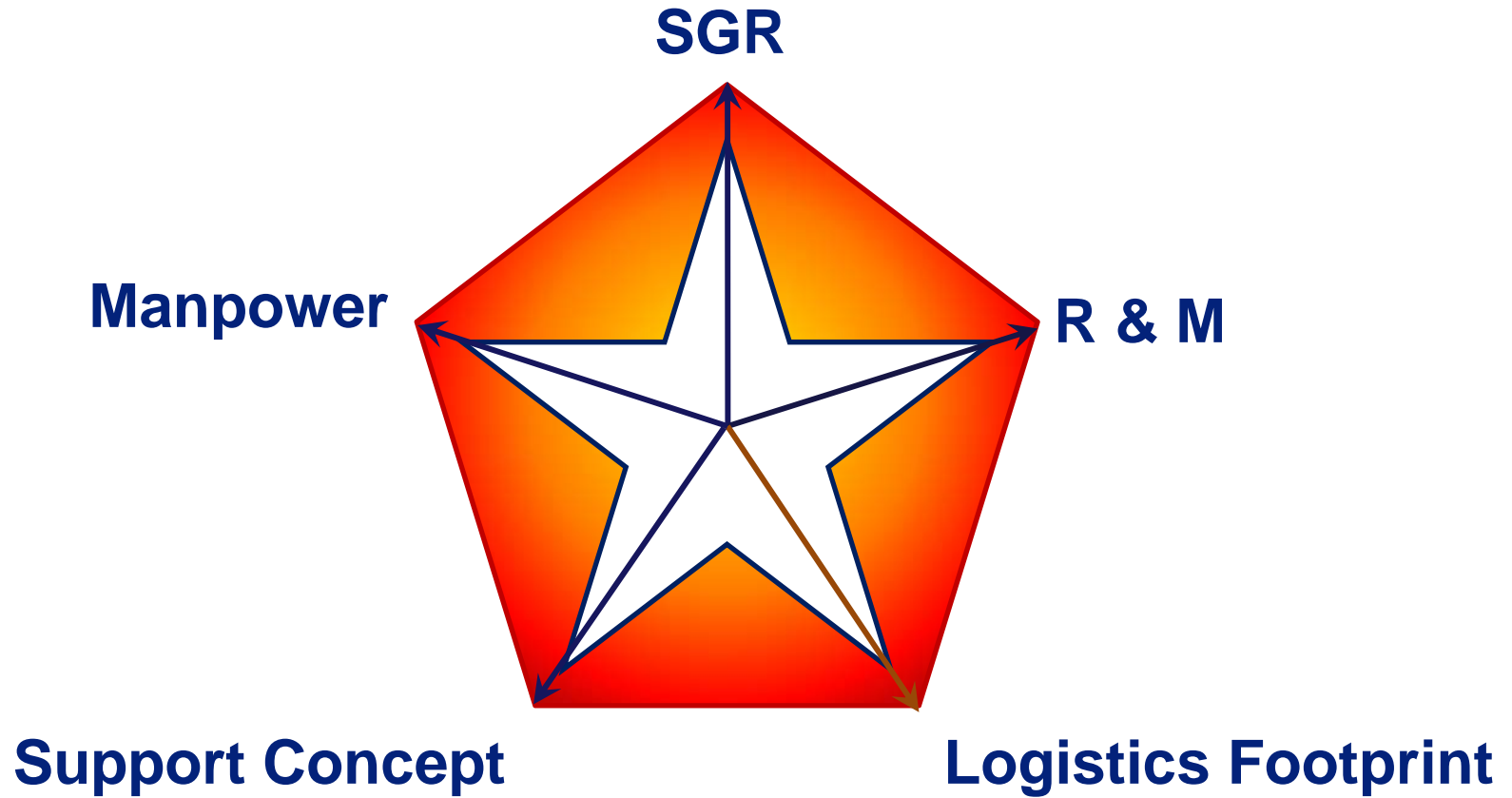
- **USMC Heavy Lift Helicopter**
- **Replaces the CH-53E**
- **USMC primary assault support platform**
- **NAVAIR PMA-261 Systems Design & Development (SDD) Program**
 - **Program Currently Post PDR approaching CDR**

H-53K Analytic Overview

- **Provides:**
 - Flight operations
 - Aircraft system failures
 - Resulting maintenance activity
 - Logistics support resource utilization
- **The following activities and organizations are represented:**
 - 4, 8, 10, and 16 aircraft detachments
 - Scenario-specific flight schedules
 - R & M characteristics adjusted to reflect the evolving CH-53K design configuration
 - Maintenance support
 - Supply system support and AIMD throughput
 - Scenario Specific AVCALs
 - Appropriate pack-up-kits (PUKs) for specific detachments



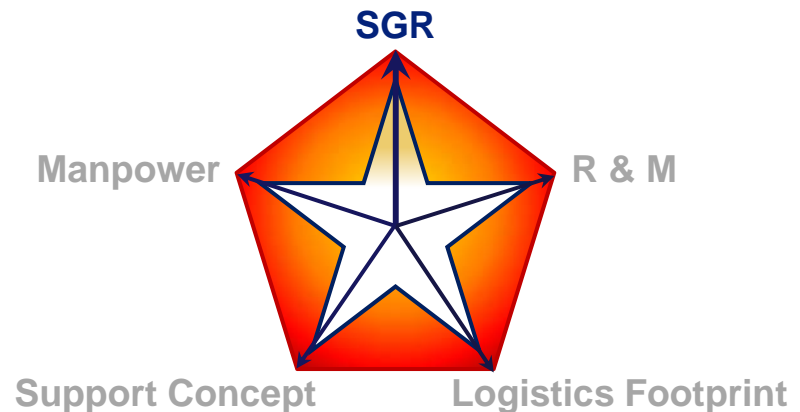
Readiness Analytic Trade Study Space



Analytic Trade Study Space

Sortie Generation Rate

- **Sortie Generation Rate (SGR) Sensitivity Analysis**
 - **Sortie Mission Demand Impact**
 - **R&M Characteristics Impact**
 - **Available Flight Window Impact**
 - **Supply Support Performance Impact**
 - **Manpower Impact Assessment**



Analytic Trade Study Space

Reliability & Maintainability

- **R&M Risk Assessment Support**

- **System Reliability**
 - Identification of potential readiness drivers
- **System Maintainability**
- **Analysis of Specific Modification Impact**
 - How much is good enough?
- **Operational Mission Failure Analysis**

- **R&M Trend Analysis**

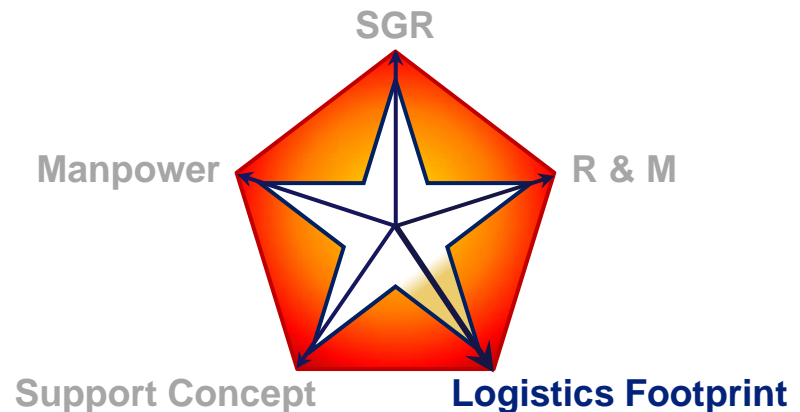
- **Updated Analytic Baselines to support trade space analysis**
 - Analyze the Impact of those updated engineering projections on other trade space parameters (i.e. manpower) SGR



Analytic Trade Study Space

Logistics Footprint

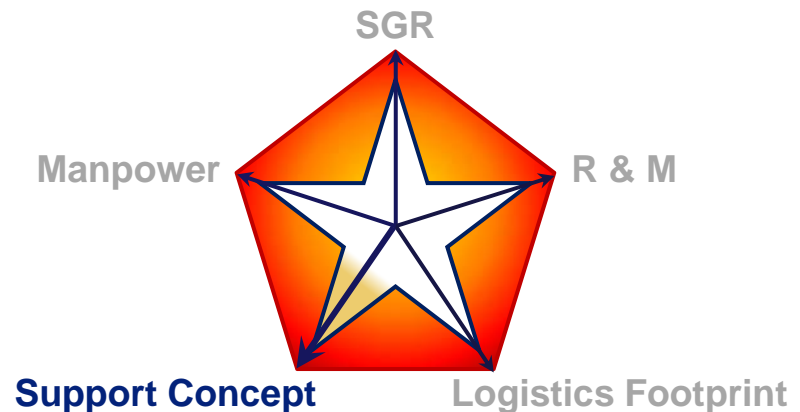
- **Footprint Element Range & Depth Sensitivity**
 - Spares
 - Support Equipment
 - Mission Kits
- **Extended Duration Footprint Requirements**
 - How long can I be self sufficient without reaching back to a main supply point?



Analytic Trade Study Space

Support Concept

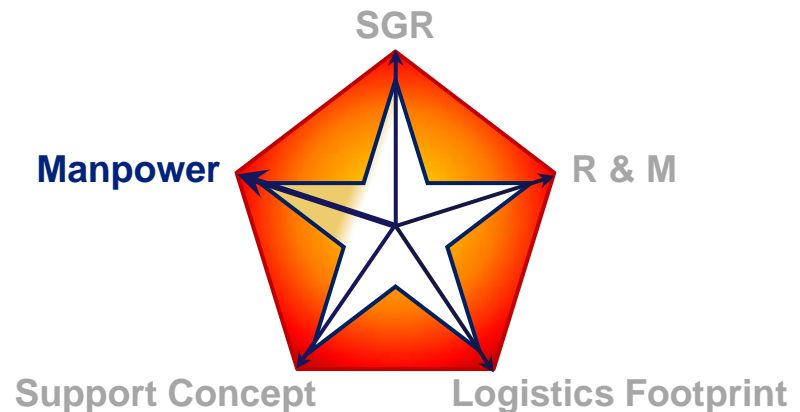
- **Sparing versus Repair**
- **Maintenance Concept**
 - Organic
 - Hybrid
 - Contractor Logistics Support (CLS)
- **PBL's**
- **RCM Analysis**



Analytic Trade Study Space

Manpower

- **Manpower Resource Utilization**
 - O-Level and I Level Work Center Manpower
- **Work Center Allocation**
- **NEC/MOS Availability**
- **Resource Demand Level**



CH-53K AMM Analytic Baseline

Output Metrics

Scenario 3 - 4 Aircraft Deployed		Historic Baseline	
Basic Metrics			
	Squadron1		Historical
Overall Sortie Generation Rate	0.46		
Day 1 SGR	0.76		
Sortie Success Rate	85%		
MMH/FH--total	28.6		42.8
% MC **	72.0%		65.8%
% FMC	57.3%		55.5%
% PMCM	9.6%		2.6%
% PMCS	5.1%		7.7%
% NMCMU	19.3%		11.9%
% NMCMS	1.4%		0.0%
% NMCS	7.3%		22.2%
Sorties Called	231		
Sorties Flown	197		202
On-Time Sorties	123		
Flight Hours	390.6		412.1
Initiated Maintenance Actions	1,689		1,823
Completed Maintenance Actions	1,590		
Number of OMFs Total	53		56
	NMC	26	
	PMC	27	
MFHBMA (Hrs)	0.2		
MFHBOMF (Hrs)	7.3		7.4
Average Daily MTTR (Hrs)	2.2		
MCMTOMF (Hrs)	0.79		
MMH--scheduled	1,395.2		5,572
MMH--unscheduled	9,775.1		12,056
MMH--total	11,170.3		17,628
MMH/FH--scheduled	3.6		13.5
MMH/FH--unscheduled	25.0		29.3
Cannibalizations	83.6		
Removals	260		240.0
Stockouts	95		
Supply Availability	63%		

• Trade Space Metrics

– Readiness Statistics

- SGR/SSR
- Mission Capability Statistics
- RBA/RFT

– R&M

- No. of Unsched/Sched MAs/
- No. of Operational Maintenance Failures
- MFHBMA
- MTTR/MCMTOMF

– Logistics Footprint

- Supply Availability %
- No. of Stockouts
- Item Demand

– Support Concept

- No. of Cannibalizations

– Manpower

- Unsched/Sched MMH
- Work Center Utilization

Project Examples

- **H-53K**
 - Just presented
- **CVN-21**
 - Impact of various manpower reduction excursions to show the impact on maintenance and supply in support of the airwing
 - Impact of maintenance concepts, supply strategies and general arrangement decisions on airwing's ability to achieve Sortie Generation Rate (SGR)
- **Littoral Combat Ship (LCS) and DD(X)**
 - Support Air 1.2 Ships Integration Team in evaluating compatibility of various deployed vertical air detachment logistic and support configurations within current and proposed LCS ship designs.
 - Identify MH-60R/S and RQ-8A degree of mission availability obtained through various support footprint alternatives and mission module reconfigurations
 - Provide Resource to Readiness and Sortie Success Rate metrics as a function of Manpower, Maintenance Concept, Supply, and Analysis
- **BAMS**
 - To demonstrate employment of the NAVAIR Readiness Analysis Capability to represent Broad Area Maritime Surveillance (BAMS) unmanned aircraft (UA) flight and maintenance operations and to support maintenance-related analysis to help define Meal Logistics Delay Time (MLDT), impacts to Extended Time On Station (ETOS) and impacts to Mission Effectiveness
- **NUCAS**
 - Manpower analysis based upon entirely new manning concept in support of forward deployed and workup carriers as well as those sailors based at a shore based Main Operating Station (MOS)/Fleet Replacement Squadron (FRS).
- **V-22**
 - Reliability and Maintainability impact analysis

Benefits

- Projected Operational Readiness Tracking
 - Readiness Metric Determination
 - Readiness Visibility from ‘Concept to Operations and Support’
 - Ability to evaluate unique KPP performance
- Trade Space Analyses
 - Visualization/Understanding of Weapon System Design and Support Concepts
 - Evaluation Before Commitment
 - Definition/Evaluation of Innovative Support Strategies
- Infrastructure Change Impact Assessment
 - Aviation/Ship Integration
 - Readiness Impact of Resource distribution
 - Interoperability effectiveness
- Improved Return On Investment
 - Resource Investment Impact
 - Cost/Benefit Analysis Support
- Retained Data
 - Provides analytic baseline for updates and further excursions
 - Requirements tractability
- Improved Acquisition Program Resource Management
 - Provides the utility of having the discipline to slow down upfront and early “to get it right”
 - SETR Process Support
 - Risk Management and Reduction

QUESTIONS?