

Kill Chains, Star Charts and the NAVAIR Capability Based Analysis Process

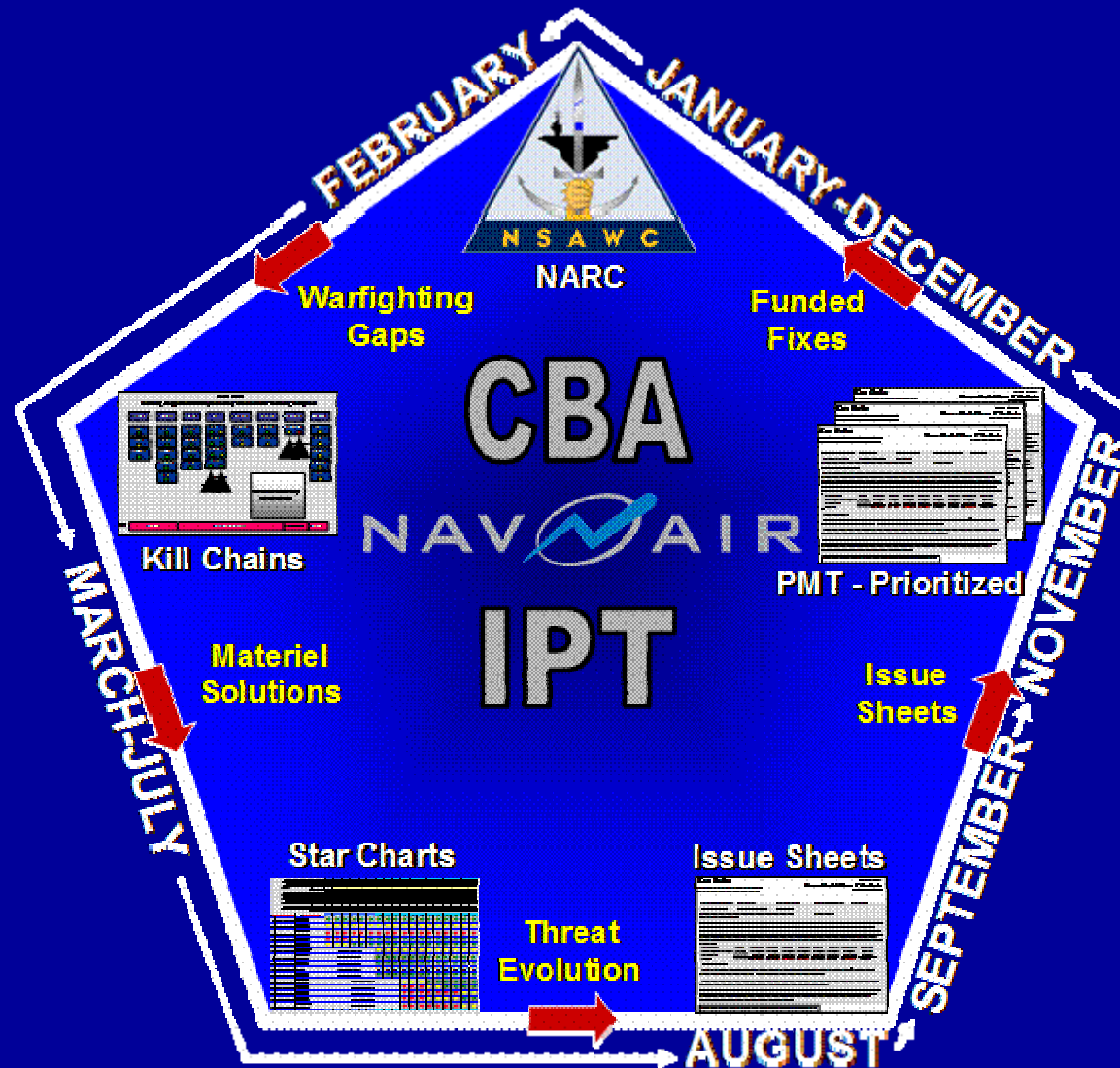
Closing the Loop
from Warfighter Capability Gaps
to the Budget Process

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15 April 2008



Closing the Loop



Outline

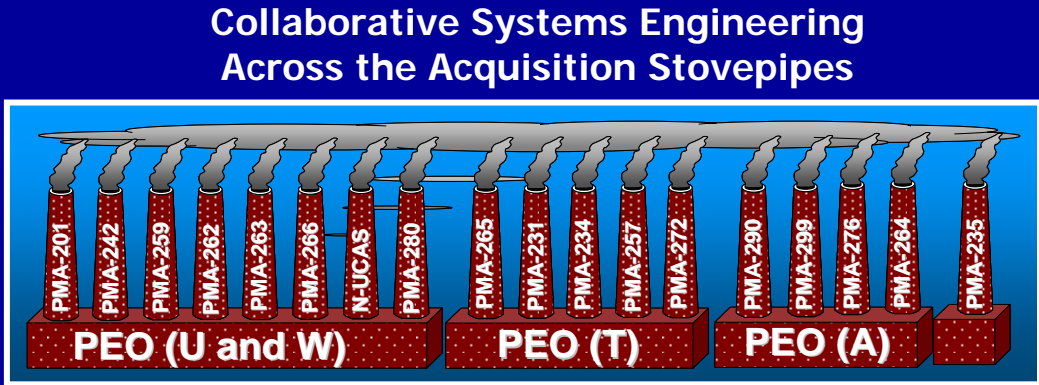
- Capability Based Analysis IPT
- Naval Aviation Requirements Conference
- Kill Chains
- Star Charts
- Issue Sheets
- Summary



Capability Based Analysis IPT



NAVAIR Commander's Guidance 2007
Future Capability
 Objective 1. - Deliver developmental programs on time and within budget
 Action 2. - Work with Naval Aviation stakeholders to develop a process that stabilizes our investment strategy and produces the highest degree of integrated warfighting capability and interoperability from the resources available





Naval Aviation Requirements Conference

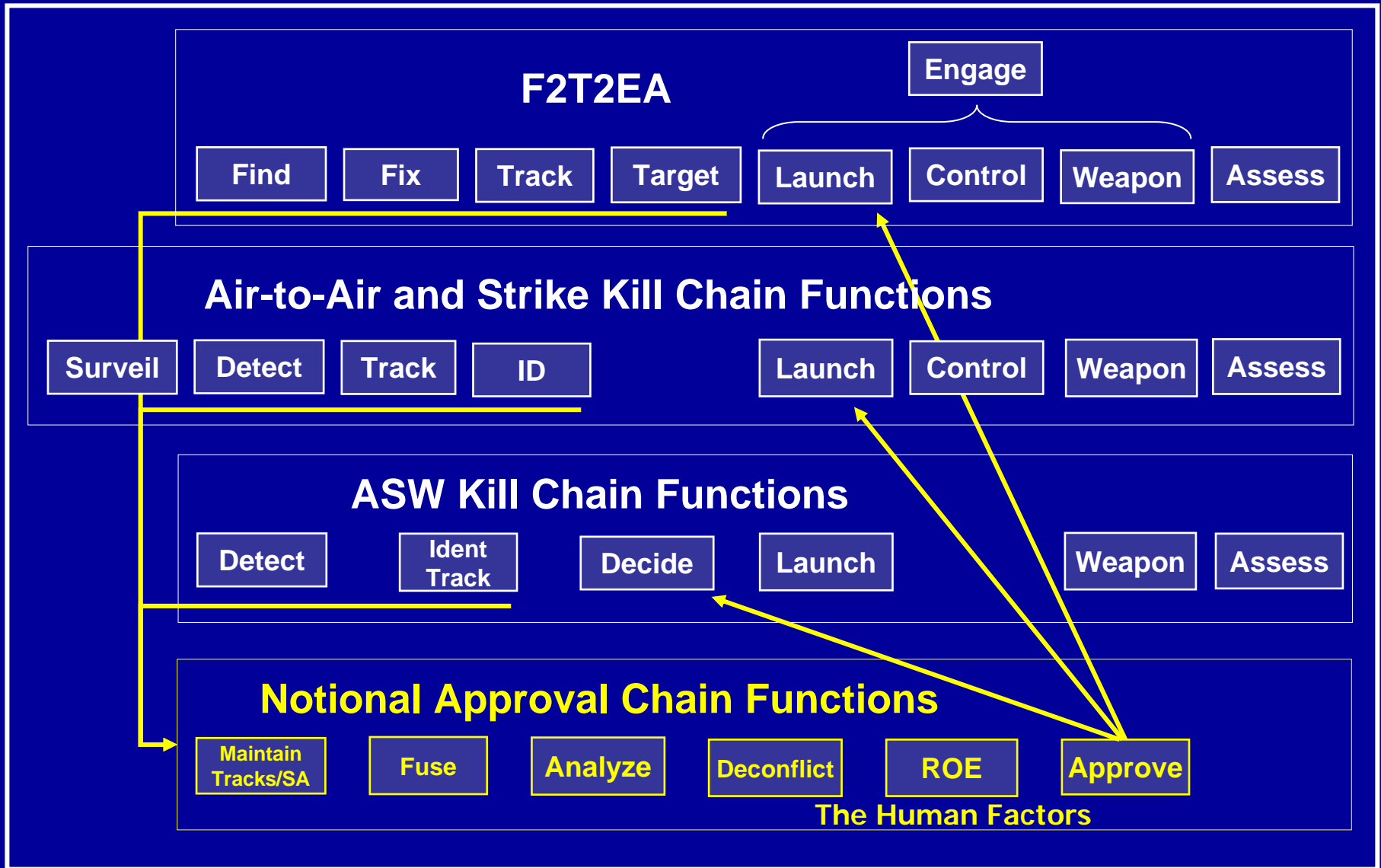
- Warfighting Gaps identified by the Fleet
- Updated yearly
- Used to focus CBA IPT efforts
- CBA IPT's connection to the Fleet



Kill Chains

- Answers the Question "In the context of the Kill Chain Scenario and Fleet approved CONOPS, does the capability exist to effectively employ the weapon against the target of interest?"
 - One weapon per Kill Chain
- Kill Chains DO NOT address
 - Inventory/Force Structure – number of platforms, sensors, and weapons required
 - Capacity – rate at which Kill Chains can be executed
 - Training – proficiency at executing Kill Chains
- Kill Chains are archived in the Kill Chain Database Tool
 - Web based application hosted on SIPRNET

Kill Chain Functions

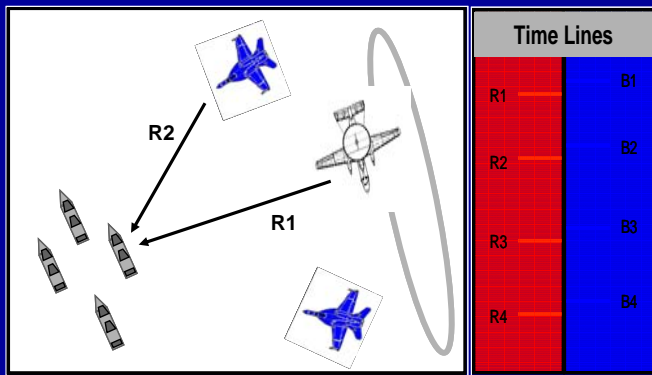
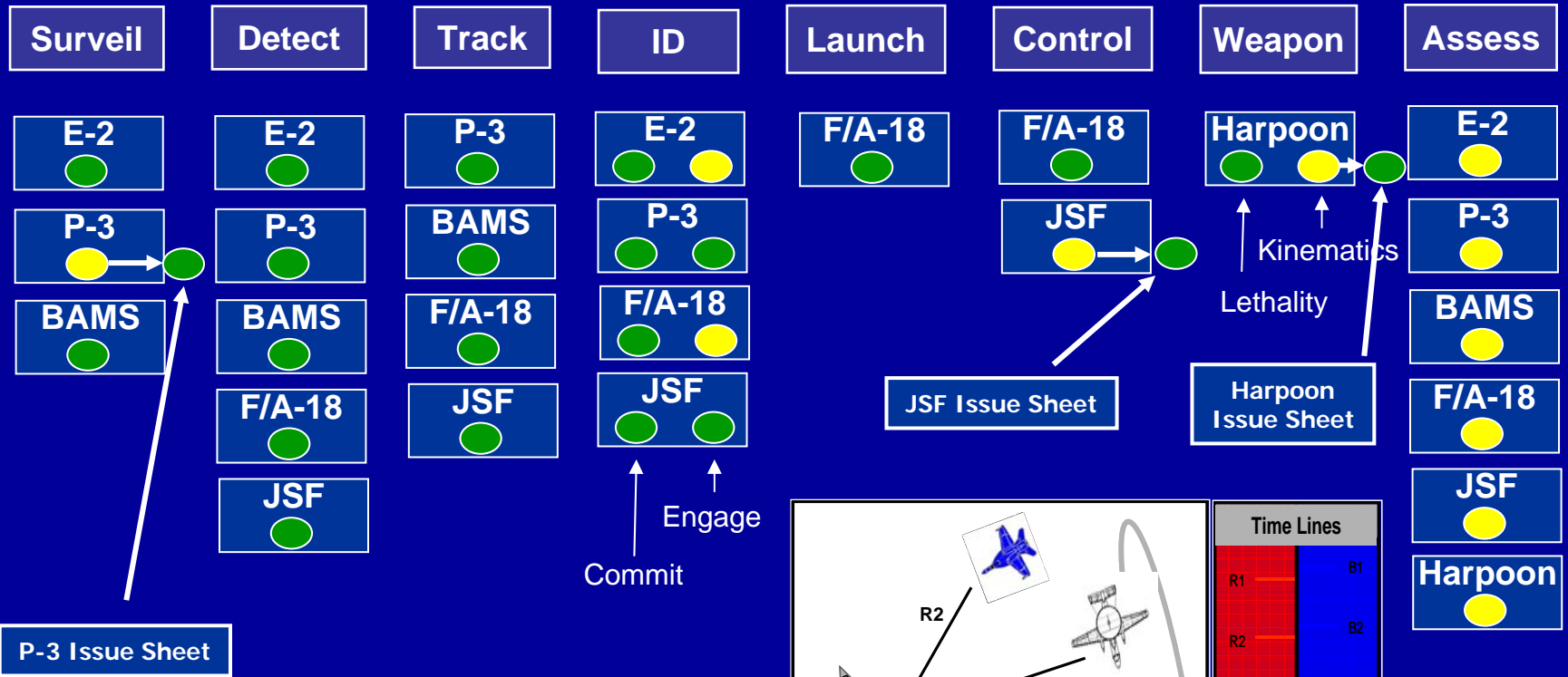


Notional Kill Chain



SuW 2015

MCO-X, Medium Combatant, SAMs, 90% Theater Weather, Harpoon 3



Electronic Attack



Kill Chain Scoring

Surveil

- Automated fusion of data
- Manually assisted fusion of data
- No surveillance capability

Detect

- Detects multiple targets
- Detects single target
- Can not detect target

Track

- Multiple tracks, weapon quality
- Single track, weapon quality
- Can't track or not weapon quality

ID

- High probability of classification
- Mod probability of classification
- No capability to classify
- High probability of identification
- Mod probability of identification
- No capability to identify

Launch

- Full Weapon capability
- Partial Weapon capability
- Weapon not integrated

Control

- Control multiple weapons
- Control single weapon
- Can not control weapon

Weapon

- Meets safe range
- Meets minimum range
- Less than minimum range
- PD between 1.0 – 0.7
- PD between 0.7– 0.4
- PD less than 0.4

Assess

- Provides IR/EO/Visual of Target
- Indirect evidence of Target state
- No capability to provide data

Interoperability – Capability of the links between platforms

- Full
- Partial
- None

Star Charts

A time domain capability assessment picture

- Graphical representation of Blue vs. Red capability vs. time
- Answer the question “For a broad spectrum of missions, how robust is our acquisition plan for platforms, sensors, and weapons as the threat systems evolve?”
- Provide data to facilitate investment decisions in future technologies to mitigate advances in threat capabilities
- Star Charts DO NOT address
 - Inventory/Force Structure – number of platforms, sensors, and weapons required
 - Training – proficiency at executing Kill Chains
 - All Naval Mission areas

Notional Star Chart

Platform and Weapon Schedules

Platforms		FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
PX-1		PX-1																	
PX-1B		PX-1B																	
PX-2		PX-2																	
PX-3		PX-3																	
Weapons		FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Z		Z																	
X		X																	
X Bk II		X Bk II																	
Y		Y																	
V		V																	
U		U																	
T		T																	
Q		Q																	
R		R																	

Target - Range Environment	Kill Chain - Weapon	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
1	Target A, Range 1, Env a 1.1 Weapon Z 2.1 Weapon X 3.1 Weapon Y	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
2	Target A, Range 1, Env b 4.2 Weapon Z 5.2 Weapon X 6.1 Weapon Y	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
3	Target A, Range 1, Env c 8.2 Weapon Z 11.4 Weapon X	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
4	Target A, Range 2, Env b 7.1 Weapon Z 13.2 Weapon X 15.3 Weapon Y	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
5	Target A, Range 2, Env c 3.3 Weapon Z 5.6 Weapon U 9.4 Weapon T	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
6	Target B, Range 1, Env a 14.1 Weapon V 14.2 Weapon U 23.3 Weapon T	Target B IOC FY 14							★	★	★	★	★	★	★	★	★	★	
7	Target B, Range 1, Env b 11.1 Weapon Z 15.5 Weapon X	Target B IOC FY 14							★	★	★	★	★	★	★	★	★	★	
8	Target B, Range 1, Env c 1.2 Weapon Z 16.2 Weapon X 21.3 Weapon Y	Target B IOC FY 14							★	★	★	★	★	★	★	★	★	★	
9	Target B, Range 2, Env b None TBD	Target B IOC FY 14							★	★	★	★	★	★	★	★	★	★	
10	Target B, Range 2, Env c 3.16 Weapon V 2.2 Weapon U 7.3 Weapon T 9.5 Weapon X	Projected Capability Decline							★	★	★	★	★	★	★	★	★	★	
11	Target C, Range 2, Env a 14.4 Weapon U 18.3 Weapon T	Target C IOC FY 17							★	★	★	★	★	★	★	★	★	★	
12	Target C, Range 2, Env b 6.14 Weapon Z 10.3 Weapon X 22.13 Weapon Y	Target C IOC FY 17							★	★	★	★	★	★	★	★	★	★	
13	Target C, Range 2, Env c 4.14 Weapon Z 5.14 Weapon X 17.7 Weapon Y	Target C IOC FY 17							★	★	★	★	★	★	★	★	★	★	
14	Target B, Range 3, Env b 3.21 Weapon V 8.8 Weapon U 19.1 Weapon P	Projected Capability Improvement							★	★	★	★	★	★	★	★	★	★	
15	Target B, Range 3, Env c 12.12 Weapon P 21.3 Weapon Q 23.3 Weapon P	Target C IOC FY 17							★	★	★	★	★	★	★	★	★	★	

Platforms

Weapons (applicable to mission area)

Capability improvements in time

Increasing Threat Capability

Tactical Scenarios
Applicable Kill Chains

Projected Capability Decline

Projected Capability Improvement



Star Chart Scoring

Background

Star



Full Capability



Capability, but with risk factors

Single Kill Chain
Requires Joint assets
Limited Naval assets available



No Capability



High confidence

Detailed analysis
Kill Chains
Mission level simulations



Subjective assessment

SMEs
Limited Analysis

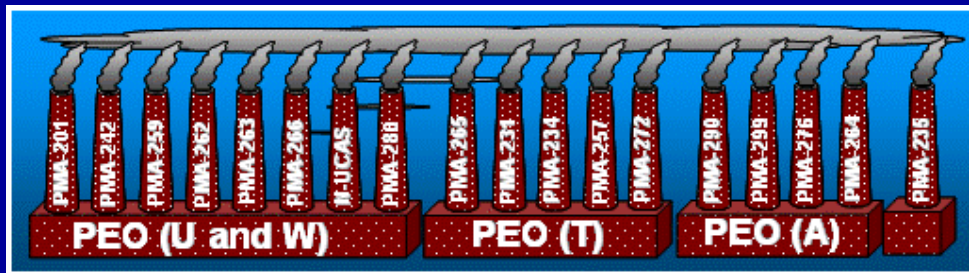


No analysis completed

Issue Sheets

- Generated by the PMAs
- Normal Program day-to-day care and feeding
- Vertically aligned

The Challenge

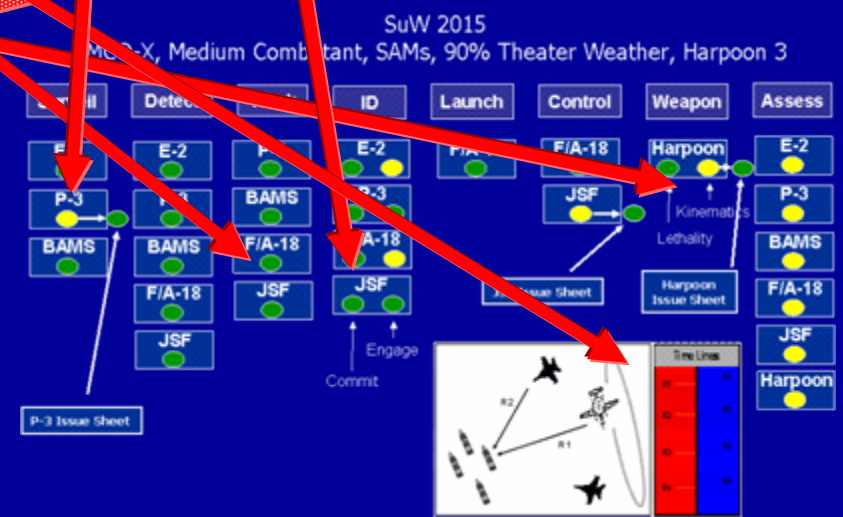


Desired Endstate



Warfighting Capability

Target	Range	Envelope	IOC Class	Weapon	F108	F108	F110	F112	F113	F114	F115	F116	F117	F118	F119	F120	F121	F122	F123	F124	F125	
1	Target A	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
2	Target A	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
3	Target A	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
4	Target A	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
5	Target A	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
6	Target A	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
7	Target B	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
8	Target B	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
9	Target B	Range 1	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
10	Target B	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
11	Target C	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
12	Target C	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
13	Target C	Range 2	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
14	Target B	Range 3	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
15	Target B	Range 3	Env 1	W2	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★



Summary

- Program acquisition process is defined by law
 - Results in stove piped developments
- The Challenge – string legacy and new/future platforms, sensors, weapons and data links into warfighting capabilities
- Capability Based Analysis using Kill Chain Analysis and Star Chart Assessments is a systematic and technically rigorous process to meet this challenge

Questions?