



The SCMILE Services Framework: A Conceptual tool for designing the NCW force

Donald Lowe, Jenny Hayward, Jon Bell and Jennie Clothier
Defence Science and Technology Organisation

11th ICCRTS

26 September 2006

Presenter: Thea Clark



- Introduce the SCMILE Services Framework (SSF)
- Compare the SSF with other approaches
- Apply the SSF to force design and “connectivity problems”

- **Simplicity**
 - Use the minimal set of concepts
- **Scalability**
 - What attributes allow the framework to be used at different scales?
- **Generic**
 - Applicable to both information-age and industrial-age capabilities



What do we mean by “services”?

- A service is a relationship between two entities, one called the provider and the other called the consumer.



- The provider creates and supplies the service, which is then utilised by the consumer.



Why use services?

- They make explicit the relationship between entities.
- They remove the focus from platforms and assets.
- They broaden the focus of relationships from information only
- They potentially make the link between capabilities to effects
- They can describe both “industrial-age” and “network-centric” capabilities in a single conceptual framework
- They can deconstruct capabilities and reconstruct them in different (hopefully better) ways by rearranging the services that normally comprise them.



What was our problem space?

- How can we better understand the relationships and dependencies between projects and capabilities in an NCW world?
- How can we realistically manage the $n(n-1)$ possible relationships?
- How can we do this at any level?
- How do we link this to strategic objectives?
- How can we better integrate industrial-age and information age capabilities?

Understanding NCW Concepts

NCW Grids



Command Grid



Engagement Grid



Sensor Grid



Information Grid

The Domains

Physical Domain

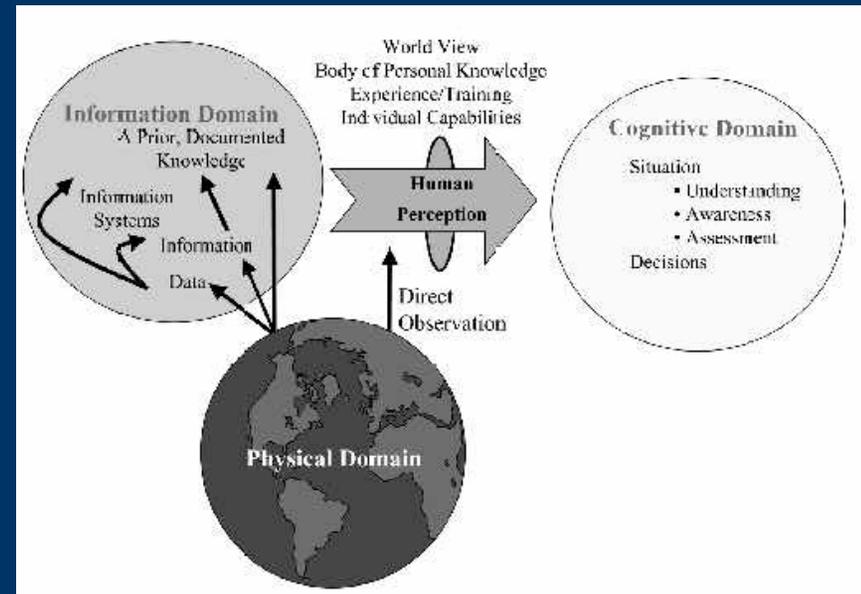
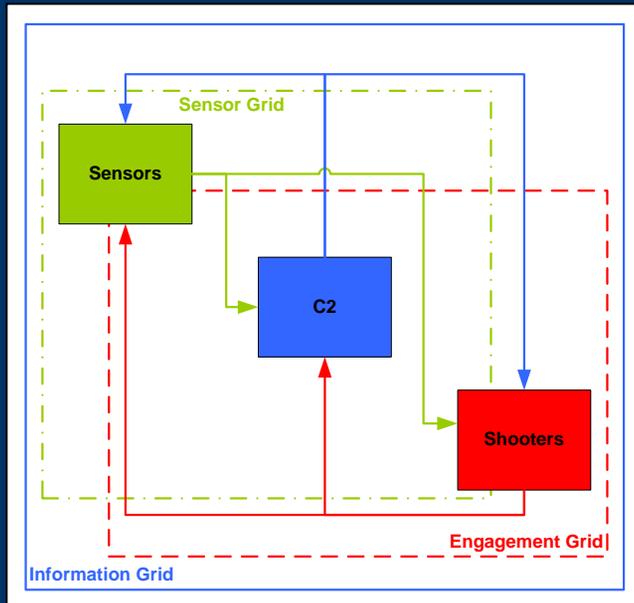
where strike, protect, and maneuver take place across different environments

Information Domain

where information is created, manipulated, and shared

Cognitive Domain

where perceptions, awareness, beliefs, and values reside and where, as a result of sensemaking, decisions are made





From Grids to Services





From Grids to Services

**Sensing
Services**

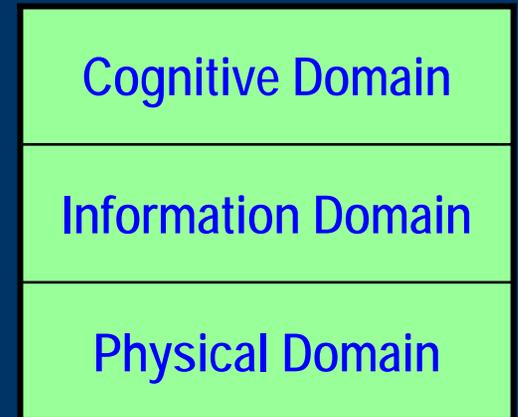
**Command &
Control
Services**

**Engagement
Services**

**Information
Services**

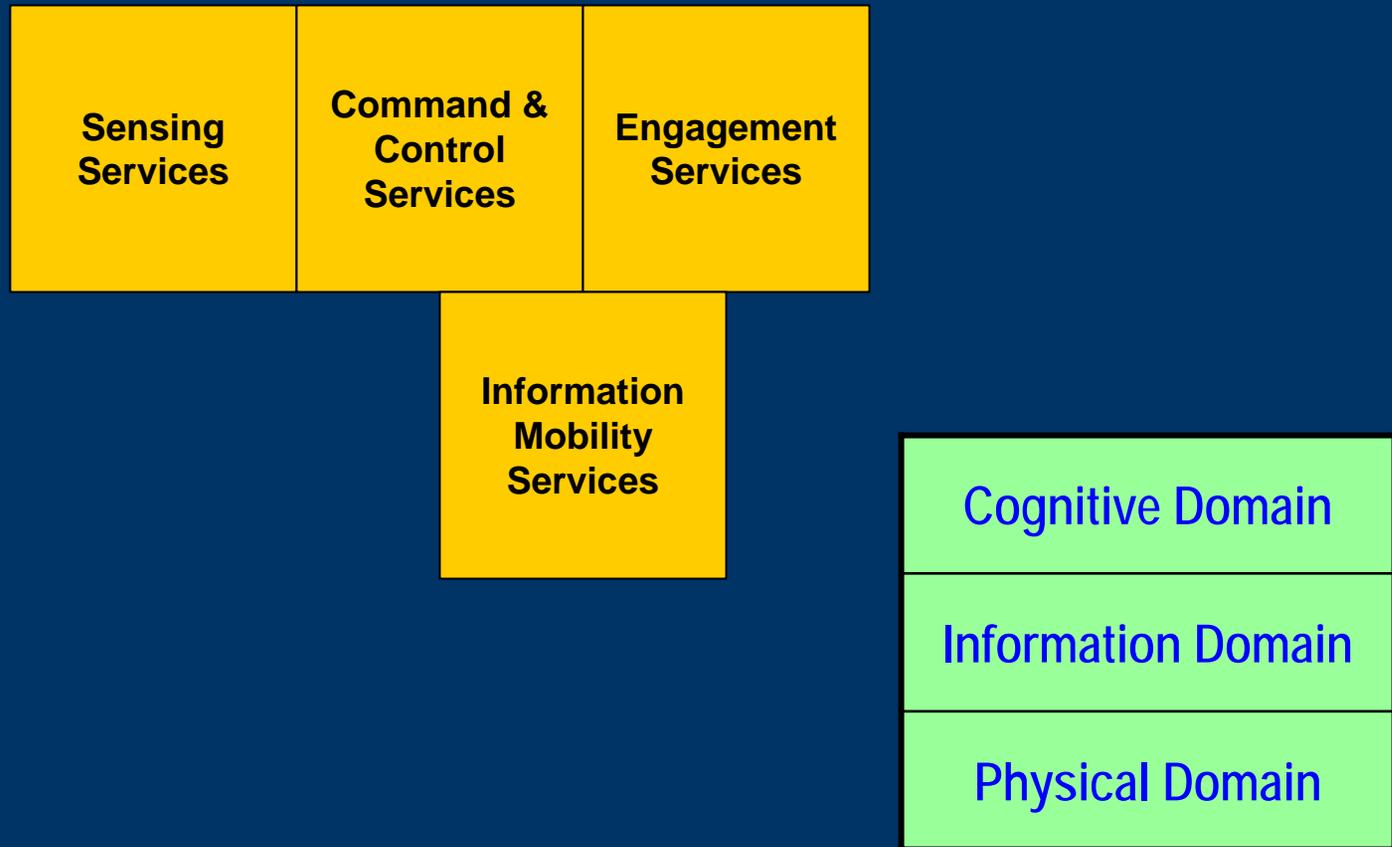


From Grids to Services



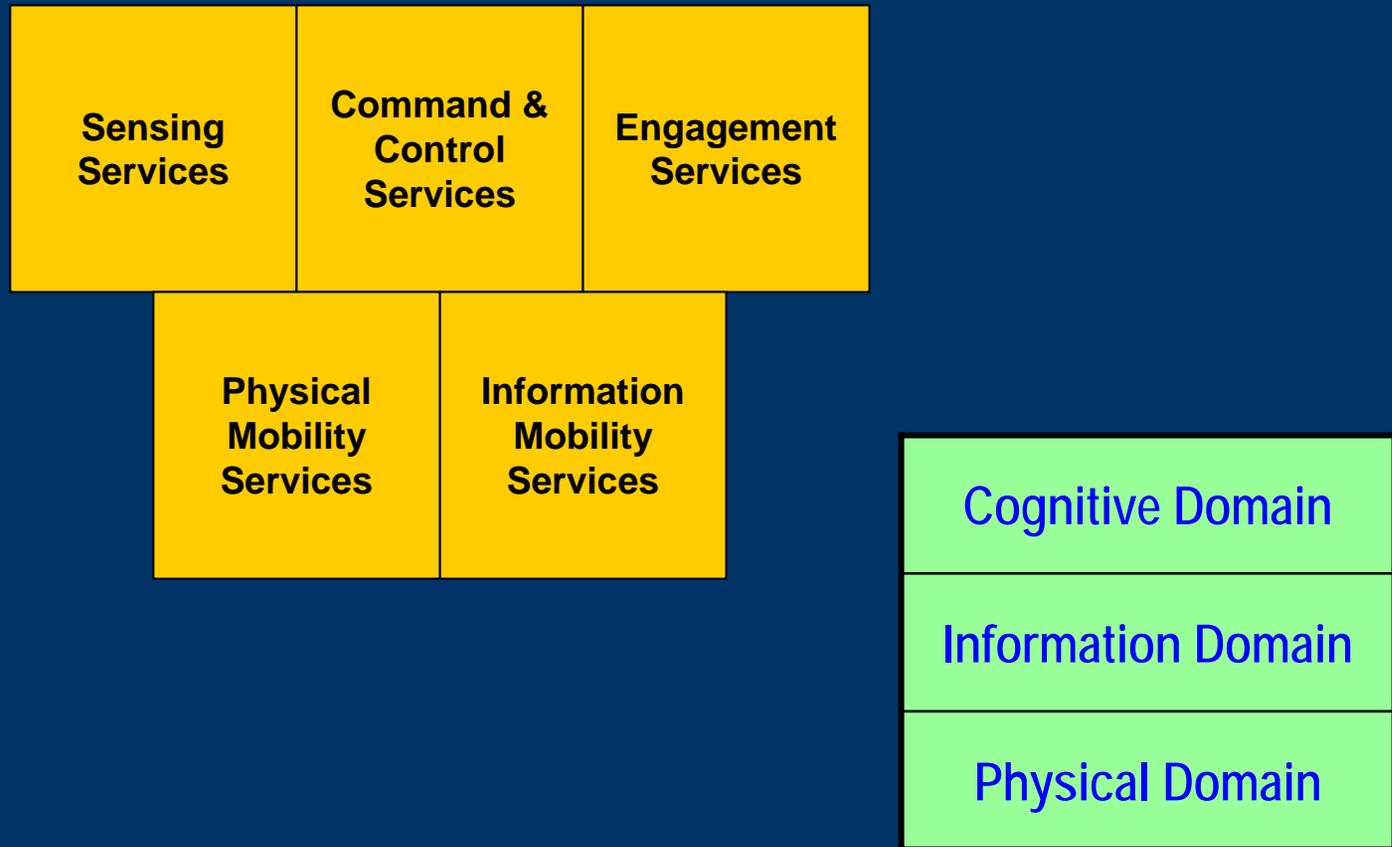


From Grids to Services



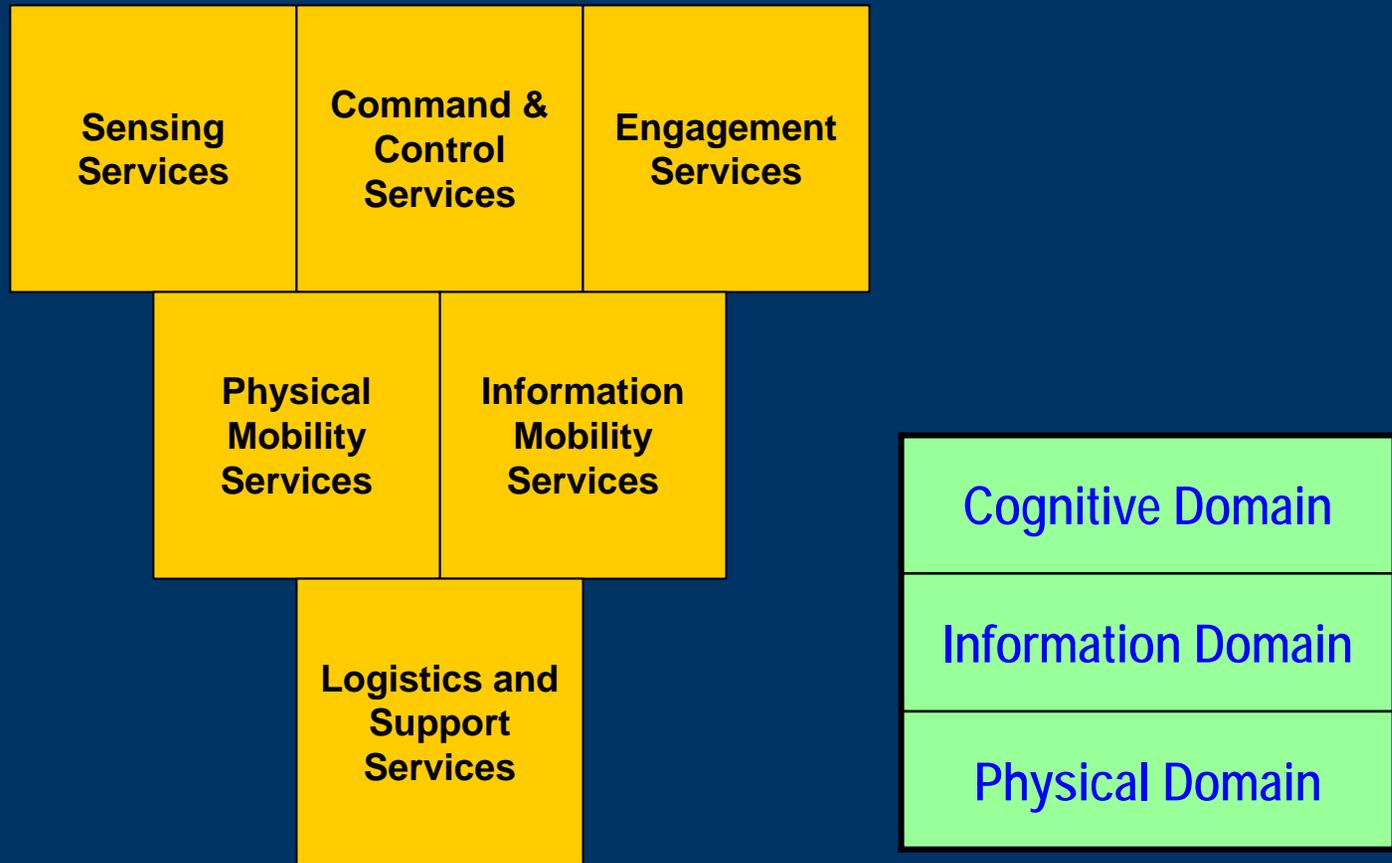


From Grids to Services





From Grids to Services

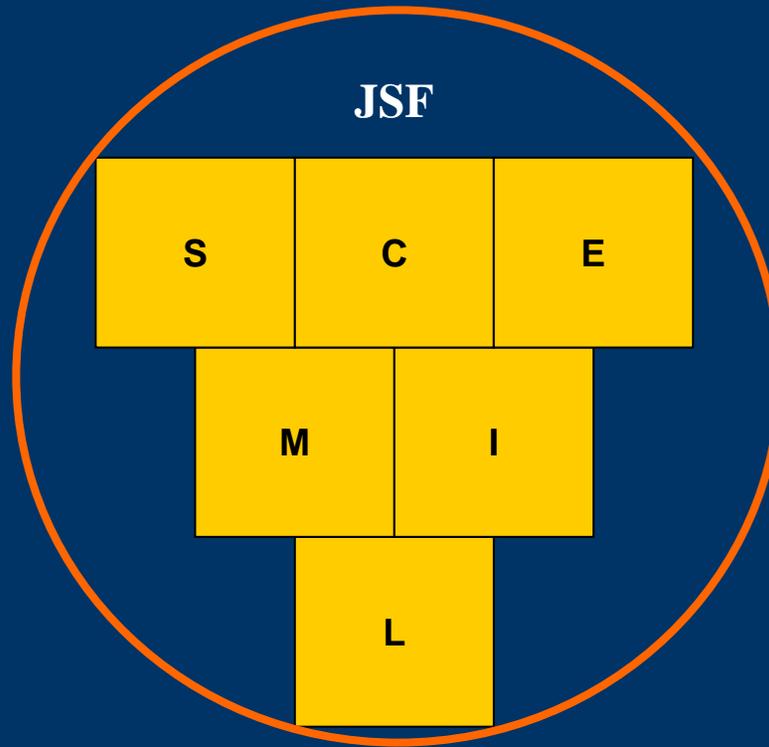


The SCMILE Services Framework (SSF)

Service	Short Description
Sensing	The provision of information about the battlespace.
Command & Control	The provision of decisions, plans and instructions for agents and analysis of the battlespace (past, present and future).
Engagement	The provision of effects, in and on the battlespace.
Physical Mobility	The provision of locomotive (movement and transport) ability.
Information Mobility	The provision of information storage, manipulation and dissemination infrastructure and processes.
Logistics and Support	The provision of activities and physical materials that enable the normal functioning of an agent.

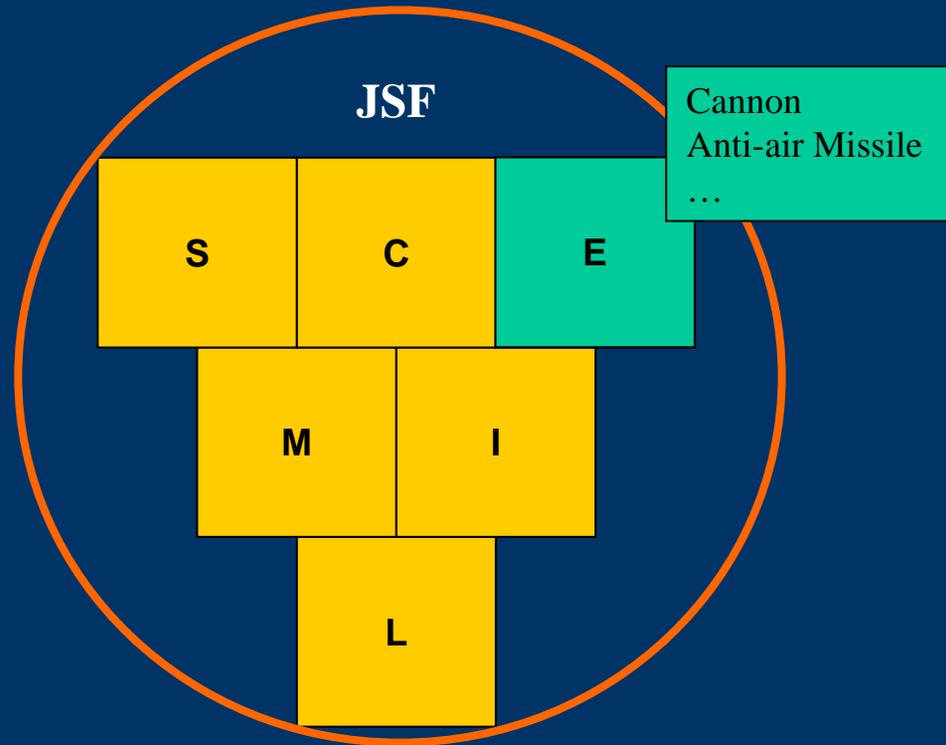


The Joint Strike Fighter as a set of services



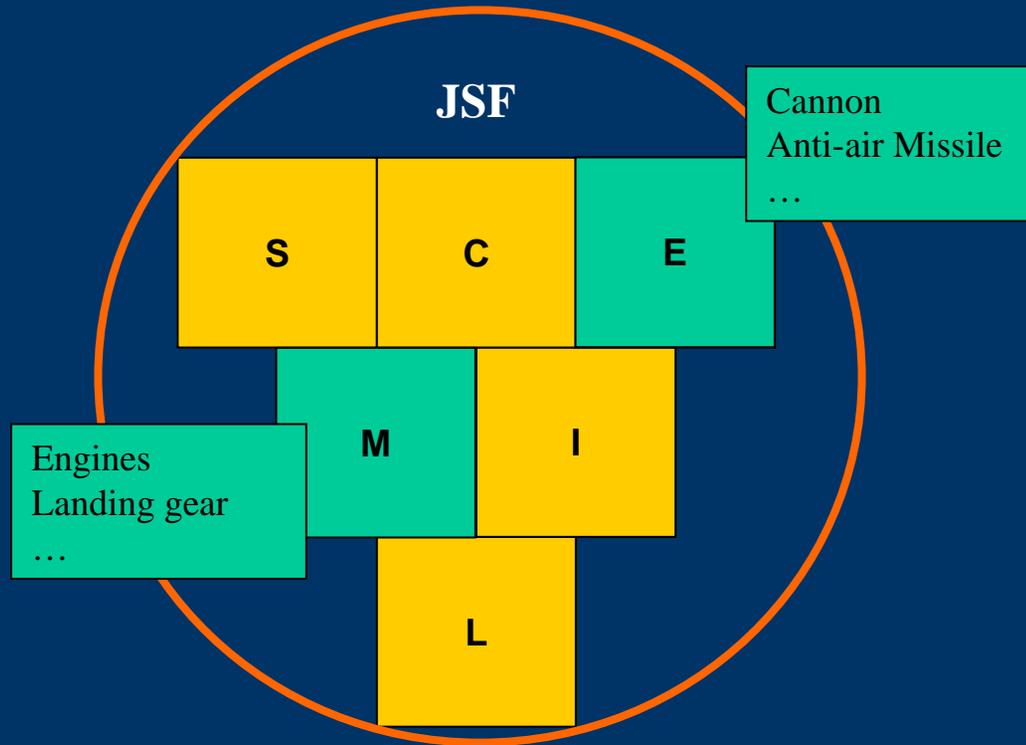


The Joint Strike Fighter as a set of services



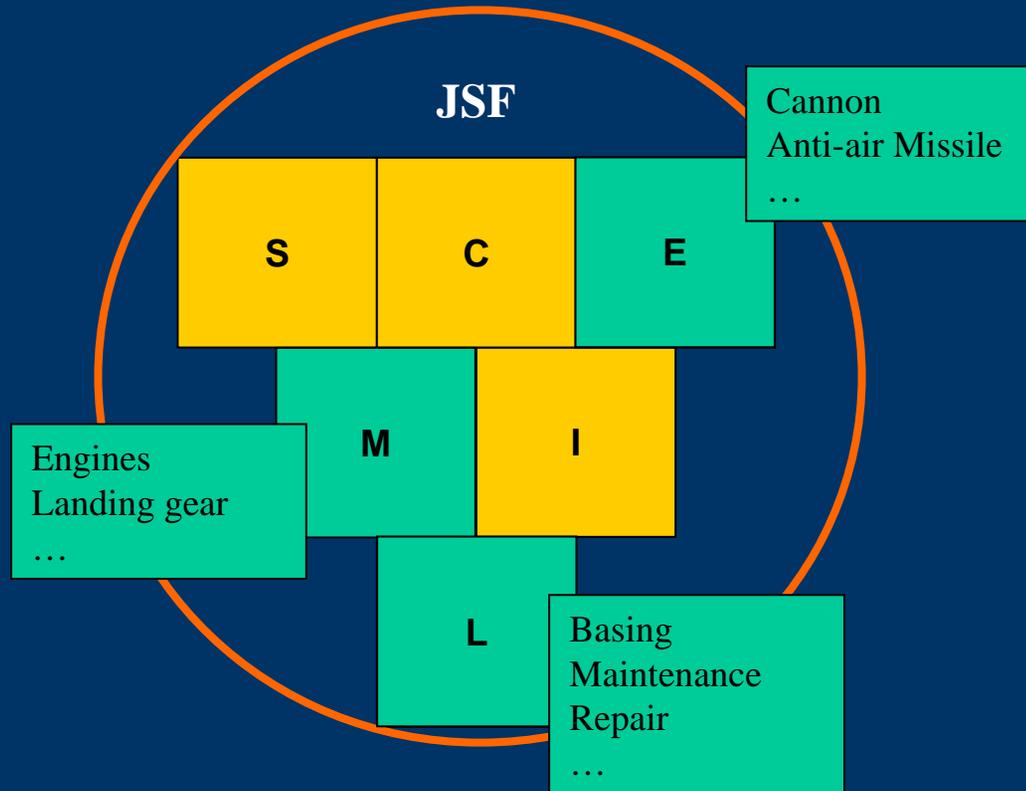


The Joint Strike Fighter as a set of services





The Joint Strike Fighter as a set of services



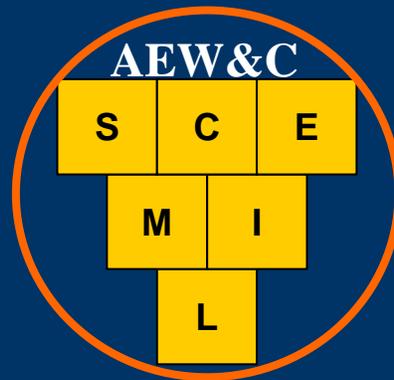
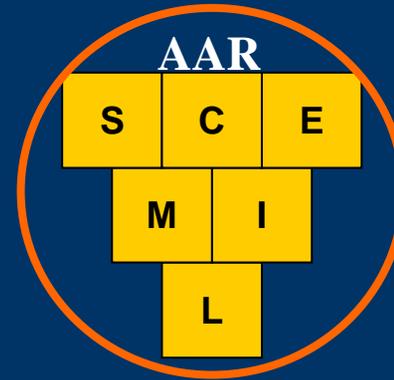
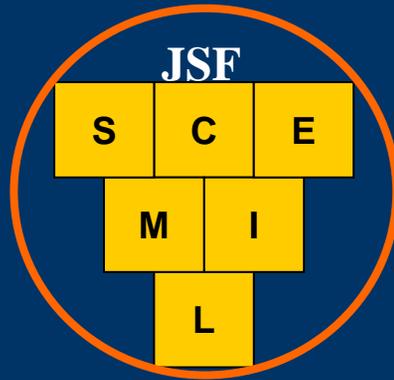


Australian Government
Department of Defence
Defence Science and
Technology Organisation

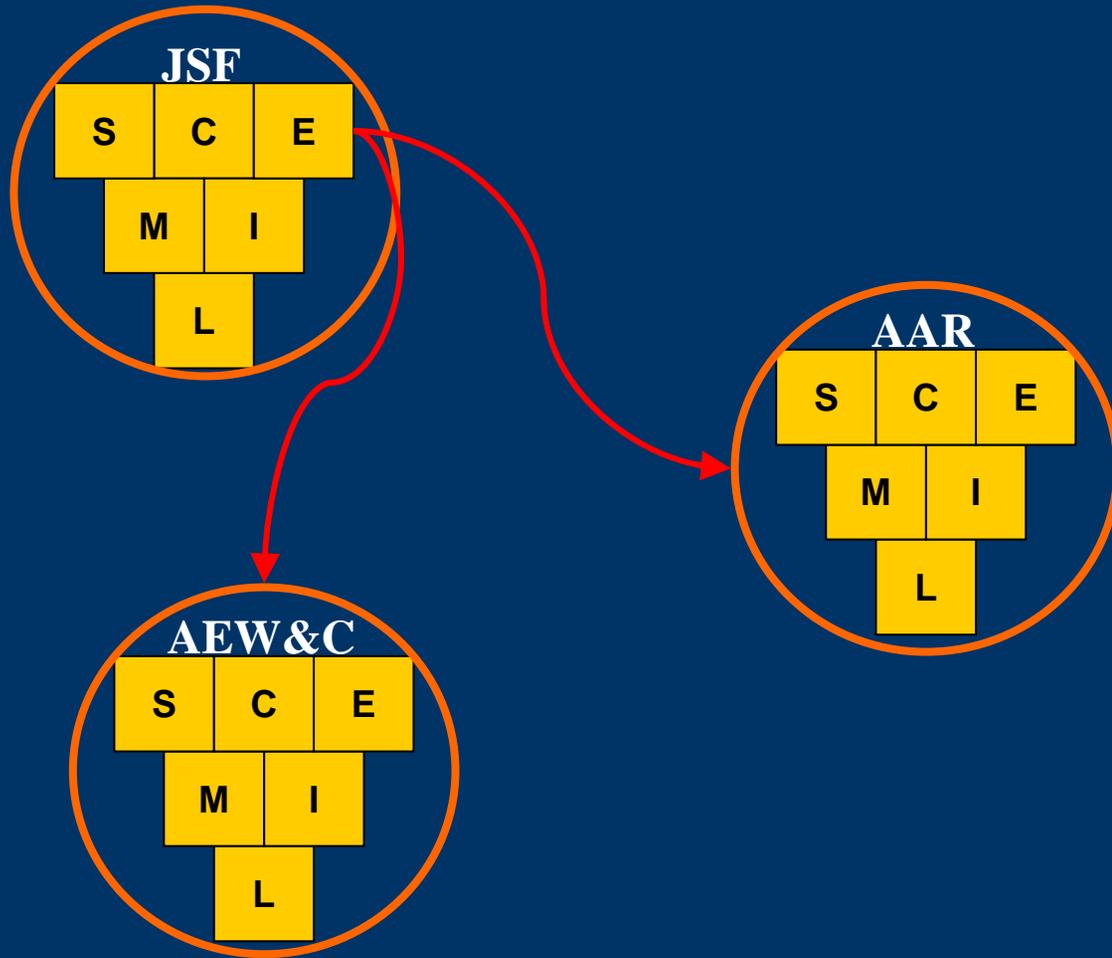
“Nested Encapsulation”



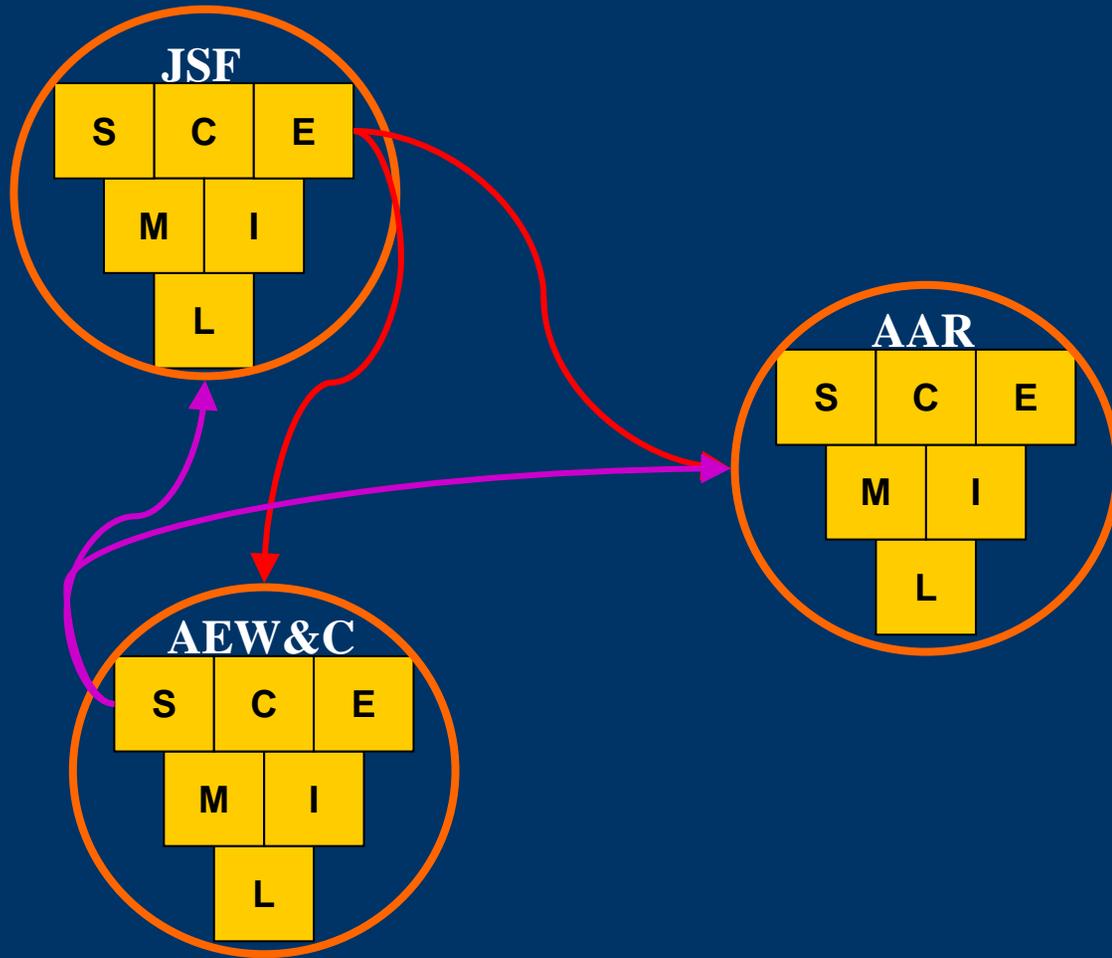
Services exchanged between JSF, AEW&C and AAR



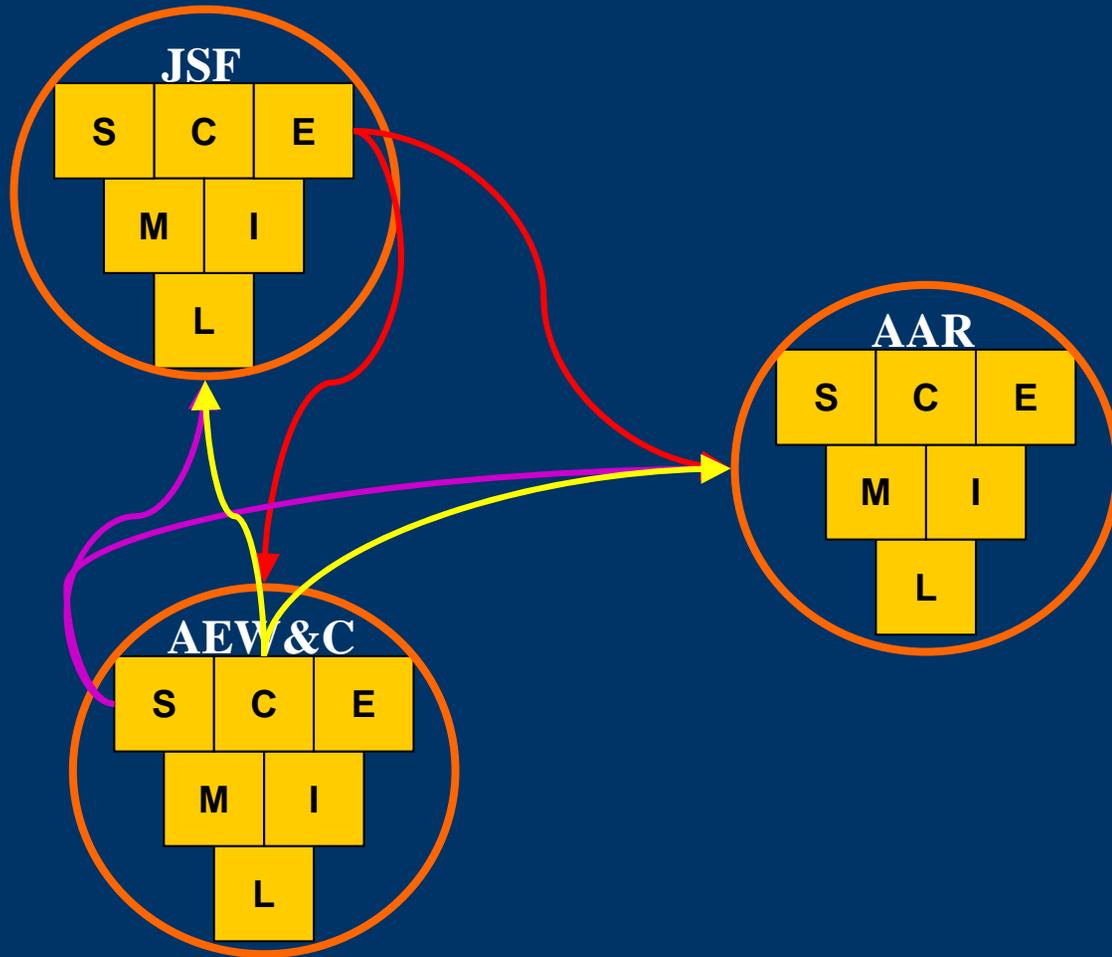
Services exchanged between JSF, AEW&C and AAR



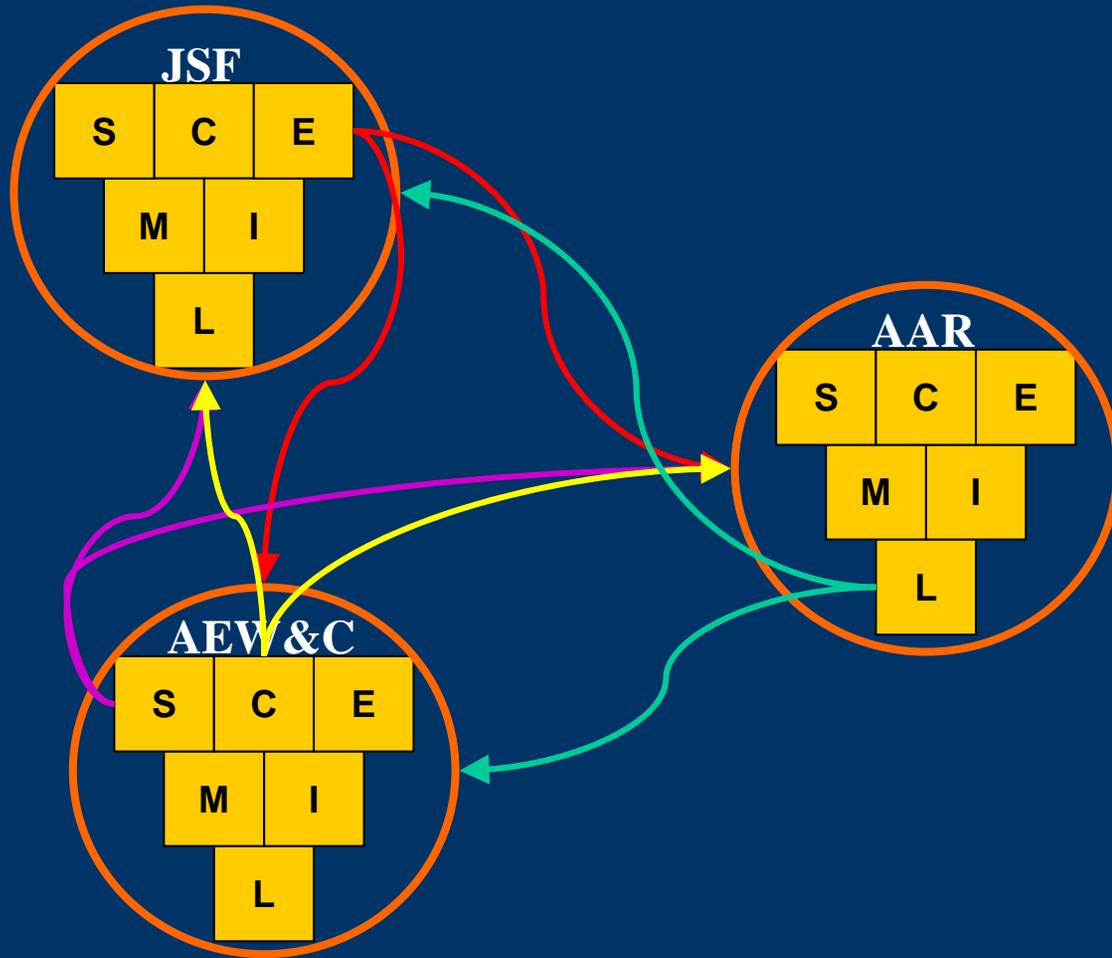
Services exchanged between JSF, AEW&C and AAR



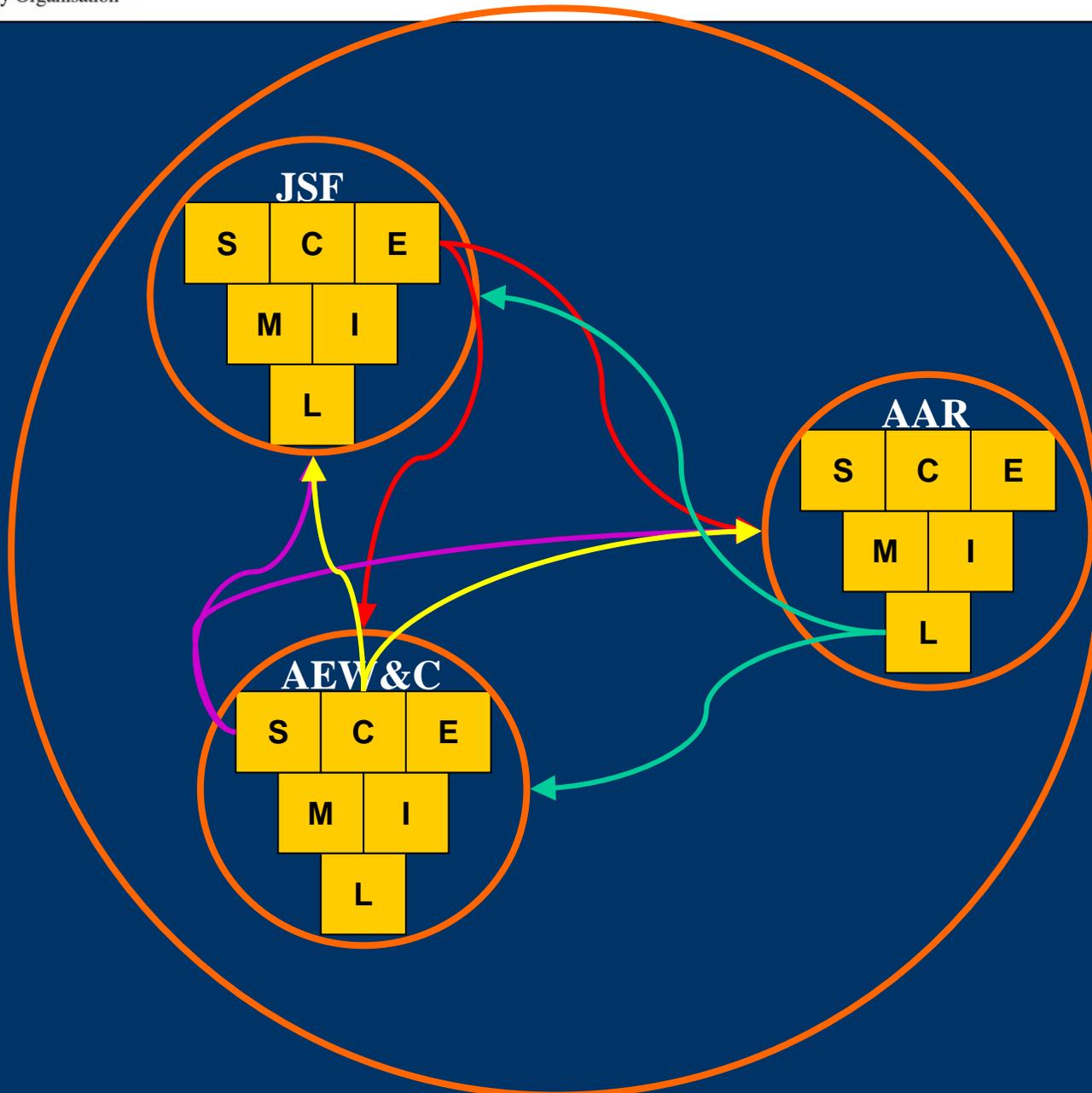
Services exchanged between JSF, AEW&C and AAR



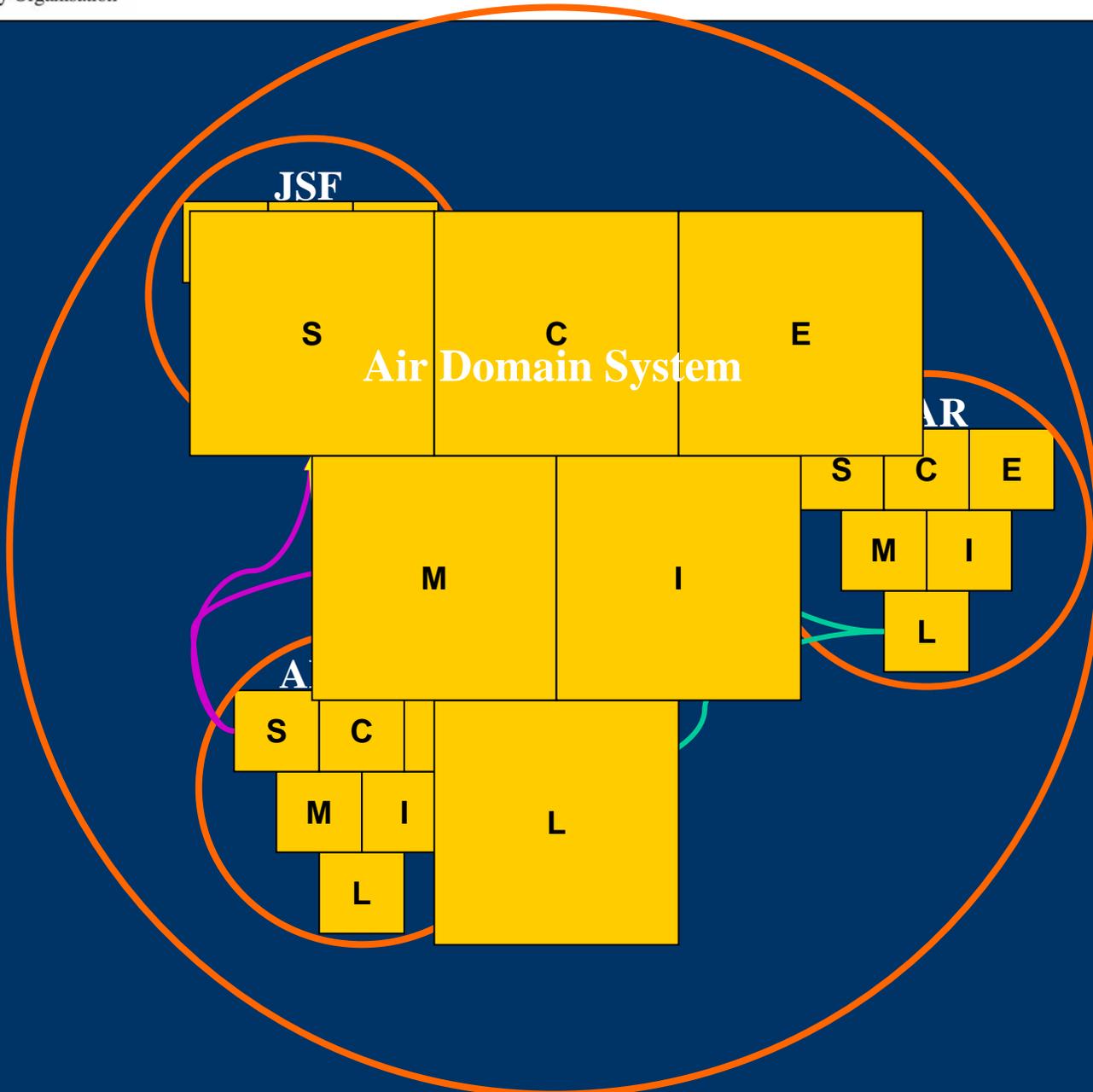
Services exchanged between JSF, AEW&C and AAR



Services exchanged between JSF, AEW&C and AAR



Aggregating this set of services





Australian Government
Department of Defence
Defence Science and
Technology Organisation

Nested Levels of Command

Relationships between levels

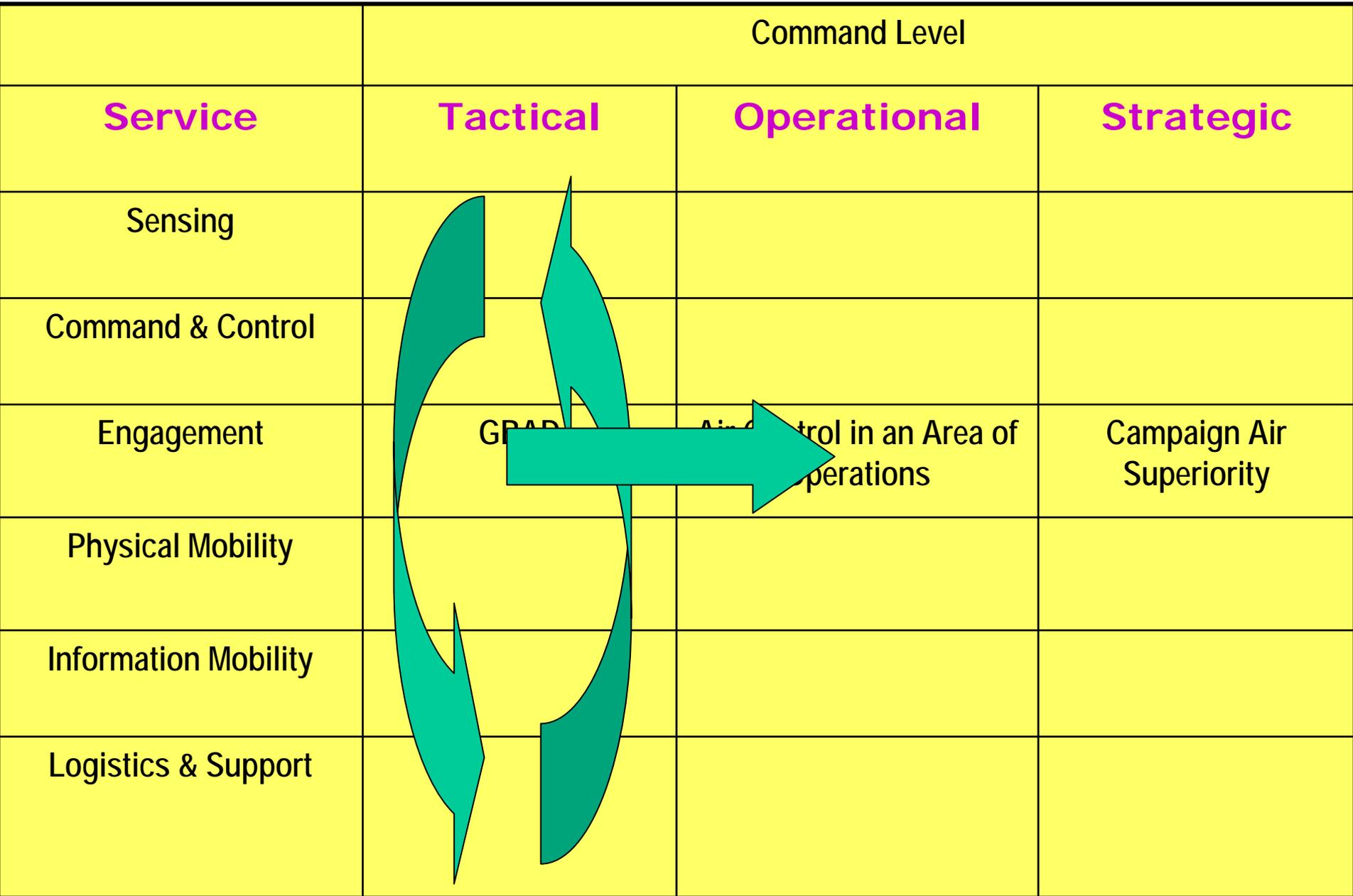
	Command Level		
Service	Tactical	Operational	Strategic
Sensing			
Command & Control			
Engagement	GBAD	Air Control in an Area of Operations	Campaign Air Superiority
Physical Mobility			
Information Mobility			
Logistics & Support			

Relationships between levels

	Command Level		
Service	Tactical	Operational	Strategic
Sensing			
Command & Control			
Engagement	GRAB	Air Control in an Area of Operations	Campaign Air Superiority
Physical Mobility			
Information Mobility			
Logistics & Support			



Relationships between levels





Australian Government
Department of Defence
Defence Science and
Technology Organisation

Services and the NCW Domains

Services and NCW Domains

	Domains		
	Physical	Information	Cognitive
S	Physical Sensing Systems Physical environment & agents	Info on sensing systems Info on environment & agents	Understanding of sensing systems Understanding Sensing Info
C	Physical systems and processes underpinning cognitive processes	Info systems and processes underpinning cognitive processes	Analyse & Understand Decide & Plan Coordinate & Conduct
E	Physical Engagement Systems Physical influence of env & agents Physical systems & processes underpinning Info Warfare	Info on engagement systems Info on physical effects Influence the information states of agents (and information on this)	Understanding engagement systems Understanding physical effects (and producing psychological impact) Psychological Impact (and understanding it!)
M	Physical Movement	Info on requirements, status and outcomes of physical movement	Understanding of requirements, status and outcomes of physical movement
I	The supporting information architecture The supporting information processes	Info on information storage & dissemination systems	Understanding of information storage & dissemination systems
L	The supporting physical materials and processes	Information on requirements and status of materials and processes	Understanding of requirements and status of materials and processes

Services and NCW Domains

	Domains		
	Physical	Information	Cognitive
S	Physical Sensing Systems	Info on sensing systems	Understanding of sensing systems
	Physical environment & agents	Info on environment & agents	Understanding Sensing Info
C	Physical systems and processes underpinning cognitive processes	Info systems and processes underpinning cognitive processes	Analyse & Understand Decide & Plan Coordinate & Conduct
E	Physical Engagement Systems Physical influence of env & agents	Info on engagement systems Info on physical effects	Understanding engagement systems Understanding physical effects (and producing psychological impact)
	Physical systems & processes underpinning Info Warfare	Influence the information states of agents (and information on this)	Psychological Impact (and understanding it!)
M	Physical Movement	Info on requirements, status and outcomes of physical movement	Understanding of requirements, status and outcomes of physical movement
I	The supporting information architecture The supporting information processes	Info on information storage & dissemination systems	Understanding of information storage & dissemination systems
L	The supporting physical materials and processes	Information on requirements and status of materials and processes	Understanding of requirements and status of materials and processes

Services and NCW Domains

	Domains		
	Physical	Information	Cognitive
S	Physical Sensing Systems	Info on sensing systems	Understanding of sensing systems
	Physical environment & agents	Info on environment & agents	Understanding Sensing Info
C	Physical systems and processes underpinning cognitive processes	Info systems and processes underpinning cognitive processes	Analyse & Understand Decide & Plan Coordinate & Conduct
E	Physical Engagement Systems	Info on engagement systems	Understanding engagement systems
	Physical influence of env & agents	Info on physical effects	Understanding physical effects (and producing psychological impact)
	Physical systems & processes underpinning Info Warfare	Influence the information states of agents (and information on this)	Psychological Impact (and understanding it!)
M	Physical Movement	Info on requirements, status and outcomes of physical movement	Understanding of requirements, status and outcomes of physical movement
I	The supporting information architecture The supporting information processes	Info on information storage & dissemination systems	Understanding of information storage & dissemination systems
L	The supporting physical materials and processes	Information on requirements and status of materials and processes	Understanding of requirements and status of materials and processes

Services and NCW Domains

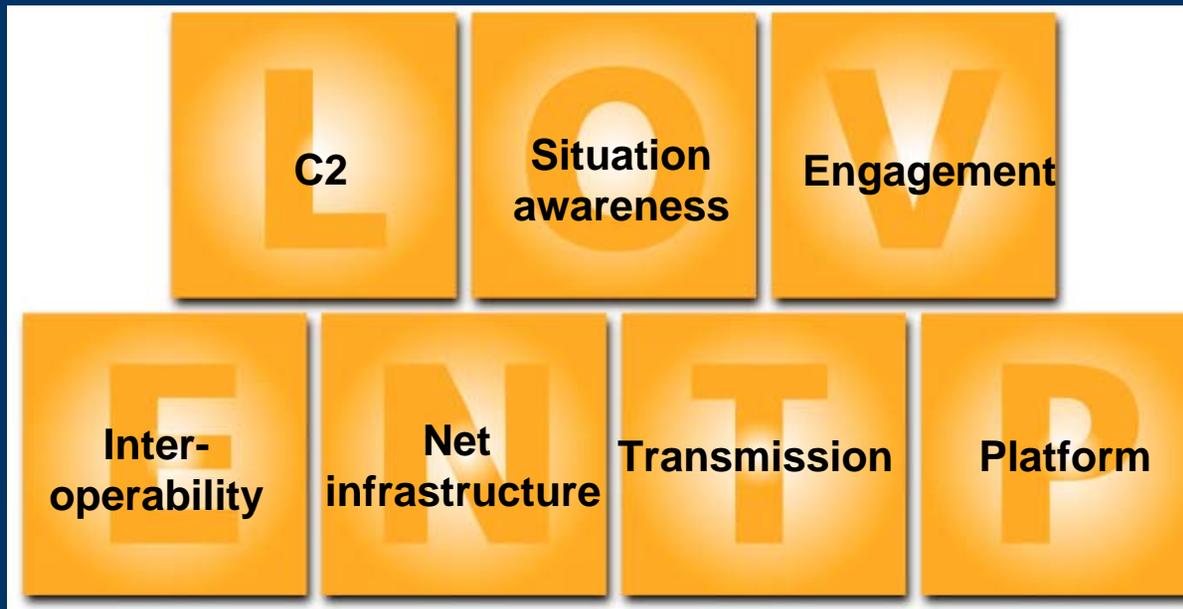
	Domains		
	Physical	Information	Cognitive
S	Physical Sensing Systems	Info on sensing systems	Understanding of sensing systems
	Physical environment & agents	Info on environment & agents	Understanding Sensing Info
C	Physical systems and processes underpinning cognitive processes	Info systems and processes underpinning cognitive processes	Analyse & Understand Decide & Plan Coordinate & Conduct
E	Physical Engagement Systems	Info on engagement systems	Understanding engagement systems
	Physical influence of env & agents	Info on physical effects	Understanding physical effects (and producing psychological impact)
	Physical systems & processes underpinning Info Warfare	Influence the information states of agents (and information on this)	Psychological Impact (and understanding it!)
M	Physical Movement	Info on requirements, status and outcomes of physical movement	Understanding of requirements, status and outcomes of physical movement
I	The supporting information architecture The supporting information processes	Info on information storage & dissemination systems	Understanding of information storage & dissemination systems
L	The supporting physical materials and processes	Information on requirements and status of materials and processes	Understanding of requirements and status of materials and processes



Connection of the SSF to some other constructs and approaches

Service providing concept “LOVENTP”

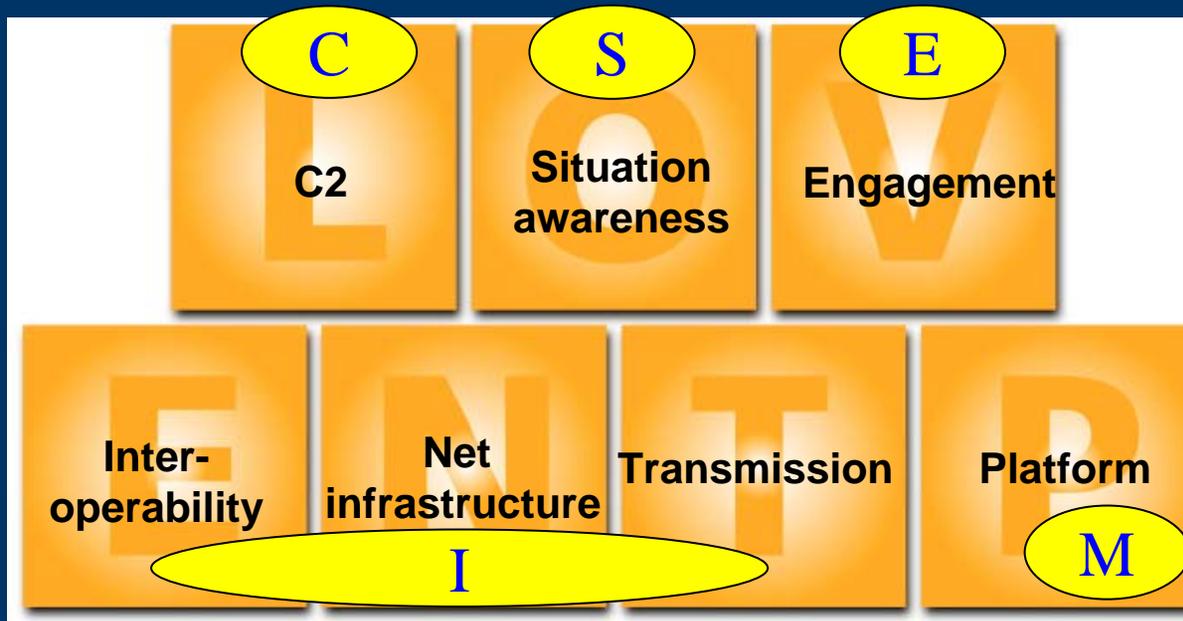
Operational services



Infrastructure services

Service providing concept “LOVENTP”

Operational services



Infrastructure services

Basic functions of a networked, distributed force

Function	Description
Sensing	Collecting observations of objects within a sphere of competition as well as observations of the environment.
Transport	Providing mobility for elements that might not have their own locomotion or for elements that in certain cases are more efficiently transported by other elements.
Netting	Creating the means of information transfer between elements of the system.
Information Fusion and Pattern Recognition	Sharing information among elements for the purpose of collecting observations from sensors, composing informational representations of the battlespace, and determining important patterns within the representations.
Interpretation, Cognition and Decision	Consuming information, deliberating and converting deliberations into decisions.
Influence	Acting to change physical, informational, or logical states in the battlespace.

Basic functions of a networked, distributed force

Function		Description
Sensing	S	Collecting observations of objects within a sphere of competition as well as observations of the environment.
Transport	M	Providing mobility for elements that might not have their own locomotion or for elements that in certain cases are more efficiently transported by other elements.
Netting	I	Creating the means of information transfer between elements of the system.
Information Fusion and Pattern Recognition		Sharing information among elements for the purpose of collecting observations from sensors, composing informational representations of the battlespace, and determining important patterns within the representations.
Interpretation, Cognition and Decision	C	Consuming information, deliberating and converting deliberations into decisions.
Influence	E	Acting to change physical, informational, or logical states in the battlespace.

L

Netforce Reference Model (NFRM)

The six elementary NEC actions are:

data collection	the action of collecting data and information for use in netcentric operations
information processing & provision	the action of data and information processing, interpretation, association, correlation, fusion, and the provision of that information in the right format to information requestors
communication	the transportation of data and information using various means of transport media
decision making	the action of using the available data and information to decide on possible courses of action
taking action	the action of effectuating the decisions made by the decision making processes
providing support	the action(s) of providing support for the netcentric operation to be carried out and sustained. This class of elementary actions consists of a variety of different support actions.

Netforce Reference Model (NFRM)

M

The six elementary NEC actions are:

data collection	S	the action of collecting data and information for use in netcentric operations
information processing & provision	I	the action of data and information processing, interpretation, association, correlation, fusion, and the provision of that information in the right format to information requestors
communication		the transportation of data and information using various means of transport media
decision making	C	the action of using the available data and information to decide on possible courses of action
taking action	E	the action of effectuating the decisions made by the decision making processes
providing support	L	the action(s) of providing support for the netcentric operation to be carried out and sustained. This class of elementary actions consists of a variety of different support actions.



- Other conceptual models differ in one of the following ways:
 - Either or both of the physical mobility (M) or the support aspects (L) of military systems is ignored
 - There is a focus on the information-centric aspects
 - They are a node-centric view of NCW and the emphasis is on node function
 - The model is not easily scalable

- The SSF provides a relatively comprehensive set of basic concepts with which to model dependencies which are both simple and scalable

- The SSF handles the subtleties and complexities of capability relationships by defining two dimensions: a primary set of six services, each of which are characterised by the three domains.



Application 1

Using the SSF to illuminate Provider vs Consumer expectations



- A set of capabilities is selected

- Each Capability Project Manager is asked to consider its relationship to another Capability
 - What service/s does your capability provide (to each other capability)?
 - What service/s does your capability consume (from each other capability)?

- The result are two tables
 - The provider-only-view table
 - The consumer-only-view table

Comparing Provider-Consumer expectations

		Consumers																															
Provider view		Capability A					Capability B					Capability C					Capability D					Capability E											
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L		
Providers	Capability A	S			I	M	S				C	I			S			C	I						S			I					
	Capability B		E					E			C	I	M				E									E							
	Capability C	S						S					L	S	E		I	M	L					C	I			S		C	I		
	Capability D				C	I		L				C	I		L			C	I		L			C	I		L			C	I		L
	Capability E				C						C						C		M	L							M	L			C		M

Agreed service exchanged

		Consumers																															
Consumer view		Capability A					Capability B					Capability C					Capability D					Capability E											
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L		
Providers	Capability A	S			I	M	S				C	I													C	I		L	S		I		
	Capability B		E		I				E		C	I	M				S	E							C	I		L	S	E			
	Capability C															S	E		I	M	L			C	I		L		E			L	
	Capability D				C	I		L					I					C	I		L			C	I		L			I			
	Capability E														S		C	I	M	L					C	I	M	L			C		M

Comparing Provider-Consumer expectations

		Consumers																																				
Provider view		Capability A					Capability B					Capability C					Capability D					Capability E																
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L							
Providers	Capability A	S			I	M		S			C	I		S			C	I								S				I		S						
	Capability B		E						E		C	I	M		E						E						E						E					
	Capability C	S						S						L	S	E		I	M	L							S				C	I						
	Capability D				C	I	L				C	I	L				C	I	L										C	I	L					C	I	L
	Capability E				C						C						C		M	L											M	L				C		M

Agreed null service exchanged

		Consumers																																										
Consumer view		Capability A					Capability B					Capability C					Capability D					Capability E																						
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L							
Providers	Capability A	S			I	M		S				I		S			C	I								S				C	I	L	S				I							
	Capability B		E		I				E		C	I	M		S	E													C	I	L	S	E											
	Capability C													S	E			I	M	L										C	I	L		E				L						
	Capability D				C	I	L						I				C	I	L										C	I	L					I		L						
	Capability E													S			C	I	M	L											C	I	M	L				C		M	L			

Comparing Provider-Consumer expectations

		Consumers																														
Provider view		Capability A				Capability B				Capability C				Capability D				Capability E														
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	
Providers	Capability A	S			I	M		S			C	I		S			C	I					I			S				I		
	Capability B		E						E		C	I	M		E						E						E					
	Capability C	S						S						L	S	E		I	M	L			C	I			S			C	I	
	Capability D				C	I					L						C	I		L			C	I		L				C	I	
	Capability E				C						C						C		M	L					M	L				C		M

Inconsistent service exchange
- provider only

		Consumers																															
Consumer view		Capability A				Capability B				Capability C				Capability D				Capability E															
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L		
Providers	Capability A	S			I	M		S			I		S			C	I					C	I	L	S				I				
	Capability B		E		I				E		C	I	M		S	E							C	I	L	S	E						
	Capability C														S	E		I	M	L				C	I	L		E				L	
	Capability D				C	I					I						C	I					C	I	L				I				
	Capability E													S			C	I	M	L				C	I	M	L				C		M

Comparing Provider-Consumer expectations

		Consumers																															
Provider view		Capability A					Capability B					Capability C					Capability D					Capability E											
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L		
Providers	Capability A	S			I	M		S		C	I			S		C	I									S				I			
	Capability B		E						E	C	I	M			E						E						E						
	Capability C	S						S						L	S	E		I	M	L			C	I			S		C	I			
	Capability D			C	I		L			C	I		L			C	I		L			C	I		L			C	I		L		
	Capability E			C						C						C		M	L											M	L		

Inconsistent service exchange – consumer only

		Consumers																															
Consumer view		Capability A					Capability B					Capability C					Capability D					Capability E											
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L		
Providers	Capability A	S			I	M		S			I			S		C	I					C	I			L	S			I			
	Capability B		E		I				E	C	I	M			S	E						C	I			L	S	E					
	Capability C														S	E		I	M	L			C	I			L		E				L
	Capability D			C	I		L									C	I					C	I			L				I			
	Capability E													S		C	I	M	L			C	I		M	L			C		M	L	

Provider-Consumer Comparison Table for all services

Agreed service exchanged

Agreed null service exchanged

		Consumers																																
		Capability A					Capability B					Capability C					Capability D					Capability E												
Services		S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L	S	E	C	I	M	L			
Providers	Capability A	X	X	X		X	X	X	P		X	X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X				
	Capability B	X		X	K	X	X	X				X	K		X	X	X	X	X	X	P	K	K	X	K	K		X	X	X	X			
	Capability C	P	X	X	X	X	X	P	X	X	X	X	P			X							X	X			X	K	P	K	P	P	X	K
	Capability D	X	X			X		X	X	P		X	P	X	X			X	P	X	X			X	X			X	X	X	P		X	P
	Capability E	X	X	P	X	X	X	X	X	P	X	X	X	K	X		K				X	X	K	K			X	X		X	X		X	

Inconsistent service exchange – provider only

Inconsistent service exchange – consumer only

Provider-Consumer Comparison Table for Sensing Services only

Contrasting Provider
 and Consumer
 Expectations of the
 Sensing Service

Consumers

Providers

		SENSING															
		Capability A	Capability B	Capability C	Capability D	Capability E	Capability F	Capability G	Capability H	Capability I	Capability J	Capability K	Capability L	Capability M	Capability N	Capability O	Capability P
	S	S	S	S	S	S	S	P	S	X	S	S	S	X	S	X	P
Capability A		S	S	S	S	S	S	P	S	X	S	S	S	X	S	X	P
Capability B		X	X	K	K	X	K	X	X	X	K	S	S	P	X	X	X
Capability C		S	S	S	S	K	K	X	P	X	S	K	K	K	K	S	X
Capability D		S	S	S	S	K	K	X	P	X	S	K	K	X	K	P	X
Capability E		P	S	S	S	S	P	P	X	X	S	K	K	X	K	P	P
Capability F		P	P	S	S	X	S	P	X	X	P	K	S	K	S	P	P
Capability G		X	K	S	K	X	S	X	X	P	S	K	K	K	S	X	S
Capability H		S	S	S	S	K	K	P	X	P	K	S	S	P	X	P	P
Capability I		X	X	K	K	X	X	X	X	X	X	X	X	K	X	X	X
Capability J		X	X	K	K	X	K	X	X	X	X	K	K	X	X	X	X
Capability K		K	X	K	K	K	X	X	X	X	X	X	X	X	X	X	X
Capability L		K	X	K	K	K	K	X	X	X	X	X	X	X	K	X	X
Capability M		X	X	K	K	X	X	X	X	P	X	X	X	X	K	X	X
Capability N		P	X	S	S	X	S	P	X	P	P	K	K	X	S	X	P
Capability O		X	X	K	K	X	X	X	X	X	X	X	X	X	X	X	X
Capability P		S	P	K	S	S	S	P	S	X	S	S	S	X	X	P	S

Provider-Consumer Comparison Table for Sensing Services only

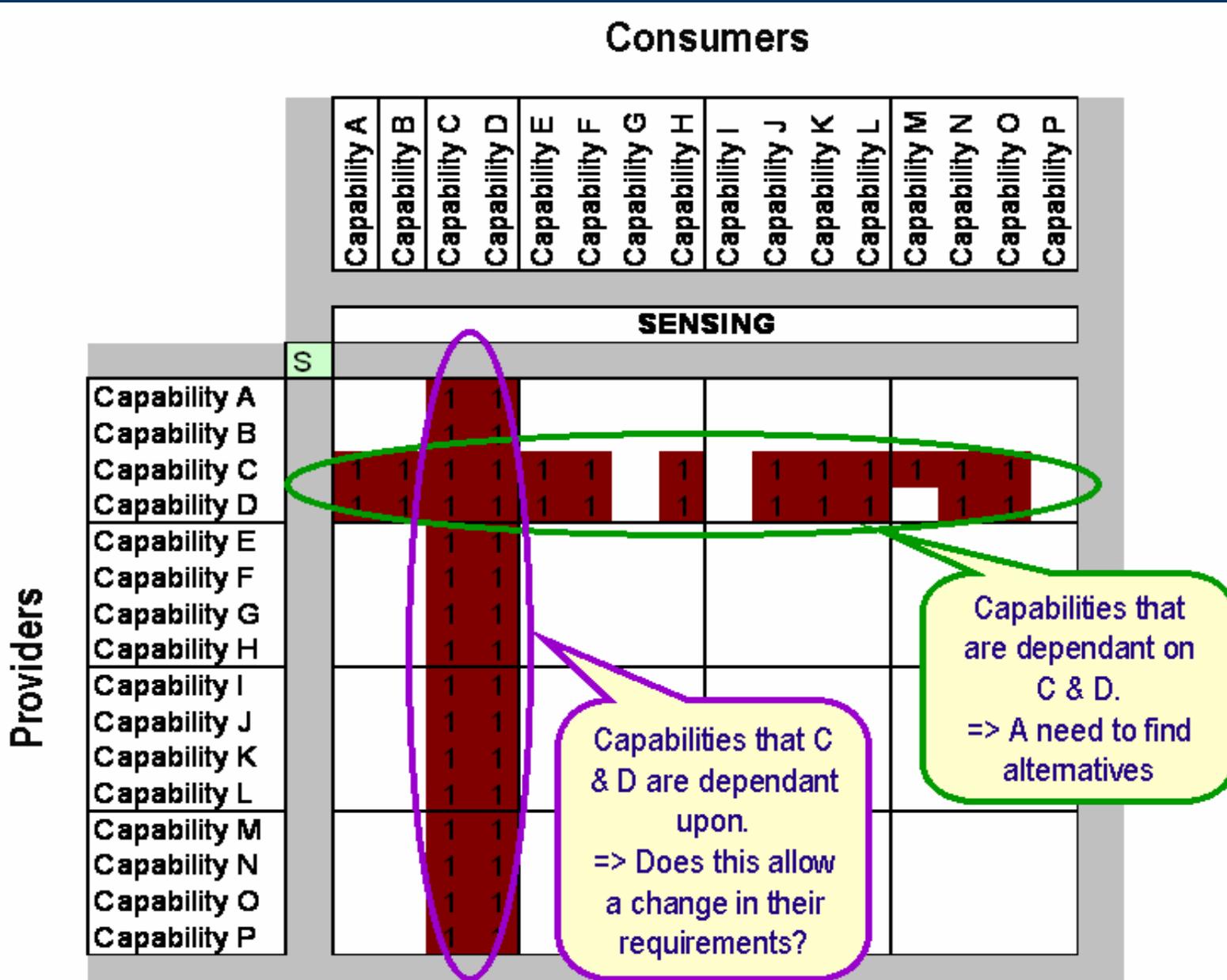
Contrasting Provider
 and Consumer
 Expectations of the
 Sensing Service

Consumers

Providers

		SENSING															
		Capability A	Capability B	Capability C	Capability D	Capability E	Capability F	Capability G	Capability H	Capability I	Capability J	Capability K	Capability L	Capability M	Capability N	Capability O	Capability P
	S																
Capability A		S	S	S	S	S	S	P	S	X	S	S	S	X	S	X	P
Capability B		X	X	K	K	X	K	X	X	X	K	S	S	P	X	X	X
Capability C		S	S	S	S	K	K	X	P	X	S	K	K	K	K	S	X
Capability D		S	S	S	S	K	K	X	P	X	S	K	K	X	K	P	X
Capability E		P	S	S	S	S	P	P	X	X	S	K	K	X	K	P	P
Capability F		P	P	S	S	X	S	P	X	X	P	K	S	K	S	P	P
Capability G		X	K	S	K	X	S	X	X	P	S	K	K	K	S	X	S
Capability H		S	S	S	S	K	K	P	X	P	K	S	S	P	X	P	P
Capability I		X	X	K	K	X	X	X	X	X	X	X	X	K	X	X	X
Capability J		X	X	K	K	X	K	X	X	X	X	K	K	X	X	X	X
Capability K		K	X	K	K	K	X	X	X	X	X	X	X	X	X	X	X
Capability L		K	X	K	K	K	K	X	X	X	X	X	X	X	K	X	X
Capability M		X	X	K	K	X	X	X	X	P	X	X	X	X	K	X	X
Capability N		P	X	S	S	X	S	P	X	P	P	K	K	X	S	X	P
Capability O		X	X	K	K	X	X	X	X	X	X	X	X	X	X	X	X
Capability P		S	P	K	S	S	S	P	S	X	S	S	S	X	X	P	S

What if Capabilities C & D were delayed or deleted from the DCP?





- Tool for high-level visualisation and analysis for senior decision-makers
 - What overall patterns do I see?
 - Where are the majority of inconsistencies occurring?

- Technique for first-level issue exposure and problem solving at the local level
 - Why do these other capabilities not see our interaction in the same way?
 - What is the quality of service I expect from providers I need to do my job?
 - What is the quality of service expected by consumers of my service?



Application 2

Applying the SSF to the analysis of Mission Capability Packages (MCPs)

Operational Effect: Strike.

The neutralisation or deterrence of the use of a key adversary strategic capability.

List of assets comprising
the MCP

Sub-surface Combatant
Surface Combatant
Helicopters
Combat Aircraft 1
Combat Aircraft 2
Surveillance Aircraft
Tanker
UAV
Missile

A set of assets might be ascribed to form the basis of the Mission Capability Package (MCP) required to produce the particular operational effect required in a particular scenario.

At this stage, it only consists only of a list of assets/capabilities and doesn't show how the MCP operates.

Service Role Allocation

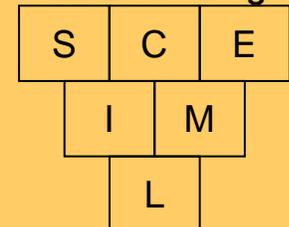
Asset	Engage	Sensing	C2	Info Mob	Phys Mob	Log & Supp
Sub-surface combatant					X	
Surface combatant	XX					
Helicopters					X	
Combat Aircraft 2	X	X	X		X	
Tanker						X
Surveillance Aircraft	X	X	X			
Combat Aircraft 1	X	X	X		X	
Missile	XX					
UAV		X				



Operational Effects

Tactical Dependency Effects

SCMILE Block Diagram





Provider-Consumer Table

Provider-Consumer
 Table

CONSUMERS								
Sub-surface Combatant	Surface Combatant	Helicopters	Combat Aircraft 2	Tanker	Surveillance Aircraft	Combat Aircraft 1	Missile	UAV

Operational Effects

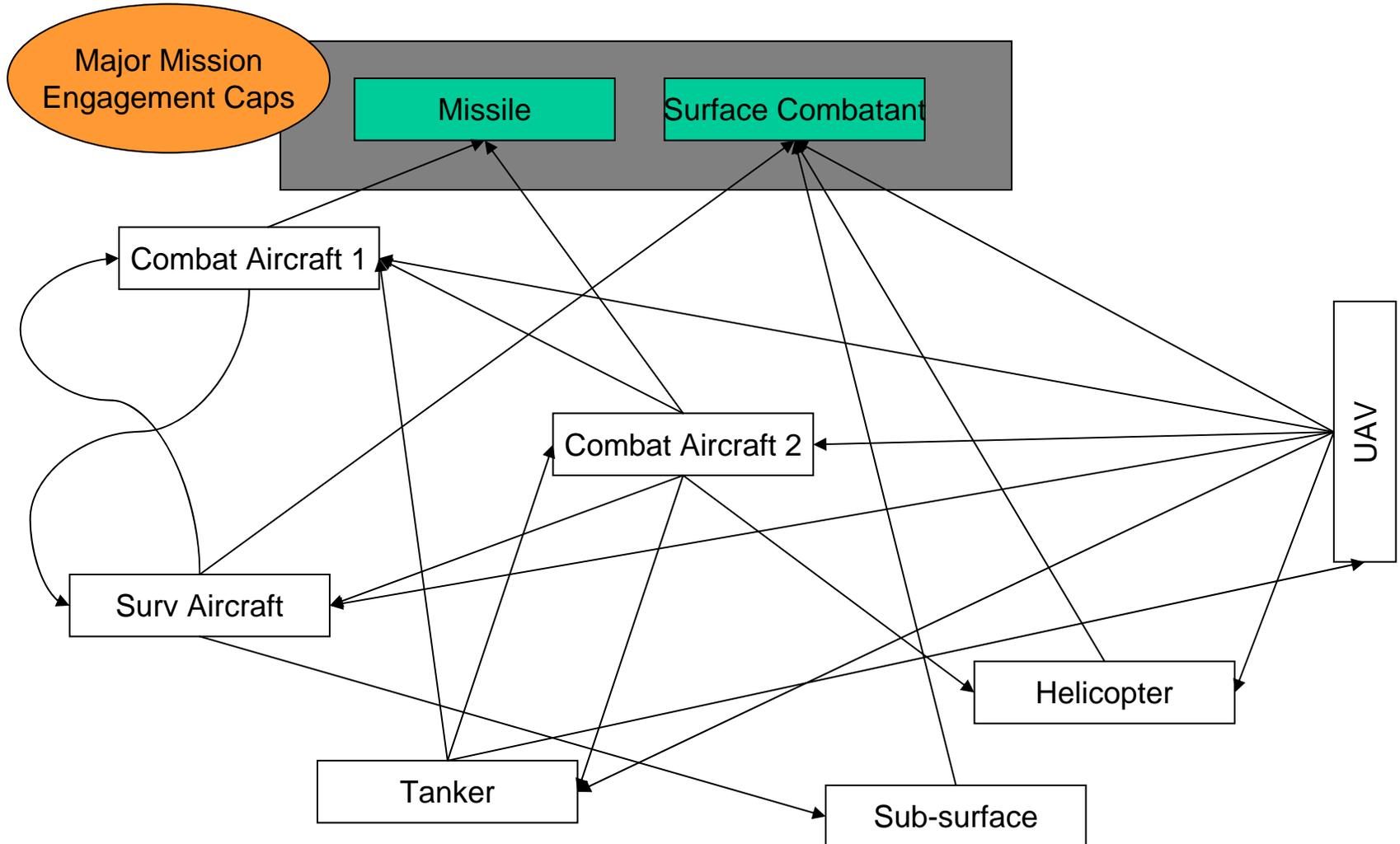
PROVIDERS	Sub-surface Combatant
	Surface Combatant
	Helicopters
	Combat Aircraft 2
	Tanker
	Surveillance Aircraft
	Combat Aircraft 1
	Missile
	UAV

	M							
	M							
		E		E	E	E	SCM	
			L			L		L
E	S					S		
					E		SCM	
	S	S	S	S	S	S		

E

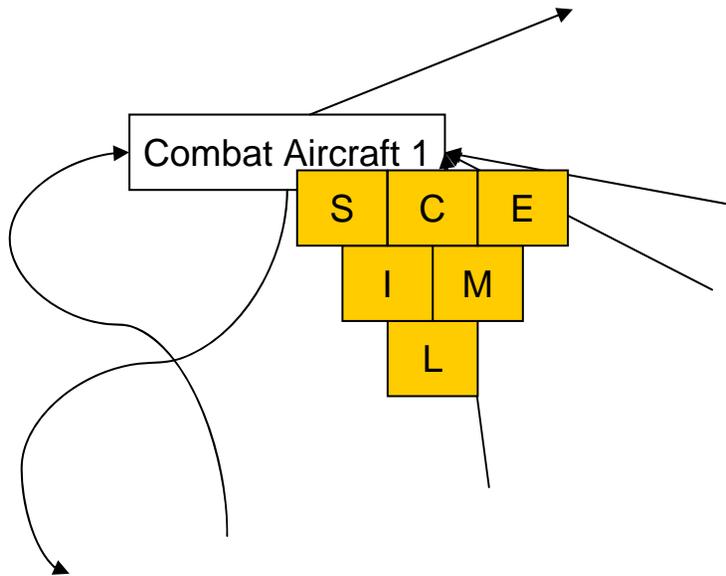
E

Network Dependencies





Combat Aircraft 1 as a SCMILE block diagram





- A single high-level concept of operations of a MCP
- A scalable construct to examine the MCP as a whole or its parts
- A technique to identify gaps in a description of a MCP which is auditable and traceable
- A progressive process of building knowledge about a MCP



- **Loose threads**
 - Identifying systems and marking boundaries
 - Defining the source of a service

- **Concept development**
 - Tactical, Operational and Strategic Services
 - Second layer of services
 - Quality of Service descriptors
 - Services to Effects (Ontology development)

- **Practical application**
 - Testing the framework's robustness and utility



The “take-home” message

- A conceptual framework called the SCMILE Services Framework (SSF) has been developed
- It offers a simple, scalable and generic method of dealing with capability dependencies
- It can handle both “industrial-age” and “network-centric” capabilities in a single consistent conceptual framework
- It provides a more comprehensive view of capability dependencies than information connectivity alone



➤ Donald Lowe

donald.lowe@dsto.defence.gov.au

DSTO Russell Offices

Canberra ACT 2600

AUSTRALIA