

Developing Coalition BML for Air Operations

Contact: Adam Brook (+44 (0) 1252 396427) RABROOK@QINETIQ.COM

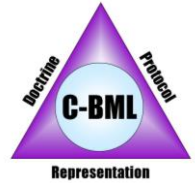
Adam Brook
Simulation and Training Group
QinetiQ
Farnborough
GU14 0LX
UK

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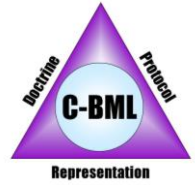
BML for Air Operations



- Aims:
 - To permit a BML capability in Joint Air-Land environment
 - To represent Air Tasking Order & Airspace Coordination Orders in C-BML
 - To permit simulated aircraft to be controlled using BML orders
 - To provide a Recognised Air Picture for use in, e.g., a Brigade C2 cell
- Benefits:
 - Orders and Reports are available to any federated BML system
 - Tactical graphics may be shared with other users, e.g. air corridors, SEADs
 - Air tasking may be generated by any BML-capable air planning system
 - Reports from ground units may be displayed on air C2 systems
 - Swivel chairs eliminated

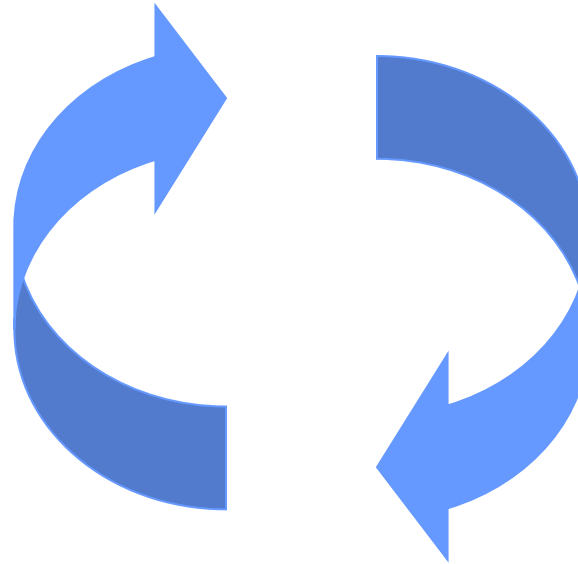


Joint Fires Targeting Cycle



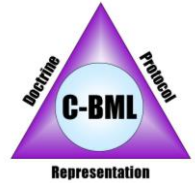
1. Objectives
2. Targets
3. Weapons
4. Force Application
5. Planning & Execution
6. Assessment

C-BML Can help here





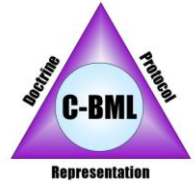
The ACO – Airspace Coordination Order



- Lists ACMs – Airspace Control Means
 - Geometrical features, e.g. routes, race-tracks, SEAD areas
 - May be constrained by flight levels
 - May be given temporal properties, when active, dormant, expired, etc
 - May be associated with control command networks
 - May be parameterised, e.g. race-tracks, circular orbits
- C-BML permits control measures to have temporal rules associated
- ACOs used to coordinate and deconflict air operations
- ACOs are used to specify the control measures associated with C-BML Orders



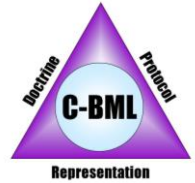
PTL – Prioritised Target List



- Targets – What the targets are
- DMPI – Desired Mean Point of Impact – Where the targets are
- Weapon Solutions – Which weapons are to be used against which targets
- PTL is used to assign targets to aircraft and missions



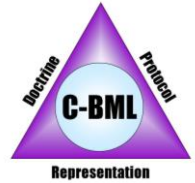
The ATO – Air Tasking Order



- Helps plan the use of air force assets:
 - Resource allocation – **which** aircraft are available, **where** they are based, what their capabilities are
 - Time coordination – **when** aircraft need to take off, **when** they need to be on station
 - Spatial coordination – **where** the aircraft will fly, what flight level
 - Interaction with ground and naval forces – CAS, SEAD, pre-determined ground targets
- Gives air crew their allotted tasks
- Does not 'micro-manage' the air crew tasks



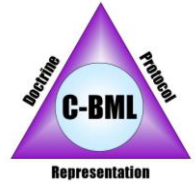
ATO Contents



- Header
- Groups of Tasks (per country, per service)
 - Groups of Missions
 - Aircraft
 - Route to: location, refuelling, target, recce, new airfield
 - Mission notes
- SPINS – Special Instructions – all free text, e.g.:
 - General information, ROE, Comms plan, EW plans
 - Free text is a challenge!



Example ADatP3 F058 ATO



EXER/UK C-BML Demo//

MSGID/ATO/UK Air Gp Cmd/0//

AKNLDG/NO//

TIMEFRAM/FROM:140001ZFEB2008/TO:142359ZFEB2008/ASOF:132000ZFEB2008//

AIRTASK/ATO A/3510N07901W/LOCATION OF COALITION AIR BASE//

Who – Tasker

TASKUNIT/23SQN//

AMSNDAT/AM01/-/ZZ/MC/JCP/-/BAT//

AMSNLOC/141325ZFEB/142000ZFEB/AWACS ORBIT/350/1A/LATM:3510N07901W/NAME:PT ALPHA//

Who – Taskee

What – Mission type

When – Start & End

Where - Eln

Where

Ctl Measure

TASKUNIT/617SQN//

AMSNDAT/AM02/-/ZZ/MC/EW/-/BAT//

GTGTLOC/P/TOT:141325ZFEB/NET:141320ZFEB/TOF:141325ZFEB/MOBILE COMMAND
POST/ID:B1234F12345/CP/-/DMPID:351025.3N0790125.7W/W84//

6ROUTE

/ 1/3510N07901W/ IP/141400Z/450KTS/300

/ 2/3520N07908W/TRN/142000Z/450KTS/300

/ 3/3530N07914W/TRN/142500Z/450KTS/200

/ 4/3560N07918W/ RP/143000Z/450KTS/ 5//

Where – RouteWhere

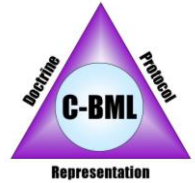
Header

Task 1

Task 2



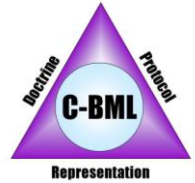
Review Process



- Battle Damage Assessment
- Assign recce aircraft
- Get reports & imagery
- Amend task orgs, etc
- Feed info into another targeting/planning/execution cycle



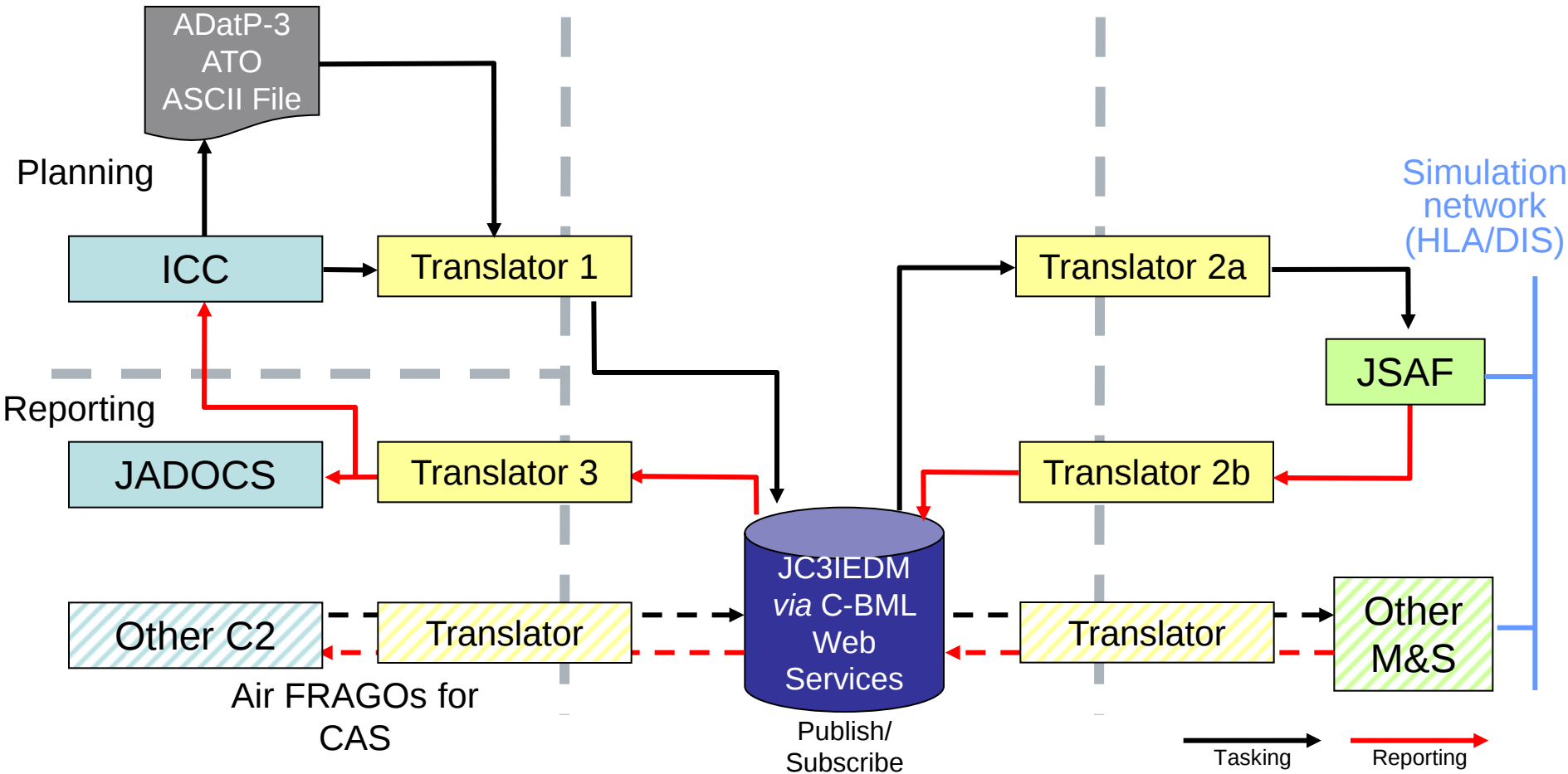
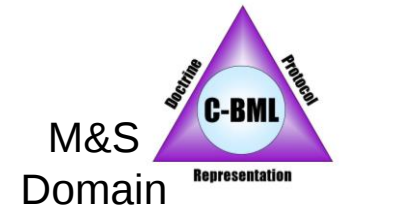
BML Requirements



- Resource allocation *not* required – this is an MSDL requirement
- Mission planning
- Mission execution
- Aircraft reporting
- Response to requests:
 - CAS – US MTF, ADatP-3 messages (CASREQ, AIRSUPREQ)
 - Scramble – associated air task data required
 - Corrections, rescheduled and cancelled missions
- C-BML FRAGO processing is appropriate
 - not part of BML, part of operating procedures

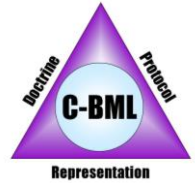
UK System

C-BML
Domain





ICC Data Tables

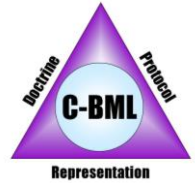


- ICC maintains numerous data tables in a database
- To generate a representative ATO a subset of these is required:
 - Who Units
 - Where Air bases, Routes, Patrol Areas, Targets*, etc
 - What Mission types
 - When Allocation and timing of missions

* Targets are also Affected Who



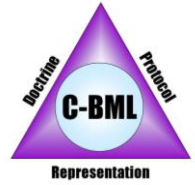
Air Additions to C-BML Schema



- Simple schema modifications:
 - <Task> split into:
 - <AirTask>, <GroundTask> & <MaritimeTask>
 - Not really necessary – will recommend all domains simply use <Task>
 - Locations added:
 - <height above ground level>
 - Reports added:
 - <velocity vector>



Timing Considerations



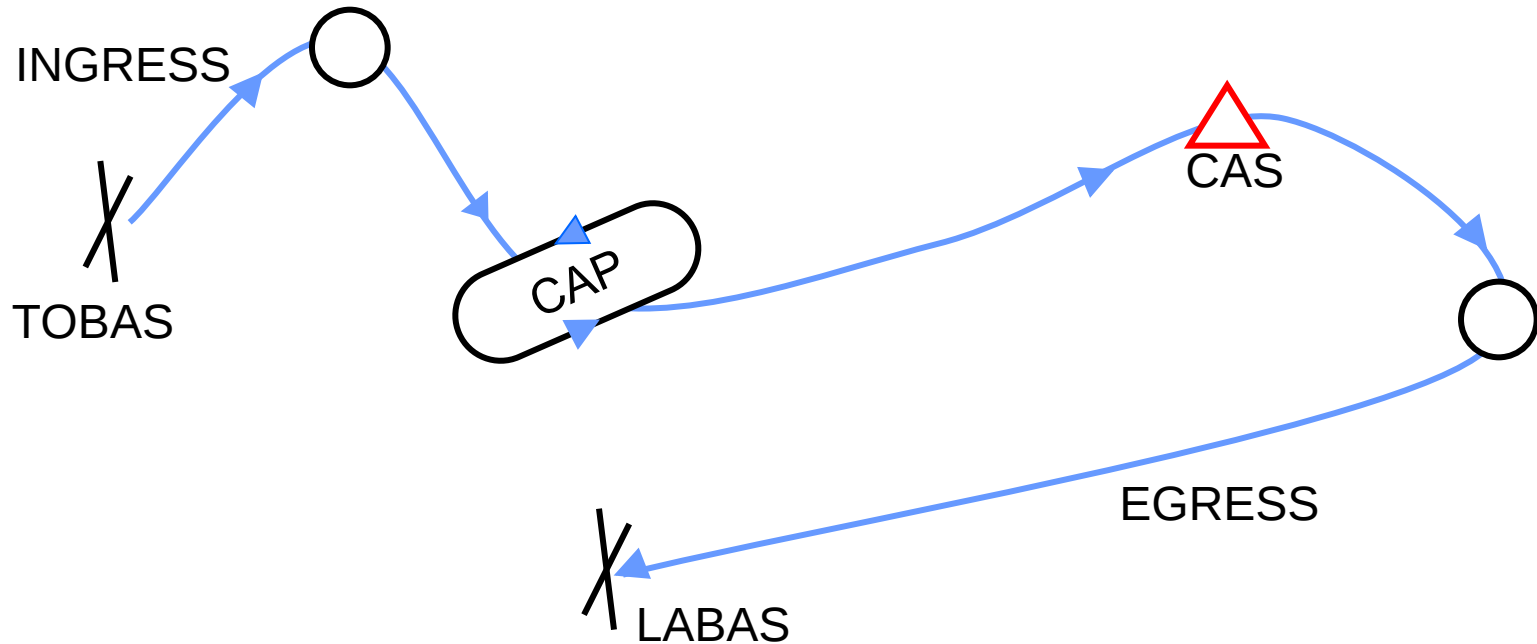
- Real aircraft fly with time-based goals, e.g. fly to location X to arrive at time T
 - ATO does not give intermediate timings
- JSAF does not have any such behaviours – typically the behaviour will be: fly route R at speed S, arrival is consequential and speed is not moderated
- Air Control Measures usually have a temporal validity:

C-BML* has always permitted the expression of a Tasker's control measure being associated with a particular Tasker for a specified period of time

* 06S-SIW-68 Schade, Hieb

Sequencing Considerations

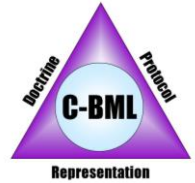
- A **single** mission in an ATO consists of a **sequence** of tasks



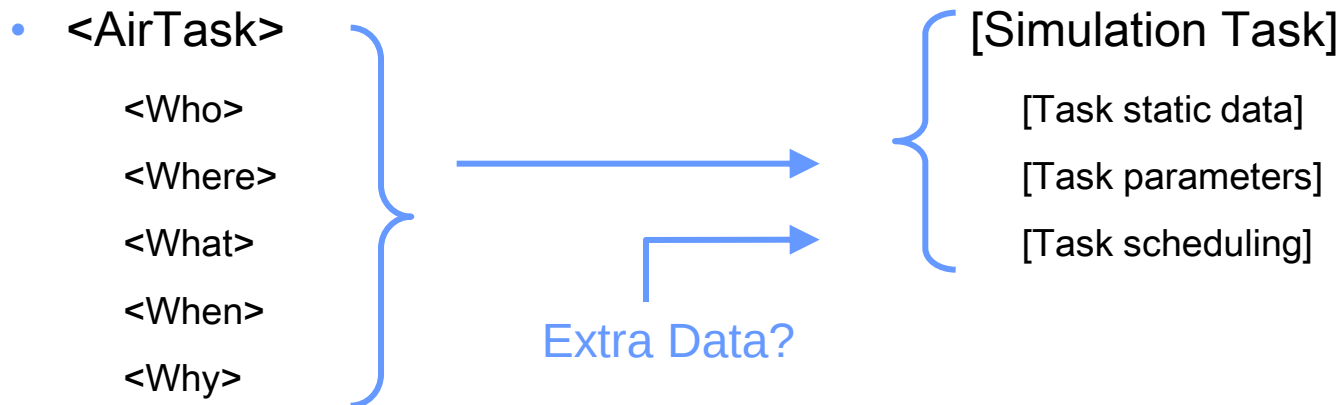
- C-BML requires this breaking down into single tasks
- Beware of default simulation behaviour at end of tasks, e.g. Orbiting or Landing



Mapping C-BML onto Simulation



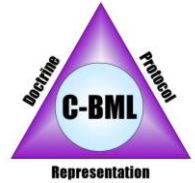
- Does a representative behaviour exist in the simulation?
- If so, can it be scheduled and tasked?
- Does it need extra information not available from the C2 system?



- In a Semi-automated simulation how acceptable is it to use human intervention?
- Can MSDL supply extra information?



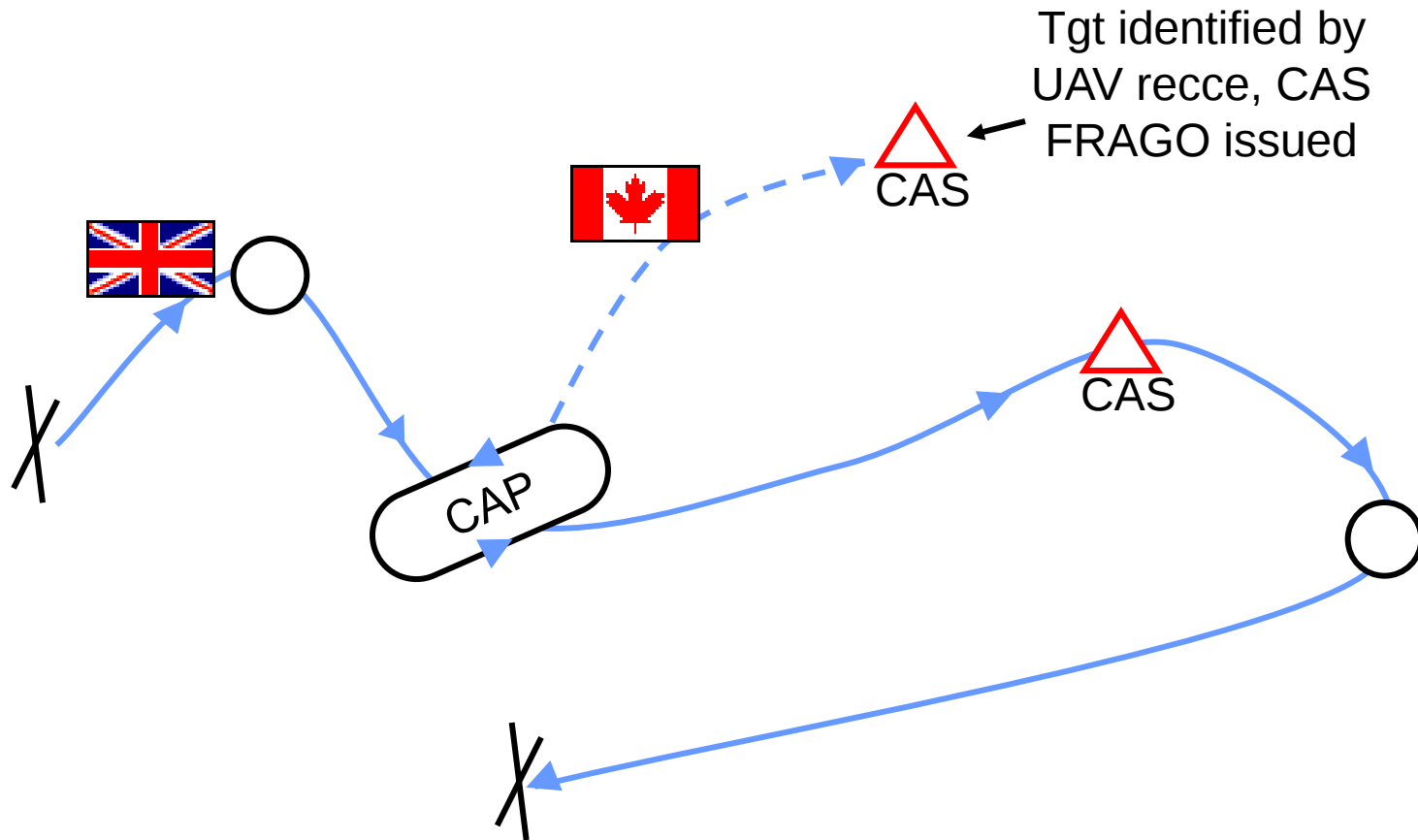
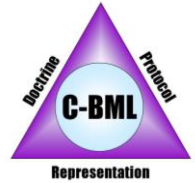
Task Mapping

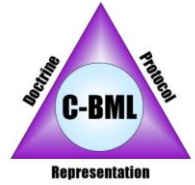


Scenario	ATO Mission Type	C-BML			JSAF
		Where Class	Where Cat	What (JC3IEDM)	
Fly Route	AR	Line	Route	MOVE	Fly Route/Orbit
Air Refuel (Orbit)	AR	Area	Route	AERRFL	Race Track
Defensive Combat Air (Orbit)	DCA	Area	Route	AIRDEF	Race Track
Air Interdiction (Ground target)	AI	Point	Target	OFFAIR	Interdiction Mission
Airborne Command (Circular orbit)	ABC	Point	Air Control Point	ARCCTL	Orbit
Suppression of Enemy Air Defence (Jam orbit)	SEAD	Area	Route	WLDWSL	JAM



Example for Air FRAGO





Questions