



# Joint Modeling & Simulation Capability Working Group

## Supporting Joint Training with the JLVC Federation (JTLS Way Ahead)

Worldwide Joint Training  
and Scheduling Conference

LTC John T. Janiszewski  
Chief, Technical Development and Innovation Branch  
J7, Joint Warfighting Center  
U.S. Joint Forces Command

# Purpose



- To provide an information briefing on the efforts of USJFCOM, J7 to develop a single Joint training federation that is composable, has a low overhead competitive capability, and can meet the training requirements of Tier I – IV training audiences (including those of KORCOM).

# Outline



- JLVC Issue
- One Federation Strategy
- Study Purpose
- Bottom Line Up Front
- Background
- Study Methodology
- Facts
- Assumptions
- Impacts of JTLS Retirement
- Findings
- Screening Criteria
- Evaluation Criteria
- COA Summary
- COA Analysis
- Recommendation

# Supporting Joint Training with the Joint Live Virtual Constructive (JLVC) Federation



Briefer: Col Tom Walrond

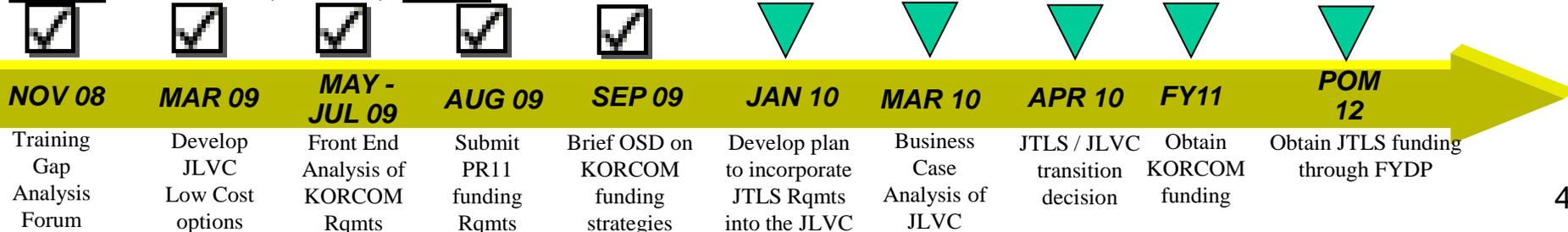
**Issue 07-014:** Diminishing resources dictate the need for a cost effective solution for delivering Joint training. Currently both the JLVC Federation & Joint Theater Level Simulation (JTLS) support Joint training. A revised strategy for development & sustainment of an enterprise training capability that supports Joint training is required

**Discussion:** The JLVC Federation is the standard for Joint training & provides the most realistic environment to align joint training with combatant command assigned missions, requirements & constraints. The JLVC federation is comprised of both Joint & Service simulations & tools. JTLS supports the combatant command Joint Exercise Program (JEP), yet, JTLS lacks the capability to model high fidelity strategic to tactical operations. This shortfall was noted in the Joint Staff's Training Capabilities Analysis of Alternatives Gaps 1-22. JLVC addresses these gaps. Recent cuts to Training Transformation (T2) Research, Development, Testing & Evaluation funds have driven the need for a revised strategy for development & sustainment of an enterprise training capability that can meet future training requirements such as those of United States Korea Command (KORCOM). JTLS sustainment is funded (O&M) for FY10. Sustained maintenance of JTLS is required. The JLVC is funded through the FYDP with combatant command funding for event integration (CE2) & USJFCOM T2 funding for development.

**Endstate:** A single Joint training federation that is composable, has a low overhead competitive capability, & can meet the training requirements of Tier I – IV training audiences (including those of KORCOM).

**POA&M:** Develop a JLVC low cost option. Determine capabilities of JTLS needed to be incorporated into the JLVC. Develop a plan for implementing capabilities into the JLVC & conduct a business case analysis to determine cost effectiveness of the plan. Conduct front end analysis of KORCOM training requirements. Obtain needed T2 funding for JLVC development.

**OPRs:** USJFCOM, JS J-7; **OCRs:** Combatant Commands



# One Federation Strategy



- Initial Thesis: The Joint Training Environment can achieve efficiencies by developing and sustaining one training federation that can meet all customer requirements
- Initial Approach: Incorporate JTLS capabilities into the JLVC
- JFCOM executed a study to prove/disprove the thesis.
- Customer involvement was absolutely critical to the success of the study

# Study Purpose



- Determine the best way to meet user training requirements currently being met by JTLS

# JTLS Background



- JTLS has been in use/Development since 1985
  - Joint Modeling and Simulation Project, not a Program of Record
- JTLS served as primary simulation driver for JWFC CAX Support from 1994-2007
- JTLS is designed to support Joint Operational Level Staff Training
- JTLS used by NATO since 1997
- JTLS provided to 19 Foreign Nations
- Decline in JWFC JTLS Usage 2007-Present
- Increased Usage of JLVC Federation by COCOMs since 2007

# Study Methodology



- Phase I: Functional Decomposition and Internal J7 Analysis
- Phase II: Stakeholder Canvassing
- Phase III: Capabilities Analysis
- Phase IV: Cost and Risk Analyses
- Phase V: Course of Action (COA) Development and Analysis
- Phase VI: Report Construction and Quick Look Briefing

# Facts



- 30% J7 R&D Budget Cut incurred for 2010, which resulted in the decision to retire JTLS
- There is a requirement for a Joint Operational Competitive Wargame based on user input
- JTLS software currently in use by 19 Foreign Nations
- JFCOM J7 training events use a MSEL-Driven Model Supported Paradigm



# Assumptions



- Services will support Joint Development Requirements  
**Importance / Reason – Time to socialize study with the Services is not factored in current study scope**
- JTLS software will become obsolete in 10 years if no improvements made  
**Importance / Reason – Determines the span of time for cost assessment of COAs**
- Present funding levels will remain the same over the next 5 years  
**Importance / Reason – Can only plan with existing information**
- One Development Man Year = \$200K (JNTC Budget Planning)  
**Importance / Reason – Avoid making the assessment matrices contractor sensitive or reveal proprietary information**
- Expressed User Requirements are Valid  
**Importance / Reason – No real alternative for study team, otherwise the basis for the study is invalid**
- The JCATS program will remain in service for at least 5-10 years  
**Importance / Reason – Availability to mitigate some JTLS capabilities**
- MTWS will be added to JLVC by 2011  
**Importance / Reason – Availability to mitigate some JTLS capabilities**
- WARSIM & OneSAF are projected to be integrated into the JLVC by 2013  
**Importance / Reason – Affects the size & complexity of JLVC federation**
- Support to International and NATO/coalition partners is required  
**Importance / Reason – National implications & training requirements**

# Impacts of JTLS Retirement



- AFRICOM
  - JTLS not used, no impact if unavailable
  - A JTLS-JDLM federation may be useful to future AFRICOM events
- NORAD/USNORTHCOM
  - JTLS not used, no impact if unavailable
- USSTRATCOM
  - JTLS not used, no impact if unavailable
- USTRANSCOM
  - JTLS not used, no impact if unavailable
- USEUCOM
  - Have used in past, but currently not used, no impact if unavailable
  - Acknowledges JTLS use in NATO, but states current & anticipated partnering events with NATO members do not include JTLS
- USSOUTHCOM
  - No response; however, moderate to severe impact anticipated for PANAMAX and possibly BLUE (INTEGRATED) ADVANCE series of exercises due to deployability and bandwidth issues

# Impacts of JTLS Retirement (2)



- **USPACOM**

- **COBRA GOLD - moderate to severe impact. Tier 2 & Royal THAI Supreme Command; JTLS database created, tested, and operated by JWFC; much more costly to use JLVC to create synthetic environment for this CPX**
- **KEEN EDGE - severe impact. Tier 1, Tier 3 (USFJ), and JSDF; JTLS database created, tested, and operated by USPACOM J73 M&S staff (4) plus R&A augmentees (3) and part-time JTLS I/Cs from KBSC, JWFC, and Navy Reservists; USPACOM is not resourced to support this CPX using JLVC.**  
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- **HAN KUANG – severe impact. TWN National Military Exercise; JTLS database created, tested, and operated by Joint Exercise Training Center in TWN plus FMS-funded R&A augmentees (2); TWN has no substitute computer model to support this CPX.**
- **BALIKATAN (Future) – severe impact. Tier 2 and Armed Forces of the Philippines; JTLS database to be created, tested, and operated by USPACOM J73 M&S staff (4) plus R&A augmentees (2) and part-time JTLS I/Cs from KBSC, JWFC, and Navy Reservists; USPACOM is not resourced to support this CPX using JLVC.**
- **INDIA Exercise (Future) – severe impact. Tier 2 and Indian Armed Forces; JTLS database to be created, tested, and operated by USPACOM J73 M&S staff (4) plus R&A augmentees (3) and part-time JTLS I/Cs from KBSC, JWFC, and Navy Reservists; USPACOM is not resourced to support this CPX using JLVC.**
- **MALAYSIA CPX (Summer 2010) - severe impact. Tier 2 and Malaysian Armed Forces; JTLS database created, tested, and operated by USPACOM J73 M&S staff (4) plus R&A augmentees (2) and part-time JTLS I/Cs from KBSC, JWFC, and Navy Reservists; USPACOM is not resourced to support this CPX using JLVC.**

# Impacts of JTLS Retirement (3)



- USCENTCOM

- JCS Exercise Bright Star (Biennial, next iteration to be FY 12, First Qtr) – moderate impact. **Tier 2 JTF Coalition Trng Event, Coalition integrated staff training, JTLS provides good staff focus level - Operational to Strategic.**
- JCS Exercise Internal Look (Biannual, next iteration to be FY 11, First Qtr) – moderate impact. **Tier 1 COCOM Battlestaff Trng Event, Integrated staff training, JTLS provides good staff focus level - Operational to Strategic.**
- JCS Exercise Internal Advance (Biannual, next iteration to be FY 11, Second Qtr) – moderate impact. **Tier 2 JTF Battlestaff Trng Event, Integrated staff training, JTLS provides good staff focus level - Operational to Strategic.**
- Notes that at least three countries in the CENTCOM AOR (Saudi, Pakistan, UAE) have JTLS, and at least two others (Oman, Jordan) are considering acquiring the system

# Impacts of JTLS Retirement (4)



## USJFCOM J7 Impacts:

- Low cost options (JECS & JLOD) no longer include a competitive operational wargame
- Significant impact to our support to USSOUTHCOM due to bandwidth issues (normally carried on Cox Cable)
- Significant impact to PfP support
- Significant impact to USPACOM support due to deployability issues

# Impacts of JTLS Retirement (5)



## NATO Impacts:

- Eliminates NATO's principle exercise support capability - Forces NATO to:
  - Fund JTLS support or
  - Purchase JLVC components (releasability issue) and accept higher operational costs or
  - Develop an alternative solution
- NATO C3 Agency (NC3A) is dependent on JTLS
- Severely impacts the Joint Warfighting Center's (JWC) exercise support program

# Findings



- JTLS Training Audience
  - Primary TA is in Tiers 1 & 2 at the strategic and operational levels of war.
  - On occasion (e.g. KEEN EDGE), Tier 3 may be included in exercise events.
  - No instances of Tier 4 TA noted in received stakeholder inputs.
- JTLS Capabilities Utilization
  - Per Stakeholder responses from primary users of JTLS
    - 485 listed capabilities
    - Only 22 are listed as not utilized
    - 95.5% capability utilization rate

# Findings (2)



- High-Level Requirements
  - Bandwidth Restrictions
  - Deployability
  - Small Hardware Footprint
  - Low Operational Costs
  - International Users/COCOM Theater Engagement Strategy
  - Foreign Disclosure
  - Support for Coalition / PfP / NATO Partners
  - Functional Capabilities

# Screening Criteria



- **Risk** – Any COA that introduces an unacceptable level of risk to the J7 Exercise Program
- **Coalition Support** – Any COA that halts or eliminates support to Coalition partners and or COCOM Theater Engagement Strategy without providing a solution

# Evaluation Criteria



- Support to J7 Exercise Program/Operational Costs (Weight X2)-  
**Merger of Operational Support Costs and extent to which COA support J7 Operational Exercise Mission**
- Joint Training Enterprise (JTE) Support (Weight X2)  
**Extent to which the COA supports the JTE as a whole and moves the community forward**
- Support to Coalition Allies and COCOM Theater Engagement Strategy (Weight X2)  
**Extent to which the COA supports the existing Joint M&S International User Community and NATO**
- Development Costs – **Software development costs for given capabilities**
- Development Time – **Time to implement changes**
- Software Sustainment Costs – **Costs of sustaining software staff and product lines**
- Opportunity Costs – **Costs/Impacts on current budgets and staff resources in terms of funding and time**
- Competitive Joint Operational War gaming Capability  
**Extent to which the COA provides a valid Competitive Joint Operational War-game**

# COA Summary



- COA 1: Maintain JTLS
- COA 2: Develop JTLS
- ~~• COA 3: Retire JTLS Without Replacement~~
- COA 4.1: Retire and Replace JTLS With Existing JLVC Federates
- COA 4.2: Retire and Replace JTLS with New Joint Model
- COA 4.3 – Retire JTLS And Replace With Web Service Based Design

# COA 1



- Maintain JTLS
  - Continue to fund JTLS with a limited O&M budget (1.8M / yr) and accept that the software will become obsolete in the long term (10 years).
  - Plan for a follow on contract and reassess in 4-5 years.
  - Meet existing requirements with JTLS in the short term.
  
- Pros
  - Little or no development cost
  - Little or no opportunity cost
  - limited sustainment cost
  - Continues current line of support – no time required
  - Continues support to foreign partners
  
- Cons
  - JTLS eventual obsolescence – short term support with long term gap
  - “Kicks the can down the road”

# COA 2



- Develop JTLS
  - Maintain and Improve JTLS as part of the Joint Force Trainer Toolkit.
  - Integrate JTLS into the existing JLVC architecture and take steps to ensure that the software is viable long term (next 10 years).
  - Evolve JTLS with other major Joint M&S capabilities to meet current and future requirements.
- Pros
  - Supports short term & long term
  - 2.5M development costs over 3 years (2M / yr once integrated with JLVC) plus 1.8M sustainment costs
  - Minimal opportunity costs
  - Reduces supported architectures to 1
  - Continues support to foreign partners
- Cons
  - Does not address consistency within JLVC

# COA 4 Option 1



- Retire And Replace JTLS With Existing JLVC Federates
  - Maintain JTLS until development for lost capabilities is complete in selected candidate systems.
  - Path of least resistance is taken to replace created Gaps, i.e. the Federates that are most capable of mitigating the Gaps quickly are employed.
- Pros
  - Improved consistency of JLVC representation in competitive wargame
  - Joint software tools (e.g. JECS & JTDS) are in place to allow for modular and efficient use of JLVC capabilities
- Cons
  - Extremely costly (>55M dev. costs over 5-7 years)
  - Higher operational support costs
  - Massive opportunity costs – will monopolize development for 6-7 yrs
  - Increases operational costs for primary users
  - Foreign partners faced with continuing with unsupported JTLS or bearing costs of JLVC component purchases
  - Does not really solve the small footprint / limited operational costs problem.
  - The costs of making JLVC Service Federates operate consistently to mitigate low fidelity Tier 1 & 2 training audiences in a low footprint and bandwidth environment is high to the point of impracticality.

# COA 4 Option 2



- Retire And Replace JTLS With New Joint Model
  - Maintain JTLS until development for lost capabilities is complete in selected candidate systems.
  - USJFCOM develops a new Joint Simulation as a single simulation that provides the composite capabilities of JTLS and JCATS with some non-kinetic effects representation.
- Pros
  - Solves the limited footprint/operator problem
  - Meets competitive wargame requirement
- Cons
  - Moderately expensive (39M over 7 years)
  - High tech risk – resulting model may not accomplish all JTLS missions
  - Although better sustainment costs than Option 1, savings are marginal
  - High opportunity costs
  - Limited internal USJFCOM focus – does not solve disconnects with Service Teams

# COA 4 Option 3



- Retire JTLS And Replace With Web Service Based Design
  - Maintain JTLS until development for lost capabilities is complete in selected candidate systems.
  - JFCOM and DoD undertake a long term, massive revamp of simulations towards a new Web-Service based architecture that decomposes the simulations into very small re-usable parts that are not duplicated (e.g. Terrain Service and Line of Sight Service).
- Pros
  - Vision for future – New paradigm decomposes existing capabilities into component services
  - Meets competitive wargame requirement
  - Reduces costs long term since modular services easier to modify
  - Addresses the budget problems associated with big simulation products.
- Cons
  - Most expensive, longest term option (200M over 10 years)
  - Some risk that it will not work
  - Does not solve exportability problem for foreign partners

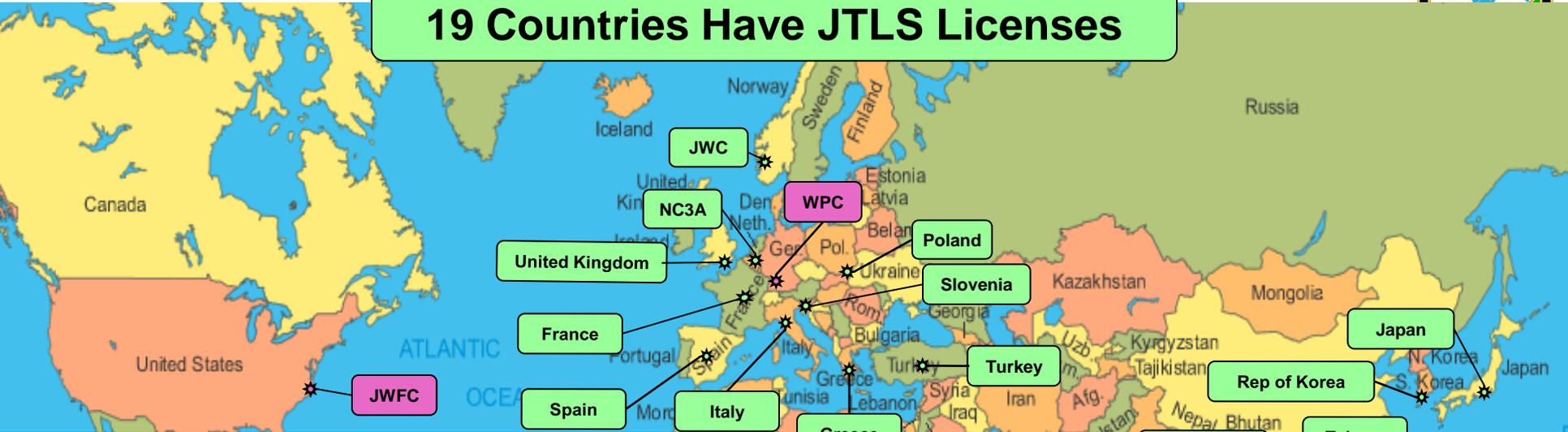


# Backups

# International Users



## 19 Countries Have JTLS Licenses

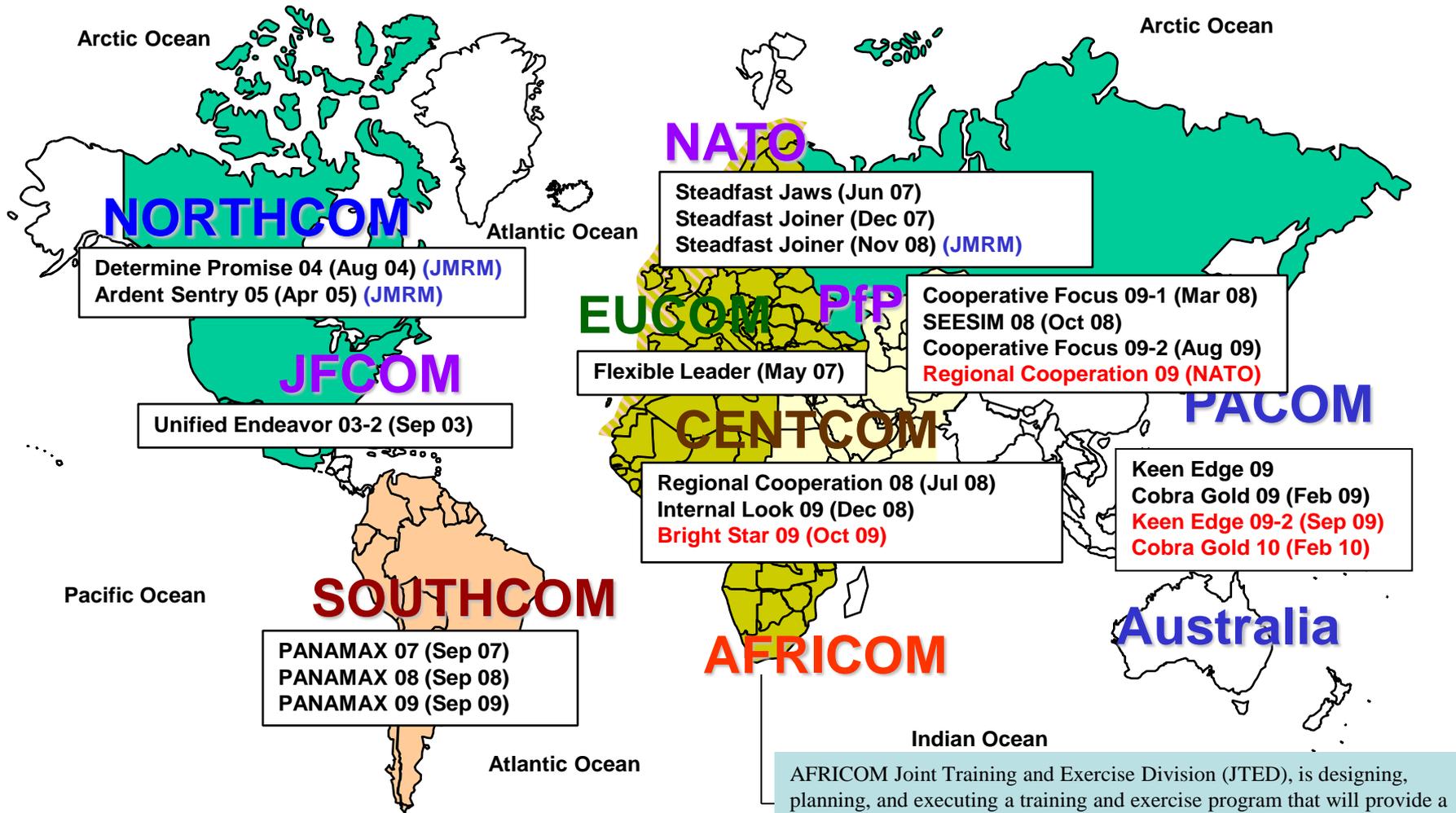


- NATO C3 AGENCY (NC3A) - The Hague, NL
- Joint Warfighting Center (JWC) – Stavanger, Norway
- Poland – Polish General Staff
- Slovenia – Ministry of Defense
- Turkey – Ministry of National Defense (MND)
- Greece – Hellenic National Defense General Staff, War Games Department (HNDGS)
- Italy – Ministry of Defense (MOD) through Marconi
- Spain – Engineering & Services Agency for Defense and Transportation (ISDEFE)
- France – Center Intermees de Defense (CID) & University of Marseilles & Laboratoire des Sciences de L'Information et des Systemes (LSIS)
- United Kingdom – Defence Science and Technology Laboratory
- Saudi Arabia – Processing
- United Arab Emirates (UAE) – through Coleman Research Corp (UAE M&S Center)
- Pakistan – Ministry of Defence, National Defence University (NDU), Wargaming Center
- Thailand – Royal Thai Supreme Command (RTSC), Joint Staff College
- Malaysia – Advanced Applications Systems (AAS), in support of the Malaysian Armed Forces (MAF)
- Taiwan – Ministry of National Defence, Joint Exercise & Training Center
- Korea – ROK AF Air University
- Japan – Mitsubishi Electric Company (MELCO) for JDA
- Australia – Australian Defense Force Warfare Center

- INTERESTED**
- CROATIA
  - CANADA
  - MEXICO
  - OMAN
  - JORDAN
  - DENMARK
  - GERMANY
  - LIBYA
  - ISREAL



# JTLS Uses



AFRICOM Joint Training and Exercise Division (JTED), is designing, planning, and executing a training and exercise program that will provide a means for CDR USAFRICOM to validate the performance of his HQ staff prior to FOC - 01 OCT 08

# COA 3



- Retire JTLS Without Replacement
  - Retire JTLS in 3 to 5 years without any deliberate effort to replace capabilities.
  - Allow users to input requirements per normal process for other tools.
  - Rejected – Did not pass screening criteria (impact to J7 Exercise Program)
- Pros
  - Cheap – no development, sustainment or opportunity costs
- Cons
  - Does not fill the gaps created by JTLS retirement
  - No real plan for long term solution
  - Poses unacceptable risk to J7 exercise program
  - Increases operational costs for primary users
  - Loss of support to foreign partners

# COA Comparison Matrix



JTLS COA COMPARISON MATRIX

#	COA TITLE	COA DESCRIPTION	Development Costs										Composite Rating	Technical Risk	Unacceptable Risk to J7 Exercise Program	Loss of Support to Coalition Partners & COCOM Reg. Eng. Strategy	Comments
			Support to J7 Exercise Prog. (operational costs)	Sustainment Costs (software programs)	Opportunity Costs (internal trade-offs)	Support to Joint Training Enterprise	Competitive Wargaming Capability	Development Time to Implement	Support to Coalition Allies and COCOM Engagement	Core Mission X2	Core Mission X2	Core Mission X2					
1	Maintain JTLS	Continue to maintain JTLS with a limited budget and accept that the software will become obsolete in the long term (10 years). Plan for a follow on contract and reassess in 4-5 years. Meet existing requirements with JTLS in the short term.	9	7	5	9	6	6	9	7	78	Low	No	No	This COA represents the present. JTLS is currently in use in stand-alone. Drawback: Limited JTLS funding will cause eventual obsolescence and create a gap capability in the JTE. If this COA is continued, a long term strategy is still needed.		
2	Maintain and Develop JTLS	Maintain JTLS as part of the Joint Force Trainer Toolkit. Integrate JTLS into the existing JLVC architecture and take steps to ensure the software is viable long term (next 10 years). Evolve JTLS with other major Joint M&S capabilities to meet current and future requirement.	6	9	3	7	8	8	7	9	83	Low	No	No	This COA continues JTLS as a viable joint project, providing O&M and R&D funding sufficient to keep the simulation current.		
4.1	Retire and Replace JTLS (Replaced by existing JLVC Federates)	Maintain JTLS until development for lost capabilities is complete in selected JLVC candidate systems. Choose the path of least resistance to replace each of the JTLS created Gaps. The Federates that are most capable of mitigating the Gaps quickly are employed. This does not really solve the small footprint / limited Operational costs problem. Joint Software tools, JECs and JTDS are in place to allow for modular and efficient use of JLVC, but the costs of making multiple JLVC Federates operate consistently is high to the point of impracticality.	2	4	4	1	5	7	3	3	41	Med	No	No	JTLS is a Joint Operational Competitive Wargame, designed to support Tier 1 & 2 consistently, but has fidelity limitations when supporting Tier 3 or 4 audiences. JLVC uses many disparate models with differing combat adjudication methods. If we care about consistent representation to support Joint Operational Wargames, this is a very expensive problem to solve. If we limit the problem to ease of use, it is fairly modest by comparison.		
4.2	Retire and Replace JTLS (New Joint Model)	Maintain JTLS until development for lost capabilities is complete in selected candidate systems. In this option JFCOM undertakes a new Joint Simulation project to provide a single simulation that provides the composite capabilities of JTLS and JCATS with some non-kinetic effects representation. The reason for considering this approach is to problem is to consider the how to solve the limited footprint/operator problem.	4	9	5	3	4	9	2	5	59	High	No	No	The problem with this version of the plan is risk. It would require JTLS to remain in place in the short term and puts all our eggs in one basket as it were. We count on evolving a single simulation that meets all the Joint Training needs.		
4.3	Retire and Replace JTLS (Web Service Based Design)	Maintain JTLS until development for lost capabilities is complete in selected candidate systems. In this option JFCOM and the DoD moves toward a new Web Service based architecture in the long term that decomposes the simulations into very small reusable parts that are not duplicated. For example, there would be a common terrain and Line of Sight Service. This is a way to address the budget problems associated with big simulation products.	1	9	3	5	9	9	1	5	65	High	No	No	This option is probably the best long term strategy but it will take 10 years or more to implement. It is the only COA that addresses the problem of major simulation lines long term.		



# QUESTIONS?