

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 4 February 2000	3. REPORT TYPE AND DATES COVERED Executive Summary and Annotated Brief - August 1998
----------------------------------	-----------------------------------	---

4. TITLE AND SUBTITLE Joint Universal Lessons Learned System (JULLS) Command and Control (C2) Analysis - Summer 1998 - Executive Summary and Annotated Briefing	5. FUNDING NUMBERS
--	--------------------

6. AUTHOR(S) Mrs. Corinne Wallshein Cadet Jachin Sakamoto Cadet Chad James	
---	--

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Studies and Analyses Agency 1570 Air Force Pentagon Washington, DC 20330-1570	8. PERFORMING ORGANIZATION REPORT NUMBER 31493
---	---

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Air Force Studies and Analyses Agency 1570 Air Force Pentagon Washington, DC 20330-1570	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
--	--

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT This publication is Unclassified and Approved for Public Release: Distribution Unlimited.	12b. DISTRIBUTION CODE
---	------------------------

<p>13. ABSTRACT (Maximum 200 words)</p> <p>Two Cadet activities in the Summer 1998 analyzed the JULLS databases for numbers and types of C2 lessons learned (LL). The first activity used an Air Force JULLS database from the Air Force Center for Knowledge Sharing Lessons Learned (AFCKSLL) and charted LL by C2 categories {such as Joint Forces Air Component Commander (JFACC), Air Operations Center (AOC), Air Tasking Order (ATO), type of exercise (Blue Flag, Red Flag, Roving Sands), type of service (Army, Navy, Air Force), and training} and by Joint Chiefs of Staff (JCS) components {J1 for manning, J2 for intelligence, J3 for operations, J4 for logistics, J5 for strategy/doctrine, J6 for C2, communications and coordination, J7-J8 for structure/resources/assessment.} The second activity used a Joint Warfighting Center (JWC), Joint Center for Lessons Learned (JCLL) JULLS database and charted LL by C2 Uniformed Joint Task List (UJTL) categories, assigned by JCLL. Over 35% of LL in both activities related to C2, indicating that JULLS could be a future source for C2 analysis data. Changes to the LL data collected must be made beforehand to ensure that LL data can be analyzed effectively and accurately for C2 LL and for trends in C2 LL over time.</p> <p style="text-align: center;">DTIC QUALITY INSPECTED 1</p> <p style="text-align: center; font-size: 2em;">20000531 024</p>

14. SUBJECT TERMS C2, JULLS, Joint Universal Lessons Learned System, Analyses, Operations Research, AFSAA, Study, JWC, Joint Warfighting Center, JCLL, Joint Center for Lessons Learned, AFCKSLL, Air Force Center for Knowledge Sharing Lessons Learned, UJTL, Uniformed Joint Task List	15. NUMBER OF PAGES 19		
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL



AIR FORCE STUDIES
AND ANALYSES AGENCY

Joint Universal Lessons Learned System
(JULLS) Command and Control (C2)
Analyses - Summer 1998

Study Director:
Corinne Wallshein

February 2000
Force Analysis Division

SAMI Number: 31493

UNCLASSIFIED

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

THIS REPORT HAS BEEN APPROVED FOR PUBLICATION	
Analyst / Study Director:	AFSAA Chief Analyst:
Signature:	Signature:
Name and Rank: Mrs. Corinne Wallshein, GS-14	Name and Rank: Lt Col John Borsi
FOR THE COMMANDER	

**Title: Joint Universal Lessons Learned System
(JULLS) Command and Control (C2) Analysis
Summer 1998**

- Do not return copies of this report unless contractual obligations or notice on specific document requires its return.
- This report is published in the interest of scientific and technical information exchange and does not constitute approval or disapproval of its ideas or findings.
- Using Government drawings, specifications, or other data included in this document for any purpose other than Government procurement does not in any way obligate the US Government. The fact that the government formulated or supplied drawings, specification, or other data does not license the holder or any other person or corporation; or convey any rights or permission to manufacture, use, or sell any patented invention that may relate to them.
- If you change your address, wish to be removed from this mailing list, or your organization no longer employs the addressee, please notify AFSAA/SAMI at:

**AFSAA/SAMI
1570 AF Pentagon
Washington, DC 20330-1570**

Executive Summary
Joint Universal Lessons Learned System (JULLS)
Command and Control (C2) Analysis
Summer 1998

QUESTION

In the Summer of 1998, Air Force Studies and Analyses Agency (AFSAA) employed two Air Force Cadets to evaluate JULLS as a C2 analysis data source. According to AF/XOOT, Lt Col Medvetz, a majority of exercises are designed to train and enhance C2. Our main question was "Are lessons learned a viable source for C2 analysis data?"

CUSTOMERS

There were no external customers for this analysis. This analysis was internally generated by AFSAA as an attempt to mine C2 data from a joint source. During and after these activities, we coordinated with the Air Force and Joint offices handling lessons learned collection and dissemination. They helped us identify which databases to use, and they provided advice and guidance as we learned and analyzed the JULLS data. They were extremely supportive of our efforts and generously shared their experiences and knowledge of the system, processes, and data. This work culminated with a brief to AF/XOOT in December 1999. AF/XOOT informally requested AFSAA to participate and contribute to Air Force meetings in the spring of 2000 to update the lessons learned software. This may promote data collection needed for analysis, particularly trend analysis.

SCOPE/LIMITATIONS

Air Force Center for Knowledge Sharing Lessons Learned (AFCKSLL) under AF/XOOT provided a sample of 1300 records from 4/96 to 12/97. Joint Center for Lessons Learned (JCLL) under JCS/J7 provided 908 records categorized by the Universal Joint Task List (UJTL), which were a subset of the 13,000 entries of the JULLS database JM971. Cadet Sakamoto sorted the AFCKSLL database by Joint Chiefs of Staff (JCS) organization categories and by C2 keywords (e.g. Air Operations Center [AOC], Joint Forces Air Component Commander [JFACC]). Trend analysis was also attempted with data split over three equal time periods. Cadet James sorted by UJTL designated C2 categories (strategic, operational, and tactical) and C2 overall. Both Cadets had approximately six weeks to complete their analysis. Each of them produced a separate written report of their findings and recommendations.

RESULTS AND AFTERMATH

Over 35% of the records in both databases related to C2. In the current system, the user must read through the narratives. Data availability and completeness vary quite widely based on the input source(s). Currently, database fields are not designed for quantitative analysis. In order to be able to use JULLS for C2 analyses, the system needs to be structured to collect relevant C2 data. Adding short fields such as YES/NO and multiple choice would aid quantitative analysis of the lessons learned.

FINAL WORDS

JULLS databases today do not lend themselves easily to analysis. JULLS databases must be populated with more than keywords and narrative to facilitate quantitative analysis -- and the entire process should be engineered to be simple and automated. Additionally, with quantitative analysis in place, the Air Force lessons learned processes and remedial action programs can be managed more coherently.

Study Team:

	Mrs Corinne Wallshein Cadet Jachin Sakamoto Cadet Chad James	AFSAA/SAAB Air Force Academy Louisiana State University
AFSAA Advisors:	Maj. Robert Morris Lt Col John Borsi	AFSAA/SAAB AFSAA/SAZ
AFCKSLL POCs:	Mr. Ray Gutierrez Mr. David Free Mr. Steven McCoy Mr. Randall Schmidt	AFCKSLL Contractor (Cntr) AFCKSLL Cntr AFCKSLL Cntr AFCKSLL Cntr
AF/XOOT POCs	Lt Col James Sullivan Lt Col Robert Medvetz Mr. William Horton	AF/XOOT AF/XOOT AF/XOOT Cntr
Joint Warfighting Center	Mr. Michael Runnals	Joint Center for Lessons Learned Cntr



Joint Universal Lessons Learned System (JULLS) Command and Control (C2) Analysis, Summer 1998

**By Cadets Jachin Sakamoto and Chad James
Analysis lead by Corinne Wallshein, AFSAA/SAAB**

1

AFSAA

...to shed light

2/10/00

This analysis was two pronged, by different Cadets, under the direction of Battle Management, Command and Control Branch in the Force Analysis Division of Air Force Studies and Analyses Agency (AFSAA). Cadet Jachin Sakamoto was a rising fourth class member at the U.S. Air Force Academy, from Hawaii. Cadet Chad James was a rising fourth class ROTC member at Louisiana State University, from Kansas.

The analysis director was Mrs. Corinne Wallshein, AFSAA/SAAB. An earlier version of this brief was reviewed by analysts in AFSAA, AF/XOOT, Joint Warfare Center's Joint Center for Lessons Learned, and the Air Force's Center for Knowledge Sharing, Lessons Learned.

The following personnel were responsible for this analysis brief:

Mrs. Corinne Wallshein

AFSAA/SAAB

Cadet Jachin Sakamoto

AFA

Cadet Chad James

ROTC, Louisiana State University



Purpose

- **Examine JULLS databases to quantify C2 Lessons Learned (LL)**
- **Evaluate JULLS as C2 data source for analysts**
 - **Examine JULLS for trends in C2 lessons learned**
 - **Recommend changes, as appropriate, to JULLS for easier quantitative analysis**

The Cadets were asked to sort and count the lessons learned in the database by C2 category. They were then requested to evaluate the databases as a C2 data source for trend analysis and other C2 analyses

CJCS 3150.25 establishes reporting policies and general responsibilities for the management of the Joint After Action Reporting System (JAARS). It applies to the Joint Staff, combatant commands, Services, Combat Support Agencies (CSAs), Defense agencies responsive to the Chairman of the Joint Chiefs of Staff, and OSD. Further, it applies to both the operational and training environments of the Armed Forces. JAARS is the formal process for the collection and dissemination of observations, lessons learned, and issues generated from joint operations and exercises. All operations precipitated by an executive order or deployment order from the National Command Authority (NCA) require a complete JAAR. All CJCS exercises in the CJCS Joint Training Master Schedule (CJCSN 3501) or the Quarterly Schedule of Significant Military Exercises (CJCSN 3502) require a JAAR. The type of report for joint training events is determined by the combatant commander during the Joint Annual Training Plan submission. There are three types of reports: a complete JAAR; an abbreviated JAAR; and a cancellation report. Lessons learned databases, reporting in the Joint Universal Lessons Learned System (JULLS) begin with a user generated JAAR report. A JAAR may consist of a summary and multiple lessons learned, issues, key observations and assessments. JAAR components are entered into JULLS databases.



Background: what is JULLS?

- **JULLS**
 - A stand alone program
 - Facilitates after-action reporting and database management
- **JULLS goal**
 - Learn from and avoid mistakes of past exercises and operations
 - Track Remedial Action Project (RAP) items
- **JULLS types**
 - Lessons learned include issues and observations
 - Summary (mandatory)
 - Assessment (optional)

3

AFSAA

...to shed light

2/10/00

JULLS was congressionally mandated so the military could learn from past mistakes and, hopefully, not repeat them. The Joint Chiefs of Staff J7 office is responsible for managing all the lessons learned, and to collect, analyze, distribute, and preserve JULLS, they set up JCLL at JWFC. The Air Force took a centralized control / decentralized execution theme in managing JULLS. AF/XOOT oversees AFCKSLL which was established in October 1997 at Langley Air Force Base (AFB), Virginia. AFCKSLL's vision is to create an environment within the Air Force where knowledge sharing is a "normal" practice at all levels of command. And, in order to share knowledge, we first have to acquire it. More data does not translate into more knowledge directly. There's a process to convert data into information, and then into knowledge. This process requires tremendous manual effort and diligence since LL are primarily narrative and, usually, highly subjective. None of the LL data is cataloged or categorized other than by type of LL and level of security classification. Data collection contributes to the problem of too much data and too little knowledge. Analysis is done by reading the narratives and mentally evaluating the LL, then conveying those findings verbally and/or in writing to others.

There are three types of JULLS. (1) The LL includes lessons learned, issues, and observations. It records a specific lesson learned or an issue noted. It is the most common type of JULL. It contains one or more UJTL Task(s) linked to the LL. (2) The summary JULL is mandatory. It provides an overall picture of the exercise of operation objectives and documents the facts of the event. It contains the Joint Mission Essential Task List (JMETL) tasks as one or more of the UJTL task. (3) The Assessment JULL is optional. It reports the degree of success obtained. It is usually from CC, staff, evaluators, or trainers. It is a complete appraisal of each objective and each UJTL based JMET.



Background: Who's who?

- **JCS/J7 established Joint Warfighting Center's Joint Center for LL (JCLL) at Fort Monroe**
- **AF/XOOT established Air Force Center for Knowledge Sharing LL (AFCKSLL) at Langley AFB**
- **Other Services have LL systems**
 - **Center for Army LL at Fort Leavenworth**
 - **Navy LL System at Naval Warfare Development Command Doctrine Development Division at Newport**
 - **Marine Corp LL System at Marine Warfighting Development Integration Division of MCCDC at Quantico**

4 

...to shed light

2/10/00

These agencies are responsible for collecting, processing, exploiting, and disseminating LL. With the implosion of web based technology, there's lots of LL on the Internet and SIPRNET, available for personnel to leaf through with key word searches.

Collecting Lessons Learned (LL) is a requirement for all Services. There are various databases of LL on web sites easily accessible to the defense community. A sampling is below:

ACC Center for Lessons Learned -- <http://157.214.212.52/samples/search/query.htm>

ACC Lessons Learned Categories -- http://157.214.212.52/acc/acc_toc.htm

AFCKSLL Internet Database -- <http://131.6.216.21>

AFCKSLL SIPRNET Database -- <http://157.214.212.51>

Joint Staff JULLS Database is at:

http://www.eucom.smil.mil/eccs-as/info_center/lessons/isrch/advanced_julls.html

EUCOM Center for Lessons Learned Command Data Base Search Engine is at:

http://www.eucom.smil.mil:80/eccs-as/info_center/lessons/isrch/simple_eujulls.html

There are many JULLS databases. Each CINC has a command database for internal use. There were three joint staff level JULLS databases. Two resided at JCLL: the archived and the current database. The third database is the Remedial Action Program (RAP) database at JCS/J7's Evaluation and Analysis Division (EAD). Both JCLL and AFCKSLL had several data bases. We chose one from each organization: the AFCKSLL was the basis for Cadet Sakamoto's analysis and the JCLL database was the basis for Cadet James. Our efforts were geared to examining JULLS for C2 lessons learned. This was done by first selecting the database, reading the narrative entries, sorting the entries into categories of C2 and/or exercises, attempting trend analysis on the JULLS, and then suggesting what might be done to JULLS to make it easier to analyze.



Background: AF LL status

- Ad hoc LL exploitation
- No standard impact on AF performance reviews
- GAO Report, Aug 95, *Military Training: Potential to Use LL to Avoid Past Mistakes is Largely Untapped* true in 1998 according to AFCKSLL
- AF web based LL collection and dissemination
 - Full text search or keyword search possible
 - Challenge to inject past LL into planned exercises and operations
- AF member of CJCS Remedial Action Program
 - Only Joint Staff JULLS corrective action program
 - Formal Service requirement in CJCSI 3150.01

5

...to shed light

2/10/00

Currently, in the AF, LL exploitation is labor intensive and ad hoc. Whether you do a thorough job of filling out JAARS or not, whether you read through past LL or not, and whether you are aware of LL system or not has no standard impact on your individual or unit performance review(s).

1995 GAO findings were: Marine Corps, **Air Force**, and Navy **do not**: (1) include all significant information from training exercises and operations in their LL programs; and (2) **analyze their LL information to identify trends in performance weaknesses**. For the most part, the dissemination of LL information is adequate. However, the Air Force does not make this information readily available to all potential users. AF's decentralized LL databases are maintained at each major command's headquarters and therefore are not easily accessible to units throughout the AF. GAO recommends that the Secretary of Defense direct the Secretaries of the Air Force and the Navy, the Chairman of the Joint Chiefs of Staff, and the regional commands in chief, as appropriate, to (1) establish controls to ensure that all significant LL information collected from combat training centers, fleet exercises, and other major training exercises are recorded in LL databases; (2) **analyze LL information so that trend data can be developed to identify recurring problems**; (3) provide training to key personnel in the use of LL information; and (4) incorporate effective validation procedures, such as testing corrective actions in joint training exercises, into LL programs. AF's LL program is the only one of the services' programs that is decentralized. As a result, each of the AF's six major operational commands is responsible for developing and managing its own LL program. AF regulations do not require that the commands' programs be uniform, so each command can take different approaches to operating its program. The programs were designed to account for, act on, and share LL information throughout the command, but not throughout the AF. The AF also operates a limited LL program at its headquarters. This program, staffed by two people, addresses LL information that results only from the AF's participation in joint exercises or operations or that affects more than one of the major commands' missions. AF LL managers at one major command were not successful in obtaining after-action reports covering units' participation in various exercises and operations. Conversely, another AF major command had established a process to monitor the submission of after-action reports by subordinate units. A 1993 AF LL report on Operations Restore Hope stated that: "Almost every problem occurring during Operation Restore Hope has already been documented in JULLS as a result of previous exercises and contingencies. There appears to be a continuing trend of failure to fix problems already know [sic] to exist. We end up paying again to achieve the same undesirable results." Lessons are not routinely analyzed to identify recurring deficiencies.

AFCKSLL consolidating AF inputs on world wide web and SIPRNET. Searches on text and key words is simple, whereas analysis requires considerably more effort. CJCSI 3150.01 describes CJCS Remedial Action Program and spells out service requirements to designate coordinators at the action officer and planner levels. AF/XOOT has this responsibility.



Methodology

- **Examine databases for C2 LL**
 - **AFCKSLL provided 1300 records from 4/96 to 12/97**
 - Sorted by JCS organizational categories (J1- J8)
 - Sorted by C2 keywords (e.g. AOC, JFACC, ATO, Exercises)
 - Trend analysis attempted on time sequenced segments
 - **JCLL provided 908 records validated by the CINCs**
 - Considered true lessons learned dating from 1991 and including Operation Just Cause
 - Data categorized by Universal Joint Task List (UJTL)
 - Sorted by C2 strategic, operational and tactical categories
 - Analyzed proportion of C2 in UJTL categories

AFCKSLL focused on AF; JCLL focused on joint

6

AFSAA

...to shed light

2/10/00

Databases contain a great deal of narrative, subjective information. The quality and usefulness of this information ranges from good to not so good. A considerable part of the work done by AFCKSLL and JCLL for their clients involves qualitative, subjective analysis and synthesis using previous military experience and professional judgment.

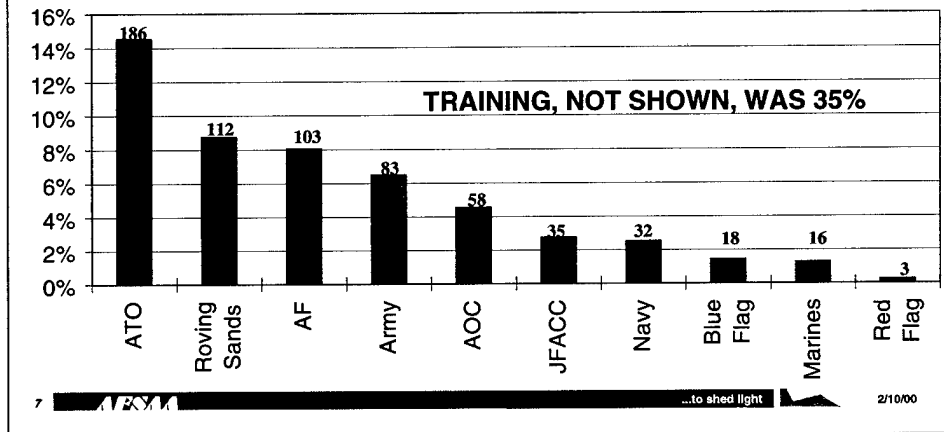
Cadet Sakamoto used a JULLS database from AFCKSLL containing approximately 1283 records and spanning a time period from 25 April 1996 to 5 December 1997. While the entire JULLS database programs has over 20,000 records, this analysis utilized a sample database for two reasons: (1) A smaller sample was easier and faster to query; (2) Additional records were difficult to obtain and import into Microsoft Access. Several attempts were made to provide key word search query capabilities on the world wide web and SIPRNET by organizations such as USEUCOM and ACC. Most of the INTELINK sites, which allow actual downloading of JULLS databases only provide the ASCII/text format, were difficult to manipulate. Other sites only allowed viewing on a file by file basis.

Cadet James used a JULLS database from JCLL containing 908 records, 810 of which were linked to one or more task in the UJTL. They were a subset of over 13,000 entries in a JULLS database called JM971. Records consisted of summaries, assessments, lessons learned, issues and key observations. In the JCLL Bulletin, CCTI 96-3, on C2 of Joint Air Operations, JCLL retrieved the following UJTls: OP 1.5.3 -- Gain and maintain air superiority in theater of operations/JOA; OP 3.1.2 -- Assign Joint/Multinational operational firepower resources; OP 6.1.3 - - Provide aerospace control. They discussed three topics: (1) Implementation of a JFACC; (2) Production of the Air Tasking Order; (3) Component coordination. They did not use Section 5, titled Command and Control, in the UJTL. Cadet James concentrated solely on Section 5.



AF Database Distribution

- Keyword sort: just under 50% of reports 'hit'
Database Distribution by Topics



A topical approach was used here to address:

- Procedures such as the ATO and training
- Organizations and Offices such as the AF, Army, Navy, Marines, AOC and JFACC
- Exercises such as Roving Sands, Blue Flag and Red Flag.

This approach seemed to be exclusive. It failed to include a majority of the records, though this could be handled by increasing the number of categories.

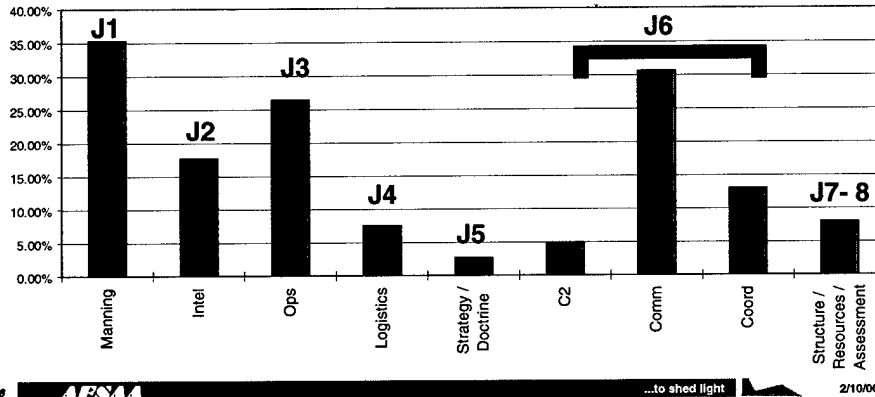
CATEGORY	SIZE	PERCENTAGE	KEY WORDS USED
View AOC	58	4.52%	AOC, Air Operations Center
View Air Force	103	8.03%	Air Force, USAF
View Army	83	6.47%	Army
View Navy	32	2.50%	Navy, USN
View Marine Corps	16	1.25%	Marine, USMC
View Blue Flag	18	1.40%	Blue Flag
View Red Flag	3	0.23%	Red Flag
View JFACC	35	2.73%	JFACC, Joint Force Air
View JSTARS	7	0.55%	JSTARS, eagle, Joint Surveillance Target Attack System
View Roving Sands	112	8.74%	Roving Sand
View ATO	186	14.51%	tasking order, ATO
View Training	443	34.56%	training, exercise, simulation, scenario
Records Not Included	649	50.6%	



AF overlap in JCS categories

- J6 (35%), J3 (25%), & J1 (35%) higher than others
 - 95% of records in J6 mentioned communication, coordination, or both
- Lots of double counting: 146% of data shown

Database Distribution by J1-J8



The database was sub-categorized by the different Joint Staff components, J1 through J8. The reasoning behind this approach was each of the Joint Staff components could pick out problems that pertain to their field. Although this approach may uncover major issues to be addressed at the strategic level, many of the issues and recommendations in the AF JULLS database were directed at the operational level. Each sub-categorization was limited to a keyword search. The entire text portion of each record was searched and depended upon the word used by personnel in the data entry stage of the database. The following key word list was generated by Cadet Sakamoto after he had read through a sample of the database to glean an understanding of the common terminology in the records. As shown, J1, J3 and J6 have the most entries. One could infer that J1, J3, and J6 have the most problems.

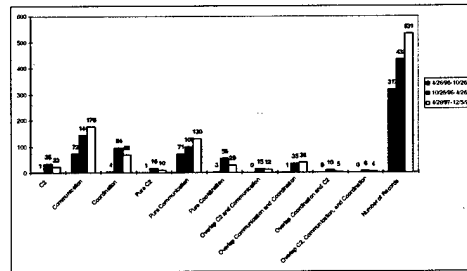
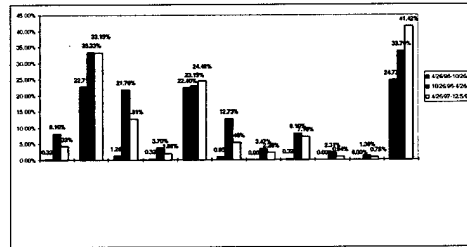
CATEGORY	SIZE	PERCENT	KEY WORDS USED
J1 - Manning	452	35.26%	Manning, Personnel, manpower, deployed, manned
J2 - Intel	226	17.63%	intel, intelligence, data, surveillance, tracking, targeting
J3 - Operations	338	26.37%	operations, ops
J4 - Logistics	96	7.49%	Logistics, log
J5 - Strategy	34	2.65%	strategy, doctrine, policy, regulation
J6 - C2	63	4.91%	C2, C3, C4, command and control
J6 - Communication	392	30.58%	Communication, phone, radio, interface, computer, net, link
J7 - Coordination	166	12.95%	coordination, aligned, synchronization, conflicting, different databases, integration, interoperability
J8 - Assessment	102	7.96%	structure, resources, assessment
Records Not Included	1	0.08%	
TOTAL:	1869	145.79%	



AF Database Trend Analysis

- Trend analysis inconclusive
- 3 time periods examined
 - 317 from 4/96 to 12/96
 - 432 from 12/96 to 5/97
 - 531 from 4/97 to 12/97

Number of records increased during each time period



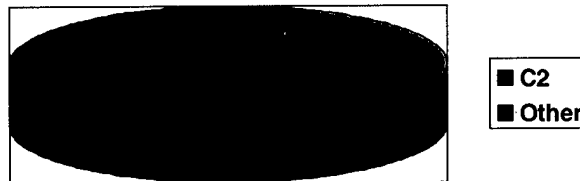
An attempt was made to analyze the communications, coordination, and C2 categories by time to discover recognizable trends. The goal behind this analysis was to show that the quantity of problems in certain areas decreased over time -- suggesting that the military was learning from its mistakes. The data was divided into three approximate six month sections, the last section being slightly larger than the other two. The time frames were: 4/26/96 to 10/26/96; 10/26/96 to 4/26/97; and 4/26/97 to 12/5/97. The bar charts show actual record counts and percentages in relation to the number of records contained in each period. While these results are inconclusive and no trends are evident, additional data covering a larger time frame may be more revealing. Data entries come in spikes following exercises and operations. Larger time sections would allow the data in each section to be more normalized in relation to other sections.

CATEGORY	NUMBER			PERCENTAGE		
	4/96-12/96	12/96-5/97	4/97-12/97	4/96-12/96	12/96-5/97	4/97-12/97
C2	1	35	23	0.32%	8.10%	4.33%
Communication	72	144	176	22.71%	33.33%	33.15%
Coordination	4	94	68	1.26%	21.76%	12.81%
Pure C2	1	16	10	0.32%	3.70%	1.88%
Pure Communication	71	100	130	22.40%	23.15%	24.48%
Pure Coordination	3	55	29	0.95%	12.73%	5.46%
Overlap C2 & Comm	0	15	12	0%	3.47%	2.26%
Overlap Comm & Coord	1	35	38	0.32%	8.10%	7.16%
Overlap Coord & C2	0	10	5	0%	2.31%	0.94%
Overlap C2, Comm & Coord	0	6	4	0%	1.39%	0.75%



Joint database C2 distribution

42% relate to C2



344 C2 related records out of 810 categorized by UJTL, out of 908 total

When Cadet James sorted UJTL Section 5 Command and Control records out of the total, he counted 344 records. $344/810$ is 42.47%. Therefore, at least 42% of the records in the database relate to C2.

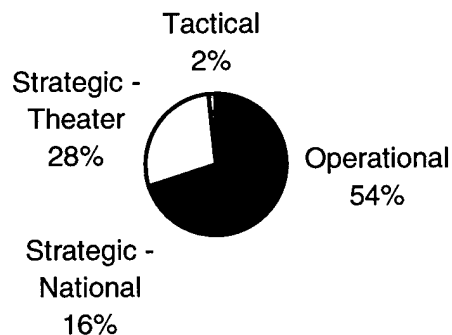
In Cadet Sakamoto's Joint Staff categorization, where J6 had the key words of C2, C3, C4, command and control, communication, phone, radio, interface, computer, net, and link, there were 455 records out of 1282. Using the key words of C2, C3, C4, and command and control for J6's C2, there were 63 records. Using the key words of communication, phone, radio, interface, computer, net, and link for J6's communication, there were 392 records. Total J6 categorization came to 455 records. Though there was undoubtedly double counting, the total percentage of $455/1282$ is 35.49%.



Joint UJTL Break-down

UJTL Tasks by Level of War

Four C2 Categories



UJTL categories 5.1, 5.4, 5.5, 5.7, and 5.8 only

11

AFSAA

...to shed light

2/1000

The UJTL records were sorted into several section 5 categories, namely:

- Section 5.1 -- Operate and Manage Communications and Information at the appropriate level (There are four levels: SN is Strategic National; ST is Strategic Theater; OP is Operational; and TA is Tactical)
- Section 5.4 -- Provide Direction to Forces at appropriate level
- Section 5.5 -- Organize Joint Headquarters
- Section 5.7 -- Coordinate and Integrate Joint/Multinational Interagency Support
- Section 5.8 -- Provide Public Affairs in Theater of Operations/Joint Operations Area (JOA)

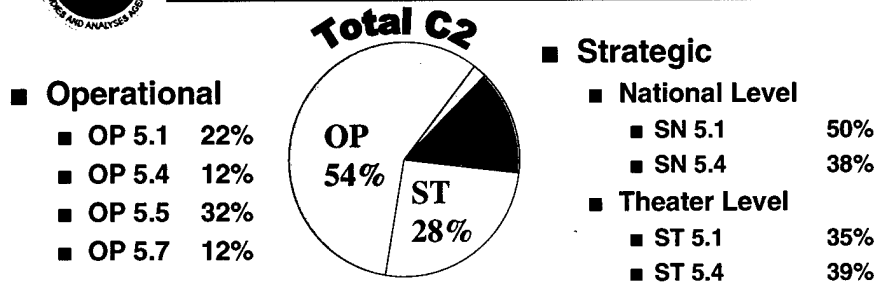
The 309 records broke out into the following levels:

SN	--	49
ST	--	87
OP	--	167
TA	--	6

These numbers translate into the percentages shown in the pie chart.



Joint C2 Levels by UJTL



Percentage of Operational Lessons Learned shift from Strategic Levels

- ↓ Operate/Manage Communications and Info at Appropriate Level (5.1)
- ↓ Provide Direction to Forces at Appropriate Level (5.4)
- ↑ Organize Joint Headquarters (5.5)
- ↑ Coordinate & Integrate Joint/Multinational Interagency Support (5.7)

This slide provides a snapshot of the total distribution of 309 C2 related records, shown in the center pie chart, together with the percentages in the three UJTL levels of warfare: Strategic National (SN), Strategic Theater (ST), and Operational (OP). The box at the bottom of the slide summarizes the difference between the warfare levels.

The percentage of LL linked to OP 5.1, *Operate and Manage Communications and Information at the Operational Level*, is less than that SN 5.1 and ST 5.1, *Operate and Manage Communications and Information at the Strategic Level*. The percentage of LL linked to OP 5.4, *Provide Direction to Forces at the Operational Level*, is less than SN 5.4 and ST 5.4, *Provide Direction to Forces at the Strategic Level*.

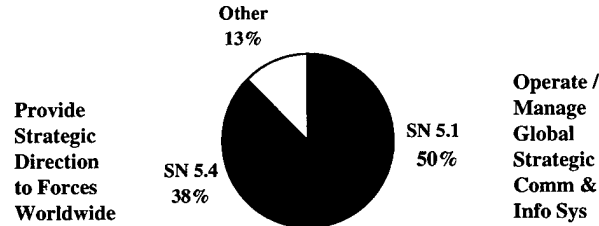
The percentage of LL linked to OP 5.5, *Organize Joint Headquarters*, and OP 5.7, *Coordinate and Integrate Joint/Multinational Interagency Support*, is much greater than similarly numbered UJTL strategic tasks.



UJTL Strategic National C2

■ 16% related to Strategic National

Strategic Level - National Military Tasks



13

...to shed light

2/10/00

The records sorted out as follows:

UJTL	Description	Number	Percentage
SN 5.1	Operate/Manage Global Strategic Communications and Information System	28	50%
SN 5.4	Provide Strategic Direction to Forces Worldwide	21	37.5%
Other		7	12.5%
TOTAL		56	100%

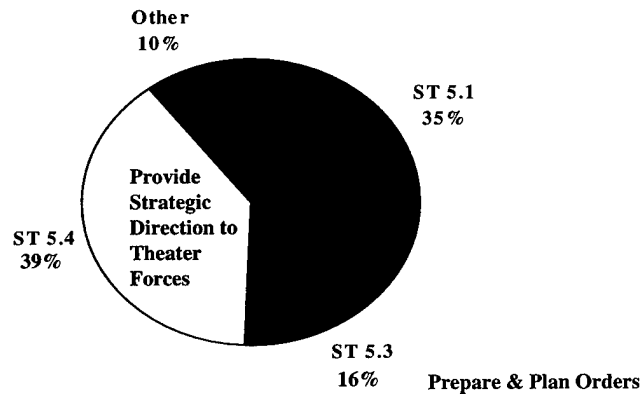
All C2 records totaled 344, so the percentage related to Strategic National is $56/344 = 16\%$.



UJTL Strategic Theater C2

■ 28% related to Strategic Theater

Strategic Level - Theater Tasks



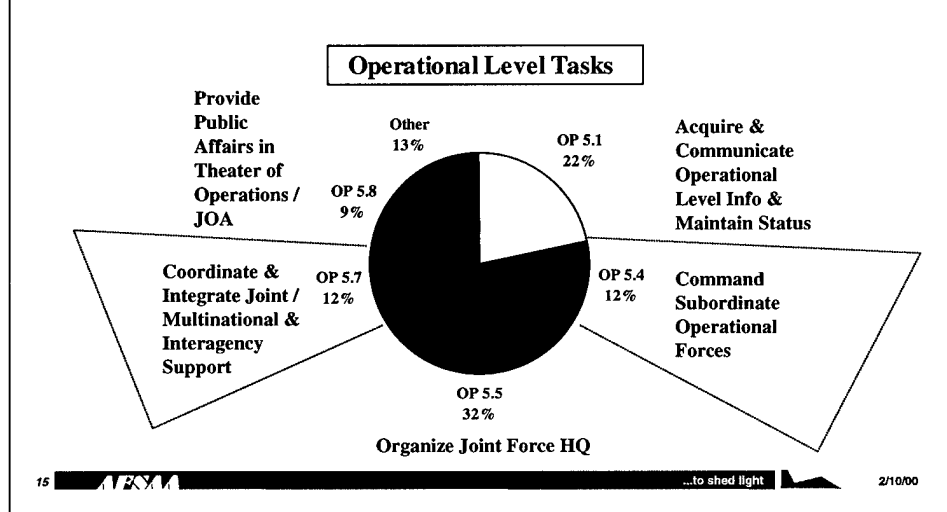
UJTL	Description	Number	Percentage
ST 5.1	Operate/Manage Theater Communications and Information Systems	34	35%
ST 5.3	Prepare and Plan Orders	15	16%
ST 5.4	Provide Strategic Direction	38	39%
Other		10	10%
TOTAL		97	100%

94/344 = 28%



UJTL Operational C2

■ 54% related to Operational C2



UJTL	Description	Number	Percentage
OP 5.1	Acquire and Communicate Operational Level Information and Maintain Status	40	22%
OP 5.4	Command Subordinate Operational Forces	22	12%
OP 5.5	Organize Joint Forces Headquarters	60	32%
OP 5.7	Coordinate and Integrate Joint/Multinational and Interagency Support	22	12%
OP 5.8	Provide Public Affairs in Theater of Operations/JOA	17	9%
Other		24	13%
TOTAL		185	100%

185/344 = 54%



Findings

- **35 - 42% of JULLS relate to C2**
- **In current system, user must read through narratives to get information and knowledge**
 - **Varied data availability and completeness**
 - **Only required short field is classification**
 - **Importing into ACCESS database took time & effort**
 - **Work in progress to make JULLS more accessible**
 - **Current capability to do analysis highly manpower intensive**
 - **Fields in database weren't designed for quantitative analysis**

We can make it easier to learn these lessons

16

...to shed light

2/10/00

Both Cadets found that approximately 40% of the LL related to C2.

The user must read through the narratives to get a feeling for what's in the databases. The data availability and completeness varies by records within the same database and between databases. The only required short field is classification level. The databases from JCLL and AFCKSLL used specially developed software to view the records. This specially developed software did not allow for easy import into ACCESS which complicated the Cadets's job of counting, sorting, and evaluating the data.

When we spoke with JCLL personnel, we learned that they were working on database inputs and formats and they were institutionalizing the process of sharing LL with testing and exercise personnel. Their approach was to grow their staff to read through and summarize the pertinent data to present to the testing and exercise personnel. I have a copy of their TRAIL BLAZER report.

At AFCKSLL, they were working on a web-based input and search database. They wanted to make the LL easily available to AF personnel. They did not have the staff and did not have plans to significantly grow the staff to internally read, process, summarize, and disseminate the summaries of AF LL.

The way to make it easier to learn lessons is to change the input process so the retrieval process is less manually intensive. It would make quantifying LL easier, it would make it easier to convert data into information and then into knowledge, and it would make disseminating the knowledge easier.



Recommendations

- **Plan to use JULLS in quantitative analyses**
 - **Restructure JULLS**
 - Survey defense community for needed analysis info
 - Change collection process to get relevant data
 - Add survey fields that are Y/N and multiple choice
 - **Expand lessons learned sharing**
 - **Communicate with AF**
 - Emphasize importance of data input
 - Educate AF personnel
 - Link LL processes with performance reviews
 - Report widely on Remedial Action Program
 - **Gather quantitative C2 data & metrics from JULLS**
 - Share data and metrics with AF
 - Analyze using various techniques, including trend analysis

17

...to shed light

2/10/00

“...never feel badly about making mistakes as long as you take the trouble to learn from them...but it’s not just learning things that’s important. It’s learning what to do with what you learn and learning why you learn at all that matters.” The Phantom Tollbooth, by Norman Juster, 1961, page 233.

One of the most glaringly obvious recommendations of this work was to restructure the JULLS inputs. If there were more quantifiable fields in the LL databases, then JULLS would be easier to quantify. This corresponds to adding Yes/No (Y/N) fields and multiple choice fields based on subjective inputs.

Another recommendation was to expand LL sharing of relevant LL. This recommendation includes the work it will require from our senior leaders to make LL relevant: communicating the importance of inputting LL, linking the quality of LL input to individual and unit performance ratings, and informing the AF of the status of RAP from LL.

Finally, once we have quantifiable fields in the database records and collect them, then we have a built a body of data for trend analysis and other analyses. The AF will be empowered to achieve the following: “We hope to share with the community the lessons we have learned so that our successes can be exploited instead of relearned and so our failures can be avoided instead of recommitted.” Modeling for Campaign Analysis: Lessons for the Next Generation of Models, Executive Summary, by Richard J. Hillestad, Bart Bennett, and Louis Moore, Rand Corporation, 1996, page 5.



Recommendations

- **Plan to use JULLS in quantitative analyses**
 - **Restructure JULLS**
 - Survey defense community for needed analysis info
 - Change collection process to get relevant data
 - Add survey fields that are Y/N and multiple choice
 - **Expand lessons learned sharing**
 - **Communicate with AF**
 - Emphasize importance of data input
 - Educate AF personnel
 - Link LL processes with performance reviews
 - Report widely on Remedial Action Program
 - **Gather quantitative C2 data & metrics from JULLS**
 - Share data and metrics with AF
 - Analyze using various techniques, including trend analysis

17

2/10/00

One of the most glaringly obvious recommendations of this work was to restructure the JULLS inputs. If there were more quantifiable fields in the LL databases, then JULLS would be easier to quantify. This corresponds to adding Yes/No (Y/N) fields and multiple choice fields based on subjective inputs.

Another recommendation was to expand LL sharing of relevant LL. This recommendation includes the work it will require from our senior leaders to make LL relevant: communicating the importance of inputting LL, linking the quality of LL input to individual and unit performance ratings, and informing the AF of the status of RAPs from LL.

Finally, once we have quantifiable fields in the database records and collect them, then we have built a body of data for trend analysis and other analyses. The AF will be empowered to achieve the following: "We hope to share with the community the lessons we have learned so that our successes can be exploited instead of relearned and so our failures can be avoided instead of recommitted." Modeling for Campaign Analysis: Lessons for the Next Generation of Models, Executive Summary, by Richard J. Hillestad, Bart Bennett, and Louis Moore, Rand Corporation, 1996, page 5.