EXPLORING THE HEART OF LOGISTICS

Bringing Logistics into the Laboratory: Developing a Team-Based Logistics Task

Joseph B. Lyons, Air Force Research Laboratory
Charlene Stokes, Wright State University
Mark Palumbo, Wright State University
Edward Boyle, Air Force Research Laboratory
Jason Seyba, First Lieutenant, USAF, Air Force Research Laboratory
David Ames, CACI MTL Systems, Inc

Background

Organizations are facing increasing demands that accompany the ubiquitous change characteristic of contemporary work domains.[1, 2] To accommodate some of these changes, organizations implement work teams.[3, 4, 5] Traditionally, the military has relied on teams of people to accomplish their missions. This is particularly evident within the realm of logistics. Military logistics involves ensuring that the right material elements of combat capability are delivered together at the proper location and time while in a configuration that is beneficial to the supported commander.[6] United States Air Force logistics utilizes many distributed teams throughout the enterprise with the goal of transitioning from large, fixed organizational units to smaller, more agile units.[7, 8] Logistics operations are increasingly complex as information exchanges are conducted across distributed information nodes at demanding operation tempo.[9, 10] This is reflected in contemporary military logistics doctrine (such as sense and respond logistics, distributed adaptive logistics, and focused logistics) which emphasizes network-centric operations and adaptability as key determinants of logistics success in military operations.[11]

The increased complexity and turbulent environments in which logistics teams are required to operate introduce novel requirements for team effectiveness. Past researchers have conceptualized team types along a continuum from simple to complex as determined by the performance contexts in which the team is required to operate.[12] Clearly, the logistics teams operating in today's warfare environment exist at the complex end of the continuum. Such teams often perform highly structured but dynamic tasks, share common goals, have specialized task requirements and distributed expertise, and have differentiated roles but coordinated patterns of interdependencies dictated by task requirements.[13] A key determinate of effectiveness in such teams is the ability of team members to integrate their individual efforts and balance their workflow interdependencies to changing situational demands. Moreover, adaptability as a performance capability of teams is critical to interdependent work teams and long-term team effectiveness.[14]

As with the overall logistics domain, the teams operating in the warfare environment are best viewed as an adaptive network where individual roles (nodes) and the links between them can be reconfigured or adapted to meet changing task demands. To achieve effective team performance, team members must develop appropriate knowledge and skills in order to comprehend the patterns of role exchange and the relation of differing network patterns to changing task demands.[15] In order to examine such performance and determine if the appropriate knowledge and skills are being developed, we must adopt a process-oriented, developmental perspective and assess team performance under changing task demands.

Information managers, or knowledge workers, in logistic readiness centers dedicate many hours to collecting information worldwide; they analyze that information, then they redistribute the combined knowledge necessary for military planners to make informed decisions. This places human operators at the heart of logistics networks. However, technology solutions and sophisticated mathematical algorithms tend to be the focus of logistics research.[16, 17] The success of these knowledge workers is dependent on distributed teams working collaboratively on a shared information space. Lessons learned from Operation Iraqi Freedom emphasize the importance of information exchange between logistics operators.[18] Even where information is gathered, analyzed, and then acted upon at a base-wide scale, distributed teams are key to the success of the mission. Examples of base-size teams include the coordination of aircraft maintenance activities, sortie generation and logistics planning, and generalized aerial port operations. Effective collaboration is a key facilitator amongst these distributed logistics teams.

Collaboration in a general sense refers to the cooperative exchange of information that may result in a novel product or idea.[19] Modern day logistics operations often involve

Article Acronyms

CAPS - Computer-Based Aerial Port Simulation
ATOF – Air Terminal Operation Flight
GUI – Graphical User Interface
XML – Extensible Markup Language

interactions among coalition forces in joint operations, thus placing greater reliance on effective collaboration. One way that researchers can gain a better understanding of the factors that influence team collaboration and performance is to design experimental scenarios that require teams to work together on tasks requiring coordination, planning, and problem solving. Laboratory environments are increasingly being used to examine team performance.[20] However, the development of team-based laboratory scenarios is limited by potentially extracting the physical fidelity that facilitates generalization from the research scenario to the applied setting. Modern simulations, albeit at a high cost, can replicate many of the intricate details of operational settings and are often used in aviation domains. Unfortunately, financial concerns will preclude the development of many of these high-fidelity simulations. In contrast, the psychological[21] or task-related (synthetic) fidelity[22] of a laboratory scenario may provide a very viable alternative. Even simulations of very low physical fidelity can be useful in predicting performance when they are task relevant.[23] Researchers at the Cognitive Engineering Research on Team Tasks Laboratory[24, 25] epitomize the development of team-based laboratory tasks. Their scenarios and tasks replicate the behaviors and skills represented in the real world domain.[26] Similarly, the present research involves a scenario with low physical fidelity yet high psychological and task-related fidelity.

Further increasing the psychological fidelity of the task, the Computer-Based Aerial Port Simulation (CAPS) scenario replicates the demands of the dynamic, unpredictable environment characteristic of warfare today. By injecting common disturbances that can occur in natural settings into the simulation and incorporating the assessment of the teams' adaptive behavior in response to such disturbances, the outcomes generated by the CAPS simulation provide increased generalizability to real world settings. When examining team collaboration, we must acknowledge that such coordination, planning, and problem solving often occurs in turbulent ever-changing environments, and therefore we must incorporate these aspects into our studies. A goal of such studies should be to provide novel situations that require adaptation and the display of a new skill set and strategies that culminate in a deeper understanding of the task and aid in future adaptive behavior.[27]

Aerial Port Operations

Aerial port operations are an excellent research domain for this type of research. They provide researchers with team-level tasks that are naturally organized in a distributed team context. The behavior of successfully launching a sortie with the proper passengers and cargo represents a viable candidate for an objective performance measure to be assessed at the team level. At a general level, aerial port squadrons consist of five primary sections:

- Passenger services
- Fleet services
- Cargo services
- Ramp services
- Air terminal operation flight (ATOF)

Passenger services focuses on the in-processing, manifesting, loading, and unloading of passengers. Fleet services provides for the loading of aircraft supplies, ordering and delivery of meals to the aircraft, and servicing of the aircraft. Cargo services are responsible for the in-processing, prioritization and sequencing of cargo. Ramp services' primary responsibility is for the uploading and downloading of cargo. ATOF represents the information broker for the entire aerial port. The ATOF section monitors all aerial port activities, ensuring that all the necessary activities are accomplished, and maintains constant communication networks with the other four sections. Aircraft requirements are passed down from ATOF to the other sections.

Aerial port squadrons are excellent candidates for empirical work on logistics collaboration. Like many other distributed logistics teams, they can be characterized as a virtual team. Virtual teams are defined as two or more individuals who do the following.

- Work interdependently
- Have and strive toward a common goal
- Use technology to interact[28]

Aerial port squadrons involve several team members who possess unique sets of skills and conduct unique activities toward the shared goal of completing aircraft requirements in the time allotted. Furthermore, aerial port squadrons typically use technology (e-mail, phones, and radios) to communicate within the different sections during their operations. Thus, aerial ports represent one form of virtual team.

Computer-Based Aerial Port Simulation

A Java-based platform was designed to simulate an aerial port squadron. The platform, referred to as CAPS, consists of five different subject stations whose functions were described in the previous section (passenger services, fleet services, cargo services, ramp services, and ATOF). An experimenter station was also designed to allow for the scenarios to be loaded, the status of the subjects and the scenario to be tracked, and psychological assessments to be loaded and distributed to the different subjects.

The primary software components of interest are the individual client-side subject stations that are operating during the sessions. The challenge of the design of these components includes displaying real time information about activity on the flight line, as well as allowing the subjects to interact with the flight line. This required real-time interactions with software objects and manipulation of objects on the screen; therefore, the latest version of a client-side language was used (Java Standard Edition 5.0). Figure 1 displays an example of the general graphical user interface (GUI). (The present GUI represents the interface for the passenger services section).

To provide participants with a shared information space and communication capabilities, it was critical that a database be used for the storage, retrieval, and updating of information in a real time manner. It was desirable to have a database that was not of a proprietary nature, therefore mySQL was chosen. The tables are all initialized when the experimenter begins the experiment. Updating and retrieving of information are possible by all of the subject stations as well. A simple chat tool was designed to facilitate collaboration within the team. As shown in Figure 1, participants had direct access to chat windows with each of the other participants, as well as a general chat capability similar to a chat room. All of the messages are logged in a database for later

coding and analysis. The chat tool is remarkably similar to contemporary instant messenger systems, and as such, participants were expected to adapt to the system with relative ease. However, from the experimenter perspective, the chat feature records text outputs, timestamps each message, and records the sender and the receiver of the message. All of the chat information is written to an Excel spreadsheet at the conclusion of each session, allowing for the content of the chat data to be analyzed by the researchers with relative parsimony. Researchers have suggested that content-based analysis of team communications has been shown to be an effective way to assess team-level constructs.[29]

CAPS Training Development

The Instructional System Design (ISD) model was used to develop the training materials for the simulation. Initially, the required outcomes of the training were determined by the developers of the experimental platform in accordance with the performance requirements inherent in each of the five individual subtasks within the CAPS scenario. These same individuals then developed a written outline of the information needed by each individual for success in each subtask. Next, this group designed and developed a series of computer generated slides which described and demonstrated individual task procedures (see Figure 2). These slides were coded in order to be displayed as a slideshow (approximately 10 minutes in length) at the beginning of the CAPS scenario.

The initial implementation of these training slides provided an opportunity for training evaluation. Five novices were recruited for an initial run-through of the task. Each novice was provided with a notepad and asked to list any questions, comments, or ideas that arose during the training slideshow and during the task. Each subject then reviewed the slides and attempted to perform that subtask. Following a 15-minute performance period, all participants, task developers, and other observers engaged in a question and answer discussion session.

Through qualitative analysis (group discussion, review of written questions and comments, and direct elicitation of specific information from individuals), specific training issues or problems were highlighted. First, participants experienced a lack of understanding of the task procedures, which was due, in part, to slideshow design. Many slides had incorporated the use of links to other slides containing additional information, thus

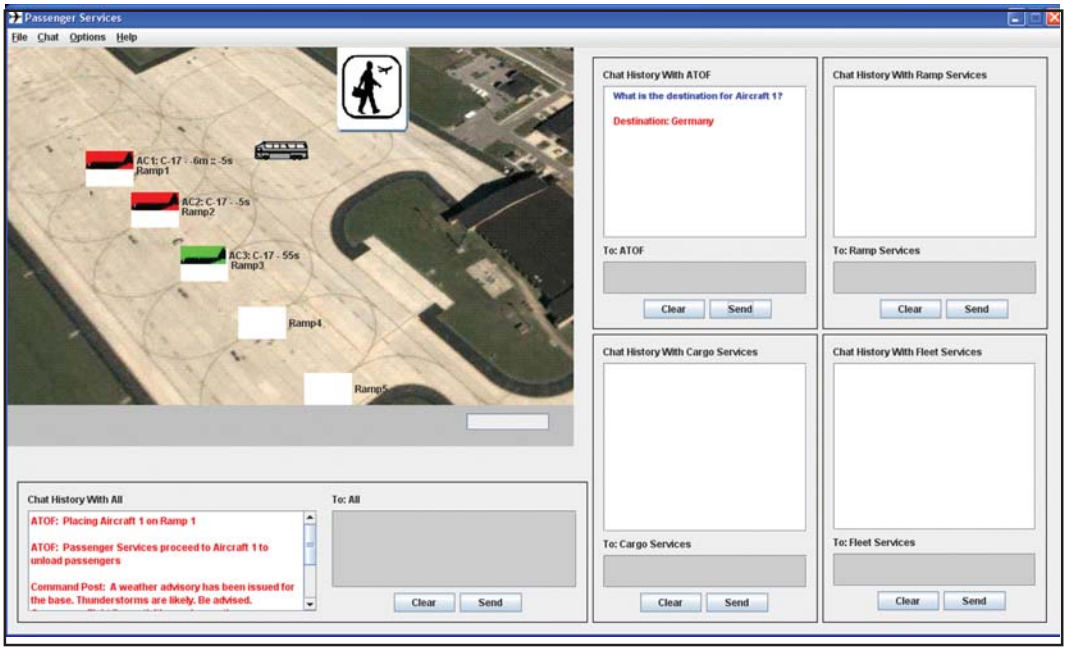


Figure 1. General CAPS GUI (Passenger Services Station Represented)

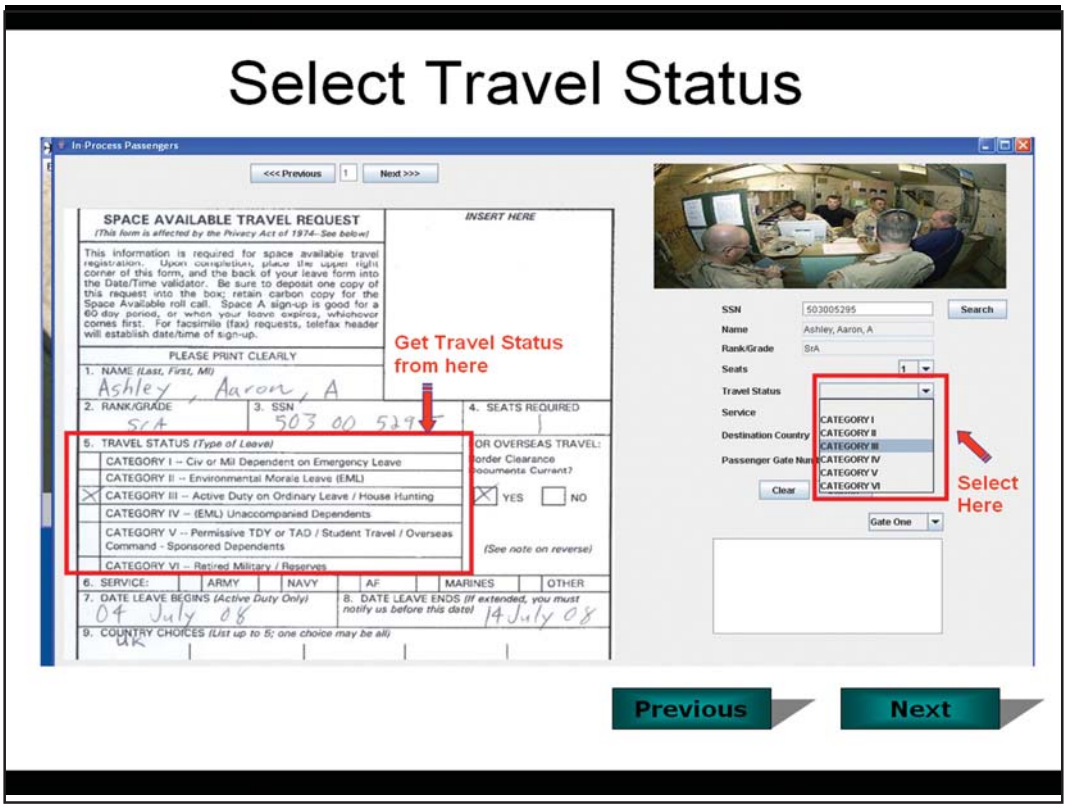


Figure 2. Sample Training Slide (Passenger Services Station Represented)

requiring the participants to select or click on the link in order to access the full gamut of information. Some participants failed to select one or more of these links and therefore missed important information. This problem was remedied by removing all links and displaying all slides in order so that the training slideshow exposed all individuals to the entire procedural information.

A second issue was the lack of a general understanding of how the individual tasks were related to the overall team task. This led to the development of a general introduction to the task. This introduction was designed as a set of preliminary slides which described an overview of the task at the macro level. These slides were incorporated into the beginning of the slideshow for each subtask station. Finally, to afford individuals' better understanding of subtask procedures, a video was appended to the slideshow. This 5-minute video incorporates a demonstration of the procedures used in each subtask along with an audio description of the processes.

Measurement

The CAPS software enables a smooth transition between training slides, demographic questionnaires, psychological assessments, and the real time interactive simulation that includes all five subjects working together. The CAPS software includes the capability to present participants with questionnaire items to asses various psychological variables. The questionnaire feature generates questions that can be loaded from the experimenter station. In order to enable a generic scenario, an Extensible Markup Language (XML) schema was designed based on an initial set of predictor questions. Figure 3 represents an example extract of the XML scheme devised. (The sample provided represents items taken from the International Personality Item Pool.) Like the chat data, all data from the questionnaires will be logged automatically into a database for analysis.

```
  <?xml version="1.0" encoding="utf-8" ?>
- <CAPS_Questionnaire version="1.0" description="Self-report variables of interest for
    implementation in the CAPS experimental framework: December 1, 2005">
  - <survey name="Background" time="preCAPS">
    - <section name="Personality" source="IPIP Scale" instructions="Please rate your
        agreement with the following items. There are no correct or incorrect answers, so
        don"t spend too much time on any one item." order="1">
      - <options>
          <option order="1">Strongly Disagree</option>
          <option order= "2">Disagree</option>
          <option order= "3">Somewhat Disagree</option>
          <option order= "4">Neither Agree nor Disagree</option>
          <option order= "5">Somewhat Agree</option>
          <option order= "6">Agree</option>
          <option order= "7">Strongly Agree</option>
      - <measure name="Extroversion">
          <question order="1">I am the life of the party</question>
          <question order="6">I do not mind being the center of attention</question>
          <question order="16">I typically start conversations</question>
          <question order="21">I talk to a lot of different people at parties</question>
        </measure>
```

Figure 3. Sample XML Script for the Questionnaire Capability

Individual and group level performance metrics will also be assessed in conjunction with the content rich chat data. A comprehensive task analysis was conducted in order to provide current and future researchers with a deeper understanding of the simulation and its behavioral requirements. In order to identify the inherent performance metrics in the simulation, the task analysis method developed by Berliner and colleagues was used.[30] Unlike other task analysis methods, this methodology uses a classification scheme intended to dimensionalize human task behavior in a manner meaningful for measuring performance.[31] In other words, this method is used to develop a task analysis scheme more amenable to performance measurement and quantification. Moreover, their research efforts were directed at military jobs and man-machine environments, which clearly align with our simulation. The information gained from the task analysis in terms of measurable performance outcomes highlights the research malleability of the simulation and alleviates future researchers' efforts to identify the viability of the simulation for a particular study.

The task analysis multilevel classification scheme is based on a hierarchical model of behaviors, activities and processes.[32] The model is composed of four high-level behavioral processes at the apex, which encompass six broad activity categories, followed by several specific behaviors. Beginning at the base of the hierarchy, once a specific behavior is identified, the subsequent activity and behavioral process categories are predetermined. As the intent of the scheme is to aid with performance measurement, the specific behaviors are represented by action verbs which have been validated as simple acts with quantifiable properties as well as easily identifiable and generalizable across jobs. Furthermore, graphical representation in a matrix system permits the identification of explicit links between behavioral variable categories and quantifiable performance measurement dimensions, such as times, errors, and frequency data.[33] Thus, the cells of the matrix contain specific behavioral statements pertinent to performance measurement and evaluation (see Table 1).

From the team level perspective, adaptability is an important dimension of teamwork.[34] In an effort to assess the adaptability of the team, a measure was devised comprising the amount of time it took the team to overcome an unexpected event. After the team has had adequate practice time and was able to perform the task, the team was presented with a novel situation. Of particular interest were events that force the collaborative replanning or repurposing of assets controlled by multiple subjects. The team's response to this novel situation was evaluated in terms of chat communications and the objective

Behaviors	Perceptual Processes	Searching for and Receiving Information				
		Identifying Objects, Actions, Events				
	Mediational Processes	Information Processing				
		Problem Solving and Decisionmaking				
	Communication Processes	Communicating				
	Motor Processes	Simple, Discrete				
		Complex, Continuous				
			Time	Accuracy	Frequency	Errors
			Measures			

Table 1. Individual-Based Matrix of Behaviors and Measures (sample)

measure of how fast they were able to overcome the obstacle. The types of distinct challenges that were presented to the subjects included diverted aircraft, maintenance problems, section specific information, communication failures, and altered cargo and passenger requirements. In such situations, the aerial port sections needed to collaborate in order to redirect and reallocate their resources to meet the impending demands of the situation. Upon completion of the entire experiment, all the data were written to an Excel file for easy analysis by researchers because the results were now importable to a variety of statistical software suites.

Research Topics

CAPS will provide a versatile experimental platform through which researchers can examine a variety of social and psychological factors that influence the logistics domain. Examples of potential research topics are examining factors that promote shared situational awareness among team members, manipulating leadership styles to measure the impact on decision selection, identifying variables related to interpersonal trust in distributed teams, and examining the impact of different types of collaborative tools on team performance. (Future studies using CAPS will involve the implementation of various forms of collaborative tools, such as Voice-Over Internet Protocol and video teleconferencing). CAPS represents the laboratory portion of the program of research in the area of collaborative logistics. Ideally, the field-based portion for the collaborative logistics program of research will identify variables that can be manipulated in the laboratory, thus creating synergy between the field- and laboratory-based programs of research.

Conclusion

In the information age, collaboration among distributed coworkers will have a significant impact on organizational performance. This is particularly true for the logistics domain which is characterized by distributed information managers interacting across a complex and dynamic problem space. Research in collaboration science will be increasingly important as organizations implement team-based systems. Also important will be the capacity to examine team-based scenarios in laboratory settings to facilitate the manipulation of factors that influence team collaboration and performance. The CAPS software will allow researchers to study logistics collaboration in controlled settings, thus reducing the impact of extraneous variables and increasing the internal validity of the research findings. By drawing from the operational nature of aerial port operations, CAPS can mirror logistics activities in a distributed team context and provide a sense of face validity to its users. CAPS can benefit the Air Force by identifying factors that influence team collaboration and performance. These factors can then be used to facilitate the performance of teams within the logistics domain and across the Air Force.

The CAPS software will allow researchers to study logistics collaboration in controlled settings, thus reducing the impact of extraneous variables and increasing the internal validity of the research findings. By drawing from the operational nature of aerial port operations, CAPS can mirror logistics activities in a distributed team context and provide a sense of face validity to its users.

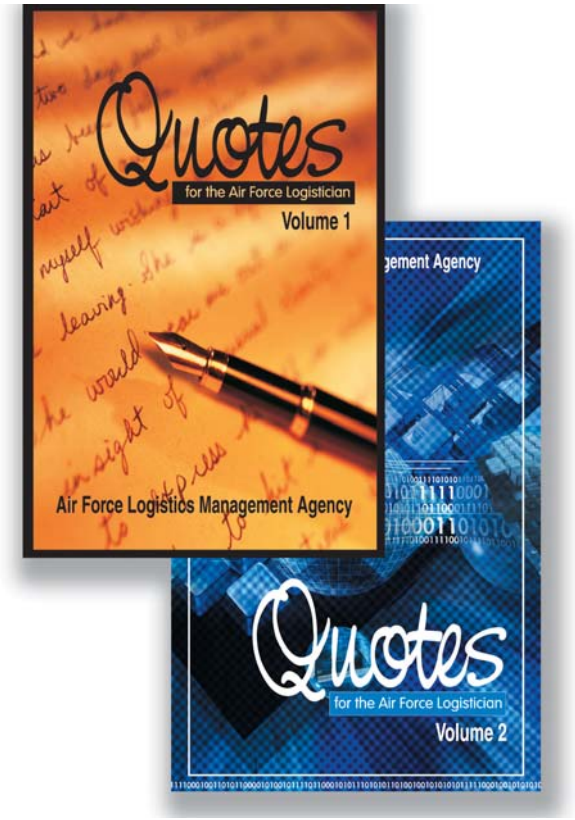
Endnotes

1. W. F. Cascio, *Applied Psychology in Human Resource Management*, Upper Saddle River, NJ: Prentice Hall, 1998.
2. S. H. Haeckel, *Adaptive Enterprise: Creating and Leading Sense and Respond Organizations*. Cambridge, MA: Harvard Business School Publishing, 1999.
3. S. G. Cohen, and D. E. Bailey, "What Makes Teams Work: Group Effectiveness Research from the Shop Floor to the Executive Suite," *Journal of Management,* XXIII, 239-290.
4. V. U. Druskat and D. C. Kayes, "The Antecedents of Team Competence: Toward a Fine-Grained Model of Self-Managing Team Effectiveness," In R.Wagerman (Ed.), *Research on Managing Groups and Teams: Context,* Stanford, CT: JAI Press, Vol II, 1999, 201-231.
5. M. J. Stevens and M.A. Campion, "Staffing Work Teams: Development and Validation of a Selection Test for Teamwork Settings," *Journal of Management,* XXV, 207-228.
6. S. M. Swartz, "A Multimethod Approach to the Combat Air Forces Mix and Deployment Problem," *Mathematical and Computer Modeling,* XXXIX, 773-797.
7. K. R. Gue, "A Dynamic Distribution Model for Combat Logistics," *Computers & Operations Research,* XXX, 367-381.
8. B. E. O'Conner and S. O. Fought, "Airdrop and Modularity," *Air Force Journal of Logistics*, XXIX, No 3/4, 5-15.
9. D. M. Crimiel and K. W. Currie, "Logistics Executive Agents: Enhancing Support to the Joint Warfighter," *Air Force Journal of Logistics*, XXIX, No 3/4, 16-31.
10. O'Conner.
11. Office of Force Transformation, "*Operational Sense and Respond Logistics*," Office of the Secretary of Defense, May, 2004.
12. E. Sundstrom, K. P. De Meuse, and D. Futrell, "Work Teams: Application and Effectiveness," *American Psychologist,* XLV, 120-133.
13. S. W. J. Kozlowski, S. M. Gully, W. R. Nason, and E. Smith, "Developing Adaptive Teams: A Theory of Compilation and Performance Across Levels and Time," In D. R. Ilgen and E. D. Pulakos (eds), *The Changing Nature of Performance*, Hoboken, NJ: Jossey-Bass, Inc., 1999, 240-292.
14. *Ibid*.
15. *Ibid*.
16. J. W. Barnes, V.D. Wiley, J.T. Moore, and D.M. Ryer, "Solving the Aerial Fleet Refueling Problem Using Group Theoretical Tabu Search," *Mathematical and Computer Modeling,* XXXIX, 617-640.
17. K. R. Gue, "A Dynamic Distribution Model for Combat Logistics," *Computers & Operations Research,* XXX, 367-381.
18. D. M. Crimiel, et al.

19. I. Hawryszkiewycz, *Designing the Networked Enterprises,* Boston, MA: Artech House, 1997.
20. R. P. DeShon, S. W. J. Kozlowski, A. M. Schmidt, K. R. Milner, and D. Wiechmann, "A Multiple-Goal, Multilevel Model of Feedback Effects on the Regulation of Individual and Team Performance," *Journal of Applied Psychology,* LXXXIX, 1035-1056.
21. S. W. J. Kozlowski and R.P. DeShon, "A Psychological Fidelity Approach to Simulation-Based Training: Theory, Research, and Principles," In S.G. Schiflett, L.R. Elliott, E. Salas, and M.D. Coovert (eds), *Scaled Worlds: Development, Validation, and Applications*, Surrey, England: Ashgate Publishing, 2004, 75-99.
22. N. J. Cooke and S. M. Shope, "Designing a Synthetic Task Environment," In S.G. Schiflett, L.R. Elliott, E.Salas, and M.D. Coovert (eds), *Scaled Worlds: Development, Validation, and Applications*, Surrey, England: Ashgate Publishing, 2004, 263-278.
23. S. J. Motowidlo, M.D. Dunnette, and A.W. Carter, "An Alternative Selection Procedure: The Low-Fidelity Simulation," *Journal of Applied Psychology*, LXXV, 640-647.
24. Cooke, et al.
25. J. C. Gorman, P. W. Foltz, P.A. Kiekel, M. J. Martin, and N. J. Cooke, "Evaluation of Latent Semantic Analysis-Based Measures of Team Communication Content," *Proceedings of the Human Factor and Ergonomics Society 47th Annual Meeting*, 2003, 424-428.
26. Cooke, et al.
27. S. J. Zaccaro and D. Banks, "Leader Visioning and Adaptability: Bridging the Gap Between Research and Practice on Developing the Ability to Mange Change," *Human Resource Management,* XLIII, 367-380.
28. G. Hertel, S. Geister, and U. Konradt, "Managing Virtual Teams: A Review of the Current Empirical Research," *Human Resource Management Review*, XV, 69-95.
29. J. C. Gorman, P. W. Foltz, P.A. Kiekel, M.J. Martin, and N.J. Cooke, "Evaluation of Latent Semantic Analysis-Based Measures of Team Communication Content," *Proceedings of the Human Factor and Ergonomics Society 47th Annual Meeting*, 2003, 424-428.
30. D. S. Berliner, D. Angell, and J.W. Shearer, "Behaviors, measures, and instruments for performance evaluation in simulated environments," Paper presented at the Proceedings of Symposium and Workshop on the Quantification of Human Performance, Albuquerque, New Mexico, August 1964, as cited in E.A. Fleishman and M.K. Quaintance, *Taxonomies of Human Performance: The Description of Human Tasks*, Orlando, FL: Academic Press, 1984.
31. *Ibid*.
32. *Ibid*.
33. *Ibid*.
34. G. Chen, B. Thomas, and C. J. Wallace, "A Multilevel Examination of the Relationships Among Training Outcomes, Mediating Regulatory Processes, and Adaptive Performance," *Journal of Applied Psychology*, XC, 827-841.

Available Now

Quotes Boxed Set:
What You Need, When You Need It!



Why a set of quotations for Air Force Logisticians? An obvious answer is there wasn't one. But that's not the only reason, and it's certainly not the most important reason. The primary reason for producing this set was to provide a teaching resource that can be used in classrooms, education, training, and mentoring programs for Air Force logisticians. It is a tool that can be used by instructors, teachers, managers, leaders, and students. It is also a tool that can be used in research settings and a resource that should stimulate comment and criticism within educational and mentoring settings. Copies of the set are provided free of charge to any Air Force logistician, educational institution, teacher, instructor, commander, or manager.

AFLMA

Generating Transformation Solutions Today; Focusing the Logistics Enterprise of the Future

***Joseph B. Lyons**, PhD, is currently the team lead for the Organizational Effectiveness Research Team within the Logistics Readiness Branch, Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio. At the time of the writing of this paper Dr Lyons was a research psychologist within the Logistics Readiness Branch, Air Force Research Laboratory.*

***Charlene K. Stokes**, PhD, is currently a postdoctoral fellow for the Organizational Effectiveness Research Team within the Logistics Readiness Branch, Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio. At the time of the writing of this paper Dr Stokes was a research fellow within the Logistics Readiness Branch, Air Force Research Laboratory.*

***Mark Palumbo**, PhD, is currently an assistant professor at the University of Indiana of Pennsylvania. At the time of the writing of this paper Dr Palumbo was a research fellow within the Logistics Readiness Branch, Air Force Research Laboratory.*

***Edward Boyle** is a supervisory research psychologist and certified professional logistician for the Air Force Research Laboratory, Wright-Patterson AFB, Ohio.*

***First Lieutenant Jason Seyba** is a ground simulation support engineer at Wright-Patterson Air Force Base, Ohio. At the time of the writing of this paper Lieutenant Seyba was a logistics engineer for the Logistics Readiness Branch, Air Force Research Laboratory.*

***David Ames** is a software engineer for CACI MLT Systems Inc. He is assigned to the Logistics Readiness Branch, Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio.*

Knowledge - Technology - Innovation

Lots of organizations have catchy mottoes. Likewise, many have catchy vision statements. We do, too. But there's a big difference—we deliver on what we promise. *Generating Transformation Solutions Today; Focusing the Logistics Enterprise of the Future* aren't just words to us; they're our organizational culture. We use a broad range of functional, analytical, and scientific expertise to produce innovative solutions to problems and design new or improved concepts, methods, systems, or policies that improve peacetime readiness and build war-winning logistics capabilities. Our key strength is our people. They're all professionals from logistics functions, operational analysis sections, and computer programming shops. Virtually all of them have advanced degrees. But more important, virtually all of them have recent field experience. They've been there and done that. They have the kind of experience that lets us blend innovation and new technology with real-world common sense and moxie. It's also the kind of training and experience you won't find with our competitors. Our special blend of problem-solving capabilities is available to every logistician in the Air Force.

501 Ward Street
Maxwell AFB, Gunter Annex,
Alabama 36114-3236

DSN: 596-4511

Commercial: (334) 416-4511

The Power to Solve Your Problems

http://www.aflma.hq.af.mil

Visit the *Journal* online at: http://www.aflma.hq.af.mil/lgj/Afjlhome.html