



**APPLICATION OF RELATIONAL CONTRACTING METHODS TO FEDERAL
CONSTRUCTION PROJECTS**

THESIS

Travis R. Johnson, Captain, USAF

AFIT/GEM/ENV/11-M03

**DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY**

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

The views expressed in this thesis are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the United States Government.

This material is declared a work of the United States Government and is not subject to copyright protection in the United States.

AFIT/GEM/ENV/11-M03

APPLICATION OF RELATIONAL CONTRACTING METHODS TO FEDERAL
CONSTRUCTION PROJECTS

THESIS

Presented to the Faculty

Department of Systems and Engineering Management

Graduate School of Engineering and Management

Air Force Institute of Technology

Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Engineering Management

Travis R. Johnson, B.S.

Captain, USAF

March 2011

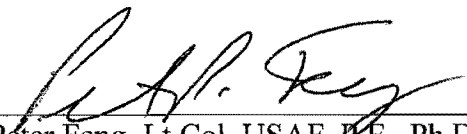
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

APPLICATION OF RELATIONAL CONTRACTING METHODS TO FEDERAL
CONSTRUCTION PROJECTS

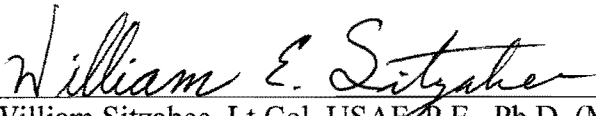
Travis R. Johnson, B.S.

Captain, USAF

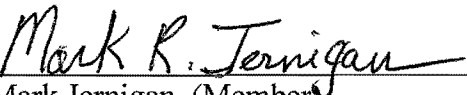
Approved:


Peter Feng, Lt Col, USAF, P.E., Ph.D. (Chairman)

9 Mar 11
Date


William Sitzabee, Lt Col, USAF, P.E., Ph.D. (Member)

9 Mar 11
Date


Mark Jernigan, (Member)

9 MAR 11
Date

Abstract

Relational contracting is a method designed to improve relationships between contracted parties. The federal construction sector was a leader in the development and implementation of an early form of relational contracting known as partnering. Since then, alliancing has emerged as the new evolution of relational contracts. While it provides many potential benefits to contracting parties, alliancing has not yet been utilized in federal construction procurement, which is subject to stringent regulations.

A commercially available standard form alliancing contract was selected for analysis against the Federal Acquisition Regulation. Key practices that characterize the alliancing method were identified. Utilizing a panel of federal contracting experts, qualitative data were gathered to analyze which of these key practices do or do not comply with federal regulations, why certain practices do not comply, and how those practices could achieve compliance.

The results show that most alliancing key practices can be utilized in a federal construction project. While some practices cannot be used effectively under current regulations, these limitations do not significantly hinder the use of a comprehensive and effective federal alliancing contract.

Acknowledgements

I would like to thank my thesis advisor, Lt Col Peter Feng, for his help and guidance throughout this research. I also wish to express my appreciation to Lt Col William Sitzabee and Mark Jernigan, who served on my thesis committee and were essential in the development and composition of this research. The data supplied by the excellent reviewers and the Air Force Center for Engineering and the Environment were also fundamental to this work.

Travis R. Johnson

Table of Contents

	Page
Abstract	iv
Acknowledgements	v
Table of Contents	vi
List of Figures	viii
List of Tables	ix
I. Introduction	1
Background.....	1
Research Questions	3
Scope and Approach.....	3
Preview	5
II. Literature Review Conference Paper	7
Abstract.....	7
Introduction	8
Types of Relational Contracts	10
The Contracts.....	12
Key Relational Practices.....	14
Summary.....	20
References	22
III. Scholarly Article	23
Abstract.....	23
Introduction and Background	24
Contract Types.....	26
Contracts.....	28

	Page
Key Practices	29
Selecting a Contract to Review	33
Methodology.....	33
Tri-Party Agreement (Article 1).....	35
Joint Decision Making (Article 4).....	38
Shared Risk (Article 3).....	40
Budget Development and Management and Pain/Gain Sharing (Articles 8-11)	41
Incentive Program (Article 11).....	45
Dispute Resolution (Article 23).....	46
Conclusions	48
Acknowledgements	50
Disclaimer.....	50
References	50
IV. Conclusion	51
Chapter Overview.....	51
Significance of Research	51
Limitations.....	51
Future Research	52
Bibliography	53
Vita.....	59

List of Figures

	Page
Figure 1 Wittgenstein Model (Chan et al., 2010)	2
Figure 2: Cone of Uncertainty	31

List of Tables

	Page
Table 1: Contract Comparison	16
Table 2: Partnering vs. Alliancing	28
Table 3: Selecting Contract by Choosing by Advantages	33
Table 4: Impediments & Facilitators to ConsensusDOCS 300 Methods	36

APPLICATION OF RELATIONAL CONTRACTING METHODS TO FEDERAL CONSTRUCTION PROJECTS

I. Introduction

Background

A business contract that does not contain a high degree of planning of the exchange relationship has a greater opportunity for good faith disputes (Macaulay, 1963). Traditional contracting methods do not provide sufficient provisions for addressing the future events that will affect project relationships, nor can they. In a field as uncertain and complex as construction, these events cannot be perceived or quantified with accuracy. Therefore contracts should be flexible in order to adjust for future events and address uncertainties when they arise (Macneil, 1974, 1980). In order to be flexible, a contract must focus on relationships.

Relational contracting is a topic that has seen increased academic focus, but there is still no consensus on a precise and comprehensive definition of the concept (Chan et al, 2010). Ludwig Wittgenstein argued that complex concepts are unable to be defined in this traditional way because there may not be a single set of characteristics that are common for all variants of a concept (Nyström, 2005; Yeung et al., 2007). He likened this idea to the resemblance between family members. Some of them may have the same type of nose, ears, or eyes, but no one feature is common to every member. However, there is still a family resemblance common to all the members of the family (Kenny, 1975).

This is a very appropriate way to define relational contracting. While no specific feature is maintained throughout every example of it, a family resemblance is maintained. Wittgenstein's concept has been previously applied to partnering (Nyström, 2005) and alliancing (Yeung et al., 2007). More recently, Chan et al. (2010) utilized the Wittgenstein concept and both of these previous researchers' work to develop a model of the elements of relational contracting. Chan et al. identified twelve elements that form the family resemblance model (Figure 1). These twelve elements provide one of the best definitions of relational contracting available in the literature, and they outline separate concepts that can be used to create a method of improving project performance.

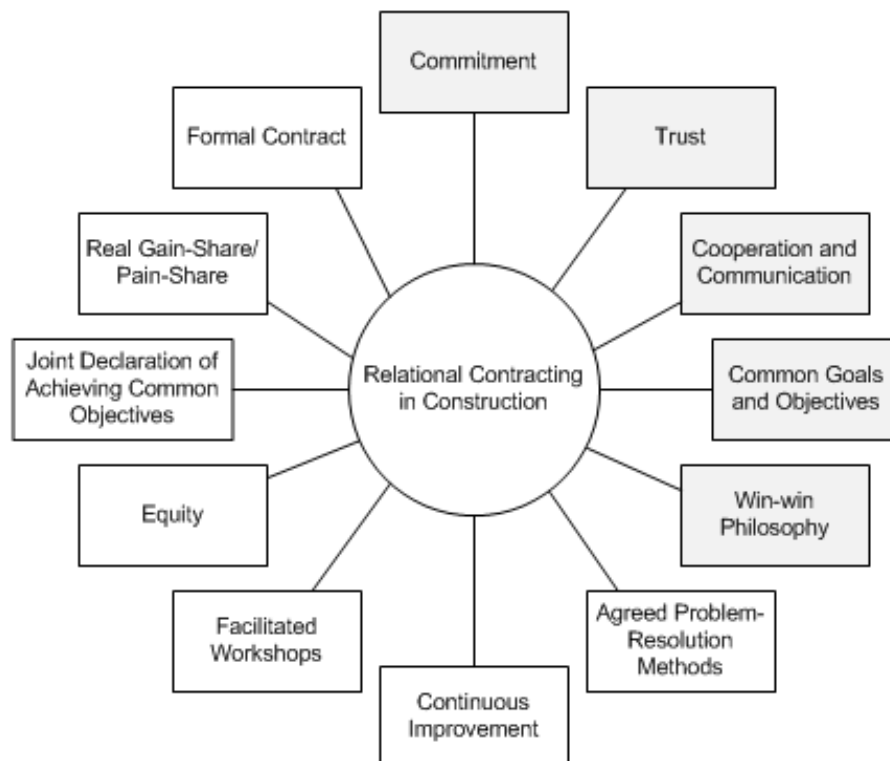


Figure 1 Wittgenstein Model (Chan et al., 2010)

Research Questions

Many federal projects, especially those conducted by the U.S. Army Corps of Engineers, have begun to develop better relationships, trust, and commitment through partnering agreements. But partnering is only a small step in the right direction. A potential obstacle to implementing more advanced relational contracting methods is perceived incompatibilities with the Federal Acquisition Regulation (FAR). The purpose of this thesis is to develop a framework of implementing relational contracting concepts in federal construction contracts by answering the following research questions:

Do relational contracting methods meet the requirements of the FAR? Why or why not?

How can relational contracting methods be implemented within the FAR?

Scope and Approach

A qualitative case study approach was selected for its ability to provide a “detailed, extensive study of a particular contextual and bounded phenomenon that is undertaken in real life situations.” (Luck et al., 2006). The method for this research was developed utilizing Yin’s (2009) five components of a case study research design:

1. A study’s questions
2. Its propositions
3. Its units of analysis
4. The logic linking the data to the propositions
5. The criteria for interpreting the findings (decision)

The first component, the study's questions, form the "who," "what," "where," "how," and "why" of the case under study (Yin, 2009). A case study approach is most appropriate for "how" and "why" questions, making it a suitable methodology for the research questions stated above.

While the research questions capture the outcomes desired by a study, they do not point to how the study should be conducted. A proposition outlines a possible answer to the research question and "directs attention to something that should be examined within the scope of study" (Yin, 2009). The propositions can outline a hypothesis that can be tested or at least give a starting point for collecting evidence. The current proposition is that relational contracting is not allowed by the current federal acquisition regulations and a construction contract that attempts to implement relational contracting methods will be disapproved by the contracting officer. This proposition outlines the problem in a way that can be tested.

The third component develops the definition of a "case," and determines how that case will be studied through its units of analysis. Yin (2009) defines three elements of a case study that must be defined in this step: the case, the units of analysis, and the units of data collection. The case is the interesting topic (or topics) of the study that is bounded by a particular context. The units of analysis are different components of the case that will be individually analyzed. The units of data collection are the actual sources of information used to answer the research questions.

An embedded single case design was selected for this research, which is composed of a single case and multiple units of analysis. The single case design is appropriate for studies that have a clear set of circumstances within which its propositions are believed to

be true (Yin, 2009). The Federal Acquisition Regulation provides a clear set of circumstances under which to evaluate the case of a relational construction contract. Because of the varying nature of a relational contract and the many elements they can be composed of, multiple units of analysis were used. Each unit of analysis is a definitive relational method utilized by a relational contract.

The data collection source for this study was an expert panel, each of which separately analyzed each unit of analysis for compliance with the FAR. Each expert was sent the relational techniques identified and a semi-structured questionnaire for each technique. The questionnaire consisted of questions that direct the expert to identify aspects of the proposed technique that meet or do not meet the Federal Acquisition Regulation, the section of the FAR that allows or disallows it, and possible changes to achieve FAR compliance. The questionnaire identified important or possibly contentious sections of each contractual method for each reviewer to comment on. It also included a section for the individual to include free form comments.

The collected data is easily linked to the propositions. The data collection creates a review of each unit of analysis that is very similar to the review required if an actual relational contract were to be implemented, utilizing the federal acquisition regulations as a basis for assessment.

Preview

This thesis uses the scholarly article format. The following chapters are the articles produced from the research. The first is a conference paper submitted to the 16th International Command and Control Research and Technology Symposium held in

Quebec City, Canada 21-23 June 2011. The conference paper is Chapter 2 and consists of a review of three advanced relational contracts and the methods they employ. This paper is primarily focused on a review and analysis of available literature. The second article in Chapter 3 was submitted to the American Society of Civil Engineers *Journal of Construction Engineering and Management*. This article provides the body of this thesis and contains all the elements of research in its layout as prescribed by the peer review journal. As an independent chapter, it includes an abstract, introduction, literature review, objective, research question and methods, analysis and results, recommendation, and conclusions. Many of the concepts explored in the conference paper were used as a basis for the introduction and literature review of the journal article. Chapter 4 offers a final discussion of the significance of the research, its limitations, and possible areas for future research.

II. Literature Review Conference Paper

Submitted to 16th International Command and Control Research and Technology

Symposium

Quebec City, Canada 21-23 June 2011

Evolution of Relational Contracting in Construction: Project Delivery Methods Beyond Partnering

Travis Johnson; William Sitzabee Ph.D., P.E.; Peter Feng Ph.D., P.E.

Abstract

Improving formal and informal relationships between parties is a major aspiration of every construction project. The United States Army Corps of Engineers led the way in developing relational contracting methods in the 1980s with the introduction of partnering. While partnering remains the Corps' standard, relational contracting continues to evolve. Advanced relational methods were pioneered in the 1990s and 2000s in countries such as the United Kingdom and Australia, quickly becoming standard practice in their public sectors. In the last three years, the commercial publication of two major standard form boilerplate contracts has made this new generation of relational contracts widely available in the United States. Introducing specific contractually-binding requirements for equitable relationships, risk sharing, and integrated project delivery, these contracts offer significant opportunities for a highly collaborative and successful construction project. This paper presents several key practices of modern relational

contracts and how implementation of these practices can benefit project success by reducing cost growth, improving construction quality, and lowering the risk of litigation.

Introduction

Military construction is an exceptional example of the importance of managing operations between civilian and military entities. Each project is a large and complex undertaking contracted between the federal government and civilian businesses. The United States military makes a vast investment in construction each year; the 2011 Military Construction program for the U.S. Air Force alone is projected to exceed \$1.3 Billion (Department of the Air Force, 2010). Receiving the greatest return from this investment requires proper management of each construction project.

However, failing to properly manage relationships has been a continuing problem within the construction industry, causing poor cooperation, limited trust, and ineffective communication (Moore et al., 1992). Relational contracting is a concept designed to address these problems. The U.S. Army Corps of Engineers took a leading role in the use of relational contracts in the 1980s, developing and implementing partnering at the Portland, Oregon (Gerard, 1995) and Mobile, Alabama districts (Sanders & Moore, 1992). The Corps inaugural partnering project was the construction of the Oliver Lock and Dam, which began in 1988 with a partnering agreement between the Corps Mobile District and the construction contractor FRU-CON (Schroer, 1994).

Partnering proved to be a genuine success. A study of Corps construction projects by Weston and Gibson (1993) compared 16 partnering projects to 28 non-partnering projects. The study found that partnering projects achieved much better performance,

averaging an improvement of 40-80 percent in the aspects of change order costs, claims costs, total project cost growth, and duration change over non-partnered projects. Recognizing their success, the Corps quickly embraced the philosophy of partnering and made it a standard way of doing business (Schroer, 1994). In 1993, then Commander of the US Army Corps of Engineers Lieutenant General Arthur Williams (1993) set the “policy of the Corps of Engineers to develop, promote and practice partnering on all constructions contracts, and to universally apply the concept to all other relationships.”

In the 1990s, partnering also became an established approach to contracting in the United States private sector, the United Kingdom, Australia, and Hong Kong (Bresnen and Marshall, 2000a, b). However, the concept of relational contracting in these markets has evolved much more rapidly than the U.S. public sector. The government of Hong Kong utilizes an expanded form of partnering that utilizes incentivization agreements, and the UK and Australia have developed advanced forms of relational contracting that have become standard practice in public sector construction (Chan et al., 2010; NEC, 2010; Department of Treasury and Finance, 2009).

Advancement in relational contracting in the U.S. private sector has been driven by the concept of Integrated Project Delivery (IPD). IPD contracts were pioneered in 2005 with the Integrated Form of Agreement, developed by Will Lichtig for Sutter Health (Post, 2010). In the last few years, the IPD method has become more accessible than ever with the commercial publication of standard form contracts by ConsensusDOCS and the American Institute of Architects. These model contracts provide a solid baseline for project parties, allowing them to easily complete a comprehensive contract by simply filling in the details of their particular project.

Types of Relational Contracts

Generally known as alliancing, the new generation relational contracts utilized by international governments and the U.S. private sector are an evolution of the partnering concept developed and still relied upon by the Corps. Before discussing the specific contracts, it is important to recognize and understand the four major types of single-project relational contracts: project partnering, project alliancing, joint venture, and public private partnership.

Every contract contains an implied commitment requiring each party to not hinder or delay the performance of any other party (George A. Fuller Co. v. United States, 1947). This sets a basic contract standard of cooperation. The objective of partnering is to change this from a standard of non-interference to a team-based standard of mutual benefits. The basis of partnering is the partnering agreement, a non-contractual but formally structured charter in which each party promises to act in the best interest of the project and the project team (Chan et al., 2001). The partnering process utilizes tools such as regular meetings, partnering workshops, team building exercises, declarations of common objectives, and dispute resolution mechanisms. Its goals are to create an atmosphere of communication, problem solving, harmonious working relationships, and shared goals. While this process does deliver mutual benefits, it falls short of guaranteeing that each party will equally benefit (Walker et al., 2002). It encourages a team approach, but gains and losses are still allocated severally, not jointly. Partnering does not replace the obligations to adhere to the formal contract, and it lacks the definite incentives required to elevate collective interests above those of the individual.

Project alliancing differs from project partnering in that it is both a relationship management system and a project delivery system (Chan et al., 2010). Traditional contracting and partnering allocates responsibilities and risk to individual parties that severally incur consequences for success or failure of the project. Alliancing requires a 'joint' rather than a 'shared' commitment; parties consent to their contribution levels and jointly incur rewards or losses (Walker et al., 2000). Three key features define a 'pure' alliance:

1. Parties are all responsible for performing the work and assume collective ownership of risk.
2. Participants share in the "pain" or "gain" depending on how actual project outcomes compare to targets.
3. The project is governed by a joint body where all decisions must be unanimous (Chan et al., 2010).

The advanced relational contracts explored under this paper fall under the category of alliances. While they allow some variation from the definition of a 'pure' alliance, they implement all the major ideals.

Joint ventures and public-private partnerships are two other relational contract forms that are not explored in this paper, but are worth mentioning. While alliancing jointly shares the risk and rewards of a project, the parties remain legally independent organizations with separate ownership and management (Gerybadze, 1995). However, a joint venture is the creation of a jointly owned entity created by separate organizations sharing their funds, personnel and services. The American Institute of Architects' Document C195 – 2008: "Standard Form Single Purpose Entity Agreement for Integrated

Project Delivery” is a step in this direction, forming the participants into a Limited Liability Company.

Public private partnership does not have a set definition or a standard framework, but is typically defined as a market driven approach for government procurement (Chan et al., 2010). It can take forms such as build-operate-transfer, build-own-operate, leasing, operation and management, equity joint venture, and cooperative joint venture. This concept has been used extensively in the privatization of government services, such as waste disposal, vehicle and facility maintenance, and military housing.

The Contracts

This paper will explore three existing boilerplate contract approaches. Two of American origin: ConsensusDOCS 300 and AIA Document C191-2009 and one from the United Kingdom: NEC3 Engineering and Construction Contract.

ConsensusDOCS describes itself as “a coalition of associations representing diverse interests in the construction industry that collaboratively develops and promotes standard form construction contract documents that advance the construction process” (ConsensusDOCS, 2010). The organization counts 32 associations as part of their coalition, the most notable of which is the Associated General Contractors of America (AGC). ConsensusDOCS 300 *Standard Form of Tri-Party Agreement for Collaborative Project Delivery*, first published in September 2007, is touted as the signature document of their catalog and the first standard construction contract to address Integrated Project Delivery (Perlberg, 2009).

The American Institute of Architects first began publishing construction contracts in 1888, and currently publishes more than 120 contracts and administrative forms for the construction industry (AIA, 2010b). AIA publishes three series of Integrated Project Delivery documents, differentiated by how the parties contract with each other. Published in November 2009, AIA Document C191-2009 *Standard Form Multi-Party Agreement for Integrated Project Delivery*, like ConsensusDOCS 300, is a three party agreement between the owner, designer, and constructor (AIA, 2009). AIA's other IPD contracts allow for separate agreements between owner and designer and owner and constructor, as well as the formation of the three parties into a Limited Liability Corporation.

The New Engineering Contract (NEC) is a set of standard contract documents developed by the Institution of Civil Engineers, a professional organization based in the United Kingdom. Now on its third revision (NEC3), it was first published in 1993. In 2006, the United Kingdom's Office of Government Commerce recommended the NEC3 suite of construction contracts for use by public sector procurers (OGC, 2006). The Engineering and Construction Contract (ECC) provides a cooperative agreement between an owner and constructor, and is the most popular document of the NEC3 series (Gerrard, 2005). The ECC provides many relational contracting tools when utilized with optional clause X12: Partnering. (NEC3 refers to this option as partnering, but it more closely resembles the definition of alliancing.) When referring to the NEC3 ECC, this paper will include Option X12 as part of the contract.

Key Relational Practices

These contracts utilize several key principles that have been shown to contribute to improved projects. Several studies have shown significant links between relational contracting activities and project success. Larson (1995), utilizing a data set of 280 construction projects, related several success factors (such as schedule, cost, technical performance, and avoiding litigation) to the level of relationship between the parties (from adversarial to full partners). The study found a significant positive effect on success when moving from an adversarial project to a relational one, and from an informal relational project to a formal relational contract. In a later study using an expanded data set, Larson (1997) related individual relational contracting principles to the same indicators of success. A few of the strongest predictors for project success were establishment of a problem-solving process, top management support, provisions for continuous improvement, and establishing the assumption of a fair profit for the contractor.

In another study, Chan et al. (2004) performed a survey of critical relational contracting success factors in the Hong Kong construction industry. Their regression analysis of the results identified five significant underlying factors contributing to overall success:

1. The establishment and communication of a conflict resolution strategy
2. A willingness to share resources among project participants
3. A clear definition of responsibilities
4. A commitment to a win-win attitude

5. Regular monitoring

Cheng and Li's (2002) study of construction success factors found the top ranked factors for the application of relational contracting are (in order of most important to least): open communication, mutual trust, effective coordination, top management support, and joint problem solving.

The basic principles of successful relational contracting are implemented in actual contracts by several basic methods. *Joint Decision Making* implements the principles of mutual trust, top management support, effective coordination, and a problem-solving process. When *Joint Decision Making* cannot resolve an issue, a clear *Dispute Resolution Process* provides a strategy for conflict resolution. *Pain/Gain Sharing* addresses principles such as fair profit, shared resources, a win-win attitude, and continuous improvement. The principles of mutual trust and willingness to share resources (and risk) are also implemented with *Shared Risk*. The similarities and differences between the contracts in each of these categories are summarized in Table 1.

Joint Decision Making

ConsensusDOCS 300 utilizes two groups to facilitate the project: the Collaborative Project Delivery (CPD) Team and the Management Group. The CPD Team meets at least weekly and executes the daily activities of the project, while the Management Group is the decision making body. Both groups are comprised of three core individuals selected to represent the Owner, Designer, and Constructor. In the Management Group, each representative has full authority to make decisions that bind the represented organization. The CPD Team is expected to add design consultants and trade contractors through joining agreements as the project progresses. Other members may

Table 1: Contract Comparison

	ConsensusDOCS 300	AIA C191 – 2009	NEC3 ECC w/ X12
<i>Joint Decision Making</i>	-Executive team: Decide by consensus -Management team: No formal decision process	-Executive team: Unanimous decisions -Management team: Unanimous decisions	-Executive team: No formal decision process
<i>Shared Risk</i>	-Waives consequential damages -Shared liability option or -Traditional liability option w/Optional liability limits	-Waives consequential damages -Shared liability	-Clear division of risk
<i>Pain/Gain Sharing</i>	-Gain sharing distributed by agreed percentages -Optional pain sharing --Agreed percentages --Optional loss limits	-Gain sharing distributed by agreed percentages -Pain sharing --Agreed percentages --Loss limits	-Gain sharing distributed by agreed percentages -Pain sharing distributed by agreed percentages
<i>Dispute Resolution</i>	-Executive team decision <i>before</i> -Mitigation or Mediation <i>before</i> -Binding Arbitration or Litigation	-Executive team decision <i>before</i> -Mediation <i>before</i> -Binding Arbitration, Litigation, or Any Agreed Method	-Executive team decision <i>before</i> -Binding Arbitration <i>before</i> - Litigation

also be brought into the Management Group and fully participate, but ultimate decision making power resides with the three original members. The Management Group is designed to make decisions in the best interest of the project as a whole, not each member's own interest. To this end, all decisions made by the Management Group are by consensus. If consensus cannot be reached between the three core members, the owner reserves the right to make a final determination. There is one exception, with the designer reserving the right to decision in cases of life, health, property and public welfare that require a licensed design professional. In cases of a unilateral decision, the

other parties may utilize the dispute resolution provisions of the contract. No formal decision making process is outlined for the CPD Team.

AIA Document C191-2009 uses a very similar process, creating a Project Executive Team for executive oversight and a Project Management Team for day-to-day management. Each group is created by representatives from the Owner, Architect, and Contractor, along with any additional parties decided at the beginning of the project. Both teams operate by unanimous decision of all members. A failure to reach unanimity by the Project Management Team is brought to the Project Executive Team. If the executive team cannot reach a unanimous decision, the owner may issue a written directive that the parties shall comply with. In the absence of a unanimous decision, a matter can be submitted to the contract's dispute resolution process.

It is difficult to ascertain a difference of practice between ConsensusDOCS 300's decision by "consensus" and AIA C191's unanimous decision making. Consensus is a term debated in the political field, and it can be viewed as a continuous variable ranging from simple majority to unanimity (McClosky, 1964). A generally accepted definition of consensus would indicate a finding that is nearly unanimous and not just a majority opinion (D'Amato, 1970; Wright, 1966). The project parties would likely operate by this definition, but a different term (or a clear definition) would remove ambiguity from the ConsensusDOCS document.

The NEC3 Engineering and Construction Contract also creates a joint management group, but does not provide a formal process structure. The ECC requires the project parties to create a Schedule of Partners, identifying the main stake holders that will have say in the project. These Partners select the members of the Core Group. The

Core Group, led by the owner's representative, acts and makes decisions on behalf of the Partners within guidelines set at the beginning of the project. The contract does not provide formal processes for the Core Group, allowing it to set its own procedures.

Shared Risk

ConsensusDOCS 300 offers two risk allocation options: Safe Harbor Decisions or Traditional Risk Allocation. The former option releases the parties from liability for "risks arising from collaboratively reached and mutually agreed-upon. Project decisions made by the Management Group (Safe Harbor Decisions)," if acting in good faith and not in willful default of the contract (ConsensusDOCS, 2007). The traditional risk option holds each party liable for its own "negligence and breaches of contract and warranty," but contains optional clauses to set individual monetary limits on the total liability of the designer and constructor. Regardless of the risk allocation option chosen, the contract requires the parties to waive the right to claims of consequential damages against each other.

In contrast, AIA C191 waives all claims except in cases such as willful misconduct, express warranty obligations, claims for payment of amounts due, damages filed against the project by outside parties, express liquidated damages clause, or when insurance proceeds are available for the claim. The contract also includes a waiver of consequential damages and rights of subrogation, as well as indemnity clauses for property damage, bodily injury, and vicarious liability. All claims that are permitted by the contract must be pursued through the agreed dispute resolution process.

The ECC does not have the same kind of risk sharing. It clearly outlines the risks borne by the owner, and places all other risks on the constructor. Each party indemnifies

the other against claims due to an event which is at his own risk, except in cases where an event at the risk of one party contributes to an event at the risk of the other.

Pain/Gain Sharing

ConsensusDOCS 300 provides for pain or gain sharing between the parties. Gain sharing is a fixed section of the contract, and the parties determine agreed percentages or other basis for sharing savings if the project costs are less than the Project Target Cost Estimate (PTCE). ConsensusDOCS allows for two options in case the project costs exceed the PTCE, allowing for the costs to be either borne by the owner or shared among the three parties. Again, the agreed percentages or other basis for sharing are to be determined by the parties and indicated on the contract. There is also an optional provision to limit the designer's and constructor's loss limit to their respective overhead and profit, or the potential for loss can be unlimited.

AIA C191 uses the same method for gain sharing, allowing the parties to agree upon share percentages for savings realized by actual costs less than the target cost. AIA also includes an option for pain sharing, but with losses for designer and constructor strictly limited to their overhead and profit.

The ECC also implements pain and gain sharing in its target cost contracts. Using share percentages, the contractor is paid a share of the savings or pays a share of the excess cost.

Dispute Resolution

A three-step dispute resolution procedure is utilized in the ConsensusDOCS 300 contract, with some steps depending on the selection of the parties at the formation of the contract. A dispute that cannot be resolved between the directly involved parties is first

submitted to the Management Group for resolution. If the Management Group is unable to resolve the issue, the dispute will move to either mitigation or mediation. Mitigation utilizes either a project neutral or dispute review board to issue a nonbinding ruling on the dispute, while mediation brings in a third-party to help bring the project participants to an agreement. If neither of these options brings about a settlement, the binding resolution process is used. The contract offers two options, litigation in state or federal court, or arbitration using a pre-agreed arbitration method.

AIA C191 uses a dispute resolution committee, formed from senior managers from each party and a designated neutral party (known as the “project neutral”) to resolve disputes that cannot be settled by the Project Executive Team. The project neutral uses pre-established mediation procedures to mediate a resolution of the dispute. If the parties fail to come to an agreement from mediation, the contract offers arbitration by the project neutral, arbitration through another entity, or any other method pre-agreed to by the parties.

When using the dispute resolution option of the contract, disputes in an ECC project that cannot be resolved by the project parties proceeds directly to arbitration by an adjudicator appointed by the parties at the formation of the contract. The adjudicator’s decision is binding, but parties can refer it for review and final decision to governmental tribunals.

Summary

Project alliancing, the next evolution of relational contracting, also presents some significant difficulties and potential problems along with its benefits. It requires

considerable involvement and commitment of personnel and top management to support the process and to maintain the strong personal and corporate relationships required for a successful project. Along with the cultural shift required from traditional contract relationships, this could require significant costs for training, education, and labor hours (Ross, 2001). Shared risk environments, waiving claims and liability, also present a major challenge for conventional liability insurance. Providing robust insurance products for shared risk projects requires a fundamental change in the conventional underwriting approach, and while some insurers are addressing this problem, insurance difficulties may be common until specialized policies are offered (Post, 2010). Similar problems may be encountered with project bonding and surety relationships that normally operate in a traditional claims environment.

If these difficulties can be overcome, all of these contracts utilize key principles that, when properly implemented, can significantly improve project relationships. In particular, ConsensusDOCS 300 and AIA C191 both offer robust relational contracting tools, as well as a complete, comprehensive, and usable contract. The ConsensusDOCS and AIA contracts are clearly more dedicated to relational contracting methods than the NEC3 ECC, not only offering more methods but more fully developing them in the contracts. While both contracts are quite similar, ConsensusDOCS 300 offers more tools and flexibility in the preceding categories than AIA C191.

U.S. military construction, led by the Army Corps of Engineers, was a leader in the development and implementation of partnering, but is currently a spectator in the field of alliancing. The private sector has supplied two excellent alliance examples in ConsensusDOCS 300 and AIA C191. To stay on the cutting edge of construction

contracts, the U.S. military should use one of these boilerplate contracts, in whole or in part, to develop a federal alliance contract. Some alliance practices may be inhibited by the current Federal Acquisition Regulation, but now is the time for the military to investigate and resolve these discrepancies. By developing and beginning to implement an alliance contract now (at least on a test basis), the U.S. military can take advantage of an excellent opportunity for construction value and efficiency in a time of economic difficulty.

The views expressed in this paper are those of the author and do not reflect the official policy or position of the United States Air Force, the Department of Defense, or the United States Government.

References

The references of this article are combined with the thesis.

III. Scholarly Article

Submitted to ASCE Journal of Construction Engineering and Management

Federal Acquisition Regulation Applied to Alliancing Contract Practices

Travis Johnson; Peter Feng Ph.D., P.E.; William Sitzabee Ph.D., P.E.; Mark Jernigan

Abstract

Relational contracting is a method designed to improve relationships between contracted parties. The federal construction sector was a leader in the development and implementation of an early form of relational contracting known as partnering. Since then, alliancing has emerged as the new evolution of relational contracts. While it provides many potential benefits to contracting parties, alliancing has not yet been utilized in federal construction procurement, which is subject to stringent regulations.

A commercially available standard form alliancing contract was selected for analysis against the Federal Acquisition Regulation. Key practices that characterize the alliancing method were identified. Utilizing a panel of federal contracting experts, qualitative data were gathered to analyze which of these key practices do or do not comply with federal regulations, why certain practices do not comply, and how those practices could achieve compliance.

The results show that most alliancing key practices can be utilized in a federal construction project. While some practices cannot be used effectively under current regulations, these limitations do not significantly hinder the use of a comprehensive and effective federal alliancing contract.

Introduction and Background

Failing to properly manage relationships has been a continuing problem within the construction industry, causing poor cooperation, limited trust, and ineffective communication (Moore et al., 1992). If not managed effectively, complex relationships between the interested parties can adversely affect a project's performance (Walker, 1989). One method for enhancing project relationships and addressing the complexity inherent in construction is the concept of relational contracting. Relational contracting is based on the recognition of mutual benefits and "win-win" scenarios that can be created through more cooperative relationships between the project parties (Kumaraswamy et al., 2005).

The U.S. Army Corps of Engineers took a leading role in the use of relational contracts in the 1980s, developing and implementing partnering in the Portland, Oregon (Gerard, 1995; Naoum, 2003) and Mobile, Alabama districts (Sanders & Moore, 1992). The Corps inaugural partnering project was the construction of the Oliver Lock and Dam, which began in 1988 with a partnering agreement between the Corps Mobile District and the construction contractor FRU-CON (Schroer, 1994).

As the first type of relational contracting, partnering proved to be a genuine success. A study of Corps construction projects by Weston and Gibson (1993) compared 16 partnering projects to 28 non-partnering projects. The study found that partnering projects achieved much better performance, averaging an improvement of 40-80% in the aspects of cost change, change order cost, claims costs, and duration change over non-

partnered projects. Recognizing their success, the Corps quickly embraced the philosophy of partnering and made it a standard way of doing business (Schroer, 1994). In 1993, then Commander of the US Army Corps of Engineers Lieutenant General Arthur Williams set the “policy of the Corps of Engineers to develop, promote and practice partnering on all constructions contracts, and to universally apply the concept to all other relationships” (Williams, 1993).

Partnering has allowed many federal project teams to develop better relationships, trust, and commitment, but it is only the first step in the right direction. While this process does deliver mutual benefits, it lacks the definitive incentives required to elevate collective interests above those of the individual.

To address this issue, expanded partnering and alliancing have become common abroad. The government of Hong Kong uses an expanded form of partnering that includes incentivization agreements, and the United Kingdom and Australia use collaborative alliance contracts as a standard practice in public sector construction (Chan et al., 2010; NEC, 2010; Department of Treasury and Finance, 2009).

The U.S. private sector has also significantly contributed to the development of relational contracting with a concept known as Integrated Project Delivery (IPD). IPD contracts, a form of alliancing, were pioneered in 2005 with the Integrated Form of Agreement, developed by Will Lichtig for Sutter Health (Post, 2010). Introducing specific contractually-binding requirements for equitable relationships, risk sharing, and dispute resolution, IPD proposes significant opportunities for a highly collaborative and successful construction project. In the last few years, the IPD method has become more accessible than ever with the commercial publication of standard form contracts by

ConsensusDOCS and the American Institute of Architects (AIA). These boilerplate contracts provide a solid baseline for project parties, allowing them to complete a comprehensive contract by simply filling in the details of their particular project. While the use of IPD in construction is still in an early stage, AIA has used case studies as a proof of concept. Analyzing six projects from 2004 to 2009 that implemented IPD practices, AIA claims that every project “met or exceeded the owner’s expectations with respect to budget, schedule, design quality, and sustainability and also met the financial expectations of designers and builders” (AIA, 2010a).

A potential barrier to harnessing the benefits of an IPD contract in federal construction is the stringent requirements of the Federal Acquisition Regulation (FAR). The purpose of this article is to evaluate the specific key practices of an IPD single project construction contract against the requirements of the FAR.

Contract Types

Integrated Project Delivery contracts fit the definition of an alliance, which is a fundamentally different type of relational contract than partnering. The basis of partnering is the partnering agreement, a non-contractual but formally structured charter tying each party to act in the best interest of the project and the project team (Chan et al., 2001). It utilizes tools such as regular meetings, partnering workshops, team building exercises, declarations of common objectives, and dispute resolution mechanisms to encourage harmonious working relationships and shared goals. While partnering drives towards common objectives, gains and losses are still allocated severally, not jointly. The partnering agreement establishes mutual goals, but it does not contractually enforce

or incentivize them. It does not replace the obligations to adhere to the formal contract. While their goals may overlap in some areas, parties are ultimately rewarded for acting in their own interest.

Project alliancing differs from project partnering in that it is both a relationship management system and a project delivery system (Chan et al., 2010). Where partnering encourages closer relationships and shared goals, alliancing mandates them (Table 2). Traditional contracting and partnering allocate responsibilities and risk to individual parties that severally incur consequences for success or failure of the project. Alliancing requires a 'joint' rather than a 'shared' commitment; parties consent to their contribution levels and jointly incur rewards or losses (Walker et al., 2002). Three key features define a 'pure' alliance:

1. Parties are all responsible for performing the work and assume collective ownership of risk
2. Participants share in the "pain" or "gain" depending on how actual project outcomes compare to targets
3. The project is governed by a joint body where all decisions must be unanimous

(Chan et al. 2010)

While most IPD contracts allow some variation from the definition of a pure alliance, they implement the same concepts.

Table 2: Partnering vs. Alliancing

	Partnering	Alliancing
<i>Organization</i>	-Partnering Agreement/Charter (non-contractual)	-Project Contract
<i>Relationships</i>	-Trust and relationship development --Team building --Communication protocols --Stakeholder commitment --Decision processes -Dispute resolution procedures (non-contractual)	-Joint decision making --Project management team: Unanimous decisions --Executive oversight team: Unanimous decisions -Dispute resolution procedures (contractual)
<i>Risk</i>	-Division of liability -Fault-based claims	-Shared liability -Waiver of consequential damages
<i>Performance</i>	-Set mutual goals (non-contractual) -Performance measures -Continuous improvement	-Contractual profit sharing -Contractual loss sharing -Performance incentives -Continuous improvement

Contracts

Two commercially available boilerplate IPD contracts were evaluated for this paper: ConsensusDOCS 300 and AIA Document C191-2009. ConsensusDOCS describes itself as “a coalition of associations representing diverse interests in the construction industry that collaboratively develops and promotes standard form construction contract documents that advance the construction process” (ConsensusDOCS, 2010). The organization counts 32 associations as part of their coalition, the most notable of which is the Associated General Contractors of America (AGC). ConsensusDOCS 300 *Standard Form of Tri-Party Agreement for Collaborative Project Delivery*, first published in September 2007, is touted as the signature document of their catalog and the first standard construction contract to address Integrated Project Delivery (Perlberg, 2009).

The American Institute of Architects first began publishing construction contracts in 1888, and currently publishes more than 120 contracts and administrative forms for the

construction industry (AIA, 2010b). AIA publishes three series of Integrated Project Delivery documents, differentiated by how the parties contract with each other. Published in November 2009, AIA Document C191-2009 *Standard Form Multi-Party Agreement for Integrated Project Delivery*, like ConsensusDOCS 300, is a three party agreement between the owner, designer, and constructor. AIA's other IPD contracts allow for separate agreements between owner and designer and owner and constructor, as well as the formation of the three parties into a Limited Liability Corporation.

Key Practices

IPD aims to create a contractual environment fundamentally different than that of a traditional or partnering agreement contract, but when looking at specific contractually enforceable differences, ConsensusDOCS 300 and AIA C191 use five basic methods. These methods are 1). Joint Decision Making, 2). Shared Risk, 3). Budget Development and Management, 4). Pain/Gain Sharing and Incentives, and 5). Dispute Resolution.

Joint Decision Making

Ensuring all parties are involved in decision making is essential to a collaborative project. Both contracts use an explicit joint decision making process as the cornerstone of the contract. They employ two managing bodies to execute a project: an executive team and a project team. Each team is composed of a three-member core representing the principal parties of the Owner, Designer, and Constructor; with allowances for the addition of other interested parties when necessary. The executive team provides senior oversight and decision making, while the project team provides day-to-day management. These teams are designed to make decisions in the best interest of the project as a whole,

not each member's own interest. To that end, the teams make decisions by unanimity (AIA) or consensus (ConsensusDOCS requires consensus for the executive team, but does not specifically designate a decision process for the project team). If agreement cannot be reached between the three core members, the owner reserves the right to make a unilateral determination. The other parties may dispute the owner's decision through the dispute resolution provisions of the contract.

Shared Risk

Provisions for sharing of project risks and waiving claims are another important element of the IPD contracts. When implemented, the shared risk clauses waive the majority of claims except in cases of negligence, breach of contract, or when insurance proceeds are available for the claim. Contractually shared risk forces the parties to act as a single team, removing the organizational barriers required of fault-based claim environments. It creates an atmosphere where all parties are either going to win together or lose together.

Budget Development and Management

IPD projects use a progressive approach to developing project cost estimates. A not-to-exceed amount may be written into the original contract, but it represents an initial planning budget instead of a target cost. From this initial budget, the Designer and Constructor develop preliminary cost models. These cost models are regularly updated as the design phase progresses through specified milestones. When the project design is sufficiently complete, the parties agree to a target cost for the project, which is not adjusted except in the case of a material change of work, differing site conditions, or

compensable delay. This target is the cost utilized as a basis for payment to and cost/profit sharing with the Designer and Constructor.

This method of budget development takes advantage of increasing certainty in construction cost estimates as the project is designed. A fixed price design and construction contract must decide on a final price while cost estimates contain many unknowns, but a contract that allows revisions to cost estimates can decide on a target cost when those costs are much more certain (Figure 2).

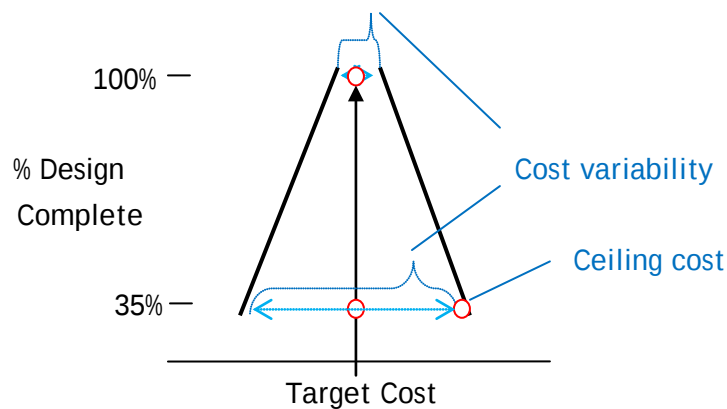


Figure 2: Cone of Uncertainty
(Adapted from Gannon, 2011)

Pain/Gain Sharing and Incentives

The next technique further enforces a win-win (or lose-lose) atmosphere by integrating the project rewards (or losses). When project costs are less than the target cost, a gain sharing agreement shares the savings among the parties according to predetermined percentages. In the other case, when project costs exceed the target cost, pain sharing distributes the losses among the parties. Pain sharing agreements often limit the designer's and constructor's losses to their overhead and profit, limiting their financial risk of joining a project.

The contracts also allow for the Designer and Constructor to earn incentive payments for meeting performance benchmarks. These plans can offer payments during the project for meeting certain goals, providing financial incentives earlier and/or in excess of the savings shared at the end of the project. The details of the incentive plans are left to the project parties to decide at the beginning of the project as a contract amendment. Incentives can be based on non-cost goals such as safety and quality, but are funded through project savings, so they depend on superior cost performance as well.

Dispute Resolution

One of the keys of the IPD contracts is the utilization of established dispute resolution procedures, pre-agreed as a binding clause of the contract at its formation. They use a three-step dispute resolution procedure. A dispute that cannot be resolved between the directly involved parties is first submitted to the joint executive team for resolution. If the executive team is unable to resolve the issue, a third-party will mediate an agreement between the project participants. If an acceptable settlement is still not agreed upon at this point, the binding resolution process is used. The preferred option is binding arbitration through a pre-established method, such as the Construction Industry Arbitration Rules of the American Arbitration Association. If binding arbitration is selected, the three parties agree to abide by it in lieu of litigation. Both contracts also offer traditional litigation for binding resolution if parties decline to agree to arbitration at the beginning of the project.

Selecting a Contract to Review

The contract to be reviewed in this study was chosen by the Choosing by Advantages (CBA) decision-making system. The central principles of CBA are that decision-makers must use sound decision-making methods, decisions must be based on the importance of advantages, and decisions must be anchored to the relevant facts (Suhr, 1999). To choose between the two alternatives, the attributes of each key practice were compared between contracts and the advantages identified. Each key practice was scored equally. Utilizing a decision table (Table 3), ConsensusDOCS 300 scores the most advantages. AIA C191 scores an advantage by having a less ambiguous management structure. While ConsensusDOCS and AIA use a similar *Shared Risk and Pain/Gain Sharing* method, ConsensusDOCS takes the advantage in both categories by providing more options and flexibility. ConsensusDOCS 300's use of milestone cost models and 100% design target costing scores it an advantage in *Budget Development and Management*. Both contracts have very similar *Dispute Resolution* methods and split that factor.

Methodology

An embedded single case study design was selected for this research, which is composed of a single case and multiple units of analysis (Yin, 2009). This type of study is appropriate to test a hypothesis with a clear set of propositions as well as clear circumstances within which they are believed to be true. The FAR provides explicit circumstances under which to test if ConsensusDOCS 300 can be utilized in federal construction.

Table 3: Selecting Contract by Choosing by Advantages

	ConsensusDOCS 300
<i>Joint Decision Making</i>	Advantage AIA C191: Management processes and teams more clearly defined (20 points) More defined processes decreases likelihood of conflict due to ambiguity
<i>Shared Risk</i>	Advantage ConsensusDOCS 300: Provides traditional liability option (20 points) Provides recourse in case of insurance difficulties
<i>Budget Development and Management</i>	Advantage ConsensusDOCS 300: Detailed milestone cost models. Target cost set after complete design. (20 points) Flexibility for cost changes during design. More accurate cost without need for amendments.
<i>Pain/Gain Sharing</i>	Advantage ConsensusDOCS 300: Flexible pain sharing methods (20 points) Allows parties to accept greater risk/reward if desired
<i>Dispute Resolution</i>	(TIE) Advantage: Nonbinding mediation before binding arbitration (0 points) No significant difference
<u>Score:</u>	<u>ConsensusDOCS 300: 60</u> <u>AIA C191 – 2009: 20</u>

The ConsensusDOCS 300 contract is divided into 25 Articles, seven of which are used to implement the key IPD practices. This study extracted the articles of the contract dealing with each alliance practice. Each key practice was used as a unit of analysis for review by a panel of three U.S. Air Force contracting officers, each with extensive experience in construction contracting. Each reviewer received a copy of the contract and a short form that specified the articles they were to review and the central clauses of each article. The reviewers were asked to answer the following questions for each article of the contract:

Do the terms of the contract meet the Federal Acquisition Regulations?

If so, are there any sections of the FAR that address the issue?

If not, what specific section(s) of the FAR does not allow certain contract conditions?

Do you see any potential alterations to the contract conditions that would bring them in line with the FAR?

A summary of the notable findings can be found in Table 4, indicating findings that impede or facilitate possible implementation under federal regulations. When researching the reviewers' findings, the authors discovered some additional findings which are included in the table. This paper's analysis was developed from a combination of the reviewers' findings and interpretations, the authors' own research and interpretations, and subsequent consultation with the reviewers.

Tri-Party Agreement (Article 1)

Article 1 is not necessarily an IPD key practice, but is an important facet of the contract that should be analyzed. It arranges three distinct parties into a single contract. This is unusual in the federal sector, where typical construction contracts use either a single contract between the Owner and a Design-Build contractor or two separate contracts between the Owner/Designer and Owner/Constructor. However, there is a precedent of contracts requiring joint participation of prime contractors in the accomplishment of a requirement. Air Force Informational Guidance 5317.9500 outlines Associate Contractor Agreements (ACA) that outline "the basis of sharing information, data, technical knowledge, expertise, and/or resources essential... to meet the terms of the contract" (Department of the Air Force, 2006). This kind of agreement is similar to the way ConsensusDOCS 300 outlines the responsibilities and interactions between

Table 4: Impediments & Facilitators to ConsensusDOCS 300 Methods

	Impediments	Facilitators
<i>Tri-Party Agreement Article 1</i>	I-1. No Precedent for Binding Tri-Party Contract (33) I-2. Competitive Selection (6.101, 36.6) I-3. Possible Organizational Conflict of Interest (9.5)	F-1. Similar to Design-Build Method (36.6) F-2. Possible Use of Associate Contractor Agreement (Air Force IG5317.9500)
<i>Management Group Article 4</i>	I-1. <u>4.6</u> Contracting Officer Approval Required for Decisions (1.601)	F-1. <u>4.1; 4.6</u> Parallels Existing Contractor/Government Relationship Precedents F-2. <u>4.1; 4.6</u> Policy of Mutual Agreement (33.204) F-3. <u>4.6</u> Owner's Final Determination Allows for Contracting Officer Approval (1.601)
<i>Shared Risk Article 3</i>	I-1. <u>3.8.2.1; 3.8.3</u> Limitations on Hazardous Indemnification Authority (50.102-1d) I-2. <u>3.8.2.1-3</u> Claims Cannot be Limited in Some Cases (11.5, 52.211-12, 33, 52.246-12) I-3. <u>3.8.3</u> Consequential Damages Under Certain Conditions (52.249-10)	F-1. <u>3.8.2.1, 3.8.3</u> Limitations on Indemnification Apply to Unusually Hazardous Only (50.102-1d) F-2. <u>3.8.2.2</u> FAR Equitable Adjustments (52.211-18, 52.236-2, 52.242-17, 52.243-1, 52.249-2)
<i>Budget, Compensation, Incentives, and Risk Sharing Articles 8-11</i>	I-1. <u>8.1.1</u> Restriction on Contract Types (16.102a,b) I-2. <u>8.1.1</u> Lack of Price Competition (6.101, 16.104a) I-3. <u>8.1, 8.3, 11.4, 11.5</u> Limitations on Incentive Contracts (16.401a,d)	F-1. <u>8.1, 8.3, 11.4, 11.5</u> Adaptable to FAR Contract Types (16.403-1, 16.403-2) F-2. <u>11.2, 11.3</u> FAR Incentive Programs (16.402)
<i>Dispute Resolution Article 23</i>	I-1. <u>23.3-5</u> Alternative Dispute Resolution Must be Voluntary (33.214.2) I-2. <u>23.5</u> Strict Limits on Binding Arbitration (33.214.4g)	F-1. <u>23.2</u> Policy of Mutual Agreement (33.204) F-2. <u>23.3-5</u> Precedence for Alternative Dispute Resolution (33.214, 33.210, AFFARS 5333.290) F-3. <u>23.3-4</u> ADR Allows Use of Neutral Party (33.214d)

1.1.1 – ConsensusDOCS 300 Clause Number Affected (Article 1 is a Single Clause)

Parentheses Indicate FAR Section Referenced (or Other Reference if Indicated)

parties, and it could be argued that an alliance contract is just an extension of this idea. However, ACAs are not contracts and do not obligate the parties in the same way a contract does. Arranging an alliance contract as an ACA would encounter many of the same difficulties as partnering agreements; without contractually binding provisions, parties are ultimately rewarded for acting in their own interest, not the project's.

A primary limitation in organizing a three party contract is the need to provide for full and open competition in the selection of two separate contractors, as required by FAR 6.101. Because of the requirement for competition, the Designer and the Constructor would have to be selected by a separate solicitation and source selection processes. In addition, 36.601-3 outlines distinct solicitation and source selection procedures to be used for Architect/Engineer (A/E) services. Another limitation is potential conflicts of interest between contractors that enter the contract as separate entities, but may have previous shared relationships or financial interests. Since the contract depends on collaborative principle and joint decision making, this could put the owner at an unfair negotiating position against a united front (perhaps a moot point when considering the Owner's final decision power). According to FAR 9.5, the contracting officer must identify and mitigate conflicts of interest. All of these issues are resolvable, but significantly complicate the solicitation and selection process. This could noticeably slow the project lead time, especially in the case of a protest of award.

A possible solution for these issues is to rearrange the contract to a Design-Build arrangement, in which the Designer and Constructor operate as a joint venture. This would change some of the collaborative principles of the contract, such as reducing three party joint decision making to a two party arrangement. Each member of the joint

venture would have to depend on a shared representative. However, certain practices such as dispute resolution, shared risk, and incentives would still meet their original intent. Pain/gain sharing could still operate as an effective incentive tool, only requiring the joint venture to internally agree on the share percentage between Designer and Constructor. While an IPD Design-Build contract would require adept management between the Designer and Constructor, it likely provides the best arrangement for a federal alliancing contract.

Joint Decision Making (Article 4)

ConsensusDOCS 300 uses a project team known as the Collaborative Project Delivery (CPD) Team for day-to-day project management. The CPD Team's decision process is not expressly outlined in the contract, deferring the settlement of disputes to the executive team. The executive team, known as the Management Group, is assigned the responsibilities of making joint decisions on issues beyond the scope of day-to-day management or in cases of disputes within the CPD Team. The Management Group and its decision process are defined in clauses 4.1 and 4.6. It is comprised of an authorized representative of the Owner, Designer, and Constructor. The Management Group is to "act in the best interest of the Project as a whole without consideration to each member's own interest." Each decision is to be made, to the greatest extent possible, by consensus. When consensus cannot be reached "the Owner shall make a determination in the best interest of the Project as a whole subject to the dispute resolution process in Article 23" (ConsensusDOCS, 2007).

Several reviewers cited existing precedents for very similar decision processes in federal defense contracts. In particular, one reviewer expressed that this arrangement operates very similarly to the collaborative project management implemented in Air Force Center for Engineering and the Environment (AFCEE) Design-Build contracts. The FAR also directly supports joint decision making. FAR 33.204 outlines that the “Government’s policy is to try to resolve all contractual issues in controversy by mutual agreement at the contracting officer’s level.”

In regards to contract decisions made by the Management Group, the authority to enact contract actions is limited solely to contracting officers according to FAR 1.601 and 1.602. This may require that the Owner’s Management Group representative be the project contracting officer, or that all Management Group decisions be subject to contracting officer approval. Since clause 4.6 already empowers final determination to the Owner, the Government retains the power to block any decisions that do not meet contracting officer approval. Therefore the contract should not have any difficulty meeting the requirements of 1.601 and 1.602.

Overall, the FAR does not provide any notable barriers to joint decision making. In fact, some areas of federal construction already use similar techniques. However, an important issue when applying this practice to the Government is ensuring proper executive buy-in and representation in the Management Group. Federal bureaucracy can cause leadership confusion and typically creates a disparity between the agency that executes construction projects and the agency that actually uses the facility. Addressing these types of issues is essential to a successful executive decision making team.

Shared Risk (Article 3)

ConsensusDOCS 300 implements a shared risk environment primarily through clause 3.8.2.1, in which the parties release each other against liabilities arising from non-negligent decisions, and 3.8.3, in which all parties waive claims against each other for consequential damages. The FAR directly addresses these types of clauses in FAR 50.102, in which it limits the authority of indemnification clauses in cases of “unusually hazardous or nuclear risks.” “Unusually hazardous” is not defined by the FAR, but Air Force acquisition guidance describes unusually hazardous risks as a potential loss that would severely impact a contractor’s financial or productive capabilities, and for which sufficient insurance is not available (SAF/AQCS, 1998). The majority of federal construction projects are unlikely to fall in this category, so this will not apply in most cases.

The more glaring difficulty with these shared risk clauses are in cases where the FAR explicitly provides for damages, such as cases of liquidated damages, non-performance, or default. FAR 33.2 as well as the Contract Disputes Act of 1978 also expressly allow for contractors to apply for claims (United States Congress, 1978). The explicit requirements of these regulations prevent the use of a blanket waiver of liability and damages.

However, ConsensusDOCS also offers a traditional risk option as an alternative. When using traditional risk, the contract suggests setting monetary limits on the total liability (beyond the coverage of insurance) the Designer and Constructor are subject to. However, this runs into the same difficulty with federal regulations as the shared risk liability waivers. Fortunately, because of the strict requirements of the FAR, federal

contracts already provide a great deal of liability protection for contractors. Numerous clauses provide for equitable adjustments for a contractor in certain circumstances, including government delay of work (52.242-17), changes (52.243-1), variations in estimated quantities (52.211-18), differing site conditions (52.236-2), and termination for convenience (52.249-2).

Therefore, the FAR manages many contract performance risks through existing FAR clauses. These clauses allow for a fact-finding and negotiation process to agree on the impact and resolution of unexpected events (risks). Combined with Joint Decision Making and the other IPD key practices, this allows for a reasonable and equitable management of risk.

Budget Development and Management and Pain/Gain Sharing (Articles 8-11)

ConsensusDOCS 300 does not include any provisions for competitive price proposals or any pre-contract price negotiations. This presents a significant issue to the FAR, in which FAR 6.101 requires full and open competition in source selection, with 16.104a establishing price as a primary competition concern. ConsensusDOCS 300's budget development model begins with a loose target budget that is successively narrowed down until a final target cost is determined at 100% design completion. This model would first appear very difficult to fit into the typical FAR fixed-price or cost-reimbursable price models, but the FAR provides strikingly similar contract models in Subpart 16.4: Incentive Contracts. In 16.403-2: Fixed-Price Incentive (Successive Targets) Contracts, the FAR provides a contract model that aligns quite closely with the intent of ConsensusDOCS 300, while allowing for cost negotiation and competition.

FAR 16.403-1 Fixed-Price (Firm Target) Contracts also meets some alliance concepts by providing pain/gain sharing, but does not provide progressive budget management.

A fixed price incentive (successive targets) contract negotiates the following elements at the outset of the contract:

1. An initial target cost.
2. An initial target profit.
3. An initial profit adjustment formula to be used for establishing the firm target profit, including a ceiling and floor for the firm target profit.
4. The production point at which the firm target cost and firm target profit will be negotiated (usually before delivery or shop completion of the first item).
5. A ceiling price that is the maximum that may be paid to the contractor, except for any adjustment under other contract clauses providing for equitable adjustment or other revision of the contract price under stated circumstances.

This method moves the initial target costs and profits required in Articles 8.1.2 and 8.1.3 from the start of project design to the solicitation and negotiation phase. It also adds a ceiling price. These are minor changes to the intent of ConsensusDOCS 300, but are significant changes in terms of meeting the FAR requirement for full and open competition. They allow specific cost values that can be used for negotiation and competition. The profit adjustment formula also allows for the parties to set a pain/gain sharing profit formula in accordance with the ConsensusDOCS contract.

As specified in ConsensusDOCS 300 Article 8, the successive targets incentive contract allows the target cost to be improved until the firm target cost is set at a certain

production point, such as 100% design. At this point, 16.403-2 allows for the parties to establish a formula for establishing the final price using the firm target cost and firm target profit. The final cost is then negotiated at completion, and the final profit is established by the formula:

“When the final cost is less than the target cost, application of the formula results in a final profit greater than the target profit; conversely, when final cost is more than target cost, application of the formula results in a final profit less than the target profit, or even a net loss. If the final negotiated cost exceeds the price ceiling, the contractor absorbs the difference as a loss. Because the profit varies inversely with the cost, this contract type provides a positive, calculable profit incentive for the contractor to control costs.” (FAR 16.403-1)

This meets nearly the exact purpose of the pain/gain sharing principle of ConsensusDOCS 300. The only key difference is the ability of the contract to allow for the contractors’ losses to be limited to their overhead and profit. Loss limits are not an essential feature, but they can reduce the prevalence of contractor risk aversion behavior, such as padding estimates, inflating contingency funds, or abstaining from competing for a project altogether.

However, the FAR does not leave the selection of contract type purely to contracting officer discretion. First, there are limits on which contract types can be used in certain situations. FAR 6.102 establishes sealed bids as the preferred method of establishing full and open competition, and FAR 16.102 requires all sealed bid solicitations to use a firm-fixed-price or fixed-price contracts with economic price adjustment contract type. Therefore, to use an incentive contract the contracting officer must first make a case

against sealed bids. FAR 6.401 outlines the four points on which this could be done, requiring the use of sealed bids when:

1. Time permits the solicitation, submission, and evaluation of sealed bids;
2. The award will be made on the basis of price and other price-related factors;
3. It is not necessary to conduct discussions with the responding offerors about their bids;
4. There is a reasonable expectation of receiving more than one sealed bid.

The project contracting officer would have to make a case on one of these points that sealed bidding is not appropriate in order to avoid the fixed price requirement.

Fortunately, this is not difficult and quite common. The most typical method is by establishing non-price measures, such as technical qualifications or past performance, as significant selection criteria. The contracting officer can then utilize best value source selection methods such as Performance Price Tradeoff or Full Tradeoff.

Next, FAR 16.401(a&d) requires that in order to use an incentive contract, the contracting officer must make a determination and finding, signed by the head of the contracting activity, establishing that “a firm-fixed-price contract is not appropriate and the required supplies or services can be acquired at lower costs and, in certain instances, with improved delivery or technical performance, by relating the amount of profit or fee payable under the contract to the contractor’s performance.” This may be a more difficult case to make, but it can use many of the same arguments as would be used to avoid sealed bids, specifically the importance of quality and performance criteria to the success of the project.

Finally, fixed price incentive (successive targets) contracts come with their own limitations, stated in 16.403-2. They can only be used when:

1. The contractor's accounting system is adequate for providing data for negotiating firm targets and a realistic profit adjustment formula, as well as later negotiation of final costs; and
2. Cost or pricing information adequate for establishing a reasonable firm target cost is reasonably expected to be available at an early point in contract performance.

Fortunately, both of the points made by these limitations can be reasonably expected to be met in a typical construction project. All of these requirements present challenges to the project contracting officer, but none of them are insurmountable. In fact, once a suitable case is made for a successive target incentive contract for one construction project, it could likely be easily revised to apply to most subsequent projects.

Incentive Program (Article 11)

Article 11.2 of ConsensusDOCS 300 outlines the development of an incentive program to reward superior performance, based on project expectations and benchmarks. This IPD key practice is directly addressed by FAR 16.402-2, 3, and 4; allowing for performance, delivery, and multiple-incentive contracts, respectfully. ConsensusDOCS 300 leaves open to the Management Group the establishment of the details of an incentive program, but FAR Part 16 makes provisions for incentive arrangements that align with the alliancing goals envisioned by ConsensusDOCS. However, incentive programs are under the same conditions of FAR 16.401(a&d) previously identified for

incentive contracts, requiring a determination and finding that they are in the best interest of the Government.

Dispute Resolution (Article 23)

The FAR sets a clear policy in 33.204 of trying to settle contractual issues by mutual agreement at the contracting officer's level prior to submission of a claim. This precisely agrees with the direct discussion and Management Group decision procedures of ConsensusDOC 300 Article 23.2. In regards to Articles 23.3 and 23.4's use of mitigation or mediation, ConsensusDOCS 300's dispute resolution procedures closely resemble the Alternative Dispute Resolution (ADR) components of the FAR. FAR 33.210 allows and encourages the use of ADR to resolve any claim over which the contracting officer would have decision authority, which includes all claims except those involving fraud or for which another agency has authority. FAR 33.214 allows the use of ADR when the following elements exist:

1. Existence of an issue in controversy
2. A voluntary election by both parties to participate in the ADR process
3. An agreement on alternative procedures and terms to be used in lieu of formal litigation
4. Participation in the process by officials of both parties who have the authority to resolve the issue in controversy
5. The confidentiality of ADR proceedings are protected consistent with

5 U.S.C. 574

6. The solicitation does not require arbitration as a condition of award, unless otherwise required by law

FAR 33.214d also allows a neutral party to “facilitate resolution of the issue in controversy using the procedures chosen by the parties.” With the limitations listed above, these regulations give the project contracting officer the capability to execute the first three dispute resolution methods used by ConsensusDOCS 300: direct discussions, mitigation, and mediation.

However, there are strict limits on the final method of binding arbitration. Binding arbitration authority is specifically limited by 33.214g to the guidelines of individual agencies, so its use is determined by the specific agency. This limitation comes from the Administrative Dispute Resolution Act, which states in section 575(c):

“Prior to using binding arbitration under this subchapter, the head of an agency, in consultation with the Attorney General and after taking into account the factors in section 572(b), shall issue guidance on the appropriate use of binding arbitration and when an officer or employee of the agency has authority to settle an issue in controversy through binding arbitration.” (United States Congress, 1996)

The Department of the Navy (2007) is one such agency that has published instructions for use of binding arbitration. This document has strict instructions and limitations on the implementation of binding arbitration; including the parties involved, when it may be used, how arbitration agreements are written, the choice of arbitrator, the conduct of arbitration hearings, arbitration awards, and the judicial review of arbitration awards.

These rigorous and extensive directives would make binding arbitration a difficult endeavor, especially since they still allow for legal review subsequent to the decision. While binding arbitration is designed to offer a timelier and less costly method of final resolution, litigation will ultimately serve the same purpose. In fact, ConsensusDOCS 300 recognizes that some parties may prefer or require litigation, offering it as an alternative to binding arbitration in the contract. Ultimately, the intent of dispute resolution is to expressly agree on dispute procedures before a dispute occurs and to offer the parties opportunities to resolve the dispute amicably before a binding resolution is required. The FAR allows for this intent to be maintained.

Conclusions

Of the five key IPD practices in ConsensusDOCS 300, only Shared Risk and the binding arbitration component of Dispute Resolution cannot be effectively implemented under current regulations. While not a key practice, ConsensusDOCS 300's tri-party contractual method also runs into difficulties. However, each of these limitations can be addressed without severely limiting the effectiveness of a comprehensive alliancing contract.

First, Design-Build would be the most reasonable method for a federal alliancing project. While the tri-party agreement could be quite effective in the civilian sector, Design-Build allows for the use of contracting and source selection methods that are already established in the federal government. It is an unnecessary distraction to attempt to break new ground on contracting and bidding methods when they are not directly related to the key practices we are trying to implement. Other than requiring some

additional coordination internal to the contractor, Design-Build does not detract from the alliancing practices.

However, some compromises are required for the key practices of Shared Risk and Dispute Resolution. Unfortunately, a shared risk of liabilities is not feasible in federal construction. Neither is ConsensusDOCS 300's alternative of traditional risk allocation with liability limits. One of the goals of an alliance embodied by sharing risk is to create a cohesive team that shares wins or losses together. Traditional risk does not enhance this goal, but much of it is still retained by Joint Decision Making and Pain/Gain Sharing. Another benefit of shared risks or contractor liability limits is reducing contractors' financial risk, the cost of which is almost always passed on to the Owner. Federal contracts already address many of these issues in their existing equitable adjustment clauses. Therefore, the existing federal construction risk structure can be used without losing significant value of the alliancing contract.

Finally, a federal alliancing contract would need to use litigation in place of binding arbitration, an option already recognized in ConsensusDOCS 300. The potential cost and time savings of binding arbitration would be lost. But, the contract can retain the benefits of setting clear procedures before a dispute creates an adversarial relationship and providing the parties opportunity to resolve disputes amicably before a binding resolution.

The remaining key practices (Joint Decision Making, Budget Development and Management, Pain/Gain Sharing and Incentives) can be achieved without any compromise from ConsensusDOCS 300. While the decision-making teams must be carefully assembled, there is no reason the Joint Decision Making clauses cannot be

replicated in a federal contract. With proper contracting officer justification, ConsensusDOCS's Budget Development and Management, Pain/Gain Sharing, and Incentives practices can be accomplished through the FAR's incentive contract methods.

We hope federal construction authorities will use these guidelines to draft a federal contract that implements alliancing key practices. New techniques always carry some risk, but several existing federal contracting avenues, such as 8(a) set-aside or AFCEE's construction programs, provide direct access to stable, capable, vetted, and experienced contractors that could be used to minimize this risk. Partnering has served an effective first step into relational contracting during the last 23 years, but it is time to take the next one. The private sector may have taken the lead this time, but there is still time for federal construction to catch up.

Acknowledgements

The writers would like to thank the Air Force Center for Engineering and the Environment and the contract review participants for their invaluable contribution to this work.

Disclaimer

The views expressed in this article are those of the writers and do not reflect the official policy or position of the U.S. Air Force, Department of Defense, the U.S. Government, or the Air Force Institute of Technology.

References

The references of this article are combined with the thesis.

IV. Conclusion

Chapter Overview

The scholarly article submitted to *ASCE Journal of Construction Engineering and Management* communicates all the prominent results of the research, including the answers to the research questions and conclusions. This chapter discusses the significance of the research, its limitations, and possible future research on this subject.

Significance of Research

The purpose of this research is to provide the Air Force (AF) and Department of Defense (DoD) alternative and potentially more successful construction contracting methods. While civilian contracting is free to use a wide range of methods, federal contracting is much more limited by laws and regulations. This research opens the possibility for the DoD to achieve the same improved project success alliancing contracts have brought to civilian construction by developing a framework under which alliancing contract methods can be used within the requirements of the FAR.

Limitations

There are several limitations to the method utilized by this research. The first is the dependence on a qualitative interpretation of ConsensusDOCS 300 and of the FAR. There is potential for variability in interpretation or misinterpretation, either in the reviewers' interpretation of the contract or the FAR or the authors' interpretation of the reviewers' input. This research also relies on a small sample size of expert reviewers. While each reviewer has extensive experience in construction contracting, the sample was not random or fully representative of federal legal and contracting experts. Finally,

because the research only reviewed the portion of the ConsensusDOCS 300 that directly represented alliancing key practices, there is a possibility that the selected clauses were not properly represented without their full context.

Future Research

An important step in implementing the recommendations of this research is to use the results to fully develop a complete federal alliancing contract document. A standard form federal alliance contract, reviewed and vetted by proper authorities, would significantly assist federal construction practitioners in utilizing an alliancing contract in their construction contracts.

Another valuable research topic would be a quantitative comparison of contract performance between traditional, partnering, and alliancing contracts, similar to the partnering versus non-partnering study performed by Weston and Gibson (1993). While significant theory and qualitative research exists, quantitative evidence of improved performance is an important step before alliancing becomes the construction standard.

Bibliography

- AIA - The American Institute of Architects. *AIA Document C191 - 2009*. Washington, DC: American Institute of Architects, 2009.
- AIA - The American Institute of Architects. *Integrated Project Delivery: Case Studies*. Sacramento, CA: AIA California Council, 2010a.
- AIA - The American Institute of Architects. (2010b). *History of AIA contract documents*. <<http://www.aia.org/contractdocs/AIAS076671>> (Oct. 27, 2010)
- Bresnen, M., & N. Marshall. "Building partnerships: Case studies of client-contractor collaboration in the UK construction industry." *Construction Management and Economics*, 18(7): 819-832 (2000a).
- , "Motivation, commitment and the use of incentives in partnerships and alliances." *Construction Management and Economics*, 18(5): 587-598 (2000b).
- Chan, A. P. C., E. W. L. Cheng, and H. Li. *Consultancy Report on Construction Partnering in Hong Kong*. The Hong Kong Housing Society, 2001.
- Chan, A. P. C., D. Scott, & A.P.L. (2004). "Factors affecting the success of a construction project." *Journal of Construction Engineering and Management*, 130(1): 153-155 (2004).
- Chan, A. P., Chan, D. W., & Yeung, J. F. *Relational Contracting for Construction Excellence*. New York: Academic Press, 2010.
- Cheng, E. W. L., & H. Li. "Construction partnering process and associated critical success factors: Quantitative investigation." *Journal of Management in Engineering*, 18(4): 194-202 (2002).

ConsensusDOCS. *ConsensusDOCS 300: Standard Form of Tri-Party Agreement for Collaborative Project Delivery*, Arlington, VA: ConsensusDOCS LLC, 2007.

ConsensusDOCS. (2010). *About ConsensusDOCS*. <<http://consensusdocs.org/about/>> (Oct. 27, 2010).

D'Amato, A. "On consensus." *Canadian Yearbook of International Law*, 8: 104-122 (1970).

Department of the Air Force. *Associate Contractor Agreements*. IG 5317.9500. Washington: HQ USAF, 2006.

-----, *Military Construction Program Fiscal Year (FY) 2011 Budget Estimates*. Justification Data Submitted to Congress. Washington: HQ USAF, 2010.

Department of the Navy. *Use of Binding Arbitration for Contract Controversies*. SECNAV Instruction 5800.15. Washington: HQ USN, 2007.

Department of Treasury and Finance. (2009). *Project Alliancing*. <<http://www.dtf.vic.gov.au/CA25713E0002EF43/pages/project-alliancing>> (Feb. 15, 2010)

Federal Acquisition Regulation. (2005). <<https://www.acquisition.gov/far/html>> (Feb. 17, 2011)

Gannon, Timothy W. *Understanding Schedule Forecasting Shortfalls in Federal Design-Build Facility Procurement*. MS Thesis, AFIT/GEM/ENV/11M-02. Air Force Institute of Technology (AU), Wright-Patterson AFB, OH, March 2011.

George A. Fuller Co. v. United States, 69 F. Supp, 409 (Ct. Cl. 1947).

Gerard, J. "Construction." *Journal of Construction Engineering and Management*, 121(3): 319-328 (1995).

- Gerrard, R. "Relational contracts - NEC in perspective." *Lean Construction Journal*, 2(1): 80-86 (2005).
- Gerybadze, A. *Strategic Alliances and Process Redesign*. New York: Walter de Gruyter, 1995.
- Kenny, A. *Wittgenstein*. Harmondsworth: Pelican Books, 1975.
- Kumaraswamy, M. M., M. Rahman, F. Y. Y. Ling, and S. T. Phng. "Reconstructing Cultures for Relational Contracting." *Journal of Construction Engineering and Management*, 131(10): 1065-1075 (2005).
- Larson, E. "Project partnering: Results of study of 280 construction projects." *Journal of Management in Engineering*, 11(2): 30-35 (1995).
- , "Partnering on construction projects: A study of the relationship between partnering activities and project success." *IEEE Transactions on Engineering and Management*, 44(2): 188-195 (1997).
- Luck, L., D. Jackson, and K. Usher. "Case Study: A Bridge Across the Paradigms." *Nursing Inquiry*, 13(2): 103-109 (2006).
- Macaulay, S. "Non-Contractual Relations in Business: A Preliminary Study." *American Sociological Review*, 28(1): 55-67 (1963).
- Macneil, I. R. "The Many Futures of Contracts." *Southern California Law Review*, 47(2): 691-816 (1974).
- , *The New Social Contract: An Inquiry into Modern Contractual Relations*. New Haven, CT: Yale University Press, 1980.
- McClosky, H. "Consensus and ideology in American politics." *The American Political Science Review*, 58(2): 361-382 (1964).

- Moore, C., D. Mosley, and M. Slagle. "Partnering Guidelines for Win-Win Project Management." *Project Management Journal*, 23(1): 18-21 (1992).
- Naoum, S. "An Overview into the Concept of Partnering." *International Journal of Project Management*, 21(1): 71-6 (2003).
- NEC. (2010). *What is the NEC*. <<http://www.neccontract.com/about/index.asp>> (Oct. 27, 2010)
- Nyström, J. "The Definition of Partnering as a Wittgenstein Family-Resemblance Concept." *Construction Management and Economics*, 23(5): 473-481 (2005).
- OGC - Office of Government Commerce. (2006). *Newsroom*.
<http://www.ogc.gov.uk/news_2006_4346.asp> (Oct. 27, 2010)
- Perlberg, B. M. *Contracting for Integrated Project Delivery: ConsensusDOCS*. Chevy Chase, MD: Victor O. Schinnerer & Company, Inc, 2009.
- Post, N. M. "Integrated-project-delivery boosters ignore many flashing red lights." *Engineering News Record*, 6 May 2010.
- Ross, J. "Introduction to project alliancing." *Defence Partnering & Alliances Conferences*, Canberra, Australia, November (2001).
- SAF/AQCS (Deputy Assistant Secretary for Contracting, Office of the Assistant Secretary of the Air Force for Acquisition). *Air Force indemnification guide for unusually hazardous or nuclear risks Revision A*. Washington DC: Pentagon, 1998.
- Sanders, Steve R., and Mary M. Moore. "Perceptions of Partnering in the Public Sector." *Project Management Journal*, 23(4): 13-19 (1992).

- Schroer, Charles R. "Corps of Engineer's Perspective on Partnering." *The use of Partnering in the Facilities Design Process: Summary of a Symposium*. Ed. Federal Construction Counsel. Washington, D.C.: National Academy Press, 1994.
- Suhr, Jim. *The Choosing By Advantages Decisionmaking System*. Westport, CT: Quorum Books, 1999.
- United States Congress. *Administrative Dispute Resolution Act of 1996*. Public Law No. 104-320, 104th Congress. Washington:GPO, 1996.
- United States Congress. *Contract Disputes Act of 1978*. Public Law No. 95-563, 95th Congress. Washington:GPO, 1978.
- Walker, A. *Project Management in Construction*. Oxford: BSP Professional Books, 1989.
- Walker, D. H. T., K. Hampson, and R. Peters. "Project alliancing and project partnering - what's the difference? Partner selection on the Australian national museum project - A case study." *Proceedings of CIBW92 procurement system symposium on information and communication in constructions projects*, 641-655 (2000).
- , "Project Alliancing Vs Project Partnering: A Case Study of the Australian National Museum Project." *Supply Chain Management: An International Journal*, 7(2): 83-91 (2002).
- Weston, D., and G. Gibson. "Partnering Project Performance in US Army Corps of Engineers." *Journal of Management in Construction*, 9(4): 331-344, 1993.
- Williams, A. E. *Partnering*. Commander's Policy Memorandum #4. Washington, DC: U.S. Army Corps of Engineers, Department of the Army, 1993

- Wright, Q. "Custom as a basis for international law in the post-war world." *Texas International Law Forum*, 2: 147 (1966).
- Yeung, J. F. Y., A. P. C. Chan, and D. W. M. Chan. "The Definition of Alliancing in Construction as a Wittgenstein Family Resemblance Concept." *International Journal of Project Management*, 25(12): 219-31 (2007).
- Yin, R. K. *Case Study Research: Design and Methods*. 4th ed. Thousand Oaks, CA: Sage Publications, 2009.

Vita

Capt Travis R. Johnson graduated in the class of 2001 from Spencer-Van Etten High School in Spencer, New York. He entered undergraduate studies at Rochester Institute of Technology in Rochester, NY where he graduated with a Bachelor of Science degree in Mechanical Engineering in May 2006. He was commissioned into the United States Air Force through Detachment 538 AFROTC.

His first assignment was as Base Mechanical Engineer at 14th Civil Engineer Squadron, Columbus AFB, Mississippi. From May 2008 to Nov 2008, he deployed to Al Asad Air Base, Iraq, serving as a design engineer on Facility Engineer Team Detachment 14. Upon returning to Columbus AFB, he became the Readiness and Emergency Management Flight Commander. In August 2009 he entered the Graduate School of Engineering and Management, Air Force Institute of Technology, where he earned a Master's of Science degree in Engineering Management with a focus in Construction Management. Upon graduation, he will be assigned to the 820th Red Horse Squadron, Nellis AFB, Nevada.

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 074-0188	
The 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 the collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to an penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 24-03-2011		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From – To) Sep 2009 – March 2011	
TITLE AND SUBTITLE Application of Relational Contracting Methods to Federal Construction Projects				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Johnson, Travis R., Captain, USAF				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S) Air Force Institute of Technology Graduate School of Engineering and Management (AFIT/ENV) 2950 Hobson Way, Building 640 WPAFB OH 45433-7765				8. PERFORMING ORGANIZATION REPORT NUMBER AFIT/GEM/ENV/11-M03	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Intentionally left blank				10. SPONSOR/MONITOR'S ACRONYM(S) Fill in	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.					
13. SUPPLEMENTARY NOTES This material is declared a work of the U.S. Government and is not subject to copyright protection in the United States.					
14. ABSTRACT Relational contracting is a method designed to improve relationships between contracted parties. The federal construction sector was a leader in the development and implementation of an early form of relational contracting known as partnering. Since then, alliancing has emerged as the new evolution of relational contracts. While it provides many potential benefits to contracting parties, alliancing has not yet been utilized in federal construction procurement, which is subject to stringent regulations. A commercially available standard form alliancing contract was selected for analysis against the Federal Acquisition Regulation. Key practices that characterize the alliancing method were identified. Utilizing a panel of federal contracting experts, qualitative data were gathered to analyze which of these key practices do or do not comply with federal regulations, why certain practices do not comply, and how those practices could achieve compliance. The results show that most alliancing key practices can be utilized in a federal acquisition project. While some practices cannot be used effectively under current regulations, these limitations do not significantly hinder the use of a comprehensive and effective federal alliancing contract.					
15. SUBJECT TERMS Scheduling, production control, lean construction, federal facility procurement, public sector construction, construction management					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF OF ABSTRACT UU	18. NUMBER OF PAGES 60	19a. NAME OF RESPONSIBLE PERSON Peter Feng, Lt Col, USAF ADVISOR
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (Include area code) (937) 255-6565, ext 4648 (peter.feng@afit.edu)

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39-18