



agcXML Data Exchange Case Study

building**SMART**alliance™

National Conference

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AGC of America
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

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National Institute of
BUILDING SCIENCES



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Project Goals and Methodology:

- Develop method to streamline information exchange during design and construction.
- Support intelligent information exchange, not document exchange.
- Use existing standard construction documents as baseline for defining business processes.
- Focus on the information that needs to be exchanged; avoid defining new business practices or codifying existing ones.
- Develop use cases for each information exchange.
- Develop XML schemas for each information exchange.

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Reference Documents:

- Owner / Constructor agreements
- Schedules of Values
- Requests for Information*
- Requests for Pricing/Proposals
- Supplemental Instructions
- Construction Change Directives
- Submittals
- Change Orders
- Applications for Payment
- Bonds

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Final 30-day Review Period:

- Opens **December 12, 2008**
- Closes **January 12, 2009**
- Open to all interested reviewers.
- Documents available at **www.agcxml.org**.
- Username: **member** Password: **nibsagc**
- Join Review and Validation Committee to receive all notices by sending e-mail to **mtardif@nibs.org**.

When published in early 2009, agcXML will be licensed at no cost in perpetuity to any software company.

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< /AGCxml > Information Exchange

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DRAFT AIA Document A101™ - 1997

Standard Form of Agreement Between Owner and Contractor
where the basis of payment is a STIPULATED SUM

AGREEMENT made as of the _____ day of _____ in the year of _____
(In words, indicate day, month and year)

BETWEEN the Owner:
(Name, address and other information)

and the Contractor:
(Name, address and other information)

The Project is:
(Name and location)

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The Architect is:
(Name, address and other information)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA Standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201-1997, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

This document has been approved and endorsed by The Associated General Contractors of America.



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AGC DOCUMENT NO. 205 STANDARD SHORT FORM AGREEMENT BETWEEN OWNER AND CONTRACTOR

(Where the Contract Price is a Lump Sum)

Job Number: _____

Account Code: _____

This Agreement is made this _____ day of _____, by and between

OWNER,

and

CONTRACTOR,

PROJECT:

ARCHITECT/ENGINEER:

1 THE WORK **Contractor** shall furnish construction administration and management services and use **Contractor's** best efforts to perform the Work in an expeditious manner consistent with the Contract Documents. **Contractor** shall provide all labor, materials, equipment and services necessary to complete the Work, as described in Exhibit A, all of which shall be provided in full accord with and reasonably inferable from the Contract Documents as being necessary to produce the indicated results.

2 **CONTRACT PRICE** As full compensation for performance by **Contractor** of the Work, **Owner** shall pay **Contractor** the lump sum price of _____ Dollars (\$ _____). The lump sum price is hereinafter referred to as the Contract Price, which shall be subject to increase or decrease as provided in this Agreement.

3 **INSURANCE** Prior to the start of the Work, **Contractor** shall purchase and maintain insurance coverage and limits of liability as set forth in Exhibit E, that will protect **Contractor** from claims arising out of **Contractor** operations under this Agreement, whether the operations are by **Contractor**, or any of

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Types of information in reference documents:

- Standard language (proprietary, largely unstructured)
 - User modifications (edits) to standard language
 - Project-specific “fill-in-the-blank” information (non – proprietary; partially structured)
-
- agcXML structures and captures only the third type of information.
 - software developers not required to reveal or share any proprietary code, contract document publishers not required to share any proprietary content.

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DRAFT AIA® Document G703™ – 1992

Continuation Sheet

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.
 In tabulations below, amounts are stated to the nearest dollar.
 Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
 APPLICATION DATE:
 PERIOD TO:
 ARCHITECT'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G		H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD		TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)		
	GRAND TOTAL	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	0.00 %	\$ 0.00	\$ 0.00

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agcXML Schema Content: Example

Owner/Constructor Agreements (184 data fields in 13 categories):

- Agreement Date
- Owner Information (see next slide)
- Contractor Information
- Project Information
- Prime Design Professional Information
- Project Milestone Dates
- Liquidated Damage or Bonus Provisions
- Compensation Provisions (see subsequent slide)
- Payment Provisions
- Insurance, Bond, & Indemnity Provisions
- Other Provisions
- Contract Documents
- Exhibits

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agcXML Content Summary: Example Information Category

Owner/Constructor Agreements: Owner Information – 22 Data Fields*

Owner Company Name	Owner Representative Phone
Owner Project Number	Owner Representative Fax
Owner Address 1	Owner Representative e-mail Address
Owner Address 2	Owner Signature
Owner City	Owner Signatory Last Name
Owner State	Owner Signatory First Name
Owner Country	Owner Signatory Title
Owner Company Phone	Owner Signature Witness Signature
Owner Company Fax	Owner Signature Witness Signatory Last Name
Owner Representative Last Name	Owner Signature Witness Signatory First Name
Owner Representative First Name	Owner Signature Witness Signatory Title

*whether a field is used in a particular transaction determined by cardinality.

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agcXML Content Summary: Example Information Category

Owner/Constructor Agreements: Compensation Provisions – 29 Fields*

Contract Sum in words	Accepted Alternate Title/Description
Contract Sum in numerals	Accepted Alternate Sum
Contractor's Fee (Cost-Plus-a-Fee Agreements)	Outstanding Alternate ID
Contractor's Fee Adjustment Terms	Outstanding Alternate Title/Description
Preconstruction Services Compensation	Outstanding Alternate Sum
Contractor's Office Project Personnel Functional Title	Outstanding Alternate Expiration Date
Contractor's Site Personnel	Unit Price Item ID
Contractor's Site Personnel, Status	Unit Price Item Title/Description
Contractor's Site Personnel, Rate of Compensation	Unit Price Number of Units
Contractor's Site Personnel, Compensation Period	Unit Price, Cost per Unit
Guaranteed Maximum Price	Allowance Item ID
Guaranteed Maximum Price Savings Provisions	Allowance Item Title/Description
Guaranteed Maximum Price Assumptions	Allowance Item Sum
Accepted Alternate ID	Allowance Item Type

*whether a field is used in a particular transaction determined by cardinality.

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Why agcXML?

- eliminate duplicate re-entry of data.
- leverage data now trapped in “documents” for other business processes.
- enable data exchange between dissimilar applications.
- allow users to collaborate with business partners using their preferred software.
- structure data to facilitate alignment and integration with building information modeling data.
- facilitate eCommerce in design and construction.

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Who benefits?

- **constructors** (general contractors, design-builders, construction managers, subcontractors).
- **design professionals** (architects, engineers, landscape architects, interior designers).
- **building industry software companies** (contract document, project management, financial management, information management, facility management).
- **building owners.**

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agcXML Schema Design

Every information exchange transaction includes the following data elements:

- Actors
- Roles
- Message content
- Required or desired action or response
- Tracking / logging
- Cardinality of data elements (governs allowable frequency of occurrence)

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agcXML Actors: Examples

- Owner
- Prime Designer (Architect, Engineer)
- Design Sub-consultant
- General Contractor
- Subcontractor
- Design Builder
- Construction Manager
- Any others that now exist or may develop over time...

Any actor can be matched with any...

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agcXML Roles:

- Sender
(initiates a transaction)
- Receiver
(expected to take action)
- Recipient
(on the “cc:” list; optional; read-only; action generally not expected or required)

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Simplicity of schema design:

- Any actor can play any role needed to execute a transaction and complete a business process.
- Every transaction is a simple, bilateral transaction between one sender and one receiver. Any required response becomes a subsequent transaction.
- Complex business processes may be modeled as sequential, nested, or compound transactions.

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agcXML Action/Response elements:

There are two elements to every action/response:

- **transactional response:** dispose of or complete transaction
- **substantive response:** take action related to the project

Most (but not all) transactions require both a transactional and substantive action/response.

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Examples of typical transactional action/response:

- Initiate (Sender)
- Receive (Receiver)
- Acknowledge (Receiver, Recipient)
- Review (Receiver Recipient)
- Comment (Receiver)
- Accept (Receiver)
- Reject (Receiver)
- File/Log (Sender, Receiver, Recipient)
- Forward to others (initiate subsequent transaction)
- Respond to sender (initiate subsequent transaction)

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Examples of substantive action/response:

- Design/Calculate
- Amend contract documents
- Research (design/cost/time)
- Compile information internally
- Compile information from others
- Execute work
- Direct others to execute work

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Cardinality: the number of instances of a data element that can occur or appear in a transaction.

[1] = required element; only one instance allowed

(e.g., owner, constructor, contract sum, contract date)

[0..1] = optional element; one instance maximum

(e.g., bonus/penalty provision amount)

[1..n] = required element, limited number

[0..n] = optional element, limited number

(prescriptive; a form of “hard coding;” rare in agcXML)

[1..*] = required element, unlimited number

[0..*] = optional element, unlimited number

(e.g., schedule of values items; unit prices, any item list)

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Benefits of schema design:

- eliminates need to prescriptively “hard code” every specific information-exchange transaction or business process.
- flexible; actors, roles, message content may change with time, but basic schema design remains the same.
- adaptable; as business culture and business practices change, new schemas can be easily developed for new types of transactions

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Gap Analysis:

Two types of gaps identified in existing contract document forms:

- **Insufficiently structured data fields** in electronic versions of standard contract documents will require revision of these applications to support agcXML (not an issue for PM, FM(\$), FM applications).
- **Poorly-documented customary information exchanges:**
 - Schedule of values – initial submission undocumented
 - RFI – undocumented
 - Information exchanges that precede formal exchanges (e.g., change orders) – undocumented

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agcXML Implementation – How?

- Software developers build in support for exchange schemas.
- Data is alphanumeric; easier to exchange than geometric building (BIM) data.

agcXML Implementation – When?

- Typical software upgrade cycle: 12 months

agcXML Implementation – Watch for:

- Surety industry: “Bond Credit Bureau”
- Open Geospatial Consortium: B-to-BIM Testbed

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Questions?

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