agcXML Data Exchange
Case Study

buildingSMART alliance™
National Conference
Wednesday, December 10, 2008
Washington, DC
Speakers:

**Michael Tardif**
Director, Integrated Project Delivery Systems
Grunley Construction Company, Inc.
(soon to be emeritus) agcXML Project Manager

**agcXML Task Force Members:**

**Kurt Koenig**
Vice President
Penta Technologies, Inc.

**Ron Antevy**
CEO
E-Builder, Inc.

www.agcxml.org  username: member  password: n i b s a g c
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.

www.agcxml.org  username: member  password: nibsagc
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

www.agcxml.org  username: member  password: nibsagc
Final 30-day Review Period:

- Opens December 12, 2008
- Closes January 12, 2009
- Open to all interested reviewers.
- 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.

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)

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

The Owner and Contractor agree as follows:

AGG TEXT COPY

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AGG 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 ________, 20____, 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 at full cost and in accordance with 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 B, that will protect Contractor from claims arising out of Contractor’s operations under this Agreement, whether the operations are by Contractor, or any of
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.
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 1 on Contracts where variable retainage for line items may apply.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION OF WORK</th>
<th>SCHEDULED VALUE</th>
<th>WORK COMPLETED FROM PREVIOUS APPLICATION</th>
<th>THIS PERIOD</th>
<th>MATERIALS PRESENTLY STORED (NOT IN D OR E)</th>
<th>TOTAL COMPLETED AND STORED TO DATE (D+E+F)</th>
<th>% (G + C)</th>
<th>BALANCE TO FINISH (C + G)</th>
<th>RETAINAGE (IF VARIABLE RATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAND TOTAL</td>
<td></td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 %</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
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
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.
agcXML Content Summary: Example Information Category

Owner/Constructor Agreements: Compensation Provisions – 29 Fields*

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

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

www.agcxml.org username: member password: nibs agc
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.

www.agcxml.org username: m e m b e r password: n i b s a g c
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**.
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)
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…

www.agcxml.org    username: member    password: nibsagc
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)
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.
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.
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)
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
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)

www.agcxml.org  username: m e m b e r  password: n i b s a g c
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
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
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
Questions?
mtardif@nibs.org