THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

NATIONAL INSTITUTE OF BUILDING SCIENCES

agcXML

CHANGE DIRECTIVE
DATA SPECIFICATION AND SCHEMA

VERSION 1.0
MARCH 4, 2009

The agcXML Project

The Associated General Contractors of America

Electronic Information Systems Committee
Mr. William A. Cobb, Jr, Chair

agcXML Task Force
Mr. John Nabholz, Chair

Monique Valentine
Chief Financial Officer
agcXML Project Staff Contact

Project Team

National Institute of Building Sciences
Henry L. Green, Hon. AIA
President

buildingSMART alliance
Dana K. Smith, FAIA
Executive Director

agcXML Review and Validation Committee
Dan Bailinger, Chair

Technical Team

Michael Tardif
agcXML Project Manager

Dr Thomas Liebich, AEC3

Thomas Froese, Ph.D., P.E.

Yimin Zhu, Ph.D.

Francois Grobler, Ph.D.
Technical Adviser

March 2009

1 CHANGE DIRECTIVE

The agcXML ChangeDirective schema is discussed in this document as a class diagram using the Unified Modeling Language notation, UML. The document should present the overall structure of the agcXML schema and discuss its components and dependencies—particularly the interrelationship between the common layer for agcXML definitions, common agcXML definitions and the particular usage and extension for the ChangeDirective schema. It also shows where components from ifcXML are reused and where IFC based BIM information can be handled and mapped into agcXML.

1.1   The `ChangeDirective` schema

The `ChangeDirective` schema is the schema to be used for sending and receiving construction change directives between parties involved in electronic exchange of business messages. The schema deals with the variable part of the change directive, not with the layout of the documents. In scope are:
- The meta-data of the construction change directive document (who, when, with what application)
- The sender (advisor) role, and the receiver role (for owner, contractor, construction manager and architect information)
- The project information
- The method of contract sum adjustment
- The change in project schedule

1.1.1   Name space considerations

The following name spaces are assigned:
- ifcXML – not part of the XML schema, will be handled by XSLT based mapping, when required
- aecXMLCOS:
  - xmlns:cos="http://www.aecXML.org/aecXML/cos"
- agcXMLCommon:
  - xmlns:agcxml="http://www.aecXML.org/agcXML/agcXMLCommon"
- Change Directive:
  - xmlns:agcchd="http://www.aecXML.org/agcXML/ChangeDirective"

1.2   The `ChangeDirective` root element

The root element of the xml exchange document is the `ChangeDirective` element. It is defined in the `ChangeDirective` name space, and inherits from the `DocumentTransaction` in the `agcXMLCommon` name space. All attributes and elements of `DocumentTransaction` are explained in the document "agcXML common definitions".

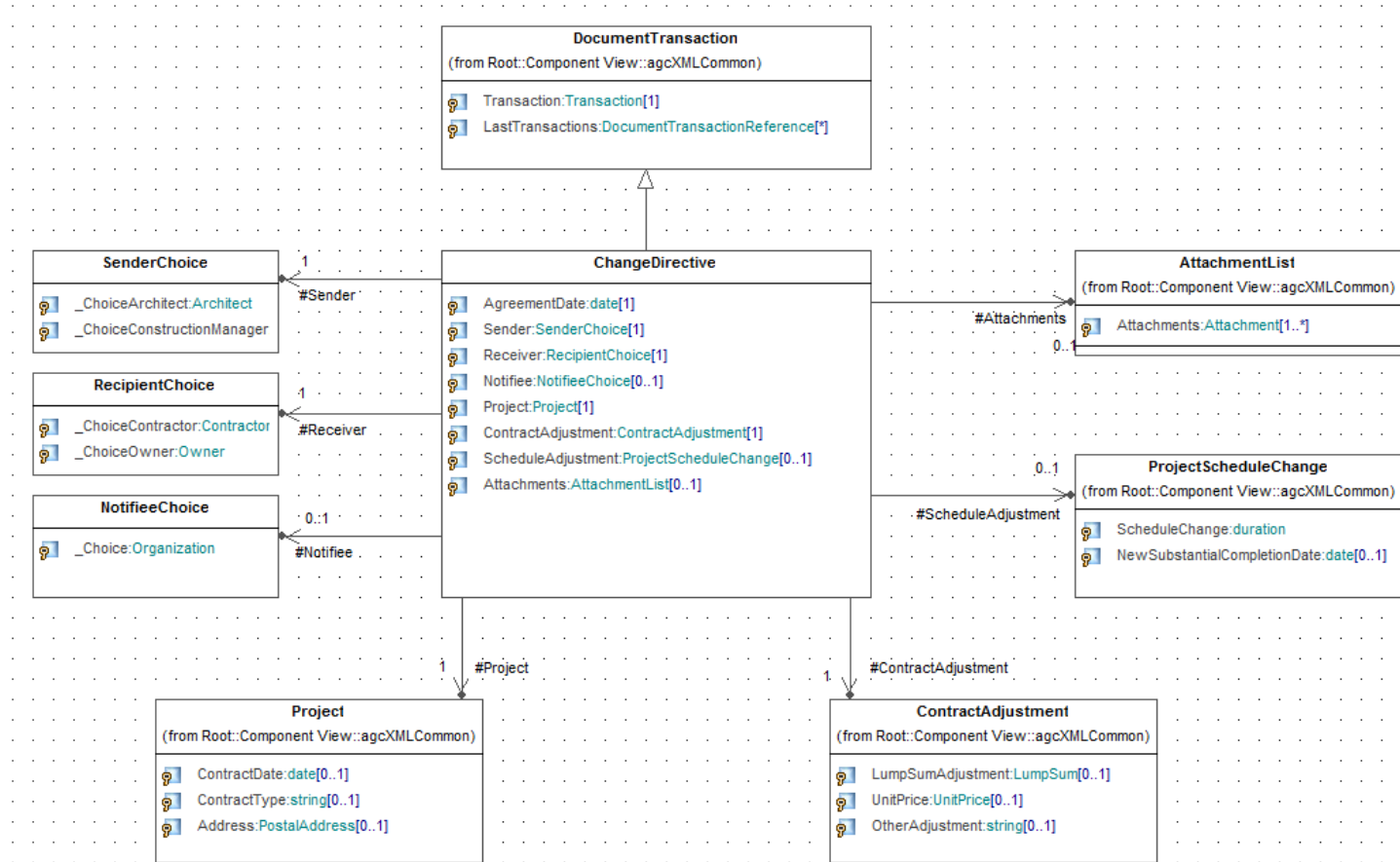The `ChangeDirective` element adds the following change directive specific elements:

Figure 1: the root element **ChangeDirective** *in* **ChangeDirective** *name space*

1.2.1   Basic document information

The **ChangeDirective** carries (if fully instantiated) the following information:

- The governing form (i.e. the template for the construction change directive document)
- The information about the parties of the construction change directive
  - The sender information, being:
    - Architect/Designer information (e.g. for change directives with architect's signature)
    - Construction manager information (e.g. for change directives with construction manager's signature)
  - The recipient information, being:
    - Contractor information
    - Owner information
  - The notifiee information (optional), being:
    - Contractor information
    - Owner information
- The project information (name and reference number)
- The method of contract sum adjustment
  - Changes of the lump sum, unit prices or other cost parameters
- The change in project schedule
  - With change in time and new substantial completion date
- (Optionally) attachments to the application for payment

1.2.2   Governing form

The exchange of the construction change directive is based on the information entered by one or both parties to the exchange in standard forms published by AGC, the AIA, or other standard-form publishers. The element **GoverningForm** is defined at **Document**.

It identifies the underlying and governing form. It currently includes:

- ConsensusDOCS 203   Interim Directed Change
  (formerly AGC Document 203)
- AIA Document G714-2001   Construction Change Directive
- AIA Document G-714/CMa-1992   Construction Change Directive, Construction Manager-Adviser Edition

It should be noted that the exchange of the copyright text of the standard form, commonly known as the "boilerplate text," is not facilitated by this schema. Proposed exchanges of the boilerplate text must be facilitated separately, e.g. by referencing an electronic document.

1.3   The parties involved in the change directive

A change directive is established between an Architect/Designer and a Contractor.

Information about organization and person information of the parties is provided in the document "agcXML common definitions", section "Person and organization".

1.3.1   The sender information

The sender for the **ChangeDirective** is presented by the Architect or ConstructionManager. It is accessible as **Sender**.

A sender (or initiator of the change directive) can be the architect/engineer (e.g. for owner-contractor change orders with architect's signature following AIA forms) or by the construction manager (e.g. for owner-contractor change orders with construction manager's signature following AIA forms).

1.3.2   The recipient information

The recipient for the **ChangeDirective** is presented by the **Contractor**. It is accessible as **Recipient**.

1.3.3   The notifiee information

Any organization can be a notifiee. The notifiee is optional information.

1.3.4   Choice of roles for client and/or applicant

The information about **Owner**, **Contractor**, **ConstructionManager**, and **Architect** is provided in the document "agcXML common definitions". The information is independent of whether the organization is the sender, recipient or notifiee in this transaction.

1.4   The project information of the change directive

The **ProjectInformation** is provided by **Project**. Information about **Project** is provided in the document "agcXML common definitions". The minimum information provided within the ChangeDirective element should be **Project.Name**, **.Description**, **.ProjectId**, and **.ContractDate**.

Information about Project is provided in the document "agcXML common definitions", section "Project".

1.5   The contract adjustment information

The **ChangeDirective** provides information about how the change in contract sum will be calculated. It is provided by the element **ContractAdjustment** defined in the **agcXMLCommon** name space.

Information about ChangeDirective is provided in the document "agcXML common definitions", section "Cost items".

1.6   The change of project schedule

The change in project time is provided by the element **ProjectScheduleChange**, defined in the **agcXMLCommon** name space.

Information about **ProjectScheduleChange** is provided in the document "agcXML common definitions", section "Schedule".

1.7   Attachments

Optionally, attachments can be added to the transaction. It is provided by the **AttachmentList**.

Information about **AttachmentList** and **Attachment** is provided in the document "agcXML Common Definitions", section "Document references."

2 XML SCHEMA

The XML schema definitions are defined in different name spaces following the agcXMLtechnical framework.

- The most general definitions are included in the **aecXMLCOS** name space; some of those definitions are taken from other standards, such as **ifcXML** for general elements and ISO-IEC_82045-5 for document metadata.

- Definitions that are common to AGC document exchanges within the scope of **agcXML** are included in the **agcXMLCommon** name space.

- Definitions that are specific to the exchange of the change directive are included in the **ChangeDirective** name space.

2.1   aecXMLCOS name space

The XML schema definitions of the aecXMLCOS schema are provided in the document "agcXML common definitions", section "aecXML schema".

2.2   agcXMLCommon name space

The XML schema definitions of the agcXMLCommon schema are provided in the document "agcXML common definitions", section "agcXMLCommon schema".

2.3   agcXMLChD name space

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- Mit XMLSpy v2007 sp2 (http://www.altova.com) von Thomas Liebich (AEC3 Deutschland GmbH) bearbeitet
-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:cos="http://www.aecXML.org/aecXML/cos"
xmlns:agcxml="http://www.aecXML.org/agcXML/agcXMLCommon"
xmlns:agcchd="http://www.aecXML.org/agcXML/ChangeDirective"
targetNamespace="http://www.aecXML.org/agcXML/ChangeDirective" elementFormDefault="qualified"
attributeFormDefault="unqualified">
   <xs:import namespace="http://www.aecXML.org/aecXML/cos" schemaLocation="aecXMLCOS.xsd"/>
   <xs:import namespace="http://www.aecXML.org/agcXML/agcXMLCommon" schemaLocation="agcXMLCommon.xsd"/>
   <!--change directive diagram-->
   <xs:element name="ChangeDirective" type="agcchd:ChangeDirective"
substitutionGroup="agcxml:DocumentTransaction" nillable="false">
      <xs:annotation>
         <xs:documentation>Root element for the XML exchange document for AGC construction change
directives</xs:documentation>
      </xs:annotation>
   </xs:element>
   <xs:complexType name="ChangeDirective">
      <xs:complexContent>
         <xs:extension base="agcxml:DocumentTransaction">
            <xs:sequence>
               <xs:element name="AgreementDate" type="xs:date" minOccurs="0"/>
               <xs:element name="Sender">
                  <xs:complexType>
                     <xs:group ref="agcchd:SenderChoice"/>
                  </xs:complexType>
               </xs:element>
               <xs:element name="Receiver">
                  <xs:complexType>
                     <xs:group ref="agcchd:ReceiverChoice"/>
                  </xs:complexType>
               </xs:element>
               <xs:element name="Notifiee">
                  <xs:complexType>
                     <xs:choice>
                        <xs:element ref="agcxml:Organization"/>
                     </xs:choice>
```

```
                </xs:complexType>
            </xs:element>
            <xs:element name="Project" type="agcxml:Project"/>
            <xs:element name="ContractAdjustment" type="agcxml:ContractAdjustment"/>
            <xs:element name="ChangeSchedule" type="agcxml:ProjectScheduleChange"/>
            <xs:element name="Attachments" type="agcxml:AttachmentList" minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <!--ChangeDirective actor diagram - Group definition for choice of client, applicant, and advisor-->
  <xs:group name="SenderChoice">
    <xs:choice>
      <xs:element ref="agcxml:Architect"/>
      <xs:element ref="agcxml:ConstructionManagerAdvisor"/>
    </xs:choice>
  </xs:group>
  <xs:group name="ReceiverChoice">
    <xs:choice>
      <xs:element ref="agcxml:Owner"/>
      <xs:element ref="agcxml:Contractor"/>
    </xs:choice>
  </xs:group>
</xs:schema>
```

A ASSIGNMENT TO COMPARATIVE ANALYSIS

The following table shows each agcXML element reference (defined as a path from root element **ChangeDirective** in **ChangeDirective** name space) assigned to the corresponding data field obtained from the comparative analysis of the existing transaction media for change directive transactions (the commonly accepted standard contract forms published by the AIA, AGC, and EJCDC, and others). The table is NOT intended to represent the entire content of the schema or the actual cardinality of each element in the schema. The full comparative analysis is published separately and can be obtained from AGC.

agcXML Comparative Analysis		
Data Field Description/Content	Cardinality	agcXML path
Agreement Date		
Project Agreement Date (dd/mm/yyyy)	[1]	AgreementDate:date (based on xs:date)
Owner Information		
Owner Company Name	[1]	Recipient or Notifiee: Owner.Name
Owner Project Number	[1]	Recipient or Notifiee: Owner.ProjectNumber
Owner Address 1	[1]	Recipient or Notifiee: Owner.PostalAddress.AddressLine1
Owner Address 2	[1]	Recipient or Notifiee: Owner.PostalAddress.AddressLine2
Owner City	[1]	Recipient or Notifiee: Owner.PostalAddresss.Town
Owner State	[1]	Recipient or Notifiee: Owner.PostalAddress.Region
Owner Country	[1]	Recipient or Notifiee: Owner.PostalAddress.Country
Owner Company Phone	[1]	Recipient or Notifiee: Owner.TelecomAddress.Telephone
Owner Company Fax	[1]	Recipient or Notifiee: Owner.TelecomAddress.Facsimile
Owner Representative Last Name	[1]	Recipient or Notifiee: Owner.Representative.FamilyName
Owner Representative First Name	[1]	Recipient or Notifiee: Owner.Representative.GivenName
Owner Representative Title	[1]	Recipient or Notifiee: Owner Representative.RepresentativeTitle
Owner Representative Phone	[1]	Recipient or Notifiee: Owner.Representative.Addresses.Telephone
Owner Representative Fax	[1]	Recipient or Notifiee: Owner.Representative.Addresses.Facsimile
Owner Representative e-mail Address	[1]	Recipient or Notifiee: Owner.Representative.Addresses.Email
Owner Representative Construction Change Directive Signature	[1]	<<actual signature not exchanged - see discussion about electronic signature>>
Owner Representative Construction Change Directive Signature Date	[1]	<<actual signature not exchanged - see discussion about electronic signature>>
Contractor Information		
Contractor Company Name	[1]	Recipient or Notifiee : Contractor.Name
Contractor Project Number	[1]	Recipient or Notifiee: Contractor.ProjectNumber
Contractor Account Code	[1]	Recipient or Notifiee: Contractor.ProjectAccountCode
Contractor Address 1	[1]	Recipient or Notifiee: Contractor.PostalAddress.AddressLine1
Contractor Address 2	[1]	Recipient or Notifiee: Contractor.PostalAddress.AddressLine2

Contractor City	[1]	Recipient or Notifiee: Contractor.PostalAddress.Town
Contractor State	[1]	Recipient or Notifiee: Contractor.PostalAddress.Region
Contractor Country	[1]	Recipient or Notifiee: Contractor.PostalAddress.Country
Contractor Company Phone	[1]	Recipient or Notifiee: Contractor.TelecomAddress.Telephone
Contractor Company Fax	[1]	Recipient or Notifiee: Contractor.TelecomAddress.Facsimile
Contractor Representative Last Name	[1]	Recipient or Notifiee: Contractor.Representative.FamilyName
Contractor Representative First Name	[1]	Recipient or Notifiee: Contractor.Representative.GivenName
Contractor Representative Title	[1]	Recipient or Notifiee: Contractor.Representative.RepresentativeTitle
Contractor Representative Phone	[1]	Recipient or Notifiee: Contractor.Representative.Addresses.Telephone
Contractor Representative Fax	[1]	Recipient or Notifiee: Contractor.Representative.Addresses.Facsimile
Contractor Representative e-mail Address	[1]	Recipient or Notifiee: Contractor.Representative.Addresses.Email
Contractor Representative Construction Change Directive Signature	[1]	<<actual signature not exchanged - see discussion about electronic signature>>
Contractor Representative Construction Change Directive Signature Date	[1]	<<actual signature not exchanged - see discussion about electronic signature>>
Prime Design Professional Information		
Architect/Engineer Company Name	[0..1]	Sender: Architect.Name
Architect/Engineer Project Number	[0..1]	Sender: Architect.ProjectNumber
Architect/Engineer Address 1	[0..1]	Sender: Architect.PostalAddress.AddressLine1
Architect/Engineer Address 2	[0..1]	Sender: Architect.PostalAddress.AddressLine2
Architect/Engineer City	[0..1]	Sender: Architect.PostalAddress.Town
Architect/Engineer State	[0..1]	Sender: Architect.PostalAddress.Region
Architect/Engineer Country	[0..1]	Sender: Architect.PostalAddress.Country
Architect/Engineer Company Phone	[0..1]	Sender: Architect.TelecomAddress.Telephone
Architect/Engineer Company Fax	[0..1]	Sender: Architect.TelecomAddress.Facsimile
Architect/Engineer Representative Last Name	[0..1]	Sender: Architect.Representative.FamilyName
Architect/Engineer Representative First Name	[0..1]	Sender: Architect.Representative.GivenName
Architect/Engineer Representative Title	[0..1]	Sender: Architect.Representative.RepresentativeTitle
Architect/Engineer Representative Phone	[0..1]	Sender: Architect.Representative.Addresses.Telephone
Architect/Engineer Representative Fax	[0..1]	Sender: Architect.Representative.Addresses.Facsimile
Architect/Engineer Representative e-mail Address	[0..1]	Sender: Architect.Representative.Addresses.Email
Architect/Engineer Representative Construction Change Directive Signature	[0..1]	<<actual signature not exchanged - see discussion about electronic signature>>
Architect/Engineer Representative Construction Change Directive Signature Date	[0..1]	<<actual signature not exchanged - see discussion about electronic signature>>
Construction Manager Information		
Construction Manager Company Name	[1]	Sender: ConstructionManager.Name
Construction Manager Project Number	[1]	Sender: ConstructionManager.ProjectNumber

Construction Manager Address 1	[1]	Sender: ConstructionManager.PostalAddress.AddressLine1
Construction Manager Address 2	[1]	Sender: ConstructionManager.PostalAddress.AddressLine2
Construction Manager City	[1]	Sender: ConstructionManager.PostalAddress.Town
Construction Manager State	[1]	Sender: ConstructionManager.PostalAddress.Region
Construction Manager Country	[1]	Sender: ConstructionManager.PostalAddress.Country
Construction Manager Company Phone	[1]	Sender: ConstructionManager.TelecomAddress.Telephone
Construction Manager Company Fax	[1]	Sender: ConstructionManager.TelecomAddress.Facsimile
Construction Manager Representative Last Name	[1]	Sender: ConstructionManager.Representative.FamilyName
Construction Manager Representative First Name	[1]	Sender: ConstructionManager.Representative.GivenName
Construction Manager Representative Title	[1]	Sender: ConstructionManager.Representative.RepresentativeTitle
Construction Manager Representative Phone	[1]	Sender: ConstructionManager.Representative.Addresses.Telephone
Construction Manager Representative Fax	[1]	Sender: ConstructionManager.Representative.Addresses.Facsimile
Construction Manager Representative e-mail Address	[1]	Sender: ConstructionManager.Representative.Addresses.Email
Construction Manager Representative Construction Change Directive Signature	[1]	<<actual signature not exchanged - see discussion about electronic signature>>
Construction Manager Representative Construction Change Directive Signature Date	[1]	<<actual signature not exchanged - see discussion about electronic signature>>

Project Information

Project Name 1 (e.g., Smith Biophysics Laboratory)	[1]	ProjectInformation.Name
Project Name 2 (e.g., University of Toledo)	[1]	ProjectInformation.LongName
Project Reference Number	[1]	ProjectInformation.ReferenceNumber
Project Street Address 1	[1]	ProjectInformation.Address.AddressLine1
Project Street Address 2	[1]	ProjectInformation.Address.AddressLine2
Project City	[1]	ProjectInformation.Address.Town
Project State/Province	[1]	ProjectInformation.Address.Region
Project Country	[1]	ProjectInformation.Address.Country
Project Postal Code	[1]	ProjectInformation.Address.PostalCode
Type of Project/Contract	[0..1]	ProjectInformation.ContractType

Construction Change Directive Information

Construction Change Directive Number	[1]	Name
Construction Change Directive Date	[1]	PreparationDate
Distribution to (check all that apply)		*note: it is only a tick for the document distribution*
Owner	[0..1]	*to be included in general document meta information (following a consolidated approach)*
Architect	[0..1]	*to be included in general document meta information (following a consolidated approach)*
Construction Manager		*to be included in general document meta information (following a consolidated approach)*
Consultant		*to be included in general document meta information (following a consolidated approach)*
Contractor	[0..1]	*to be included in general document meta information (following a consolidated approach)*
Field	[0..1]	*to be included in general document meta information (following a consolidated approach)*

Other	[0..1]	*to be included in general document meta information (following a consolidated approach)*
Construction Change Directive Description	[1]	Description
Proposed Contract Adjustments		
Contract Sum or GMP Adjustments (choose one)		
Lump Sum increase/decrease (dollar amount)	[0..1]	ContractAdjustmentInformation.LumpSumAdjustment.LumpSum
Unit Price (dollar amount)	[0..1]	ContractAdjustmentInformation.UnitPrice.UnitCost
Per	[0..1]	ContractAdjustmentInformation.UnitPrice.UnitCostBasis
As follows	[0..1]	ContractAdjustmentInformation.OtherAdjustment
Contract Time Adjustment (days)	[1]	ScheduleAdjustmentInformation.ScheduleChange

Table 1: agcXML path information assigned to the fields of the comparative analysis