Project Plan for IFC Release 2.0 Development

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A. Introduction, Background and Scope

Introduction: The Project plan for Release 2.0 defines the development tasks for the delivery of an IFC model which includes increased scope in several areas.

Development tasks for requirements definition, model development and documentation are defined in section E - Work Package definitions and Assignment. The scope of AEC processes to be supported in Release 2.0 is defined in sections G and H. These project summaries also define the member company resources that are engaged in documenting these AEC processes and requirements.

Background: Release 2.0 will be based on the improvements made in Release 1.5. Enhancement over R1.5 stems mainly from the development of domain extension modules.

Scope: A minimal development will be completed to meet the "minimal critical mass" in order to deliver a commercially employable release for small set of focused domain extensions.

This development work has been adjusted to fit within the reduced budget set in the November 1996 Council meeting in Frankfurt. To be more specific, a budget of $485K (US) was proposed for 1997; to complete the development of Release 1.5 and Release 2.0. The council approved an expenditure of $205K (US) through Release 2.0 pre-release. This project plan includes a budget of $136K (US) for work to be complete within 1997. This, together with the $124K (US) budget included in the Release 1.5 project plan gives a total of $260K (US) → $205K thorough pre-release of R2.0 and $55K to complete R2.0.

Domain Model extensions in R2.0 include support for the following processes:

- Architecture
    - Core Design
        - Stair Design
        - Restroom Design
    - Roof Design
    - Shell Design
    - Blocking & Stacking
- Building Codes & Standards
    - Residential Energy Codes
    - Handicapped Access to buildings
    - Escape from buildings (in case of fire)
- Cost Estimating
    - Objects identification
    - Quantification
    - Cost modeling
- HVAC systems
    - Air-side delivery systems (ducting)
    - Water-side delivery systems (piping)
- Facilities Management
    - Property Management
    - Occupancy planning and moving
    - Systems furniture workstation design and layout

B. Project Task Breakdown:

Work for the project is broken down into the following workpackages and tasks:

- Work package 1 : Domain Projects: AEC Processes to be supported
  - Task 1 - Project Proposals
    - *Proposals for AEC processes to be supported by R2.0*
  - Task 2 - Project Requirements Documentation
    - *Domain project teams development of AEC process definition and IFC Model requirements analysis*
  - Task 3 - Domain Model Validation
    - *Validation of the Domain models against requirements documents.*
- Work package 2 : Architecture and Methods
  - Task 1 - Finalize Scope for R2.0
    - *ITM Adjustment of scope according to strategy and resources*
  - Task 2 - Review/Feedback - Project Documents
    - *STF review and advice back to domain project teams*
- Work package 3 : Model and Documentation Tools
  - Task 1 - Tools/Environment Specification
    - *Specification of tools to improve quality and consistency of models and documentation*
  - Task 2 - Tools/Environment Development
    - *Development of model and documentation tools*
- Work package 4 : Model Definition and Development
  - Task 1 - Class Semantic definition
    - *AEC domain definitions for all model concepts and object types*
  - Task 2 - Domain model development
    - *Development of models to support AEC processes defined in WP 1*
  - Task 3 - Domain Model Integration through Interop Layer
    - *Development of Interop modules which allow 'plug-in' of domain models into Core*
  - Task 4 - Core Model Enhancement
    - *Enhancement and adjustment of the Core model to support added domain models*
- Work package 5 : Documentation
  - Task 1 - Documentation Strategy/Forms/Templates
    - *Development of various templates, forms to allow integration of docs by many*
  - Task 2 - Documentation Development
    - *Development of the documentation - both online and printed*
  - Task 3 - Review and Editing
    - *Review and editing by ITM, Technical docs expert, selected reviewers*
  - Task 4 - Issues/Resolutions Management
    - *Management of Issues and resolutions DB for review comments*
- Work package 6 : Implementation Program Support
  - Task 1 - Pre-Implementation Model Validation
    - *Model integrity checking using model development tools*
  - Task 2 - Support of Software Checking Routine Development
    - *Technical support for implementer development -common lib for model checking*
  - Task 3 - Support of Implementers (Meetings and email)
  - Task 4 - Issues/Resolutions Management
    - *Management of Issues and resolutions DB for review comments*
- Work package 7 : Certification Program Support
  - Task 1 - Certification program definition and contract management
  - Task 2 - Certification program support
  - Task 3 - Certification Tools / Kit Development
    - *development of certification tools for use by implementers seeking use of logo*

C. Project Schedule

Please see the file: "IFC_ReleasesOverview_Sched_4d.PDF"

D. Project Budget

WP	Task	Sub	Work Description		Total
1	1		Project Proposals	100%	0
	2		Project Requirements Documentation	100%	0
			Domain Projects		**0**
2	1		Finalize Scope for Release 2.0	100%	500
	2		Review/feedback on Projects' Model Requirements	100%	4,000
			Architecture and Methods		**4,500**
3	1		Tools/Environment Specifcation	100%	3,500
	2		Tools/Environment Development	100%	2,000
			Model Development Tools		**5,500**
4	1		Class Semantic Definition	100%	2,500
	3		Domain Model Development	100%	11,000
	3		Domain Model Integration via adapters	100%	10,000
	3		Core Model Enhancement	100%	8,000
			Model Development		**31,500**
5	1		Documentation Strategy / Forms / Templates	100%	2,000
	2		Documentation of Release 2.0	100%	12,000
	5		Pre-Implementation Testing and Validation	100%	4,500
			Documentation		**18,500**
6	1		Pre-Implementation Model Validation	100%	4,500
	2		Software Checking Routines Development Support	50%	5,500
	3		Implementation Program Support	50%	7,000
			Software Implementation Support		**12,500**
7	1		Certification program support/management	50%	5,000
	2		Certification Testing Kit Development (partial pmnt)	35%	30,000
			Certification Program		**35,000**
			Printing		1,000
			CD Rom production		3,500
			STF meetings travel (12 * $2,000 = $24,000)		24,000
			Other Project Costs		**28,500**
Total			***Version 2.0 Development Budget***		**136,000**

E. Work Package definitions and Assignment

Work Package 1:   Domain Projects: AEC Processes to be supported

Task 1:   Project Proposals

Domain committees in all chapters were asked to discuss priorities for Release 2 during July-October '96. All TCs were given a proposal template and asked to facilitate the development of these proposed projects by the ITM. The proposal template provided for the preliminary definition of AEC processes to be supported in R2.0.

The ITM was tasked with defining the strategy and scope for R2.0 and then to work with the project leaders to refine their work in the next task.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D1.1a	Proposal template	10-Jul-96	10-Aug-96		1-Sep-96
Description:	Proposal for a set of AEC processes to be supported in R2				

Task 2:   Project Requirements Documentation

After review/comment on Proposals, some projects were combined and others pushed to release 3.0 for various reasons. These reasons included a) insufficient resources to complete work on schedule, b) a long research cycle could not be completed in time for R2, and c) could not identify implementers that would commit to implementation of defined processes.

Each project team appointed a project leader who was primarily responsible for the following:

- adequate industry participation (to insure industry support for definition)
- global industry participation (contribution and review)
- completion of all segments in templates
- completion of documents on schedule (3 drafts completed, final is scheduled)

Each project was responsible for developing the following:

- Project Summary - defines focus/theme for project and resources (committed and needed).
- AEC Process Definitions - Processes to be supported by IFC R2.0 model (functionality to be implemented by software implemnetations)
- IFC Model Requirements Analysis - Analysis of required extensions to existing object types (from R1.0) and required new object types.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D1.1a	Templates for 1) Project Summary 2) AEC Process Definitions 3) IFC Mdl. Requirements Analysis	15-Sep-96	1-Nov-96	1-Feb-97	1-Mar-97
Description:	Templates to insure consistency, completeness and quality of project team work. Also to ease integration of requirements documentation for final specifications.				
D1.2a	Project documents for 13 domain projects as included in the final scope set by the ITM 1) Project Summary 2) AEC Process Definitions 3) IFC Mdl. Requirements Analysis	1-Nov-96	20-Dec-96	20-Feb-97	15-Jun-97

Description:	These documents constitute the Requiremens Definition for Release 2.0

Task 3: Domain Model Validation

After completion of a domain model in support of the Domain Project process definitions by the STF, each project team will be tasked with validating the design. This will be done through the completion of Validation Test Cases.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D1.3a	Model Validation Test Cases	15-Jul-97	15-Aug-97	15-Sep-97	15-Oct-97
Description:	Documented test cases which verify that the domain model design satisfies the requirements as defined in Task 2				

Work Package 2:   Domain Committee Technical Support

Task 1:   Finalize Scope for Release 2.0

The STF was tasked with analysis of the projects proposed by all teams. In order to insure that we achieve our schedule and complete development within the budget proposed, some projects had to be combined or delayed to future releases. This scope submitted for review and approval by the ITM in the April meeting.

A statement of scope will result and will be incorporated into the long term roadmap for IFC development. This Roadmap will become the guide for focus and scope definition for each planned IFC release.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D2.1a	Scope Statement for Release 2.0	1-Mar-97			15-Apr-97
Description:	This will take the form of a spreadsheet (section G) and accompanying rationale				
D2.2a	IFC Development Roadmap - draft 1	1-Mar-97			1-Jun-97
Description:	This document will layout anticipated focus and scope for future releases of IFC. It will project 3 years.				

Task 2:   STF Review/Feedback ⇒ Project Documents

The STF will complete a review of Project Documents (see above) for the 12 Domain projects. Feedback and advice will be provided in the form of an Issues Log. Primary objective of this review is to enhance the integration and harmonization of the model extensions that will be required to support AEC processes defined for each domain project.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D2.2a	STF Domain Project Issues Log	1-Mar-97	5-May-97		1-Jun-97
Description:	This log will be passed to all domain project leaders, who will be responsible for resolution thorugh their team				

Work Package 3:   IFC Development Tools / Environment

Task 1:   Tools/Environment Specification

The software toolset used in the development of IFC Release 1.0 is limited in range and capability. Experiments undertaken during the development period have identified that tools can be

developed which will significantly ease many of the development and documentation problems. In particularly we are working to insure consistency between the specifications for the IFC Object Model, the data model view and the software interfaces view through the use of tools designed to generate such information based on a single integrated model definition 'dictionary'. This 'model definition store' is an SDAI based repository adapted to support this custom IAI toolset.

This task sets out to define specifications for software tools at all stages of development and ultimately to provide a modeling environment which can maximize the delivery of a self consistent document and model set. The tool specification should support the Release 2.0 model development and documentation requirements (as defined below). Whether parts of it could already be used within Release 1.5 development remains to be seen. The specification and development of tools must support the documentation requirements defined in workpackage 5.

Software tools being considered include:

- Style sheets and 'Templates' for word processed documents
- Standard spreadsheet layouts and macros
- Database specifications
- Shape sheets for Visio
- HTML conversion tools
- Graphical data modeling environment
- EXPRESS and MIDL code generation

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D3.1a	Software Tool Development Outline	1-Jan-97	8-May-97	25-Jun-97	11-Jul-97
Description:	Requirements/Specifications for a set of tools to be used to design and document the IFC models for R2.0				

Task 2: Tools/Environment Development

A set of custom software tools will be developed in this taskset. As specified in Task 1, these tools will be based on a custom adaptation of an SDAI model repository. In this case, the model is a meta-model for the IFC object model. We also losely refer to this meta-model as the IFC model dictionary.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D3.2a	SS → Model Dictionary importer	15-Jan-97	15-Feb-97		1-Jun-97
Description:	reads the MS Excel table definition of models/object types and creates a model dictionary - stored in an DSAI repository.				
D3.2b	Documentation integrator	15-Jan-97	15-Feb-97	1-Jul-97	1-Aug-97
Description:	PERL based tool which reads files including EXPRESS schema, semantic definition, interface definition → and produces HTML documentation for each model schema which integrates all information about an entity to a single location.				
D3.2c	Model Dictionary → docs generator	15-Feb-97	15-Jun-97	1-Jul-97	1-Aug-97
Description:	interogates the Model dictionary to produce HTML and .DOC files. NOTE: this will become the longer term solution - after we complete the toolset which enables this dictionary to be the model definition source → from which documentation, a SS view, a data model view (EXPRESS and EXPRESS-G) and an interfaces view (MIDL code) will be generated.				
D3.2d	Model Dictionary → EXPRESS gen.	15-Feb-97	15-Apr-97	1-Jul-97	1-Aug-97
Description:	interogates the Model dictionary to produce EXPRESS files - one for each Model Schema defined.				
D3.2e	Model Dictionary → MIDL generator	15-Apr-97	1-Jul-97		1-Aug-97
Description:	interogates the Model dictionary to produce MIDL files - one for each software interface defined.				
D3.2f	Model Dictionary → SS generator	15-Apr-97	1-Jul-97		1-Aug-97
Description:	interogates the Model dictionary to produce .XLS files - in the same format as for input in D3.2a				

Work Package 4:   Model Integration and Development

Task 1:   Class Semantic Definition and Assertions

Building on the work of class semantic definition and assignment completed for the release 1.5 model, this task will ensure that semantic definitions adopted in release 2.0 conform to the naming conventions adopted in the IFC architecture and that wherever possible, definitions conform to the primary sources adopted for IFC development. Additionally, this task will provide for support of domain committees during their definition of requirements so that any semantic definitions which they explicitly declare are in conformance prior to the development of models. The output of the class semantic definition will be later re-used during the documentation of the IFC 2.0 model in order to include domain semantics for understandability during the implementation process.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D4.1a	Release 2.0 Semantic Definitions and Assertions	1-Feb-97	1-Mar-97	15-Apr-97	1-Jun-97
Description:	Standard semantic definitions, some aligned with reference models. A .doc file that will provide semantic definitions for each model element definition thorugh the documentation integration tool				

Task 2:   Domain Model Development

The domain model development task relies on the work of domain committees. Before this task may begin, each Domain Project team must complete the standard requirements definition phase and submit these to the ITM in the timeframe indicated. This task includes design of domain models to support these requirements by the STF. This model development will include some pre-harmonization in advance of their integration via the Interop layer of the model.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D4.2a	Domain Models for R2.0	1-Jun-07	1-Jul-97	1-Aug-97	15-Sep-97
Description:	Note design of these are driven by the Domain Project documents. Validation will be done with the project teams in WP1, task 3.				

Task 3:   Domain Model Integration via the 'Interop' layer

All domain extension models must be integrated -- with each other, with the Core model and with the adapted Resource models to ensure that they conform to the common development strategy and that they are interoperable. This task provides for the review and qualification of domain models and assurance that they interoperate through consistent use of the 'Interop Layer' of the model architecture.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D4.3a	Issues/Resolutions log	1-Jul-97	1-Aug-97	1-Sep-97	1-Oct-97
Description:	Log of integration issues and modifications made to resolve them and insure optimal integration with the rest of the models.				
D4.3b	Integrated Domain Models	1-Jul-97	1-Aug-97	1-Sep-97	1-Oct-97
Description:	As documented through standard documentation set.				

Task 4: Core and Interop Layer Enhancement

As a result of domain extensions, it is probable that further demands will be made on the Interop Layer and Core model or that some adjustment to constructs existing within the Core will be required to support the domain extensions. It is considered that some enhancement to the Interop layer and/or Core may be required as a result of 'discovering' of common concepts used across domain models during the domain model integration task. This task allows for this work to be completed.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D4.4a	R2.0 Core and Interop Layer models	15-Jul-97	15-Aug-97	15-Sep-97	1-Nov-97
Description:	Enhanced to better support the new Domain Models.				

Work Package 5: Documentation

Task 1: Documentation Strategy / Forms / Templates

This task will consider and develop the most appropriate forms of delivery for IFC specifications. Electronic forms of documentation will be given preference for the following reasons:

1) specifications on paper is cumbersome

2) paper based specifications create configuration management problems

3) this results in a high cost both to the IAI

Particular forms of document delivery which are currently considered appropriate for consideration at this time include the provision of CDs containing hyper linked documentation and the provision of such documentation in the required HTML or Acrobat format.

While it is our goal to eliminate printed forms of documentation over time, it is acknowledged that a printed version of specifications will be required for R2.0. These will most likely be based on the electronic document set and may therefore not be optimal.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D5.1a	New and improved documentation templates	1-Jul-97	15-Jul-97	15-Aug-97	15-Sep-97
Description:					

Task 2: Documentation Development

This task defines the actual documentation work on the advanced release for comments as well as for the final release documents for Release 2.0. The actual documentation form will be taken as defined in 5.1. Any other intermediate publication for internal comments will only include the relevant parts, in particular there will be no continuation of the frequent document delivery as done within the Release 0.88 to Release 0.962 period last year.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D5.2a	Documentation of Advanced Release	15-Jul-97	15-Aug-97	15-Sep-97	15-Oct-97
Description:					
D5.2b	Documentation of Final Release	15-Oct-97	15-Nov-97	15-Dec-97	15-Jan-98

Description:	

Work Package 6:   Implementation Support

Task 1:   Pre-implementation Model Validation

In order to optimise the implementation of IFCs by software developers during the implementation process, it is proposed that a pre-implementation testing and validation task will be undertaken for the Release 2.0 model. The objective of this task is to ensure the quality of the Release 2.0 model prior to pilot implementation and therefore to minimise the implementation support required in Work Package 4 (see below). In this way, it is intended that the implementation period will be reduced to a minimum and therefore enhance the delivery of IFCs to industry.

It is proposed that the interest of software developers will be engaged in this task.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D6.1a	Issues Log additions and Validated Model	1-Jan-98			1-Jun-98
Description:					

Task 2:   Support of Software Checking Routine Development

This task incorporates the provision of software implementation test routines by implementers acting together for the common benefit of IFC development. Such test routines enable the checking of individual entities and hierarchies within a model for implementation validity during the model development phase. Testing in this way will particularly facilitate the incorporation of required WHERE, DERIVE and UNIQUE clauses in EXPRESS code. It should be mentioned that the assigned resource figures for this task are only an estimate for a medium work load coming from the checking routines down to the model. A full specification of all envisionable checking routines in EXPRESS is not covered thereby.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D6.2a	Enhanced EXPRESS model and supporting forms by checking routines	15-Jan-98			15-Apr-97
Description:					

Task 3:   Pilot Implementation Program support

Experience with IFC Release 1.0 has shown the necessity for appropriate selection of model parts for pilot implementation and for support to be given to the pilot implementation process by modellers so as to ensure consistent interpretation of the model.

This task provides the necessary support to the implementation process.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D6.3a	Implementation Support Log	15-Jan-98			1-Jun-98
Description:					

Task 4: Issues/Resolutions Management

Issues will be raised by the implementers during the implementation program for R2.0. In order to insure improvements based on these issues, an Issues/Resolutions DB will be maintained and resolutions developed.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D6.4a	Issues/Resolutions DB	1-Feb-98			15-Jul-98
Description:					

Work Package 7:   Certification Program

Task 1:   Certification Program Definition and Contract Management

A subset of the STF will be assigned to define improvements to the Certification Program used in R1.5 such that it is unambiguous to the company contracted to complete task 3.

A member of this team will also be assigned to insure completion of required components on schedule.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D7.1a	Program description	1-Nov-97	1-Dec-97	1-Jan-97	1-Feb-98
Description:					

Task 2:   Certification Program Support

One or two of the Model development team will be assigned to support the company contracted to complete task 3. Their detailed knowledge of the model will be requisite for such support. Support will include answering questions, resolving issues and offering advice with respect to approaches for testing implementations and reporting results.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D7.2a	Support Log	1-Jan-98			1-Apr-98
Description:					

Task 3:   Certification Tools/Kit Development

A consultanting company specializing in the development of such kits must be contracted to complete this development. We propose that the IAI front-end 35% of the fee (reduced from 50% in R1.5) and that the contractor will bear the risk that the remainder of the development cost will be more than covered through licensing the Took Kit to software implementers seeking certification.

Deliverable	Title	Begin	Draft 1	Draft 2	Final
D7.3a	Certification Test Kit/Toolbox	1-Jan-98	1-Feb-98	1-Mar-98	1-Apr-98
Description:					

F. Consulting Contracts

WP	Work Description	Total	JW	TL	RJ	JF	??
1	*Domain Projects*						
2	*Architecture and Methods*						
3	*Model and Documentation Tools*						
4	*Model Definition and Development*						
5	*Documentation*						
6	*Implementation Program Support*						
7	*Certification Program Support*						
	Other project hard costs						
Total	*Release 2.0 Budget (US$)*						

G. Release 2.0 Projects Overview

Notes:

- Size (Domain Group work) -
- Size (Tech. Support work) -
- PS (Project Summary doc.) -
- US (Process Definition/Usage Scenaria) -
- AN (Project Model Requirements Analysis) -

IFC Release 2.0

Proj ID	AEC Domain Grouping / Project description	AEC Processes defined in this project	Project Lead
	Architecture		
1 AR-1	**Completion of the Architectural Model**		*NA - Ken Herold iaiexec@interoperability.*
		Building Core design	
		Building Shell design	
		Roof Design	
		Stair Design	
		Publilc Restroom design	
		Conceptual Space Planning	
2 AR-2	**Space planning for escape routes**		*UK - Jay Patankar patankar@dial.pipex.co*
	Building Services		
3 BS-1	**HVAC Systems design**		*NA - Jim Forester forester@crl.com*
		HVAC duct design(air-side delivery systems)	
		HVAC hydronic design(water-side delivery systems)	
4 BS-3	**Pathway coordination with other trades**		*D - Robert Rotternan 100041.2347@compuserv*
5 BS-4	**Thermal loads calculation**		*D - Mr. Tonke 100436.705@compuserve*
	Codes and Standards		
6 CS-1	**Code compliance checking**		*NA - Robert Briggs rs_briggs@pnl.gov*
		Code Compliance - Energy	
7 CS-2	**Code extensions**		*S - Mr. Wong Wai Chir WONG/PWD/SINGOV@SI*
		Code Compliance - Disabled Access	
		Code Compliance - Escape routes	
	Estimating and Scheduling		
8 ES-1	**Cost Estimating**		*NA - Mike Cole mikec@timberline.cor*
		Cost Item Identification	
		Task & Resource Modeling	
		Cost Modeling	

Facilities Management

9	*FM-3*	**Property Management** *(building owner viewpoint)*	*N - Poul Sorgenfri Ottos*
10	*FM-4*	**Occupancy Planning** *(moving people around)*	*NA - Kevin Yu* *yu@civil.ubc.ca*

Move Planning

Workstation design

Wrokstation layout in an open plan

Simulation

11	*SI-1*	**Photorealistic Visualization**	*NA - Vladimir Bazjana* *vlado@gundog.lbl.go*

X-Domain Model features

12	*XM-2*	**Project document management**	*NA - Ray Brungard* *rbrungard@tcco.com*
13	*XM-3*	**Overall model features/architecture extension**	*STF - Thomas Liebic* *thomas@cab1.m.eunet*

General Network model

General purpose constraints (design, codes, alignment)

Semantic associations (element aggregator)

General purpose tables

Projects distribution
By AEC discipline/domain

2 *Architecture*

3 *Building Services*

2 *Codes and Standard*

1 *Estimating/Scheduling*

2 *Facilities Management*

1 *Simulation*

2 *X-domain*

13 *Total projects*

By chapter lead

0 *French (F)*

2 *German (D)*

0 *Japan (J)*

1 *Nordic (N)*

7 *North America (NA)*

1 *Singapore (S)*

1 *United Kingdom (UK)*

1 *Spec Task Force (STF)*

13 *Total projects*

H. Release 2.0 Project Summaries

Architecture

H.1 [AR-1] Completion of the Architectural Model

H.1.1 Project Description

The Architectural Domain with tackle six processes (listed below) that are grouped under completion of the Architectural Model. To find out more about the proposed processes, review the Architectural project proposal document. The processes to be included in the 2.0 release will cover processes that span from the Schematic design phase of Architecture through refinement in the Construction Document phase. :

1. Core Design

1A. Stair Design

1B. Restroom Design

2. Roof Design

3. Shell Design

4. Block & Stack

H.1.2 Project Team

Project Leader à Ken Herold - North American

Chapter	Name	Company	Email	Hrs / Week
NA	Gustavo A. Lima	Cannon	glima@cunnon.com	
	Bill O'Malley	Hammel Green and Abrah...	BOMalley@EMAIL.HGA.COM	
	Barbara Golte...	Heller & Metzger, PC	74212.354@compuserve.com	
	Ken Herold	HOK	iaiexec@interoperability.com	180 H
	Steve Stevens	Intergraph	festeven@ingr.com	104 Hr
		Intergraph		
	Juniper Russell	Juniper Russell & Assoc.	juniper@novimundi.com	
	Ed Ebbing	MC2	eebbing@mc2-ice.com	68 Hr
	Martin Rozmanith	RMW Architecture + Design	marty_rozmanith@rmw.com	
	Ardie Aliandust	RTKL	2350@la.rtkl.com	104 Hr
	Bill Houstoni	RTKL	bhouston@balt.rtkl.com	
	Nick Reveliotty	The Kling Lindquest Pa...		
	Tony Sinisi	The Kling Lindquest Pa...	76636.1043@compuserve.com	
	Beth Brucker	USA-CERL	B-Brucker@cecer.army.mil	104 Hr
	Paul Lewis	Visio	paull@visio.com	
	Rob Wakeling	Visio	robw@risiu.com	
German				
UK				

| Nordic |
| Singapore |

H.1.3 Scope of Work

AEC processes to be supported	- 6	Est. total AEC expert time (days)	- 30.2
Expected IFC Model Impact (1 *(min)* to 5)	- 4	Est. total Info Modeling expert time (days)	- nn
Degree of technical difficulty (1 *(min)* to 5)	- 4	Est. total Software/PM expert time (days)	- nn

H.1.4 Resources Required / Committed

Member Company Resources	Reqired Days	Market Value	Days Committed	Resource shortfall
Process Model	30	$10,195	nn	nn
Usage Requirements	30	$10,195	nn	nn
Object Model development	30	$10,195	nn	nn
Integration	7.5	$2,600	nn	nn
Test Case development	37.75	$12,740	nn	nn
Implementation technical support	7.5	$2,600	nn	nn
Management and Review	7.5	$2,600	nn	nn
Total Member Company Resources	**151**	**$51,000**	nn	nn
Travel		**$68,000**		
	Tr			
Project Support	**Required Days**	**Market Value**		
Technical support	nn	$nn		
Project management	nn	$nn		
Publication and Administration	nn	$nn		
Equipment and software	nn	$nn		
Travel and subsistence	nn	$nn		
Total Project Support	**nn**	**$nn**		
Total for Project	**nn**	**$nn**		

H.2 [AR-2] Space Planning for Escape Routes

H.2.1 Project Description

This project includes the following four processes:

• Means of Escape from Spaces

The person responsible for planning means of escape takes the brief data and establishes various types of occupancy within the project envelope. This is then divided into usage compartments from the point of view of the client. The clients usage compartments are then subjected to regulation and compartments derived which conform to regulatory constraints. By default safe zones are the remaining spaces. Escape routes, either to another safe compartment or to outside air are then defined by linking safe spaces.

H.2.2 Project Team

Project Leader à Jay Patankar UK

Chapter	Name	Email	Hrs / Week
UK	Jay Patankar	patankar@dial.pipex.com	
UK	Steve Race	darcyrace@dial.pipex.com	
Total for Project			
Total person-days			

H.2.3 Scope of Work

AEC processes to be supported	- 3	Est. total AEC expert time (days)	- 30
Expected IFC Model Impact (1 *(min)* to 5)	- 5	Est. total Info Modeling expert time (days)	- 40
Degree of technical difficulty (1 *(min)* to 5)	- 4	Est. total Software/PM expert time (days)	- nn

H.2.4 Resources Required / Committed

Member Company Resources	Reqired Days	Market Value (apply $45/hr-head)		Days Committed	Resource shortfall
Requirements definition					
Process Model	30	£13200			
Usage Scenaria	20	£8800			
Model design					
Object Model development *(w/ tech.Support)*	40	£17600			
Integration *(w/ tech.Support)*	10	£4400			
Design and Implementation validation					
Test Case development	20	£8800			
Review/feedback on implementations	40	£17600			
Project Management					
Project management and administration	34	£14960			
Travel and Meetings	80	£35200			
Total Member Company Resources	**274**	**120560**			

Model/Specification development support	Required Days	Market Value			
Technical support	50	£12500			
Project management	24	£10500			
Publication and Administration	10	£2200			
Equipment and software		£2000			
Travel and subsistence		£2000			
Total Project Support		**£29200**			
Total for Project		**£149760**			

Building Services

H.3 [BS-1] HVAC System Design

H.3.1 Project Description

This Project includes the following processes:

- HVAC Duct Design
- HVAC Hydronics Design

These processes will involve utilizing the network classes defined in the IFC 2.0 Core model. This effort will be led by the North American Building Services Committee, but will be an international collaborative effort. This will ensure that the resulting system design extensions are globally applicable.

Engineers responsible for the design of duct and hydronic systems may be consulted during the building conceptual stage. However, the major design effort occurs after the architect has substantially completed the building drawings. The design process includes both the schematic and detailed description of duct and hydronic components. These components include sections of duct and pipe, fittings, accessories such as dampers, valves, and terminals. This process also includes the connection of these components to equipment such as fans and pumps. Classes for equipment were defined in IFC Release 1.x, and are not elaborated in this proposal. The system design process also includes construction cost estimates but actual costs are determined by contractors using drawings and specifications prepared by the Building Services engineers.

Significant cost savings will result from the application of IFC's to systems design in Building Services.

- Building geometry and construction materials used in the design of HVAC load calculations and the fluid distribution systems.
- The exchange of data between engineering design and analysis programs with manufacturers' equipment selection programs.
- The production of schedules of bill of materials for the system components.
- Producing the data for engineers cost estimates and for contractors actual construction cost estimates.
- The opportunity for integration of control components used for the operation of these systems.

H.3.2 Project Team

Project Leader à Jim Ahart (Domain) Jim Forester (Technical)

Chapter	Name	Email	Hrs / Wk
NA	Jim Ahart	103073.1120@compuserve.com	8
NA	Tim Baliles	tbaliles@cellabarr.com	6
UK	Tony Baxter	100316.3252@compuserve.com	4
NA	John Deal	75601.1346@compuserve.com	4
NA	Rod Dougherty	rod.dougherty@landis+gyr.sprint.com	6
NA	Tom Edman	tom@htc.honeywell.com	4
NA	Jim Forester	jim@marinsoft.com	6
NA	Scott Frank	sfrank@pipeline.com	4
NA	Jim Lindquist	jlindquist@tklp.com	4

NO	Pekka Metsi	pekka.metsi@granlund.fi	4
FR	Jean-Luc Monceyron	monceyron@cstb.fr	4
NA	John Murphy	jmurphy@trane.com	4
FR	Patrice Poyet	poyet@cstb.fr	4
D	Robert Rotterman	100041.2347@compuserve.com	4
NA	Larry Schaefer	larry.schaefer@carrier.wltk.com	4
NA	Tony Sherfinski	tony.sherfinski@greenheck.com	4
D	Jeremy Tammik	73174.2355@compuserve.com	4
UK	Jeff Wix	100342.2537@compuserve.com	4
Total for project			**82**

H.3.3 Scope of Work

AEC processes to be supported	2	Est. total AEC expert time (days)	40
Expected IFC Model Impact (1 to 5)	3	Est.total Info Modeling time (days)	40
Degree of technical difficulty(1 to 5)	3	Est. total Software/PM expert time (days)	40

H.3.4 Resources Required / Committed

Member Company Resources	**Reqired Days**	**Market Value**	**Days Committed**	**Resource shortfall**
Requirements definition				
Process Model	10	$12000	10	0
Usage Scenaria	15	$18000	10	5
Model design				
Object Model development *(w/ tech.Support)*	10	$12000	15	15
Integration *(w/ tech.Support)*	20	$24000	?	?
Design and Implementation validation				
Test Case development	15	$18000	10	20
Review/feedback on implementations	15	$18000	?	?
Project Management				
Project management and administration	15	$18000	30	0
Travel and Meetings	10	$12000	10	0
Total Member Company Resources	**110**	**$132000**	**85+**	40+
Model/Specification development support	**Required Days**	**Market Value**		
Technical support	5	$6000		
Project management	10	$12000		
Publication and Administration	10	$12000		
Equipment and software	5	$6000		
Travel and subsistence	10	$12000		
Total Project Support	**40**	**$48000**		
Total for Project	**150**	**$180000**		

H.4   [BS-3[Pathway Design and Coordination

H.4.1   Project Description

The design of pathway contains draft, coordination and representation of pipe and duct systems. These processes are usually carried out after the first coordination with architect and client as well as an approaching calculation of energy and media requirements of a building before starting the detailed planning of each single system.

The process terminates with the coordinated pathway for the distribution of media in general as well as for heating, cooling, airconditioning and electrical purpose of a building in detail.

H.4.2   Project Team

Project Leader à Rolf Tonke / Bertram Witz - German Chapter

Chapter	Name	Company	Email	Hrs / Wk
Germany	Felix Brückner	vögtlin engineering	100737.1421@compuserve.com	
Austria	Bernhard Fragner	PHi-Tech	fragner@phitech.co.at	
Germany	Rainer Hirschberg	GTS	100065.2412@compuserve.com	1 WK
Austriay	Doris Huber	'ESS		
Germany	Eberhard Michaelis	Softtech	EMichaelis@softtech.com	2 WK
Germany	Ulrich Paar	Ziegler Informatics	ziegler@caddy.de	
Swiss	Robert Rottermann	RoCAD Informatik	100041.2347@compuserve.com	2 WK
Germany	Willi Spiegel	Triplan GmbH	willi.spiegel@triplan.com	
Germany	Rolf Tonke	Planungsgruppe M+M AG	100436.705@compuserve.com	3 WK
Germany	Kurt Weber	Pit-cup GMBH	pit-cup@t-online.de	
Germany	Bertram Witz	Planungsgruppe M+M AG	100436.705@compuserve.com	2 WK
Total for				**10 WK**

H.4.3   Scope of Work

AEC processes to be supported	- 7	Est. total AEC expert time (days) - 18
Expected IFC Model Impact (1 *(min)* to 5)	- 3	Est. total Info Modeling expert time (days) - 15
Degree of technical difficulty (1 *(min)* to 5)	- 2	Est. total Software/PM expert time (days) - 15

H.4.4   Resources Required / Committed

Member Company Resources	Reqired Days	Market Value		Days Committed	Resource shortfall
Requirements definition					
Process Model	10	$7060		nn	nn
Usage Scenaria	7	$4942		nn	nn
Model design					
Object Model development *(w/ tech.Support)*	5	$3530		nn	nn
Integration *(w/ tech.Support)*	8	$5648		nn	nn
Design and Implementation validation					
Test Case development	10	$7060		nn	nn
Review/feedback on implementations	5	$3530		nn	nn
Project Management					
Project management and administration	2	$1412		nn	nn
Travel and Meetings	3	$2118		nn	nn
Total Member Company Resources	**50**	**$35300**		nn	nn

Model/Specification development support	Required Days	Market Value		Days Committed	Resource shortfall
Technical support	nn	$nn			
Project management	nn	$nn			
Publication and Administration	nn	$nn			
Equipment and software	nn	$nn			
Travel and subsistence	nn	$nn			
Total Project Support	**nn**	**$nn**			
Total for Project	**nn**	**$nn**			

H.5   [BS-4] HVAC Loads Calculation

H.5.1   Project Description

Load calculations serve as base for the complete design of all building technical plants. Results of load calculations allow dimensioning of plant components and the determination of required space.

Load calculations are official proof methods (in Germany e.g. proof of warmth protection), mode of calculation for heating load or dynamic mode of calculation for cooling load or the simulation through one year.

The process terminates in the complete calculations and the data exchange to the IFC model.

H.5.2   Project Team

Project Leader à Rolf Tonke / Rainer Hirschberg - German Chapter

Chapter	Name	Company	Email	Hrs / Wk
Germany	Felix Brückner	vögtlin engineering	100737.1421@compuserve.com	
Austria	Bernhard Fragner	PHi-Tech	fragner@phitech.co.at	
Germany	Rainer Hirschberg	GTS	100065.2412@compuserve.com	3,5 WK
Austriay	Doris Huber	'ESS		
Germany	Eberhard Michaelis	Softtech	EMichaelis@softtech.com	3,5 WK
Germany	Ulrich Paar	Ziegler Informatics	ziegler@caddy.de	
Swiss	Robert Rottermann	RoCAD Informatik	100041.2347@compuserve.com	2 WK
Germany	Willi Spiegel	Triplan GmbH	willi.spiegel@triplan.com	
Germany	Rolf Tonke	Planungsgruppe M+M AG	100436.705@compuserve.com	4 WK
Germany	Kurt Weber	Pit-cup GMBH	pit-cup@t-online.de	
Germany	Bertram Witz	Planungsgruppe M+M AG	100436.705@compuserve.com	2 WK
Total for				**15 WK**

H.5.3   Scope of Work

AEC processes to be supported	- 6	Est. total AEC expert time (days) - 30
Expected IFC Model Impact (1 *(min)* to 5)	- 5	Est. total Info Modeling expert time (days) - 20
Degree of technical difficulty (1 *(min)* to 5)	- 2	Est. total Software/PM expert time (days) - 20

H.5.4   Resources Required / Committed

Member Company Resources	Reqired Days	Market Value	Days Committed	Resource shortfall
Requirements definition				
Process Model	14	$9884	nn	nn
Usage Scenaria	12	$8472	nn	nn
Model design				
Object Model development *(w/ tech.Support)*	5	$3530	nn	nn
Integration *(w/ tech.Support)*	8	$5648	nn	nn
Design and Implementation validation				
Test Case development	15	$10590	nn	nn
Review/feedback on implementations	8	$5648	nn	nn
Project Management				
Project management and administration	5	$3530	nn	nn
Travel and Meetings	5	$3530	nn	nn
Total Member Company Resources	**72**	**$50832**	nn	nn

Model/Specification development support	Required Days	Market Value	Days Committed	Resource shortfall
Technical support	nn	$nn		
Project management	nn	$nn		

Publication and Administration	nn	$nn		
Equipment and software	nn	$nn		
Travel and subsistence	nn	$nn		
Total Project Support	**nn**	**$nn**		
Total for Project	**nn**	**$nn**		

Codes and Standards

H.6 [CS-1] Enable Code Compliance Checking - Energy Codes

H.6.1 Project Description

This project has two parts: CS-1A - **Code Compliance Enabling Mechanism** and CS-1B **Energy Code Compliance Checking**. These two parts have been combined into a single project for administrative efficiency. Part A of the project will define a generic code compliance enabling mechanism that will be applicable to codes of various types; e.g., accessibility, egress, and energy. The mechanism will likely involve defining new abstract classes for code compliance in the core model. Part A will be an international collaborative effort, which will ensure that the resulting enabling mechanism is broadly applicable. Part B, Energy Code Compliance, will serve an important role in validation of the generic mechanism for a set of code applications. This work will be performed primarily by the North American Chapter and will enable established energy code compliance applications to be made IFC compliant.

Code compliance checking is performed by building designers, systems designers, and code enforcement officials. Compliance with codes begins during the programming phase when designers determine which codes apply to the building project. Preliminary code reviews are frequently performed during schematic design, and more thorough reviews are performed by members of the design team late in the design process before construction documents are complete. Building code officials perform plan reviews as part of the building permit process. Designers and code official perform drawing dimension takeoffs as necessary to ensure compliance. Information about building systems, assemblies, layout, etc. is gathered during this process and compared to the requirements for each applicable code.

Codes impact virtually all disciplines involved in building design and construction processes, and code considerations persist throughout a building's life cycle. Energy codes are strongly related to architectural, HVAC, and electrical design processes. While it would be difficult to establish a reliable estimate of time and cost savings from IFC support of code checking, the tedious nature of code review and the large cost and schedule impacts that code violations can cause suggest that there will be high demand for code checking applications. Energy codes represent an attractive application for IFC support because of their extensive requirements for building data that are already in electronic form (e.g., geometric data and lighting fixture data) and demonstrated strong demand--thousands of copies of these applications currently in use.

H.6.2 Project Team

Project Leader à Rob Briggs - North America Chapter

Chapter	*Name*	*Email*	*Hrs / Wk*

North America	Rob Briggs	rs_briggs@pnl.gov	10
Singapore	Tan You Tong	youtong@iti.gov.sg	2
France	Philippe Debras	debras@cstb.fr	2
UK	Robert Amor	trebor@bre.co.uk	1
Total for project			**15**

H.6.3 Scope of Work

AEC processes to be supported	- 1	Est. total AEC expert time (days) - 5
Expected IFC Model Impact (1 *(min)* to 5)	- 2	Est. total Info Modeling expert time (days) - 2
Degree of technical difficulty (1 *(min)* to 5)	- 3	Est. total Software/PM expert time (days) - 2

H.6.4 Resources Required / Committed

Member Company Resources	Reqired Days	Market Value		Days Committed	Resource shortfall
Requirements definition					
Process Model	5	$4,000		5	0
Usage Scenaria	5	$4,000		5	0
Model design					
Object Model development *(w/ tech. Support)*	10	$8,000		10	0
Integration *(w/ tech. Support)*	8	$6,400		8	0
Design and Implementation validation					
Test Case development	5	$4,000		5	0
Review/feedback on implementations	5	$3,840		5	0
Project Management					
Project management and administration	5	$4,000		5	0
Travel and Meetings	5	$7,000		5	0
Total Member Company Resources	**48**	**$41,240**		48	0

Model/Specification development support	Required Days	Market Value		Days Committed	Resource shortfall
Technical support	nn	$nn			
Project management	nn	$nn			
Publication and Administration	nn	$nn			
Equipment and software	nn	$nn			
Travel and subsistence	nn	$nn			
Total Project Support	**nn**	**$nn**			
Total for Project	**nn**	**$nn**			

H.7 [CS-2] Enable Code Compliance Checking -

- **Code Compliance - Disabled Access**
- **Code Compliance - Escape Routes**

H.7.1   Project Description

The project covers specific application of the code compliance enabling mechanism (R2_CS-1) in serving the disabled access and escape routes code compliance.

Disable access code compliance is a process of assessing whether **the access provisions and facilities** of a building complies with one or more codes or standards **that serve the needs of the wheelchair user and ambulant disabled** enforced by various codes and standards promulgation entities.

Escape route code compliance is a process of assessing whether **the exit provisions and facilities** of a building complies with one or more codes or standards **that provide safe means of escape for occupants** enforced by various codes and standards promulgation entities.

The processes are performed by building designers and code enforcement officials during early design and submission stages, respectively. Automatic code compliance software based on the IFC models created in this project will help building designers to carry out self-checking of their designs in order to detect code violations as early as possible while design changes are still relatively cheap to make. Similarly, it also help the code enforcement officials to verify the plans submitted by the designers for building approvals.

The resources required to produce the IFC model for the disabled access and escape route are estimated to be 160 man-days over 20 elapse calendar weeks. Based on market value of $200 (Singapore) per man-days, a total of $32000 is required for the project.

H.7.2   Project Team

Project Leader à Mr. Wong Wai Ching - Singapore

Disable Access

Chapter	Name	Email	Hrs / Week
Singapore	Mr. Wong Wai Ching (leader)	- (through keewee@ncb.gov.sg)	2
Singapore	to be appointed (domain)	-	4
Singapore	Mr. Zhong Qi (info modeling)	zhongqi@iti.gov.sg	22
Singapore	Mr. Liew Pak San (software)	paksan@ncs.com.sg	4
F	??	??	??

A total of 32 man-hrs/week is required which is equivalent to 4 man-days/week (based on 8 hrs/days). Over 20 calendar weeks, a total of 80 man-days is required.

Escape Route

Chapter	Name	Email	Hrs / Week
Singapore	Mr. Wong Wai Ching (leader)	- (through keewee@ncb.gov.sg)	2
Singapore	to be appointed (domain)	-	4
Singapore	Ms Gosselin Yveline (info modeling)	gosselin@iti.gov.sg	22

Singapore	Mr. Liew Pak San (software)	paksan@ncs.com.sg	4
UK	??	??	??

A total of 32 man-hrs/week is required which is equivalent to 4 man-days/week (based on 8 hrs/days). Over 20 calendar weeks, a total of 80 man-days is required.

H.7.3 Scope of Work

AEC processes to be supported	- 2	Est. total AEC expert time (days)	- 15
Expected IFC Model Impact (1 *(min)* to 5)	- 2	Est. total Info Modeling expert time (days)	- 55
Degree of technical difficulty (1 *(min)* to 5)	- 2	Est. total Software/PM expert time (days)	- 10

H.7.4 Resources Required / Committed

Member Company Resources	Required Days	Market Value	Days Committed	Resource shortfall
Process Model	4	S$200	4	0
Usage Requirements	20	S$200	20	0
Object Model Development	80	S$200	80	0
Integration	20	S$200	20	0
Test Case Development	10	S$200	10	0
Implementation Technical Support	10	S$200	10	0
Management and Review	16	S$200	16	0
Total Member Company Resources	**160**	**S$32000**	**160**	**0**

Model/Specification development support	Required Days	Market Value	Days Committed	Support shortfall
Technical support	??	$??		
Project management	??	$??		
Publication and Administration	??	$??		
Equipment and software	??	$??		
Travel and subsistence	??	$??		
Total Project Support	**nn**	**$??**		
Total for Project	**nn**	**$nn**		

Estimating and Scheduling

H.8 [ES-1] Cost Estimating

H.8.1 Project Description

This project is designed to increase the ability of the model to support cost estimating. The model already supports cost estimating to some degree. This project focuses refining and expanding that capability.

Most of the information used by cost estimating will be entered into the model by earlier design processes. At various times during the evolution of the design, an estimator will use the model to do cost estimating. During early design stages, very little information will be available, and only a rough estimate will be possible. As the model becomes more detailed, more accurate estimates are possible. When different designs are under consideration, "what if" or "alternate" estimates may be used to compare their cost impact. After a design and estimate are approved, inevitably, changes will be proposed and "change order" estimates will be required to determine the cost impact of the proposed change.

Using the IFC Model to do cost estimating saves time by using information provided by the design processes. It can also save time by making the task and resource data that it creates available to later processes such as scheduling. Using the model as the primary information source for estimating can also reduce errors and omissions that occur when data is entered into an estimating system by hand.

H.8.2   Project Team

Project Leader à Mike Cole - North American Chapter

Chapter	Name	Email	Hrs / Wk
NA	Mike Cole	mikec@timberline.com	10
NA	Ray Brungard	rbrungard@tcco.com	.5
UK	Jeffrey Wix	10342.2537@compuserve.com	?
NA	Peggy Woodall	peggy@bsdsoftlink.com	?
NA	Annette Stumph	a-stumpf@cecer.army.mil	?
NA	Roger Grant	rgrant@rsmeans.com	?
DE	Hans-Peter Sanio	San@mail.rib.de	?
Total for project			

H.8.3   Scope of Work

AEC processes to be supported	-	1	Est. total AEC expert time (days)	-	nn
Expected IFC Model Impact (1 *(min)* to 5)	-	1	Est. total Info Modeling expert time (days)	-	nn
Degree of technical difficulty (1 *(min)* to 5)	-	1	Est. total Software/PM expert time (days)	-	nn

H.8.4   Resources Required / Committed

Member Company Resources	**Reqired Days**	**Market Value**	**Days Committed**	**Resource shortfall**
Requirements definition				
Process Model	2	$1000	2	0
Usage Scenaria	4	$2000	4	0
Model design				
Object Model development *(w/ tech.Support)*	10	$5000	10	0
Integration *(w/ tech.Support)*	6	$3000	6	0
Design and Implementation validation				
Test Case development	6	$3000	6	0
Review/feedback on implementations	8	$4000	8	0
Project Management				
Project management and administration	8	$4000	8	0
Travel and Meetings	50	$25000	50	0

Total Member Company Resources	94	$47000	86	

Model/Specification development support	Required Days	Market Value	Days Committed	Resource shortfall
Technical support	nn	$nn		
Project management	nn	$nn		
Publication and Administration	nn	$nn		
Equipment and software	nn	$nn		
Travel and subsistence	nn	$nn		
Total Project Support	**nn**	**$nn**		
Total for Project	**nn**	**$nn**		

Facilities Management

H.9   [FM-3] Property Management (from the Owner´s viewpoint)

H.9.1   Project Description

Property management is a process starting from requirement programming and continuing through the building's life cycle. In this phase the FM-3 project covers just a subset of this process focusing on grouping of spaces and other possible objects for different purposes, like maintenance, administration, public registers, mapping etc. This process is based on objects provided by the design and construction process and uses mainly the attributes in the current model. The main user is the building owner and the benefit is more efficient use of the building data and through this cost savings in the administrative work. This process starts after the building is completed and is carried out through the whole life cycle of the building.

H.9.2   Project Team

Project Leader à Poul Sorgenfri Ottosen - Nordic Chapter

Chapter	Name	Email	Hrs / Wk
Nordic	Poul Sorgenfri Ottosen	pso@aua.auc.dk	10
Nordic	Jan Karlshøj	jakbyg@carlbro.dk	3
Nordic	Arto Kiviniemi	arto.kiviniemi@vtt.fi	5
NA	? Kevin Yu		?
Singapore	? Tan Kee Wee		?
UK	? Mike Goodman		?
Total for project			

H.9.3   Scope of Work

AEC processes to be supported	-	3	Est. total AEC expert time (days)	- 30
Expected IFC Model Impact (1 *(min)* to 5)	-	1	Est. total Info Modeling expert time (days)	- 15

Degree of technical difficulty (1 *(min)* to 5)   -   1   Est. total Software/PM expert time (days)   -   10

H.9.4 Resources Required / Committed

Member Company Resources	Reqired Days	Market Value		Days Committed	Resource shortfall
Requirements definition					
Process Model	10	$5 000		10	0
Usage Scenaria	20	$10 000		20	0
Model design					
Object Model development *(w/ tech.Support)*	6	$3 000		?	?
Integration *(w/ tech.Support)*	9	$4 500		?	?
Design and Implementation validation					
Test Case development	5	$2 500		?	?
Review/feedback on implementations	5	$2 500		?	?
Project Management					
Project management and administration	10	$5 000		10	0
Travel and Meetings	10	$10 000		10	0
Total Member Company Resources	**75**	**$42 500**		50 + ?	?

Model/Specification development support	Required Days	Market Value		Days Committed	Resource shortfall
Technical support	nn	$nn			
Project management	nn	$nn			
Publication and Administration	nn	$nn			
Equipment and software	nn	$nn			
Travel and subsistence	nn	$nn			
Total Project Support	**nn**	**$nn**			
Total for Project	**nn**	**$nn**			

H.10 [FM-4] Occupancy Planning

- **Including Design and layout of workstations**

H.10.1 Project Description

This project includes the following three processes:

- Occupancy Planning
- Design of Workstations
- Layout of Workstations for an Open Office

The occupancy planner (includes interior designers, facilities managers, architects, furniture dealers' designers, etc.) applies standards during the assignment of people and organizations to interior spaces. It also involves the planning and moving of building assets such as equipment and furniture. This process occurs during the initial planning of space occupancy, and whenever

that occupancy needs to change (company reorganization, company growth, or new hires, etc.). The layout and design of typical workstations can be sub-processes of the occupancy planning when it involves systems furniture planning for open offices. These processes require information about the building floor spaces. They also generate space occupancy data for future use of office planning.

Automatic input and utilization of the IFC supported object data, such as building elements and spaces as well as FF&E and occupants, may improve the efficiency of the processes. New objects generated will also be IFC compliant so that they can be used by varies FM processes during the operation of the facility.

H.10.2   Project Team

Project Leader à Kevin Yu - NA

Chapter	Name	Email	Hrs / Wk
NA	Rick Bartling / Karen Smith-Hosner	rbartling@hermanmiller.com ksmithhosner@hermanmiller.com	3.5
NA	Vicky Borchers	vicky@mksinfo.qc.ca	7
NA	Rolanda Derderian	rolanda@meritt.com	3.5
NA	Francois Grobler	f-grobler@cecer.army.mil	7
NA	Chia Y. Han/ Carl Ruther	chia.han@uc.edu	4
NA	Kevin Yu	kevin@naoki.ca	12.5
NA	other (e.g. IBM, IFMA/CAC, etc.)		?
UK	Paul Chadwick	fax: 117-943-4113	?
Germany	???	???	?
			37.5
Total for project			

H.10.3   Scope of Work

AEC processes to be supported	- 3	Est. total AEC expert time (days)	- 29
Expected IFC Model Impact (1 *(min)* to 5)	- 5	Est. total Info Modeling expert time (days)	- 61.5
Degree of technical difficulty (1 *(min)* to 5)	- 4	Est. total Software/PM expert time (days)	- 32

H.10.4   Resources Required / Committed

Member Company Resources	Reqired Days	Market Value	Days Committed	Resource shortfall
Requirements definition				
Process Model	15	$4,725	15	0
Usage Scenaria	15	$4,725	15	0
Model design				
Object Model development *(w/ tech.Support)*	30	$9,450	30	0
Integration *(w/ tech.Support)*	15	$4,725	15	0
Design and Implementation validation				
Test Case development	25	$7,875	15	10
Review/feedback on implementations	7.5	$2,363	0	7.5
Project Management				
Project management and administration	15	$4,725	11	4
Travel and Meetings	60	$4,800	60	0
Total Member Company Resources	**132.5**	**$43,388**	**161**	**21.5**

Model/Specification development support	Required Days	Market Value	Days Committed	Resource shortfall
Technical support	nn	$nn		
Project management	nn	$nn		
Publication and Administration	nn	$nn		
Equipment and software	nn	$nn		
Travel and subsistence	nn	$nn		
Total Project Support	**nn**	**$nn**		
Total for Project	**nn**	**$nn**		

Simulation

H.11 [SI-1] Visualization

H.11.1 Project Description

In the design of a building or other structure, the architect or designer may want to see what the building or the structure will look like, or may want to render images for the client's benefit. Such visualization may be desired at any time from the earliest architectural design or retrofitting to the final interior design. Visualization is the key to solving lighting and daylighting design problems, and is also important in assessing building performance and human comfort issues. IFC support of this process may reduce input preparation time by 75-85% process (through automatic acquisition of building geometry and all surface properties) and thus make the use of the corresponding applications economically feasible.

H.11.2 Project Team

Project Leader: Vladimir Bazjanac, North American Chapter

Chapter	Name	Email	Hrs / Week
North American	Vladimir Bazjanac	vlado@gundog.lbl.gov	as needed/possible
U.K.	Sandy Kinghorn	100412.3254@compuserve.com	?

H.11.3 Scope of Work

AEC processes to be supported - 3	Est. total AEC expert time (days) - 1	
Expected IFC Model Impact (1 *(min)* to 5) - 1	Est. total Info Modeling expert time (days) - 1	
Degree of technical difficulty (1 *(min)* to 5) - 1	Est. total Software/PM expert time (days) - 1	

H.11.4   Resources Required / Committed

Member Company Resources	Reqired Days	Market Value	Days Committed	Resource shortfall
Process Model	3	$2,250	0	$2,250
Usage Requirements	1	$750	0	$750
Object Model development	.5	$375	0	$375
Integration	0	$0	0	$0
Test Case development	5	$3,750	0	$3,750
Implementation technical support	0	$0	0	$0
Management and Review	1	$750	0	$750
Total Member Company Resources	**10.5**	**$7,875**	**0**	**$7,875**

Model/Specification development support	Reqired Days	Market Value	Days Committed	Support shortfall
Technical support	0	$0		
Project management	0	$0		
Publication and Administration	0	$0		
Equipment and software	0	$0		
Travel and subsistence	0	$0		
Total Project Support	**0**	**$0**		
Total for Project	**10.5**	**$7,875**		

Cross Domain Projects

H.12   [XM-2] Project Document Management

H.12.1   Project Description

Project Document Management refers to all information pertaining to the documents used to estimate, bid, purchase, and manage the building process as well as for use within the Facilities Management domain. This data identifies the document, the author of the document, changes to the document since the last change, and relationships to other documents.

It is being suggested to the group that the first concentration of our work will be on the Contract Drawings represented in the model. It is acknowledged that this is only a small subset of the related documents of the model. We will continue to review the areas affected and complete a framework for our section of work with a complete understanding of what will be reflected in the first pass of our work into the model by the end of our first full meeting to be held at the end of January.

- *Who performs this process?*

    All software vendors that use drawings, specifications, and sketches during the life cycle of a project. This would include (the Architect's use of) CAD, estimating, scheduling, management, and facilities management software vendors.

- *When in the project lifecycle it is performed?*

From the very inception of the project, where these documents are used to define the project, through the construction of the project with all of its changes, through the management of the "building" once the project is complete.

- *What other processes does it relate to (input from/output to/controlled by)?*

This process starts in the creation and modification of the documents and outputs to all processes that use the documents as a means of identification. This would include estimating where changes to the work are usually quantified by document, management, where the documents are used to control the flow of work on a project and establish what is being built by document, and Facilities Management, where documents are the prime method of identifying actual conditions in a facility.

- *What is the benefit (time or cost savings) in IFC based application support of these processes?*

The control of the project over time depends upon the comparison of many baselines of data from one point in time to another. These baselines are reflected as (can be seen as) documents with a reflection in time. Without the identification and use of these documents, such as a Change Estimate, applications would not be able to identify themselves as distinct from others. In this way, applications such as Estimating, Purchasing, Scheduling, and Management packages are enabled to provide these standard views of a project model. In addition, where documents are still being used as the preferred method of delivery of information regarding a project, such as various government agencies requiring drawings and members of the project team who are not CAD enabled.

H.12.2 Project Team

Project Leader à Raymond H. Brungard - North American

Please note that the team makeup for this work will be international and cross domain in nature. There are a number of individuals who are interested in this work and I am at this time arranging for the final team size and makeup, without the undue disruption of other groups. It is my intention to make sure that the project team includes members from the CAD and Architectural backgrounds to round out the view of Contract Documents.

Chapter	Name	Email	Hrs / Week
NA	Raymond H. Brungard	rbrungard@tcco.com	7
UK	Graham Storer	G_Storer@tel-consult.co.uk	7
UK	To be named later		4
NA	Ken Herold (part time)	iaiexec	1
	As yet Named CAD Software		7
Nordic	Arto Kiminieri	arto.kiminieri@vtt.fi	7
NA	Mike Cole (part time)		.5
Total for Project			33.5

H.12.3 Scope of Work

AEC processes to be supported	-most	Est. total AEC expert time (days)	- 50
Expected IFC Model Impact (1 *(min)* to 5)	- 2	Est. total Info Modeling expert time (days)	- 5
Degree of technical difficulty (1 *(min)* to 5)	- 4	Est. total Software/PM expert time (days)	- 15

H.12.4 Resources Required / Committed

Member Company Resources	Required Days	Market Value	Days Committed	Resource shortfall

Requirements definition				
Process Model	25	$1,250	25	$1,250
Usage Scenaria	25	$1,250	25	$1,250
Model design				
Object Model development *(w/ tech.Support)*	5	$250	5	$250
Integration *(w/ tech.Support)*	5	$250	5	$250
Design and Implementation validation				
Test Case development	10	$500	nn	nn
Review/feedback on implementations	5	$250	nn	nn
Project Management				
Project management and administration	5	$250	nn	nn
Travel and Meetings		$12,000	n/a	nn
Total Member Company Resources	**80**	**$16,000**	nn	nn

Model/Specification development support	Required Days	Market Value	Days Committed	Support shortfall
Technical support	3	$200		
Project management	5	$340		
Publication and Administration	5	$340		
Equipment and software	2	$130		
Travel and subsistence	5	$340		
Total Project Support	**20**	**$1,350**		
Total for Project		**$nn**		

H.13   [XM-3] IFC Model - Enabling Mechanisms

{{ Project Summary for this project not yet available }}