

building **SMART** with COBIE

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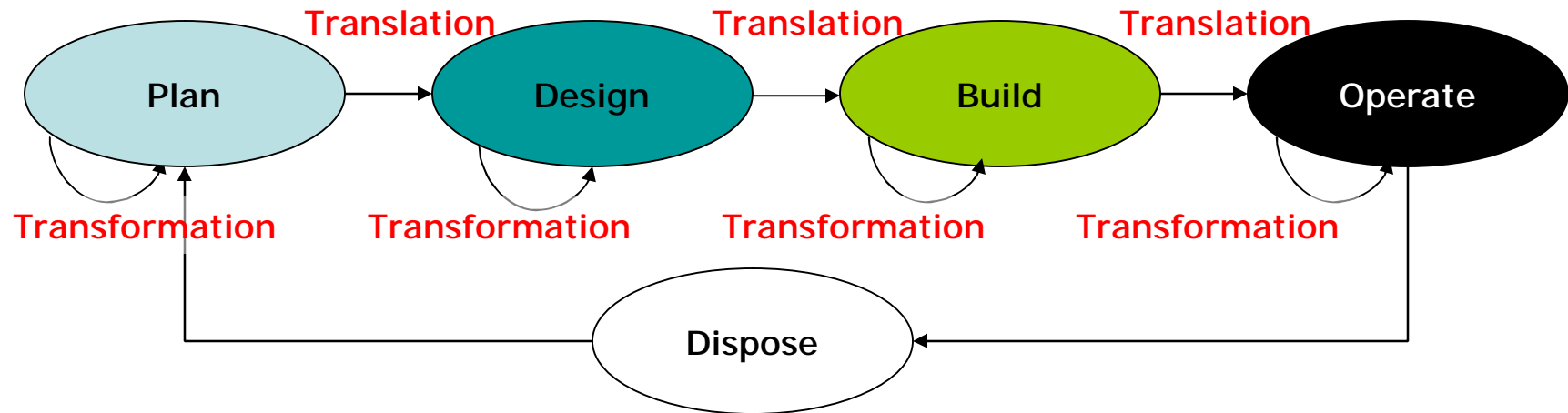
Problem – The Cost of Data Entry Precludes Full Use of Maintenance Management Software



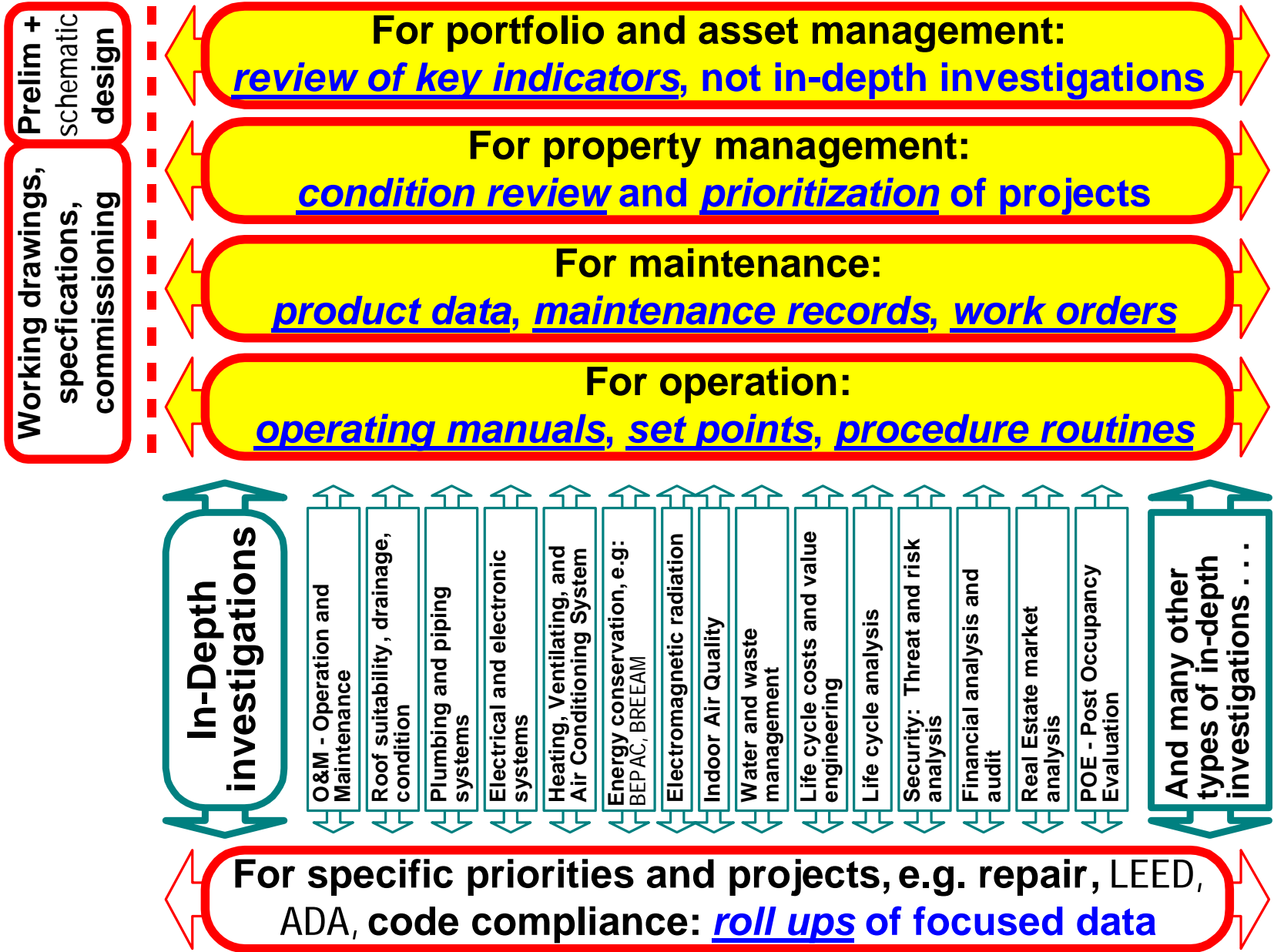
Problem - Building Documentation is Fragmented . . .

Architects, Engineers and Construction Contractors each submit design plans, operating instructions and repair manuals in hardcopy which must be organized and maintained in order to support building operations, maintenance and renovation throughout the building's life

Problem - Critical data is lost ...

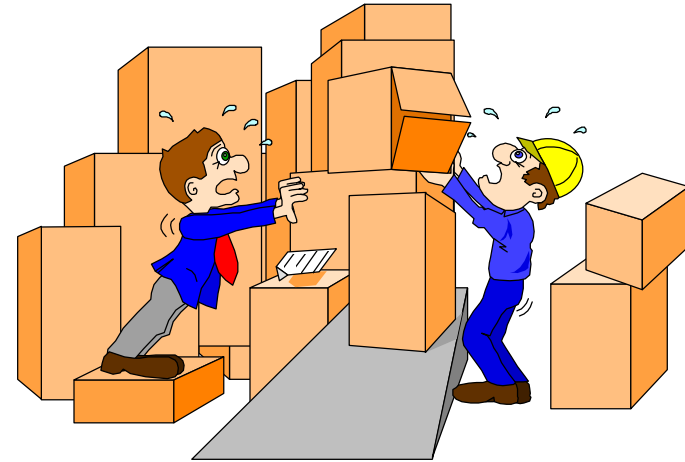


- decisions made as ideas & parts are **transformed** into designs & buildings are not captured
- **translation** of information for downstream use loses much of what is known during the previous phase
- increased “owner” cost due to data losses = \$14.8B annually “Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industries,” NIST GCR 04-867/Aug 2004.



Past Practices . . .

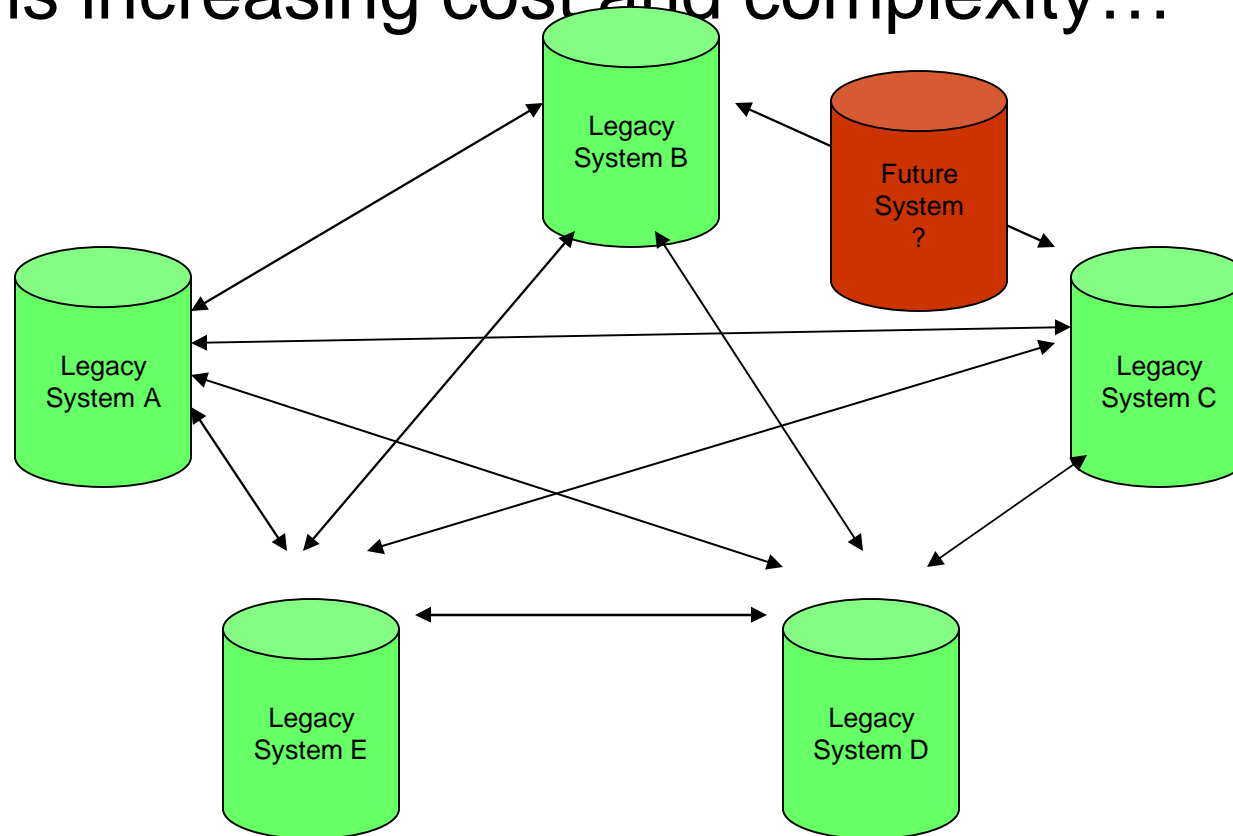
- O&M submittals in unusable format - boxes, piles
- Data quickly lost
- Poor preventive maintenance
- More costly repairs
- Warranties not maintained or lost



Result ... Adverse impact on mission of the building occupant

What people have tried . . .

Directly linking contractor and government systems means increasing cost and complexity...



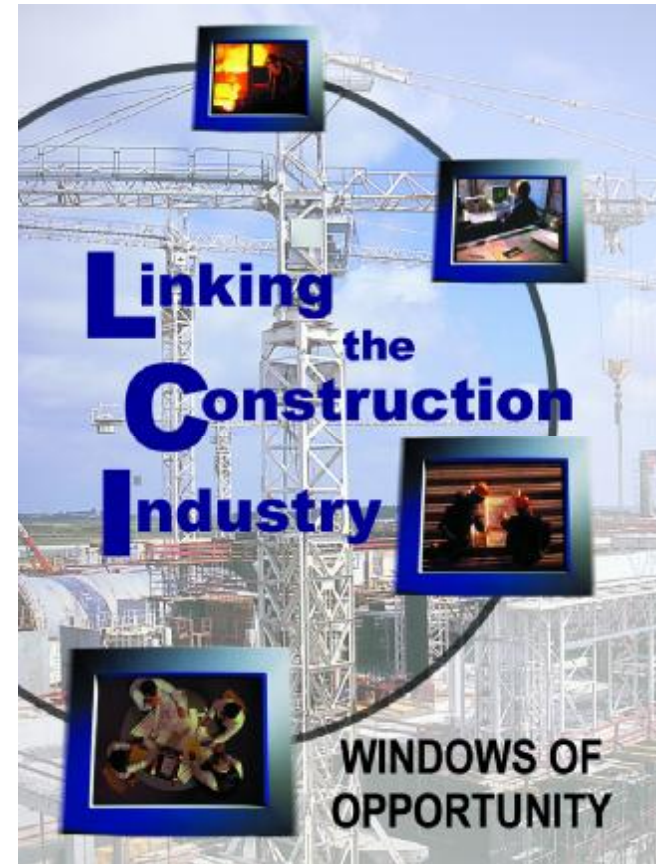
Federal Agencies Confirmed Interest

Developing Data-Input Standards for Computerized Maintenance Management Systems: Summary of a Symposium/Workshop
1994

Information Technology Innovations Award, National Partnership for Reinventing Government, 1999

Linking the Construction Industry: Electronic Operation and Maintenance Manuals: Workshop Summary,
1999

Incorporated into IAI IFC buildingSMART Model, 2003

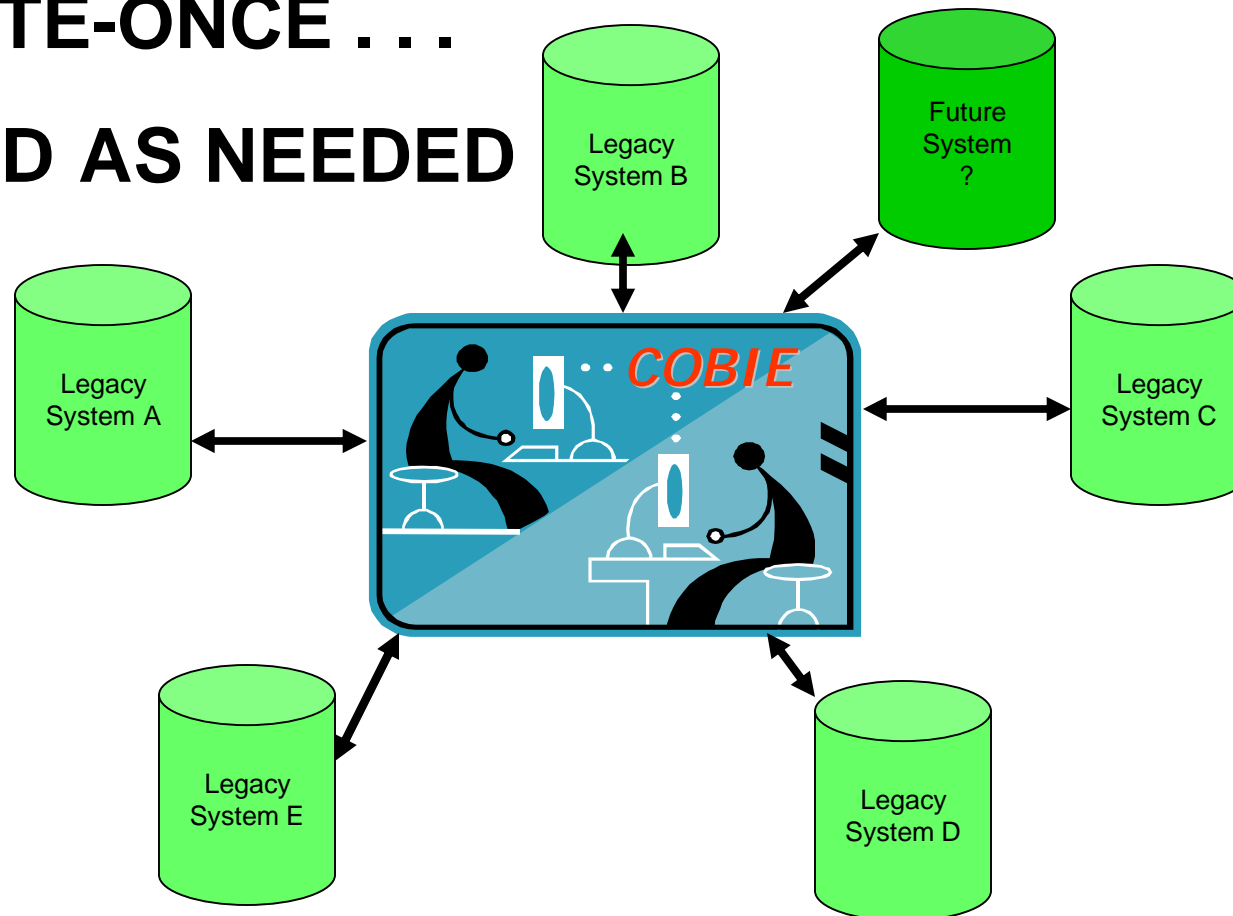


COBIE Captures Information at Source – Designers, Constructors & Manufacturers



10/31/20

COBIE uses internationally recognized
standard and data definitions requirements . . .
WRITE-ONCE . . .
READ AS NEEDED



COBIE Incorporates Related Efforts . . .

- **NAVFAC Operations & Maintenance System Information (OMSI)**
- **NIBS Facility Maintenance and Operations Committee (OMSI XML/IAI 2x2)**
- **U.S. Army, Department of Public Works, Fort Lewis, WA**
- **Specification software exports construction submittals**
- **m-BOMB project. International Alliance for Interoperability (IAI)**
- **FIATECH Automated Equipment information eXchange (AEX)**
- **Machinery Information Management Open Systems Alliance (MIMOSA)**
- **Open Standards Consortium for Real Estate (OSCRE)**
- **National Institute of Science and Technology (NIST)**
- **GSA Preliminary Design information Exchange**

PRODUCT GUIDE

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Technical Data
- PDF format
- link to URL
- or XML database

Product Data Sheet



FOAMULAR® 404 & 604
FOAMULAR® 404 RD & 604 RD
FOAMULAR® Extruded Polystyrene Insulation

Product Data

FOAMULAR 404 and 604 Insulation

Extruded polystyrene insulation is the most effective means of reducing energy-related heat loss and heat gain in buildings. It is a rigid, closed-cell foam that provides excellent thermal insulation. It is available in a variety of thicknesses and is suitable for use in a wide range of applications. It is resistant to moisture, mold, and mildew, and it does not contain any harmful substances. It is also resistant to fire and is non-toxic.

For use in Protected Rigid Membrane Assemblies and other Roofs Systems

Overview Combined Membrane System Solution for Protected Rigid Membrane Assemblies (PRMA)

FOAMULAR 404 and 604 insulation provides protection for membrane flashings, terminal areas and TV exposures in PRMA systems.

- Designed for use with liquid-applied membrane systems.
- FOAMULAR 404 and 604 insulation products support panel systems that require reflective and particle resistant drainage.
- High compressive strength - allows for long-term performance.
- Outstanding moisture resistance gives long-term thermal performance.
- Superior moisture and vapor resistance.
- Tough, light-weight panels handle, handle and install quickly and easily.
- Proper Design: Correct thermal expansion conditions with membrane manufacturer's membrane for correct performance.

IRMA Overview Solutions

The way already known that membrane performance in a variety of membrane applications is provided by FOAMULAR 404 and 604 insulation products. Other roofing options that specify types of FOAMULAR insulation for IRMA are:

- FOAMULAR 404
- FOAMULAR 604

FOAMULAR® 404 & 604
FOAMULAR® 404 RD & 604 RD
FOAMULAR® Extruded Polystyrene Insulation

Roofing System Solutions

When the design prohibits plan or vertical details, double membrane panels, FOAMULAR 404 RD and FOAMULAR 604 RD insulation products are the solution of choice. In addition to providing strong support for the FRMA roof, these products also provide drainage from the membrane. This is because double membrane roofs are not as flat as the single layer roofs. The double membrane roof system is designed to provide drainage from the membrane of the panels to provide from membrane roof drains.

As a bonus, FOAMULAR 404 RD and FOAMULAR 604 RD are also available in a variety of thicknesses to provide additional thermal protection for the roof assembly.

Compliance with Standards

- UL Classified: UL 723, UL 790
- ICC-ES ESR-1111
- ICC-ES ESR-1112
- ICC-ES ESR-1113

Physical Properties

Property	ASTM	FOAMULAR 404 Insulation	FOAMULAR 604 RD Insulation	FOAMULAR 404 RD Insulation	FOAMULAR 604 RD Insulation
Compressive Strength (psi) (25°C/77°F)	D 1585	400	600	400*	600*
Water Absorption (% by volume max.) (25°C/77°F)	D 1585	0.07	0.07	0.07	0.07
Thermal Conductivity (k) (25°C/77°F)	D 1585	0.03	0.03	0.03	0.03
Moisture Content of Membrane Systems (25°C/77°F)	D 1585	0.7 to 2.0	0.7 to 2.0	0.7 to 2.0	0.7 to 2.0
Tensile Strength	E 8	0	0	0	0

* Based on 1/2" thickness.
† Compressive strength values based on minimum thickness of 1/2".
‡ These strength values are intended to provide the basis for design of the roof assembly. They are not design values.

Benchmarking Participants



Owners

DoD
GSA
Navy
State
UNC-Chapel
Hill
VA

A/E/C Firms

Burns & McDonald
CH2M
HOK
Jacobs
Judd Allen
LS3P
Lynn Blair Associates
O2 Resources
Onyx Group
Rush Inc
TRM
Woolpert

Software Firms

Archibus
Autodesk
Bentley
Digital Alchemy
e-specs
Green Building
Studio
Infor
Instep
Mapcon
Micromain
MRO
TMA Systems
Tririga

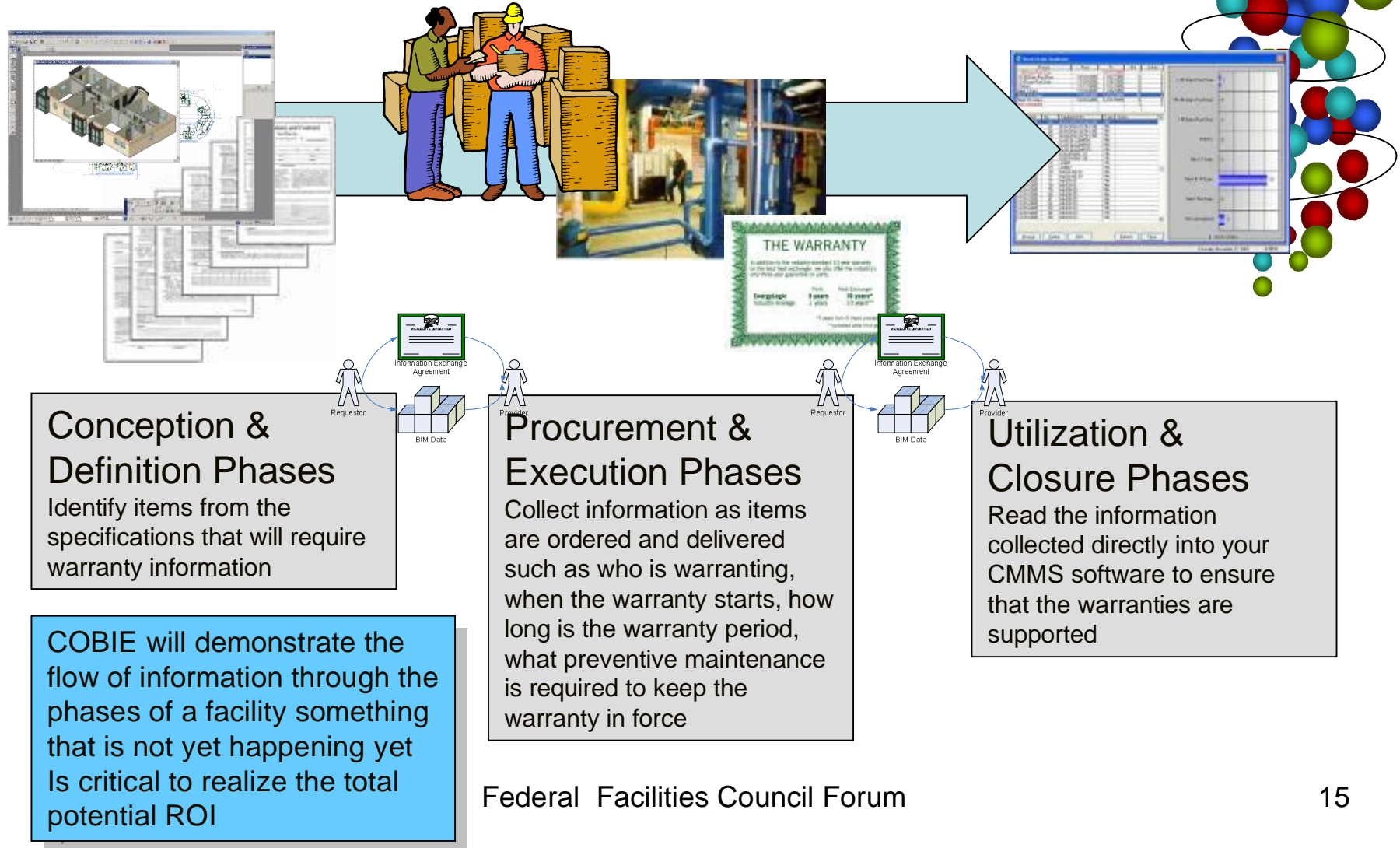
Other

International Code
Council
National Institute of
Building Sciences

How will we know when it's right?

- **User transparent**
- **No cost to O&M office**
- **Costs less than current paper-based method**
- **Requirements are clearly identified**
- **Information can be captured as work is accomplished with option for real-time information exchange**
- **Acceptable to all tiers of contractors, suppliers, subs, etc.**
- **Simple update format for existing deliverables/contracts**
- **Framework to store information for later exchange/retrieval**
 - **Cost of information exchange must be nil**

COBIE Construction Operations Building Information Exchange



How can I get started?

- **Owner**
 - Join **buildingSMART**
 - commit to and communicate a FY07 roll-out
- **Software producer/vendor**
 - Join **buildingSMART**
 - make import/export transparent
- **Designer, consultant, builder, subcontractor**
 - Join **buildingSMART**
 - Participate in COBIE pilot projects
- **Manufacturer/supplier**
 - Use **buildingSMART** standard templates