Massachusetts Institute of Technology

MIT Open Source Building Alliance

A House_n Initiative

The **MIT Open Source Building Alliance** (**OSBA**) has been established to develop and test strategies (and ultimately, recommend standards) that will lead to the scalable introduction of new materials, technologies, applications, and services into the built environment. It will initially focus on single and multifamily residences. Members of the House_n Consortium or the Changing Places Consortium are automatically members of the OSBA.

Overview

Open source strategies have dramatically improved the quality, value, and variety of products in other industries, from electronics to automotive. In contrast, most new homes and apartments are generic, low-grade, and expensive. The **OSBA** proposes that an open source web of industrial relationships, combined with the modularity of design, data, electronics, software, and physical component connections, can lead to an explosion of creative activity resulting in high-performance, cost-effective environments. We believe that this approach is necessary to remove barriers to innovation, and that it will create exciting opportunities related to energy conservation, proactive home-based preventative health care, and new forms of work, learning, entertainment, and the mass-customization of highly personalized residential environments.

OSBA is designed to play a role for the building industry ($832 billion dollars per year) comparable to the World Wide Web Consortium (www.w3.org), the Auto-ID Center (www.autoidcenter.org) and other similar organizations centered at MIT. **OSBA** is managed by the MIT House_n research group.

MIT Open Source Building Alliance Operation

OSBA will operate as an open source organization. A website will be established for idea generation, technical evaluation of **OSBA** recommendations, and public comment. **OSBA** members and affiliated academic researchers will engage in research to develop, test, and establish prototypes and test beds.

OSBA test bed venues are now being established:

A. **MIT Laboratories:** Early prototypes are now being developed and tested in MIT lab environments.

B. **PlaceLab:** The apartment-scale PlaceLab in a full service condominium building will demonstrate the first generation of OSBA infill units and is planned for completion in early 2004.

C. **OSBA Demonstration Units:** The **OSBA** plans a series of "real world" demonstration environments. To evaluate **OSBA** standard recommendations in practice, the **OSBA** will select certain design concepts, technologies, and applications for demonstration, testing, and evaluation in commercial developments. **OSBA** implementation partner, Oaktree Residential Systems, made the first demonstration venue in one unit of a

market-rate condominium development project available to collaborator TIAX, LLC for the PlaceLab. Approximately one new demonstration unit will be produced each year, with each subsequent project of increasing complexity and sophistication. **OSBA** standards will be updated each year based on MIT research, **OSBA** industry participation, and OSBA demonstration unit testing and evaluation.

The precise agenda for the PlaceLab and Demonstration Units will be determined in consultation with **OSBA** members. Possible elements for inclusion, depending on industry involvement and interest, are:

- o Volumetric modular chassis - first steps.
- o Mass-customized, reconfigurable cabinetry-based infill components replacing framed walls. A variety of light-weight, high-strength, durable materials will be considered.
- o Power/signal connections from chassis to infill.
- o Technologies integrated into "Tier-1" cabinetry-like infill components: environmental sensing, activity recognition, and communication media.
- o Health-related applications.
- o Apartment design tool for non-experts.

In addition, companies have proposed the following for inclusion in the OSBA recommendations:

- o Modular heating, ventilation, and air conditioning and distributed control.
- o High performance translucent glazing with Aerogel insulation and other energy conserving technologies.
- o High performance doors and windows with integrated shading, etc.
- o Addressable lighting.
- o Networked appliances.
- o Modular elevator, fire stair, and virtual concierge for apartment buildings
- o Object identification via RFID.
- o Wireless biometric monitoring technologies.

Participation by OSBA Members in the Prototyping Process

OSBA members are invited to create prototype components for inclusion in the **OSBA** Demonstration Units. Members may create new components or transform existing products into components that meet current **OSBA** standards recommendations. **OSBA** members have priority within product group based on seniority of **OSBA** membership. While it is anticipated that **OSBA** members will develop both proprietary and non-proprietary products, their interface to other components will be according to open source principals developed by **OSBA**. Members donate prototype components to the demonstration unit and coordinate their installation. The process of installation and final prototype will be thoroughly documented.

Public Awareness Efforts

A wide variety of popular press, television, radio, and professional publications have contacted House_n researchers to express their interest in communicating to the public the potential for new technologies and new approaches to the design and construction of "homes in the future." **OSBA** will consider part of its mission to coordinate a sustained stream of communication to consumers, professionals, manufacturers, developers, and educators about the potential of this approach to creating residential environments.

Evaluating Consumer Needs and Values

MIT researchers are developing digital tools for non-experts (consumers) using **OSBA** components. One multi-day consumer design exercise will be conducted each year by MIT researchers. **OSBA** members will have the option of including their own devices/technologies in these exercises, which will be designed to evaluate consumer reaction to **OSBA** concepts and to test the viability and acceptance of **OSBA** member components, technologies, services, and applications.

Kent Larson, Director

Stephen Intille, Technology Director

For more information, please contact:

Ms. Deenie Pacik
Changing Places / House_n Administrator
Massachusetts Institute of Technology (MIT Bldg NE18-4FL)
One Cambridge Center, 4FL
Cambridge, MA 02142 USA
tel 617-452-5676 fax 617-225-0027 email dpacik@media.mit.edu

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