The buildingSMART International

Annual Report 2022

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buildingSMART International

Contents

Chairman's Welcome

Patrick MacLeamy

Chairman

buildingSMART International

Dear buildingSMART colleagues and friends,

This past year of 2022 was a year of transitions. Our leader and good friend, Richard Petrie, passed away suddenly in April after transforming buildingSMART International into a vibrant, professionally led organization. Under his stewardship, buildingSMART emerged as the international leader for transforming the global building and infrastructure industries. We celebrated Richard's leadership during a memorable event in London in December, attended by many buildingSMART colleagues and the Petrie family.

Ian Howell, a buildingSMART founder, agreed to serve as interim CEO after Richard Petrie passed away, leading us through a very challenging time with unfailing good cheer while earning our affection and gratitude.

Ian and I worked together to identify and recruit a replacement CEO during the last half of 2022. After engaging a professional search firm, we identified almost 200 candidates and selected five finalists for in-person interviews in London. The four buildingSMART directors – Richard Kelly, Aidan Mercer, Léon van Berlo and Céline Bent – interviewed finalists separately and shared their impressions with Ian and me.

After the interviews, we were pleased to select Clive Billiald as the buildingSMART replacement CEO. He is a natural leader with extensive experience in both the public and private sectors and well-positioned to take buildingSMART to a new level. Clive began his new role in January this year and has already begun to shape our future.

This will be my last Chairman's Welcome message, as I have decided not to seek re-election. I have been engaged with buildingSMART since our formation in 1996 and have served as Chairman since 2001. Helping our organization through last year to new beginnings in 2023 marks an appropriate time to step aside for others to continue our work.

This is not goodbye. I will continue to attend some of our summits in a new role as author, interviewing as many of you as possible for a new book I am writing about our shared buildingSMART journey.
Of course, I will continue to enjoy our community of international friends – The International Friendship Club!

Best regards to all.

Patrick

buildingSMART emerged as the international leader for transforming the global building and infrastructure industries

Chief Executive's Statement

Clive Billiald

CEO

buildingSMART International

It was my great privilege to take up the position of CEO at buildingSMART International at the start of 2023. As many of you will be aware, the buildingSMART International that we know today is largely the creation and legacy of the late Richard Petrie, who served as CEO for nine years before tragically passing away in April 2022. The progress and achievements of 2022 set out in this report bear testament to Richard's incredible vision, as well as to the leadership of the management team and dedicated staff that he assembled, and to the vital role played by Ian Howell, who stepped in last year as interim CEO to help steer the organisation through those challenging times. Our community is deeply indebted to them all.

Since joining buildingSMART International, I am even more convinced that this is a vital organisation in exactly the right place at the right time. It is no exaggeration to say that the global built asset industry is central to what we can achieve as humans and to the legacy we leave for future generations. But, the industry faces two fundamental challenges: productivity and sustainability. Our ability to tackle these challenges – essentially to do more with less – hangs on our ability to optimise our decision-making and automate our processes. This, in turn, demands access to the most comprehensive, trusted, machine-readable information fused together from different organisations, applications and lifecycle phases. The openBIM standards and services provided by buildingSMART International allow this information fusion, ultimately creating a more productive, profitable and sustainable built asset environment. This is our role and the subject of this report.

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The Strategic Roadmap

In early 2023, buildingSMART International (bSI) published its highly anticipated "Strategic Roadmap," a dynamic framework designed to align and focus the industry's efforts across three distinct time horizons. Developed in collaboration with stakeholders from across the buildingSMART network, this roadmap outlines clear objectives and milestones for the community's work in the short, medium, and long term.

While the completion of the roadmap is a significant milestone, bSI emphasizes that it is a living document that will continually evolve. Recognizing the importance of adaptability, bSI plans to enhance the roadmap by providing additional details on how the community can effectively meet the defined requirements and evolve their ways of working.

The strategic roadmap encompasses three key horizons, each representing a different focus and timeframe:

Today ('Use'):

bSI recognizes that the industry already has excellent open standards available. Thus, the immediate role is to advocate for and support the widespread adoption and utilization of these standards globally. By promoting their use, bSI aims to drive industry-wide collaboration and interoperability.

Tomorrow ('Improve'):

In the near term, bSI's focus lies in the evolution and improvement of existing standards and services. The organization aims to enhance their user-friendliness and effectiveness, ensuring they remain relevant in an ever-changing technological landscape. By continuously improving these standards, bSI strives to empower stakeholders with efficient and robust tools for the built environment.

Future ('Reinvent'):

Looking further ahead, bSI recognizes its role in developing and deploying the next generation of standards and services. This forward-thinking approach aims to harness and unlock the potential of future technology trends. By embracing innovation, bSI aims to revolutionize the industry, paving the way for increased productivity and sustainability.

At the very core of the roadmap lies bSI's commitment to addressing the critical challenges of productivity and sustainability within the global built environment. To overcome these challenges, the roadmap emphasizes the importance of optimized decision-making and increased automation throughout project lifecycles. This necessitates the fusion of project data from diverse sources into comprehensive information and intelligence that remains accessible throughout the project's life. This is the fundamental purpose of open digital standards – to enable the data fusion that in turn allows the smart decisions and process automation necessary to enhance global productivity and sustainability across the built environment.

The strategic roadmap sets the stage for the organization's future endeavours. By providing a clear vision and roadmap for the development of interoperable standards and digital services, bSI aims to empower the built environment industry to drive positive change. As the roadmap continues to evolve and more details are added, bSI eagerly anticipates collaborating with its community and wider partners to shape the future of the industry and create a sustainable and prosperous built environment for all.

By providing a clear vision and roadmap for the development of interoperable standards and digital services, bSI aims to empower the built environment industry to drive positive change

The Sustainable Development Goals

bSI is committed to driving digital transformation in the construction and built environment sector, with a clear focus on sustainable development. Our strategic roadmap aligns with several Sustainable Development Goals (SDGs) set by the United Nations. By actively engaging with these goals, we aim to contribute to a more sustainable and resilient future.

1. SDG 9: Industry, Innovation, and Infrastructure

bSI recognizes the importance of resilient infrastructure, sustainable industrialization, and innovation. We champion the use of digital technologies, open standards, and interoperability to enhance the efficiency, sustainability, and resilience of infrastructure development worldwide. Through collaboration with industry stakeholders, governments, and research institutions, we work towards achieving SDG 9 and promoting sustainable growth.

2. SDG 11: Sustainable Cities and Communities

bSI is dedicated to building smarter cities and sustainable communities. Our efforts in advancing digitalization and collaboration in the built environment enable data-driven decision-making and enhance building performance. By promoting sustainable design, energy efficiency, and the development of inclusive, safe, and resilient human settlements, we contribute to the achievement of SDG 11.

3. SDG 13: Climate Action

Addressing climate change is of utmost importance on a global scale, and at bSI, we fully acknowledge our role in this crucial endeavor. We are actively committed to promoting sustainable practices by advocating for the use of digital tools and methodologies that facilitate precise assessments of embodied carbon, optimize resource utilization, minimize waste, and enhance the efficiency of construction processes for both new structures and renovations. By fostering climate-friendly solutions and supporting the integration of green building practices, we contribute to SDG 13 and the mitigation of climate change impacts.

4. SDG 12: Responsible Consumption and Production

bSI supports SDG 12 by promoting responsible consumption and production patterns in the construction sector. Our focus on digital technologies enables the optimization of resource usage and re-usage, minimizing waste generation, and enhancing efficiency in construction processes. By encouraging the adoption of sustainable practices and fostering collaboration among industry stakeholders, we contribute to SDG 12 and the transition towards more sustainable consumption and production.

5. SDG 17: Partnerships for the Goals

bSI recognizes that achieving sustainable development requires strong partnerships and collaboration. We actively foster partnerships among industry stakeholders, governments, and research institutions to facilitate knowledge exchange and drive innovation. By promoting interoperability, open standards, and global cooperation, we contribute to SDG 17 and the creation of effective partnerships necessary to achieve all the SDGs.

It is worth noting that while these five SDGs are particularly relevant to bSI's work, our activities may also contribute indirectly to other SDGs, as the SDGs are interconnected and mutually reinforcing.

bSI's strategic roadmap embodies our commitment to sustainability and the pursuit of the SDGs. By leveraging digital technologies, fostering collaboration, and advocating for sustainable practices, we aim to empower the construction and built environment sector to drive positive change. Through our collective efforts, we strive to create a more sustainable, resilient, and inclusive future for all.

By providing a clear vision and roadmap for the development of interoperable standards and digital services, bSI aims to empower the built environment industry to drive positive change

The buildingSMART Programs

Standards and Solutions

Compliance

User

Technical Services

Standards and Solutions Program

Summary

The Standards and Program in 2022 consolidated the success of achieving IFC 4.3 Production Standard late the previous year and with an anticipation for the first in person working Summit scheduled for later in the year.

The term "Room" has officially been replaced with "Domains" in buildingSMART's vocabulary. While "Rooms" has served us faithfully for many years since the inception of our organization, it is now necessary to use a term that accurately reflects the specific domains within the built asset industry.

The accomplishments of the program can be attributed to the exceptional leadership of the Domains and their dedicated delivery projects. These achievements are further bolstered by a well-defined procedural and governance structure, as outlined by the bSI Process.

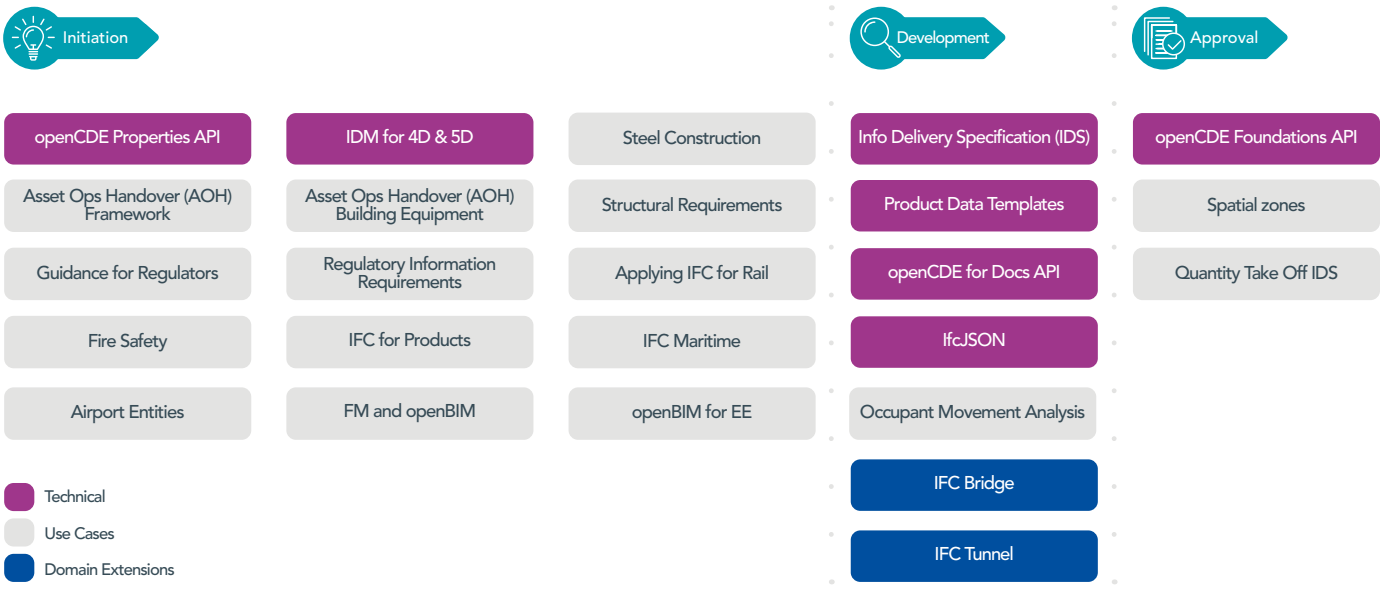
All activities in the program follow the bSI Process, and they are managed within the specialist Domains. Activities define standards, toolkits or reports that are delivered through projects overseen by the Domain Steering Committees.

buildingSMART has its world-renowned Industry Foundation Classes (IFC) standard, which is ISO certified. The ISO 16739 standard was published in 2013 and is now being revised to incorporate the IFC 4.3 Production Standard that was completed in 2021. The latest ISO revision is expected to be published in late 2023 or early 2024.

During 2022, the nine Domains went to the Standards Committee six times to ask for endorsement of activities as they progress through the bSI Process.

This included the IFC Spatial Zone technical report, Asset Operations Handover framework activity proposal, Guidance for Regulators activity proposal, IFC for Products activity proposal, Applying IFC 4.3 for Rail Detailed project plan and the approval of the Final Technical Report for BIM Building Energy Modelling workflows.

Portfolio of Activities



Before each of these activities is presented to the Standards Committee, they are first evaluated by the Standards Committee Technical Executive who review the technical merits of each proposal or outcome depending on its phase in the bSI Process.

The bSI community met online in the spring in what was to be the last of the pandemic virtual Summits. Over 800 people attended to partake in sessions from more than 100 speakers. In October was the Montréal Summit which not only was the first in-person Summit since Beijing in 2019 but was also buildingSMART's first hybrid Summit. With nearly 400 people in Montréal and a similar number attending online, the Domains presented a full agenda of presentations and working sessions for all the activities that were in progress.

Governance and Leadership

Each Domain has a Steering Committee made up of industry representatives who create the Domain's long-term roadmap.

They oversee the delivery of projects that respond to that roadmap and hence meet the requirements of that industry sector.

The Domain roadmaps and the project plans, which will deliver new solutions and standards, consist of a balanced approach to ensure that the functional needs are met, as well as the requirements for quality, longevity and relevance.

The Regulatory Domain Steering Committee elected new members giving a rich variety of specialisms from across the industry into the team.

The members of all the Domain Steering Committees are listed at the back of this report and on the respective Domain web pages. These people all give their time to the community pro bono.

The Regulatory Domain also published a report on the outcomes of its Role of openBIM in Regulatory Process survey and put forward an activity proposal subsequently.

The chair of the Infrastructure Domain, Tiina Perttula recorded a podcast in 2022. These 'Domain Chats', have now become a continuing feature in 2023, and provide valuable insights into what the industry requires from openBIM processes and the routes we are taking to achieve the benefits. They also cover some discussion of relevant current affairs.

The Infrastructure Domain also published the final outcomes of the Ports and Waterways project, the objects and properties of which had already been incorporated into the IFC 4.3 Production Standard. These were uploaded to the Use Case Management service.

The Building Domain progressed with their Handover to FM of building equipment project, drafting a specification based on IFC 4.3.

The Occupant Movement Analysis project published the first phase process maps into the Use Case Management service.

They also published a Final Technical Report on BIM Building Energy Management workflows.

The Domain Roadmaps and the Project Plans, which will deliver new solutions and standards, consist of a balanced approach to ensure that the functional needs are met, as well as the requirements for quality, longevity and relevance

The Railway Domain, following the successful completion of the IFC 4.3 standard with the Infrastructure Domain, launched a project to deploy the standard for use in real applications in capital projects and operational management.

The Sustainability Energy Management Domain which is focused on electrical networks within buildings is now called the Electrical Domain.

They held a two day workshop in Paris in September 2022 to address their roadmap and identify projects that respond to immediate demands.

The Product Domain also held a workshop, but in Brussels with similar aims. They were joined by representatives from manufacturers of construction products who laid out their openBIM requirements and which are being incorporated into the Domain roadmap.

The Domains have several calls for participation in progress and we encourage all members of the community to review these or indeed submit an activity proposal for specific digital exchange requirements that are important to their business needs.

The bSI Process also continues to be improved, and certain projects, such as the Rail and Infra Extensions, continue to be at the leading edge, testing out the requirements for validation which will be included in a future update of the process.

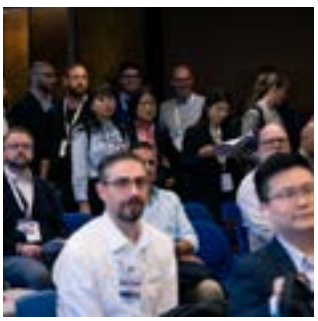
Addendum 3 Project Delivery Governance was reissued in 2022 with additional definition of:

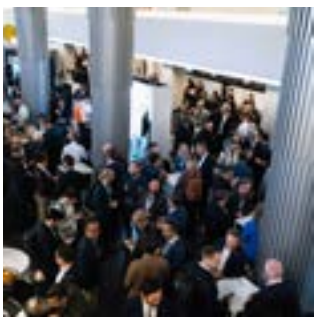
- the Use Case Management Service use process and reference to the Service Tools document;
- Reinforcement of the governance levels and funding arrangements;
- Addition of Production Standard status;
- Addition of reference to ISO standard coordination.

Organisation definition, communication channels and document access are also key elements of the bSI Process, and we continue to make significant improvements in these areas.

The technical deployment guidelines are continuing to be defined and are ensuring proper quality control and publishing of new standards and making the delivery of new standards more efficient with clearer instructions for the project teams.

The web-based platforms that support project management and information flow are now in good use across the program and training continues to be delivered in their use to ensure efficiency and conformity.

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Summary of 2022 Standards Committee Co

2022

AP: Activity Proposal
SP: Standard Proposal
CS: Candidate Standard
PS: Production Standard
TR: Technical Report

New members to the community are always offered an 'onboarding' meeting and this is open at any time to existing members who would like to refresh their understanding or introduce new colleagues.

International Standards

There is a broad portfolio of activities across all Domains.

The IFC4.3 version of the schema, which has been expanded to incorporate infrastructure aspects, is now complete and published as a bSI Production Standard. This means software vendors can start to use it to produce compliant software. The IFC 4.3 has been formally submitted to ISO who have accepted it as a Draft International Standard (DIS) which means it is on track for a revision of ISO 16739.

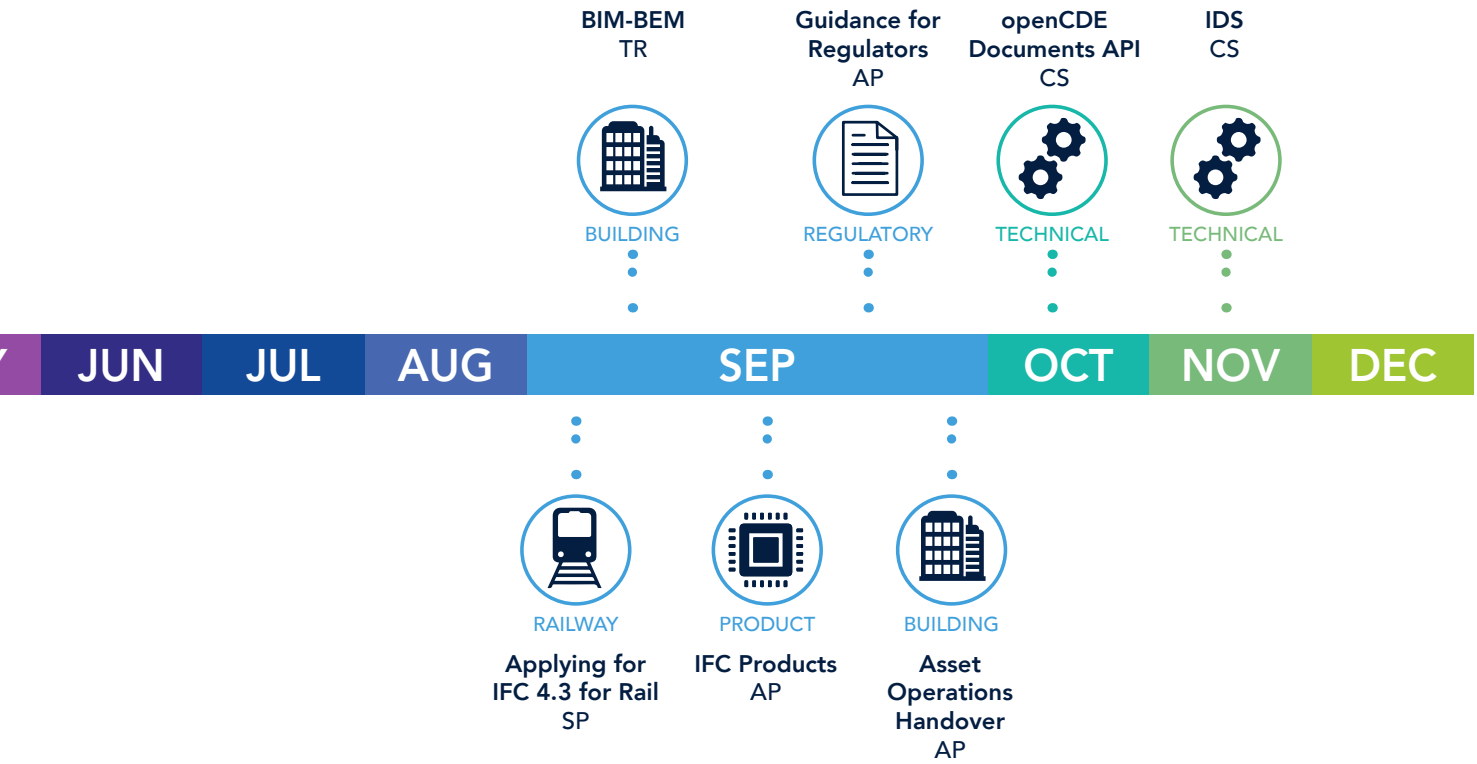
User Services

1) Use Case Management (UCM)

The new Use Case Management service was prepared for an early 2021 launch. This service improves the capture of exchange requirements.

Domains and their projects are able to input specific exchange requirements and search for existing use cases to help with new Activity Proposals.

onsultation



It also allows the Domain Steering Committees to review user requirements to inform the Domain Roadmap plans.

Chapters are also able to obtain a tenancy on the system, and in the near future all enterprises will be able to do so.

2) buildingSMART Data Dictionary (bSDD)

The bSDD has been revised and the new version is now available for use. The openBIM Standards, which are being created through the program, use the bSDD to input the user-defined properties and classifications.

3) Software Certification

A program to improve the software certification process is in progress. This consists of two consecutive projects. The first is to determine user needs through a Voice of the Customer analysis. The out put of the subsequent gap analysis will determine whether an improvement to the existing service or a whole new model is required.

Project 2 will be to deliver the working service.

Standards Committee Voting

The Standards Committee consists of representatives from every member and Chapter and is the senior body overseeing that the bSI Process has been correctly followed to ensure international consensus.

They were asked to vote on the following:

Final Technical Reports

BIM Building Energy Modelling workflows

Detailed Project Plans

Applying IFC 4.3 for Rail

IFC Spatial Zone

Activity Proposals

Asset Operations Handover framework

Guidance for Regulators

IFC for Products

Compliance Program

In order to provide a comprehensive Compliance Roadmap, in 2022 buildingSMART has recruited and appointed a Compliance Director as an additional member of the bSI Management Team.

Professional Certification

The Professional Certification Program has grown significantly through organic means. The Program has been accelerated through the Chapter network which has provided the world with a common international framework to support the use of openBIM solutions and services.

In 2022, buildingSMART has continued to develop the Program, including by:

- Supporting Chapters to deploy Foundation training and certification
- Creating Practitioner training and certification courseware and examinations

bSI Program initiation: **November 2015**

First Chapter launch: **September 2018 (Germany)**

Number of participating Chapters: **30**

Number of active Chapter program: **23**

Number of Training Providers worldwide: **165**

Number of Qualified Individuals: **12,648**

Number of active development workgroups: **3** (Foundation subcommittee, Practitioner subcommittee, Energy Performance)

Number of volunteers at an international level: **50** (Steering committee, Advisory Panel, Experts reviewers/ subcommittee members)

Number of external paid individuals at international Level: **3** (Foundation/ Entry/ Practitioner content review & development)

Total sponsorship gained:
€ 142,000

Total development & operational costs:
€ 504,885

Other revenue:
€ 1,010,128

Program Balance:
€ 647,243

Total revenue:
€ 1,152,128

**In accordance with bSI's status as a not-for-profit, all funds are reinvested back into all programs*

***These figures are accurate as of 1st December 2022*

Chapters are continuing to form working groups that align to international Domains which helps develop new concepts and helps develop use cases

User Program

The buildingSMART User Program plays a vital role in the global implementation of bSI standards and services. Its primary objective is to promote and encourage the use of openBIM within the international community. By showcasing practical applications of openBIM and providing access to relevant resources, the program aims to facilitate its adoption worldwide.

One of the key components of the User Program is the establishment of chapters, which provide localized support to end-users. These Chapters form working groups that align with international Domains, contributing to the development of new concepts, use cases, and best practices. Additionally, they create materials that assist professionals in leveraging openBIM effectively.

Use cases are integral to the User Program and are submitted through the UCM service. The UCM service serves as a platform for industry experts to exchange experiences derived from implemented or ongoing BIM-related projects. Each use case has a specific objective and focuses on achieving tangible outcomes or benefits. Participation in the UCM is open to the entire buildingSMART community, encouraging professionals to actively shape the digitization of their respective industries.

Promoting best practices is another key aspect of the User Program. The bSI Awards program has gained considerable traction, with a substantial number of project submissions in 2022. The program recognizes excellence through category awards, excellence awards, and special mentions. The annual report features an awards section that provides more detailed information, and a Yearbook was created to showcase all winners and finalists.

To enhance support for end-users, the Knowledge portal was established. This portal addresses the need for comprehensive resources on openBIM standards and services. It offers user guides, tutorials, and materials that provide step-by-step guidance on various tasks, such as exporting IFC from authoring vendor applications and making the most of BCF. The portal also allows for translations and user voting on contributed content, with plans for continuous growth and development as new content is added.

The buildingSMART User Program actively promotes openBIM adoption globally. Through Chapters, UCM service, best practice recognition, and a comprehensive knowledge portal, the program empowers professionals to leverage openBIM standards and services effectively in their industries.





Technical Services

The buildingSMART Technical services have the goal of increasing the efficiency of open standards. The collection of services are online tools that can be accessed by everyone. Currently the list of services is:

- buildingSMART Data Dictionary (bSDD)
- Use Case Management (UCM)
- IFC Validation Service
- IFC Implementers Forum
- IFC Software Certification
- IFC Management and Maintenance System
- Translation framework

In the future, additional services will be developed to further support industry needs. bSI only develops and runs services that have an added value to the industry and are not being developed by the market itself.

In practice this means buildingSMART only runs services that no other organization can, or will, facilitate.

Throughout 2022, each service has grown to a higher quality level and has increased usage.

buildingSMART Data Dictionary (bSDD)

The bSDD got a new product manager in 2022. Artur Tomczak joined buildingSMART International and took the role as leader of the bSDD developments. The focus of the bSDD in 2022 was on increasing the support for domain publishers and supporting software vendors to make a connection to the interface.

The bSDD also advanced with the ability to publish protected data in 2022. This means that dictionary owners who want to restrict access to their content to only a certain group of users can now do so in the bSDD. This opens the door to using the bSDD in more private situations, or to link to standards that require a paid license.

The bSDD is an 'API first' service that users can utilize through any software tool which supports the connection. A rudimentary search site is available at: **https://search.bsdd.buildingsmart.org/**

buildingSMART International only develops and runs services that have an added value to the industry and are not being developed by the market itself

IFC Validation Service

The IFC Validation Service started as a bSDD functionality. By popular request it has now graduated into a separate service. Evandro Alfieri has been appointed product manager for the IFC Validation Service during 2022. The service allows any user to upload an IFC file and to have it checked to see if the file is valid. Checks happen on syntax of the file, compliance to the schema, and to multiple rules that have been defined as part of the full IFC specification. The IFC Validation Service has proven to be instrumental for software developers in their efforts to implement IFC 4.3.x.

The 'information consistency' checks that validate the data in an IFC file against bSDD publications is still a valuable part of the service.

The IFC Validation Service is available at:
http://validate.buildingsmart.org

IFC Implementers Forum

The IFC Implementers Forum is a weekly online meeting between software vendors that implement IFC. In 2022, the focus of the forum was implementation of IFC 4.3. The engagement of vendors in the implementation of IFC 4.3 has been unprecedented. Software vendors large and small, from all kinds of domains, have been fine-tuning the new version of the IFC standard.

IFC Software Certification

In 2022 a new direction for IFC Software Certification was presented and endorsed by the community. The new setup involved multiple options to get certified. The IFC Validation Service can assess if an IFC file is compliant with the IFC Schema and specification. Metrics from the IFC Validation Service can provide insights into how consistently software tools produce valid and compliant IFC files. And as a third option, it is possible to have experts assess the capability of software tools to execute a defined use-case or best practice. In 2022 there have also been explorations to link this to the UCM.
https://www.buildingsmart.org/compliance/software-certification/

General Assembly of Implementers

Within the buildingSMART community there are many standard developments going on at the same time. Several IFC developments (IFC 4.3, 4.4 and IFC 5) are running in parallel with new developments on BCF and API standardization.

It is quite common that these development teams progress at their own pace with different priorities. Twice a year the teams come together to share updates and learn from each other. This is done during the General Assembly of Implementers. These meetings typically take place a few weeks before the buildingSMART Standards Summit and are hosted by alternating software vendors.

After a couple of online meetings in 2021, the fall meeting in 2022 was hosted by Autodesk at their offices in Boston. All sessions were recorded and are publicly available on the buildingSMART YouTube channel. All information about past and upcoming meetings is available at:
https://www.buildingsmart.org/general-assembly-of-implementers/

bSDD®

IFC®

buildingSMART®
Software Certification

The buildingSMART Domains

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22 **Building Domain**

23 **Construction Domain**

24 **Electrical Domain**

25 **Infrastructure Domain**

26 **Product Domain**

27 **Railway Domain**

28 **Regulatory Domain**

29 **Technical Domain**

Airport **Domain**

The mission of the Airport Domain is to develop and deploy open digital standards for the airport environment. The unification of digital airport standards will enable more efficient working from the common supply chain and create a uniform approach for the industry.

The Airport Domain continues to develop and now has representatives from airports in Asia, the GCC, Europe and the United States on its Steering Committee.

Some of the key objectives/ challenges for the Domain include:

- Creating a work plan for managing airport-specific assets
- Usage rules for IFC models at airports
- Linked data/ontology regarding library exchange specifications
- Development of GIS-IFC interoperability
- Missing IFC entities
- Identification of the functional requirements of a digital twin
- Enabling economies of scale within the supply chain and with maintenance suppliers
- Completing the existing standards with airport-specific objects, data and processes
- Integrating these standards to align with the building, infrastructure and airport processes
- Enabling asset management decisions based on cost, risk and performance derived from openBIM for the entire lifecycle of airport facilities
- Innovative solution decisions designed to reduce disruption at airports
- Collaboration with the other buildingSMART Domains

The primary activity in the Domain at the moment is to uniquely define critical airport entities to create clear digital workflows for the whole airport community.

A survey has been completed on baggage handling products and a series of further surveys is underway, in multiple languages to harmonize terminology as part of this initiative.

For more information, visit: **www.buildingsmart.org/standards/domains/airport**

Building **Domain**

The core mission of the Building Domain is to create open digital standards and solutions by enabling intelligent data that either contributes to the planning, design and construction of buildings or the ongoing operations and maintenance.

This will enable process and data integration for buildings for their entire lifecycle. The Building Domain is led by a Steering Committee comprised of representatives from international Members and buildingSMART Chapters.

Some of the key objectives of the Building Domain are:

- Open standard data exchange for whole life building management
- Asset management exchange of information
- Ensuring archives of asset information
- Digital project management
- Focused on a variety of projects.

The Building Domain progressed with their Handover to FM of building equipment project, drafting a specification based on IFC 4.3.

The Occupant Movement Analysis project published the first phase process maps into the Use Case Management service.

They also published a Final Technical Report on BIM Building Energy Management workflows

These are published in the Standards Library at www.buildingsmart.org

For more information, visit: **www.buildingsmart.org/standards/domains/building**

Construction **Domain**

The Construction Domain is focused on digital transformation and believe it will make construction site practices more efficient, safe and sustainable through the better flow of information, enabling innovative methods of construction and the incorporation of modern technologies.

Its remit is to enable the application of openBIM standards to construction sites and communicate the benefits of openBIM to industry players in order to promote its further use.

The Construction Domain is concerned with use cases where the application of openBIM will result in greater productivity, right first-time assembly, reduction in waste of materials and resources and improved safety.

Some of the key objectives of the Construction Domain are:

- Advance the digitalization of construction
- Develop site environment best practices based on openBIM
- Integration of design, schedule and cost
- Capturing of use cases to make 4D and 5D (schedule and cost) more commonly used
- Provide openBIM education to the construction industry
- Logistics, material management and barcoding/RFID integration
- Incorporate forward-looking Information and communication technologies into the development of open construction solutions and standards
- Easier and streamlined flow of information through the supply chain, with appropriate levels of definition, including for final design sign off
- Opportunities for modern designs combining materials and components through DfMA analysis and off-site modular solutions, enabling efficient assembly flow
- Visual simulations of defined methods such as the placement of temporary works and assembly of components and modules
- Data linkage with non-BIM software and other standards

With a strong focus on new technologies, the Construction Domain intends to focus efforts on new and emerging trends. Proposed initiatives include Construction Information Management, Integrated BIM Project Management, 4D/5D modelling, material passport, openBIM and the Internet of Things (IoT), and the design of autonomous vehicle control.

For more information, visit: **www.buildingsmart.org/standards/domains/construction**

Electrical **Domain**

The Electrical Domain was established at the end of 2021 and its mission is to ensure a more sustainable future for the built asset industry focussed on electrical networks in buildings. This new Domain aims to develop and increase the use of open digital BIM standards for the optimum management of building energy requirements to address energy management and waste, and to create innovation opportunities.

Its key objectives are:

- Enabling energy consumption, understanding the carbon footprint, and evaluating circular economy aspects in the design of innovative solutions
- Enabling users to make informed decisions in design, build and operation based on a comprehensive connected data model of their buildings incorporating a full electrical network, control network and the energy forecasted behaviour
- To anticipate and specify digital ways of working at the earliest stage of an assets life whether it be new build or refurbishment
- Complementing the existing buildingSMART Industry Foundation Class (IFC) open standard, by integration of the Normalised Electrical Model (NEM) to enable more efficient working in the electrical design domain
- Linking the electrical network and building management system to the building and mechanical and plumbing system model

Proposed initiatives include openBIM for Electrical Engineering (NEM) electrical energy efficiency modelling, and assessing the electrical power network sustainability impact.

For more information, visit: **www.buildingsmart.org/standards/domains/electrical**

Infrastructure **Domain**

The Infrastructure Domain aims to combine, enhance and develop open standards for intelligent data, with enabling process and data integration for infrastructure projects and assets. The Infrastructure Domain has been leading buildingSMART's efforts in several areas, including roads, bridges, tunnels, ports and waterways and alignment work.

Some of the key objectives of the Infrastructure Domain are:

- Enable data exchange based on open standards for the planning, realization and maintenance of infrastructure works and ultimately all aspects of the built environment
- Improve the exchange of information and open data access between asset management databases
- Promote enduring archives of asset information based on open standards
- Enable lifecycle information management for infrastructure based on open standards
- Enable the merging of project related information (e.g. requirements and risks, with asset information)

The Infra IFC Extensions program, which was the collection of infrastructure projects and the Rail project delivered the requirements for IFC 4.3 . Further work on IFC Bridge is taking place to determine test instructions. The IFC Tunnel project continues to develop IFC extensions.

IFC 4.3 was published as a bSI Production Standard. This will also be published as a revision to ISO 16739 and the IFC 4.3 program board managed the relationship with ISO for this. The ISO process is still in progress and a revised standard is expected soon.

The buildingSMART collaboration with the Open Geospatial Consortium continues following the publication of the 2021 report but is now being led through a multi-domain Strategic Group. A further report on the practicalities of BIM GIS coordination, illustrated with specific use cases, is in authorship.

The Steering Committee is also focused on the roadmap which tackles the future needs of the infrastructure industry and addresses these in conjunction with other core themes such as the Technical roadmap, partner liaisons, completion of current standard creation work and launching future activities.

For more information, visit: **www.buildingsmart.org/standards/domains/infrastructure**

Product **Domain**

The Product Domain's core mission is to manage the development and provision of processes, templates, tools and functionality to enable the robust and efficient use of product data. This includes relevant third-party standards, classification systems and other forms of structured content for openBIM.

The Steering Committee are developing strategies that will bridge the information divide between those operating in the supply chain, where there are no international open standards, and the design and build domains, who are using IFC-based standards.

Some of the key objectives of the Product Domain are:

- Enable the efficient use of product data in projects and subsequent asset management, including advances in digital supply chains
- Support the other Domains to define the product data requirements needed as outcomes of their standards
- Develop and execute projects for product support to advance the development of openBIM
- Facilitate the translation and localization of IFC

The Domain is also continuing its liaison with the working group for advancing the supply chain needs in a proposal to connect bSI and GS1 standards, which will ultimately develop new standards for product manufacturers.

The Product Domain held a workshop in Brussels to address the Domain Roadmap and identify projects that respond to immediate demands. They were joined by representatives from manufacturers of construction products who laid out their openBIM requirements and which are being incorporated into the Domain Roadmap.

Initiatives in development include IFC Products as a proposal to develop classification for Products within IFC and Environmental Indicators for product manufacturers which have been added to the buildingSMART Data Dictionary (bSDD).

For more information, visit: **www.buildingsmart.org/standards/domains/product**

Railway **Domain**

The core mission of the Railway Domain is to accelerate and exploit new digital opportunities for railway systems and create a comprehensive and applicable digital representation of the entire railway ecosystem that will support all phases of the lifecycle. This provides the basis of interoperable support systems, reduced complexity, secure and safe solutions, and reduced costs for all stakeholders.

The Railway Domain Steering Committee is led by representatives from BANE Denmark, ÖBB-Infrastruktur, SBB, Trafikverket, CRBIM, MINnD, SNCF, Finnish Transport Infrastructure Agency, Deutsche Bahn, Bane NOR and RFI. The Steering Committee oversees the largest international project at bSI.

Following the successful completion of the IFC 4.3 standard with the Infrastructure Domain, a rail project was launched to deploy the standard for use in real applications in capital projects and operational management.

Some of the key objectives of the Railway Domain are:

- Develop interoperable support systems
- Reduce the complexity of the rail ecosystem
- Assure secure and safe solutions
- Reduce project costs and delays for all players
- Work with buildingSMART, rail owners and operators, and other stakeholders to:
  - Extend the IFC Infrastructure Schema for the rail domain, construction and maintenance
  - Contribute to the IFC Common Schema development
  - Build on international consensus
  - Take into account iterative works with complementary data and IFC deployments
  - Support early deployment and testing by making the deliverables publicly available and open

For more information, visit: **www.buildingsmart.org/standards/domains/railway**

Regulatory **Domain**

The core mission of the Regulatory Domain is to help both facility owners and regulatory authorities benefit from the use of openBIM to meet expectations. The vision is an automated regulatory process, achieved by supporting gradual change in workflow from manual to fully automated whilst safeguarding the legal perspective.

The Regulatory Domain continues to improve in the development and procedures needed to support activities across the community. The Regulatory Roadmap has been updated twice: in 2019, with minor changes, and in 2022 the Domain added preliminary scheduling of identified projects. The objectives of the roadmap have remained unchanged.

Some of the key objectives of the Regulatory Domain are:

- Standardize processes, workflows and procedures for applicants and regulators based on openBIM and support them with tools, guidelines and manuals
- Support interoperability between Regulatory, Requirements and Recommendatory (RRR) content
- Provide an open discussion forum for each government's building regulators, researchers and implementers to promote openBIM-based processes and collaborative issues
- To be an arena for government regulatory bodies to share information, inspire and implement automated code checking and using openBIM standards, including ISO 16739, in real-life situations
- Lead and manage projects and initiatives to facilitate and influence adoption by stakeholders

The Domain has published several bSI Technical Reports, including:

- e-submission: common guidelines to introduce BIM to the building approval process
- Application forms: common information requirements for automated compliance checking

With growing interest worldwide in improving and automating regulatory compliance process, the Regulatory Information Requirements project will ensure that the regulatory information requirements common across many jurisdictions have an appropriate representation in IFC, whilst leaving jurisdictions free to add local information requirements and implement their own checklists and rules.

The Domain is developing a document entitled "Guidance for Regulators on using openBIM". The document will make the case for openBIM and a step-wise acceptance of openBIM to progressively support visualization, measurement and checking.

The Domain has published a survey of Regulatory bodies which reached 160 participants in 38 countries. It concluded that awareness of BIM in Regulatory bodies was high, with the majority planning to use it in their processes, setting a good foundation for the Domain's plans.

For more information, visit: **www.buildingsmart.org/standards/domains/regulatory/**

Technical **Domain**

The Technical Domain actively collaborates with the global bSI community to drive advancements in core data architecture, tools, and applications of open data standards. Its primary objective is to enhance interoperability within the built asset industry.

The Technical Domain engages in the following activities:

- **Conducting Surveys:** The Domain conducts surveys to explore information technology, data architecture, and data science advancements in the broader technology industry. This helps determine their relevance to bSI initiatives and identify potential areas for improvement.
- **Connecting Innovators:** The Domain fosters connections between innovators from industry and academia, encouraging their active participation in buildingSMART technical programs and projects. By bringing together diverse expertise, the Domain promotes collaboration and knowledge sharing.
- **Facilitating bSI Processes**: The Domain plays a vital role in facilitating bSI processes, particularly in maturing technological innovations from ideation to formalized projects and subsequent standardized standards. It ensures a smooth transition by providing guidance and support throughout the process.
- **Supporting Workflow-Enabling Technologies:** The Domain supports the development, promotion, and utilization of workflow-enabling toolkits, tools, and technologies. By encouraging the adoption of these solutions, it aims to improve efficiency and effectiveness in the industry.

In 2022, the Technical Domain continued its efforts from the previous year and achieved significant progress on IFC5. Additionally, it has reached important milestones in various projects, some of which have passed the voting stage and are close to being standardized. These projects include:

- The first phase of the openCDE API
- Information Delivery Specification (IDS)

Furthermore, the Technical Domain has initiated two new projects:

1. **IFCDelta Project:** This project focuses on facilitating the delivery of specific portions of a model that have changed, rather than sending the entire dataset every time a model is published to IFC. The project involves collaboration with multiple vendors and primarily concentrates on IFC 2x3 and IFC 4x, with implications for IFC 5.
2. **IFC 5:** This ambitious project is currently in its initial stages of development. Its overarching goal is to address historical challenges and provide support for future and unforeseen use cases. To ensure an effective solution, feedback, requirements, and necessary components are being gathered through Summits and General Assembly meetings. A dedicated working group is finalizing an information model, and its work is expected to continue throughout 2023.

For more information, visit: **www.buildingsmart.org/standards/domains/technical**

Chapter Network

Chapters serve as the fundamental building blocks of the work carried out by buildingSMART. The year 2022 witnessed significant milestones and developments that underscore the crucial role played by Chapters in the development of standards and services. Throughout the year, numerous expressions of interest were received from various parts of the world, all aimed at establishing new Chapters.

Notably, 2022 marked a momentous occasion as Africa was formally included as a continent in the Chapter network, with Morocco's approval in June. Furthermore, Portugal's successful submission led to their approval, and Romania also obtained formal approval to establish Chapters.

Two Chapters, namely the Italy and Spain, transitioned from Developing status to Full status. This transition grants them increased voting rights within the council, emphasizing the strength and progress of the Chapters. Additionally, there has been a growing interest in the formation of new Chapters in India and Brazil, with submissions expected in 2023.

"The expansion of the Chapter network is occurring at a rapid pace, and what's particularly exciting is its reach into new continents. While witnessing the steady growth of Chapters in mature markets, we are now eagerly anticipating the opportunity to provide support to emerging economies and regions that recognize the indispensable role of open standards in their building and infrastructure projects."

Aidan Mercer, Marketing Director, buildingSMART International

Chapters remain at the forefront of driving initiatives such as Professional Certification, recognizing the ever-increasing demand for certifications and the development of practitioner courses.

Chapters serve as the fundamental building blocks of the work carried out by buildingSMART

Full Chapters

Benelux
Canada
China
Denmark
Finland
France
Germany
Hong Kong
Italy
Japan
Korea
Norway
Spain
Sweden
Switzerland
UK and Ireland
USA

Developing Chapters

Australasia
Austria
Croatia
Czech Republic
Morocco
Poland
Portugal
Romania
Singapore
Slovenia
Turkey
UAE

Marketing

Overview

2022 saw further progress in the overall communications and messaging in support of mission to share the benefits of openBIM. Not only was there strong growth in engagement, and the return of the in-person International Standards Summit, there was a significant demand for materials to support the day-to-day use of openBIM in practice. With advances in standards and services, and the increased demand for software support, the need to explain clearly how tools are used became a feature of 2022. This led to the creation of the Knowledge Portal which shared user guides and materials for end-users. There was also a high demand for online content, with the virtual summits and attendance at physical events back to pre-pandemic levels. There was also a change in the demand for the structure of the traditional events, with attendees feeding back that they would like more hands-on workshops and masterclasses to support the demand.

The buildingSMART Awards Program helped to share best practice and showcased exemplar projects, and 2022 continued to show success in the number of submissions and the quality received. The technical triage continued – that being a group of technical experts who went through each submission to ensure it adhered to the recommended level of technical competence before the jury assessed each submission. There were 121 submissions, with 51 passing technical triage. Finalists were invited to present at the summit in Montreal, with the second edition of awards brochure created from the finalists and winners.

News

The Digital Newsletter continues to be the main source of news and information sharing. The newsletter runs once a month and is archived on the bSI website.

In 2022, bSI published a variety of important news stories for the community. Full stories can be found on the website. Some important news items from the year included:

- Clive Billiald appointed Chief Executive (January 2023)
- Ian Howell appointed as Interim-CEO
- Italy and Spain become Full Chapters
- buildingSMART mourns the loss of Richard Petrie
- Céline Bent and Evandro Alfieri join bSI
- Summits return in Montreal, Canada
- Romania, Morocco and Portugal become Developing Chapters
- IFC 4.3 submitted to ISO

Platforms

The CRM platform from **HubSpot** continues to be the main method for sharing news and information with the community. There was a drop in the deliverability of emails, with spam filters changing on many email servers and new methods for sharing information sought after. There was overall a higher frequency of emails from bSI and a better use of preferences for recipients.

Zoom continued to be the webinar/meeting platform of choice, with **Hopin** continuing to be the platform for the virtual summits and hybrid environment for the in-person events. The feedback for Hopin was very good with most attendees finding it a good balance between being user friendly and interactive.

Videos are now mainly managed on the **YouTube** account, with some legacy videos still residing on **Vimeo**. Having both platforms gives good options for on-demand content to be placed and then embedded on various bSI web domains.

The team is now enabled with **Camtasia** accounts and a lot of video production is being done in-house to support the growing demand for online content.

Award Force continued to be the platform for supporting the Awards Program, adding professionalism and ease of use for submitters and jurors. This has helped to streamline to the submission and review process and provided a place to house important materials.

GitHub helps to manage open-source code and documentation related to the standards and solutions. The buildingSMART page can be found at **github.com/buildingSMART**.

Monday.com is predominantly used for managing the solutions and standards program and is a tool for project managing the Domains and the output from the working groups. This includes working documents, tasks and deliverables, and roles and responsibilities.

Miro is a tool used by bSI and it helps teams to collaborate and brainstorm for strategic or working meetings by capturing notes and ideas.

Buzzsprout is the platform for the buildingSMART Podcast and this houses all of the interviews and discussions for wider public consumtion.

The buildingSMART **Forum** continues to provide users a variety of ways of getting involved and engaging with the community.

There is also a new **User** website for knowledge-based learning that is designed to house user guides and tutorials. This is still early days for this domain but it provides an opportunity for end-users to learn more about openBIM.

Social Media

Social media platforms are fast becoming a critical function for buildingSMART's outbound communications. Growth in LinkedIn for example has been high. A break-down of the channels and the growth can be seen below:

The LinkedIn page has grown from **31,511 followers in 2021 to 39,240 in 2022**. This channel sees the highest amount of engagement.

- Twitter grew from followers **from 7,568 to 7,934**
- Facebook grew **from 2,720 to 2,950**
- YouTube has grown **from 1,860 to 2,650**
- Vimeo now has **376 followers** with over 100,000 views on the channel

39,240
LINKEDIN

2,950
FACEBOOK

2,650
70,000 views
YOUTUBE

7,934
TWITTER

376
100,000 views
VIMEO

2022 saw further progress in the overall communications and messaging in support of mission to share the benefits of openBIM

Fellows

The buildingSMART Fellowship Scheme was established in 2017 to honour long serving professional contributors who have been the organisation's lifeblood over many years. These individuals have made significant contributions to the work of buildingSMART and the advancement of BIM. buildingSMART Fellows have contributed substantial leadership or technical input at an international level, working on international programs or standards or with more than one chapter.

In 2022 the Fellowship Committee determined that the following individuals should be recognised as buildingSMART Fellows and they were presented at the Rome Summit in 2023.

Karin Anderson
Sweden

Mark Baldwin
Switzerland

Calvin Kam
USA

Jeffrey Ouellette
USA

Bill Moore
Canada

Pasi Paasiala
Finland

Steen Sunesen
Norway

Masaki Muto
Japan

David Watson
Canada

Håvard Bell
Norway

The full list of existing Fellows (which is also published annually on the website www.buildingsmart.org/community/fellows is as follows:

Yoshinobu Adachi
Kjell Ivar Bakkmoen
Christophe Castaing
Birgitta Foster
Francois Grobler
Frédéric Grand
Leif Granholm
Roger Grant
Chris Groome
Reijo Hänninen
Tomi Henttinen
Ian Howell
Rudolf Juli
Jan Karlshøj
Susan Keenliside
Inhan Kim
Arto Kiviniemi
Thomas Liebich
Alain Maury
Patrick MacLeamy
John Mitchell
Nick Nisbet
Tiina Perttula
Richard Petrie
Jim Plume
Øivind Rooth
Birgitta Schock
Mikio Shoji
Jøns Sjøgren
Dana Smith
Rasso Steinmann
Cheng Tai Fatt
Väino Tarandi
Jeff Wix

Membership

Membership remains the main source of financial income that supports the operation of buildingSMART International. There has been development in technical services, Professional Certification and Accelerated Projects that will provide income in the coming years. The trend for membership growth has been steady with new members joining in 2022 that are committed to developing open standards. bSI has strong growth targets for 2023 to support the growing programs and demand for services.

The new "Principal" membership category which is closely aligned to work being done on the Technical Roadmap, now has two members. ASSHTO and SBB have joined this category to help shape the developments of the roadmap and show their support to resources needed to deliver against the ambitious goals. Other levels include Strategic, Multinational and Standard. Strategic membership is the most influential level, with members contributing to the strategic direction of the community. These include the Strategic Advisory Council meetings, hosted twice yearly and are now resuming as in-person. Multinational members are entitled to be members of up to five local Chapters in addition to membership of bSI. Standard members are also given membership of a local Chapter of choice plus membership to bSI.

As of early 2023, there are nine strategic members: Arup, Autodesk, China Communications Construction Company (CCCC), China Railway BIM Alliance (CRBIM), Nemetschek Group, Oracle Construction and Engineering, Schneider Electric, Siemens and Trimble. There are nineteen multinational members and thirty-eight standard members. Members sit on the Standards Committee, which endorses the creation of standards, and can work in Domain Committees and on projects. Members benefit from the collective local and international activities of other members. They play an active role, not only in identifying issues, but also in developing solutions.

New members during the year were AASHTO and SBB (upgraded from Standard in early 2023) as Principal members, WSP as Multinational and SIA, Hungarian Roads, Eplan, Plannerly and Track Machines Connected all as Standard members.

Governance and Finance

buildingSMART International is incorporated in the UK as a company limited by guarantee while the self-governing Chapters are set up according to the legal framework in their country. The International Council (IC) consists of representatives from the Chapters in their governance capacity, and oversees activities of bSI. Each Chapter sends two representatives to the IC meetings. A Board is elected at the annual International Council meeting.

The Board met online on four occasions and twice in-person in 2022. Its work includes setting key priorities, reviewing and signing off the accounts, receiving and deciding upon new Chapter applications, setting and updating Company Byelaws.

The Strategic Advisory Council (SAC) also advises bSI, and during the year Strategic members met with the Board on two occasions. Six full-time and two part-time officers were employed by bSI in 2022: an Operations Director, a Marketing Director, a Compliance Director, a Finance Manager, a Business Administrator, an Events Manager and two International Program Coordinators. An interim CEO was procured on a fee basis after the passing of Richard Petrie.

Other services procured on a fee basis include a Technical Director and Technical Coordinator, technical support for solutions & standards development, an International Program Coordinator, regional representation and support in the Americas, HR support, communications support and website management.

The principal source of income for bSI is membership subscriptions which in 2022 contributed €1,725,000; on paper static compared with 2021, but stripping out the effect of currency exchange differences, actually a 7% increase. Income from Chapter membership stood at €411,000. €297,000 was returned to the Chapters under the rebate scheme.

Income from services was €576,000. Of this total, €477,000 was Professional Certification income and €91,000 was Software Certification income, but most of the latter passes through with payments to the service provider. The Use Case Management Service generated €8,000 of service income, but again most of this is passed on to the service provider. Net contribution to the business from services was €385k.

Other income in 2022 comprises grants and donations of €67,000, and bSI charges for non-member project sponsors of €16,000.

In 2022 there was one virtual summit and one in person summit in Montreal in the autumn. The latter generated €299,000 income through sponsorship and ticket sales. This income is offset by the costs of putting on the summit and the surplus shared with the local Chapter. The bSI share was utilized for hosting other events in 2022. The net contribution from summits was €-4k.

Total core operational and program costs in 2022 were €2,307,000. The principal outgoing was bSI management (€1,492,000). This is slightly less than 2021 as our full time CEO did not start until January 2023, but there was a new Compliance Director from June 2022. Other bSI operational costs were similar to 2021 with the exception of travel which increased by €136,000 to €157,000 following the lifting of pandemic restrictions. Despite an increase in program engagement and activity in 2022, Program support costs were €10,000 less than in 2021. Technical support costs increased by 31% compared with 2021 due to the engagement of a technical coordinator and increased support for IFC 4.0, validation, bSDD and other services. The main saving was in operational support costs from external contractors due to more of this work being done by the bSI management team.

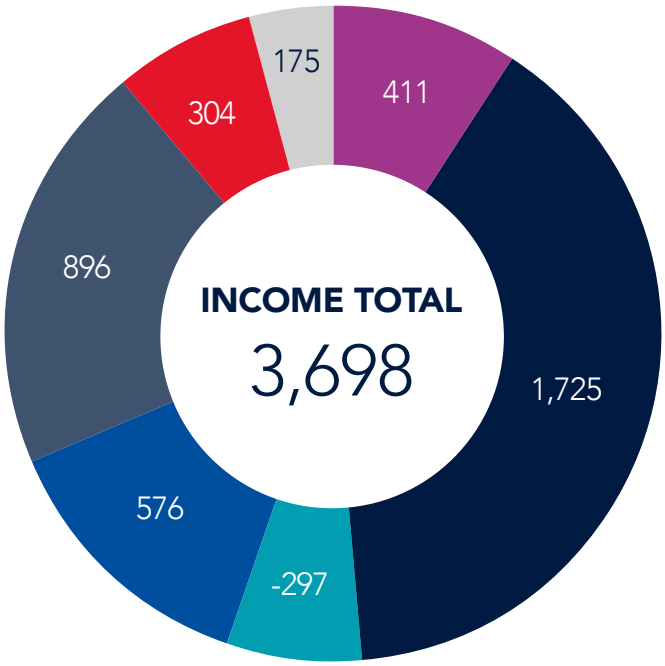
Projects are funded separately, with total funding and expenditure balancing out on project completion. Project funding in 2022 stood at €896,000, 70% of which was funding for phase three of the IFC Rail project.

Currency exchange rate movements between the Euro and GBP in 2022 led to foreign exchange gains in excess of €138,000. This was a large contributing factor to the year end surplus of €134,000. Consequently, total equity increased by over €100,000 to €614,000.

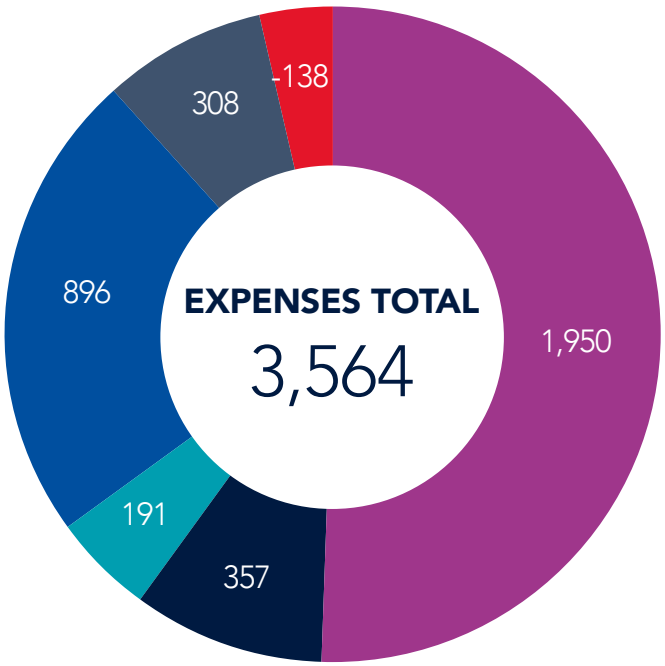
Top financial priorities for 2023 are increasing membership income and maximizing revenue from Professional Certification and new income streams such as Accelerated Projects and Validation.

The Financial Statements are published at the end of this report.

2022 Full Year (€000's)



Income	2021 Actual	2022 Budget	2022 Actual
Chapters	399	400	411
Membership	1,725	1,917	1,725
Chapter rebate	-263	-329	-297
Services	435	691	576
Projects	1,682	926	896
Summits	175	200	304
Other Income	170	37	175
Income Total	**4,323**	**3,842**	**3,698**



Expenses	2021 Actual	2022 Budget	2022 Actual
bSI Core	1,783	2,031	1,950
Programs	367	430	357
Services	277	319	191
Projects	1,682	926	896
Summits	49	150	308
Exchange & bad debts	164	30	-138
Expenses Total	**4,322**	**3,886**	**3,564**

Surplus	**1**	**-44**	**134**
GBP to Euro rates	1.19	1.18	1.13
(€000's)			

Awards Program

The final presentations for the openBIM Awards Program 2022 took place in a hybrid format during the buildingSMART International Standards Summit Montreal 2022, on 19-20 October. A different elite jury was put in place for each category, who watched and deliberated live in Montreal. The winners were announced on the evening of 20 October at the first live Awards Ceremony for 3 years.

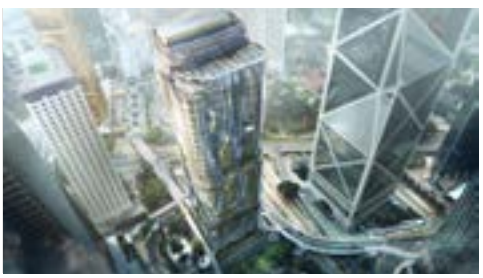
The program has received over 100 submissions for each of the last three years, this year with 121. Of those, 51 passed reviews by the technical triage team spread over 11 categories. An extensive international jury further narrowed the candidates down to 21 in 9 categories. And of those 21 finalists, 9 were crowned as category Winners with 3 Special Mentions also awarded.

Award Winners

Category of Asset Management

Winner: Engisis, Minnucci Associati and COSTIM, Italy

Project Name: ChorusLife: Creation and maintenance of an openBIM Digital Twin for asset management



Category of Construction for Buildings

Winner: Henderson Land Development Company Limited, Hip Hing Construction Company Limited, China

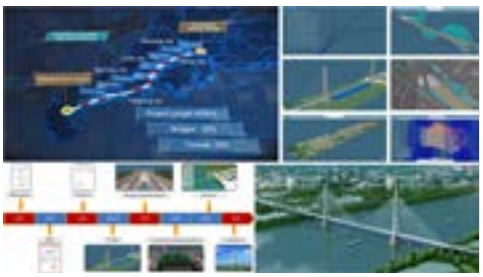
Project Name: The Henderson – openBIM Driven Landmark Project

Category of Design for Buildings

Winner: Bond Bryan Digital, UK

Project Name: Department for Education: Gen Zero

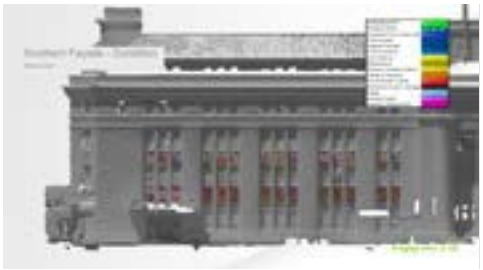
Award Winners



Category of Design for Infrastructure

Winner: China Railway Design Corporation, China

Project Name: Application of openBIM in the Design and Delivery of Guangzhou-Zhanjiang High Speed Railway



Category of Facility Management

Winner: Aurecon, New Zealand

Project Name: Wellington Railway Station Façade Condition Assessment

Category of Handover

Winner: Mostostal Warszawa S.A., Poland

Project Name: Handover to FM with openBIM - Marshal's Office, West Pomerania

Category of Professional Research

Winner: The Hong Kong University of Science and Technology, Hong Kong

Project Name: Secure openCDE with Blockchain for HKUST Campus-wide Digital Twin with openBIM and openGIS Applications

Category of Student Research

Winner: THM (University of Applied Sciences Mittelhessen), Germany

Project Name: Implementing passive RFID technology into BIM models in combining them with open-source software applications

Category of Technology

Winner: Future Insight, The Netherlands

Project Name: Implementation of BIM-based building permit process in Estonia

buildingSMART International Ltd
Unaudited Financial Statements
for the year ended 31 December 2022

buildingSMART International

Statement of Financial Position

	Notes	2022 £	2022 £	2021 £	2021 £
Non-current assets					
Intangible assets	4		103,303		120,520
Property, plant and equipment	5		10,578		10,787
			113,881		131,307
Current assets					
Inventories		3,750		4,091	
Trade and other receivables	6	660,333		504,199	
Cash and cash equivalents		1,852,343		1,976,654	
		2,516,426		2,484,944	
Current liabilities	7	(2,043,809)		(2,106,833)	
Net current assets			472,617		378,111
Total assets less current liabilities			586,498		509,418
Non-current liabilities	8		(42,219)		(83,848)
Net assets			544,279		425,570
Reserves					
Capital contribution reserve			52,431		52,431
Income and expenditure account			491,848		373,139
Members' funds			544,279		425,570

The directors of the company have elected not to include a copy of the income and expenditure account within the financial statements.

For the financial year ended 31 December 2022 the company was entitled to exemption from audit under section 477 of the Companies Act 2006 relating to small companies.

The directors acknowledge their responsibilities for complying with the requirements of the Companies Act 2006 with respect to accounting records and the preparation of financial statements.

The members have not required the company to obtain an audit of its financial statements for the year in question in accordance with section 476.

These financial statements have been prepared and delivered in accordance with the provisions applicable to companies subject to the small companies regime.

The financial statements were approved by the board of directors and authorised for issue on 23 February 2023 and are signed on its behalf by:

Jaan Saar
Director

Company Registration No. 05024694

Notes to the Financial Statements

1 Accounting policies

Company information
buildingSMART International Limited is a private company limited by guarantee incorporated in England and Wales. The registered office is 9 Quy Court, Colliers Lane, Stow-cum-Quy, Cambridge, CB25 9AU.

1.1 Accounting convention
These financial statements have been prepared in accordance with FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" ("FRS 102") and the requirements of the Companies Act 2006 as applicable to companies subject to the small companies regime. The disclosure requirements of section 1A of FRS 102 have been applied other than where additional disclosure is required to show a true and fair view.

The financial statements are prepared in sterling, which is the functional currency of the company. Monetary amounts in these financial statements are rounded to the nearest £.

The financial statements have been prepared under the historical cost convention. The principal accounting policies adopted are set out below.

1.2 Income and expenditure
Turnover comprises the fair value of the consideration received or receivable for the provision of services in the ordinary course of the company's activities and membership subscription income. Turnover is shown net of sales/value added tax, returns, rebates and discounts.

The company recognises revenue when:
The amount of revenue can be reliably measured;
it is probable that future economic benefits will flow to the entity and specific criteria have been met for each of the company's activities.

Income is recognised over the period to which it relates and any amounts received during the year that relate to future periods are carried forward at the balance sheet date as deferred income.

1.3 Intangible fixed assets other than goodwill
Intangible assets acquired separately from a business are recognised at cost and are subsequently measured at cost less accumulated amortisation and accumulated impairment losses.

Intangible assets acquired on business combinations are recognised separately from goodwill at the acquisition date where it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity and the fair value of the asset can be measured reliably; the intangible asset arises from contractual or other legal rights; and the intangible asset is separable from the entity.

Amortisation is recognised so as to write off the cost or valuation of assets less their residual values over their useful lives on the following bases:

bSI DD Straight line over 10 years

1.4 Property, plant and equipment
Property, plant and equipment are initially measured at cost and subsequently measured at cost or valuation, net of depreciation and any impairment losses.

Depreciation is recognised so as to write off the cost or valuation of assets less their residual values over their useful lives on the following bases:

Office equipment 25% straight line basis per annum.

The gain or loss arising on the disposal of an asset is determined as the difference between the sale proceeds and the carrying value of the asset, and is credited or charged to surplus or deficit.

1.5 Impairment of non-current assets
At each reporting period end date, the company reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where it is not possible to estimate the recoverable amount of an individual asset, the company estimates the recoverable amount of the cash-generating unit to which the asset belongs.

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset (or cash-generating unit) is estimated to be less than its carrying amount, the carrying amount of the asset (or cash-generating unit) is reduced to its recoverable amount. An impairment loss is recognised immediately in surplus or deficit, unless the relevant asset is carried at a revalued amount, in which case the impairment loss is treated as a revaluation decrease.

Recognised impairment losses are reversed if, and only if, the reasons for the impairment loss have ceased to apply. Where an impairment loss subsequently reverses, the carrying amount of the asset (or cash-generating unit) is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset (or cash-generating unit) in prior years. A reversal of an impairment loss is recognised immediately in surplus or deficit, unless the relevant asset is carried at a revalued amount, in which case the reversal of the impairment loss is treated as a revaluation increase.

1.6 Inventories
Inventories are stated at the lower of cost and estimated selling price less costs to complete and sell. Cost comprises direct materials and, where applicable, direct labour costs and those overheads that have been incurred in bringing the inventories to their present location and condition.

Notes to the Financial Statements

Inventories held for distribution at no or nominal consideration are measured at the lower of cost and replacement cost, adjusted where applicable for any loss of service potential.

At each reporting date, an assessment is made for impairment. Any excess of the carrying amount of inventories over its estimated selling price less costs to complete and sell is recognised as an impairment loss in profit or loss. Reversals of impairment losses are also recognised in profit or loss.

1.7 Cash and cash equivalents

Cash and cash equivalents are basic financial assets and include cash in hand, deposits held at call with banks, other short-term liquid investments with original maturities of three months or less, and bank overdrafts. Bank overdrafts are shown within borrowings in current liabilities.

1.8 Financial instruments

The company has elected to apply the provisions of Section 11 'Basic Financial Instruments' to all of its financial instruments.

Financial instruments are recognised in the company's statement of financial position when the company becomes party to the contractual provisions of the instrument.

Financial assets and liabilities are offset, with the net amounts presented in the financial statements, when there is a legally enforceable right to set off the recognised amounts and there is an intention to settle on a net basis or to realise the asset and settle the liability simultaneously.

Basic financial assets

Basic financial assets, which include trade and other receivables and cash and bank balances, are initially measured at transaction price including transaction costs and are subsequently carried at amortised cost using the effective interest method unless the arrangement constitutes a financing transaction, where the transaction is measured at the present value of the future receipts discounted at a market rate of interest. Financial assets classified as receivable within one year are not amortised.

Classification of financial liabilities

Financial liabilities and equity instruments are classified according to the substance of the contractual arrangements entered into. An equity instrument is any contract that evidences a residual interest in the assets of the company after deducting all of its liabilities.

Basic financial liabilities

Basic financial liabilities, including trade and other payables, bank loans, loans from fellow group companies and preference shares that are classified as debt, are initially recognised at transaction price unless the arrangement constitutes a financing transaction, where the debt instrument is measured at the present value of the future payments discounted at a market rate of interest. Financial liabilities classified as payable within one year are not amortised.

Debt instruments are subsequently carried at amortised cost, using the effective interest rate method. Trade payables are obligations to pay for goods or services that have been acquired in the ordinary course of business from suppliers. Amounts payable are classified as current liabilities if payment is due within one year or less. If not, they are presented as non-current liabilities. Trade payables are recognised initially at transaction price and subsequently measured at amortised cost using the effective interest method.

1.9 Taxation

The company is primarily a mutual company and as such is exempt from corporation tax on surpluses generated from mutual activities.
.

1.10 Employee benefits

The costs of short-term employee benefits are recognised as a liability and an expense, unless those costs are required to be recognised as part of the cost of stock or non-current assets.

The cost of any unused holiday entitlement is recognised in the period in which the employee's services are received.

Termination benefits are recognised immediately as an expense when the company is demonstrably committed to terminate the employment of an employee or to provide termination benefits.

1.11 Leases

Rentals payable under operating leases, including any lease incentives received, are charged to profit or loss on a straight line basis over the term of the relevant lease except where another more systematic basis is more representative of the time pattern in which economic benefits from the leases asset are consumed.

1.12 Foreign exchange

Transactions in currencies other than pounds sterling are recorded at the rates of exchange prevailing at the dates of the transactions. At each reporting end date, monetary assets and liabilities that are denominated in foreign currencies are retranslated at the rates prevailing on the reporting end date. Gains and losses arising on translation in the period are included in profit or loss.

2 Judgements and key sources of estimation uncertainty

In the application of the company's accounting policies, the directors are required to make judgements, estimates and assumptions about the carrying amount of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised where the revision affects only that period, or in the period of the revision and future periods where the revision affects both current and future periods.

3 Employees

The average monthly number of persons (including directors) employed by the company during the year was:

	2022	2021
Total	8	8

4 Intangible fixed assets

Cost	bSI DD £
At 1 January 2022 and 31 December 2022	172,171
Amortisation and impairment	
At 1 January 2022	51,651
Amortisation charged for the year	17,217
At 31 December 2022	68,868
Carrying amount	
At 31 December 2022	103,303
At 31 December 2021	120,520

5 Property, plant and equipment

Cost	£
At 1 January 2022	29,233
Additions	8,090
Disposals	(4,381)
At 31 December 2022	32,942
Depreciation and impairment	
At 1 January 2022	18,446
Depreciation charged in the year	6,545
Eliminated in respect of disposals	(2,627)
At 31 December 2022	22,364
Carrying amount	
At 31 December 2022	10,578
At 31 December 2021	10,787

6 Trade and other receivables

Amounts falling due within one year:	2022 £	2021 £
Trade receivables	377,597	459,300
Other receivables	282,736	44,899
	660,333	504,199

7 Current liabilities

	2022 £	2021 £
Trade payables	137,000	70,039
Other payables	1,906,809	2,036,794
	2,043,809	2,106,833

8 Non-current liabilities

	2022 £	2021 £
Other payables	42,219	83,848

9 Members' liability

The company is limited by guarantee, not having a share capital and consequently the liability of members is limited, subject to an undertaking by each member to contribute to the net assets or liabilities of the company on winding up such amounts as may be required not exceeding £500.

10 Operating lease commitments

Lessee

At the reporting end date the company had outstanding commitments for future minimum lease payments under non-cancellable operating leases, as follows:

	2022 £	2021 £
	4,292	6,438

11 Related party transactions

P Macleamy
(director)
Included in other operating income are donations the director made via CAF America.

Other member organisations
The directors: A Moreno, A Jost, F Hovorka, Professor R T Steinmann, K V Anderson, D Schaper, K I Davik, K Yajima, C Castaing and J Makwana are connected with member organisations, each pay annual membership subscriptions to bSI Ltd in the normal course of their business.

In the course of normal business, some member organisations also receive payments for services provided to the company. Such services are provided on an arms length basis.

Strategic Principal Multinational

Standard


Basler & Hofmann
+GF+
Lombardi
RFI
RETE FERROVIARIA ITALIANA
GRUPPO FERROVIE DELLO STATO ITALIANE
CBIM
Digital Makes Cities Better
Gräbert
The Trinity of CAD
Desktop - Mobile - Cloud
mensch maschine
CAD as CAD can
Schiphol
Amsterdam Airport
CEMEX
HDR
MTR
sia
c r b
HOCHTIEF
ViCon
SNCF
RÉSEAU
DB NETZE
h+k
ÖBB
INFRA
storaenso
OYO
oyo corporation
ePLAN
MAGYAR KÖZÚT
strategic
buildinginnovation
Don't plan late.
plannerly
TAKENAKA
ferrovial
construction
IES
POLITECNICO
MILANO 1863
tmc
Track Machines Connected
FM Global
CONSULTING
ENGINEERS
PRAGOPROJEKT
TNO
innovation
for life
Finnish Transport
Infrastructure Agency
Leica
Geosystems
ProMaterial
TRAFIKVERKET

Officers, Board Members and Leaders

buildingSMART International Management Office

Ian Howell
Interim CEO *in 2022;*
Clive Billiald
CEO *from January 2023*
Richard Kelly
Operations Director
Léon van Berlo
Technical Director
Aidan Mercer
Marketing Director
Céline Bent
Compliance Director

Board Members

Patrick MacLeamy
Chairman
Rasso Steinmann
Vice Chairman
Jaan Saar
Treasurer
Anna Moreno
Alar Jost
Frank Hovorka
Kazumi Yajima
Kjell Inge Davik
Jugal Makwana

Company Secretary

Richard Kelly
Interim Company Secretary *in 2022;*
Clive Billiald
Company Secretary *from April 2023*

Certification

Mark Baldwin
Rasso Steinmann
Léon van Berlo

Airport Domain

Xuan Dai
Arisca Droog
Christoph Carl Eichler
Basak Keskin
Fumiaki Kishida
Mohammed Salem
Maya Tryfona
Gerard van der Veer
Lai Wei

Building Domain

Kjell Ivar Bakkmoen
Mirbek Bekboliev
Gianluca Genova
Jouni Hurskainen
David Ivey
Jan-Anders Jönsson
Francis Leung
Geraldine Rayner
Rob Roef
Alex Plenty

Construction Domain

Rory Doak
Ken Endo
Adolfo Gutierrez
Veljko Janjic
Konstantinos Kessoudis
Jorge Camilo Diaz Garcia

Electrical Domain

Trinidad Chardin-Segui
Christian Frey
Bernd Gmeiner
Gregory Sigwalt
Bertrand Lack
Oliver Lebherz
Rolf Schulte

Infrastructure Domain

Isabel M Gutiérrez
Phil Jackson
Jürgen Litsch
Marc Goldman
Mike Kennerly
Anna Neidenström
Tiina Perttula
Jim Plume
Marion Schenkwein
Marek Suchocki
Alexa Mitchell
Hiromasa Shima

Product Domain

Radboud Baayen
Michel Bohren
Frédéric Grand
Hans-Christoph Gruler
Robert Heinze
Justas Lauzikas
Magdalena Pyszkowski
Hansueli Schmid
Espen Schulze
Petr Vokoun
Lai Wei

Railway Domain

Kristian Fevejle Andersen
Susanne van Raalte
Modestino Ferraro
Xenia Fiorentina
Pierre-Etienne Gautier
Konstantinos Kessoudis
Joachim Kanis
Dashuang Li
Franz-Josef Peer
Tarmo Savolainen
Liming Sheng
Winfried Stix
Eivind Pagander Tysnes
Adrian Wildenauer

Regulatory Domain

Franco Coin
Tamer El-Diraby
Tomi Henttinen
Rick Klooster
Paulina Magdzicka
Masaki Muto
Nick Nisbet
Wawan Solihin
Adrian Wildenauer

Technical Domain

Jakob Beetz
Christophe Castaing
Christian Frey
Thomas Liebich
Greg Schleusner
Dennis Shelden
Bjørn Stangeland
Angel Velez

Standards Committee Executive (SCE)

Birgitta Foster
Kjell Ivar Bakkmoen
Leif Granholm
Rasso Steinmann
Richard Kelly

Standards Committee Technical Executive (SCTE)

Håvard Bell
Mirbek Bekboliev
André Borrmann
Christophe Castaing
John Dickinson
Benjamin Gonzalez
Leif Granholm
Jan Karlshøj
Haijiang Li
Thomas Liebich
Nick Nisbet
Greg Schleusner
Dennis Shelden
Souheil Soubra
Bjørn Stangeland
Rasso Steinmann
Maya Tryfona
Léon van Berlo
Sergey Vishnevetsky
Chi Zhang
Richard Kelly

Implementers Support Group

Jeffrey Ouellette
Angel Velez

Model Support Group

Thomas Liebich
Jon Mirtschin
Thomas Krijnen
Nicholas Nisbet

Annual Report Priorities for 2023

Overall, the priorities for 2023 can be described as the refresh of buildingSMART International's (bSI's) strategic direction, expansion into new regions and sectors, global adoption of Industry Foundation Classes (IFC) 4.3, and increasing the support bSI provides to the community through the services available. These services span both technical products such as the buildingSMART Data Dictionary (bSDD), to capability-based services such as Accelerated Projects and Professional Certification. bSI's role is to enable effective digital workflows across the industry, so that efforts go beyond just the provision of standards. bSI is also committed to better supporting organisations and individuals in their openBIM adoption and use. Further detail on these is provided below.

Strategy

2023 will see bSI review and refresh its strategic direction, to keep the organisation at the forefront of the digitalisation of the built environment. This work will include:

- Publication of the Strategic Roadmap
- Alignment of bSI's programs and projects with the direction set by the Strategic Roadmap
- Updates to the "ways of working" to better reflect the growing Chapter and Domain footprint
- Increased emphasis on partnerships with aligned organisations and thought leadership across the industry
- Publication of White Papers, including on Digital Twins and other relevant topics

Standards

bSI operates across multiple time horizons, supporting legacy standards, delivering new standards and designing future standards. Key milestones in 2023 will include:

- ISO review of IFC 4.3, submitted as a Candidate Standard for ISO approval
- Development of the alpha release of the next-generation IFC 5 model
- Submission of the Information Delivery Specification (IDS) – a bSI standard already transforming the way information is specified, required and validated – as a Candidate Standard, ahead of full release

Services

bSI provides several services, to support organisations and individuals in the adoption and use of openBIM standards. Priorities for 2023 include:

- Establishing a governance process and leadership structure for bSI's Compliance portfolio, to include Professional Certification, IFC Software Certification and related programs
- Updating and expanding the Professional Certification Program, providing a broader range of global training and accreditation in openBIM for different levels and profiles
- Growing the number of Chapter and Training Provider registrations for Professional Certification, and improving awareness of and accessibility to the program for students and professionals
- Development of the IFC Software Certification program to add a IFC validation service and a global IFC certification, to complement the current use-case based certification
- Launch of the new Accelerated Projects service, providing direct, targeted advice and support to client organisations to help them adopt and grow their openBIM capabilities
- Growth of bSDD content providers and users, and enhancing the ease of use via integrated tools, documentation, and conformance with ISO and Linked Data standards

Markets

buildingSMART continues to grow in multiple dimensions: via new national Chapters, new government and industry members, new sector-based industry domains, and through partnerships with aligned organisations. Specific priorities for 2023 include:

- Establishing a new Chapter in India
- Supporting a new Chapter in Brazil
- Investigating new Domains focussed on Product Manufacturing and Power Transmission
- Establishing a new Membership level of Principal Member, for organisations focussed heavily on technical engagement
- Strengthening alignment with partner organisations, including in geospatial and product manufacturing

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