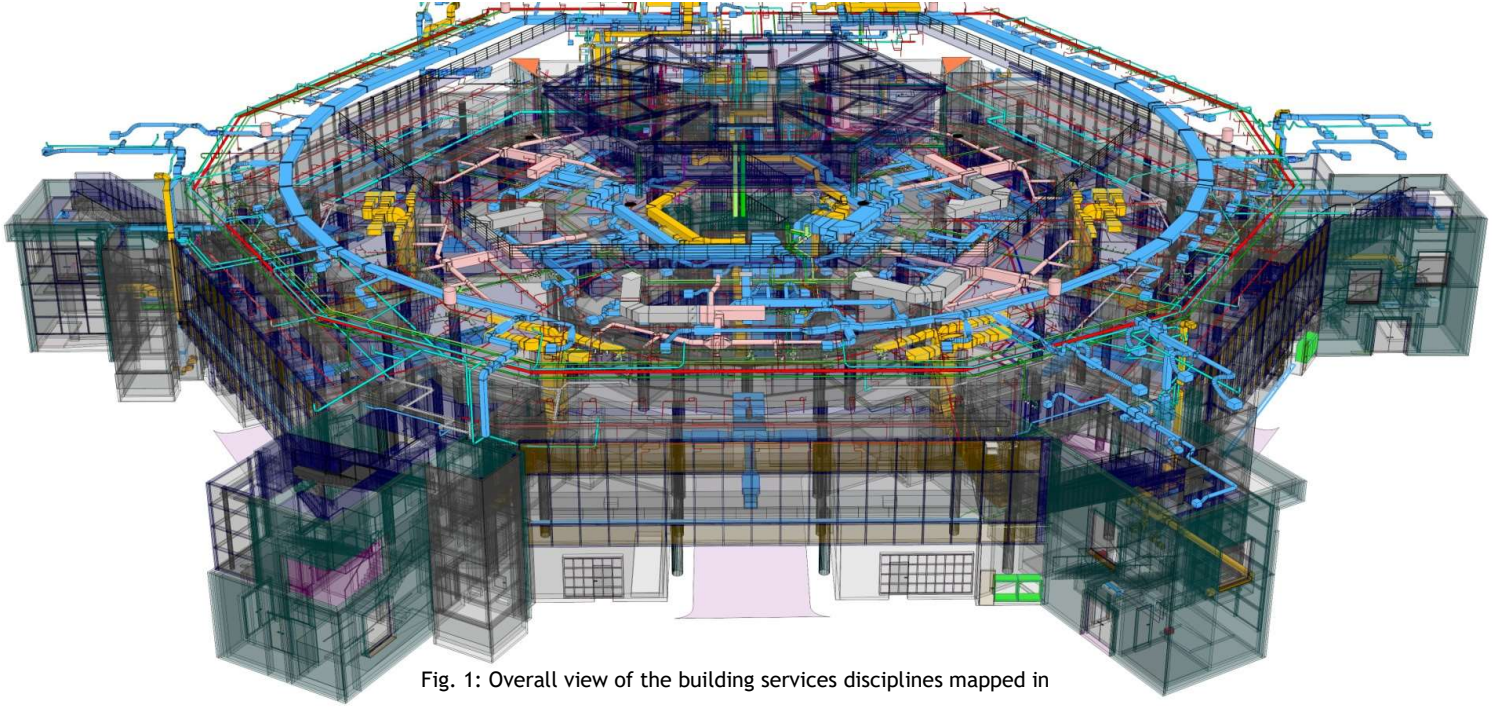

Fig. 1: Overall view of the building services disciplines mapped in TRICAD MS – you need access to complete data sets to stay in control.

No BIM without continuity?

Initiatives such as "Building Information Modeling" (BIM) or "Design and Build 4.0" aim at one thing in particular: the digital twin of a construction project. Surprisingly, you can get there faster than you think. / Background discussion with building services engineering expert Stefan Eisen from VenturisIT about the various facets of BIM.

Anyone who deals with "Design and Construction 4.0" comes across declarations of intent, can browse through publications of associations that want to pave the way for so-called "Building Information Modeling". This gives the impression that digitization in construction is a topic of the future - no, rather the opposite is the case, IT-driven design has long become a reality - but on what data are the follow-up processes based?

At its core, BIM is about creating digital twins, that is, the complete virtual clone of a real-life construction project. However: "We have rarely been able to experience the possible added value, even if the 3D models of the buildings and infrastructure measures are nice to look at," says Stefan Eisen, Building Services Engineering Consultant at VenturisIT GmbH, thoughtfully. During implementation, he says, people repeatedly fell into the data and cost trap because data was not available, important information was not stored alongside the CAD model or design mistakes were made. Eisen comes from a practical background and knows what he's talking

about: "Digitally transforming 80 percent
of the information is relatively easy, but the rest is really time-consuming." This statement is surprising, especially since the designers are usually well versed in 3D CAD and collision checking is now has become commonplace.

More diligence in planning

Eisen has been a consultant at the 3D software experts specializing in building services engineering, VenturisIT, for a good three years and gives many training courses. He learns daily that the industry is not using the functionality of CAD solutions to the extent that would be opportune. There is no question that the right training is the key, Eisen is firmly convinced, in order to benefit in depth from the possibilities now available. The expert makes this statement using the IFC interface as an example. IFC stands for "Industry Foundation Classes." Behind the acronym is a data model that is being tirelessly developed further by the buildingSMART association.

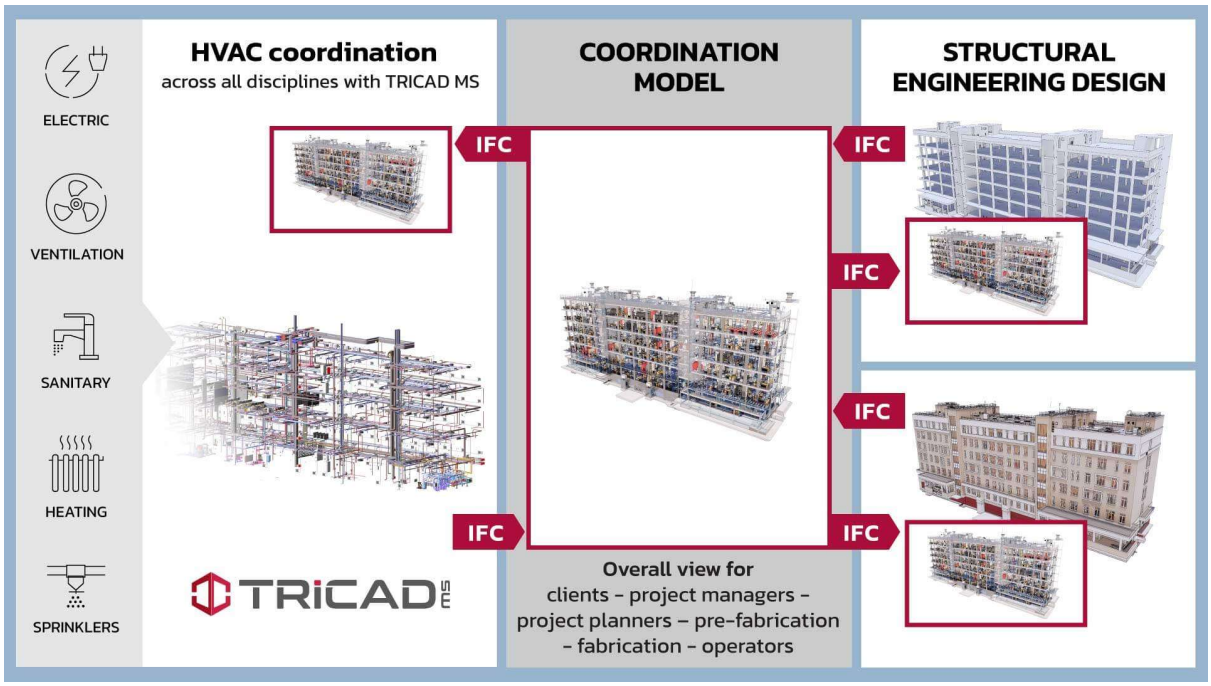

Fig. 2: Importance of the IFC interface of TRICAD MS for the database of the entire project

Since version 4, IFC has been an official ISO standard (ISO 16739:2013). "IFC defines all the important specifications for how objects can be exchanged between software tools,"

explains Eisen and illustrates this with an example: the better radiators are positioned in the room, the more efficiently their heating capacity can be used. For this purpose, entire room arrangements can be imported into the building services engineering tool TRICAD MS via IFC. Using the IFC type "IfcFaceurface" (surface shape), the objects to be imported are dimensioned, further information is added in TRICAD MS by means of room macros and exported to another tool via an interface to calculate the heating capacity. The resulting design of the radiators is imported into the TRICAD MS model via the calculation interface. "Implementing BIM requires that every designer knows what their software can already do," Eisen emphasizes. "The digital twin has a lot to do with the consistent use of information that already exists - you just have to know how," the design expert sums it up. Why is this important? If the planning basis is not right, the basis for the digital twin in BIM is not right either.

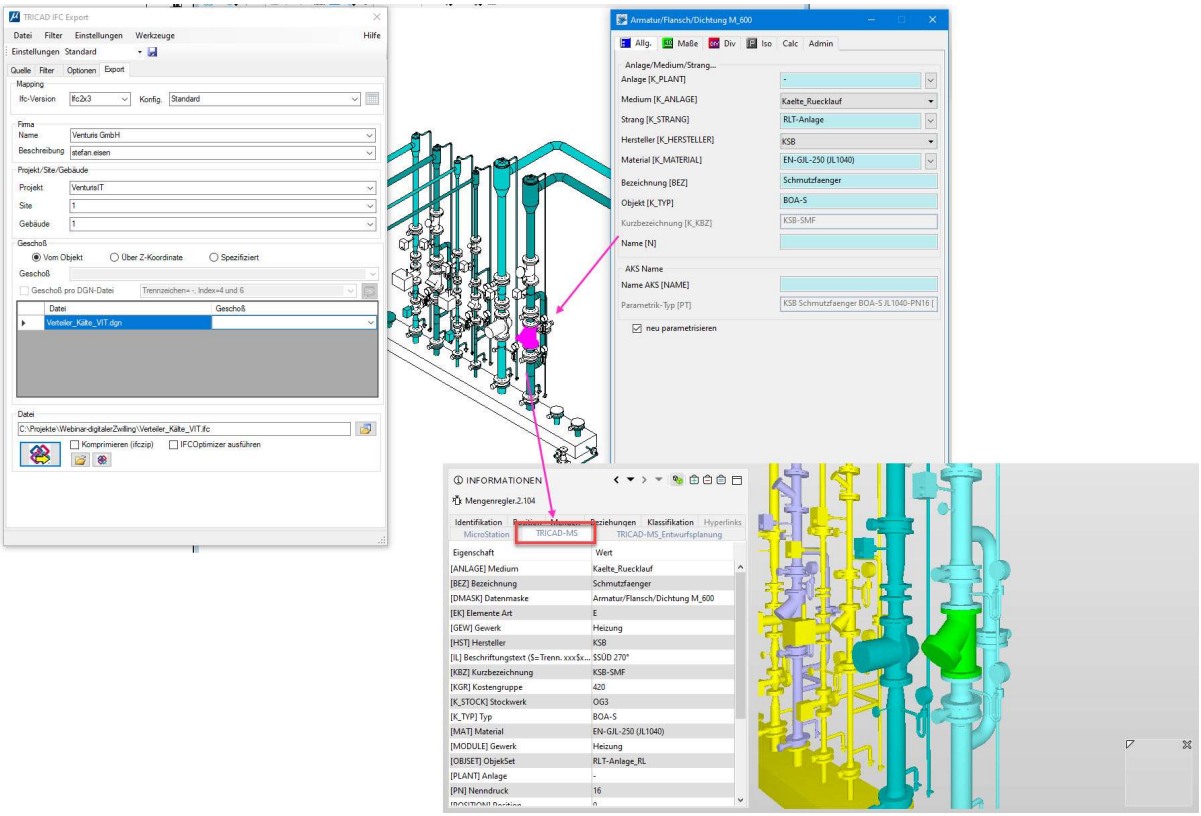

Fig.3: IFC export in TRICAD MS: Transfer of complete data sets to the coordination model

Learn, learn, learn

Training is also important because the software is always evolving. Almost every week something new is added because the client information requirements (AIA) are very high. For example, the client may require additional attributes on the components.

"Even those that fall into the category of 'completely unnecessary' from the perspective of building services," warns Eisen, who recalls, "VenturisIT made this a lot easier for a customer by adapting the IFC interface. Objects that are not needed are assigned default values. The IFC interface is so extensive that it can be used to implement an incredible range of use cases. It just needs to be configured accordingly." Appropriate customizing is also important because otherwise you end up with very large files when exporting. Eisen recommends seeking advice in any case.

Plan every detail in advance

In the past, you would here people say "That will be settled at the construction site" a lot. But that can get expensive. "We mustn't neglect the necessity of knowledge transfer between design and realization," warns Eisen urgently. Design must be much more precise than before by "integrating information in a timely and intelligent manner - seamlessly from design to commissioning."

Conclusion from the conversation with Stefan Eisen: Design and Build 4.0 means using the possibilities of design software in a very targeted way to enable project participants to make their contribution to the consistency of information. The standard for this is already configured by VenturisIT in TRICAD MS. For example, by limiting the exchange of attributes to those relevant for cooperation with other suppliers. Any type of attribute can be exchanged in a targeted manner - for example, only 4 out of 48 and the others being used internally only, for example to create bills of materials and order lists. Or the design office is still in delivery stage III (design phase), in which only a reduced set of information is to be released because the follow-up order is still pending.

In any case, it is important to really store all information in the 3D model throughout the design cycle: Wall types, room heights that can vary on the same floor, for example because raised floors have been installed, and so on. Such information can be derived from the IFC surface shapes and used in other disciplines: "Up to now, the standard has been to work with floor files. But this is an isolated view," says Eisen, prompting reflection.

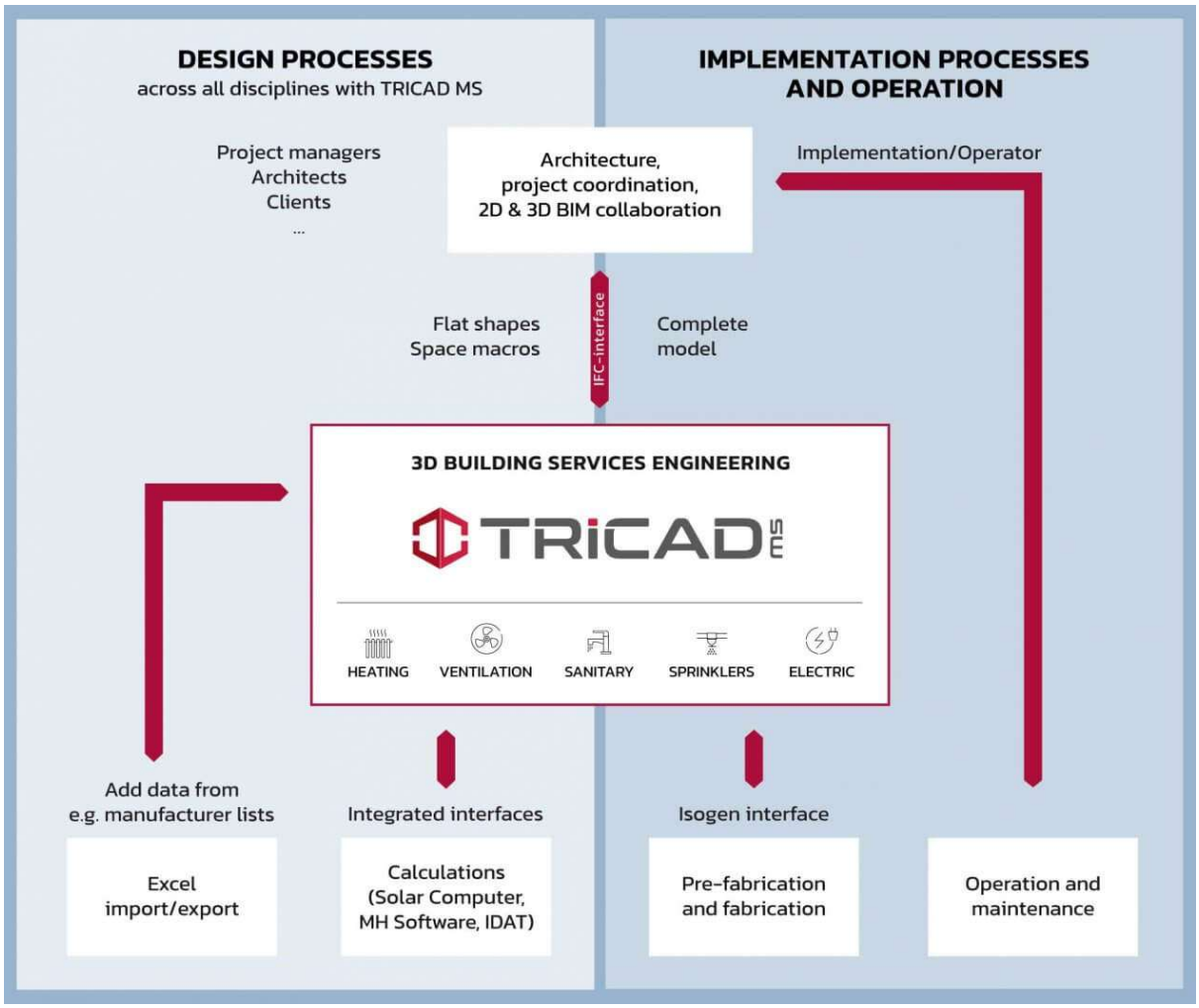

Fig. 4: TRICAD MS interfaces enable an integrated data model.

What is already feasible today?

And what recommendations does the VenturisIT consultant give us for the data handover for the construction site? We have to be able to model the digital twin across all disciplines without collisions during the design phase!" urges Eisen - all this is already possible today! Careful coordination in advance of the design phase is time well spent. After all, Design and Build 4.0 stands for stress-free work at the construction site and for collaboration in design in order to meet that final deadline.

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Graphics: VenturisIT GmbH