

# ***IFC 4.3 Implementation & Validation Report***

## ***Appendix A – Software Vendor List***

*Information on the Software Vendors who participated in both the Infrastructure and Rail projects.*

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## 1 Software Vendors list

*Software Vendors are listed alphabetically*

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<b>Bricsys</b>	Andrej Kogovsek		x	andrej.kogovsek@bricsys.com
<b>Cardiff University</b>	Alex Bradley		x	Bradleya@cardiff.ac.uk
<b>Catenda AS</b>	Havard Bell	x		havard.bell@catenda.no
<b>CGS Labs</b>	Tanja Plavec	x	x	tanja.plavec@cgs-labs.com
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<b>Geometry Gym</b>	Jon Mirtschin	x	x	jonm@geometrygym.com

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## 2 Company Introductions

The following sub-chapters briefly introduce the Software Vendors according to the alphabetical list shown previously in chapter 1.

## 2.1 12d Solutions

Established in 1988, 12d Solutions is an Australian software developer specialising in civil engineering and surveying solutions. Its flagship product, 12d Model, is sold direct and through resellers around Australia and worldwide. The first version of 12d Model was released in 1991 and today 12d Model is used in over 65 countries.

12d Model is powerful civil engineering, surveying and terrain modelling software. It allows fast production in a wide variety of projects including mapping; site layouts; road, rail and highway design; residential and land developments; drainage and sewer design; and Environmental Impact studies.

12d Model users include civil and water engineering consultants; environmental consultants; surveyors; local, state and national government departments and authorities; research institutes; construction companies; and mining consultants.

12d Model is modularized, so users can easily choose modules to suit their needs. It is the complete design, survey and mapping solution.

12d Model is a solution that can be used by small businesses and individual consultants, through to large organizations.

## 2.2 A+S

A+S Consult GmbH (A+S) is an innovative, globally active engineering company in the field of traffic and infrastructure planning. To this end, we use our own highly-specialized BIM platform, KorFin®, which we continue developing and improving after twenty years. We also make KorFin® available to other partners (road construction administrations, railroad companies, engineering offices). From the feasibility study up to and including facility management, all service phases are presented in 3D, 4D, and 5D with the assistance of AI applications.

## 2.3 AB Consulting & Technologies

AB Consulting & Technologies is a UK based small company, specializing in interoperability and openBIM. Offering consultancy and support in the application and use of openBIM standards and BIM processes & best practices, to enhance the digitalization of engineers & constructors.

In addition, AB Consulting & Technologies is actively developing a new generation of software and tools for the management and exchange of built environment data making full use of openBIM standards it is an active collaborator in developing.

## 2.4 ACCA

ACCA is the leading software company in Italy, highly involved in developing technical software for the AEC sector and one of the most specialized companies in the world in the development of IFC-OpenBIM solutions.

ACCA's software solutions have been rapidly become true technological standards for the past 30 years thanks to their ease of use, the strong drive for innovation and the ability to provide adequate responses to the growing needs of professionals and companies of this important industry.

With a range of over 90 software products and an organization of over 200 employees, ACCA plays a leading role in the digital transformation process of the construction sectors in Italy, Spain, Brazil, France and the rest of the world.

To date, ACCA software is the company with the largest number of buildingSMART international certified BIM software in the world.

3D BIM modeling applied to building design, structural and energy performance analysis, BIM management, smart buildings, artificial intelligence, immersive virtual reality, site georeferencing: these are the assets on which ACCA is currently focused today to win the great challenge of the Industry 4.0. digital revolution.

## 2.5 AEC3

AEC3 is an international consulting company in the field of process optimisation in the building industry. For more than ten years we have been specialized in the support of planning and construction processes by integrated, model based IT solutions - today known as Building Information Modeling (BIM).

## 2.6 AKG

AKG Software, founded in 1983, is a software solutions leader in civil design and engineering. The flagship product is VESTRA, a complete transportation solution for road and railway design, sewer design, and surveying. VESTRA is the standard design software at many government agencies and engineering consultants. It works alongside AutoCAD, Autodesk Civil 3D, AutoCAD Map 3D, and BricsCAD.

As a long-time Autodesk Gold Partner, AKG provides full solutions ranging from presales to postsales including BIM training, implementation, customization, and support. Another focus is on research projects in the field of civil design and engineering, on BIM workflows, and the implementation of standard data formats. AKG has been significantly involved in the development of the German OKSTRA standard and is a member of the „BIM for Infrastructure (Traffic Routes)“ Technical Unit at buildingSMART Germany. The VESTRA software is widely used at German and European Universities and research agencies.

AKG Software, which is an owner managed company, has more than 90 employees and is based in Freiburg/Heitersheim, Germany, with branches in Berlin, Hamburg, Cologne, Halle/Saale. There are also branches in Vienna, Austria, and Chur, Switzerland.

Website: [www.akgsoftware.de](http://www.akgsoftware.de)



## 2.7 Allplan

With our integrated software solutions, ALLPLAN plays a crucial role in shaping the design, construction, and management of the future. As a central hub, ALLPLAN brings together everyone involved on a project and productively networks them with each other. Our specific goal: to support our customers to develop better structures for a better life.

ALLPLAN is a leading european vendor of open solutions for BIM (Building Information Modeling).

For more than 50 years, we have supported the AEC industry with a pioneering software portfolio and play a key role in promoting the digitalization of the building industry: innovative, geared to your requirements - and with best quality „Made in Germany“.

## 2.8 Aplitop

APLITOP specializes in Surveying and Civil Engineering software since 2004. We have developed a broad variety of solutions for field survey and setting out, CAD-based software for civil projects, and special applications for point-clouds, tunnels and photogrammetry.

We have more than 15,000 users all over the world, including public administration, universities and training centers, construction companies, engineering and town planning studios, quarries, mines, environmental services, as well as independent professionals.

We are leaders in the application of the last technologies and have worldwide collaboration agreements with leading surveying equipment manufactures and CAD systems. The Research and Development projects with several universities and major construction firms guarantee our technical know-how and innovation capacity.

Our distribution network, comprising suppliers of surveying instruments and CAD solutions, is an essential part of our marketing policy and we guarantee full technical support and respect for their customers.

## 2.9 Arkance

Within the ARKANCE group, ARKANCE SYSTEMS strives to provide complete software and application expertise for all phases of the life cycle of a construction project. Following these acquisitions, ARKANCE SYSTEMS now has 470 employees – including more than 250 application engineers serving more than 70,000 users through a European network (France, the Netherlands, Belgium, Luxembourg, Poland, Finland and Central Europe) – and will continue to invest in its strategic development.

Its experts are at the forefront of all topics concerning BIM, digital twins, industry 4.0 and other IoTs.

ARKANCE SYSTEMS is an AUTODESK® PLATINUM and TRIMBLE AUTHORIZED CHANNEL PARTNER reseller in the territories where the group operates.

## 2.10 Arcadis Gen

Arcadis Gen creates next-generation digital products and solutions. We apply technology to rapidly improve performance, decision-making and customer experiences. Across the natural and built environments, we empower the people that make the world turn. Together, we unleash the potential of data. Reaching further and getting there faster. With our deep asset knowledge, digital expertise and advanced analytics, Arcadis Gen helps you generate what's next. We are the new global digital business from Arcadis.

## 2.11 Autodesk

Since its foundation in 1982, Autodesk technology has helped customers design and make products, buildings, and entire cities that foster healthy, resilient communities. With more than 11,500 employees worldwide (2021) supporting over 5.25 million users we lead the industry's transformation to Building Information Modelling by enabling engineers, architects, builders, and owner-operators in the design, construction, and operation of critical infrastructure.

We envision a future that is equitable, safe, and free from preventable illness and injury and evidence of our commitment to this saw us ranked fourth on Barron's 2021 list of the 100 most sustainable companies and received a perfect score on the HRC Corporate Equality Index in 2021. We will continue delivering technology that helps people adapt, grow, and prosper alongside increasing levels of automation. Our leadership in cloud solutions will support and enable human creativity, not replace it, in an increasingly remote workforce.

Autodesk founded the Industry Alliance for Interoperability (IAI) in 1994 that went onto become buildingSMART in 2005. We continue to be active in the development of open standards for the industry sectors we serve and have been closely involved in the IFC 4.3 for infrastructure and rail work programmes from their initiation.

## 2.12 Bentley Systems

Bentley Systems (Nasdaq: BSY) is the infrastructure engineering software company. We provide innovative software to advance the world's infrastructure – sustaining both the global economy and environment. Our industry-leading software solutions are used by professionals, and organizations of every size, for the design, construction, and operations of roads and bridges, rail and transit, water and wastewater, public works and utilities, buildings and campuses, and industrial facilities. Our offerings include MicroStation-based applications for modeling and simulation, ProjectWise for project delivery, AssetWise for asset and network performance, and the iTwin platform for infrastructure digital twins. Bentley Systems employs more than 4,000 colleagues and generates annual revenues of more than \$800 million in 172 countries.

### 2.13 Bexel

BEXEL Consulting is a state-of-the-art technology provider and engineering consultancy company. We simplify and provide solutions that aid in overcoming the most complex design and construction-related issues using a fine-tuned synergy of innovation and technology.

BEXEL brings the next generation of digital construction management combining knowledge, experience, and creativity with massive computing power. With BEXEL Manager software platform BEXEL changes the perspective of integrated project management allowing construction industry professionals to optimize their digital workflows and take advantage of advanced openBIM technologies.

With over a decade of development of advanced construction consulting solutions and state-of-the-art software technology, BEXEL's services have been applied to well over nine million square meters of various complex projects – including luxury hotels, large residential and commercial blocks, national medical, legal, scientific and corporate centers, sports institutions, industrial projects, infrastructure, and metro projects, etc.

### 2.14 Bimetrica

Company dedicated to the consultancy and development of projects in BIM. Bimetrica provides BIM training and advice to the different building agents both in the design phase and in the construction phase. We cover the aspects of modeling, analysis, visualization, automation, implementation, organization and management of BIM projects. Among our clients are architecture firms, medium and large construction companies, engineers, installers, public and private developers, professional associations and companies outside the construction sector that use BIM for the construction and maintenance of their spaces.

### 2.15 BimOne

Founded in 2013 in Quebec by Jimmy Plante and Carl Veillette, BIM One is a firm specializing in digital transition for the construction industry (BIM, VDC, and CIM), including associated software development. Our flagship product is BIM Track, that helps the construction industry communicate better across projects the world over.

### 2.16 Bricsys

Bricsys is a global provider of the BricsCAD® brand of engineering design software. For the last two decades, our singular focus has been making unique CAD, BIM and Common Data Environment (CDE) products.

BricsCAD is a modern and cost-effective CAD for everyone who designs, builds and manufactures. We offer familiar DWG-based CAD solutions for 2D, 3D, BIM and mechanical design.

Now a part of the global technology giant Hexagon AB, we are reinforcing our commitment to take your design workflows to the next level. Our goal: to help our customers achieve more, in less time, for less money.

## 2.17 Cardiff University

Driven by creativity and curiosity, we strive to fulfil our social, cultural and economic obligations to Cardiff, Wales, and the world. Founded in 1883, Cardiff University is established as one of Britain's leading research universities. We excel in producing high quality, innovative research which translates into benefits both locally and worldwide.

We have a diverse student population with students coming from more than 100 countries and with a range of backgrounds. Our academic staff are driven by creativity and curiosity and many are leaders in their fields, creating a stimulating environment for learning.

Based on the long-term successful cooperation and the combined research and development strength, Cardiff University, Dalian University of Technology and China Communications Construction Company (CCCC) jointly set up a BIM for Smart Engineering R&D Innovation Centre (BIMSE) in 2019. BIMSE works with a wide range of UK and China industry partners, including buildingSMART international, China State Construction Engineering Group (CSCEG), Royal HaskoningDHV, BSI and other well recognized academic partners.

As part of Cardiff University and the School of Engineering the BIM Smart Engineering R&D Innovation Centre (BIMSE) is a dedicated research and education centre with expansive expertise in BIM, semantics, ontology & Artificial Intelligence, Large scale engineering computing, data analytics and optimization, lifecycle BIM frameworks & holistic decision-making technologies, put to use developing the next generation of processes, software & tools.

## 2.18 Catenda AS

Catenda AS was established in 2009 as a spin-off from SINTEF Building and Infrastructure. The company's core values are openness and quality, and it is privately held, owned in majority by its staff. Catenda makes Bimsync®, a cloud based collaboration platform.

The company has a strong national and international market position, and holds a central position in the developing bodies for both the IFC, BCF and bSDD standards under buildingSMART. Catenda is a multinational member of buildingSMART.

Today Catenda has offices in Oslo and Bergen in Norway, and has a consistently growing team of ambitious and driven people.

## 2.19 CGS Labs

CGS Labs is innovative software company with 30+ years of experience developing solutions for the design, construction and maintenance of transportation infrastructure.

Our applications promote openBIM approach and standardized IFC data exchange. We contribute to greater transparency, quality and cost-effectiveness of construction projects and support sustainable decisions.

CGS labs develops specialized software solutions for the design of roads (Plateia, Autopath, Autosign), railways (Ferrovia) and channel - river engineering works (Aquaterra). Our software solutions incorporate local design standards.

We are not just a software vendor! Our goal is to successfully integrate CGS Labs solutions into your design processes. Our engineers help you get to the highest experience level for the use of CGS Labs software. Besides the always accessible on-line knowledge base, we organize traditional live customer trainings, as well as trainings per customer request, where we discuss selected topics according to the specific requirements of your projects.

Complete customer satisfaction is very important to us. If any problems should arise while using CGS Labs software, our team of experts is there to assist you, so your design process runs with minimum interferences or delays.

## 2.20 Cirilgroup

Cirilgroup is a software editor. Specialised in Web GIS, Business has deployed a state-of-the-art GIS infrastructure providing a wide range of technologies and modular tools for the deployment of innovative, efficient and evolving mapping solutions. Cirilgroup's philosophy consists in placing final users at the core of GIS processes, in order to help them take the most of GIS modern technologies.

## 2.21 Dassault Systèmes

Dassault Systèmes, the 3DEXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our 3DEXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit <https://www.3ds.com>

## 2.22 Elecosoft

Founded in 1895, our business has a consistent association with delivering technical innovation. Although today our offerings are a long way from our origins, we remain dedicated to the delivery of technical advancement.

We enable companies supporting the building lifecycle across a range of industries to drive efficient operations through the use of market-leading, integrated software. From our centres of excellence in the UK, Sweden, Germany, the Netherlands, and the USA, our established portfolio of software is used during early planning stages through to construction and facilities management, driving the performance and day-to-day operations of our customers' businesses.

Our software solutions are developed by teams of highly skilled and innovative in-house developers in close collaboration with our customers. Customers are supported with flexible training, technical support and consultancy services, to maximise value.

### 2.23 Engisis

The management of complex systems requires collaboration and data interoperability.

We provide engineering services and standard-based technologies for data modeling and exchange.

We help organizations in the Automotive, Energy, Rail, Aerospace and Defense sectors to better manage their complex systems.

### 2.24 Esri

Esri is the global leader in GIS, location intelligence, and mapping software. With more than 4,000 employees in 100 offices, Esri enables organizations of every size to derive deep insights from their spatial data. Esri's products are used in all segments of transportation, utilities, urban development for planning, design, construction, operations and maintenance of the built and natural environments.

Esri develops ArcGIS, the leading spatial analytics and digital mapping solution, delivering location intelligence to build and manage projects across the world. Esri's desktop, mobile and cloud-based solutions are used by 90 of the Fortune 100 companies; 93% of the ENR top AEC firms; government agencies and universities. As a privately owned company Esri invests nearly one-third of its 1 billion USD in annual revenues into R&D, continually improving value to users.

Esri's ArcGIS products are used to create the content for interoperable workflows, connecting digital models into a system of systems. Esri actively embraces open standards to exchange data, including reading IFC. As a founding member of the ODA, Esri has a strong commitment to open data and formats and relies extensively on ODA libraries to read proprietary CAD, BIM, and now IFC files.

### 2.25 FineSoftware

We are among the leading developers of structural engineering software in the Czech Republic and worldwide. We design and sell software for static analysis, dimensioning and geotechnical engineering since 1989.

GEO5 is a software suite, providing solution for majority of geotechnical tasks. Individual programs have the same user interface and communicate with each other, while each program verifies definite structure type.

### 2.26 GEODESIAL Group

GEODESIAL Group was founded at the end of 2016 as a result of GEOMENSURA SAS and GEOMEDIA SAS joining forces. These two strong brands have been acknowledged by professionals for more than forty years. Together, they make GEODESIAL Group the leader on the French market for

geomatic engineering, urban planning, landscape design and engineering for major transportation infrastructure. ([www.geodesial.com](http://www.geodesial.com))

## 2.27 Geometry Gym

Australian based Geometry Gym Pty Ltd is a small, trailblazing company specializing in interoperability and openBIM. It supports architects, engineers, builders and clients with tools, training and strategic advice related to interoperability. Geometry Gym staff first and foremost have industry experience as architects and engineers, as well as experience in software development.

Geometry Gym develops software tools to facilitate best practise interoperability. Most of these developments are provided in the form of plugins for popular software including Rhino3d/Grasshopper, Revit, Tekla, Navisworks, Civil3d, Excel and various structural analysis applications.

Geometry Gym was an early implementer of the IFC4 release by buildingSMART, and generated examples to assist other implementers to understand the changes/improvements. This role has grown into technical roles supporting the IFC4.3 extension.

An open source C# toolkit with a very permissive license to serialize IFC data sets is published and maintained by Geometry Gym. This toolkit simultaneously supports multiple versions of IFC from IFC2x3 to IFC4.3. More sophisticated functionality is provided in licenses closed source toolkits.

Geometry Gym also provides technical services/training to other software developers requiring support for implementing IFC.

## 2.28 IB&T Software

card\_1 has been a market leader since 1985. It's an innovative, comprehensive CAD software application for surveying and civil engineers focusing particularly on road, rail and sewer planning plus cost calculation and GIS. The interaction between these modules guarantees its BIM-oriented, methodical approach.

It can be used to plan any road- and rail-based transport infrastructure, to complete any surveying task, including those involving point clouds, to plan the drainage of complex projects and subsequently visualize them. German planning regulations, norms and guidelines are an integral part of the software.

As a member of the FGSV (Road and Transportation Research Association), IB&T is involved in developing a common framework for data processing. We are also contributing to buildingSMART e.V.'s objectives. We are also an initiator of the BIM Traffic Routes specialist group.

Our software and a wide range of services are available worldwide through our local and international branch offices and sales partners. Group headquarters are located in Norderstedt, just north of Hamburg. In conjunction with our offices in Berlin, Düsseldorf, Stuttgart and Aalen, and our regional sales partners, we provide regular program updates, reliable customer support, comprehensive training and project consultation.



Our partners in China, Eastern Europe and South America are all valuable members of our international business. A total of 75 staff members and partners are continuously striving to extend and enhance the system to bring only the best to you.

Website: [www.card-1.com](http://www.card-1.com)

## 2.29 InfraKit Group

Infrakit connects project participants into common information management system. Thanks to open formats and cloud technology, enhanced information flow enables collaboration for all stakeholders of civil construction project. Infrakit has intuitive visual approach to access all your information on map or on automated reports. This ensures that your whole team works for common targets and has up-to-date information easily in their hands – also when mobile.

Infrakit Cloud allows you to easily monitor and manage your entire site. With Infrakit, project progress information is available from the field in real-time. This innovative approach results into faster project completion while improving quality with less errors – all culminating in vast cost savings.

## 2.30 Jotne

Jotne – The leader in product data exchange and sharing. Jotne EPM Technology data products have successfully reduced development and product lifecycle costs through the use of intelligent data management in the areas of Defense, Aeronautics, Oil & Gas, Built Environment and Aerospace. Jotne EPM Technology is a leader in the development of standards-based software products.

## 2.31 JHY

BIM Consultancy based in Finland

## 2.32 Novatron

We are a technology company focused on earthmoving automation offering open solutions for digitalizing earthmoving jobsites and robotizing earthmoving machinery.

We develop, manufacture, and supply hardware and software to increase the productivity, quality, safety, and sustainability of the earthmoving industry. Our customers are earthmoving contractors and construction equipment manufacturers.

Our headquarters is located in Pirkkala, Finland. We are a team of 130+ professionals and have 30 years of experience in the field of machine control.

We are part of German MOBA Mobile Automation AG, a globally recognized trusted partner for supplying high- quality solutions for earthmoving, road construction, cranes and lifters, waste management, mining, and agriculture.



### 2.33 Open Design Alliance (ODA)

Open Design Alliance is a non-for-profit technology consortium that develops interoperability solutions for the CAD and BIM industries. ODA became a buildingSMART partner in 2019, establishing openBIM as a part of the ODA mission. Through its unique non-profit business model, ODA has put forth a valuable new offering to the BIM industry: Collaborative development of openBIM solutions.

### 2.34 Pragoprojekt

We are a project engineering company with wide experience in the field of transport and engineering construction, both at home and abroad.

Our mainly specialises in road and motorway structures, municipal roads, building construction, bridges, tunnels, subways, urban rail transportation; all that including economic assessment of investments by means of the HDM-4 methodology, traffic research and research assessments. In addition, we provides complex engineering activities, including supervision of large transport construction work.

The Company has been operating on the project market in the Czech Republic since 1969. The company headquarters is in Prague, the regional project studios are in Liberec, Karlovy Vary, České Budějovice.

The RoadPAC programme system is a powerful system for automated road and motorway design. RoadPAC allows you to model the road route, road body, including the balance of earthworks and the calculation of the expro grading elements with a very short response time.

### 2.35 ProVI

ProVI GmbH, based out of Munich, develops and distributes ProVI, a BIM solution for transport infrastructure design. The software development started in the late 1980s from within the IT department of OBERMEYER Planen und Beraten GmbH as an AutoCAD add-on application. Owners and operators of civil infrastructures, transport companies as well as engineering service providers plan their transport and infrastructure projects using the BIM-enabled software. ProVI GmbH was founded in 2018 as a spin-off of OBERMEYER Planen und Beraten and operates independently since January 2019. As the preferred track alignment solution at Deutsche Bahn AG, ProVI has been one of the leading systems in the planning of rail transport routes for years.

### 2.36 QLX

PLAN 100 KM OF ROAD: 30 MINUTES. INTEGRATE STRUCTURES: 30 SECONDS. DETERMINE COSTS AND QUANTITIES: REAL-TIME.

With QLX smarttrass you plan roads, rails, power lines - extremely fast, highly intuitive, largely automated.

With smarttrass, you can create roads, rails or overhead power lines in just a few clicks, while simultaneously designing the site plan, elevation plan and cross-section in just one step. You can view your design directly in the 3D model and simply edit it by dragging and dropping. smarttrass

automatically checks the conformity of your design with the guidelines and at the same time provides further information such as cost estimation, land consumption, etc.

QLX GmbH has broad experience in software applications for the planning of traffic infrastructures and geographic information systems (GIS), software development and adaptation of planning and visualization solutions and relevant research and teaching.

With these competencies, QLX GmbH supports engineering offices and authorities in the development of concepts for the introduction of BIM in the company and their implementation.

### 2.37 RailCOMPLETE

Railcomplete AS was founded in Norway in 2015 and is the producer of RailCOMPLETE®.

Railcomplete's clients are Norwegian consulting companies and the French SNCF Réseau. Being a startup company, we are still in the early investment and development phase. We are aiming to reach world-wide general use within the end of 2028, starting with Europe.

RailCOMPLETE is an authoring tool for railway wayside electrotechnical infrastructure. RailCOMPLETE supports the daily tasks of railway design engineers within track, catenary, signaling, telecom, electrical supply and earthing. RailCOMPLETE lets users build and maintain a distributed semantic database for each construction project. 3D views are generated from the semantic model.

RailCOMPLETE lets the railway administration formulate its own DNA – Definition of Network Assets – from which RailCOMPLETE expresses and interrelates their familiar objects. Railcomplete supports its clients in DNA maintenance when requested. Clients are expected to take control over their own DNA, to allow for rapid changes in DNA modelling whenever new railway object types appear or whenever their properties or application rules change. RailCOMPLETE uses the powerful scripting language Lua, similar to how Visual Basic empowers Excel.

IFC Rail will certainly become an important interface to RailCOMPLETE.

### 2.38 RDF Ltd.

RDF Ltd. is a privately owned specialized IT company and was founded by Iveta Bonsma and Peter Bonsma back in 2008. The company participates in and co-funds research projects with a focus on parametric and semantic geometry and large data sets. The software development part of the company creates and supports generic, scalable libraries to process geometry and open standards based on EXPRESS and Semantic Web standards. All libraries are offered with their C++ source code; the libraries are available for multiple platforms (Windows, Linux, MacOS, iOS, Android, a.o.), offer multi-language API's and available in 32 / 64 bit versions. The libraries are used by over 100 commercial software companies located all over the world and by SME's as well as by large enterprises. All sources of the libraries are owned by RDF Ltd. Best known is the IFC Engine, however also other STEP standards are supported including AP203, AP214, AP242 and CIS/2. The Geometry Kernel is embedded in each library, however as such and together with its parametric extension available as stand-alone library also.

### 2.39 RIB Software

RIB Software is an innovator in the building and construction industry. The company develops and offers cutting-edge digital technologies for construction enterprises and projects across various industries worldwide.

With over 50 years' experience in the construction industry, RIB Software focuses on IT and engineering and becomes the pioneer in construction innovation, exploring and bringing in new thinking, new working methods, and new technologies to enhance construction productivity. With over 2,700 talents in more than 25 countries worldwide, RIB Software is targeting to transform the construction industry into the most advanced and digitalized industry in the 21st century.

### 2.40 Safe Software

Safe Software began in a home in 1993, helping forestry companies exchange maps with the provincial government. It was technically possible, but often involved hours of fighting data and losing information in the process. In short, nobody was happy.

We built FME to change that.

We didn't start out with a business plan, but we did have a desire to help. By sharing FME with over 10,000 organizations around the world, Safe has been able to empower data users who were once limited by their data struggles.

We believe that anyone who needs to connect, transform, and use their data should be able to do so without barriers.

FME (aka. Feature Manipulation Engine) has built-in support for hundreds of formats and applications as well as transformation tools, allowing users to build and automate custom integration workflows without having to code.

Who doesn't want that?

Whether your data challenges have to do with spatial data, data storage, or business intelligence, FME is here to help you solve them. Spend more time using data, and less time fighting it.

### 2.41 Seequent

Industry leaders in integrated earth modelling, geo-data management, and team collaboration software

Seequent software empowers customers to make better, more sustainable decisions about their earth, environment, and energy challenges.

It's our mission to unite the insights of geotechnical, geology, geophysics, geochemistry, hydrogeology, and GIS teams – and their stakeholders.

We enable geo-data to tell a story with software that combines in-depth analysis, 2D and 3D visualisation, and data management.

Accessible on desktop and Cloud, Seequent brings together the trusted power of Leapfrog 3D, Geosoft, and GeoStudio software. Our solutions integrate with industry-leading tools and have an open API so that all data and workflows can be considered.

## 2.42 Siemens

We are a technology company focused on industry, infrastructure, transport, and healthcare. From more resource-efficient factories, resilient supply chains, and smarter buildings and grids, to cleaner and more comfortable transportation as well as advanced healthcare, we create technology with purpose adding real value for customers. By combining the real and the digital worlds, we empower our customers to transform their industries and markets, helping them to transform the everyday for billions of people.

## 2.43 SierraSoft

SierraSoft, founded in 1998, is a company that develops and markets BIM software solutions for the sectors of land surveying, infrastructure design and construction.

SierraSoft products are based on the proprietary SierraSoft M3 Framework software platform, are available in several languages (English, Italian, Spanish, Portuguese, German, French, Greek, Russian, etc.), they include the main international standards and have been adapted to comply with the specific requirements of several countries (Italy, USA, Germany, Spain, Portugal, France, etc.).

SierraSoft products are used in more than 15 countries by surveyors, architects, engineers, engineering companies, architecture companies, construction companies, research institutes, public bodies.

The main products are:

- SierraSoft Land - BIM software for land survey mapping, modeling and analysis.
- SierraSoft Roads - BIM software for the design of roads and highways.

The BIM technologies are part of the M3 Framework software platform and include:

- BIM Modeling for information modelling
- BIM Exchange for information exchange
- BIM Checking for information analysis and checking

## 2.44 Skill Software

We help people put their plans into action

Since 1991 we have been developing scheduling and project management software, e.g. for the multiplier support of Henkel KG with the smartphone precursor "Atari Portfolio".

This resulted in solutions for customer acquisition and support, today based on Project CRM or Microsoft Dynamics CRM, combined with smartphones that even work as offline applications (e.g. for BlackBerry, iPADS, Android and Samsung Galaxy). Today, we offer solutions for mobile Industrie 4.0 deployment.

We make it simple and mobile

Skill Software GmbH specializes in radically simplifying complex business processes in order to make them available on smartphones and tablets while mobile. We offer Industry 4.0 solutions for construction and building management, energy and technology, customer and visitor flows; furthermore control systems and solutions for locating, measuring and controlling in the Internet of Things (IoT). Another focus is classic CRM and construction CRM.

#### 2.45 ThinkProject

At Thinkproject, we turn intelligence from data and people into an indispensable asset. For owners, stakeholders, contracts and developers, the right levels of insight and expertise elevate projects to a higher level of sustainability and efficiency.

Since 2000, we have helped our customers deliver more than 75,000 projects, achieving the fastest payback period in the sector.

Valuable insights from data

We create technology solutions for the AECO sector that unlock the potential of data seamlessly across the entire asset lifecycle. We drive progress in the industry by accelerating collaboration and innovation, creating a gold standard for industry digitalisation.

Gain knowledge from experts

Our engineering and software experts combine their real-world experience with the power of our platform to give customers digital solutions that allow teams to collaborate and gain a competitive edge.

#### 2.46 Topcon Technology Finland

Topcon Technology Finland Oy is located in ESPOO, Uusimaa, Finland and is part of the Computer Systems Design and Related Services Industry. Topcon Technology Finland Oy has 27 employees at this location and generates \$4.41 million in sales (USD). There are 3 companies in the Topcon Technology Finland Oy corporate family.

#### 2.47 TMC

TMC is a global leader in the success of rail transport infrastructure maintenance, bringing system solutions for maximum efficiency and availability in rail-infrastructure maintenance. Launched in 2017, tmc's unique programming strategy established it as the go to the source of technology solution across railroad network and the foundation for climate-friendly passenger and freight traffic. Our goal is to

improve the world's rail networks and make people's work in track maintenance easier, safer, and more efficient. We developed a modern sensor technology, browser-based platforms, and applications.

We care deeply about the quality of our products. Our team of over 90 expert of scientist, technology development professional, project management specialist and digitization specialist build our products from the idea generation to product deployment using an architecture development, building prototype design, and realizing the design concept, ensure they deliver exceptional performance.

Our headquarters in Linz and our branch office in Vienna, we deliver our services to clients in Europe, North America, Japan, and Australia.

## 2.48 Tool

TOOL S.A. was founded in Madrid (Spain) in 1983 in order to respond to technical requirements in Civil Engineering and Architecture.

TOOL S.A. develops and distributes different IT solutions within the theme of roads, rail, digital terrain models, slope stability and budgets and measurements. CLIP is the best known software among the companies of design and construction of linear works.

CLIP is a computer system for designing and constructing road, highways, freeways, railway, water ways, housing developments, widening and improvement projects, and support for roadbed and highly transited roads. It can manage very long road and railway designs in no time.

TOOL CURVADO is a powerful solution that can manage huge different types of digital model terrain data to do models to be used as base of linear works. It includes LIDAR, massive points files, etc.

SISPRES is a program that facilitates the elaboration of project measurements, certification and production, budgets, valued relationships, all kinds of economic reports, work planning and space-time diagrams.

## 2.49 Trimble

Trimble is transforming the way the world works by delivering products and services that connect the physical and digital worlds. Core technologies in positioning, modeling, connectivity and data analytics enable customers to improve productivity, quality, safety and sustainability. From purpose built products to enterprise lifecycle solutions, Trimble software, hardware and services are transforming industries such as agriculture, construction, geospatial and transportation and logistics.

Trimble Civil Engineering and Construction is a leading innovator of productivity solutions for the civil engineering and construction sectors. Trimble's solutions leverage a variety of technologies, including Global Navigation Satellite System (GNSS), construction lasers, total stations, wireless data communications, the Internet, and application software. As part of the Trimble Connected Site® strategy, these solutions provide a high-level of process and workflow integration from the design phase through to the finished project—delivering significant improvements in productivity throughout

the construction lifecycle.

## 2.50 Triona

Triona's long term goal is being a leading and reliable supplier of innovative IT-solutions within logistics and infrastructure oriented operations. Our focus is mainly on organizations in a few specific industries.

Today we are an IT-company that combines industry specific competence and skills in first and foremost transport infrastructure, power/energy, sub-contracting, transports, and the forest industry with industry-targeted products and leading-edge competence within system development and maintenance. It is within these areas we can create efficient solutions that help our customers reach their goals, which is what our business model and mission is based on.

### Business concept

"By combining industry specific competence and IT skills we offer efficient solutions that help our customers reach their goals"

### Mission

"We create efficient, sustainable and safe flows of data, energy, goods and people"

We are established in Finland, Norway and Sweden with an annual turnover of approximately 170 MSEK and employ around 150 people. Among our customers you will find Hitachi ABB, Bane NOR, BDX, Clas Ohlson, Euroskilt, Mantum, MaserFrakt, Mesta, NCC, Norra Skog, SCA, The Norwegian Road Authority, Sveaskog and The Swedish Transport Authority and Transdev.

## 2.51 TUM

The Chair of Computational Modeling and Simulation (CMS) at the Technical University of Munich (TUM) is actively contributing to IFC extension projects for a long period already. Besides the IFC Infrastructure Extension Deployment project, the team has been part of the core teams of the recent InfraRoom projects IFC Infra Overall Architecture, IFC-Alignment, IFC-Rail, IFC-Road and IFC-Bridge, and is currently providing the technical lead of the IFC-Tunnel project. TUM collaborates in several other IFC related projects on a national and international level to achieve an increasing knowledge and better deployment of the BIM technologies through all stakeholders in the Architecture, Engineering and Construction (AEC) sector.

As an institution focused in research and education, the focus of TUM's participation is not on the development of commercial software products, but to realize high quality vendor-neutral data exchange standards by implementing scientifically backed methods and procedures in information model design. This enables the team to deliver an additional and unbiased view on any activities in the project. Furthermore, a research institution can access a comprehensive set of existing literature (e.g., guidelines, codes, or recent publications by other researchers) and provide the international project team with additional information and references.



## 2.52 WSDOT

WSDOT is setting out to create a family of bridge engineering software tools. These tools will range from Automation compatible libraries that you can call from productivity tools like spreadsheets to State-of-the-Art software applications like PGSuper. This massive undertaking is called the Alternate Route Project. We've chosen the name Alternate Route because we are going to develop this software using a non-traditional model. Alternate Route software will be Open Source and licensed using the Alternate Route Open Source Licenses.

## 2.53 VARS BRNO

VARS BRNO a.s. is a technology company offering innovative and smart solutions for transport telematics, asset management and GIS. The core of these solutions is software that reflects the latest trends in information technology and gives customers completely new options on highly competitive terms.

The company was founded in 1995 in Brno - the technological centre of the Czech Republic. The main field the company VARS operates in is transport. In this field, the company provides software solutions in the areas of ITS (Intelligent Transportation Systems) and transport infrastructure asset management. It also provides related GIS & CAD systems and IT infrastructure.

The goal and the mission of VARS BRNO is to provide first-class and innovative ICT solutions, particularly in the area of transport. Our strategy for achieving these goals is innovation associated with significant investments in research and development and close partnerships with leading technology companies worldwide (ESRI, Microsoft, Navteq, FUGRO Roadware, SWARCO ...).

VARS BRNO a.s. also provides related services – consulting, proposals for solutions, customization and development, implementation, 24/7 support and training.

Our innovative solutions are created by our own team of experts, who also work in research and development projects and co-create the company know-how, respecting industry trends and the current and future needs of customers.

Among our most important customers are: The Ministry of Transport, transportation and research centres, State Administration of Navigation, technical administrative bodies, regional authorities and regional city administrations, designers and others.

## 2.54 VIANOVA

VIANOVA France, founded back in 2005, acts as a strategic adviser, systems integrator, and deployment and training services provider in the field of BIM solutions for infrastructure projects, in all phases from functional programmatic studies, through detailed design, construction design and methods optimization, as-built recollection and its integration into assets management.

Such infrastructure projects cover railways and metros, roadways, bridges & tunnels, ports and airports, as well as urban development and industrial plants.





We mix expertise in organisational methodology for BIM-based multi-disciplines concurrent design with over 10 years of advice provision to infrastructures' owners and operators.

Our reference projects include high-speed TGV lines in France, offshore extension of Monaco, highway bypass in Doha & extension of the Santiago Int'l airport in Chile, to name a few.

We lead several working group within France's national MINnD project (BIM-for-Infrastructure) as well as bSI's IfcTunnel int'l project.

## 2.55 xD Visuals

We have over 25 years of experience in problem solving in areas of 3D, VR, AR, BIM, VDC, visualization and digitalization of planning, design and construction workflows. This experience leads into innovation, which leads into solutions that increase your productivity.

We develop workflows that are as easy, as low cost and as fast as possible to execute. We do workflow automation and optimization. We find best tools and methods for the job. We have resources to make jobs done more cost efficient. We save your time and money.

We are independent from any 3rd party organizations, technologies, products or services. We have no vendor locks, and you should neither. We tell honest and neutral recommendations and we value transparency and open solutions. Your future success is based on that.