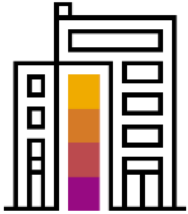


SAP Innovation Awards 2021 Entry Pitch Deck

DENIA - Denios Intelligent Assistant for Hazmat Storage Solutions

itelligence AG

PUBLIC



Company Information

Headquarters	Bielefeld, Germany
Industry	Business SAP/IT Advisory Services
Web site	www.itelligencegroup.com

At itelligence, we believe in innovation, trust and the power of togetherness. We are passionate about enabling our customers to reach their full potential and being part of the appropriate change. Our deep industry, SAP technology and business process knowledge is based on over 30 years of consulting experience. We have successfully guided thousands of customers across industries, countries and markets through their business transformation.

DENIOS Intelligent Assistant: “DENIA”

itelligence AG



“The travel group SAP, the customer DENIOS, together with itelligence is a perfect match. The destination: #EnablingInnovations.

This motto drives us together to create solutions for the end customer that create value there.

The result is impressive.”

Andreas Pauls, Executive Vice President, itelligence AG

Challenge

The storage of hazardous good is strictly regulated and has high requirements. Today, the knowledge about these complex processes exists mostly in the minds of specialists or written down on paper. This leads to poor process quality, less transparency and higher risks in dealing with hazardous substances in almost all industry.

Solution

Knowledge is digitalized and made available using artificial intelligence. A digital assistant guides the worker through the storage process in compliance with safety regulations and posts automatically into the hazardous substances register. As a result, processes are safer and can be executed more efficiently.

Outcome

A big leap towards the goals of the customer’s digital roadmap and part of their business model „Safety Management as a Service“. The Intelligent Hazardous Materials Warehouse acts as a Blueprint for Sustainable Service Solutions with new opportunities in future B2B.



25

Skills of the Digital Assistant based on complex and strict storage regulations.

6

Leading industry Partners collaborated on the innovative solution outcome.

100%

Market Awareness for an innovative Digital Business in an emerging market.



Participating Partner Information



DENIOS AG

Case giver



"Our long-standing partner itelligence has been with us on our new path in the digital transformation. As part of our digitization strategy, the joint development of an innovative digital business scenario, itelligence helps us to set up new digital service offers for our customers and thus to continue to position ourselves as a leader in the market."

Philipp Bruelheide, Chief Digital Officer, DENIOS AG



Participating Partner Information

Center Connected Industry

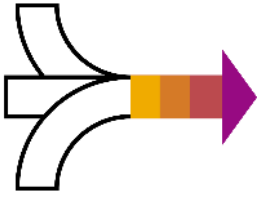
Demo Factory and Network Facilitator



"Together with intelligence, DENIOS, industrial partners and startups, we develop innovative business scenarios with key technologies such as IoT, AI or 5G at the Center Connected Industry and bring them to pre-series maturity through pilot projects. The added value for industrial users is that these scenarios allow a realistic look into the future and show opportunities and possibilities for their own implementation options."

Christian Maasem, Director Center Connected Industry, Managing Director EICe Aachen GmbH

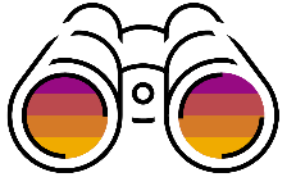




Business Challenges and Objectives

- Extensive and time-consuming research in manuals and safety data sheets
- Operating the system with safety clothing on (gloves, protective clothing, ...)
- Terminal access is often separated from the hazardous goods container
- Outdated safety instructions
- Forgotten PPE (personal protective equipment)

- (Part of) Digital business roadmap
- Digitalised knowledge about hazardous substances and their safe storage
- No more searching in, potentially outdated, manuals and safety data sheets
- Guided and safe storage of hazardous substances



Project or Use Case Details

Starting point of the project was the development of a roadmap for the "Business of tomorrow." This roadmap enables Denios to become an Intelligent Enterprise and offer new and innovative services to their customers.

An essential point on the roadmap was the design and realization of a digitized container for the storage of hazardous materials. SAP S/4 HANA was used as backend system and provides standardized processes for warehouse management. Via SAP Cloud Platform (SCP) it is connected to the Denios container. The knowledge about hazardous goods and the requirements for storing them was digitalized and made available (e.g. through a companion app for iOS devices).

Moreover, a digital assistant ("DENIA") helps the worker to store the materials safely and provides access to the digital twin of the container. Using information from the backend system and the SCP, workers are guided through the process. This includes the check of protection clothing using Image Recognition technologies. On top of that, sensors in the container are connected via MQTT to the SCP and allows the intelligent system to check the worker's actions. Voice-based conversations between workers and the digital assistant are realized using the SAP Conversational AI platform.



Benefits and Outcomes

Business or Social

Decreased risk in global supply chains for chemical industries to run a connected digital business

Applied Artificial Intelligence to an industry product of a hazmat storage which enables DENIOS to provide digital products services in the new digital business model

Better Environmentally management of "toxic chemical" (SDG 12) to ensure sustainable consumption and production using AI and intelligent technologies

IT (optional)

Faster response times after storing goods into the hazmat cabinet

Live insights into the storage management of toxic chemicals

Immediate system feedback

Better process efficiency empowered through end-to-end integration of decentralized hazmat storages into ERP backend systems

Human Empowerment

Opportunity to communicate intuitively and hands-free with a hazmat storage

Information can be accessed easily through voice integration

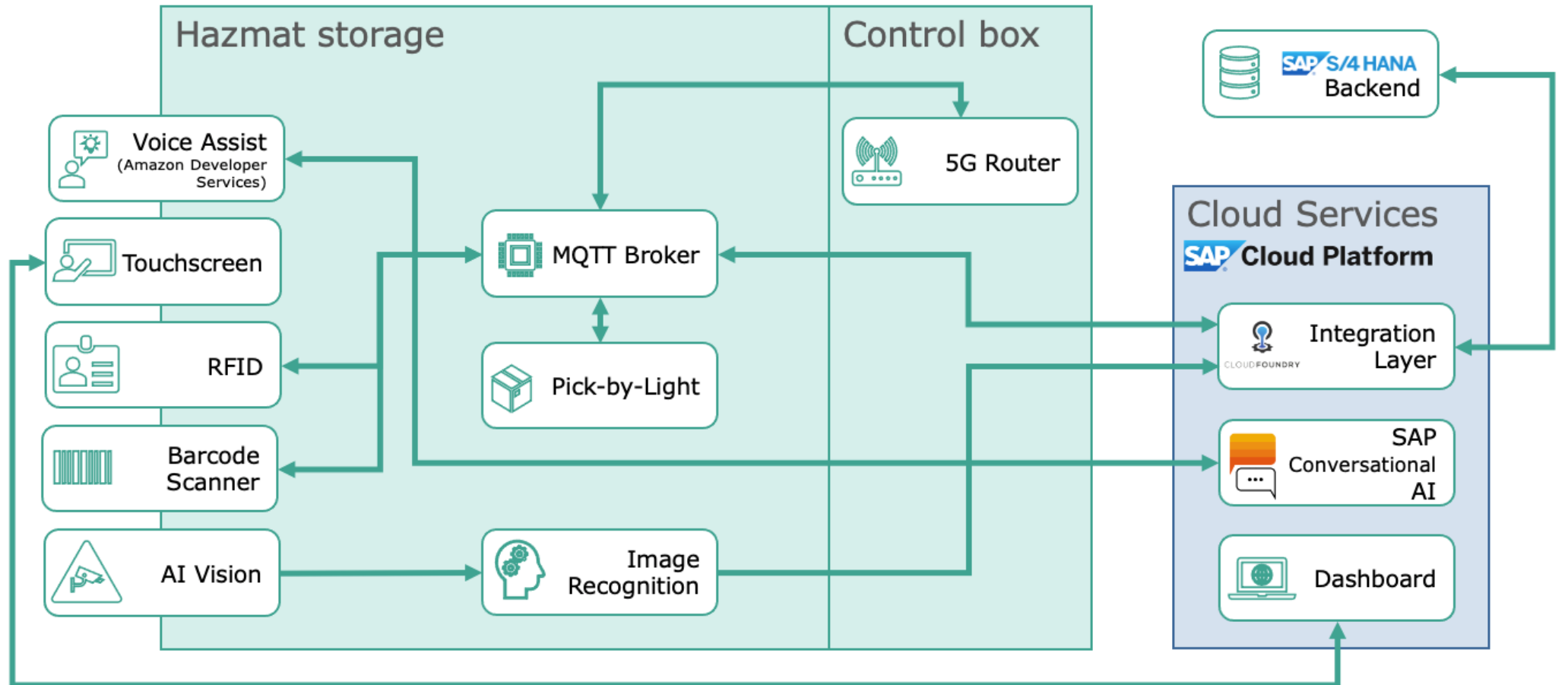
Reduced risk for workers in their daily job when dealing with hazardous materials

Solution can be used after a short training session

Conversational AI component can be trained in order to improve the process continuously



Architecture





Deployment

Deployment status POC

Date September 2020

Number of users 10

SAP® technologies used:

	SAP product	Deployment status (live or proof of concept [POC])	Contribution to project
1	SAP Conversational AI	POC	Conversational intelligence
2	SAP Cloud Platform	POC	Integration layer between hazmat cabinet and digital assistant
3	SAP S/4HANA	POC	Backend
4			
5			

If you have used one or more of the services or support offerings from SAP Services and Support during the implementation or deployment phase, please indicate which one(s) below with an

SAP MaxAttention™

SAP ActiveAttention™

SAP Advanced Deployment

SAP Value Assurance

SAP Model Company

Others:

SAP Innovation Services

SAP Innovative Business Solutions



Advanced Technologies (1 of 2)

The following **advanced technologies** were part of the project.

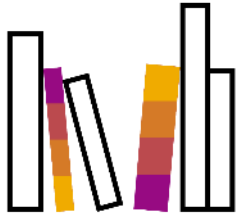
Technology or use case	Product used*	Contribution to project and how product used integrates with SAP products
1 Machine learning or artificial intelligence Robotic process automation, conversational AI, AI-based knowledge graph	SAP Conversational AI AI Knowledge Database based on SAP HANA	Guides the user through the process of storing hazardous goods under current safety and environmental compliances.
2 Intelligent data management Multi-cloud, data virtualization and governance, smart data tiering, persistent memory, data privacy	S/4 HANA SAP HANA Database	End-to-End Process Integration of a decentralized hazmat storage process with SAP S/4HANA backend ERP business process to validate goods movement events The database stores types of hazardous goods and the storage matrix, which tells which substances can or cannot be stored with certain others.
3 Advanced and augmented analytics <ul style="list-style-type: none"> Real-time and streaming analytics, spatial analytics Natural language query and generation AutoML to identify trends, patterns, outliers Predictive analytics (time series analysis and forecasting, regression, classification) 	Natural Language Query and Generation	Used AWS Poly Service to integrate Speed-to-text and Text-to-Speed with SAP Conversational AI platform
4 Data and analytics solutions in the cloud <ul style="list-style-type: none"> Unified data and analytics cloud platforms by SAP Modern/self-service data to analytics 		



Advanced Technologies (2 of 2)

The following **advanced technologies** were part of the project.

Technology or use case	Product used*	Contribution to project and how product used integrates with SAP products
5 Advanced cloud integration <ul style="list-style-type: none">• API economy (monetization and API marketplaces)• AI-based or crowdsourced integration• High throughput, low-latency digital integration hub	SAP Cloud Platform	The integration layer between hardware components, backend services and the digital assistant is deployed via Cloud Foundry on the SAP Cloud Platform.
6 Industry cloud platform		
7 Blockchain		
8 Internet of Things	Digital Twin	Digital version of the hazmat storage to integrate master data and operational data into one single source of truth
	MQTT	Communication layer between SAP Cloud Platform and the hazmat storage
9 3D printing		



Additional Information

Company blog article

English: <https://itelligencegroup.com/my/global-blog/intelligent-hazardous-materials-storage-for-sustainable-service-solutions/>

German: <https://itelligencegroup.com/de/local-blog/digitale-chancen-im-b2b-das-intelligente-lager-als-blaupause-fuer-nachhaltige-service-loesungen/>

iOS Companion App

<https://apps.apple.com/de/app/mengen-checker/id1527415638>

Case video by itelligence

English: <https://www.youtube.com/watch?v=ca5mw0VQTQI>

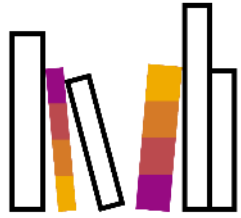
German: <https://www.youtube.com/watch?v=oiAC595rQEI>

Case video by DENIOS (English)

<https://www.youtube.com/watch?v=rgCiJiFIHe4>

Success Story (German)

<https://itelligencegroup.com/de/success-stories/denios-ag-neue-wege-entlang-der-digitalen-roadmap/>



Additional Information

CO-INNOVATION

DENIOS
GENETISCHER SCHUTZ & SICHERHEIT

itelligence NTT DATA Business Solutions

NTT DATA

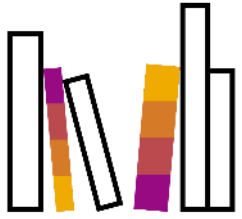
CENTER CONNECTED INDUSTRY

SICK
Sensor Intelligence.

DEMOFABRIK AACHEN

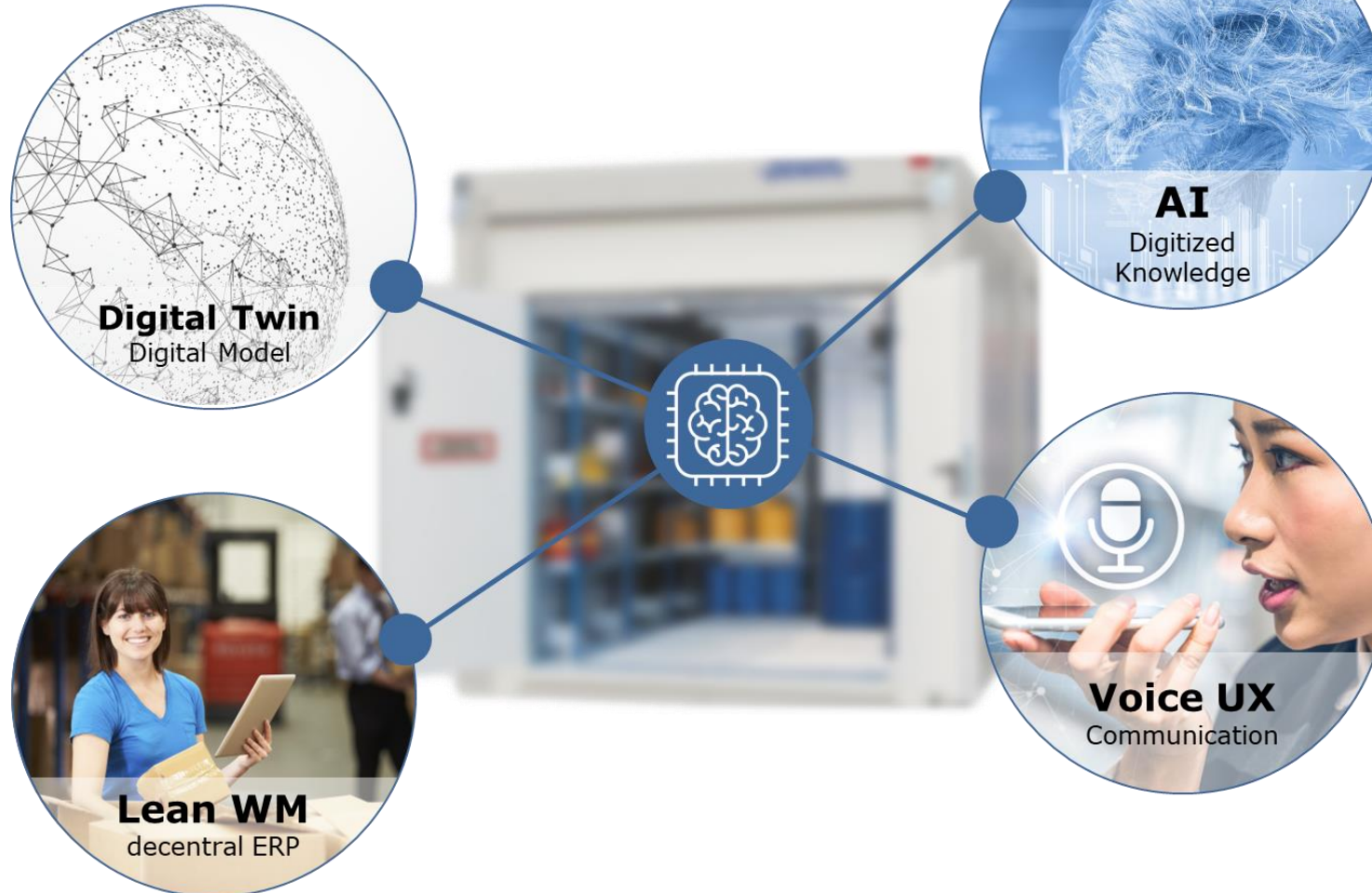
GEUTEBRÜCK

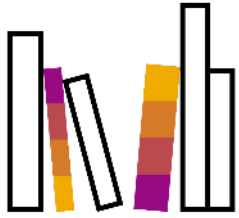
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Additional Information

Orchestration of Innovation Technologies





Additional Information

Support of the **Sustainable Development Goal 9 + 12** in providing innovative industry infrastructure and support a responsible management of hazardous goods in production in a **Circular Economy**.

it

DREAM BIG TOGETHER

for Sustainable Business Opportunities in Safety Management

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS	SUSTAINABLE DEVELOPMENT GOALS

Image: Getty Images/ERNEST AG