





SCAUT – Reasons for the Initiative

- Create space for the increasing urbanisation
- Use the 3rd dimension - downwards!
- Reasons:
 - Reduce the surface usage
 - Activate the advantages of the underground space (climate ..)
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- Usage means: Build-up knowledge and do technological developments to make the best use of the underground space
- Integration / use of new technologies (IOT, BIM, digitalization etc.)
- Switzerland has outstanding knowledge and peak technology (Gotthard Base Tunnel.....)



SCAUT – Challenges in the Use of the Underground Space

1. The space below ground needs to be opened up first.
2. The caverns' dimensions are limited by the underground area's physical properties.
3. The conversion of existing caverns (mines, tunnels, etc.) is challenging, expensive and rarely well-fitting for the new use.
4. The underground space used needs to be treated as an integral part of the space above ground.
5. Planning, implementation and usage of the underground space requires special know-how and expertise that is not yet available for the current aboveground industry stakeholders



SCAUT's Vision

The Swiss Centre of Applied Underground Technologies (SCAUT) is the world's leading competency centre for the use of the underground space. It relies on high-end engineering, innovative solutions and most advanced ITC to make a substantial contribution to the creation of underground spaces for the future and to provide relief for metropolises and highly populated urban areas.

SCAUT's Mission

The Swiss Centre of Applied Underground Technologies is committed to three main tasks:

1. Innovative underground concepts

Leading network and know-how provider for the evaluation, concepts and implementation of innovative industrial usages the underground space.

2. Driving innovative technology

Facilitating technology development projects relevant in the world of underground facilities, as well as disseminating know-how by means of publications, events and networking platforms

3. Creation of high-tech jobs

Proactively winning contracts for innovative underground projects domestically and abroad and handling them by creating and coordinating consortiums consisting of high-tech companies



SCAUT's Range of Services

For providers of products and services in the underground facilities sector:	For national and international partners, investors and clients:
<ul style="list-style-type: none">• Securing contracts for innovative projects for underground industrial applications	<ul style="list-style-type: none">• Know-how and expertise platform to source resources for innovative projects
<ul style="list-style-type: none">• Creating consortiums and joint ventures	<ul style="list-style-type: none">• Conceptual designs, feasibility studies, laboratory tests, pilot projects for construction and technologies
<ul style="list-style-type: none">• Creation and support of consortia, joint ventures etc.	<ul style="list-style-type: none">• Concepts, feasibility studies, lab tests, prototyping, pilot studies etc. for various usages and technologies
<ul style="list-style-type: none">• Assisting in the international positioning through joint platforms	<ul style="list-style-type: none">• Centrally organizing underground maintenance & services
<ul style="list-style-type: none">• Being actively involved in trends and ongoing projects	<ul style="list-style-type: none">• Central contact for investors in the field of underground applications
<ul style="list-style-type: none">• Know-how and cooperation platform	<ul style="list-style-type: none">• ...



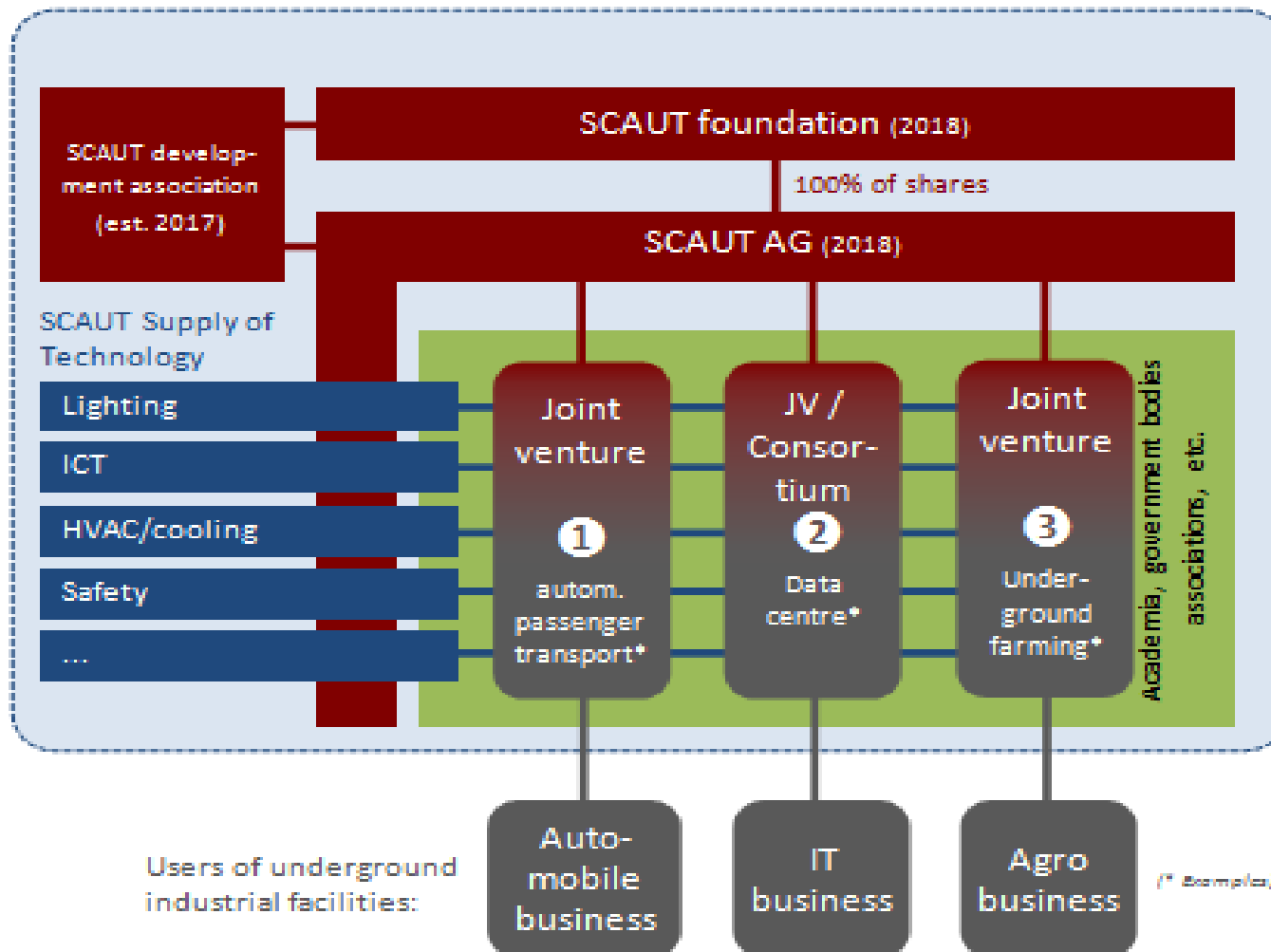
SCAUT Mode of Operation

- Platform function
- Events, workshops (SCAUT - internal and public)
- Bottom-up and top-down launch of innovative topics (such as 'construction 4.0')
- Brokerage events for information exchange and to facilitate the formation of JV and consortia
- Support in definition of / services and leadership of
 - Technology projects / developments
 - Concept studies
 - Communication internal / external (e.g., clients, SRF ...)
- Prototyping, Demonstrations

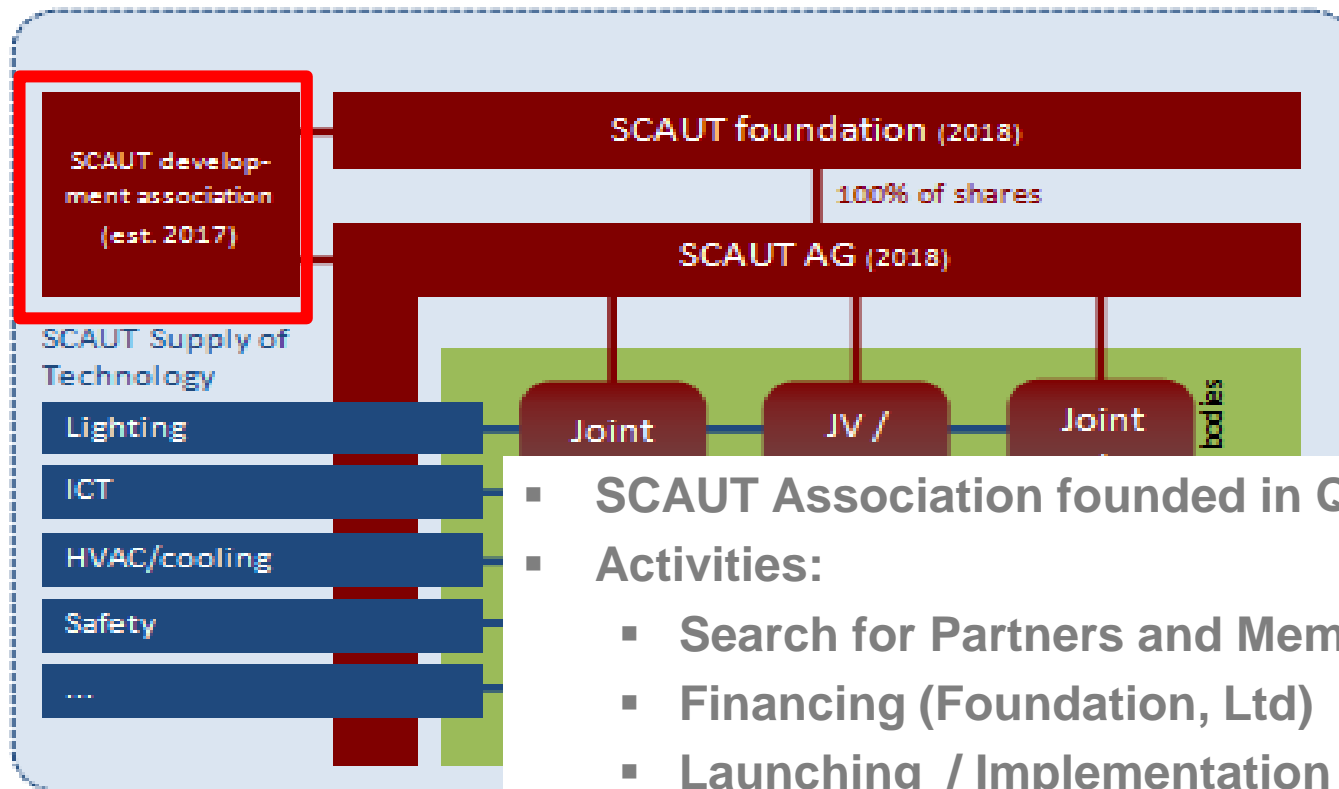
Important:

- driven by industry -> IPR remain with the project - partners
- ... 'applied Technology '

SCAUT Organizational Structure



SCAUT Association Membership (Status April 2017)



- SCAUT Association founded in Q1 2017
- Activities:
 - Search for Partners and Members
 - Financing (Foundation, Ltd)
 - Launching / Implementation of Projects and Concept Studies
 - Events

Users of underground
industrial facilities:



SCAUT Association Steering Board

SCAUT team

SCAUT Development Association - Steering Board



Felix Amberg (chairman)

MSc CE ETHZ · Owner of the Amberg Group, one of the world's leading underground engineering companies



Michael Lierau

MSc ME ETHZ, MBA degree from the George Washington University, CEO of Elkuch Bator AG, one of Europe's leading manufacturers of tunnel door systems



Thomas Freuler

MSc CE ETHZ, EMBA degree from HSG · CEO of Spaeter Group, swiss-wide active steel supplier



Ernesto Schümperli

MSc CE ETHZ, MBA GSBA Zurich, Head Concrete & Waterproofing Division; Sika AG, Baar leading supplier of chemical construction products



SCAUT Annual Programme 2017 (Status April 2017)

- | | |
|-----------------------|---|
| ❖ 10. April 2017 | GA SCAUT Association at ACO in <u>Netstal</u> |
| ❖ 30./31. May 2017 | Road Show STC 2017, Lucerne (CH) (public) |
| ❖ June 2017 | Construction site 4.0 (public) |
| ❖ 9.-15. June 2017 | Road Show WTC 2017, Bergen (N) (public) |
| ❖ June 2017 | Brokerage Event I |
| ❖ August 2017 | <u>Underground</u> Data-Center (on invitation only) |
| ❖ Autumn 2017 | 3-D printing in underground construction (members only) |
| ❖ November 2017 | Brokerage Event II |
| ❖ 5.-7. December 2017 | Road Show STUVA, Stuttgart (D) (public) |



SCAUT Projects and Concept Studies

- SCAUT Project Cases und Concept Studies (current)
 - 3D Printing
 - Prefabricated closure elements for crosscuts
 - IOT 'Construction site 4.0'
 - Data storage centers
 - Engergy storage
- Additional information
 - [www. Scaut-association.com](http://www.Scaut-association.com)
 - Flyer, brochure



SCAUT Concept Study 'Underground Data Centers'





SCAUT Concept Study 'Underground Data Centers'

Short Description

- Development of a **modular scalable concept** for Underground Data Centers (technology)
- Analyse and optimisation of the decisive **economic parameters** versus greenfield-solutions (technology), i.e.
 - muck re-usage
 - cooling and air conditioning,
 - energy and energy recovery,
 - safety and security,
 - maintenance and extension etc
- **Market potential analyse**
- **Prototyping** of individual aspects, identified together with market stakeholders (technology)



SCAUT Concept Study 'Underground Data Centers'

Targets

- Technological and economic optimized modular concept for Underground Data Centers
- Commitment of one or several launching partners



SCAUT Concept Study 'Underground Data Centers'

Results to achieve

- Implementation of an Underground Data Center
- IPR for project partners
- Market focused promotion for Underground Data Centers through a first implemented business case



SCAUT Concept Study 'Underground Data Centers'

Project-Initiator, Project-Coordinator, Ownership

- Initiator: Amberg Engineering AG
- Coordinator: SCAUT
- Partners: Subscribers of the Multi Client Feasibility Study
- Ownership: tbd



SCAUT Concept Study 'Underground Data Centers'

Stakeholders

- Consultants and planners
- Contractors
- Energy supplier
- Data Center -
 - supplier and / or
 - operators and / or
 - users

evtl

- Economic area promotion (s) / administration (s)
- Industry organisations



SCAUT Concept Study 'Underground Data Centers'

Activities

- **Multi Client Feasibility Study**
 - Documentation available
 - SCAUT internal workshop: August 2017
 - Subscription until 31. August 2017
 - Minimum number of subscribers : 16
 - Study elaborated until end 2017
- Definition specific projects: 1Q 2018
- Innovations- / promotions workshop: 1Q 2018
- First practical application Q3 2018
- Commercialisation: >2018