piql

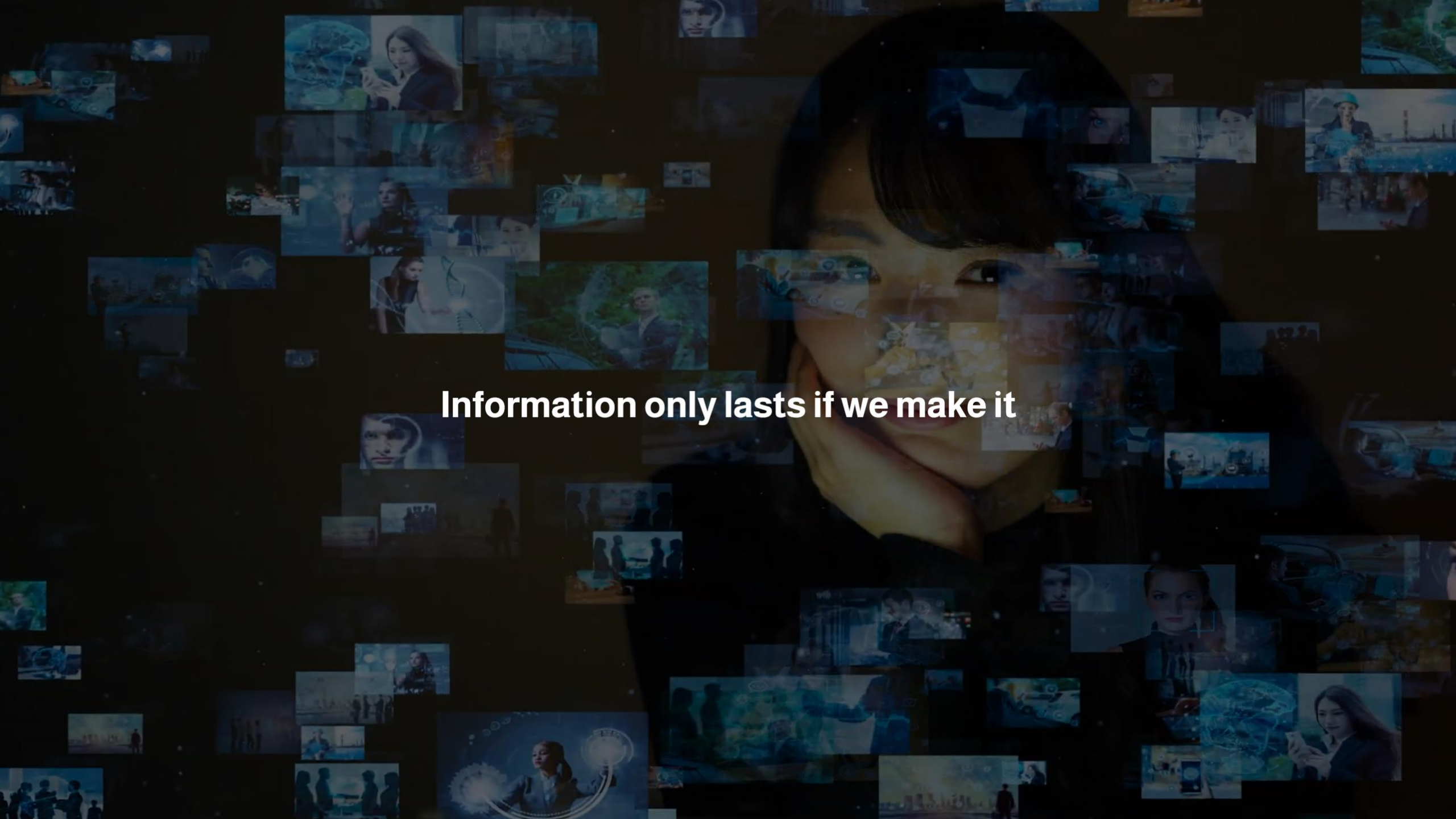
Co-funded by the European Union

Piql og AWA for Stiftelsesforeningen

BI Nydalen | 13th October 2022

Rune Bjerkestrand – Founder and Managing Director
Katrine Loen – Deputy Managing Director


We want to make a
difference in this world!


Information only lasts if we make it

piql

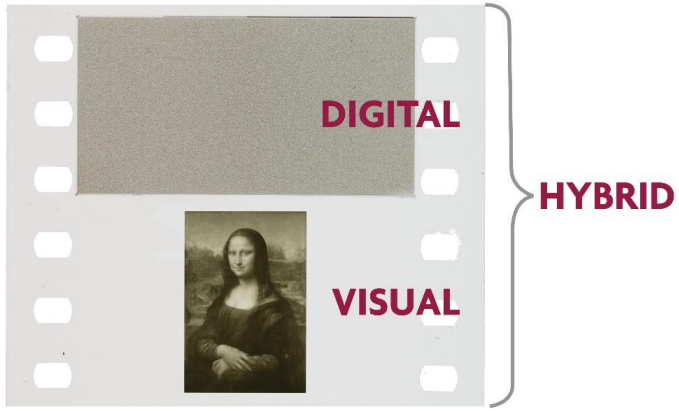
Co-funded by
the European Union

Piql have something TRULY UNIQUE

Truly unique

Co-funded by the European Union

- The MOST SECURE data storage medium - *non-hackable and immutable*
  - The ultimate insurance policy for the clients data



piql BOX piql FILM

Truly unique

piql

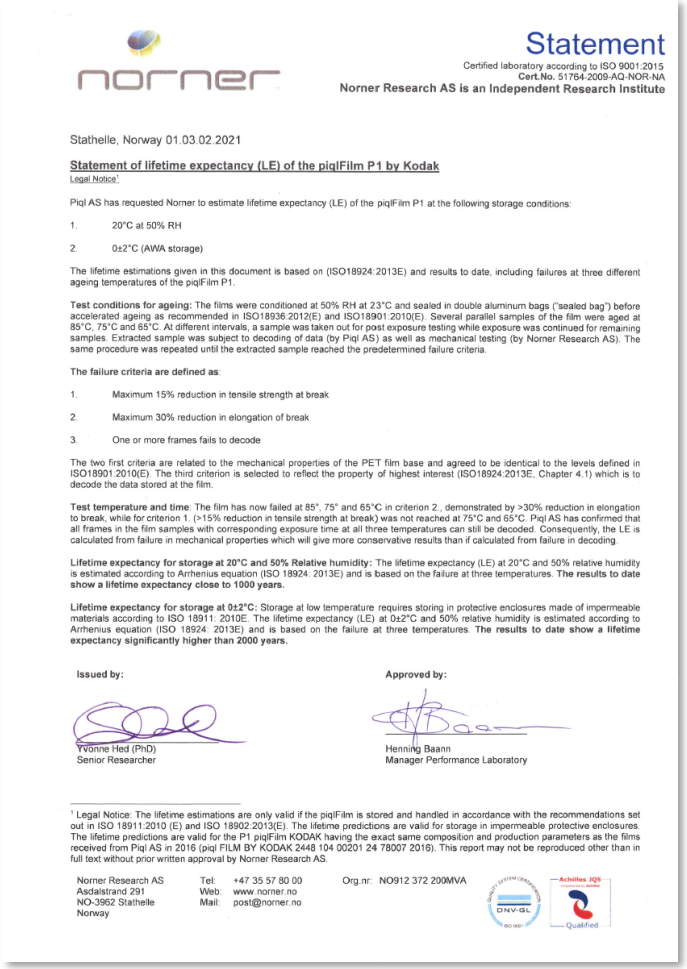
Co-funded by the European Union

- The MOST SUSTAINABLE data storage solution
  – *lowest carbon footprint*

Truly unique

Co-funded by the European Union

- The MOST DURABLE and LONG-TERM data storage medium – ***1000 years***
  - With guaranteed access to authentic data in the future



norner

Statement

Certified laboratory according to ISO 9001:2015
Cert.No. 51764-2009-AQ-NOR-NA
Norner Research AS is an Independent Research Institute

Stathelle, Norway 01.03.02.2021

Statement of lifetime expectancy (LE) of the piqlFilm P1 by Kodak
Legal Notice[1]

Piql AS has requested Norner to estimate lifetime expectancy (LE) of the piqlFilm P1 at the following storage conditions:

1. 20°C at 50% RH
2. 0±2°C (AWA storage)

The lifetime estimations given in this document is based on (ISO18924:2013E) and results to date, including failures at three different ageing temperatures of the piqlFilm P1.

Test conditions for ageing: The films were conditionad at 50% RH at 23°C and sealed in double aluminum bags ("sealed bag") before accelerated ageing as recommended in ISO18936:2012(E) and ISO18901:2010(E). Several parallel samples of the film were aged at 85°C, 75°C and 65°C. At different intervals, a sample was taken out for post exposure testing while exposure was continued for remaining samples. Extracted sample was subject to decoding of data (by Piql AS) as well as mechanical testing (by Norner Research AS). The same procedure was repeated until the extracted sample reached the predetermined failure criteria.

The failure criteria are defined as:

1. Maximum 15% reduction in tensile strength at break
2. Maximum 30% reduction in elongation of break
3. One or more frames fails to decode

The two first criteria are related to the mechanical properties of the PET film base and agreed to be identical to the levels defined in ISO18901:2010(E). The third criterion is selected to reflect the property of highest interest (ISO18924:2013E, Chapter 4.1) which is to decode the data stored at the film.

Test temperature and time: The film has now failed at 85°, 75° and 65°C in criterion 2., demonstrated by >30% reduction in elongation to break, while for criterion 1. (>15% reduction in tensile strength at break) was not reached at 75°C and 65°C. Piql AS has confirmed that all frames in the film samples with corresponding exposure time at all three temperatures can still be decoded. Consequently, the LE is calculated from failure in mechanical properties which will give more conservative results than if calculated from failure in decoding.

Lifetime expectancy for storage at 20°C and 50% Relative humidity: The lifetime expectancy (LE) at 20°C and 50% relative humidity is estimated according to Arrhenius equation (ISO 18924: 2013E) and is based on the failure at three temperatures. **The results to date show a lifetime expectancy close to 1000 years.**

Lifetime expectancy for storage at 0±2°C: Storage at low temperature requires storing in protective enclosures made of impermeable materials according to ISO 18911: 2010E. The lifetime expectancy (LE) at 0±2°C and 50% relative humidity is estimated according to Arrhenius equation (ISO 18924: 2013E) and is based on the failure at three temperatures. **The results to date show a lifetime expectancy significantly higher than 2000 years.**

Issued by:

Yvonne Hed (PhD)
Senior Researcher

Approved by:

Henning Baann
Manager Performance Laboratory

[1] Legal Notice: The lifetime estimations are only valid if the piqlFilm is stored and handled in accordance with the recommendations set out in ISO 18911:2010 (E) and ISO 18902:2013(E). The lifetime predictions are valid for storage in impermeable protective enclosures. The lifetime predictions are valid for the P1 piqlFilm KODAK having the exact same composition and production parameters as the films received from Piql AS in 2016 (piql FILM BY KODAK 2448 104 00201 24 78007 2016). This report may not be reproduced other than in full text without prior written approval by Norner Research AS.

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The Arctic World Archive
Protecting
World Memory

Tested and verified by third parties

Co-funded by the European Union

The **Norwegian Defense Research Establishment** have assessed our technology relative to all kinds of security challenges related to storage/preservation of data over time;

- inside threats, fire, water, chemical compounds, microorganisms, nuclear radiation, electromagnetic radiation, sabotage, espionage and different forms of "cyber"-threats.

"Basically, there is nothing more secure out there, we just recommend to keep the piqlFilm in a secure mountain vault"

Tested and verified by third parties

Co-funded by the European Union

IFE, the **Norwegian Institute for Energy Technology**, has exposed different data storage technologies (Hard disk (HDD), Magnetic Tape (LTO), USB stick and Solid-State Drive (SSD)) and **piqlFilm** to deadly doses of electromagnetic radiation (EMP).

Institute for Energy Technology

"The only technology that survived was the piqlFilm, all the data could be read back 100%. The other storage media could not even be connected"

THE SOLUTION

Piql is self-contained

– a one-of-its-kind feature!

piql

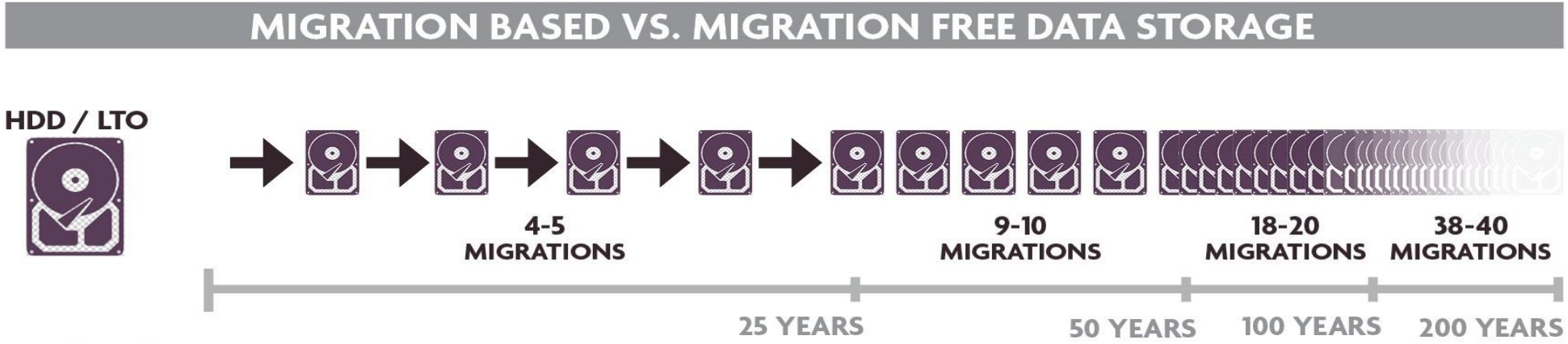
Co-funded by the European Union

Everything needed in the future to retrieve the data is written in human readable text on the piqlFilm, i.e. instructions, file format descriptions and source code for the relevant programs.

This makes the solution **resilient against the accelerating development and obsolescence** of the needed software and hardware to retrieve and visualise the data in the future.

Solving a major challenge – *migration of data*

Co-funded by the European Union



Every migration introduces a risk of data loss and data corruption!

The piqlFilm with its proven **longevity** and **self-contained** characteristics solves the challenge of information migration to keep data alive.

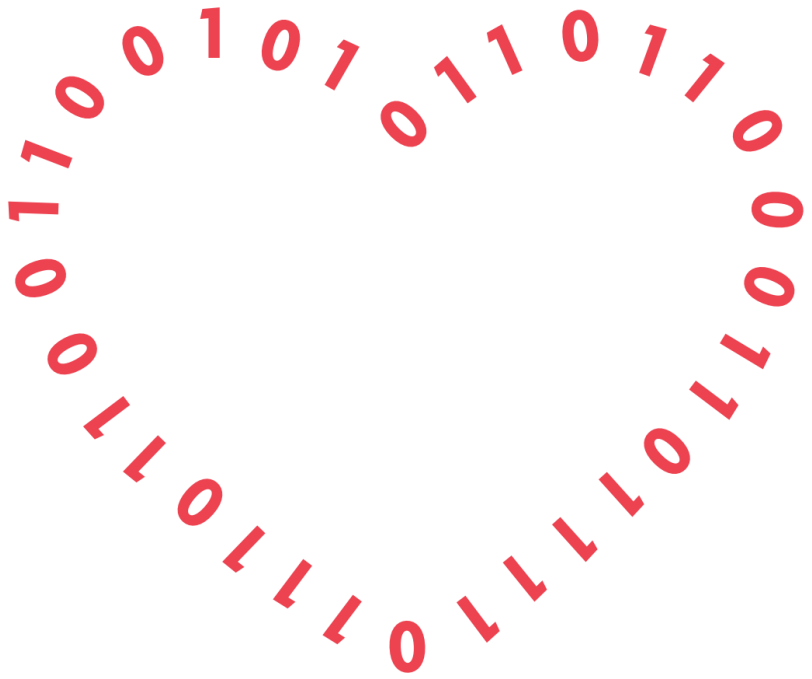
A unique and disruptive data storage solution

Co-funded by the European Union

Through extensive R&D and Innovation (*EUR 43 mill. invested*), we have developed a unique and disruptive data storage technology and solution that enables a **truly differentiated service**,

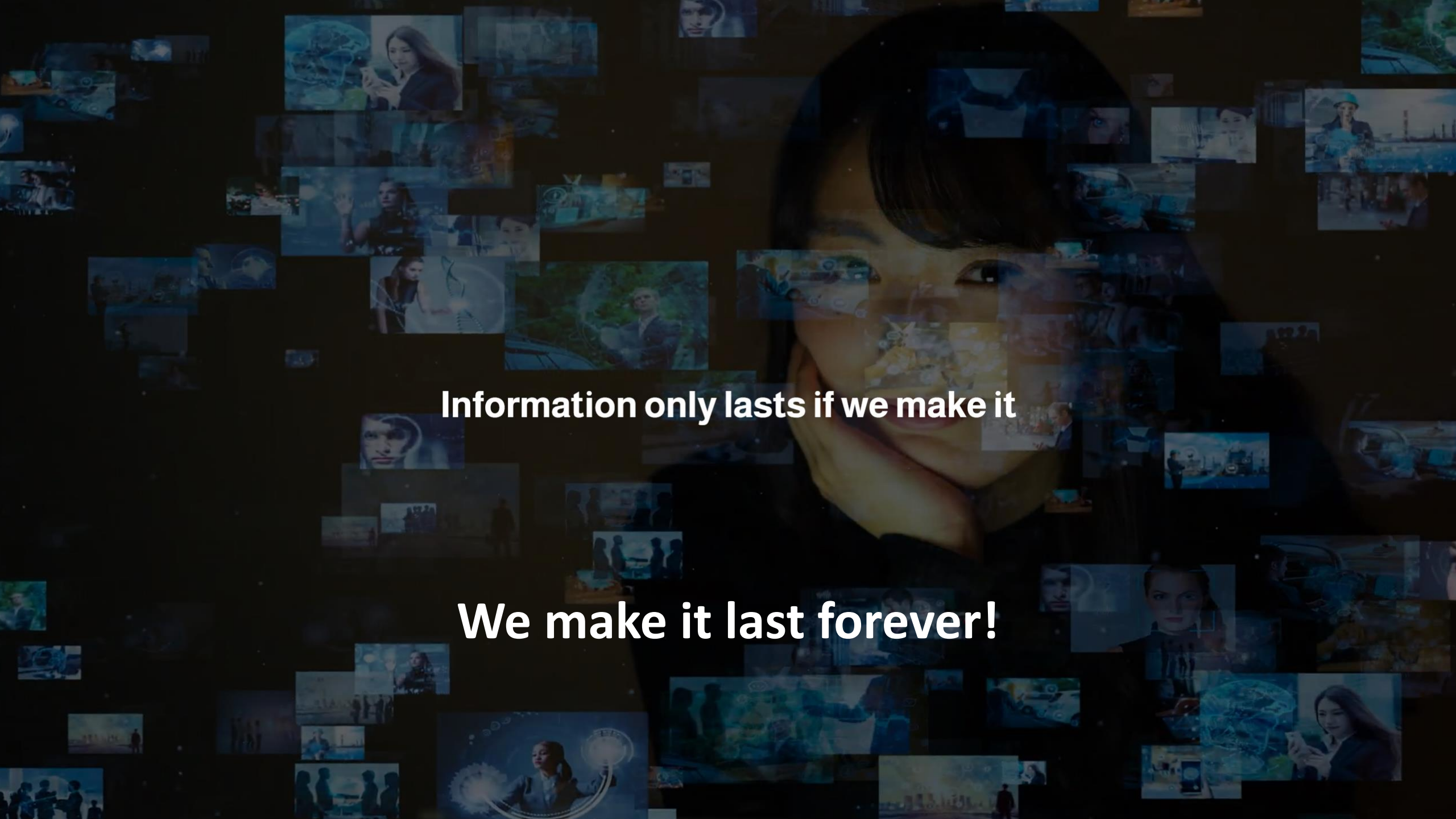
*- securing that **data is protected** against cybercrime, cyberwar and electromagnetic weapons,*
*- guaranteeing that information remains accessible now and in the future, **in it's authentic form**, - independent of specific technologies or solutions*

Piql's clients care about their data!



Either because they have valuable and/or irreplaceable data that **must be available in the future** (*e.g. because the data has commercial, historical, political, cultural, strategic etc. value*).

… or they need to have their data **available whatever might happen** (*e.g. in case of a disaster, catastrophe or a cyberattack*)


Information only lasts if we make it
We make it last forever!


A safe Repository for
World Memory

Inspiration

Svalbard Global Seed Vault

Our goal

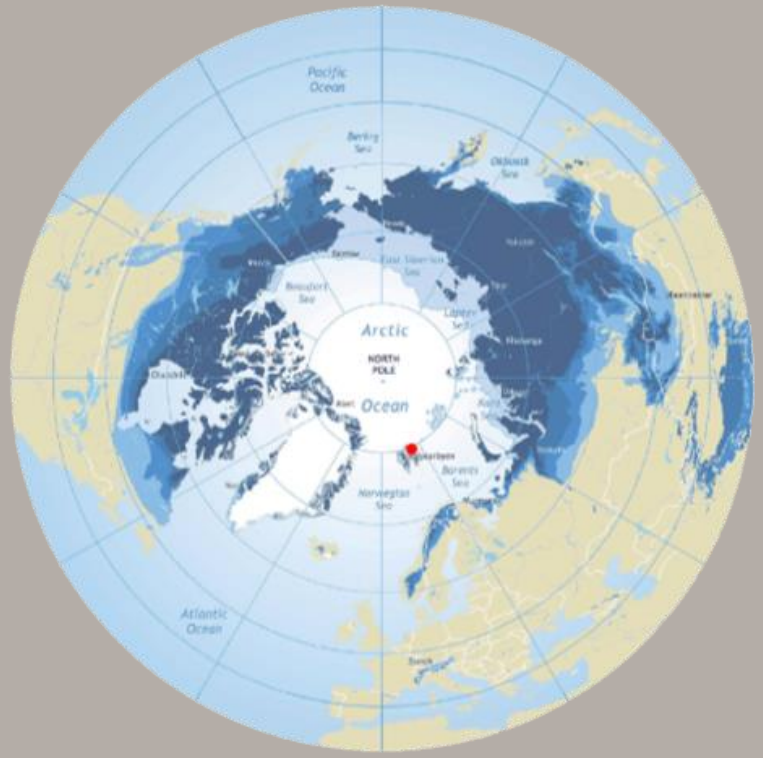
To ensure precious memories and valued cultural items are never lost, - but can be kept forever without the risks of data corruption or technology obsolescence

AWA is located at Svalbard

A unique geopolitically stable area

- Spitsbergen (Svalbard) Treaty (1920) provides for Norwegian sovereignty over Svalbard

- A declared demilitarised zone by 44 nations



Arctic World Archive

Why Svalbard?

The cool, dark and dry conditions are ideal for the storage medium, piqlFilm, and increases the longevity of the stored data.

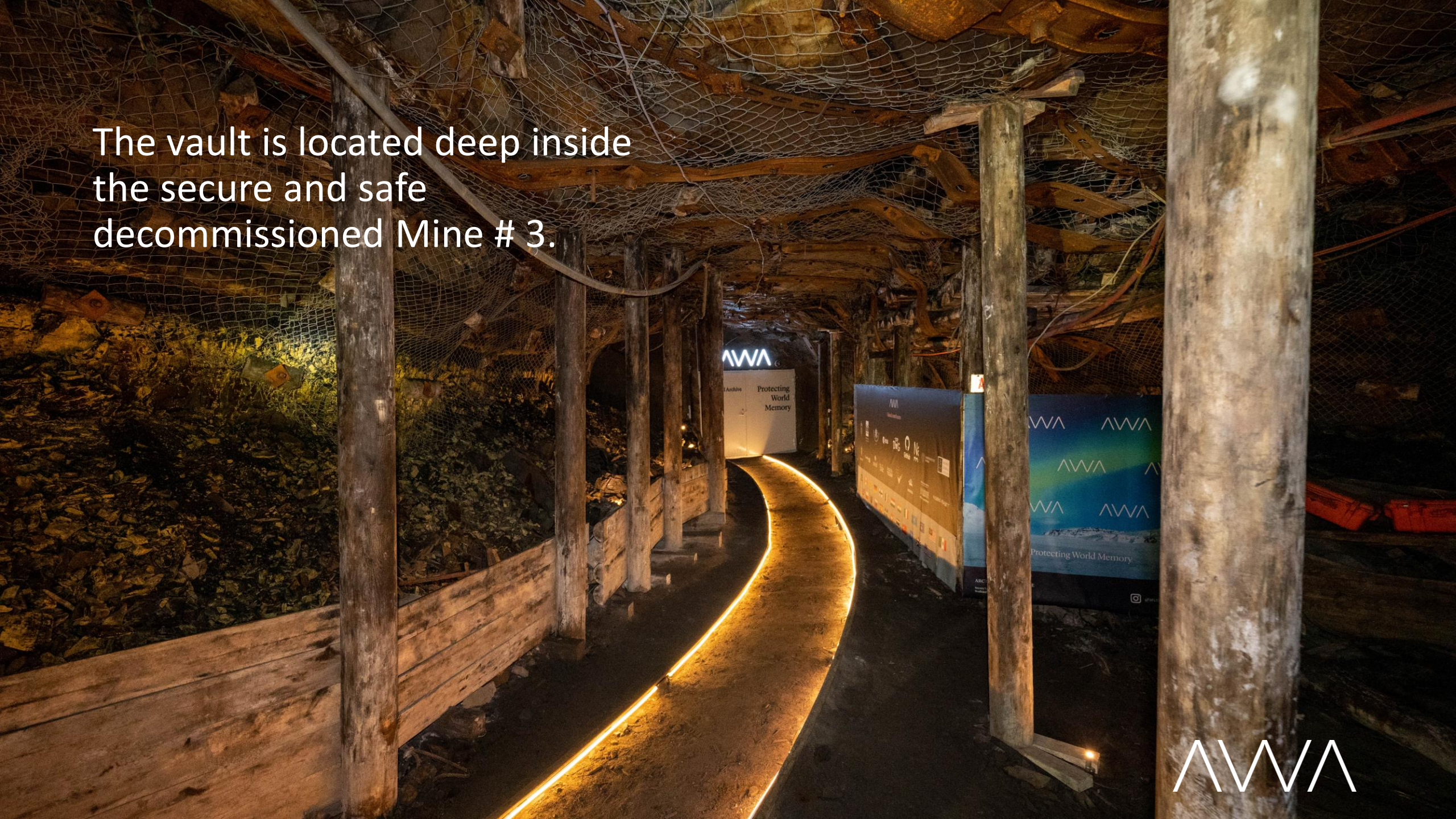
Behind the scenes

- AWA is a secure vault in the decommissioned Mine # 3 owned and maintained by Store Norske Spitsbergen Kulkompani (SNSK)
- Piql is the initiator and commercial operator of AWA.
- SNSK has more than 100 years' experience developing and operating mines on Svalbard and is owned by Norwegian Ministry of Trade, Industry and Fisheries.

piql

STORE NORSKE

AWA


The vault is located deep inside
the secure and safe
decommissioned Mine # 3.
Protecting
World
Memory
Protecting World Memory

Somebody did the “ground work” for us

The miners took out the coal, we replace it with information


Protected by polar bears and permafrost

Inauguration March 2017

MINISTÉRIO DA JUSTIÇA
E SEGURANÇA PÚBLICA

ARQUIVO NACIONAL

AGN
MÉXICO

ARCHIVO GENERAL DE LA NACIÓN

KDRS
Kommunearkivinstitusjonenes
Digitale RessursSenter

AWA


Proud representatives from the first clients of AWA

Inauguration of AWA in March 2017

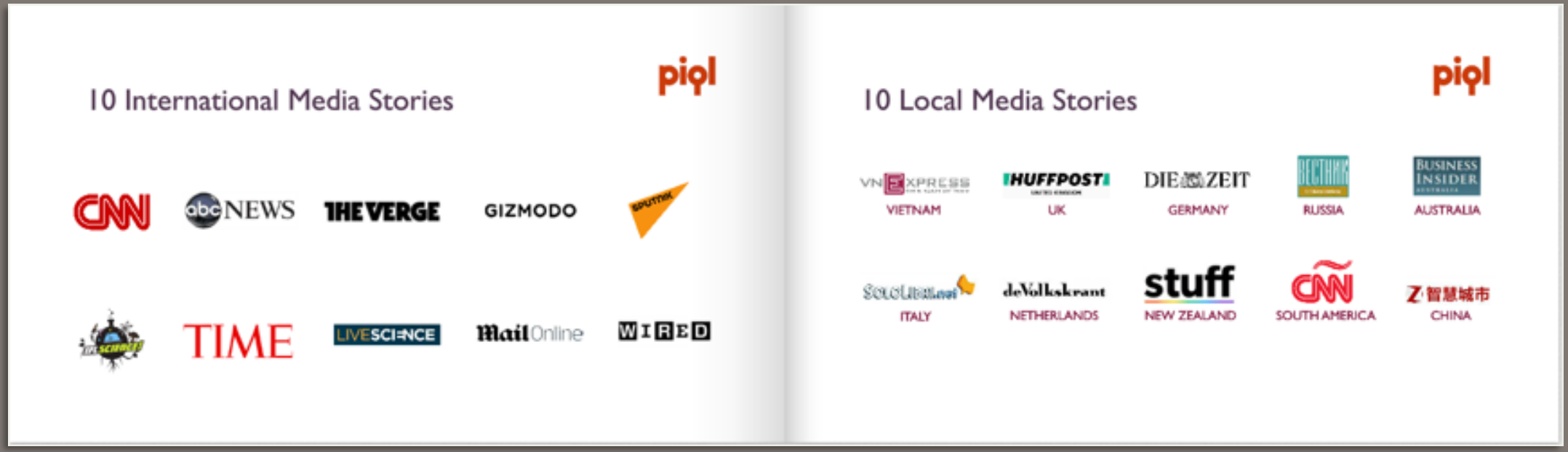
The opening

" It’s an amazing feeling to know that my own nation’s memory will be kept safe for future generations to see on this arctic island.

Erick Cardoso, National Archive of Mexico


Brasilia
11150 km
8425 km
Mexico City
Roma
4052 km
2611 km
Tromso
957 km
3043 km
London

A success story
- Global presscoverage 700 articles in 14 days after the opening



AWA deposits

Photo: Vidar Ibenfeldt / The National Museum of Art, Architecture and Design

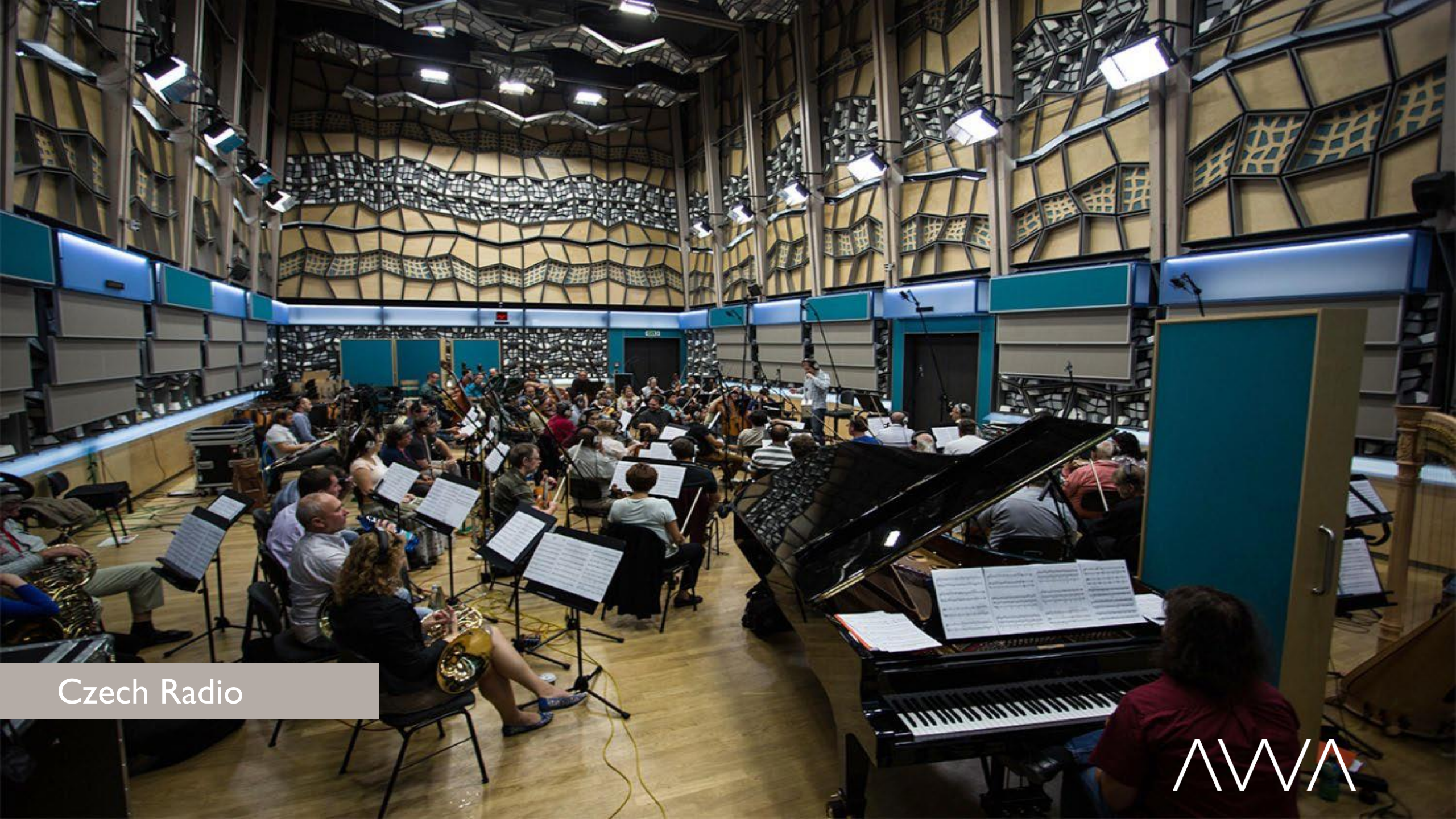
AWA deposits

Photo: Morten Thorkildsen / The National Museum of Art, Architecture and Design

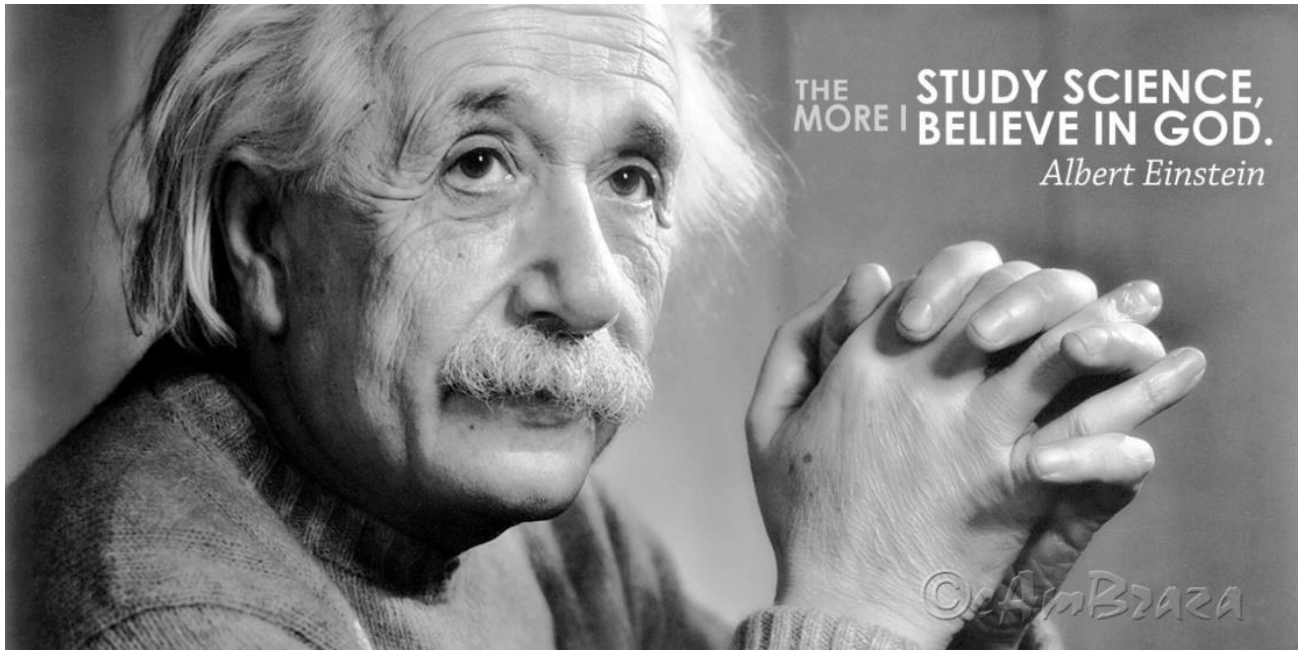

Longyearbyen – a wonderful place to visit

Treasures in AWA

Vatican Library



Czech Radio



Click the loudspeaker icon to play back one of the last speeches by Albert Einstein (that originally was broadcasted by the Czech Radio) that now is preserved on piqlFilm


National Archives of Mexico


National Archives of Brazil

National Archives of Peru


National Museum of Norway


National Library of Hungary

Norwegian Health Archive

The world's repository for open source software

Taj Mahal

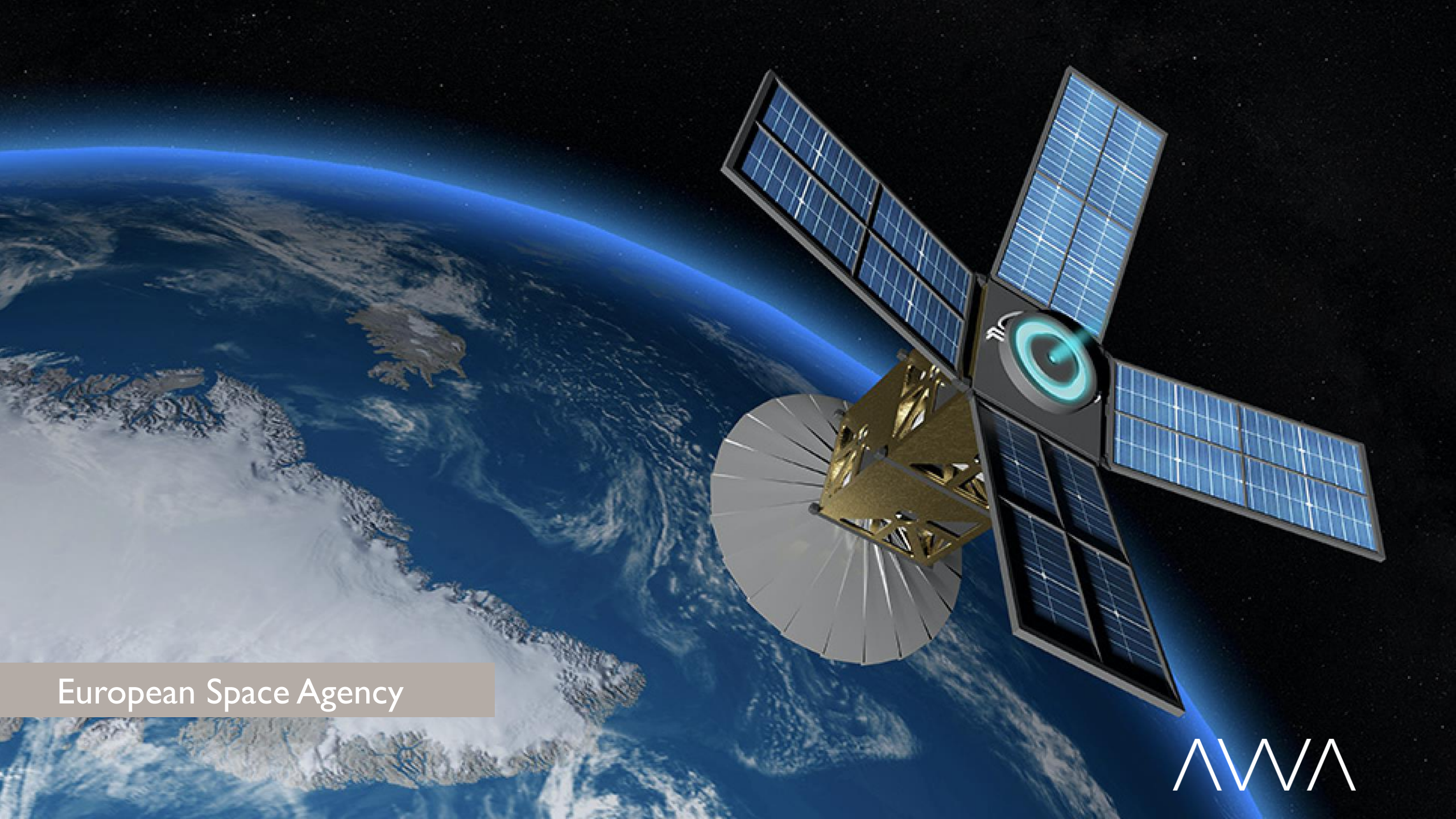
National Museum of Brasilia

Rembrandt's The Night Watch

Gutenberg Bible

Higgs Boson scientific breakthrough (CERN)

Architectural design of the Guggenheim Bilbao


European Space Agency

Svalbard Global Seed Vault

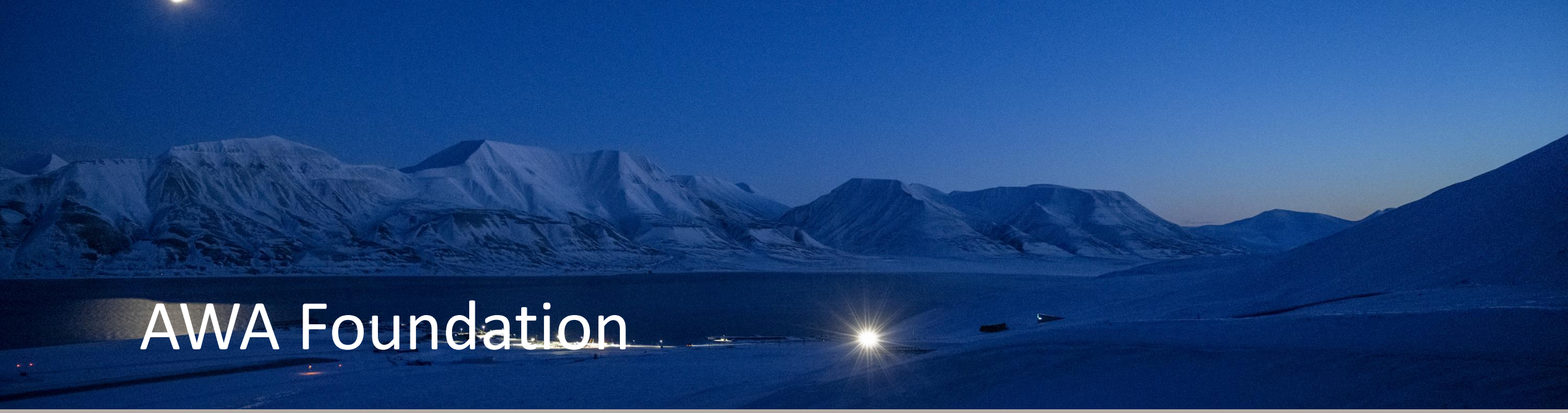
The greenest data storage solution there is

AWA Foundation

Piql has now decided to convert AWA into a **self-owned, not-for profit foundation** with the main purpose of protecting the clients' data into perpetuity.

AWA Foundation

- To secure that AWA gets eternal life to protect the clients' data, thus giving the necessary confidence and trust in AWA
- That AWA shall be a non-profit institution
- To ensure that AWA shall be independent of commercial companies
- To ensure that AWA can never be sold, e.g. to someone that does not have the same intentions



AWA Foundation

- To ensure control of what AWA shall be and for whom it shall be
- To build capital to be able to contribute economically to those that cannot afford to protect their irreplaceable memories for the benefit of future generations
- To ensure that AWA remains an environmentally friendly institution
- To ensure that AWA shall be also for the benefit of Svalbard and the local community in Longyearbyen

- We are now actively seeking co-founders.
- The intention is to engage the co-founders to define the detailed purpose of the AWA Foundation.
- The ambition is to raise a minimum capital of EUR 50 million to secure the AWA Foundation eternal life.

Do you want to join?

Protecting World Memory