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EIC INNOVATION PROCUREMENT PROGRAMME

DATANA DNA Data Storage
case study

DATANA

by BioSistemika

with the support of

REPUBLIC OF SLOVENIA
MINISTRY OF DEFENCE

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PILOT: BioSistemika d.o.o. & Ministry of Defence of the Republic of Slovenia

DATANA DNA Data Storage (DNAmmo) | Security, Defence, and Long-Term Data Archiving

100%	0% LOSS	-46°C to +71°C	0 WATTS
DATA RETRIEVAL ACCURACY	**ZERO DATA CORRUPTION**	**TEMPERATURE RESILIENCE**	**ZERO ENERGY AT REST**
Complete error-free recovery of encoded digital files from biological DNA molecules	No data loss or degradation across full encoding, physical storage, and decoding cycles	Passed extreme thermal cycle stress testing meeting military equipment standards	Requires no electrical power or active cooling while storing data long-term

PILOT PROFILE

EIC Awardee: BioSistemika d.o.o. (DATANA Initiative)

Solution: DATANA DNA Data Storage (DNAmmo)

Partner: Ministry of Defence of the Republic of Slovenia

Testing Ground: Stand-alone, air-gapped defence testing environment evaluating military archives and field-durability stress testing

Sector & Challenge Focus: Security, Defence, and Long-Term Data Archiving

The Challenge

National security organisations generate critical historical, operational, and administrative records that must be preserved securely for decades or centuries. Traditional digital storage media—such as magnetic computer tapes, hard disk drives, and cloud data servers—suffer from digital decay. They require continuous electrical power, constant air conditioning, and expensive hardware replacements every 3 to 10 years. Furthermore, electronic storage media remain vulnerable to digital security threats, physical degradation, and severe electrical power surges.

The Solution

DATANA DNA Data Storage is an offline, zero-power data archiving system. It converts digital binary computer code (ones and zeros) into biological Deoxyribonucleic Acid (DNA) molecular sequences (using the four natural chemical building blocks: A, C, G, and T). The synthetic DNA strands are chemically protected inside solid, air-tight capsules. The biological medium can preserve massive volumes of data for thousands of years without electricity, cooling, or maintenance, while remaining completely immune to digital security breaches and electromagnetic pulse damage.

Objectives

The trial aimed to demonstrate that sovereign defence documents can be reliably converted into synthetic DNA, stored safely, and recovered with 100% accuracy. The Slovenian Ministry of Defence wanted to evaluate

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whether biological storage is a practical solution for long-term archives and reduce technical uncertainty before participating in international defence technology initiatives.

Constrains

Due to strict national security rules, live sensitive networks could not be connected directly to early-stage laboratory equipment. The pilot used representative unclassified historical founding treaty documents. The physical capsules also had to undergo rigorous temperature testing to verify that they can survive harsh field conditions.

Performance

The system successfully encoded, stored, and recovered the digital files with 100% accuracy and zero data loss. The encapsulated DNA samples survived cyclic temperature shock testing ranging from minus 46 degrees Celsius to plus 71 degrees Celsius without any structural damage. The pilot met all four project performance targets, proving that biological DNA storage can preserve critical records with zero power consumption.

Partner Operational Improvements

Total risk reduction for long-term archiving, zero electricity consumption for stored archives, and complete security against digital and electromagnetic threats.

PILOT ON VALIDATION

Full commercial installation awaits scaling up automated reading and writing speeds to 1 Gigabyte per day (reaching Technology Readiness Level 5). The technology is being spun out as an independent business entity, with follow-on validation planned under international innovation frameworks.

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