



# 1135-B: Implementing state-of-the-art storage facilities for One Health biobanking in Norway

Øivind Øines & Kristin S. Pettersen, Norwegian Veterinary Institute  
oivind.oines@vetinst.no

## INTRODUCTION

The Norwegian Veterinary Institute (NVI) finalized implementation and take-over of an automated freezer for storage of biological samples in February 2024. This is one of the first (public) automated (-80°C) freezer units established for biobanking of animals and environmental samples in Europe. NVI is a public-sector research institute with a particular focus on aquatic and terrestrial animal health, animal welfare and sustainable bio-production. The NVI mission includes national and international reference laboratory functions, and a wide range of international activities with more than 100 ongoing research and diagnostics projects in 2024. These activities are funded by the Ministry of Agriculture and Food, Ministry of Trade Industry and Fisheries, and national and international research funding agencies, including EU programs. NVI acknowledge the importance of professionalizing biobanking and investing in state-of-the-art storage facilities for biological samples.

## METHODS

The biological samples in the NVI collections includes laboratory preparations of strains of microorganisms, preserved and processed samples of blood, prepared aliquots of DNA and RNA derived from various environmental or animal tissues from terrestrial and aquatic sources. NVI's sample portfoglio include more than 250 separate biological collections, which have been stored in different formats, for different purposes. As a consequence, the automated sample storage that was selected had to allow storage of many formats. NVI selected the BiOS system from Hamilton Company. This system can accomodate for a range of 10 different labware, some that can be individually stored and retrieved (cherry-picking) and some that can only be retrieved on rack level (fig 1). NVI's automated biobank has the overall capacity to store an estimated 3.5 million samples (as calculated per 1 ml tubes).

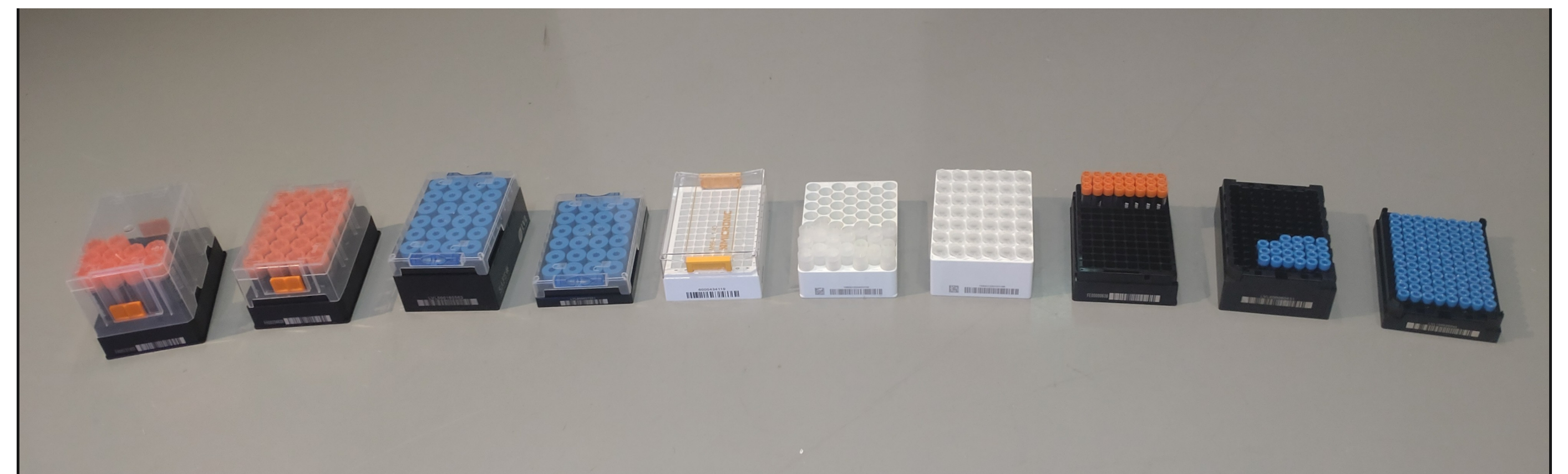
## RESULTS

NVI recieves annually ca 200 000 samples to serve its diagnostic mission and disease outbreak investigation within food safety and animal health. Approximately 50 % of these represents surveillance samples, from aquatic or terrestrial sources for the purpose to monitor the presence of contaminants or pathogens causing animal diseases or zoonoses (Årsmelding, NVI 2023). Of these ca. 50k samples arrive annually from industry for the same purposes, with another 50k samples for various diagnostic enquiries, export/import control or other investigations on behalf of the Norwegian Food Authority, or other government agencies. In addition to the above 200k samples, another undisclosed volume of samples are collected for research purposes in a large number of projects, make up an even larger inflow of biological samples to the institute. These samples should be regarded as a resource which should be curated for purposes of future research and diagnostic purposes and to propagate human and animal health. The Biobank initiative at NVI, and the implementation of this automated samples storage is an important step to increase the reusability and value of these biological collections.

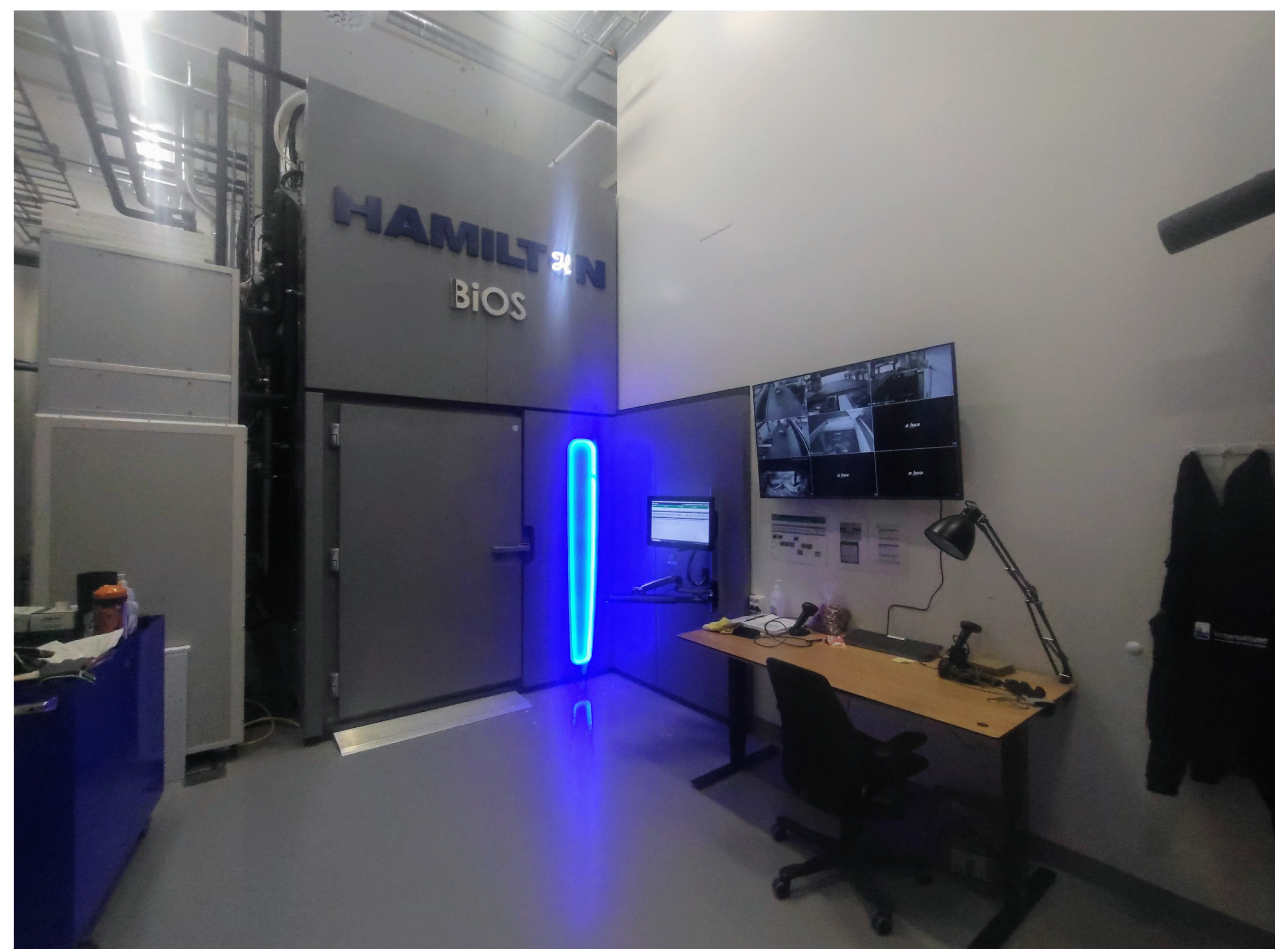
## CONCLUSION

**NVI work systematically to implement the FAIR-principles (Findable, Accessible, Interoperable and Reusable) for future biobanking and research activities at NVI. NVI perceives biological samples as a non-renewable resource, valuable for sustainable use of research funding and crucial for future needs and emerging research questions. The presented automated sample storage is one step to promote these values in its daily operation.**

Interdisciplinary collaboration, enabling efficient sharing of samples and access to high quality and larger sample collections are enablers for future research in **One Health**. The Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) has defined that One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. Guided by the UN's sustainable development goals, we welcome potential collaboration and interest in our automated biobank and sample collections, with the aim of developing new partnerships, and relevant and applicable knowledge and improve our technical competences.



Picture 1. Overview of 10 different labware included in the Hamilton BiOS L6 at the Norwegian Veterinary Institute. Labware include LVL and FluidX as vel as legacy collections of Micronic, Eppendorf and different 1-2 ml cryotubes.



The installation of the automated sample storage BiOS L6 from Hamilton Company at the Norwegian Veterinary Institute.

## Summary

- Biological samples can be hard, expensive or impossible to re-sample due to their uniqueness
- Although the F.A.I.R (FINDABLE, ACCESSIBLE, INTEROPERABLE and RE-USABLE) principles was made with Scientific Data Management in mind, we believe the same principles could be applied to Biological samples
- Technological solutions that enable the storage and facilitate its reuse is an important resource for sustainable research and diagnostic development
- Implementations of Automated Sample Storage solutions, such as the BiOS -80C automated freezer is one crucial step for NVI to implement solutions that enable F.A.I.R practises on biological material

## References

- Veterinærinstituttets årsrapport 2023 Rapport 12/2024 ISSN 1890-3290
- FAIR guiding principles for scientific data management and stewardship, FAIR Principles - GO FAIR (go-fair.org)