

## Final Report Summary

### Quantum Dot VECSEL Feasibility Study

# SOLUS

SOLUS Technologies Ltd  
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The purpose of this feasibility study was to determine if it is possible to place quantum dots (QDs) in Vertical External Cavity Surface Emitting Lasers (VECSELs) structures. The programme was a collaboration between Solus Technologies Limited and the University of Glasgow.

The Molecular Beam Epitaxy (MBE) Research Group in Glasgow has thirty years experience with growth and characterisation of III-V semiconductors, and has a well-established and world renowned capability in the growth InAs quantum dot structures.

Solus Technologies Limited is a Glasgow based company specialising in the commercial development of VECSELs and other solid state laser technologies. It has a team of industry professionals and is funded by a mix of public and private sector investment.

Through the T-TOM initiative, an interdisciplinary programme was created based upon these complementary skill sets. The programme aim was to determine if InAs quantum dots could be incorporated into VECSELs and if so, what level of performance could potentially be achieved.

Growth factors have been determined and aligned with the design process, and a VECSEL structure has been produced that meets the required reflection and resonance conditions. The device has been inserted into a laser cavity and has shown some promising emission characteristics, and is undergoing further investigation.

The T-TOM investigation has resulted in progress towards an optically pumped Quantum Dot VECSEL and has opened the door to a potentially key customer/supplier relationship. Further collaborative activity is currently being considered.

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