

Taking Quantum to Another World



Teledyne e2v has over 30 years of heritage, putting advanced and technically demanding instrumentation into space. We have sent instruments to every planet in the solar system, and have never had a failed mission in space.

Over the last four years, Teledyne e2v have been leading Europe's efforts to industrialise quantum systems for space. Quantum systems in space offer a new generation of extremely sensitive sensors for measuring gravity, acceleration, rotation and time.

CASPA (Cold Atom Space PAYload) is Teledyne e2v's flagship quantum space programme. This 6U CubeSat is a fully automated unit that will generate and test cold atom systems in space. As with all of our space systems, it has been through a rigorous process of modelling and testing to ensure that it can survive launch and work in space. We are actively exploring launch opportunities for CASPA.

As part of the next phase of quantum instrumentation for space, Teledyne e2v is working with partners to develop mission and payload concepts for future earth observation missions.

QUANTUM IN SPACE

With our expertise in both space and quantum technology we are exploring space based quantum instruments for the following applications:

- » **Earth Science:** Ocean currents, ice sheet monitoring, aquifer depletion & atmospheric density
- » **Exploration:** Water reserves for mining, oil & gas exploration & geothermal energy sources
- » **Navigation:** Inertial sensing, frequency references (atomic clocks) & attitude detection
- » **Secure Communications:** Ground receivers for quantum key distribution for ultra-secure communication networks.



Model of CASPA showing solar panels deployed

CASPA FEATURES

- » Payload mass: <4 kg
- » Payload volume: 4U (20 mm x 20 mm x 10 mm)
- » Functionality: Autonomous production of Cold Atoms (MOT)
- » Engineered and tested for space

PHYSICS PACKAGE

- » Ruggedized miniature vacuum chamber
- » Pressure in chamber ~10⁻¹¹ mbar
- » Ready to generate MOTs
- » Integrated atom dispenser, ion pump & coils
- » Space suitable



EXPERTISE

- » Space proven > 5,000 instrument-years in orbit
- » Concept development through to full systems design
- » Supply at component to full system level
- » Custom UHV system design & manufacture
- » Low SWAP quantum systems
- » Complete design, assembly, integration & test capability for space
- » Product assurance

Assembled engineering model of CASPA



Custom solutions for customer specific requirements available.
Email us at quantum@teledyne-e2v.com