

CALL FOR PARTICIPATION IRVA PROJECT

AUTOMATED PRECISION ASSEMBLY OF LARGE SYSTEMS (APLAS)

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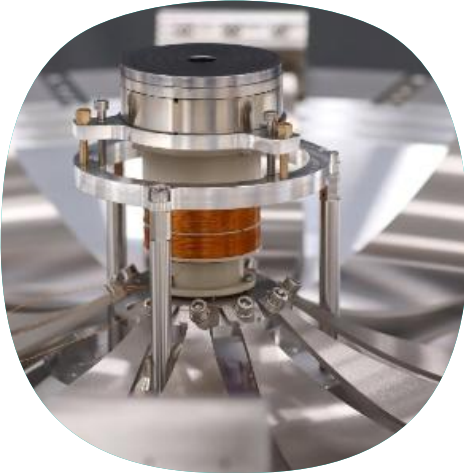
MAARTEN WITTERS – ALEXANDER DE COCK



EINSTEIN TELESCOPE -ET-PATHFINDER

INDUSTRIAL STATE-OF-THE-PRACTICE

PRECISION ASSEMBLY OF LARGE SYSTEMS IS MAINLY MANUAL



Adjustment time-consuming

- Multiple elements to be tensioned and adjusted simultaneously
- Extensive tuning required



Moving large components complex

- Manually operated overhead cranes, aerial platforms add complexity in e.g. clean environments



Limited Design for Assembly

- Implicit assumption that human presence will fit/fix the assembly
- Unsupervised use of assembly instructions





PROJECT GOAL

Development of a (semi)automated assembly solution for specific large precision assembly processes

Offering the following **benefits**:

- Automated assembly and tuning will **reduce the need for skilled operators**
- **Higher quality** of the assembly, **less errors**, **higher traceability** of the assembly process
- **Less impact** on conditioned environments
- Inclusion of **Design-for-Assembly enables automation**, reduces errors, etc....

Demonstration in non-conditioned environment

If required by the application transfer to cleanroom feasible by design

Specific KPI's will be defined together with industrial partners

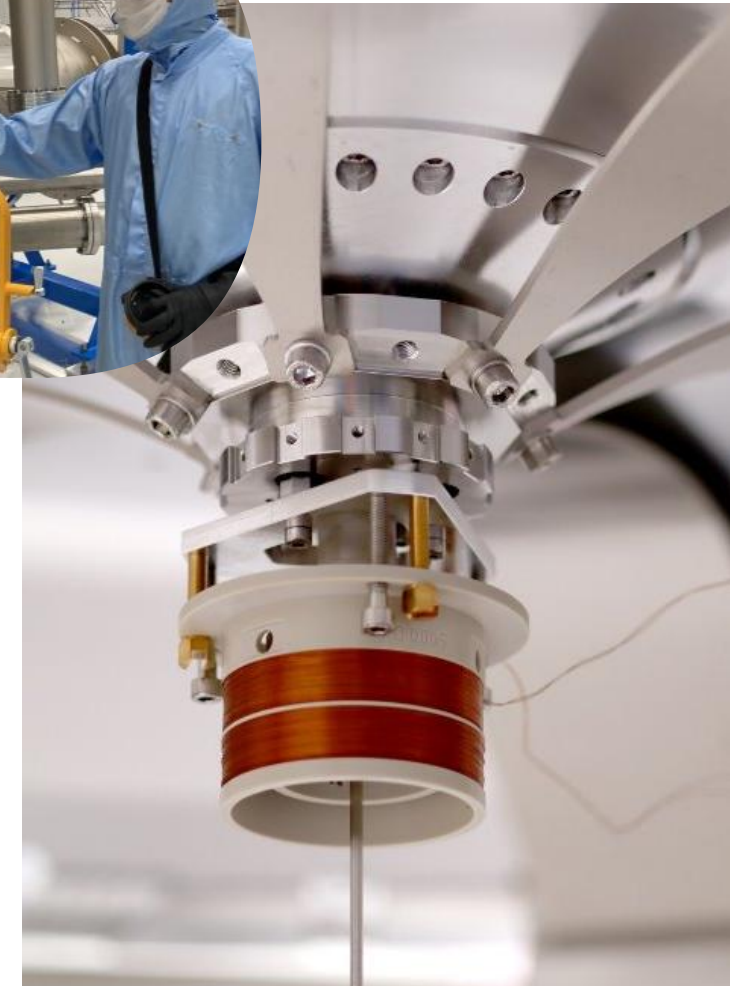


USE CASES

- Einstein Telescope
- Non-ET use cases with similar requirements
- Selected precision assembly research demonstrators
- Advanced vibration isolation system components



Inverted Pendulum (IP)
assembly



Geometric Anti Spring (GAS)
constrained assembly and tuning

EINSTEIN TELESCOPE

THIRD GENERATION GRAVITATIONAL WAVE DETECTOR



In the Meuse-Rhine region, on the borders of B/NL/D



30 km of tunnels at a depth of 250m



10x more sensitive than present detectors



3 billion euro investment

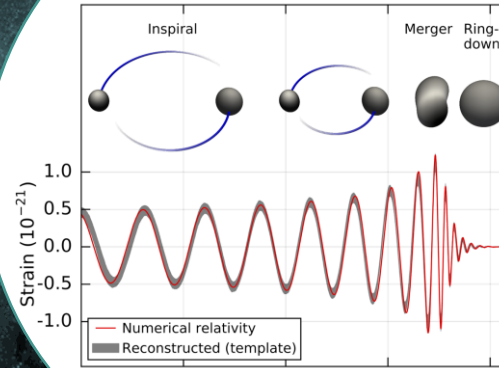
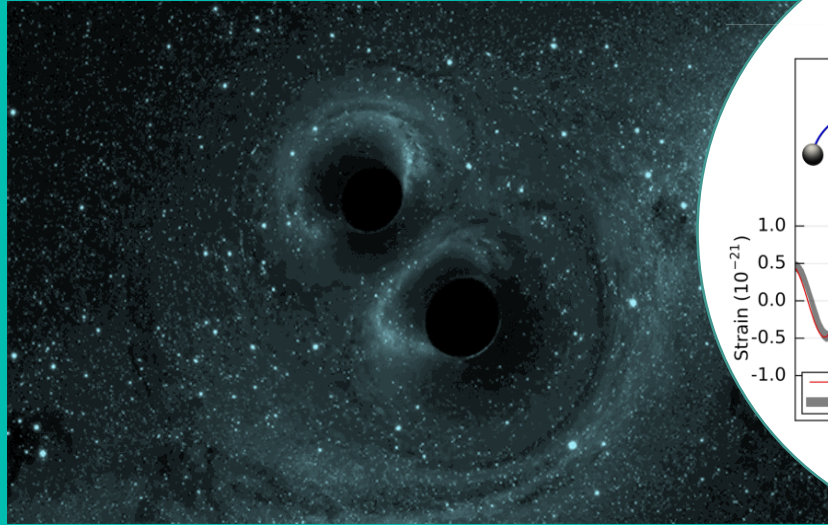


Potentially 1500 - 20.000 new jobs

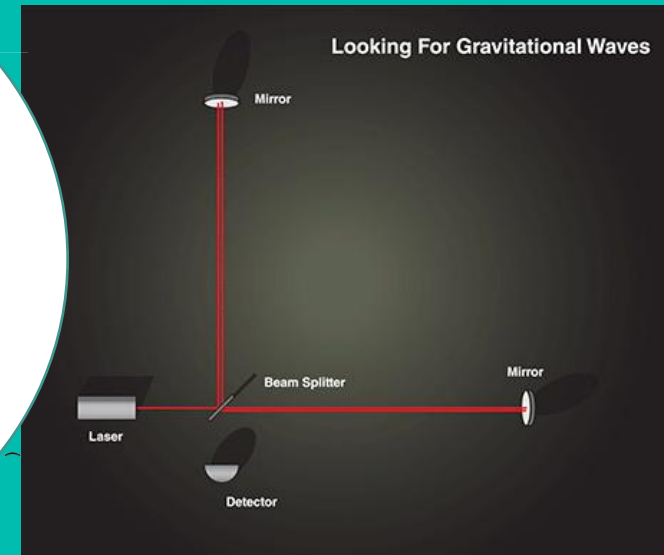


DETECTING GRAVITATIONAL WAVES

RIPPLES IN TIME-SPACE



LASER INTERFEROMETRY



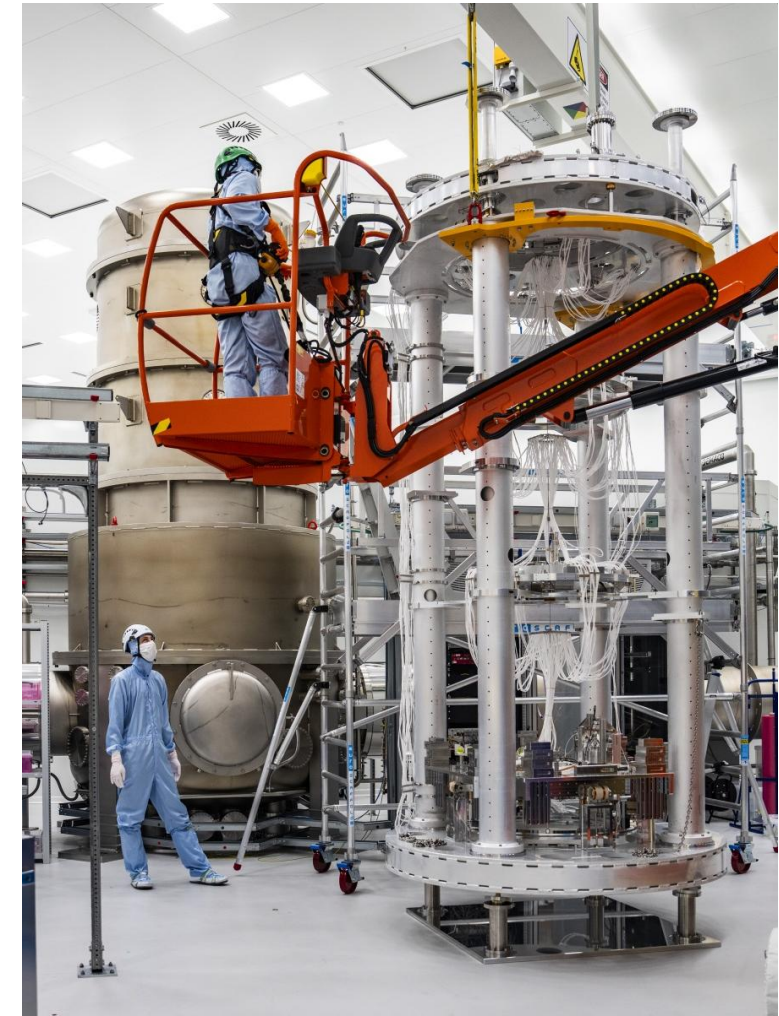
ROBOTIC ASSEMBLY OF VIBRATION ISOLATION TOWERS

Challenge:

- manual assembly of 1 prototype tower (3 isolation stages) takes **4 months**
- final towers will be 2x higher with **7 isolation stages**
- the Einstein Telescope will contain more than **300 towers**
- they need to be assembled in **tight cleanroom space**

Solution:

**Design-for-Assembly
Automated Precision Assembly**





WHO SHOULD BE INTERESTED?



Manufacturing companies

Design and (semi-) automated assembly of precise or large products (machinery, optical systems, drivetrains, etc.)



Tech & service providers

Robotics system and auxiliary suppliers
Robotic system integrators
Design services



Companies willing to be part of ET-ecosystem

Design
Automation
Manufacturing





INTERESTED?

Get in touch

Automated precision assembly of
large systems

