



Driven by innovation

JPE in Big Science

Innovating the future by unraveling the mysteries of science

14-10-2024  Algemene Big Science industrie middag

Maurice Teuwen



Agenda

- ◆ **Short introduction**
- ◆ **Involvement in Big Science**
 - ◆ Configurable slit mask for Canary Telescope instrument
 - ◆ Fast moving mirror for ELT instrument
 - ◆ Vibration isolator for gravitational wave detection
- ◆ **Take-aways**

Development partner of high precision mechatronic systems

We develop custom systems for high precision applications in high-tech machinery and scientific instrumentation



Our field of work



High-Tech OEM

Scientific Research

Partner in development of high precision mechatronic systems

Semicon
industry



High-tech
automation



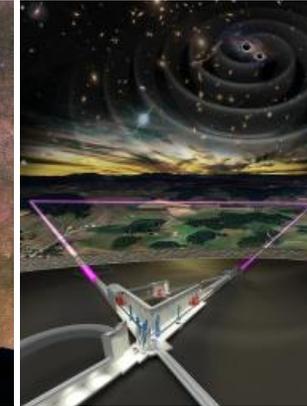
Life Science &
material research



Infra Red
Astronomy



Gravitational
waves detection



Quantum
physics



Industry

Research institutes

ASM  ASML

THALES

VDL 

itec

ThermoFisher
SCIENTIFIC

SCANLAB
innovators for industry


IONQ

 SAFRAN
Sagem

HZB Helmholtz
Zentrum Berlin

KAIST

NIST
National Institute of
Standards and Technology



ASTRON

Netherlands Institute for Radio Astronomy

SLAC NATIONAL
ACCELERATOR
LABORATORY



JPL

Jet Propulsion Laboratory
California Institute of Technology

MAX-PLANCK-GESELLSCHAFT

These companies represent a sample of our extensive client base

◆ Gran Telescopio de Canarias

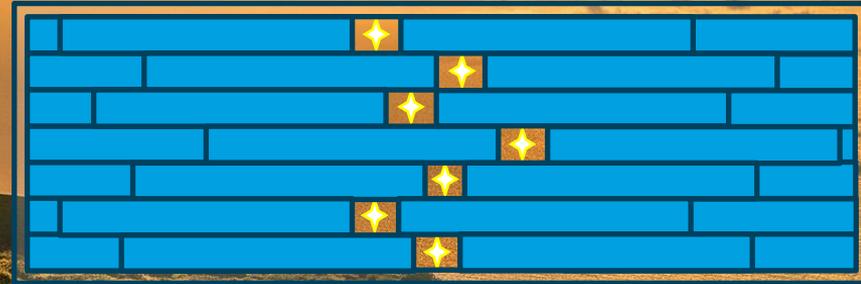
La Palma – Canary Islands

◆ Development of a configurable slit

Tender project

Cryogenic instrument

110 moving elements, 200 mm range, micron precision





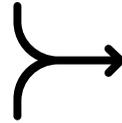
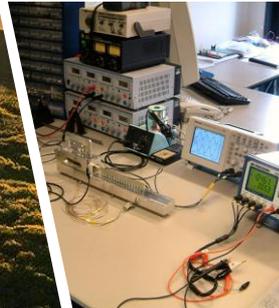
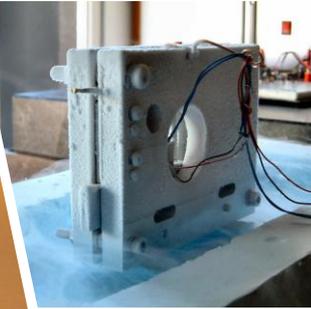
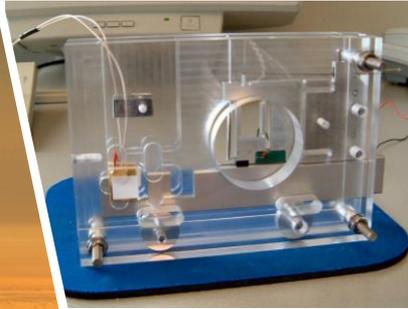
◆ Gran Telescopio de Canarias

La Palma – Canary Islands

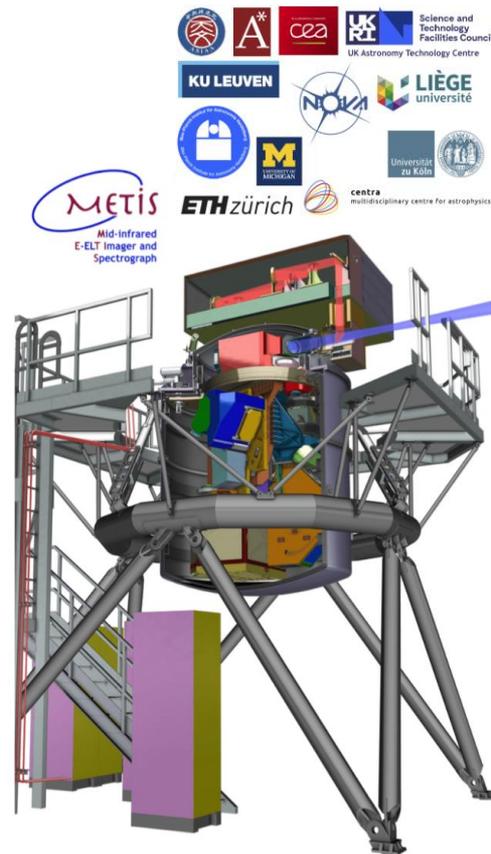
◆ No bidding party for tender

- ◆ Technology readiness lacking
- ◆ Mitigated by phased development
- ◆ Reinvolvement JPE
- ◆ Total project span 2007 ... 2017

JPE in Big Science - Gran Telescopio Canarias

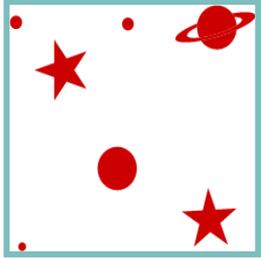


JPE in Big Science – METIS (ELT)

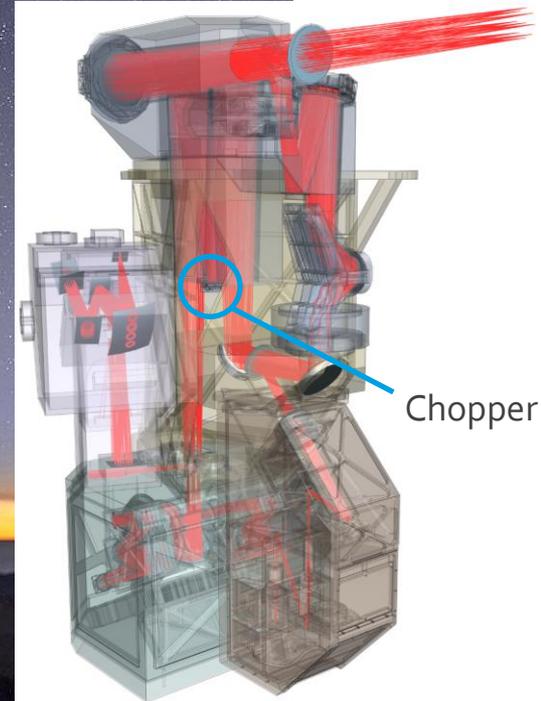


JPE in Big Science – METIS (ELT)

TARGET SKY

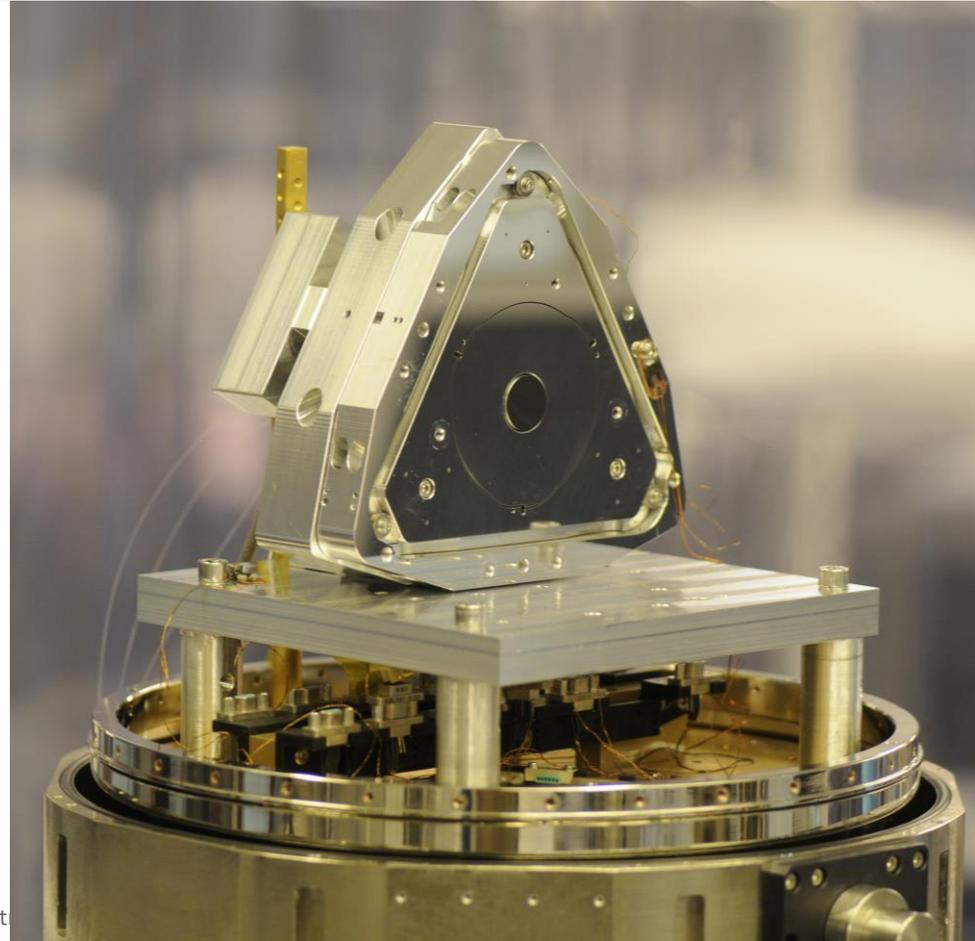


REFERENCE SKY



JPE in Big Science – METIS (ELT)

- ◆ **Demonstration programme**
 - ◆ 2010 – 2014
 - ◆ From spec to demonstrator
 - ◆ METIS assigned among first light instruments
- ◆ **From demonstrator to 'flight model'**
 - ◆ Requirements shifted
 - ◆ Design for robust operation
 - ◆ 2020 – ...



JPE in Big Science – Einstein Telescope



- ◆ **Pathfinder: Key area of investigation**
 - ◆ Vibration suppression needed for the extreme sensitivity of the instrument
- ◆ **JPE involved based on**
 - ◆ Proven track record on accurate positioning in vacuum and cryogenic environment
 - ◆ In house development of cryogenic positioners with nanometric resolution
 - ◆ Vibration challenges from customers in scientific research



ETTechnologies



EUROPESE UNIE
Europees Fonds voor Regionale Ontwikkeling
Mede gefinancierd in het kader van de respons
van de Unie op de COVID-19-pandemie.

provincie limburg



Ministerie van Economische Zaken
en Klimaat

OPZuid
Europees innovatieprogramma Zuid Nederland



www.JPE.nl



Maastricht-Airport, The Netherlands

<https://www.etpathfinder.eu/gallery/>

JPE in Big Science – Einstein Telescope

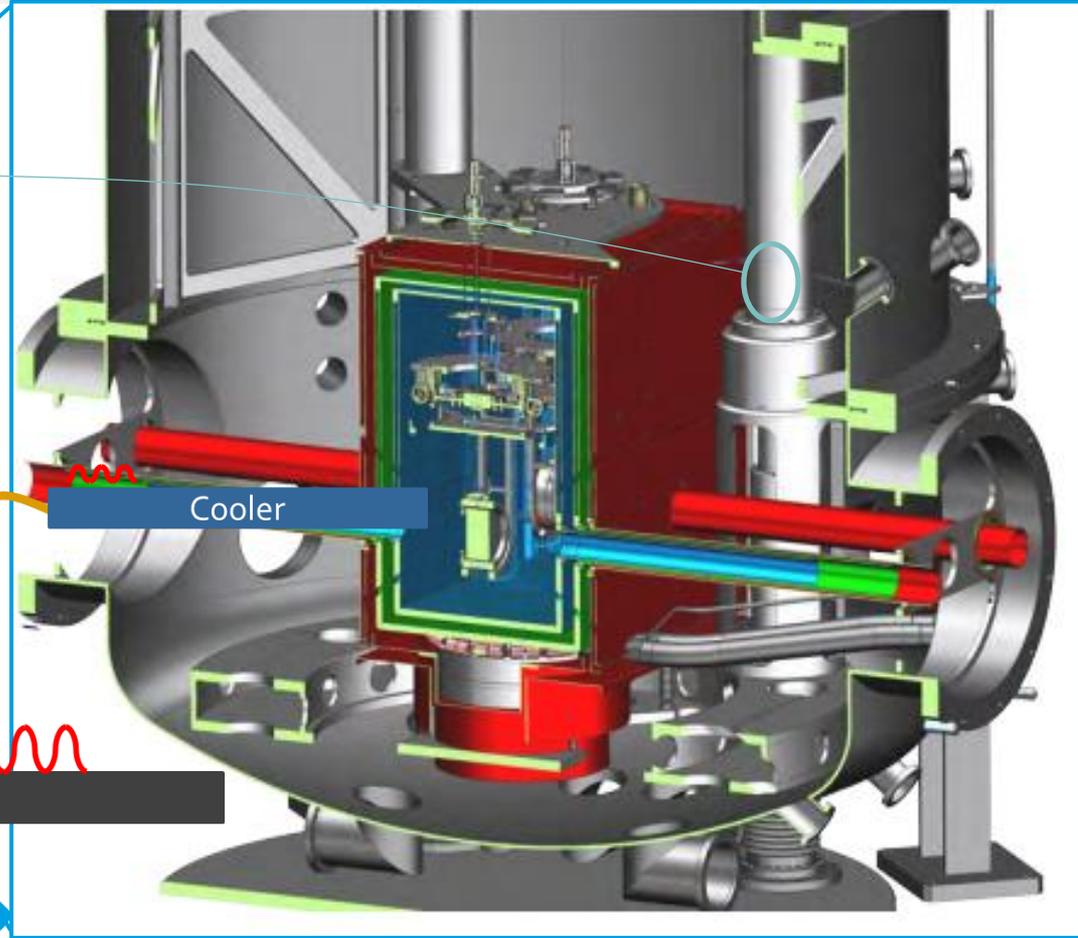


Mirror

Cold Finger

Vibration Isolator
payload table

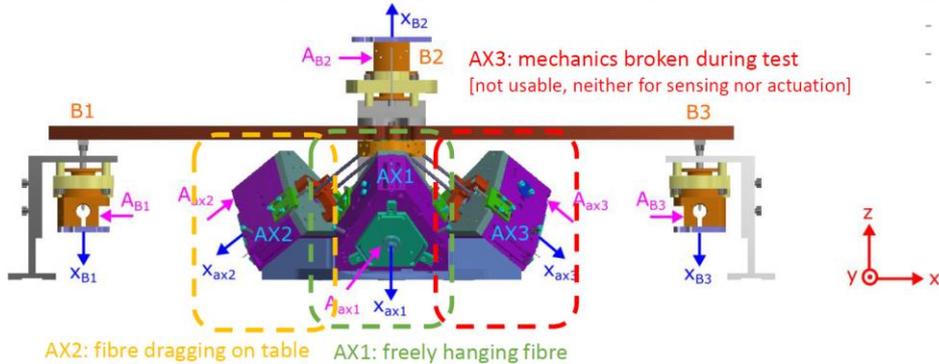
Floor



Cooler

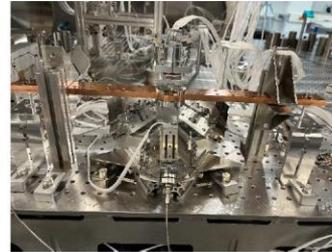
Setup status @AEI in June 2024

Goal of this slide show: preliminary plots and further analysis ideas



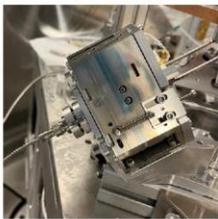
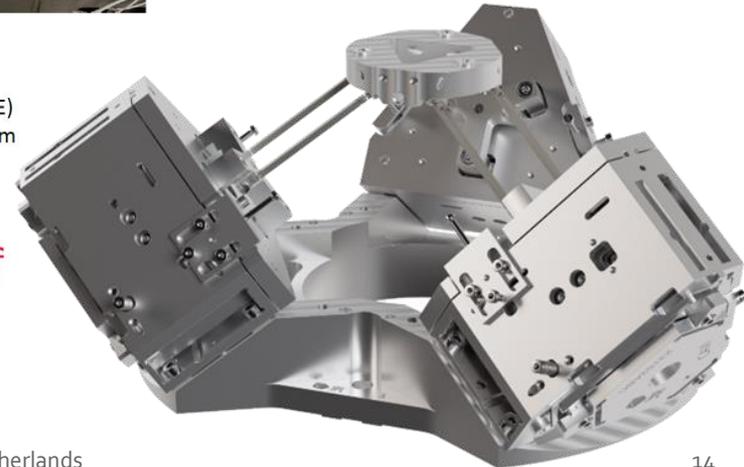
Tests in clean and quiet environment:

- integration into DAQ
- mechanical fine-tuning
- transfer functions
- noise characterization



Technical issues to be discussed:

- out-of-vac fibre issues (borrowed one from JPE)
- alignment tricky, even with old Attocube system
- one port of feedthrough (Attocube) broken
- purpose of attenuation connector at IDS?



Luise Kranzshoff
08-2024

Nikhef



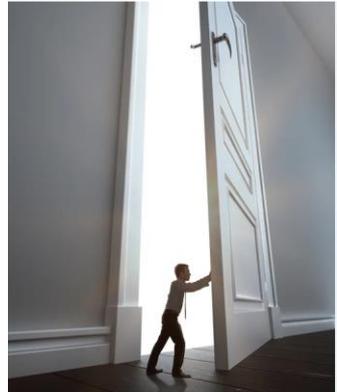
Maastricht University

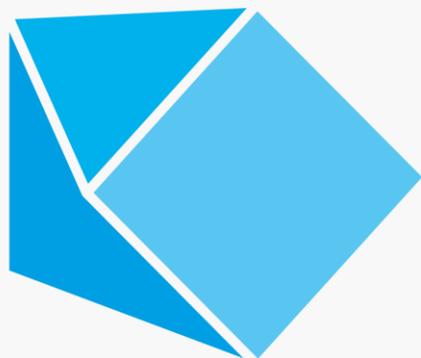
Take aways

- ◆ **JPE – ‘Driven by innovation’**
 - ◆ Rewarding to be involved in pioneering science
 - ◆ Rewarding to work in inspiring (academic) international setting

- ◆ **Involvement as SME is challenging**
 - ◆ “Tendering of technology development” → large risk for SME
 - ◆ Having a relevant key expertise is an enabler to open doors

- ◆ **Focus on research valorization**
 - ◆ Focus on science projects that benefit your own product or competence roadmap





JPE

Driven by innovation

Since 1991