

# *Project Review*



MPI für Physik  
München

*14.–15. December 2015*

*Report of the  
Mechanical workshop*



Thomas Haubold  
haubold@mpp.mpg.de



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# Overview

- *Employees*
- *Project reports*
- *New machines, new technologies*
- *Some statistics*



Thomas Haubold  
haubold@mpp.mpg.de

# Employees



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*4 graduated engineers, 5 certified engineers and one draftsmen are working at the engineering department*

*1 engineer from a temporary employment agency is supporting us in the AXION project*



Thomas Haubold  
haubold@mpp.mpg.de

# Employees



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*3 foreman and 16 technicians are working at the mechanical workshop, the fitter's shop, carpenter's shop and the storage*

*6 apprentices receive their mechanical education in our mechanical workshop*



Thomas Haubold  
haubold@mpp.mpg.de

# *Project Report*

*The mechanical department is involved in a lot of experiments, e.g.*

- *MAGIC, CTA / LST*
- *GERDA, GeDet*
- *ATLAS; MDT II, HEC II, SCT*
- *BELLE II*
- *AWAKE*
- *CRESST*
- *Future Accelerators*
- *AXION*



# *Project Report*

## *MAGIC*



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*The technicians of the mechanical department checked and serviced the MAGIC I and II telescopes in summer and performed repair works.*

*An automatic camera drying system has been mounted at MAGIC I.*



Thomas Haubold  
haubold@mpp.mpg.de

# Project Report

## CTA/LST



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*Mechanical design engineers are involved or designed following sub projects:*

- *Rail system*
- *Central pin*
- *Elevation drive and the elevation arch*
- *Interface plate*
- *Access tower*
- *Definition of interfaces e.g. foundation, cabling, access*



Thomas Haubold  
haubold@mpp.mpg.de

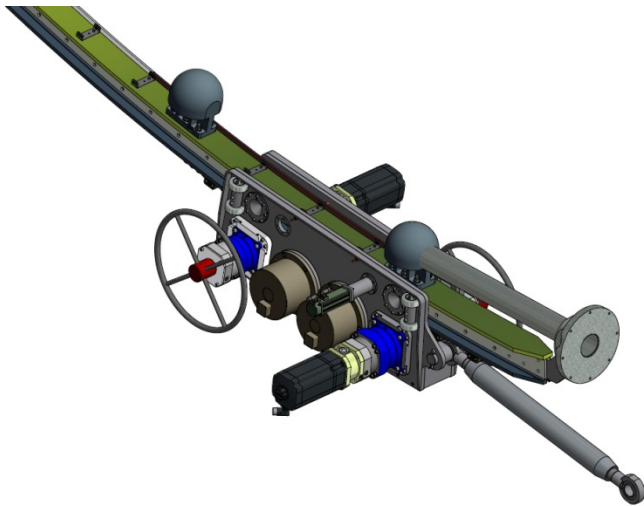
# Project Report

## CTA/LST

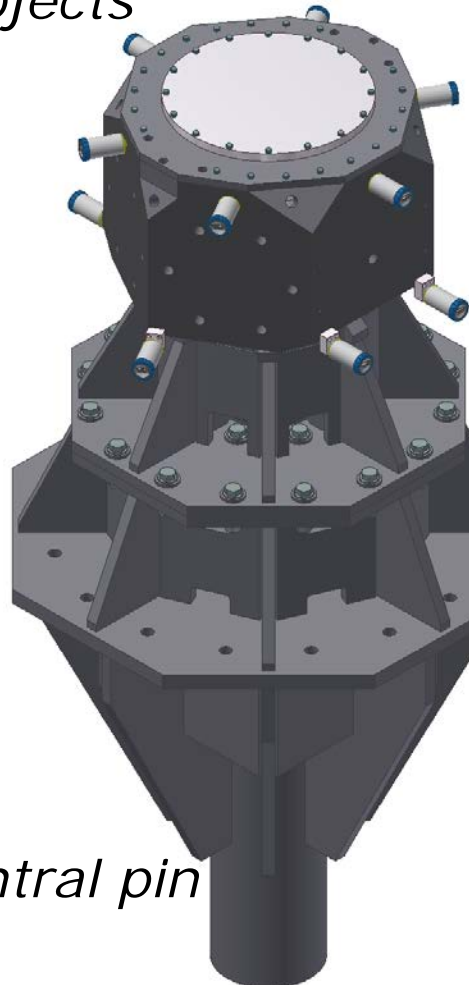


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*Examples for design projects*

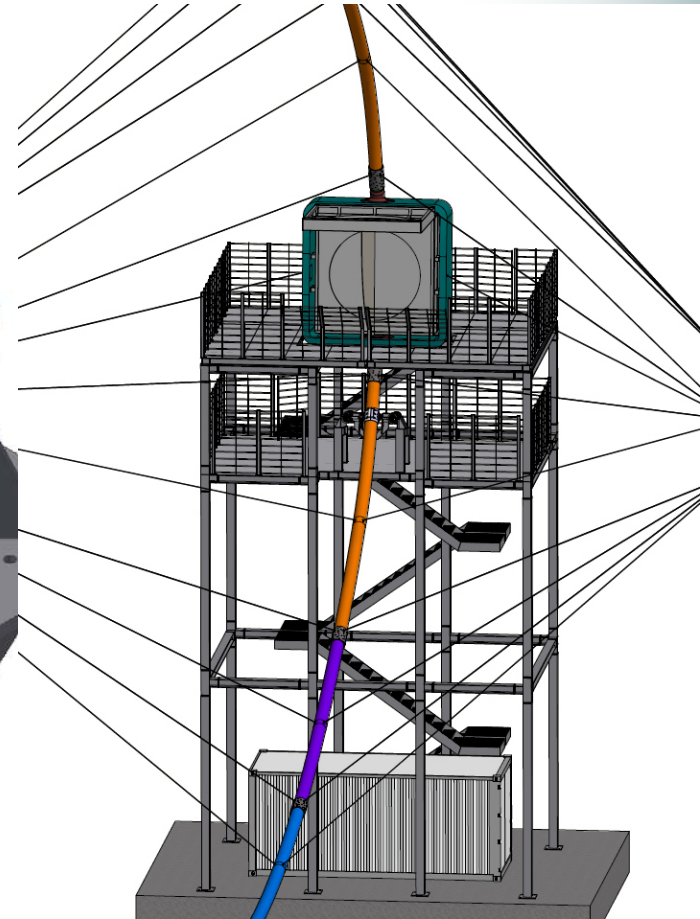


*Elevation drive*



*Central pin*

*welded structural component (4 tons)*



*Access tower*



Thomas Haubold  
haubold@mpp.mpg.de

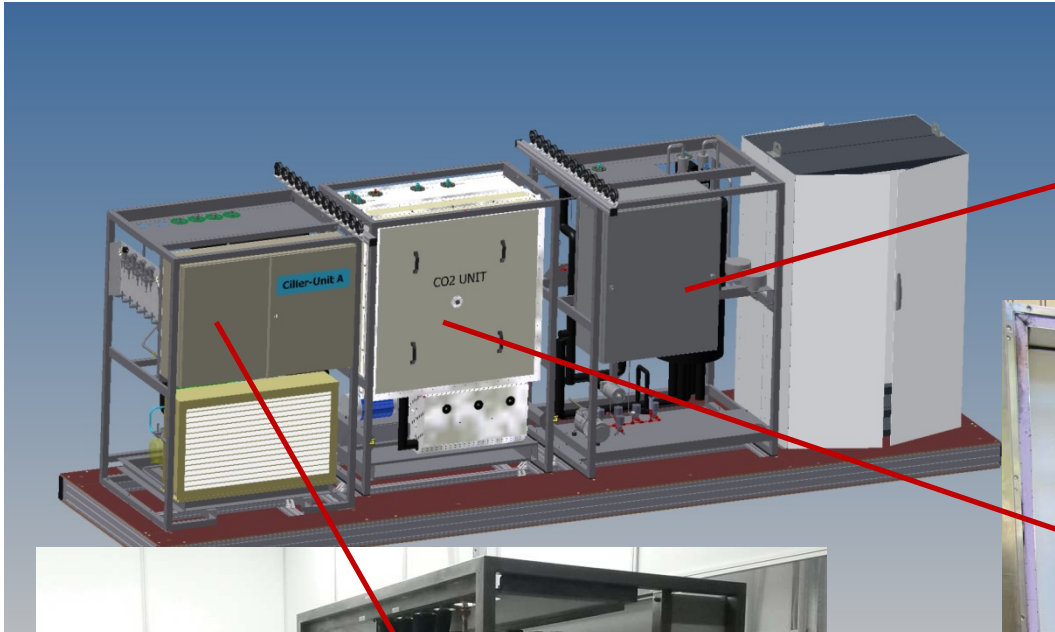


# Project Report

## CO<sub>2</sub> cooling



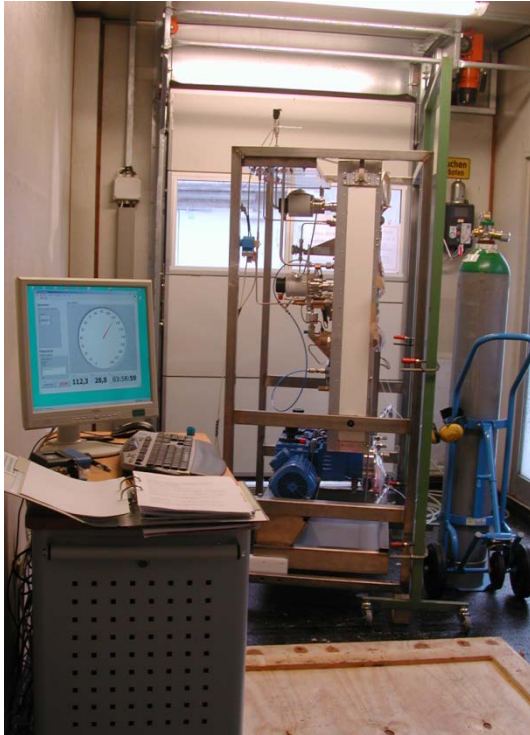
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haubold@mpp.mpg.de

# Project Report

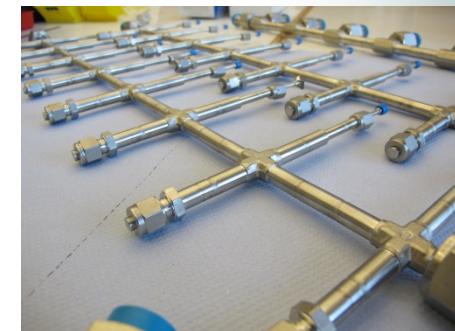
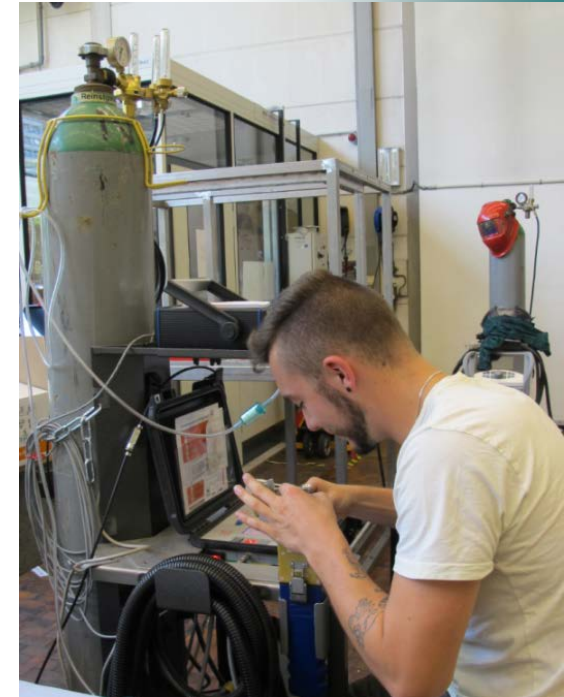
## CO<sub>2</sub> cooling



*After the first test, the complete assembly is tested with high pressure (160 bar)*

*All tubes are welded with orbital welding technology*

*All welded joints are tested by colour penetration method*



# Project Report

## ATLAS MDT II



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*after some starting problems, the production of the BMG chamber has started*

*Chamber*

*1*

*2*

*3*



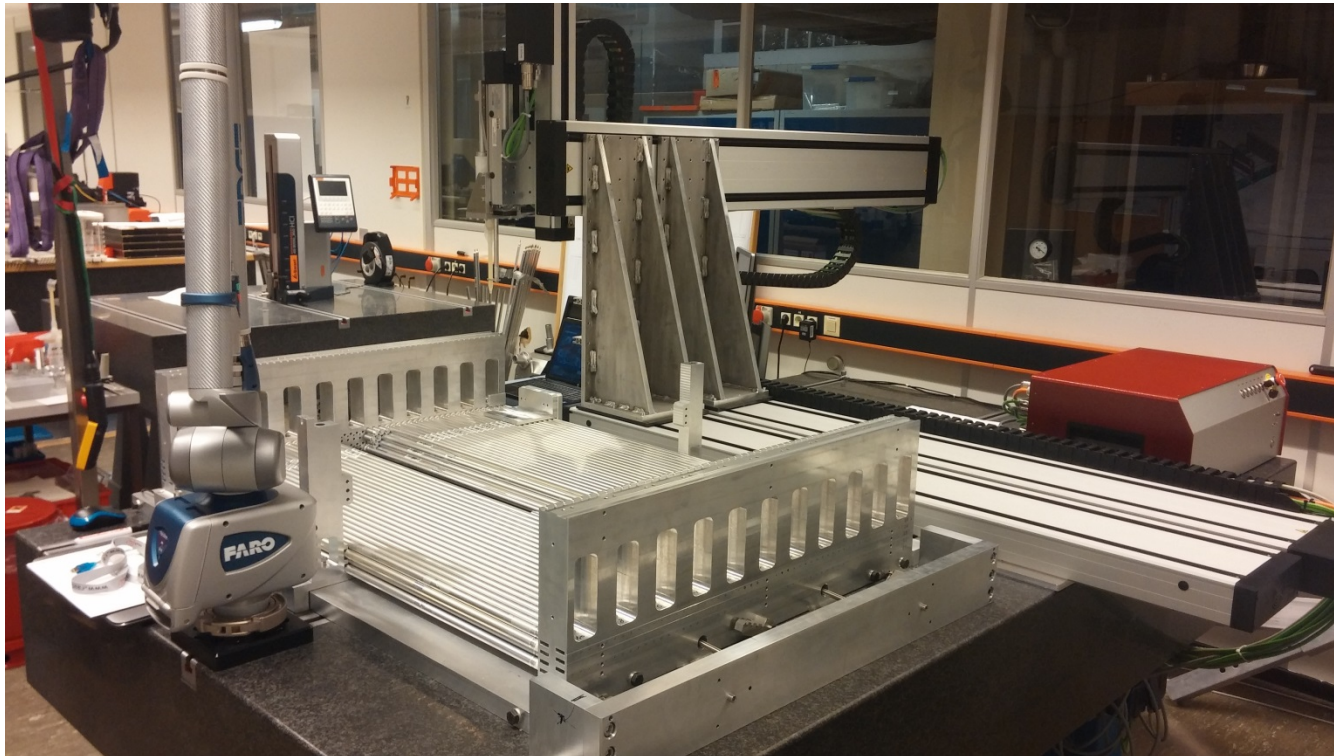
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haubold@mpp.mpg.de

# Project Report

## ATLAS MDT II



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*the gluing setup*

*after further optimization to the assembly procedure  
we reached the highest precision ever achieved*

[Video](#)

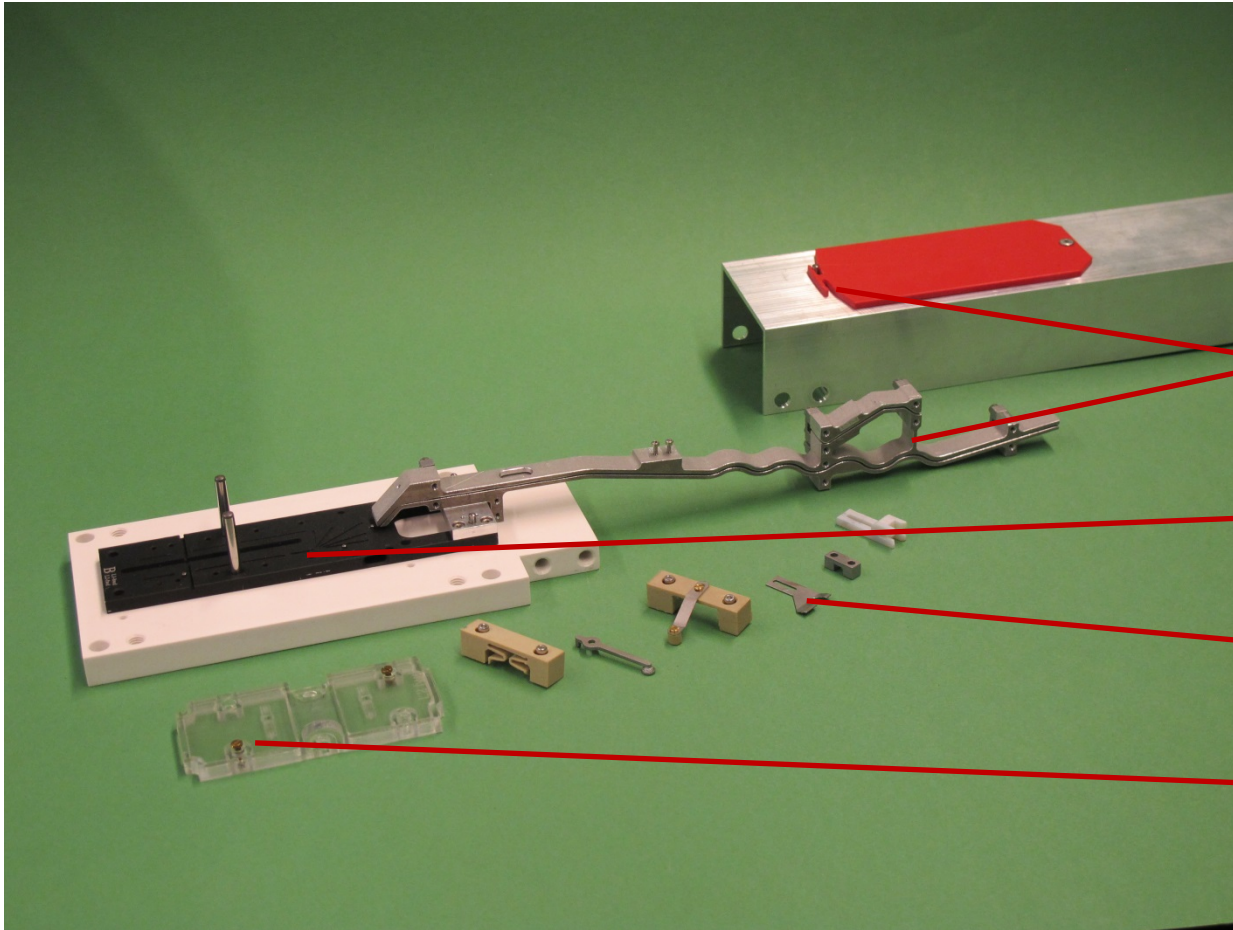


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haubold@mpp.mpg.de

# Project Report BELLE II



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*all parts show the new possibilities of our new machines*

*waterjet cutting*

*CNC milling*

*laser cutting*

*3D printing*

*an assembly fixture for the lader production*



Thomas Haubold  
haubold@mpp.mpg.de

# Project Report

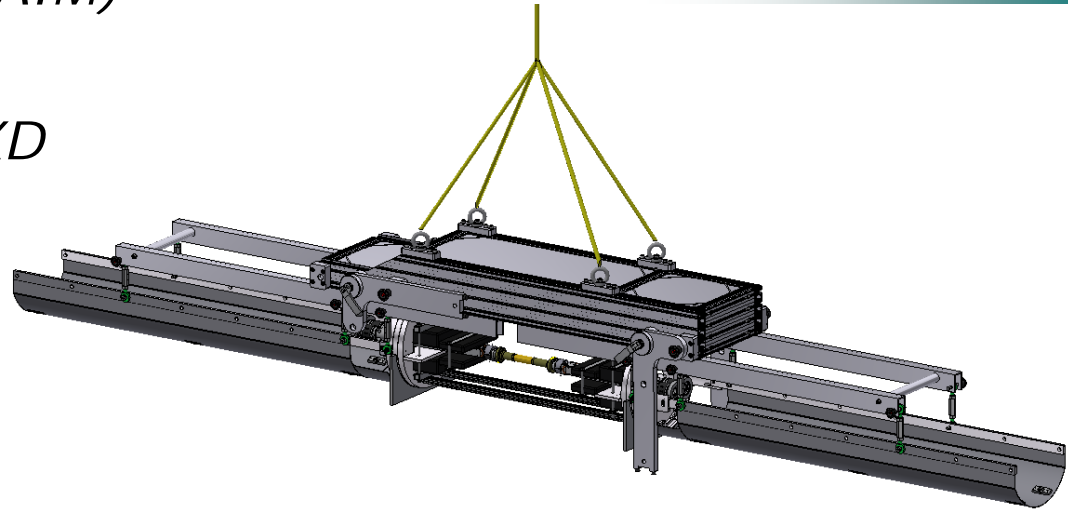
## BELLE II



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### *Alternative Installation Method (AIM)*

*The „mounting tubes“ and „cable trays“ for the installation of in VXD in the Belle2-Detector could be manufactured completely for the first time in our own work shop. Main advantages were a quick manufacturing period and a cost relief for the project.*



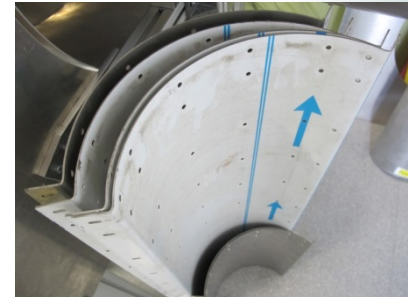
*Waterjet cutting*



*Round rolling*



*Bending*



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haubold@mpp.mpg.de

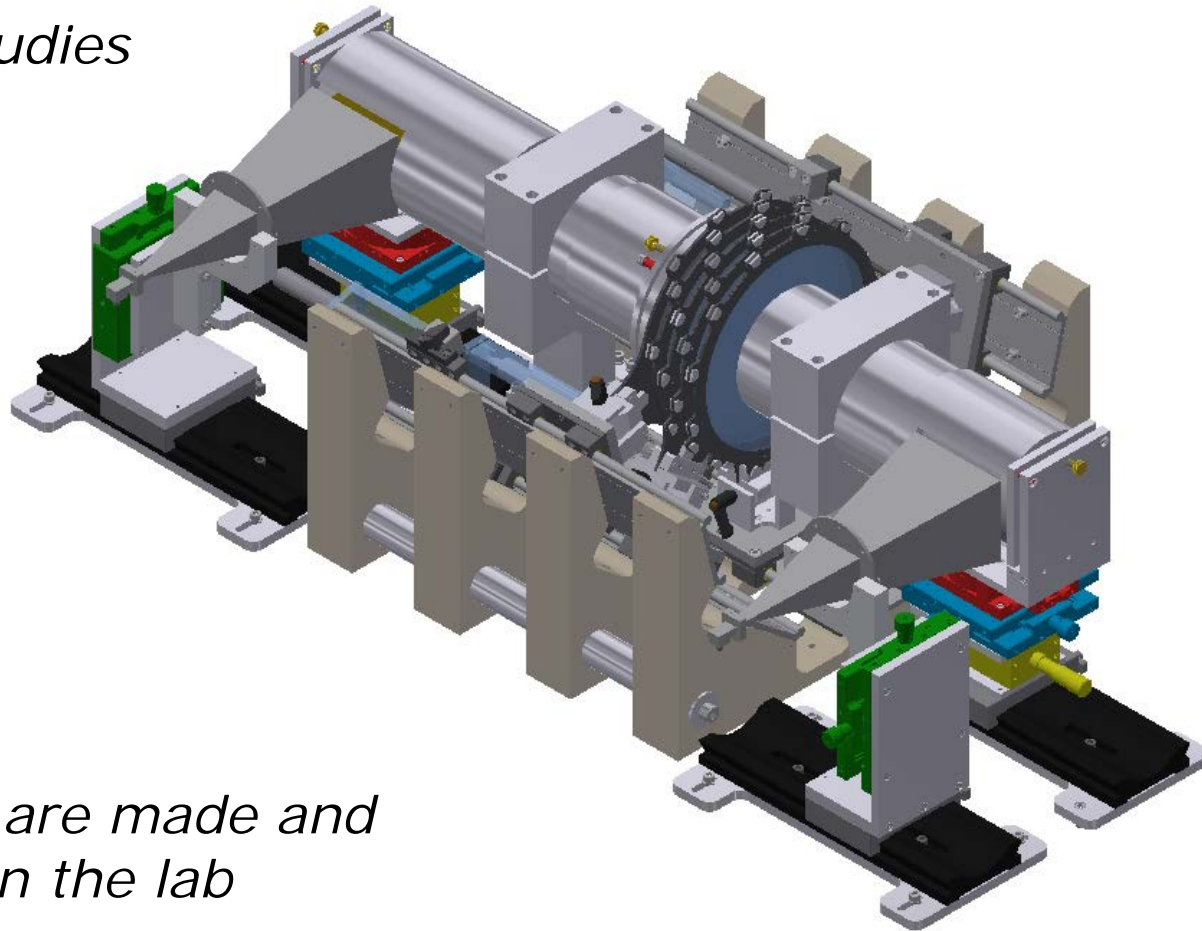
# Project Report

## AXION



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*Design studies*



*first parts are made and  
mounted in the lab*



Thomas Haubold  
haubold@mpp.mpg.de

# *Project Report*

*The mechanical workshop worked also for other projects, e.g.*

## *CRESST*

*Support the service work in Gran Sasso lab*

*Produced the prototype and the final version of the new detector holder (it was only possible with new CNC milling machine)*

## *MDT*

*Produced and assembled the GIF test equipment*

## *HLL*

*Produced and assembled a "dark box"*







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# *Project Report*

*The mechanical design office updated the CAD Inventor Software from version 2011 to version 2016 because the new CNC machines needed a new CAD/CAM software.*

*As part of the CAD update we installed also a new version of FEM software.*



Thomas Haubold  
haubold@mpp.mpg.de

# *new machines new technologies*

*Last year I presented  
this picture*

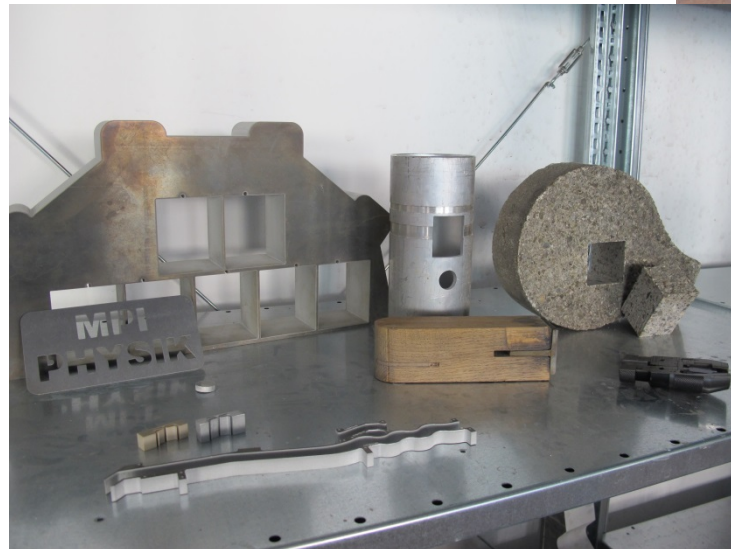


*and now*

*our new waterjet cutting  
machine was installed*



*some  
examples*



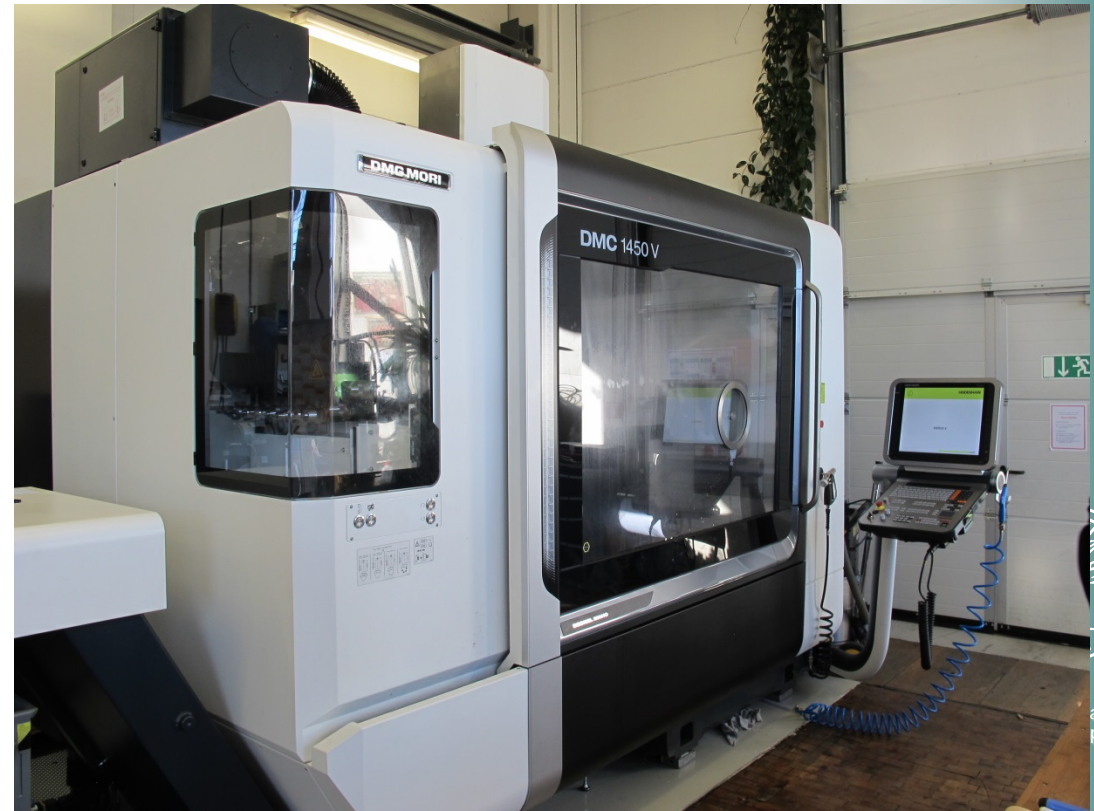
*it's a very efficient  
technology*

# *new machines new technologies*

*In 2013 we sold our old  
milling machine*



*with money from the "Großgeräteantrag"  
we bought a new and very comfortable  
CNC machine with a machining volume of  
1450x700x500 mm<sup>3</sup>*



# *New machines New technologies*



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*an old milling machine in  
the apprentice  
workshop was  
renovated*



Thomas Haubold  
@mpp.mpg.de

# *New machines New technologies*



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*for fast prototyping we installed two  
3-D printing machines*



*they are direct connected to the  
CAD system*



*FDM technology  
with ABS material*



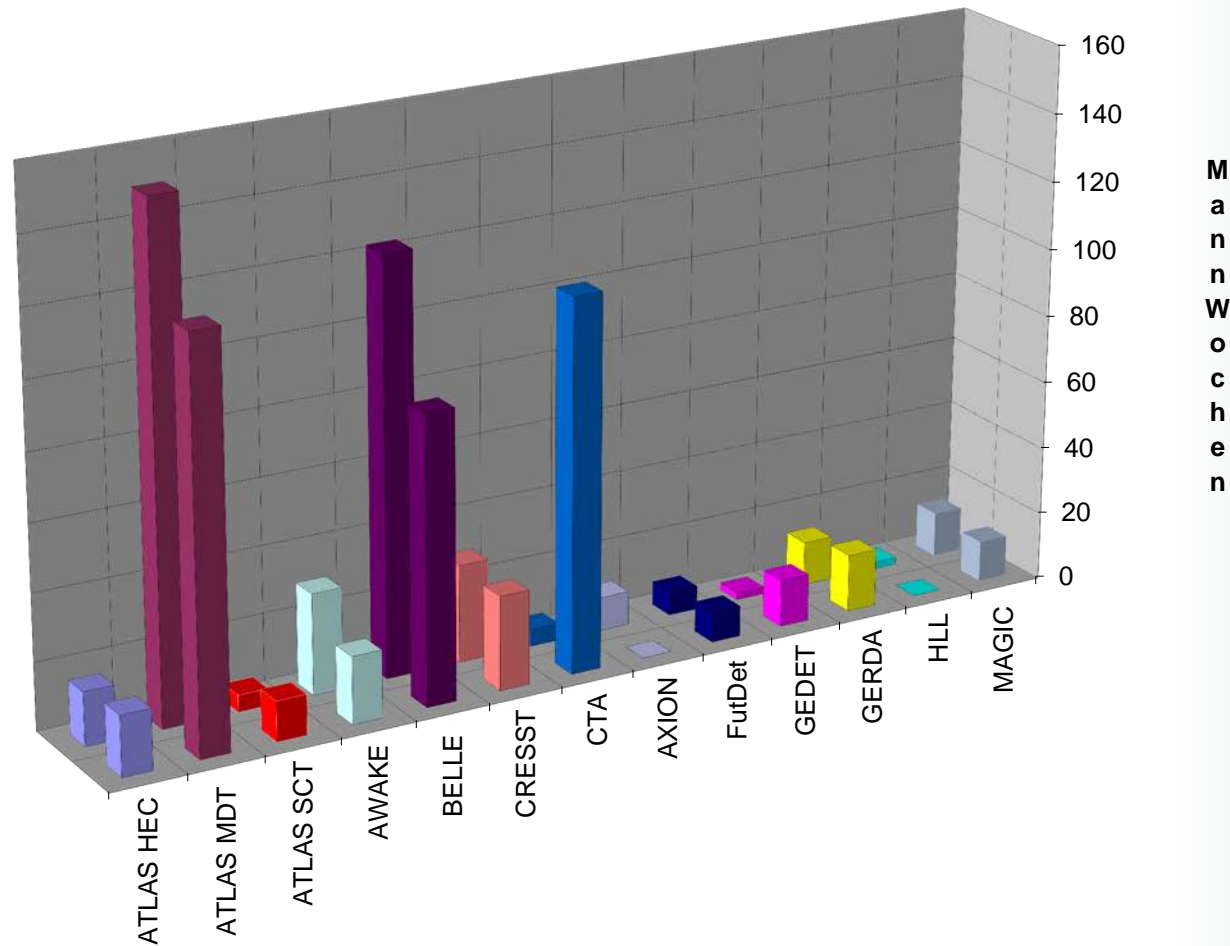
*Poly jet technology*



Thomas Haubold  
haubold@mpp.mpg.de

# Some statistics

*Time and effort of the workshop for the projects*



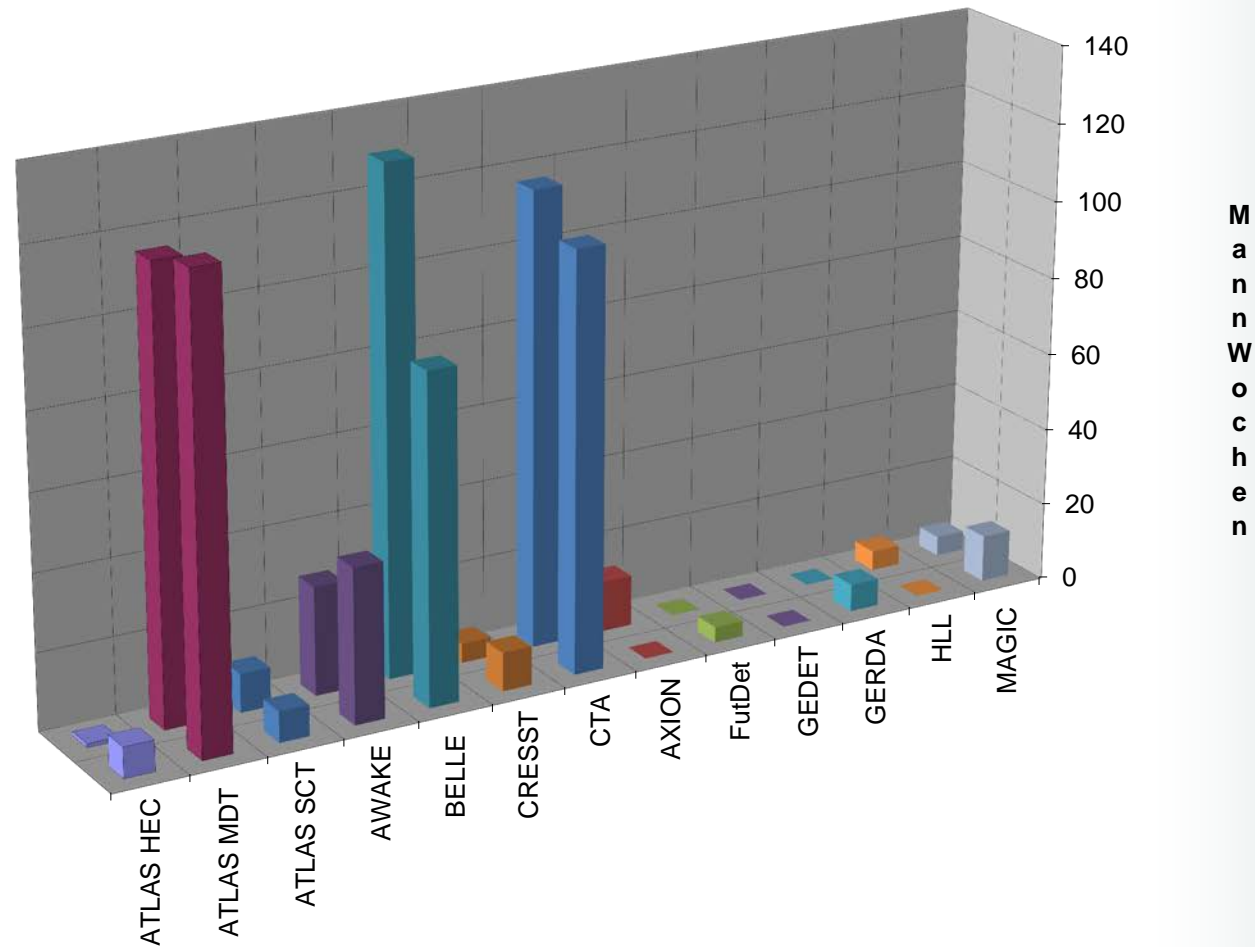
**M  
a  
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effort until NOV 2015  
requirements 2015



# Some statistics

*Time and effort of the design office for the projects*

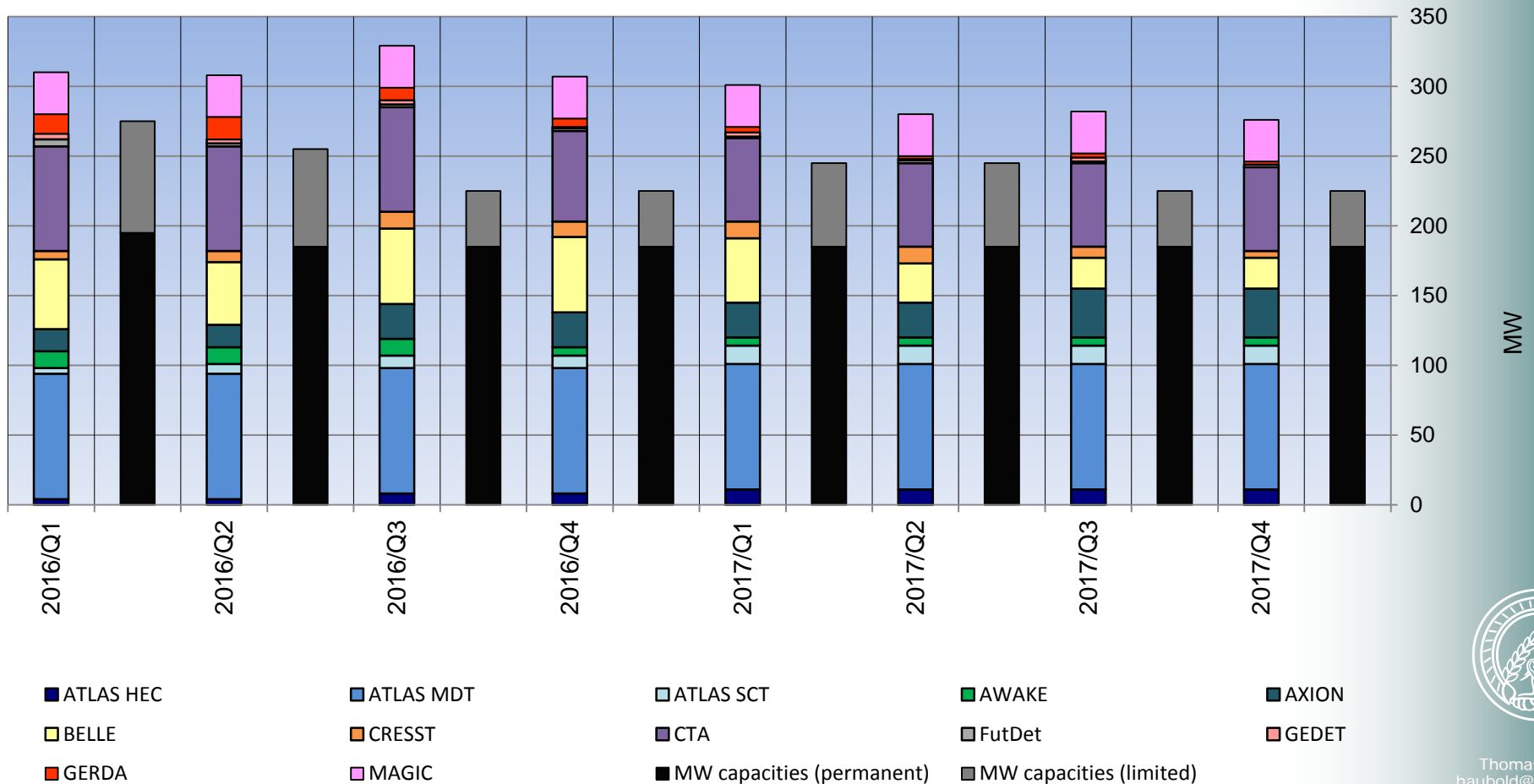


effort untill NOV 2015  
requirements 2015



# Some statistics

## *Demands on the Mechanics Division 2016/17*







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*Thank you for your attention*



Thomas Haubold  
haubold@mpp.mpg.de