

# VLT instruments 1<sup>st</sup> generation

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## RETROSPECTIVE OF THE INVOLVMENT OF THE INTEGRATION and VACUUM CRYOGENIC DEPARTMENT

# VLT instruments 1<sup>st</sup> generation

*Integration and cryo.vacuum department*

## INTRODUCTION - HISTORY

VLT Instrumentation program/ budget approval 1992

From ISAAC PDR on October 1992

To the HAWK-I Installation July 2007

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*Integration and cryo.vacuum department*

## TEAM - STAFF

Mechanical workshop (S Balon, R Buetinghaus)

Closed in 2002

Stefan Wegerer

JL Lizon *Department head* (Sept 1981)

A Silber *Mechanic Cryo-vac. Tec* (March 91 till June 2007)

C Dupuy *Opto. Mec Tec* ( September 1997)

S Tordo *Opt. Ing* ( January 2002)

M Accardo *Mec. Cryo-vac Tec* ( March 2003)

JP Kirchbauer *Mec. Tec* ( September 2004)



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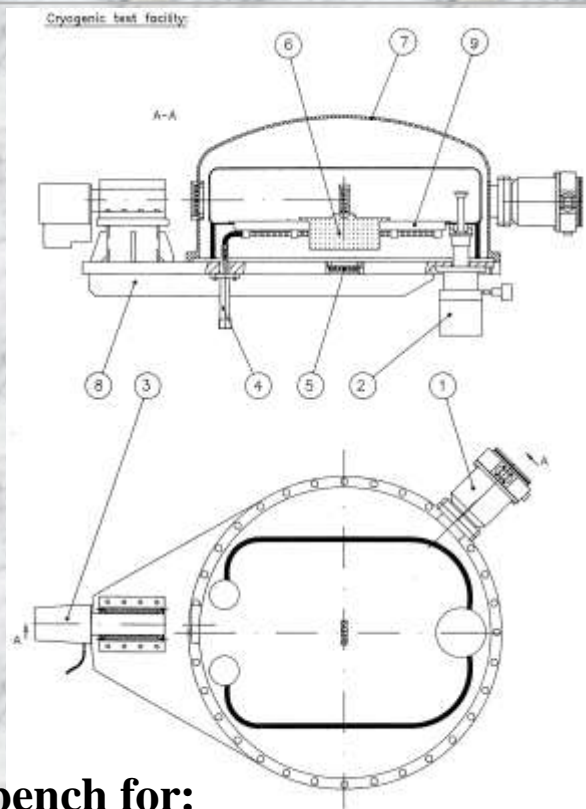
## Cryogenic test facility

JL Lizon

1 FTE

A Silber

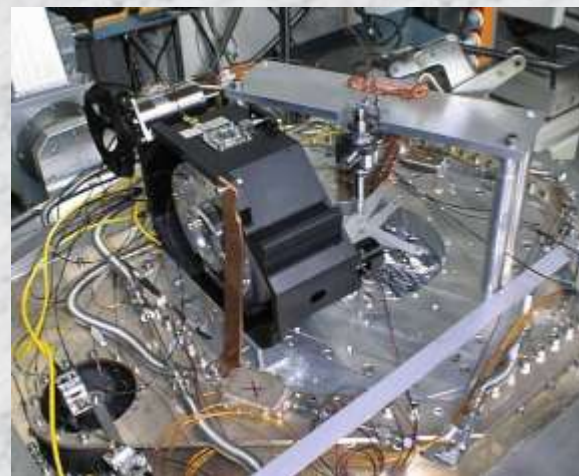
June 1994



### Test bench for:

- Pre cooling system
- Closed cycle cooler
- Pumping system

**152 cool-down**



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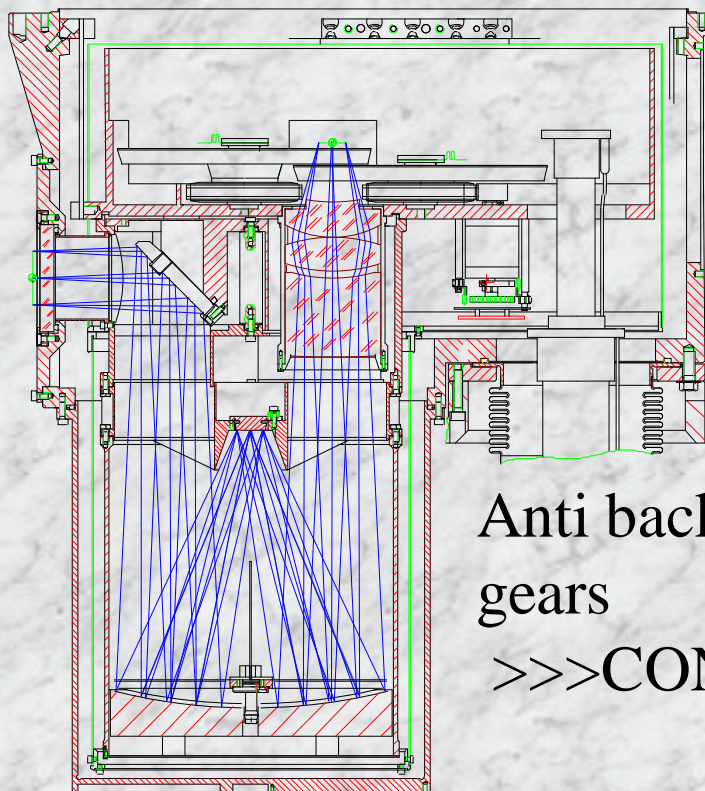
IRATEC

June 1995

JL Lizon

A Silber

1 FTE



Anti back-lash  
gears

>>>CONICA

Detector test facility (<70 K, <30 K)

ISAAC, CONICA..



1 COPY at M.P.



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## Cryo-development

1994-1998

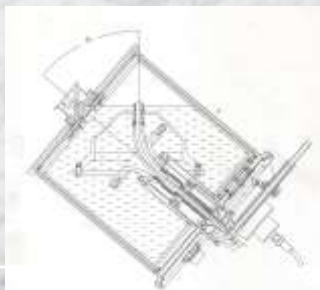
JL Lizon, A Silber  
G Hess

0.5 FTE, 1 FTE,  
0.5 FTE, 0.3 FTE



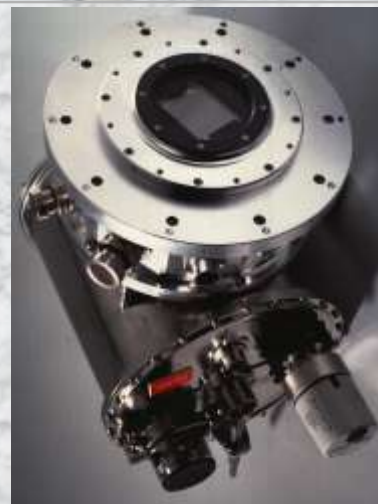
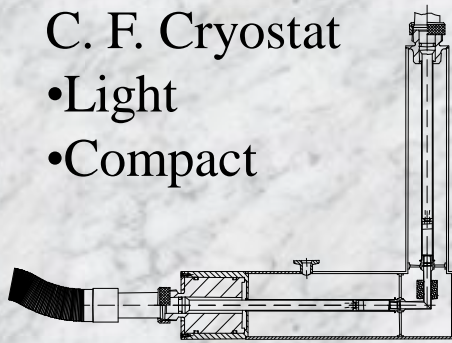
Standard CCD head

- Stable (3 micron)
- Robust
- Easy to separate

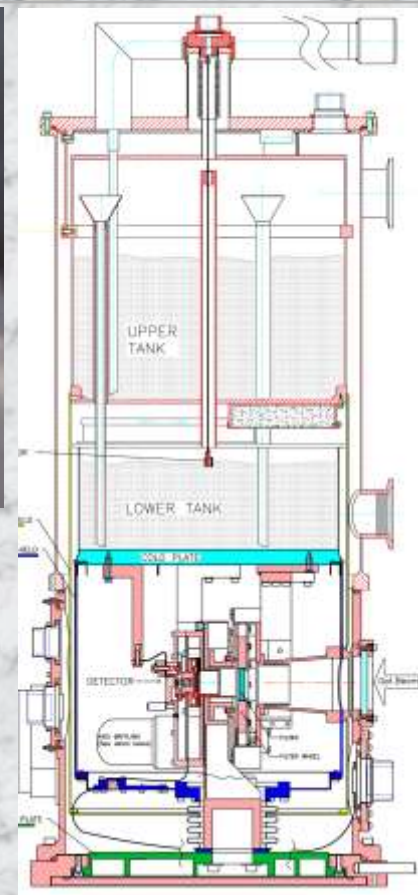


C. F. Cryostat

- Light
- Compact



Bath cryostat  
95% filling



VLT I cryostat

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## Test Camera 1 and 2

1997

A Silber (R Conzelmann)

JL Lizon

1 FTE

- Regular technical meetings/  
Mechanical design collaboration
- Mechanical procurement
- Detector cryostats including  
stability measurements
- Integration
- Transfer to Paranal
- Installation





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## FORS 1 and 2

JL Lizon

0.4 FTE

0.3 FTE

September 1998, November 1999

- Regular technical meetings
- Flexure test of the 1<sup>st</sup> focusing system
- Detector/camera interfaces definition
- Detector cryostats including stability measurements and installation carriage
- Vibration measurements
- Detector up-grades





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## ISAAC development

JL Lizon (G Huster)

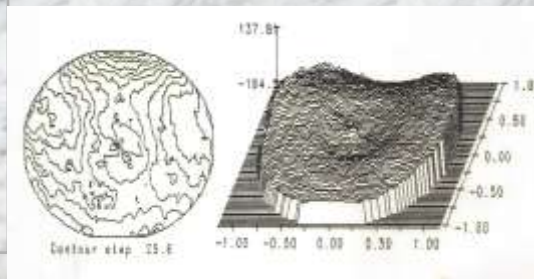
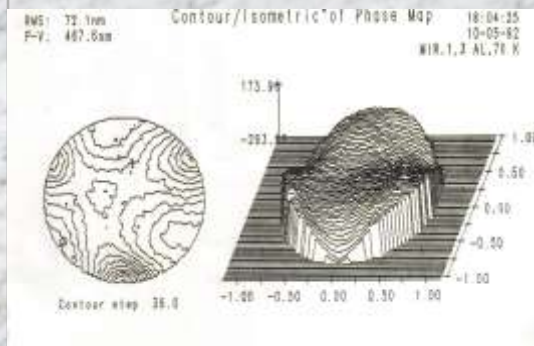
1 FTE

### Cable co-rotator

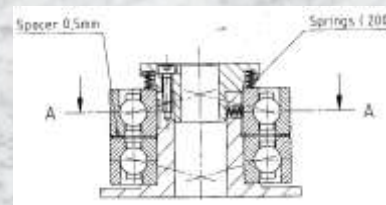
(ISAAC, NACO, VIMOS, HAWK-I)



### Aluminum mirrors



### Ball bearings



### Stepper motor (ISAAC, SPIFFI, AMBER)



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## ISAAC

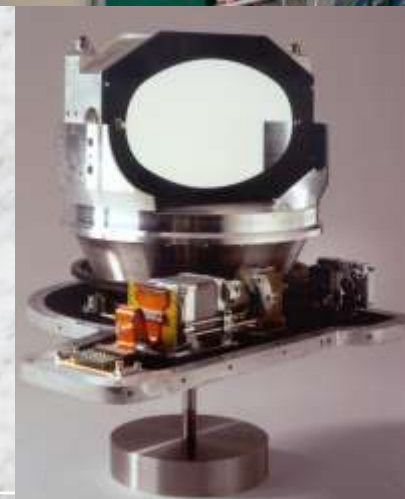
November 1998

JL Lizon (G Huster)

A Silber, R Buettinghaus

3.2 FTE

- Cryo/vacuum design
- Cooperation for the mechanical design
- Technical follow-up of the manufacturing
- Thermal treatments
- Integration and qualification of the subsystems
- System integration
- Transfer to Paranal
- Installation
- Documentation
- Maintenances, up-grades





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*Integration and cryo.vacuum department*

## UVES

August / September 1999

JL Lizon, C Dupuy (H Kotzlovski)

S Balon

3.7 FTE

- Detector vacuum and cryogenic
- Cooperation for the mechanical design
- Testing of components and material
- Integration and qualification of the subsystems
- System integration and optical alignment
- Transfer to Paranal, Installation
- Documentation
- Maintenances, up-grades



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## NACO

January- February 2002

JL Lizon

C Dupuy

NAOS: 0.63 FTE

CONICA: 0.23 FTE

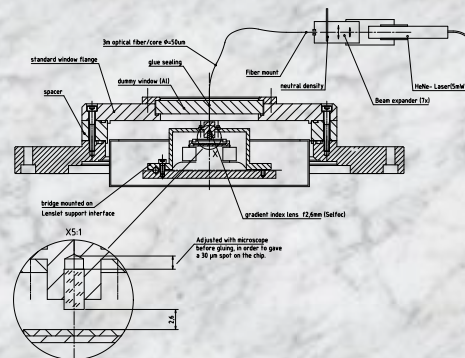
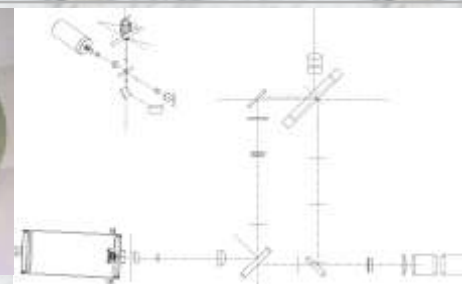
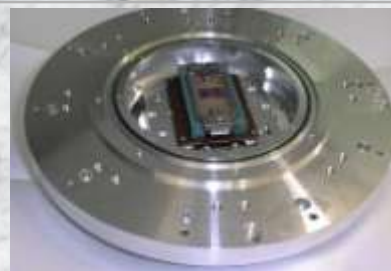
## NAOS

- General follow-up
- Vacuum and cryogenic system for the 2 wave-front sensors
- VWFS head
- Implementation of the LGS arm

## CONICA

- Technical follow-up
- Test of the 1st filter wheel
- CCC suspension system

Cable co-rotator installation





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## FLAMES

January-April 2002

JL Lizon

C Dupuy

OzPoz: 0.06 FTE

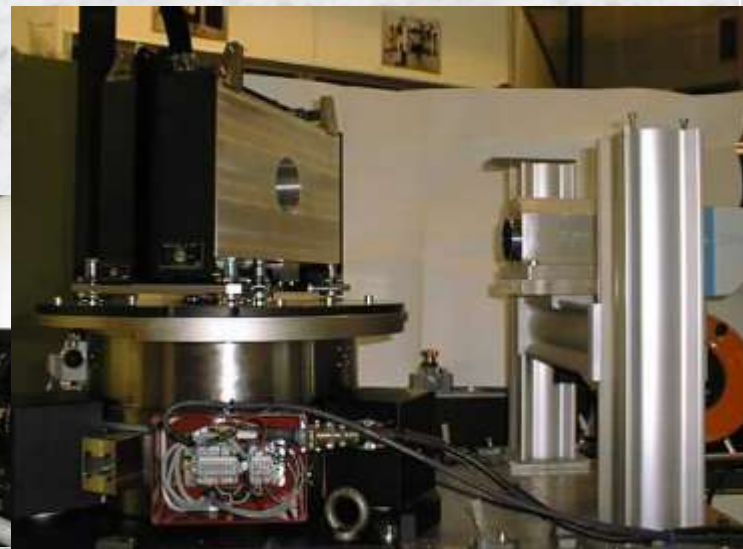
Giraffe: 0.5 FTE

### OzPoz

- Technical follow-up, Bearing problems
- Fibers installation

### GIRAFFE

- Cooperation for the mechanical design
- Detector vacuum and cryogenic
- Testing and qualification of the subsystems
- System integration, optical alignment
- Transfer to Paranal
- Installation





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## VIMOS

September 2001-February 2002

JL Lizon,  
M Accardo

1.7 FTE

- Detector cryo/vac system
- 4 CFC supplied from one tank via rotating feed-through
- Very little support required (fast track project)

### Major upgrade

- Front part, focal plane
- Back part, Filter, camera, mirrors
- Documentation (*still on going*)
- Maintenances, up-grades





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## SINFONI

June 2004

S Tordo, (R Conzelman)

JL Lizon

AO Mod: 2.4 FTE

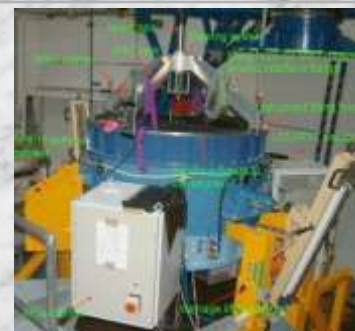
SPIFFI: 0.23 FTE

### A. O. Module

- Cooperation for the mech. design, manufacturing and th. treatment
- Integration and qualification of the subsystems
- System integration, optical alignment
- Transfer to Paranal, Installation
- Documentation

### SPIFFI

- General follow-up
- Stepper motor
- Cryo. test of grating unit
- Cryo. test of the camera



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**VISIR**

June 2004

A Silber,  
JL Lizon,

0.85 FTE

- Technical follow-up
- Ball bearings definition
- Vacuum testing
- Acceptance Europe
- Technical support during installation
- Design alignment tool
- Design handling tools
- Up-grade re-alignment





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**CRIRES**

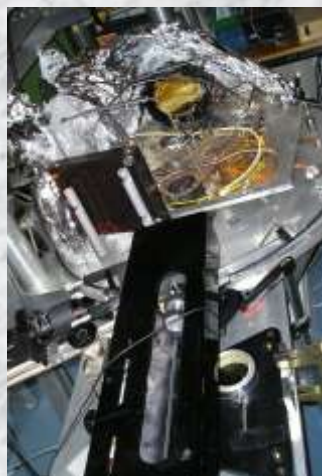
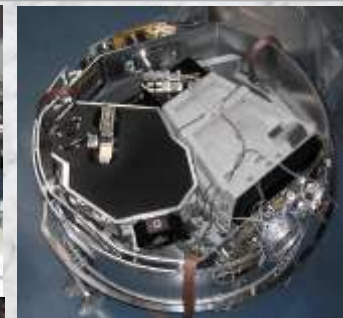
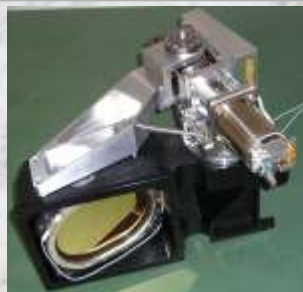
June 2006

JL Lizon, (G Huster)

B Sokar, S Tordo

2.8 FTE

- Vacuum cryo. Design
- Collaboration on mec. Design
- Mec. procurement
- Thermal treatment
- Integration testing sub-systems
- System integration
- Optical alignment, test
- Transfer to Paranal
- Installation
- Documentation





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*Integration and cryo.vacuum department*

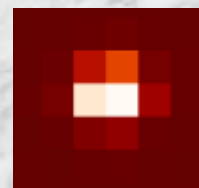
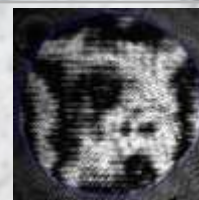
## HAWK-I

July 2007

JL Lizon, (G Huster)

1 FTE

- Vacuum cryo. Design
- Collaboration on mec. Design
- Mec. procurement
- Thermal treatment
- Integration testing sub-systems
- System integration
- Optical alignment, test
- Transfer to Paranal
- Installation
- Documentation





# VLT instruments 1<sup>st</sup> generation

*Integration and cryo.vacuum department*

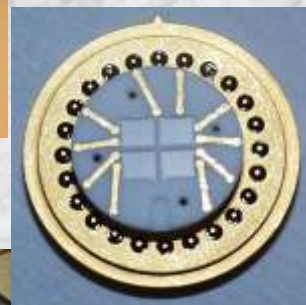
## Other developments

A Silber  
C Dupuy

STRAP: 1 FTE  
AO Fiber: 1 FTE

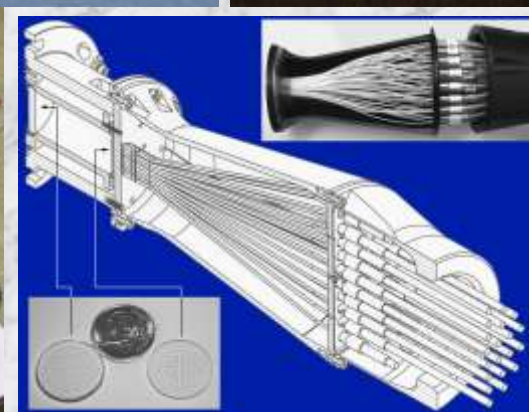
### STRAP

APD based tip/tilt sensor  
Design, procurement,  
integration



### Fiber bundles

Design, procurement  
Integration  
Testing





# VLT instruments 1<sup>st</sup> generation

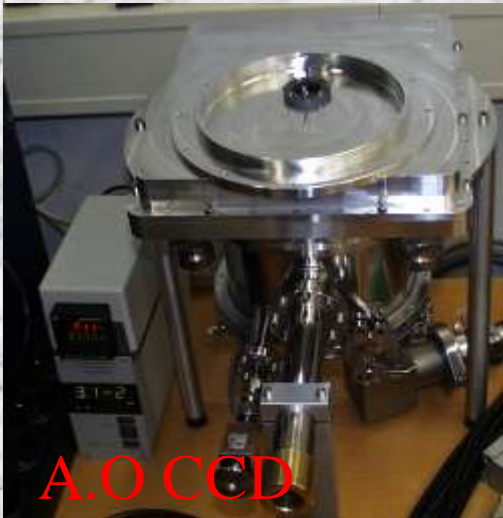
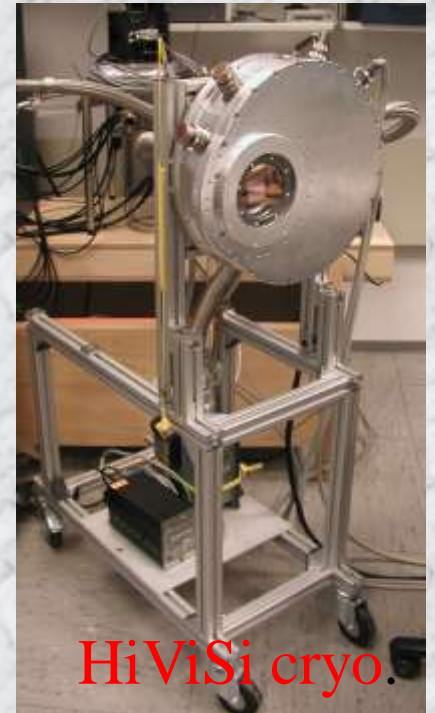
*Integration and cryo.vacuum department*

## Other tools and facilities

A silber, JL Lizon

1 FTE

C Dupuy





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VLT-I

JL Lizon,  
M Accardo

1 FTE

- Solve the vacuum problem of LISA

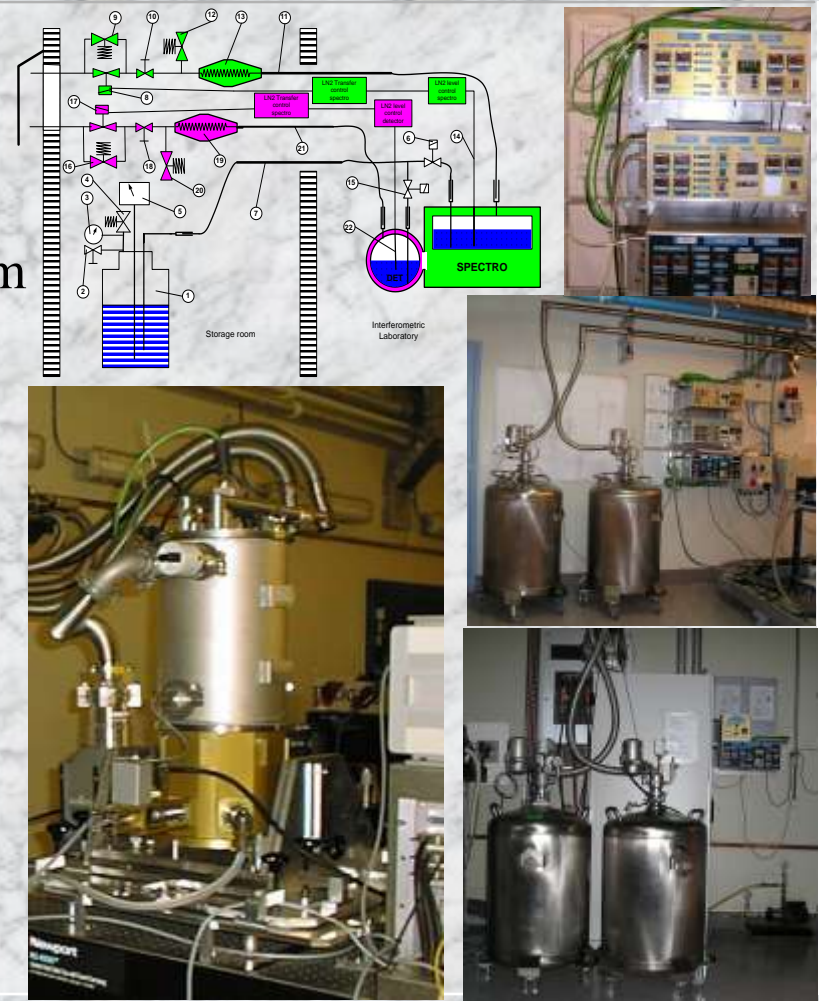
MIDI

- Technical follow-up
- Interface definition for LN2 and vacuum

AMBER

- Technical follow-up
- Definition of the interface for LN2 and vacuum
- Preparation of the “cryo-motor”
- Support installation

LN2 distribution for MIDI and LISA  
LN2 distribution for AMBER,  
FINITO, IRIS and PRIMA (1 and 2)



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## TRANSPORT / PACKING



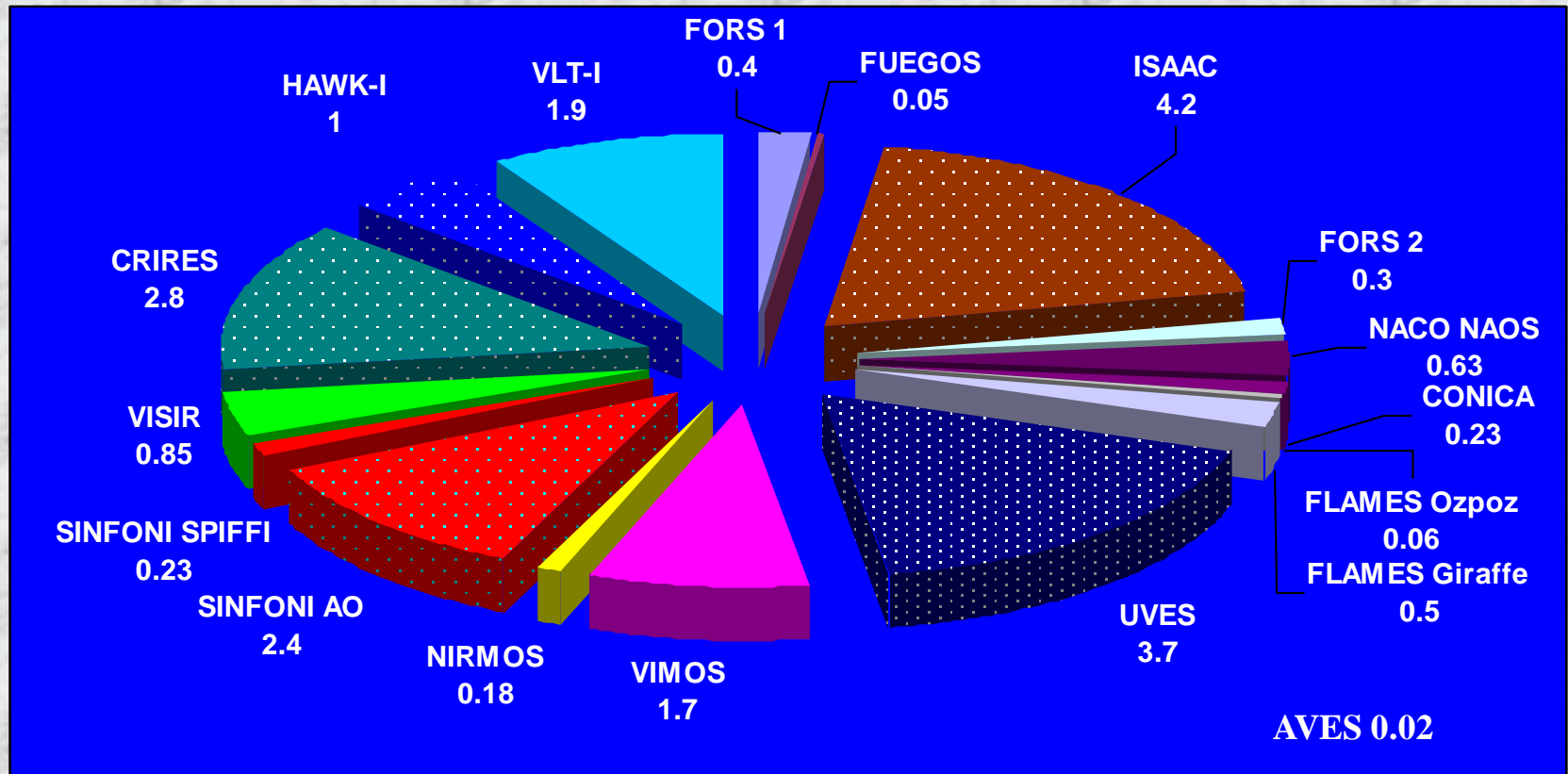


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## MAN-POWER INSTRUMENTS

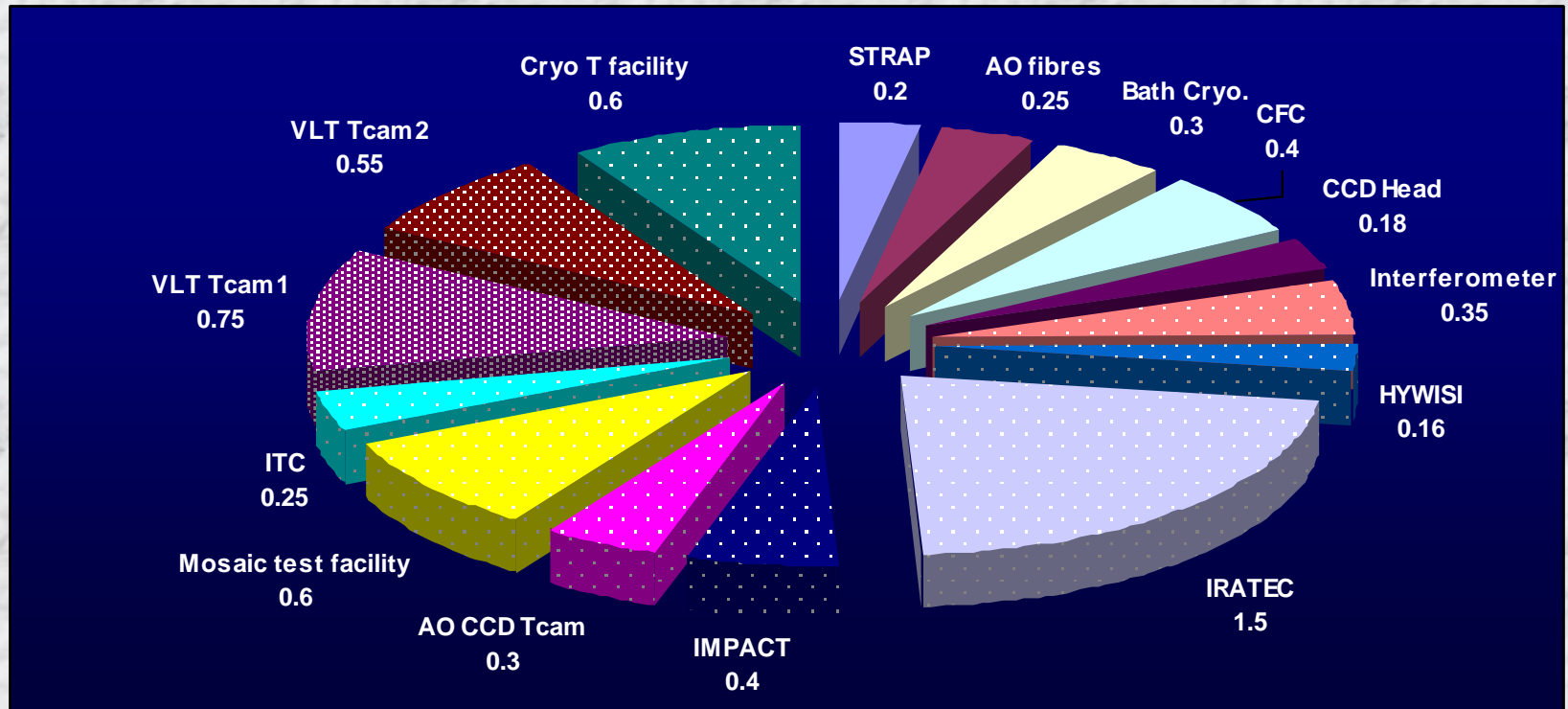
21 FTE



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**MAN-POWER INSTRUMENTATION 29.2 FTE**



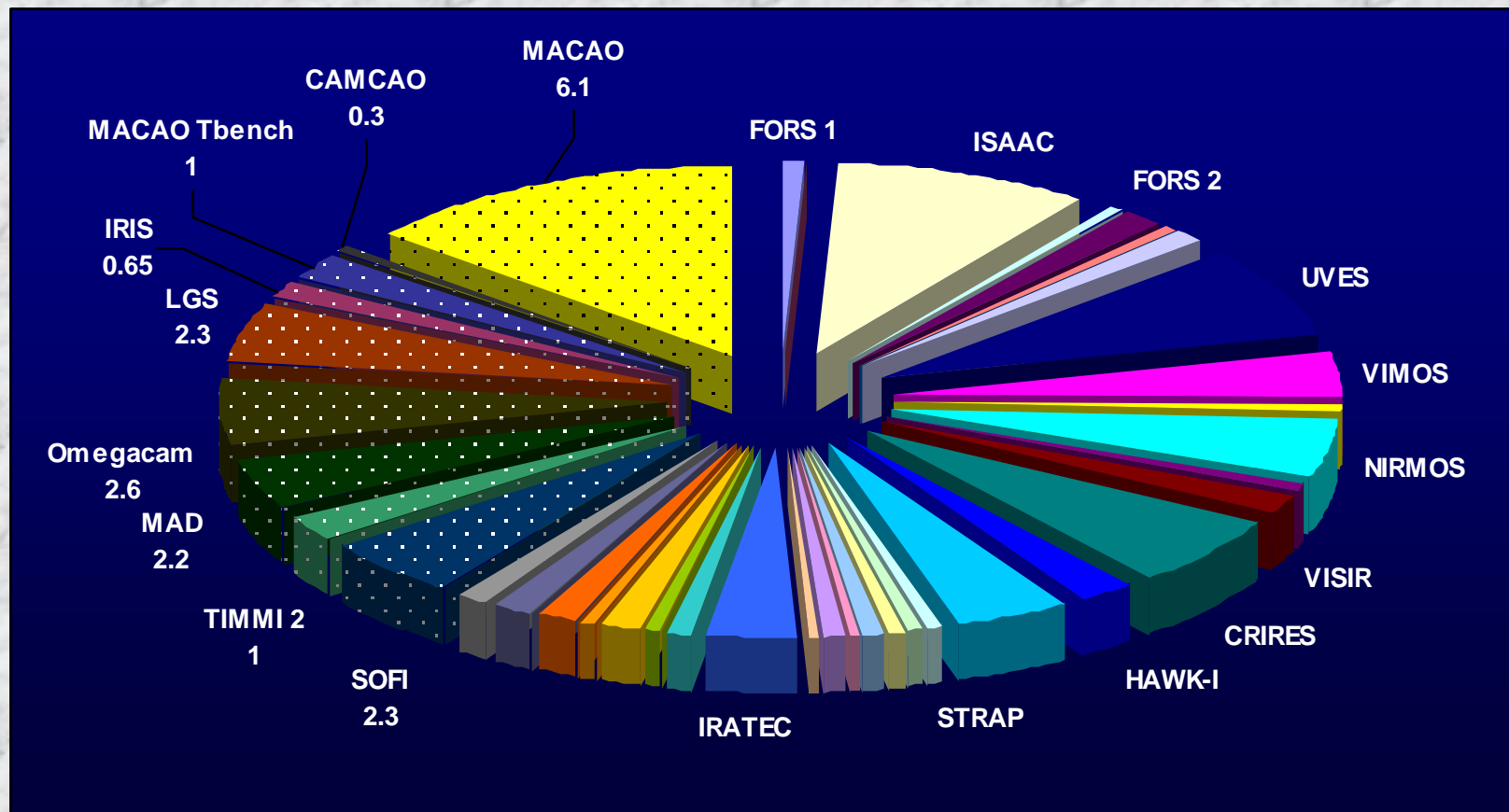


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MAN-POWER GENERAL

48 FTE



# VLT instruments 1<sup>st</sup> generation

*Integration and cryo.vacuum department*

## CONCLUSION

Mainly addressed to the future “Project manager”

Very important involvement (*not always planned*)

Collect a lot of practical experience  
with a solid and well trained team

→ **Give the credibility**

What is practical experience ?

- Something which cannot be written in the famous PDR, FDR document
- Even less in an official publication
- Something that we can only transmit through long and patient process

Even if we will not work any more in the same way, we should do the best use of this EXPERIENCE

