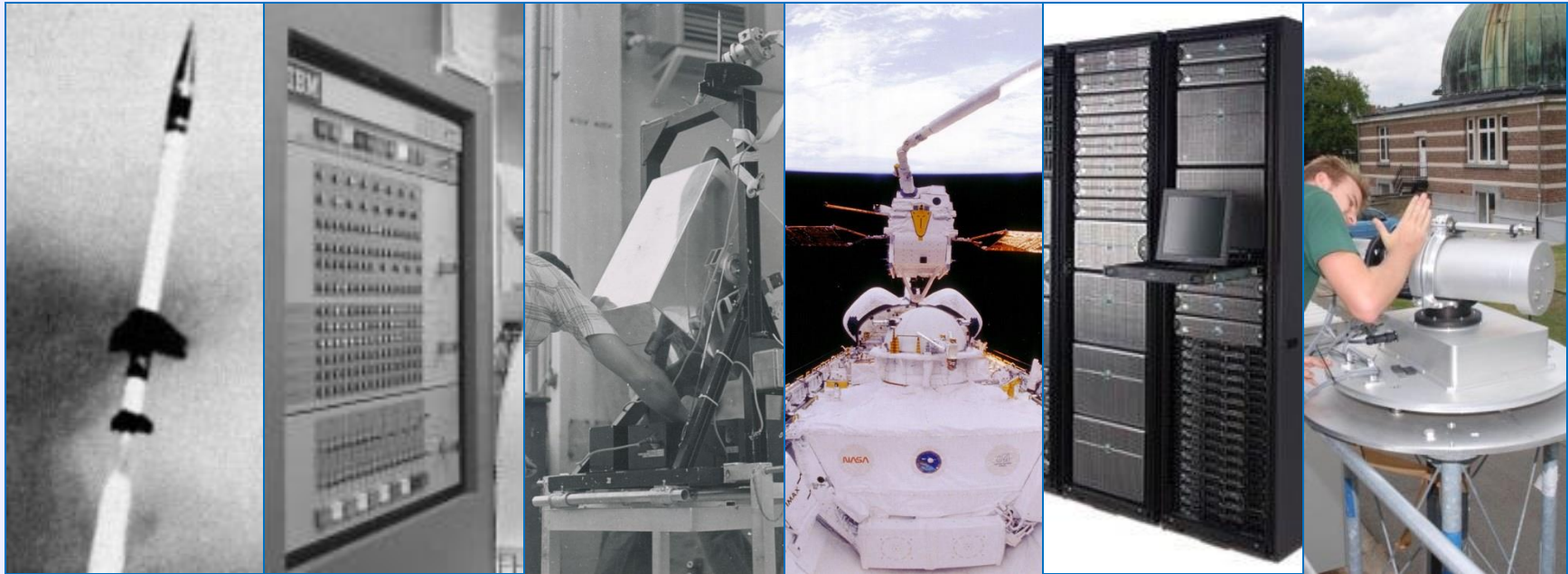


# « BITS » AND « PIECES » FOR AERONOMY

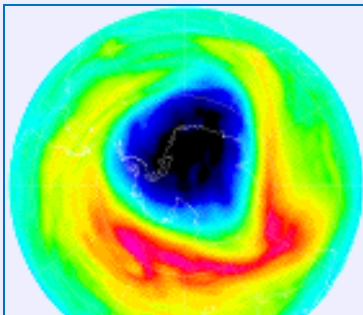
## 1964...2014



**J. BULCKE (HEAD IT) AND E. NEEFS (HEAD ENGINEERING)**

**50th ANNIVERSARY BIRA-IASB  
ACADEMIC SESSION – NOVEMBER 25th 2014**

# « BITS » AND « PIECES » OF AERONOMY



OZONE



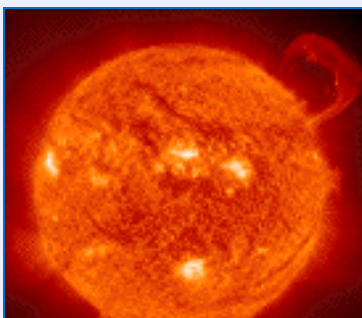
SPACE PHYSICS



AIR QUALITY



CLIMATE

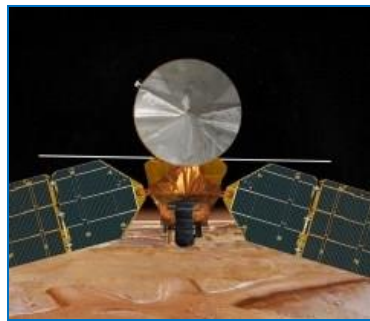


UV



PLANETARY AERONOMY

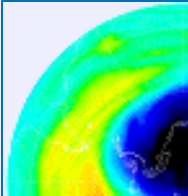
# « BITS » AND « PIECES » FOR AERONOMY



DATA HANDLING



SERVERS



DATA STORAGE



COMPUTERS



MECHANICS



ELECTRONICS

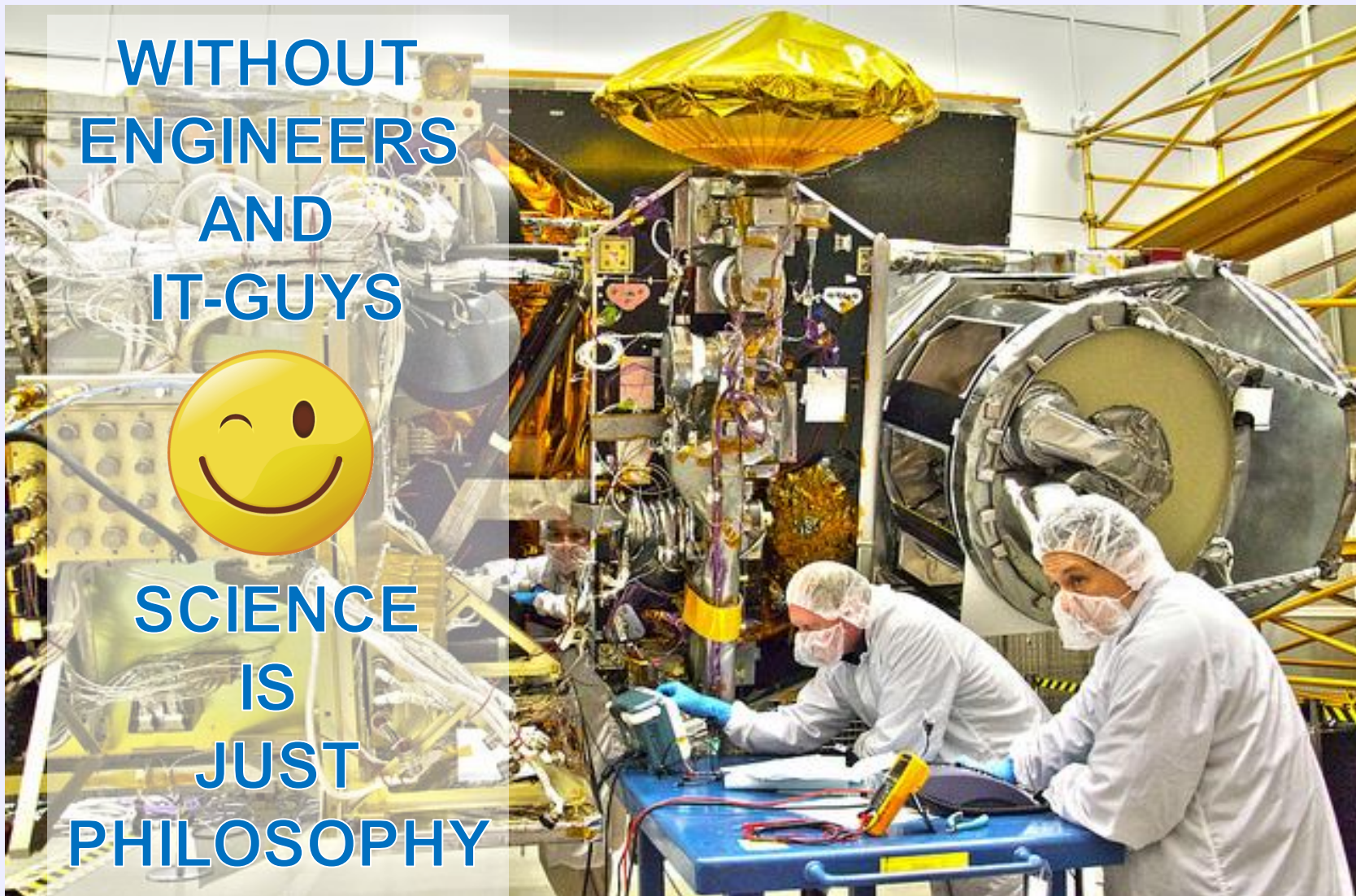


# SCIENCE AND TECHNOLOGY HAND IN HAND

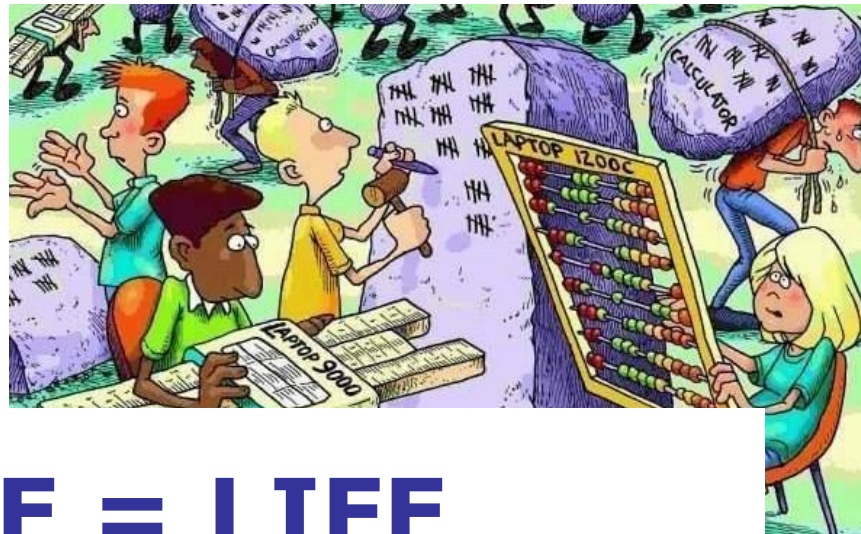
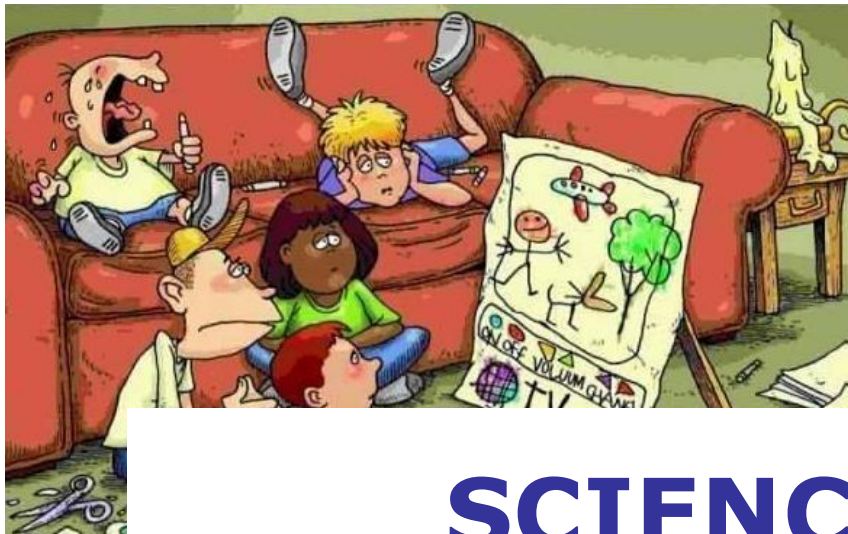
WITHOUT  
ENGINEERS  
AND  
IT-GUYS



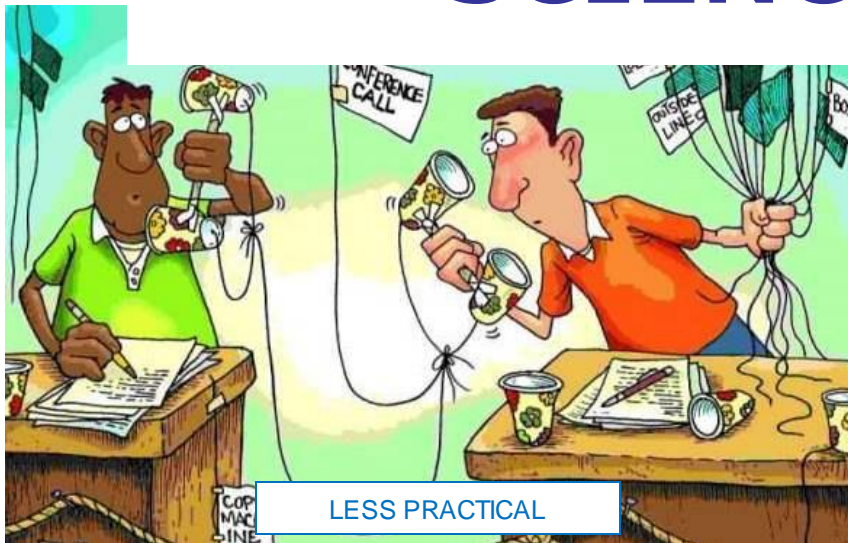
SCIENCE  
IS  
JUST  
PHILOSOPHY



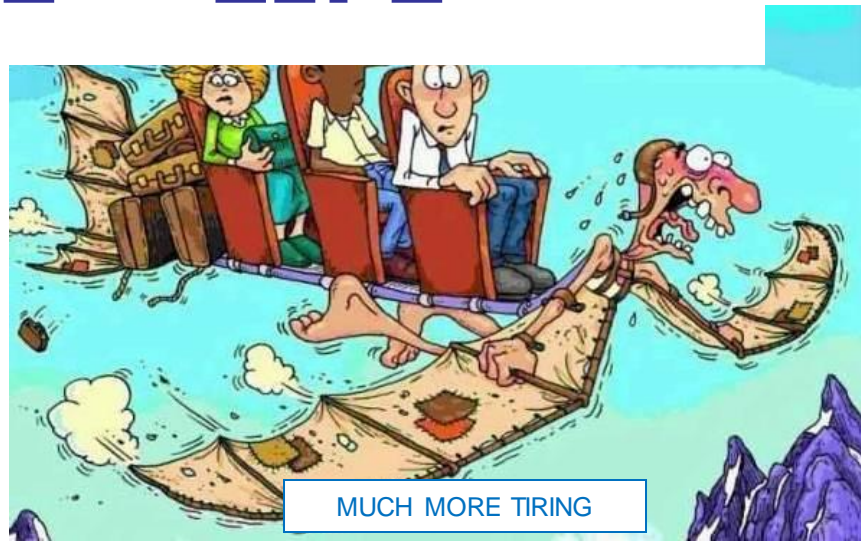
# SCIENCE AND TECHNOLOGY HAND IN HAND



**SCIENCE = LIFE**



LESS PRACTICAL

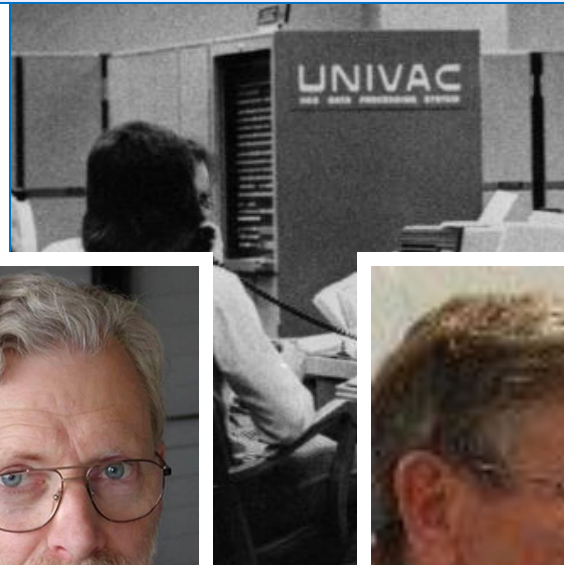
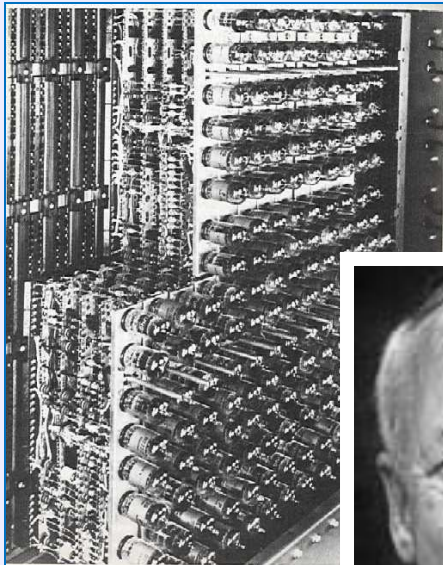


MUCH MORE TIRING

# SCIENCE AND TECHNOLOGY HAND IN HAND



# DEPARTMENT OF APPLIED AERONOMY



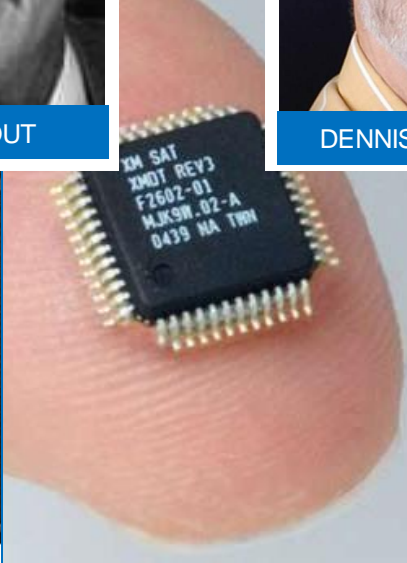
DIRK FRIMOUT



DENNIS NEVEJANS



CARLOS LIPPENS



# SEPARATE ENGINEERING AND IT SERVICES



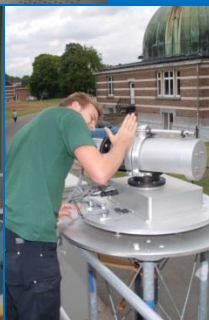
OPERATIONS



MECHANICAL  
MANUFACTURING



AIR  
SPACE  
BORNE



GROUND  
BASED



GROUND SUPPORT  
EQUIPMENT

MECHANICAL  
DESIGN

SOFTWARE  
DEVELOPMENT



ON BOARD  
FIRMWARE



ELECTRICAL  
DESIGN



TESTING



PROJECT  
MANAGEMENT





# ENGINEERING AND IT SERVICE



aeronomie.be



.be



WEB DESIGN



NETWORKING



GROUND BASED



AIR SPACE BORNE



**BELNET**

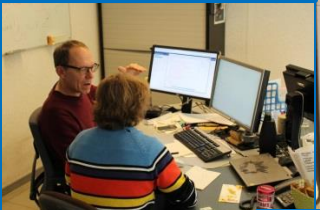
INFRASTRUCTURE MANAGEMENT

E-ADMINISTRATION

IT CONSULTANCY



HIGH PERFORMANCE COMPUTING



INTERCONNECTIVITY



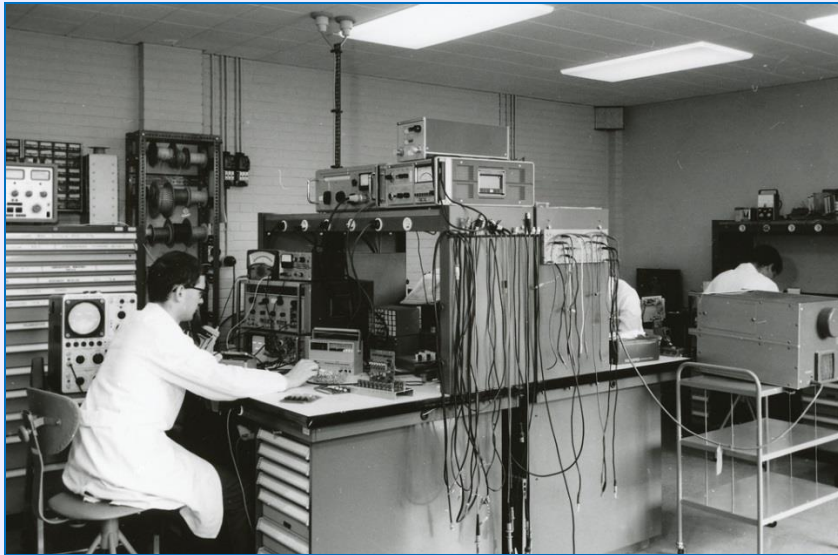
PERSONAL COMPUTING



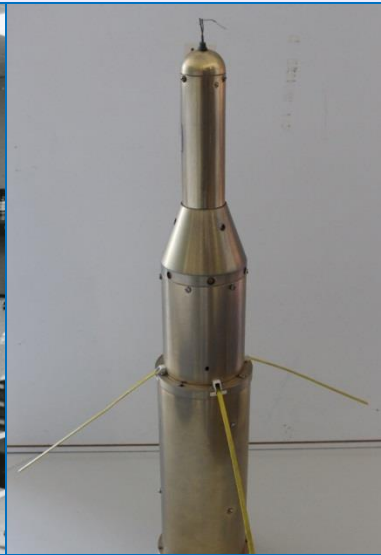
DATA STORAGE



# THE EARLY YEARS 1965-1975



ELECTRONICS LABORATORY OF BIRA-IASB



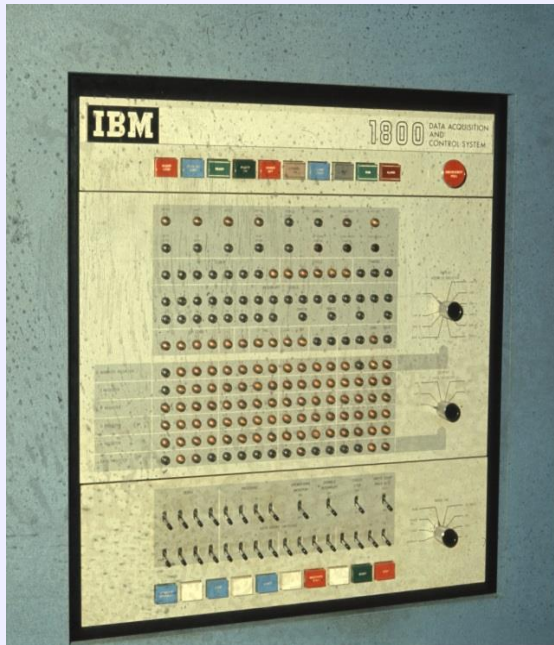
ROCKET PAYLOAD



BUILDING BALLOON PAYLOADS



# THE EARLY YEARS 1965-1975



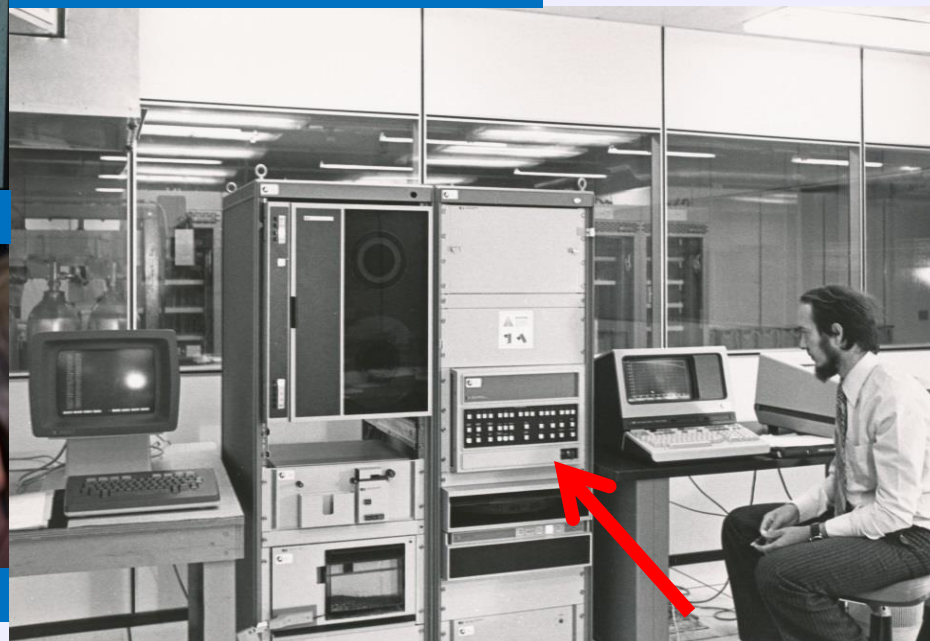
IBM 1800



UNIVAC1100 MAINFRAME



HP1000 WITH CONSOLE



HP2100 MINICOMPUTER

# THE EARLY YEARS 1965-1975



BIRA-IASB COMPUTER ROOM IN 1974

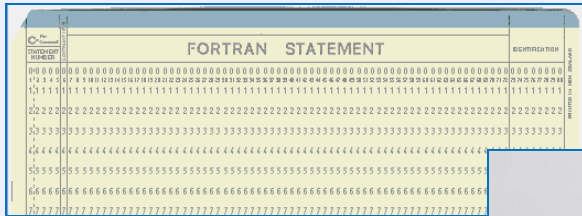


```
1050 REM FOR I=DLSTART TO BLEND
1060 REM PRINT I,PEEK(I)
1070 REM NEXT I
1080 REM
1090 POKE 512,0
1100 POKE 513,6
1110 REM
1120 FOR I=1536 TO 1550
1130 READ A
1140 POKE I,A
1150 NEXT I
1160 REM
1170 FOR I=DLSTART+6 TO DLSTART+28
1180 POKE I,130
1190 NEXT I
1240 POKE 54286,192
2000 REM
2010 DATA 72
2020 DATA 173,11,212,141,10,212,141,24,2
08,141,26,208
2030 DATA 104,64
```

READY

PROGRAMMING IN BASIC

# THE WONDER YEARS 1975-1985



PUNCH CARDS



PAPER TAPES



ESA

CONVENTION



TAPE REELS AT BIRA-IASB

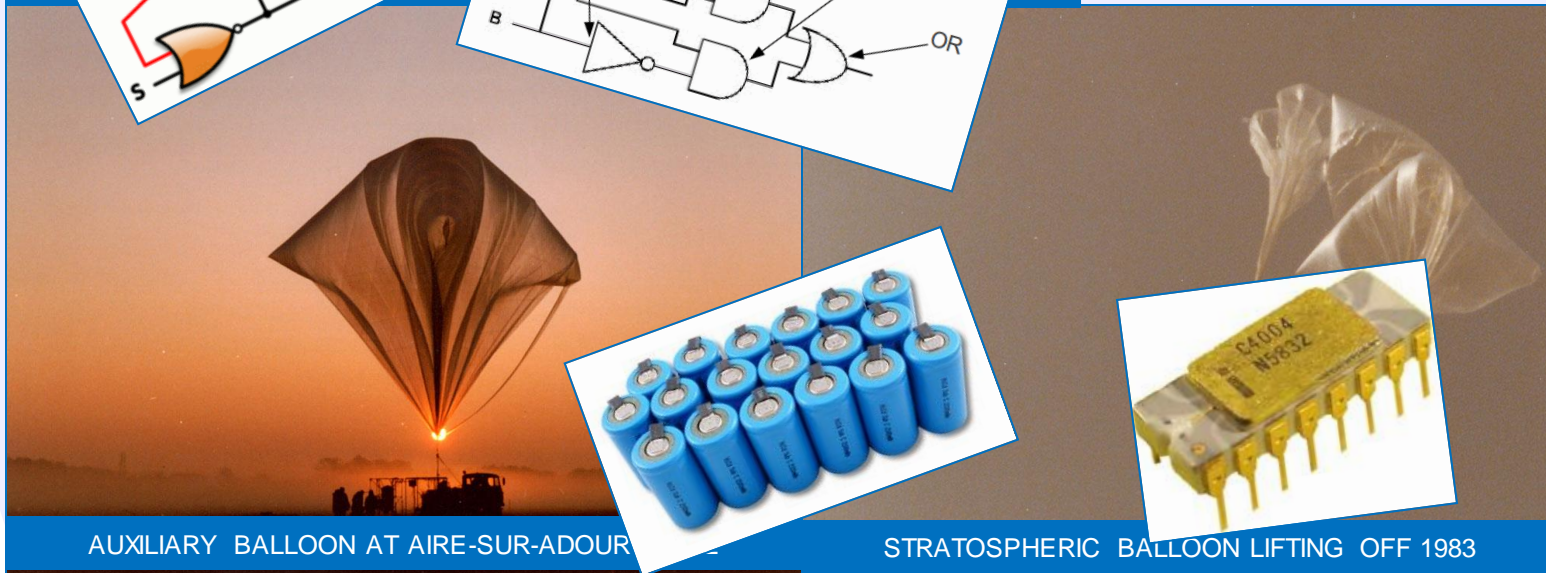
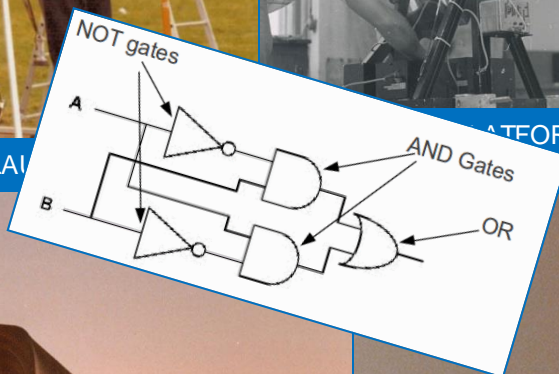
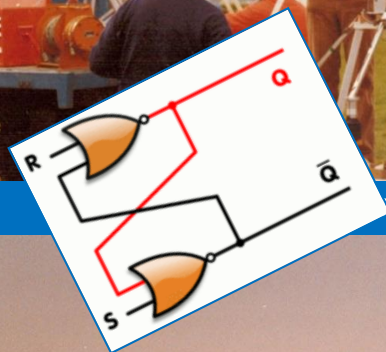
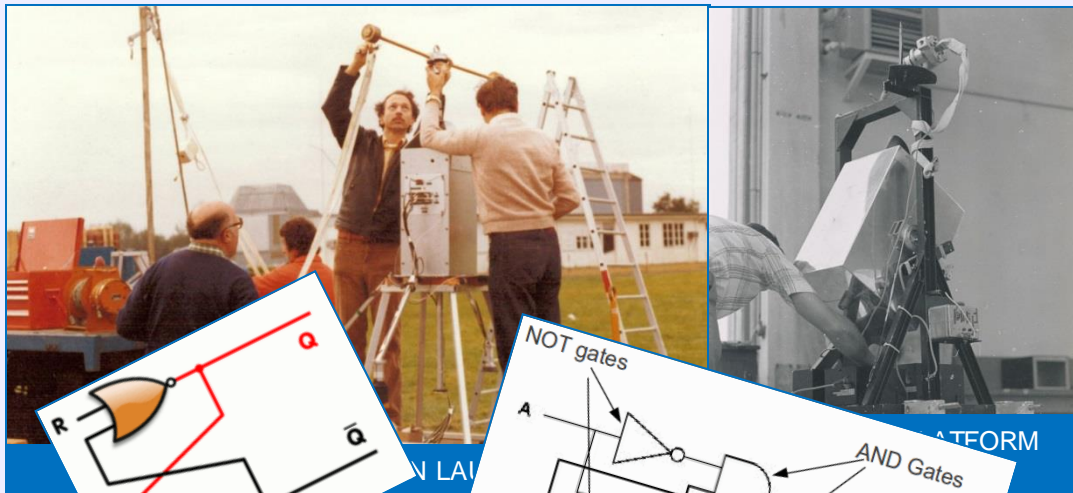


FIRST HARD DISK DRIVES



FIRST PERSONAL COMPUTERS IN BIRA-IASB

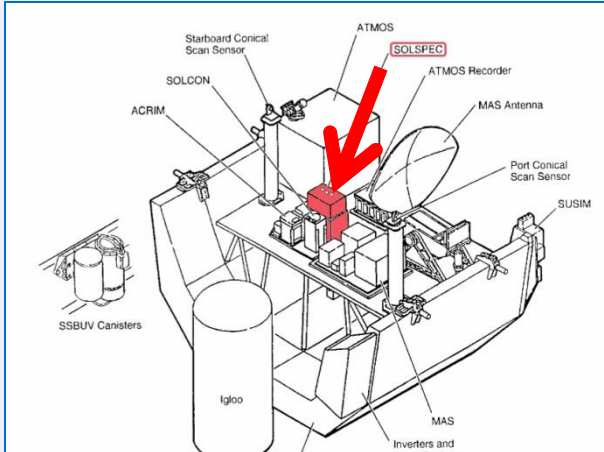
# THE WONDER YEARS 1975-1985



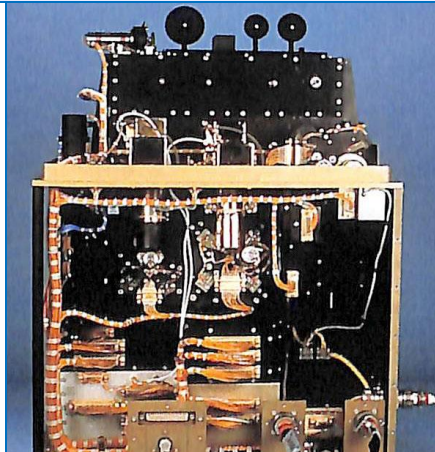
AUXILIARY BALLOON AT AIRE-SUR-ADOUR

STRATOSPHERIC BALLOON LIFTING OFF 1983

# THE WONDER YEARS 1975-1985



SPACELAB-1 WITH SOLSPEC 1983



SOLSPEC INSTRUMENT



SPACELAB-1



GRILLE SPECTROMETER



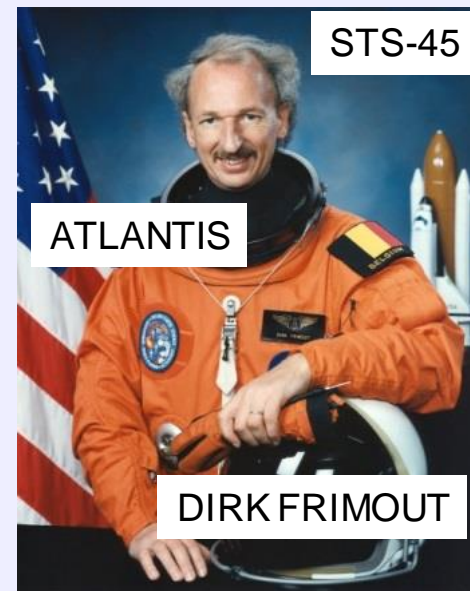
SOLSPEC TEAM IN HOUSTON 1983



# THE BOOMING YEARS 1985-1995



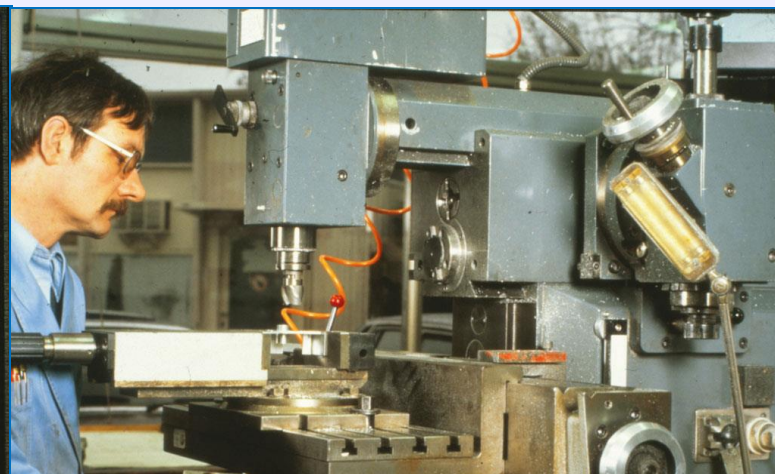
SIDAMS MASS SPECTROMETER 1992



STS-45

ATLANTIS

DIRK FRIMOUT

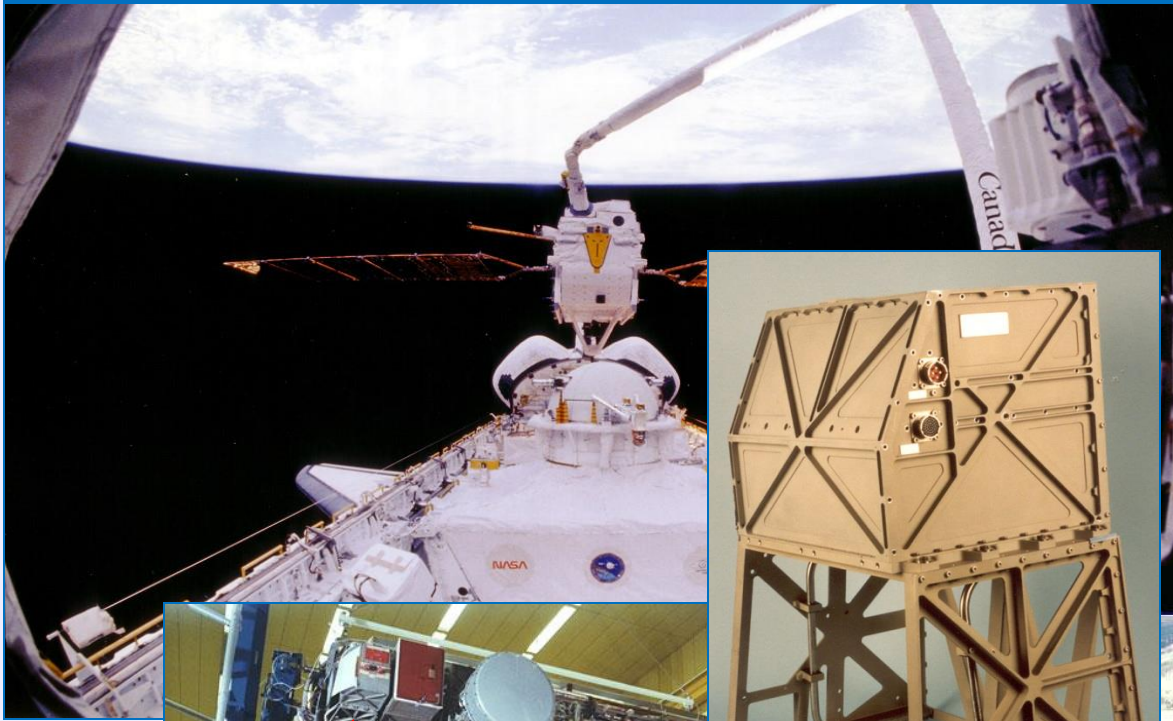


MANUFACTURING OF INSTRUMENT PARTS IN THE MECHANICAL WORKSHOP 1988



# THE BOOMING YEARS 1985-1995

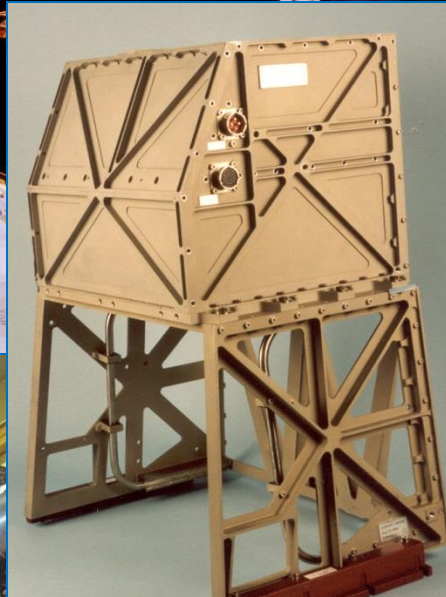
EURECA DEPLOYMENT 1992



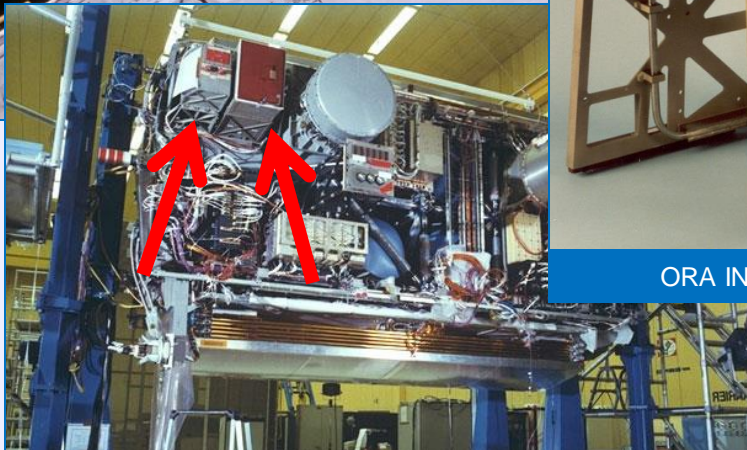
STS-45

ATLANTIS

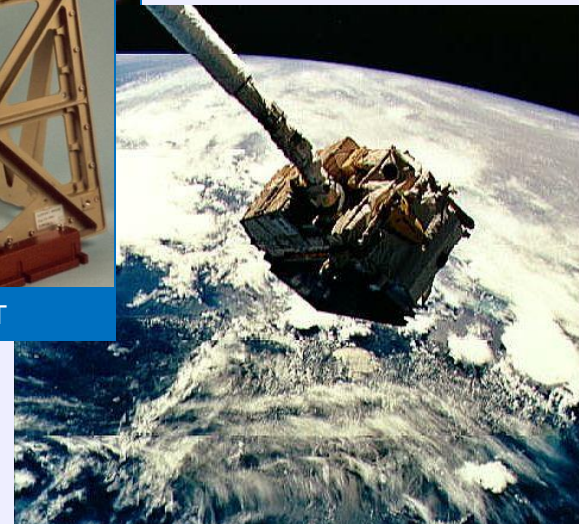
DIRK FRIMOUT



ORA INSTRUMENT



EURECA SATELLITE WITH ORA AND SOLSPEC

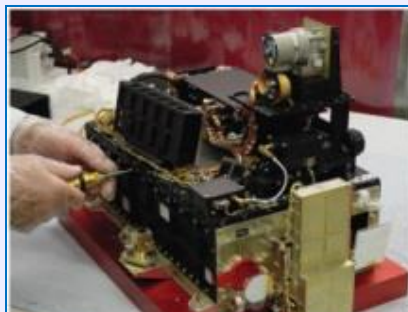


EURECA RETRIEVAL 1993

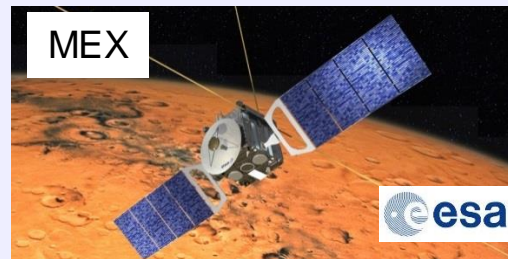
# THE HECTIC YEARS 1995-2005



MARS 96 MISSION



OIP Sensor Systems



MEX



ROSETTA



VEX



VERHAERT



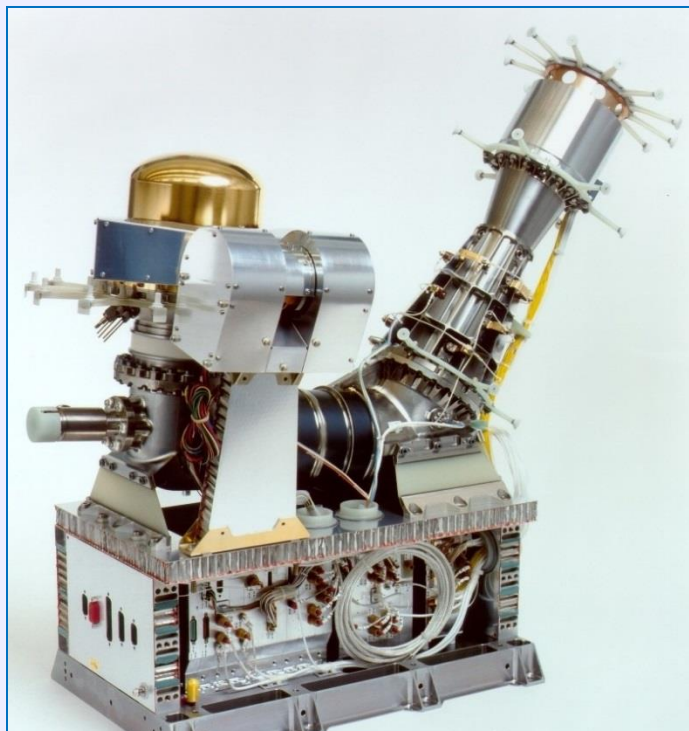
SPICAM-S INSTRUMENT ON MARS



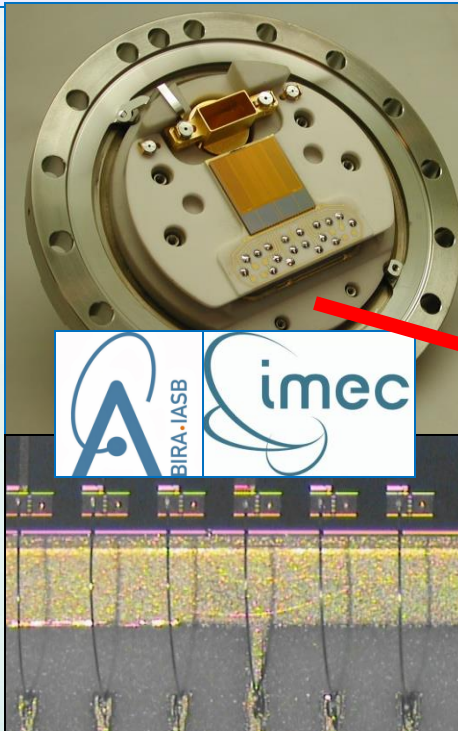
FPGA IN SOIR-VEX

SPICAM-LIGHT ON MARS-EXPRESS 2003

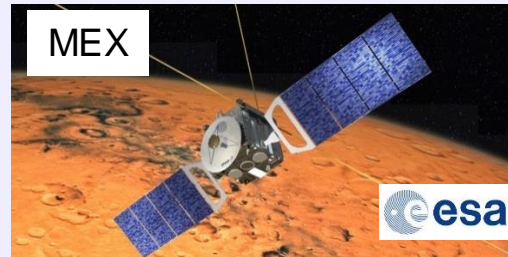
# THE HECTIC YEARS 1995-2005



DFMS (ROSINA) ON ROSETTA



LEDA DETECTOR



MEX



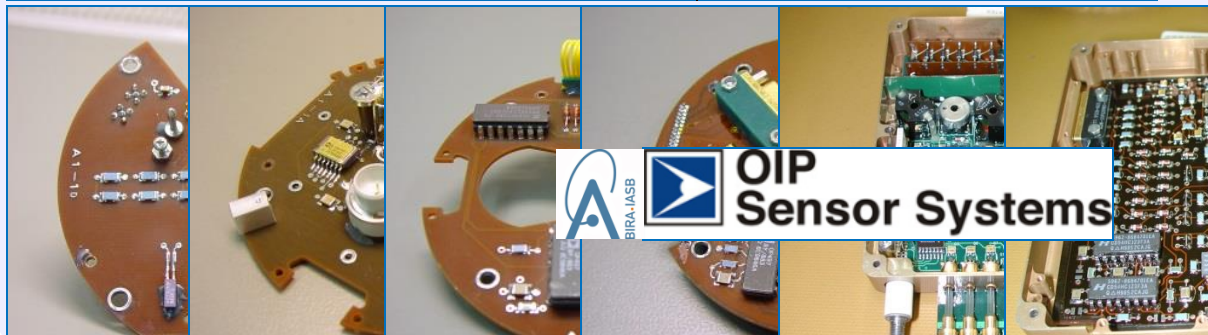
esa

ROSETTA



esa

VEX



PROXIMITY AND DISTANT ELECTRONICS FOR THE DOUBLE FOCUSSED MASS SPECTROMETER (DFMS)

# THE HECTIC YEARS 1995-2005



WORKSTATIONS



CRAY J916

SGI ORIGIN SUPERCOMPUTER



MEX



ROSETTA

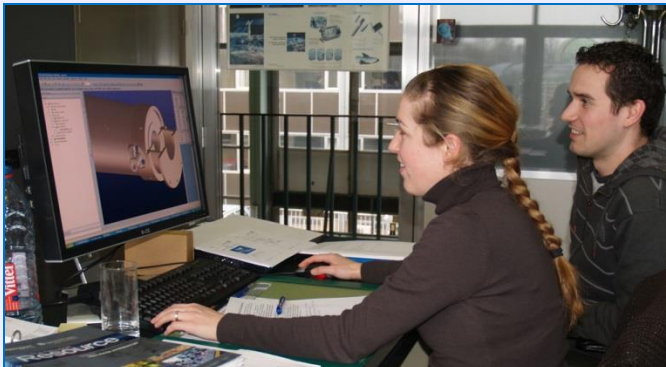


VEX

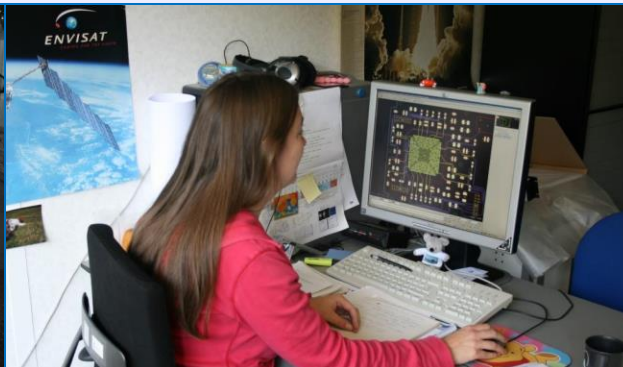


GROUND SUPPORT SOFTWARE

# THE ADULT YEARS 2005-2015



CAD ENGINEERING



ELECTRONIC DESIGN



BRAM



ES

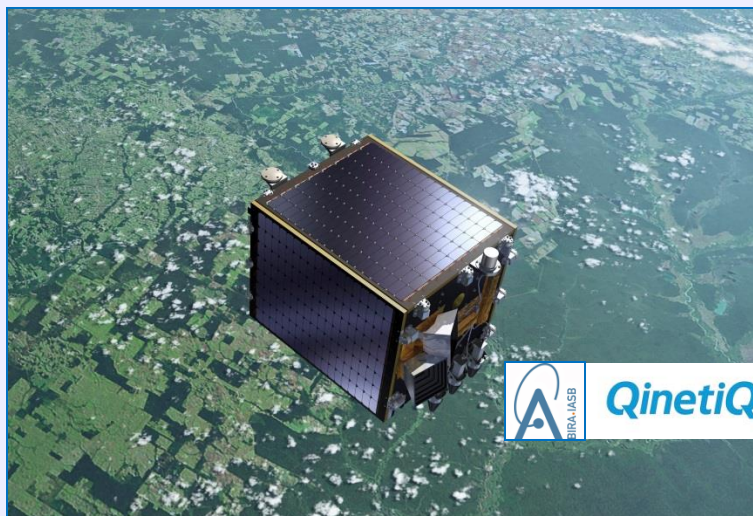


UV AT SOUTHPOLE

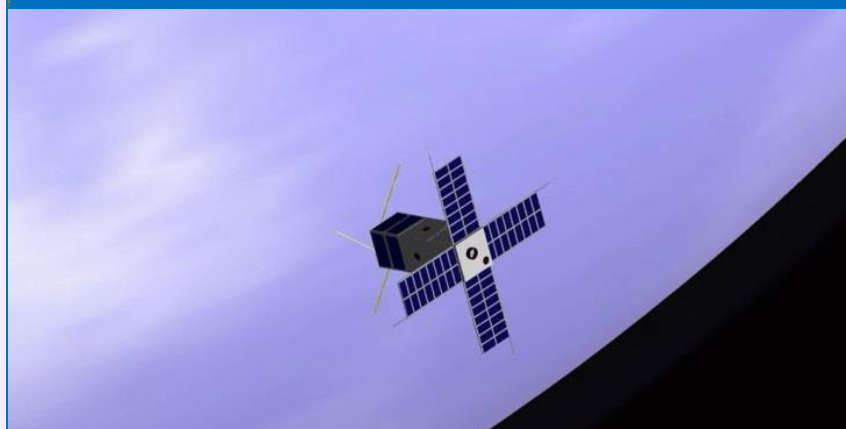
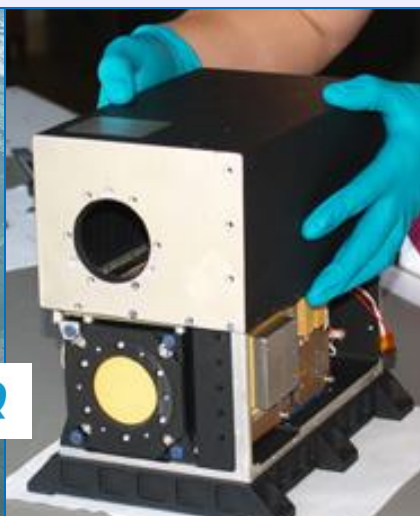


MAXDOAS IN BEIJING CHINA

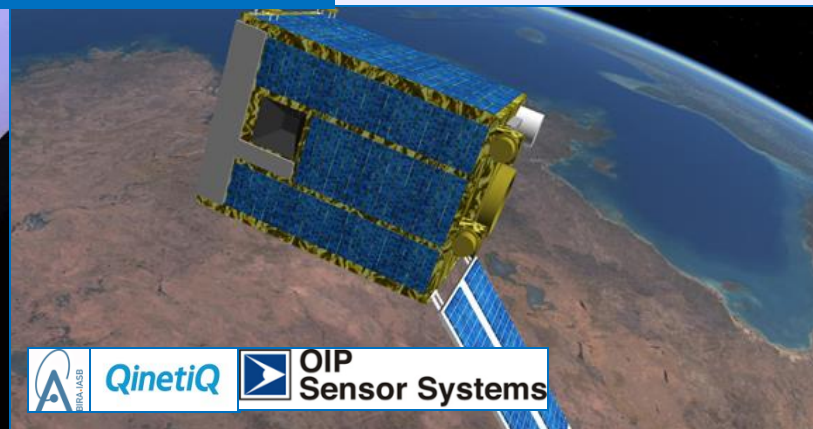
# THE ADULT YEARS 2005-2015



ENERGETIC PARTICLE TELESCOPE ON BOARD PROBA V - 2013



PICASSO PICOSATELLITE

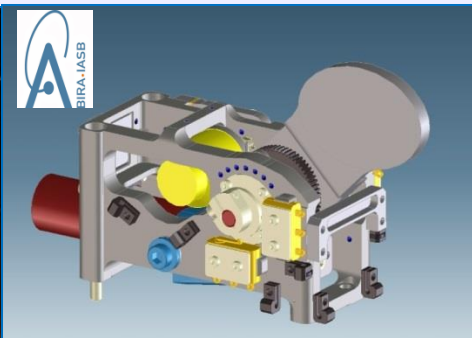


ALTUIS SPACECRAFT & INSTRUMENT

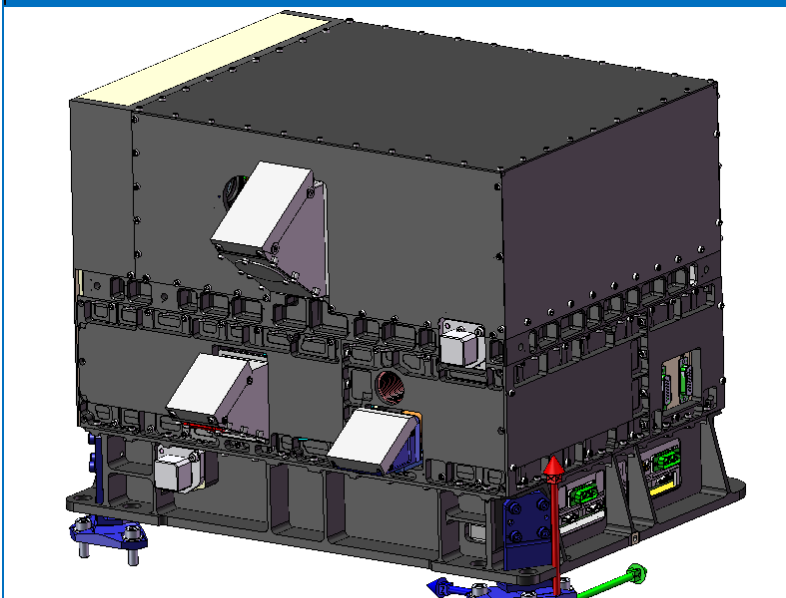
# THE ADULT YEARS 2005-2015



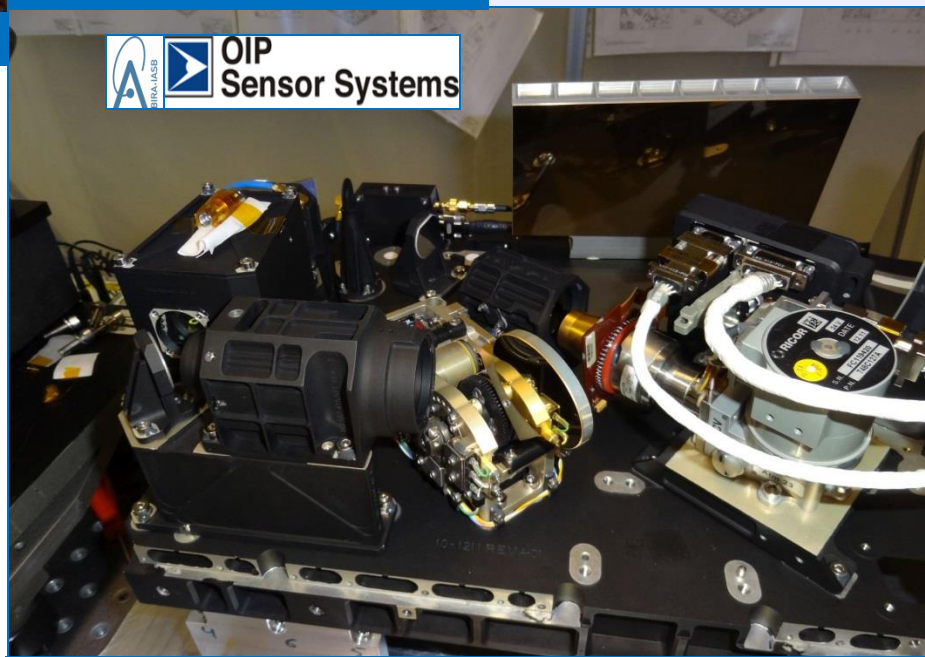
EXOMARS TRACE GAS ORBITER - 2016



FLIP MIRROR MECHANISM  
NOMAD



NOMAD ON EXOMARS TGO - 2016



NADIR CHANNEL OF NOMAD WITH FLIP MIRROR MECHANISM

# THE ADULT YEARS 2005-2015

## 1 The accelerating pace of change ...



## 2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years



**Colossus**  
The electronic computer, with 1,500 vacuum tubes, helped the



**UNIVAC I**  
The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



**Apple II**  
At a price of \$1,298, the compact machine was one of the first massively popular personal computers

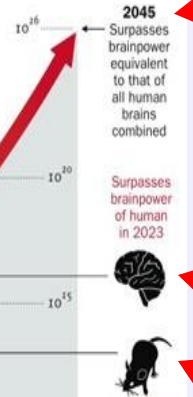
IBM PC, Pentium PC, Pentium II PC

## 3 ... will lead to the Singularity

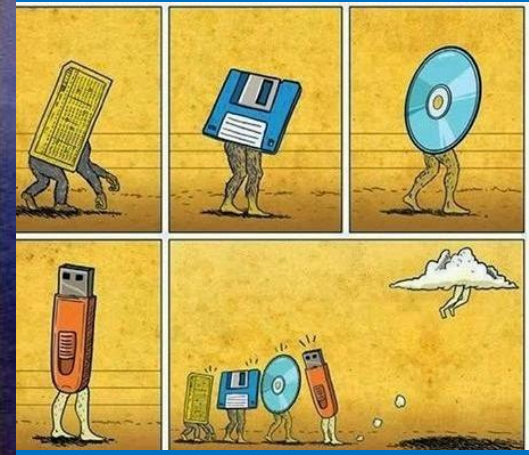
Nvidia Tesla GPU & PC



NEW APPLICATIONS



NEW SOLUTIONS





# BELGIAN USER SUPPORT AND OPERATIONS CENTRE



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# COMMUNICATION SERVICE OF BIRA-IASB



aeronomie.be



- fr en Zoeken
- Wat is BIRA?
- Wat is aeronomie?
- Organigram
- Projecten
- Vacatures
- Nieuws - Pers
- Planetariumbezoek

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woensdag 06 augustus 2014

24

Aanbevelen

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RTL TVI - Le jou

Een eerste foto van de komeet  
AFP



PUBLIC OUTREACH

EDUCATION

ORGANIZING APPEARANCES IN MEDIA

INTERFACE WITH (WRITTEN) PRESS

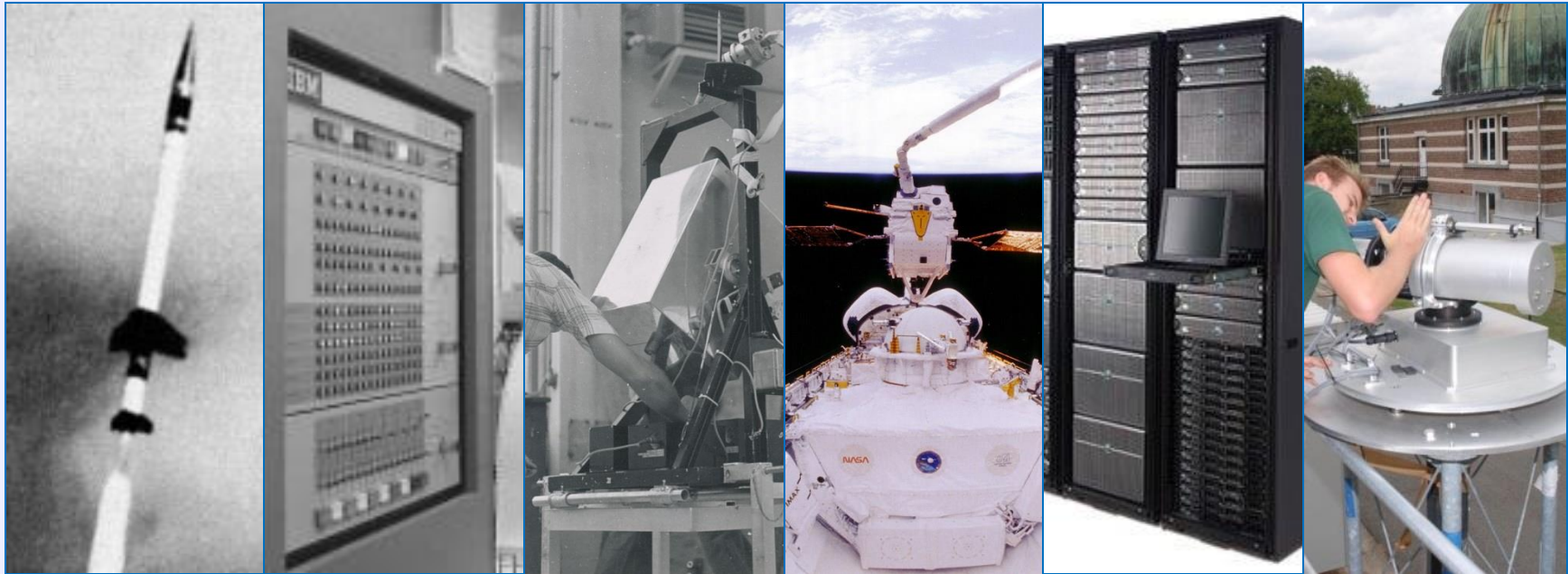
YEARLY REPORTS

WEBSITE OF THE INSTITUTE



# « BITS » AND « PIECES » OF AERONOMY

## 1964...2014



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