Astronomy in the Netherlands

Konrad Kuijken
Leiden Observatory
Four university departments, together form NOVA
Two National research institutes, Space and Radio
Funding agency NWO-exact sciences
Direct funding from ministry of science
Members of ESO, ESA, partners in La Palma, SKA, …,
operating Westerbork, Lofar, …
Landscape

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Landscape

Amsterdam
Groningen
Leiden
Nijmegen

NWO

SRON
ASTRON

Lofar
WSRT
Landscape

NOVA

Amsterdam
Groningen
Leiden
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NWO

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NWO-EW grants, programmes

SRON ASTRON

La Palma
JIVE

NWO

WSRT
Lofar
Community

- ca 80 university academic staff, 150 PhD students, 100 postdocs
- internationally oriented / many trained abroad
  - ‘kick PhD graduates across the border’
- ca 200 science + engineering staff at ASTRON/SRON
- undergraduate BSc programmes attract 100-200 astronomy students per year (variable!)
Strategic Plan

- Every decade
- For all of NL astronomy, written by NCA
  - extensive consultation (esp. with young staff)
  - make choices
    - withdraw from projects to make way for new ones
  - sketch financial roadmap to realising the plan
  - aligned with international roadmaps
Strategic Plan

- Top priority new facilities (leadership role):
  - E-ELT instrument; SPICA/SAFARI; SKA
- Smaller initiatives (partnerships in bigger ones):
  - Euclid, WEAVE, Athena, LOFT, ALMA/EHT, Blackgem
- Fundamental R&D
Research focus

- Broad community
  - galaxies/cosmology
  - interstellar matter/star + planet formation
  - high-energy astrophysics
  - instrumentation research
Galaxies/cosmology

- Lofar: 21cm reionization signal
- KiDS/Euclid: growth of large-scale structure (dark E,M)
- Simulations: galaxy formation physics
- HST/ALMA: high-redshift galaxy population
- VLT: Stellar populations, streams
Star formation, exoplanets

- lab/APEX/ALMA: astrochemistry
- SMA/ALMA: protoplanetary disks
- VLT: exoplanets
- high-contrast imaging instrumentation
High energy astrophysics

- VIRGO/eLISA/BlackGEM: gravitational waves and their sources
- WSRT/Lofar/LOFT: neutron star physics
- Lofar/Pierre Auger/Fermi/CTA: particle astrophysics
Instrumentation

- Active groups at universities, ASTRON, SRON, NOVA
  - ASTRON: radio
  - NOVA: optical/IR
  - SRON: Xray detectors, submm receivers
  - universities: AO, monitoring, mid-IR
Data processing

- Gaia, MUSE, VST, Euclid, Lofar, SKA, ...

- Significant efforts, specialised, avoid re-inventing the wheel

- shared infrastructures for storage & handling

- specialized pipelines (eg Euclid) build on earlier work (eg KiDS survey at ESO)
Choices

- We do not do everything
- No involvement in CMB missions
- No involvement in LSST, Sloan, DES, …

- Opportunities for smaller programmes through using ESO, ESA, … facilities
Interdisciplinarity

- Links with:
  - physics
  - chemistry
  - computer science
  - Euclid
  - CTA
  - VIRGO/LISA
  - data mining

- Education & Outreach
On/just beyond the horizon

- E-ELT
- SKA
- Spica/Safari
- Euclid
- CTA
- Athena
- LISA

Strong involvement in each

Science-motivated

Interesting workpackages

Aligned with technical know-how
Main focus of ground-based O/IR instrumentation

NOVA has grown into the national home base

E-ELT instrumentation role crucial
- scientifically
- programmatically

science case —> instrument building —> GTO —> science return + training of young astronomers
- E-ELT decision (Dec’14) key to maintain momentum

- VLT mature facility with much potential still

- La Silla and APEX testbed for innovation

- ALMA access transformational
Magic formula?

- Fundamental science
- Attractive to wider public and to children/students
- Stimulates high-tech instrumentation development
- (Big data)
- Small community, self-organised, open to the world