OPTICON

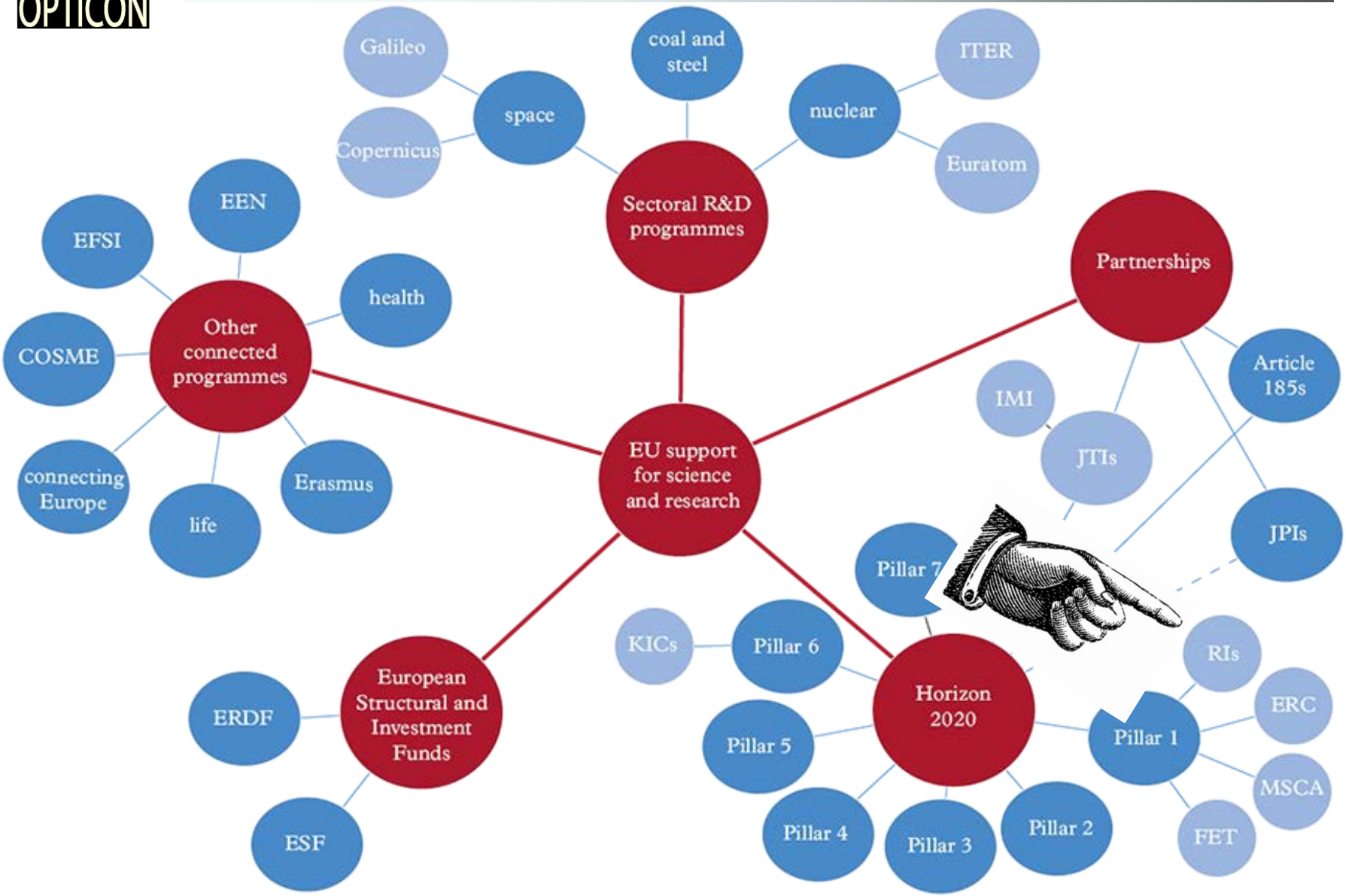
EC Optical InfraRed Cordination Network for Astronomy

- FP5 (2000-2004) Start-up networking
- FP6 (2004-2008) 47 partners €19M (5 years)
- FP7-1 (2009-2012) 30 partners €10M (4 years)
- FP7-2 (2013-2016) 25 partners €8.5M (4 years)
- Partners: funding agencies, hardware R&D groups, observatories, industrial partners
- Activities: observing access, technology R&D, networking/community development

H2020 (2017-2020) 32 partners, €10M (4 years)

Coordinator: Gerry Gilmore; Project Manager: Dr Gudrun Pebody; Project Scientist: Dr John Davies (ATC Edinburgh)

The EC science funding maze



Participants are

Funding agencies
- UK, Fr, D, It, Sp, Nl (+ESO)
Industry
university technology groups
telescope operators

This list is for H2020

We are “Research Infrastructures”

OPTICON: Optical Infrared Coordination Network for Astronomy

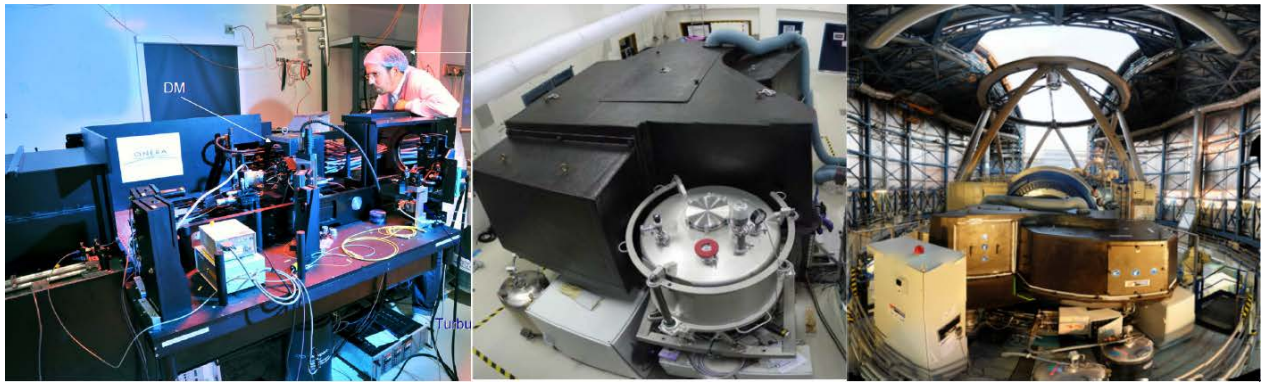
#	Participant organisation name	Country
1	THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE	UK
2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	FR
3	ISTITUTO NAZIONALE DI ASTROFISICA	IT
4	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	DE
5	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	UK
6	EUROPEAN SOUTHERN OBSERVATORY	IO
7	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES
8	UNIVERSITEIT LEIDEN	NL
9	FIRST LIGHT IMAGING SAS	FR
10	OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES	FR
11	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO	NL
12	INSTITUTO DE ASTROFISICA DE CANARIAS	ES
13	MAGYAR TUDOMANYOS AKADEMIA CSILLAGASZATI ES FOLDTUDOMANYI KUTATOKOZPONT	HU
14	UNIWERSYTET WARSZAWSKI	PL
15	NATIONAL OBSERVATORY OF ATHENS	EL
16	NATIONAL UNIVERSITY OF IRELAND, GALWAY	IE
17	KOBENHAVNS UNIVERSITET	DK
18	UNIVERSITE DE LIEGE	BE
19	UNIVERSIDADE DO PORTO	PT
20	LEIBNIZ-INSTITUT FUR ASTROPHYSIK POTSDAM (AIP)	DE
21	POLITECNICO DI MILANO	IT
22	NORDIC OPTICAL TELESCOPE SCIENTIFIC ASSOCIATION	SE
23	DEPARTMENT OF INDUSTRY - AUSTRALIA	AU
24	HERIOT-WATT UNIVERSITY	UK
25	THE UNIVERSITY COURT OF THE UNIVERSITY OF ST ANDREWS	UK
26	LIVERPOOL JOHN MOORES UNIVERSITY	UK
27	UNIVERSITY OF DURHAM	UK
28	THE UNIVERSITY OF EXETER	UK
29	UNIVERSITY OF BATH	UK
30	THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD	UK
31	THE UNIVERSITY OF SHEFFIELD	UK
32	INSTITUT D'OPTIQUE THEORIQUE ET APPLIQUEE IOTA	FR

Opticon- early ambitions

- Build European astronomical community
- Access developing EC science resources

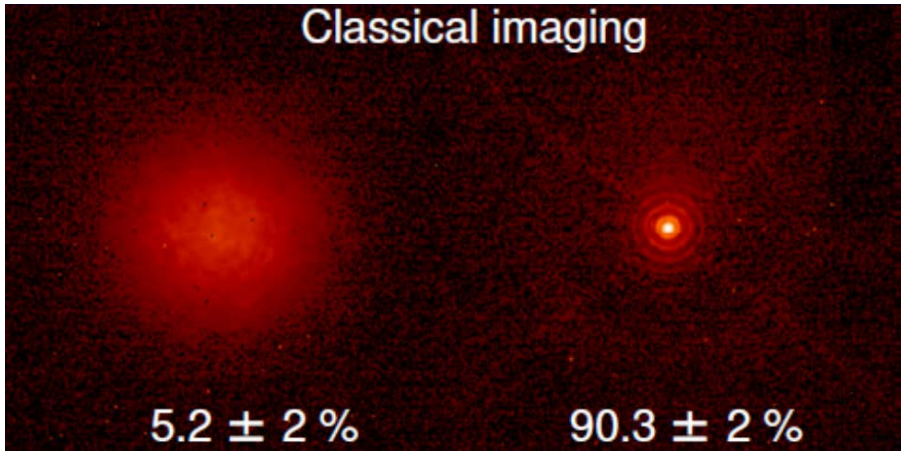
- Day-one Projects:
- Future strategy for medium-sized European telescopes
- Develop proposal for Hubble-like EC Fellowships (Benvenuti)
- Expand astronomy archiving with ESA-ESO-ECSTScI – Genova/Benvenuti
- Develop new high-tech capabilities with multi-national teams (software-Peter Quinn & RTD/adaptive optics – Guy Monnet)
- Build community support/develop the science case for future ELT project (Gilmozzi+Gilmore)

SPHERE @ VLT: OPTICON RTD provided ~30% of the AO technology

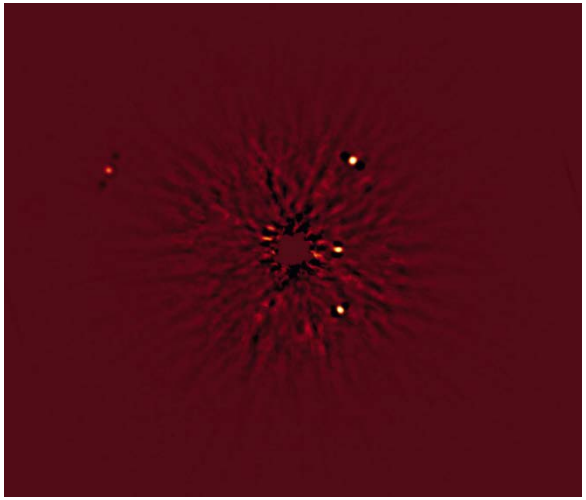


Various phases of SPHERE/SAXO integration and tests. Left: SAXO tests at LESIA in Paris in 2012. Centre: the fully integrated instrument at IPAG in Grenoble before shipping to the VLT in early January 2014. Right: SPHERE installed on the VLT telescope UT3 end of April 2014.

SPHERE PSF in nominal turbulence at VLT



4 planets round HR8799
Sphere H-band Zurb etal

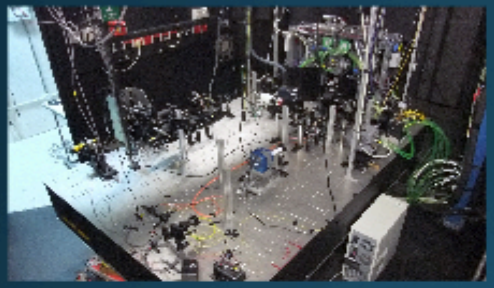


CANARY – adaptive optics testbed

With the Na laser outside Canary+WHT is a 1:1 scale E-ELT testbed

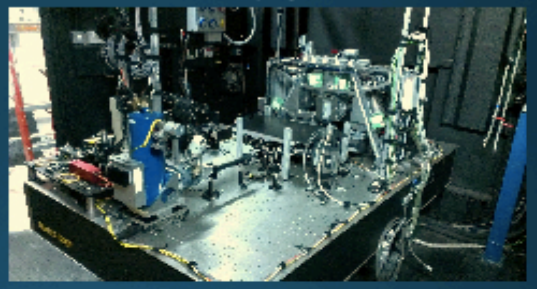
CANARY: Phase A to Phase C2

2010

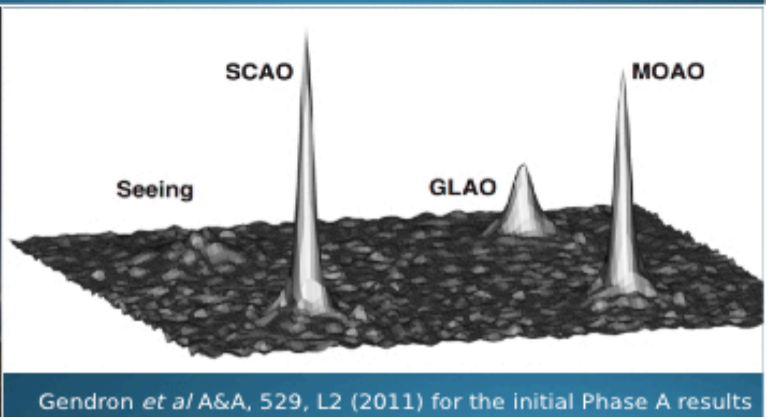


1 NGS Telescope Simulator
1 52-actuator DM
1 Tip-tilt Mirror
3 off-axis 7x7 WFSs
1 on-axis truth sensor
1 InGaAS NIR camera
1 full-field NGS acquisition camera

2015



1 NGS & LGS Telescope Simulator
1 52-actuator DM
1 241-actuator DM
1 Tip-tilt Mirror
3 off-axis 7x7 WFSs
4 off-axis 14x14 LGS WFS
1 LGS tip-tilt mirror
1 on-axis 14x14 truth sensor
1 NICMOS NIR camera
2 DM figure sensors
1 Multi-LGS Laser Launch System
1 full-field NGS acquisition camera
1 LGS acquisition camera
1 Calibration source system
1 Centralised triggering and timing system

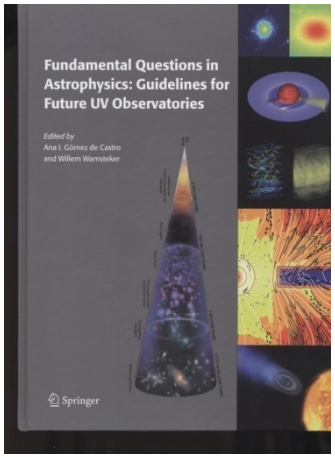


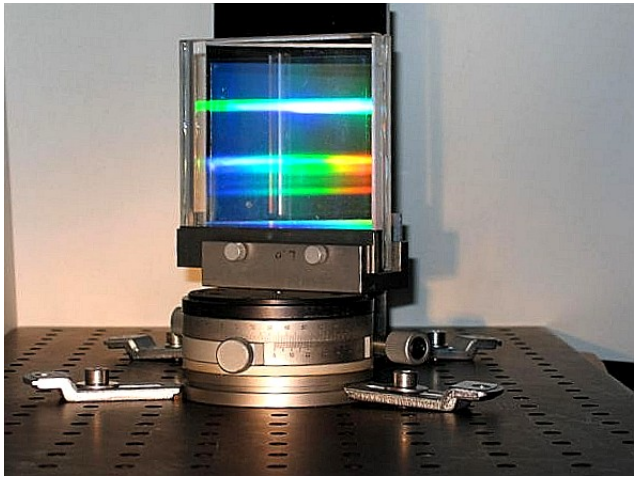
Gendron *et al* A&A, 529, L2 (2011) for the initial Phase A results

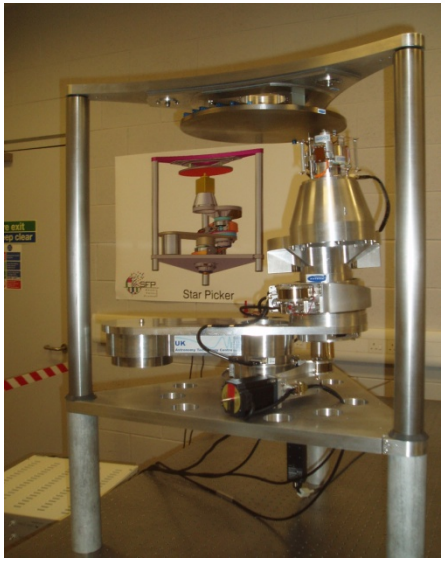
OPTICON is an I3, so JRA, Networks, TNA

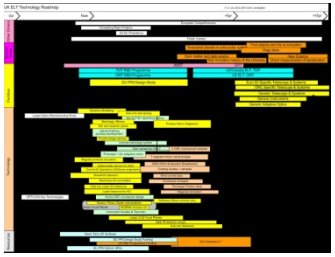
Technology R & D

2009-2012. Euro 10M









Later ELT Science meetings

Marseilles 2003

Florence 2004

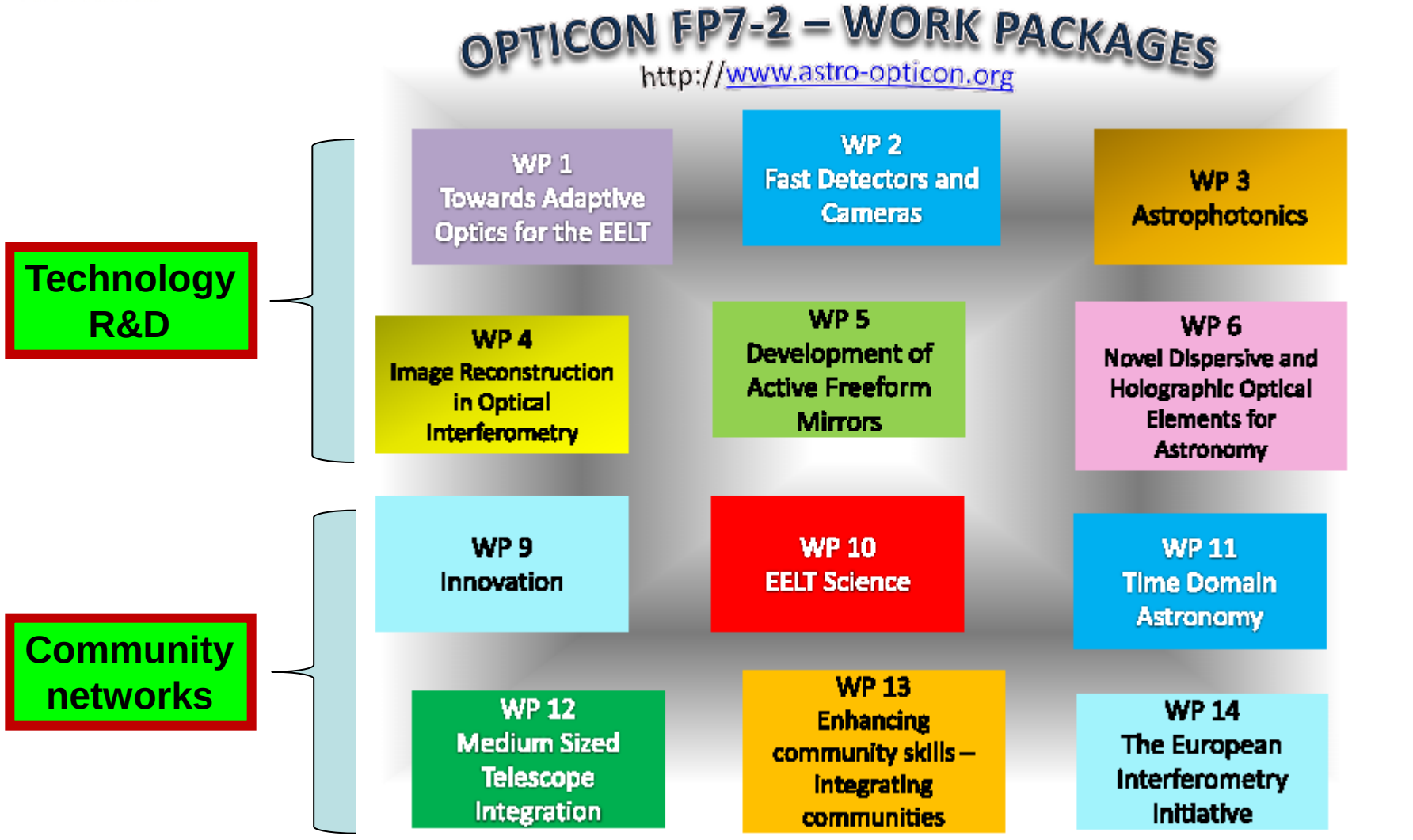
Marseilles 2006

Some other completed projects

- Developments in Adaptive Optics technology
- Developed OCAM, fast wavefront sensing cameras
- European supplier of VPH gratings
- AVO standards, support to CDS expanded role
- UV-community White Paper
- High Time Resolution White Paper
- Medium Telescopes Future Strategy White Paper
- IFU-3D data reduction initiative
- European Solar Telescope technology support

- at this time of UK insanity, we are good Europeans

Current OPTICON activities



H2020 – the opportunity continues

1) Adaptive optics (Fr): extend and expand the successful AO community to retain viability outside the E-ELT instrument teams

2) Fast detectors & Cameras (Fr): implement fast CMOS cameras and integrate into ELT real time controllers

3) Astrophotonics (D): explore potentially disruptive technologies

4) Interferometry (D): deliver performance from new VLTI upgrades

5) Additive manufacture/3-D printing (UK): lighter, cheaper, faster…

6) Active Freeform mirrors (Nl): lighter, cheaper, faster…

7) New processes & materials (It): lighter, cheaper, faster…

Networking in H2020

- WP10 – CANARY as a common facility – TNA+training
- WP11 – VLTI. Fizeau staff exchanges; 2x schools, community days, science board meeting, strategy plans
- WP12 – “new community” and tech training schools
- **WP13 – Time Domain Astro: lots!**
- WP14 – future tech, instrument, industry plans
- WP15 – future strategy planning – the big ask
- **WP16 – TNA delivery: “classic” and TDA**

H2020 – TNA Access

- Continue current TNA access on the 4-m telescopes: CFHT, TNG, AAT, CAHA3.5, & WHT until WEAVE in use in 2018

- **Continue and expand use of smaller and robotic facilities, with special emphasis on time domain astronomy – transient follow-ups, monitoring**
- **Complement this with a central open dBase of reduced calibrated data linked to the Gaia Alerts system (https://gaia.ac.uk)**

- Establish two VLTI regional centres (Nice, Exeter)
- Make the CANARY + WHT adaptive optics testbed an experiment open to new collaborations

- Support these with networks:
- Community adaptive optics expertise
- European Interferometry Initiative
- **Time Domain Astronomy community development and coordination**
- Training schools

- Do we reach all the relevant populations?

  [EC demand elite, not local, infrastructures.]

- Should/could we work usefully with non-EC neighbours with new major facilities: Iran, India, Turkey? Others?

- Impact of no EC resources: on telescopes? On PIs?

Two postdoc positions to support Alerts Followup

- https://jobregister.aas.org/node/56868
- closing date Dec 21 – general ad, one Gaia alerts post
- To start end Sept 2017 (or earlier)

- http://www.jobs.ac.uk/job/AVV427/research-assistant-associate/
- Closing date Jan 3 – position available immediately

- Also see:
- http://www.ast.cam.ac.uk/people/vacancies