



Celebrating 50 Years of
Achievement in Space Science
and Astronomy

1960-2010

Space Research Centre

18th March 2009
STFC Advanced Technology Showcase 2009

**Knowledge Exchange and Economic
Impact from Space Instrumentation
Research and Development**

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The University of Leicester Space Research Centre



- Part of the Department of Physics and Astronomy
- Foci in High Energy Astrophysics, Planetary Science (STFC), Earth Observation Science (NERC)
- 75 people, housed in purpose-built Labs (550 sq.m Michael Atiyah Phase IIIT – ready August 2009)
- Diversified funding (~65-70% STFC); ~£4M pa
- Innovative laboratory programme in detectors and optics
- Engaged with India. China and Turkey
- Nationally recognised for Knowledge Exchange
- Emda-funded Technology Audit by Qi3 in 2007 considered 35 technologies (first 10 all now funded)
- Spin-off companies ; Gamma Technologies Ltd 11.03.09
- Agreements with EADS Astrium UK, Magna Parva Ltd.

Transferable Technologies

- Life marker chip and X-ray spectrometer for EXOMARS
- X-ray Spectrometers for Marco Polo, MoonLITE
- Low-mass X-ray Telescope for BepiColombo
- Soil heat flow by Gamma ray backscatter
- Thin film sensors for dust and debris detection
- Compact auroral UV imager (WFAI) for KuaFu B
- Wide field Lobster-eye X-ray telescopes
- Bulk conductive, high count rate microchannel plate detectors
- X-ray polarimeter based on novel dichroic materials
- X-ray Interferometer, Active X-ray optics
- High temperature Silicon Carbide X-ray detectors for NDT
- Cryogenic X-ray spectrometers
- Student CUBESAT
- Gold blacking for IR detectors
- Centre for Earth Observation Instrumentation (CEOI) and G-STEP
- Trace gas spectroscopy

e2v

PHOTONIS

EADS
ASTRIUM

QinetiQ

magnaparva

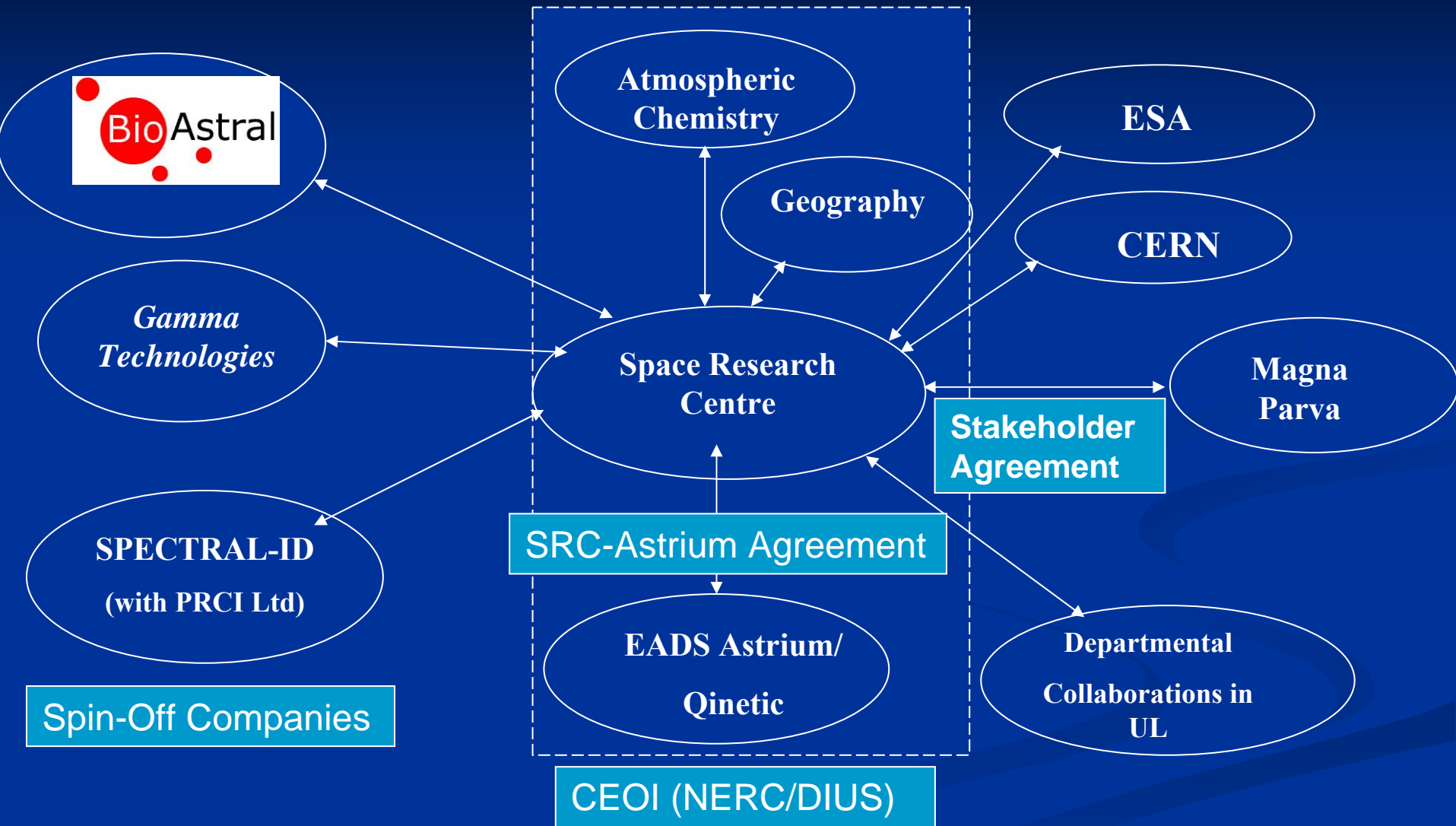
Knowledge Exchange Timeline

- Bioimaging Unit (1997)
- Beta autoradiography (1996 ; Mk II system at right)
- High resolution gamma camera (1998; GTL formed 2008)
- Optical fluorescence with STJs (2001; Bioastral formed, 2003)
- TCS / KT Associateships (2001, 2008)
- Life Marker Chips in forensic science (2002)
- Applications of astronomical software (various)
- STFC Innovation Fellowship (2008)
- Anti-counterfeiting (2004: Spectral ID formed, 2008)
- High Content Biology (partnership with CERN, 2006)
- Oil Prospecting by Radar (2008)
- Point of Care (2009)



Total Grant and Contract Value > £5M

SRC Knowledge Exchange Network - 2009



1. Mini Gamma Ray Camera (MGRC)

Scintillator-coupled CCD with sub-mm resolution at 140 keV

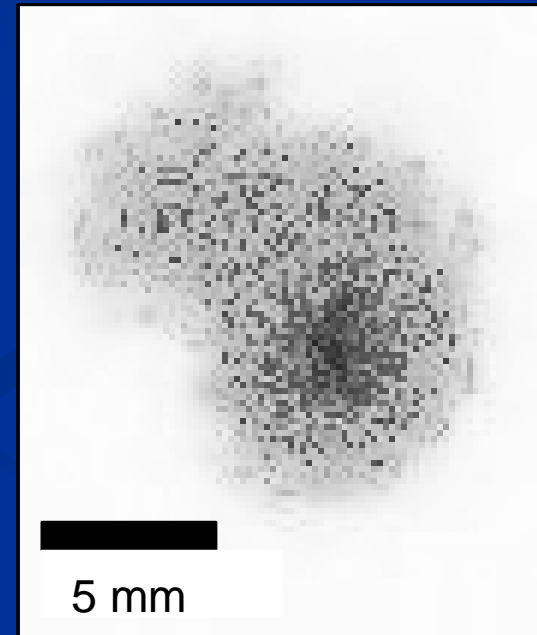
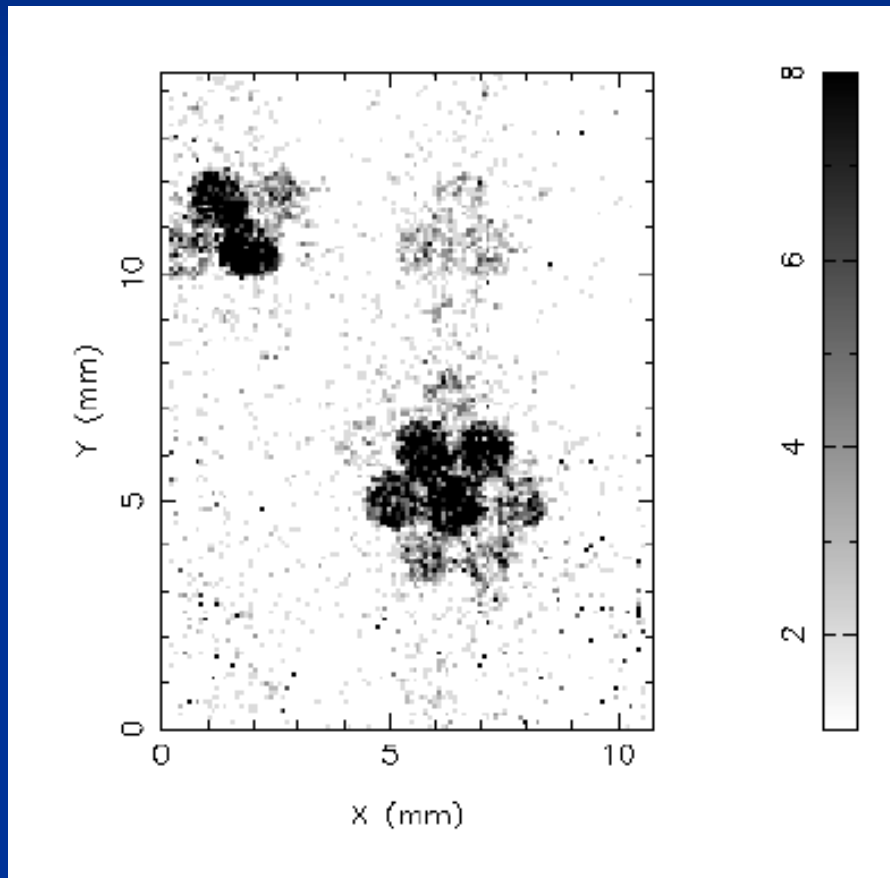
- Sentinel lymph node imaging
- Nuclear cardiology
- Assessment of aspiration in acute stroke patients
- The imaging of bone lesions
- Lacrimal drainage (eye)
- Thyroid morphology
- Nasal clearance (drug delivery studies)



First patient trials imminent at Queens Medical Centre / Univ. Nottingham
Gamma Technologies Ltd. – spin-off company formation (UL/UN/ICR)

MGRC performance versus conventional γ -camera

Two images of a ^{99m}Tc phantom from (left) the prototype MGRC and (right) a large field-of-view GE Maxicamera 400 gamma camera. The phantom was made from Perspex, 5 mm thick, having one 3mm diameter source and two 2mm diameter sources on 5mm pitches. Each hole was filled with a ^{99m}Tc solution (activity 3MBq per 100 μl).

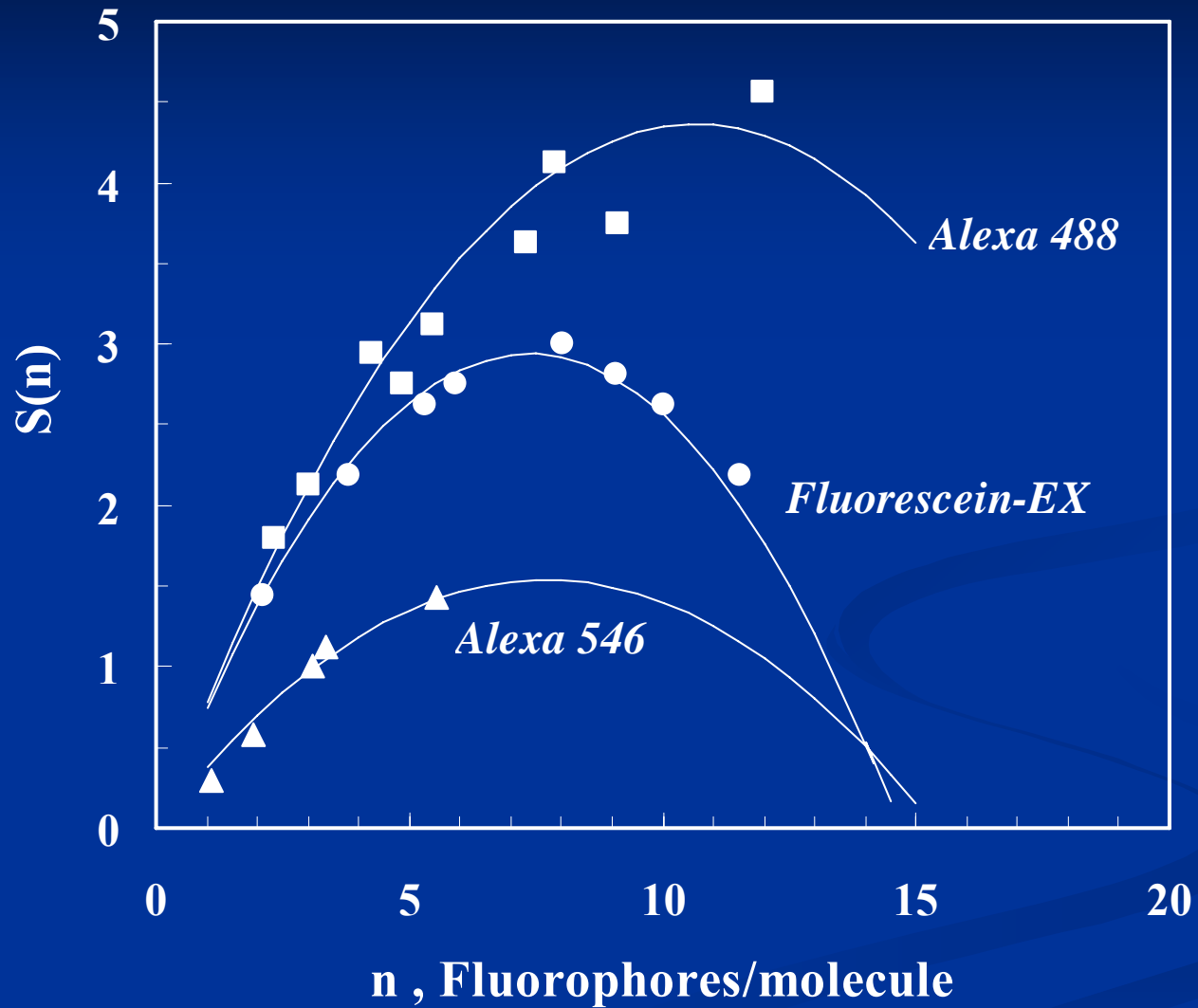


2. BioAstral

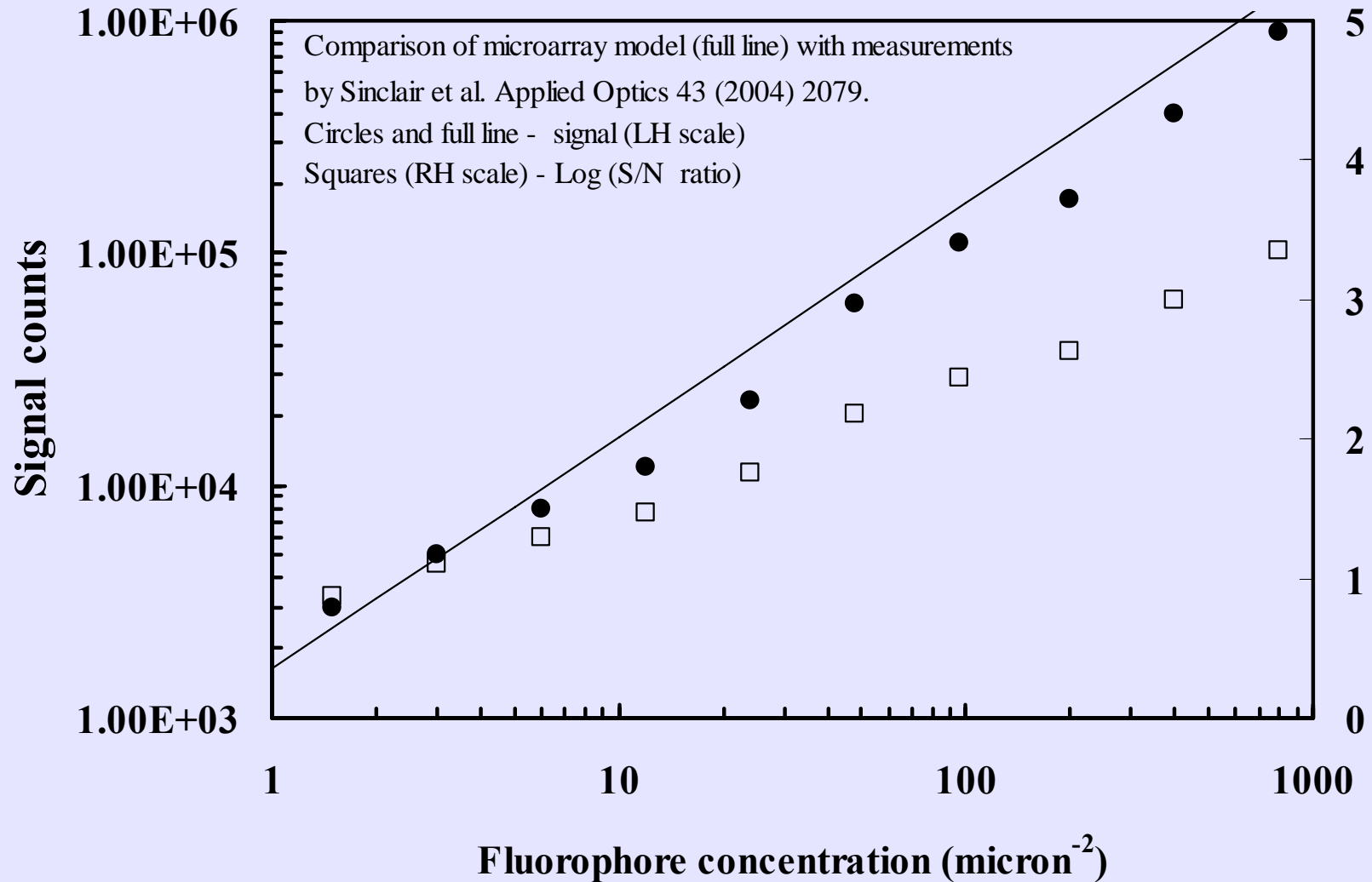


The Future of Biology is the Detection of Light

Spin-off from Spin-off : Fluorescence Self-Quenching



Quantitative Modelling



3. SPECTRAL-ID:

Identifying counterfeits by optical reflectance spectroscopy



Faulkes Spectrograph

PPARC-funded construction of optical spectrographs on 2metre public-access telescopes in Australia and Hawaii

