Technology in the UK Space Agency:

An Update for NCEO/CEOI Conference

http://www.bis.gov.uk/ukspaceagency

8 September 2011

Quick Overview

- ✓ Reminder of organisation
- ✓ Existing Technology Programmes
- ✓ NSTP Overview
- ✓ NSTP sub-elements
- ✓ Whither CEOI ?
- ✓ Next steps

Who We Are

- Fully operational in April 2011
- Replaced the British National Space Centre (BNSC)
- Integrates space budgets from four organisations and policy responsibilities from others

→ more coherence and efficiency

→ a sweep of activities from basic science, through technology and on to applications

- An executive agency of the Department of Business Innovation and Skills (BIS)
- HQ in Swindon, Wiltshire
- Offices in London and Harwell, Oxford

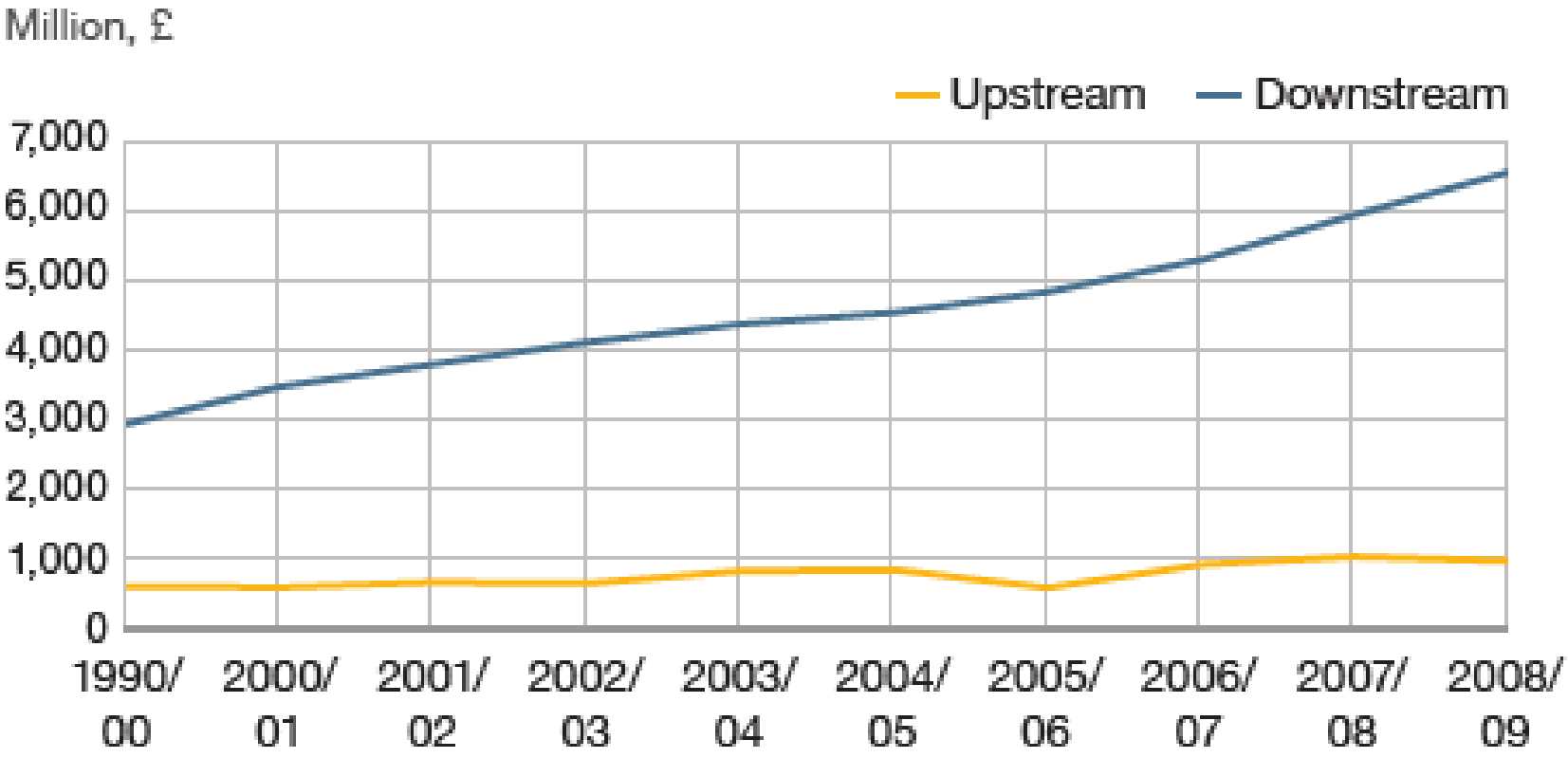
Dr David Williams

Chief Executive

Purpose of UK Space Agency

- To meet national needs, the Agency is responsible for ensuring that the UK retains and grows a strategic capability in space-based systems, technologies, science and applications.
- The UK Space Agency will therefore enable sustained economic growth, scientific excellence and societal benefits from the UK civil space sector.

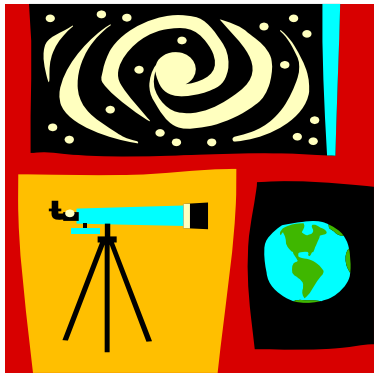
UK downstream and upstream space industry turnover



Source: Oxford Economics

The UK space sector has changed

- ✓ Formation of UK Space Agency
- ✓ Industry-led strategy to grow the sector over ten years (‘Space IGS’)
  - ➢ Goal to win 10% of £400B market in 2030
- ✓ Establishment of an ESA presence in the UK
- ✓ Creation of the International Space Innovation Centre at Harwell
- ✓ New businesses exploiting space



…but where does science fit in ?

…Science is at the heart of the UK civil space investment

- <5% of the UK space sector
- But half of government space spending
  - And the majority of that is outwards-looking space science

✓ ESA Science Programme

✓ Earth Observation Envelope Programme

✓ ESA Robotic Exploration Programme

✓ Bilateral scientific missions

✓ National activities

✘ European Life and Physical Sciences Programme

Our strategy *'To lead and sustain the growth of the UK Space Sector'*

Growth through exports

- Winning a larger share of the global market

Growth through innovation

- New technologies and applications of space

Growth through exploiting new opportunities

- New uses of space such as climate change services

Growth through smarter government

- Using space across the public sector to deliver more efficient services

Education for growth

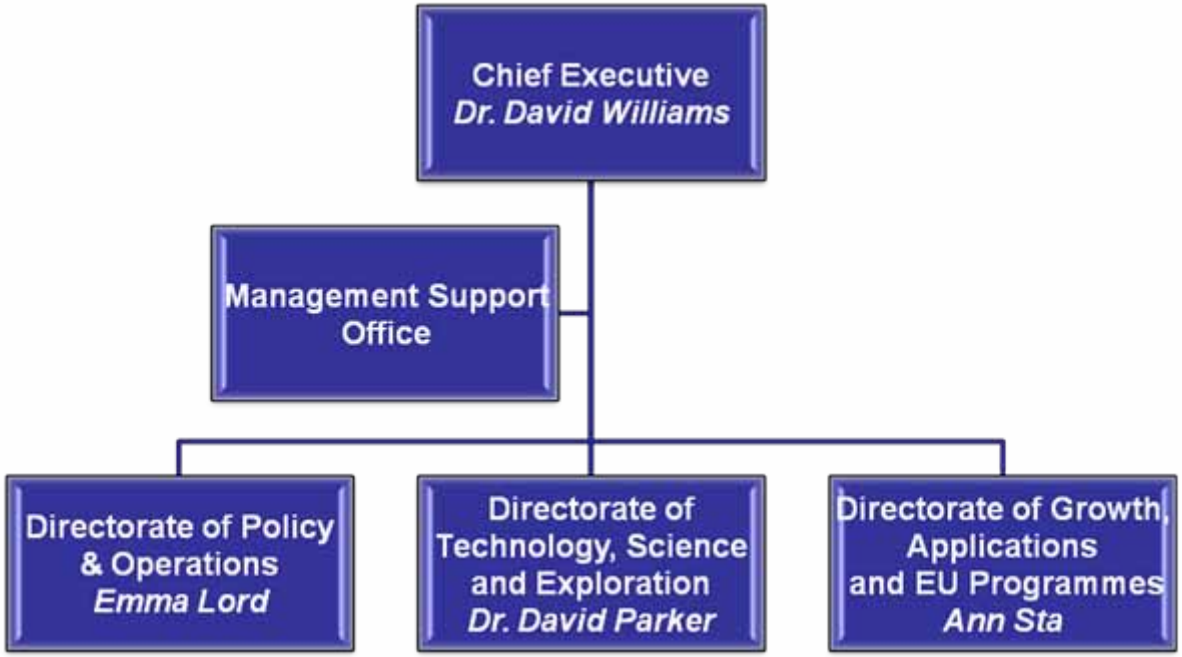
- Education for space (the skills the industry needs to grow) and space for education (using space to attract young people into STEM)

Science as an enabler of growth

- Exploring space to gain new knowledge, train the next generation and create new technology

14 week Public Consultation
1 April – 8 July 2011

Senior Management



Three axes to deliver our strategy and objectives:

- D/PO provides the policy advice, regulation and backbone of the Agency
- D/TSE delivers the science, education and technology programmes nationally and through ESA
- D/GAE manages EU space policy & stimulates new applications of space in business and in government

Governance and Advice

Space Leadership Council

Strategic Advice

Minister

Director General Knowledge & Innovation

Agency Steering Board

Advice to Chief Exec.

UK Space Agency Chief Executive

Agency Audit Committee

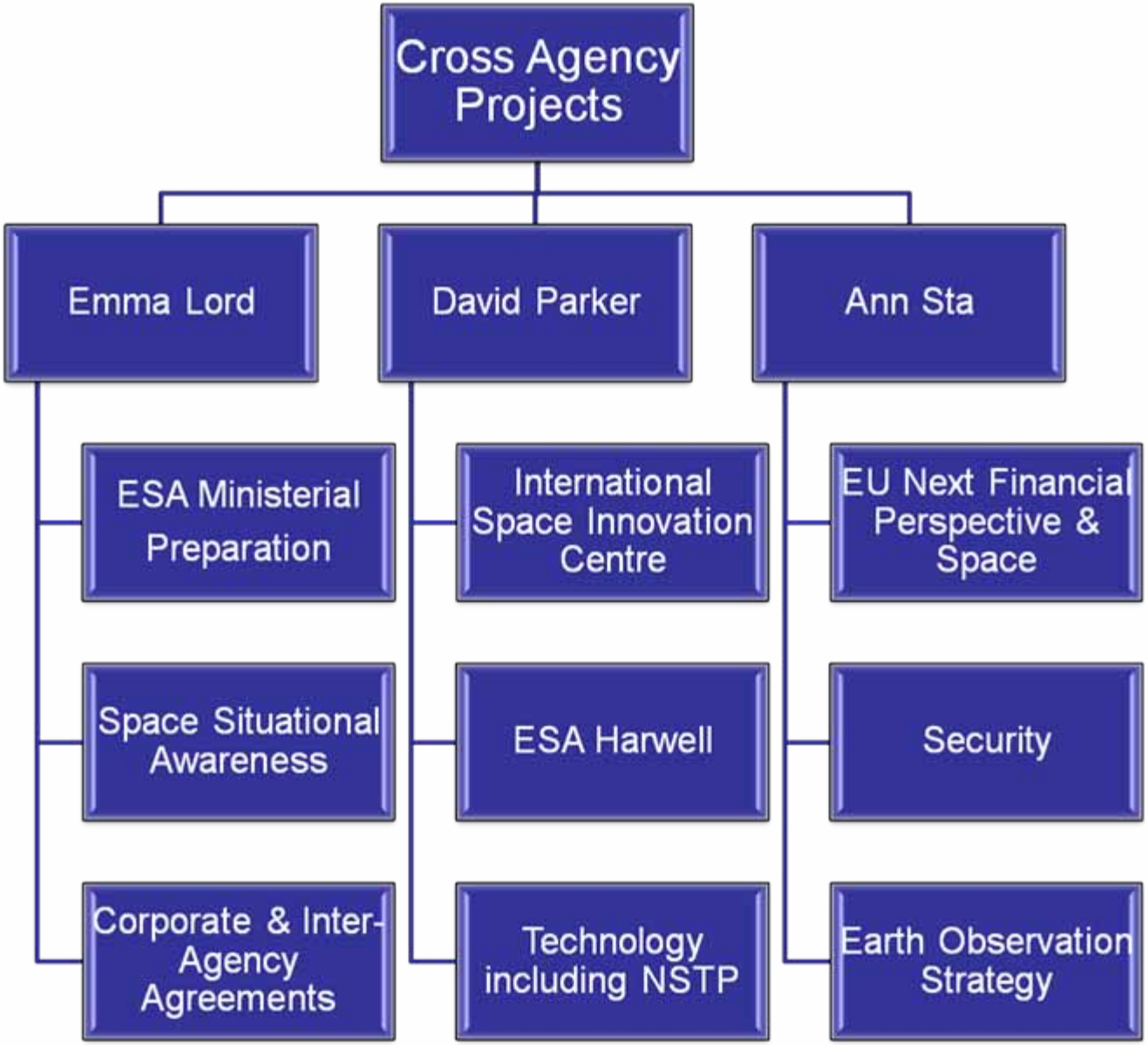
Formal oversight

Agency Advisory Bodies:

Telecoms/Nav
Science
Technology
Exploration
Earth Observation
Exports/Trade
Projects Review/Selection
Industrial Policy at ESA
etc.

Policy and Programme Advice

UK Space Agency Executive Team


Cross Agency Projects
Emma Lord
David Parker
Ann Sta
ESA Ministerial Preparation
International Space Innovation Centre
EU Next Financial Perspective & Space
Space Situational Awareness
ESA Harwell
Security
Corporate & Inter-Agency Agreements
Technology including NSTP
Earth Observation Strategy

Agency funding of Technology and Business

- Major funding via ESA
  - Technology Research Programme (mandatory)
  - Technology Transfer Programme (mandatory)
  - GSTP (optional)
  - Programme specific (ARTES, EOEP, CTP, MREP etc.)
  - Business Incubator

Technology - Existing National Programmes

Feasibility Studies for Innovation in Space

(TSB)

Exploration technology (CREST)

Exploration spin out (Aurora KE)

(UKSA)

Cosmic Vision National

(UKSA)

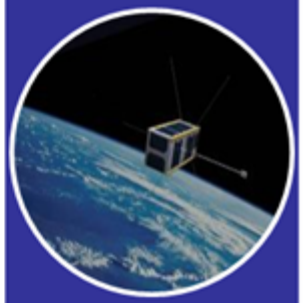
Centre for Earth Observation Instrumentation

GIFTSS (promotion of EO data take-up in government)

(NERC + UKSA)

TechDemoSat-1 (160kg microsat)

(TSB)



UKube-1 (cubesat)

(TSB + UKSA+ STFC)

Basic R&D through to flight demonstrations and applications

National Space Technology Programme

A set of National Space Technology Roadmaps issued on April 8th 2011

Will inform a new National Space Technology Programme (new funding announced in March 2011)

Programme will be augmented by industrial funding

Plus partnership with Technology Strategy Board and the Research Councils

ISIC will be a key delivery mechanism

Five NSTP Roadmaps

Telecommunications

Sensing

Position, Navigation & Timing

Exploration and Robotics

Access to Space

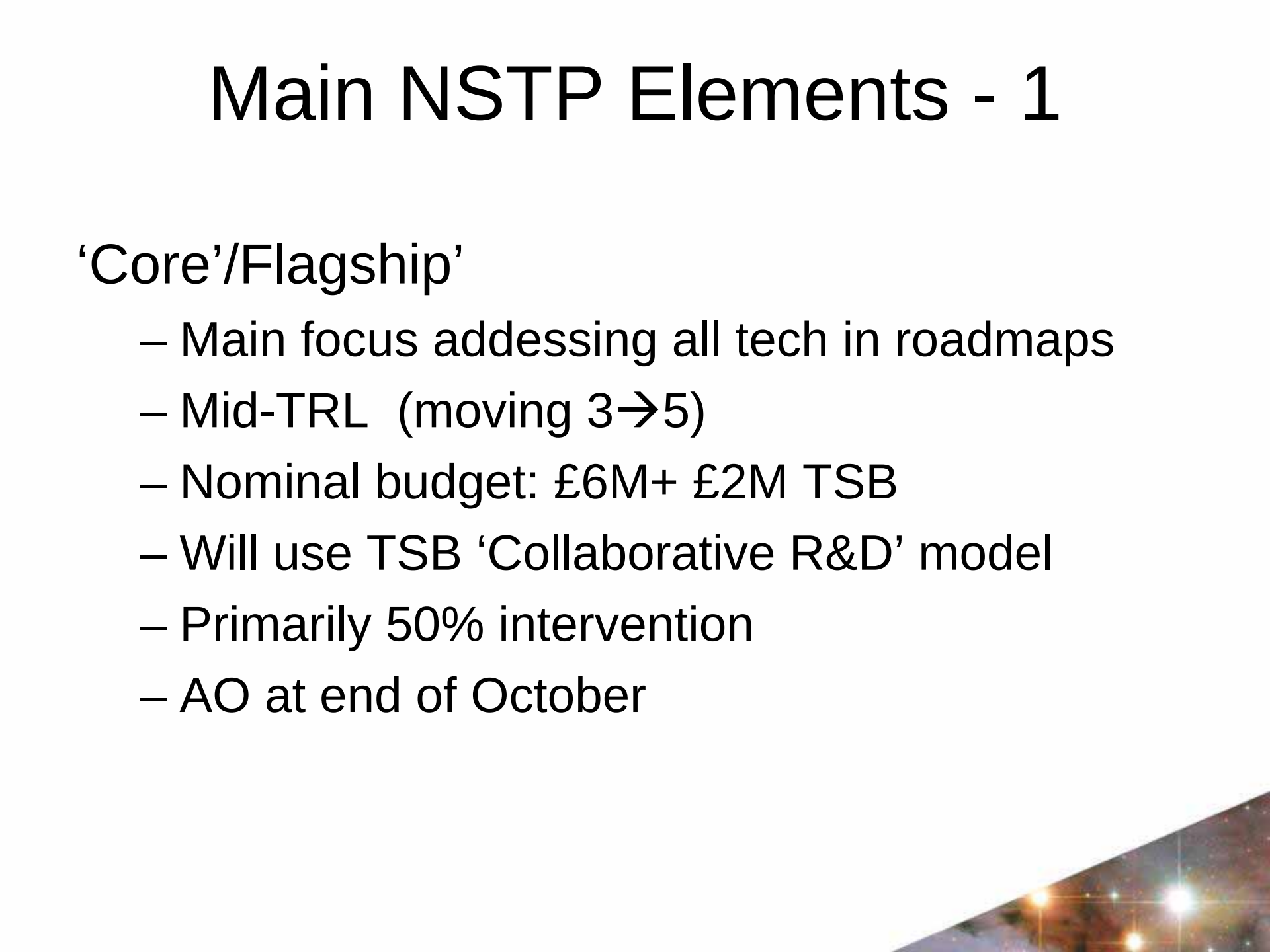
Key Message

- NSTP primarily responds to the growth agenda of the UK space sector
- Not-focused on pure science objectives
  - BUT be creative:
  - Translation of science into technology?
  - Using technology from one space field into another ?
  - Technology of generic applicability including EO?
  - Technology to be first applied to science before becoming commercialised ?

Main NSTP Elements - 1

‘Core’/Flagship’

- Main focus addessing all tech in roadmaps
- Mid-TRL (moving 3→5)
- Nominal budget: £6M+ £2M TSB
- Will use TSB ‘Collaborative R&D’ model
- Primarily 50% intervention
- AO at end of October



Main NSTP Elements - 2

‘Pathfinder’

- Nominal budget: £500k
- Focused on early phase/low TRL
- Typically £50k activities
- Help stimulate longer term activities
- May be targeted at specific items in the roadmaps
- Procurement likely to be similar to CEOI model

Main NSTP Elements - 3

‘Demonstration Programmes’

- Nominal budget: £500k
- Focused on supporting flight demonstrators
- Including TechDemoSat 1 (competitive procurement of ground segment)
- Preparation for future technology demonstrators (grant supported studies)
  - TDS 2, 3 ?
  - UKube 2, 3 ?
  - Constellations ?
  - Formation Flying ??

Main NSTP Elements - 4

‘GSTP4 Additional Funds’

- Nominal budget: £1000k
- Top-up to remaining UK subscription in ESA optional technology programme
- Support technology developments in an ESA context and involving non-UK collaborators
- Priorities established via discussions with UKSA and ESA

Main NSTP Elements - 5

‘Focused Co-located projects at ISIC’

- Nominal budget: £500k
- ‘Star Tiger’ model
- Competitively selected projects where a team is located at ISIC Ltd Harwell to undertake an accelerated R&D project taking advantage of the national facilities
- Any subject area from road-maps
- Especially welcome academic-industrial partnerships
- Funding model TBC
- Info on ISIC facilities included in NSTP plan and available from Peter Allen

NSTP Elements - 6

‘Collaboration with Other Public Sector Funders’

- Nominal budget: £1000k
- Resource to jointly fund activities with other public sector bodies
- e.g. NERC, STFC, TSB, DSTL
- Discussions underway
- Funding models variable to suit partners and scale of projects
- Will be re-directed to other elements if not used

Main NSTP Elements - 7

‘Horizon Scanning and Management’

- Nominal budget: £500k
- 100% funded pre-commercial research grants allocated in response to strategic need
- Focused on the long term; exploratory in nature
- Plus dedicated NSTP Programme Manager to work with community and across programme lines

Whither CEOI ?

- Cannot continue without either a re-bidding process or new model

  No decision yet

- Once NSTP underway, Agency Technology Working Group tasked with addressing the way forward for CEOI
- Recognised as effective mixture of low TRL tech development and KT
- But clear gap at mid-TRL
  - NSTP Core addresses this for EO technology with commercial potential
  - But does not offer a route for development up to mission applications in the case of non-ESA (e.g. bilateral) scientific missions

Way forward for EO tech

- Linked to overall EO Business Case work
- Need to take best practice from across Agency ‘heritage’ technology programmes
  - Expand CEOI up to higher TRL ? (‘CEOI plus’)
  - Common technology programme for science-driven technology (space science/Earth observation/exploration?)
  - Other ideas ?
- Your input welcome

Next Steps ?

- Prepare for the NSTP
  - Read and understand the programme plan and the supporting documents
  - Talk to the Agency Technology team
  - Talk to the ISIC team and explore what they can do for you
- Feedback to the Agency Technology project team your views on EO technology development
- Keep in touch via our web site and twitter feed

Good luck

UK Space Agency

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