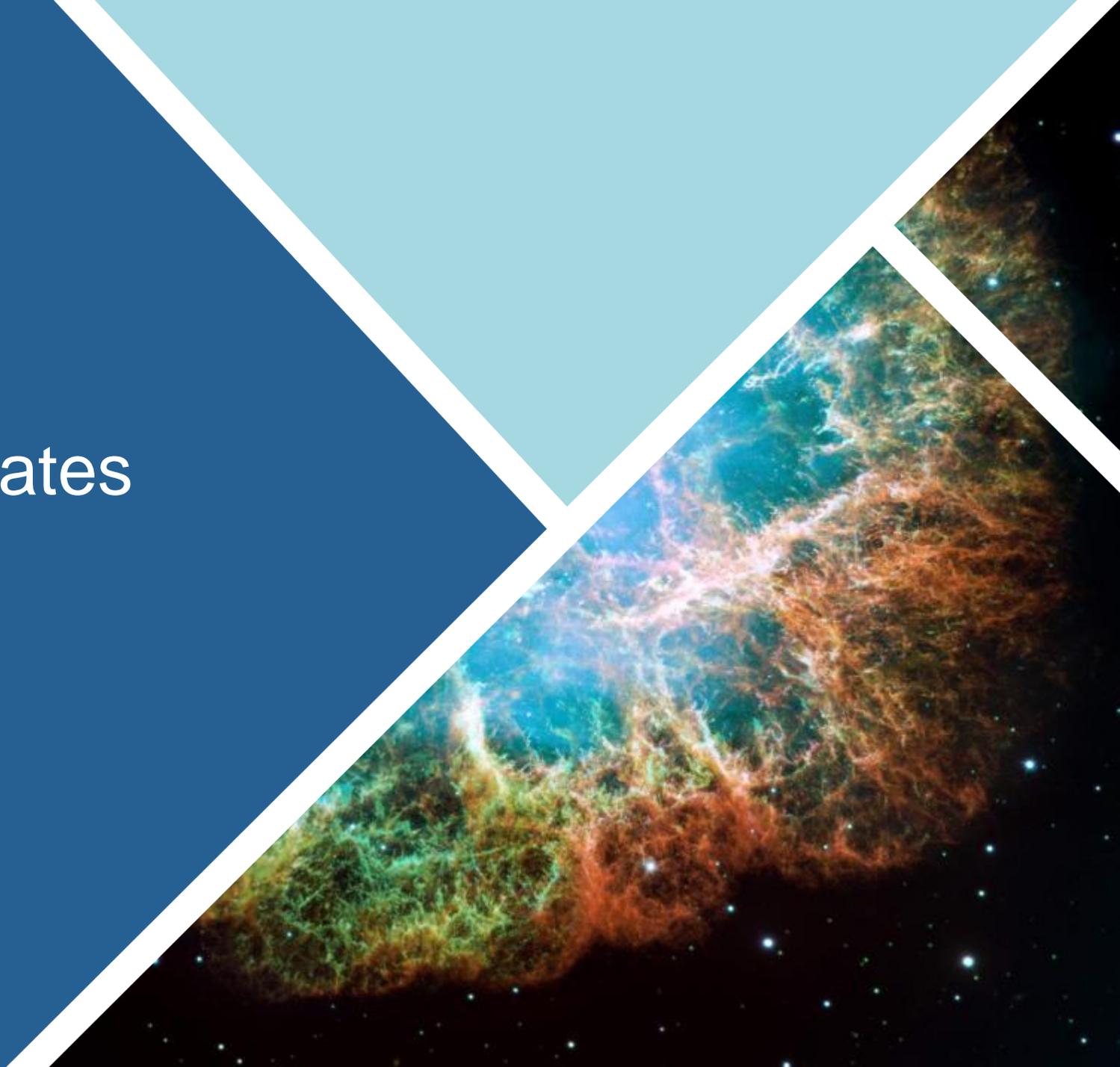


NAVISP Element 3 Support to Member States

UK Presentation

18 January 2019



Why NAVISP? What benefits does it bring?

- More space/non-space partnerships (**Grow sector**)
- More SME involvement and supporting the £100m / year **growth** in UK PNT sector
- **Develop** innovative new PNT technologies, products and services
- **Grow** the major downstream sectors, secure more business to UK companies and capture more of the market share
- Reduce technical risk (for industry and for the customer)
- **Deliver** confidence and establish trust in PNT systems for the UK
- Continue **ESA reform** and support ECSAT
- Access to ESA technical skills and international collaborative developments



What has NAVISP done for us?



Low ESA overhead
(15%)



Short time to contract
(target 4 months) – agile
and responsive



Improved IPR and
product ownership
contractual terms



60% SME prime overall



Strong commercial focus
in line with UK approach



Very flexible programme
– support, blue skies
work, product and
service development



15 new UK
organisations into the
programme

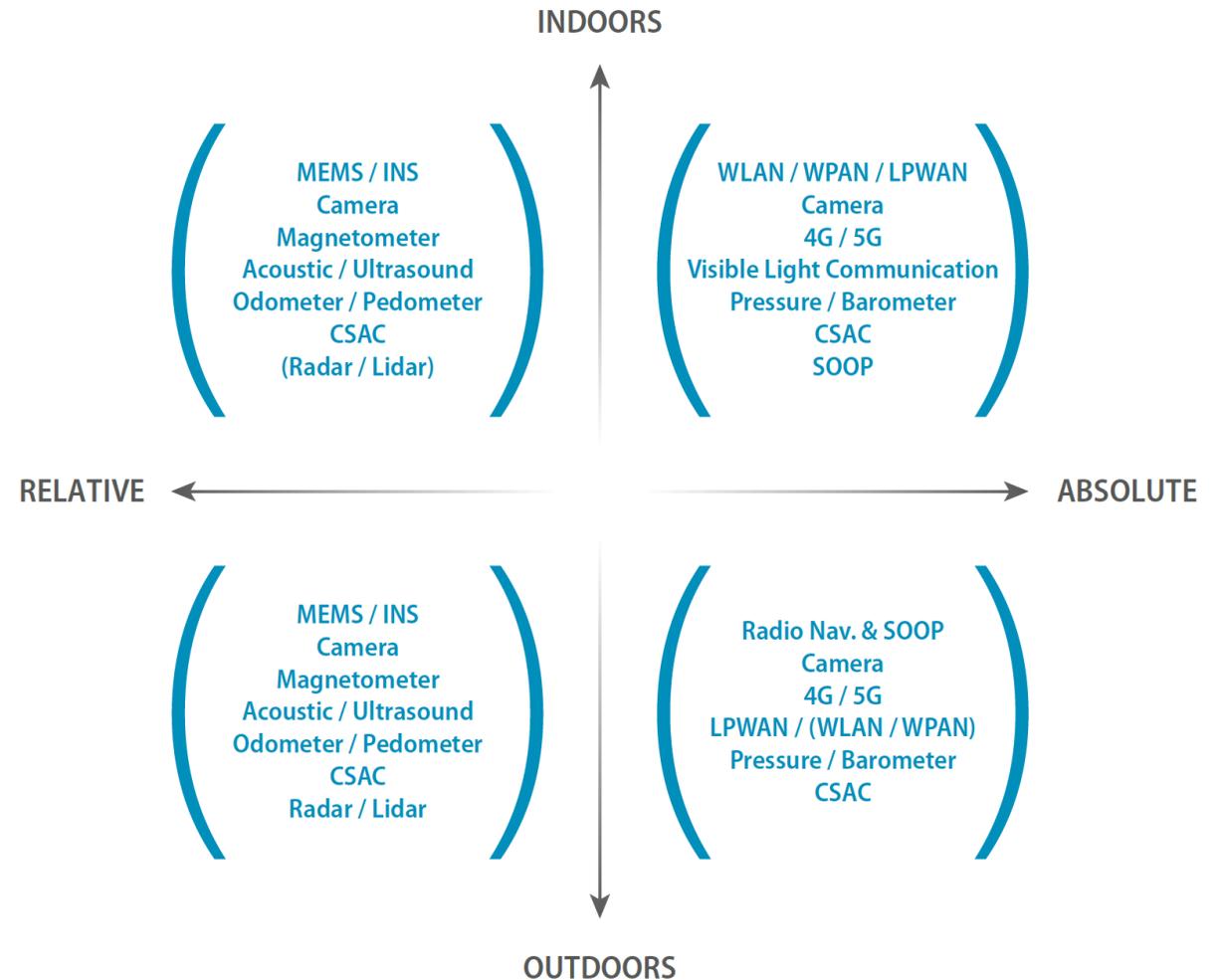


New space/non-Space
partnerships created,
new research orgs
funded

Importance of NAVISP is the wider PNT area

Position Navigation and Timing (PNT) technologies underpin our society

- 13% of UK GDP directly underpinned by GNSS (>£264bn) (£1.8bn/year direct income CAGR 3% on 1.7bn)
- Loss of GNSS would cause ~£1bn day economic impact (Road, maritime, Emergency/Justice biggest losers)
- The GNSS global landscape is changing, technology moving rapidly
- Extent of UK dependency highlighted by Blakett review into GNSS dependency
- Non-GNSS PNT technologies evolving – PNT is not all about GNSS



What is Element 3 (for us)?

Has enabled us to address the most difficult challenges, a catalyst

MARINAV the first funded work

Two or three other activities in early forming stage

Key areas are flexibility and agility

Although sometimes ESA is ahead of industry in this area!

Blackett Review Implementation Group



Policy focused cross-government formal group



Chaired by the Cabinet Office



Reporting to the National Security Framework

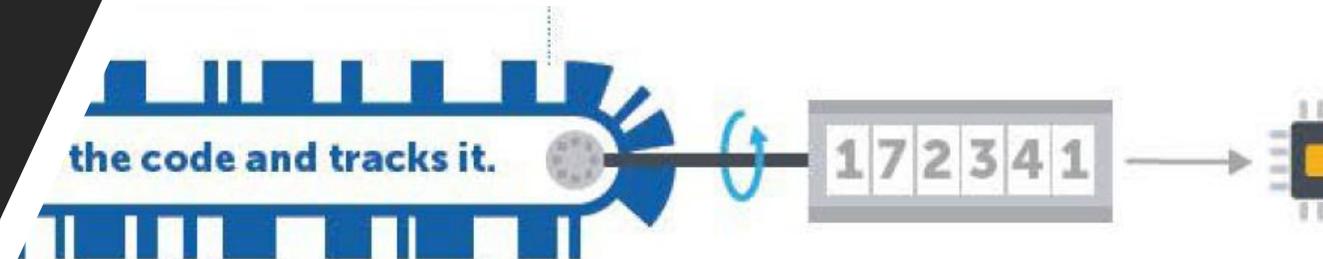


MI Government

Other work - PNT Technical Group

- Fully formed
- Academia, Industry & Government Partnership
- Currently addressing awareness, guidance standards and evidence
 - Will be via Element 3
- Co-Chaired by Royal Institute of Navigation

Time to first fix	
Time-to-acquisition time	
Operation in non-GNSS conditions, including timing outputs	
Long-term operation	
Continuity	Operation in poor RF environments Operation under conditions of GNSS data/system errors Ability to flag when subject to interference Ability to switch between PNT sources, as necessary Continuous output, regardless of environmental conditions
Accuracy	Position and time accuracy within required parameters Accuracy specifications in harsh conditions



By multiplying the time of a signal's flight from a satellite by the speed of light, a receiver can determine the distance between it and the satellite. These distances to an offset in the receiver's time measurements are called pseudo ranges.

Summary



The UK continues to support all elements of NAVISP



Element 3 is a catalyst to getting things done

Not always at my speed



Need to address coherently new PNT technology development to ensure continued UK leadership and economic success.



Programme is PNT (not GNSS), and combines space and non-space technologies (unique in ESA).



Complimentary with UK GNSS ambitions, and exploitation of space systems.



It's working!