Joint techUK/UKspace PNT Committee
Wednesday 21 October 2020 | 14:00 - 16:30 | Online

Actions outstanding:

Action	Lead	Status
Invite Geospatial Commission to present to PNT	RBowden	Ongoing
Identify opportunities for a PNT presentation to relevant techUK committees	SJames	Ongoing
Record lessons from NAVISP	MDumville	Closed
Establish new baseline for PNT-UKSA engagement	RBowden	Ongoing
IAli requested PNT members to highlight any training that they undertake or sponsor, or anything that UKSA should be focusing on in university-level education.	All	Closed
Identify who the BEIS Secretary should contact in sectors with a high dependency on 'assured PNT outcomes'	All	Closed
Seek to secure BSI involvement around CAV development at PNTC	RBowden	Ongoing
PNTC members available to review and finalise the common PNT Risks slide deck to contact RB by close of 12th June.	All	Closed
Parliamentary Questions on a UK GNSS to be circulated	RBowden	Closed

Actions arising:

Action	Lead	Status
Discussion on ESA/CMIN interim activity	RBowden and MDumville	Ongoing
Send summary of NAVISP comments to AProctor	MDumville	Ongoing
Write summary of the SBPP discussion and prepare an output to submit to the SBPP team.	RBowden	Ongoing
CMIN: Contact RBowden if members have PNT specific queries	All	Ongoing

Agenda

Timings	Agenda Items	Lead
1400 – 1410	Welcome, house rules, intros, review of previous actions	Richard Bowden
1410 – 1420	UKspace update	Nick Shave
1420 – 1445	UKSA update on UK PNT Strategy	Kev Mcloughlin
1445 – 1500	ESA and CMIN	Andy Proctor, Mark Dumville, Richard Bowden
1500 - 1615	SBPP (All)	Specific inputs from George Shaw, Terry Moore, Simon Atkinson, Martin Potter and Washington Ochieng.
1615 – 1630	Wash-up and AOB	Richard Bowden
1630	Close	

Attendees

Company	First Name	Last Name
Airbus Defence and Space Limited	Mark	Stevens
Albora Technologies	Anselm	Adams
Boeing Defence UK Ltd	Parm	Sandhu
Borwell	Marcus	Ambler
CGI IT UK Limited	Mark	Cole
CGI IT UK Limited	Martin	Potter
City University of London	Ehsan	Razavizadeh
Deimos Space UK Ltd	Philip	Davies
Euroma Ltd	Kumar	Singarajah
Galaxy Innovation	Leon	Molchanovsky
GRACE	Paul	Bhatia
Imperial College London	Washington	Ochieng
Inmarsat Global Limited	David	Hill
Inmarsat Global Limited	Nick	Shave
Jacobs UK Ltd	Mark	Gittins
Jacobs UK Ltd	Simon	Jackson
Jaltek Design Services Ltd	Jack	Groom
Knowledge Transfer Network	Bob	Cockshott

NATS	Ricardo	De Sousa
Nottingham Scientific Ltd	Mark	Dumville
Ofcom	Callum	Gray
QinetiQ Group	Richard	Bowden
Raytheon Systems Limited	Paul	Day
RHEA Group	Louise	Rees
Roke Manor Research Limited	Simon	Atkinson
Satellite Applications Catapult Ltd	Paul	Febvre
Spirent Communications plc	Chris	Loutsaris
Spirent Communications plc	Esther	Anyaegbu
Spirent Communications plc	Guy	Buesnel
Spirent Communications plc	Simon	Lithgow
Surrey Satellite Technology Limited	Gary	Lay
Teledyne Limited	Cliff	Weatherup
Telespazio VEGA UK Ltd	Yequi	Ying
Thales Alenia Space UK Ltd	Remi	Challamel
The Corporation of Trinity House	George	Shaw
UK Space Agency	Andy	Proctor
UK Space Agency	Kevin	Mcloughlin
UKspace	Lizzie	Kerr
University of Nottingham	Terry	Moore
WorldVu Development, LLC	Cecilia	Emmanuel

Meeting summary

Welcome and actions
Richard Bowden (RB) welcomed the attendees and made introductions. Actions and agenda were agreed.

UKspace
Nick Shave (NS) provided an update from UKspace. NS outlined the announcement of a one-year settlement for the CSR: UKspace's submission had proposed for an ambitious national space programme, including SBPP, and the campaign will continue. The National Space Settlement programme is ongoing and Ukspace is calling for a ramp-up (£150m funding over the next two years).

UKspace is evolving into its own legal entity, discussions are ongoing with Julian David, CEO of techUK and Paul Everitt, CEO of ADS.

The new UKspace ESA CMIN22 Working Group will be chaired by Jacquie Conway. UKspace is also looking to accelerate the SBPP and skills work, with initial studies expected in Q1 2021.

UKSA update on UK PNT Strategy
Kev McCloughlin (KM) updated the committee on the key work for the UK PNT Strategy. UKSA has made use of the MarRINav concept to help others understand System of Systems, as well as the need for duality and diversity. UKSA has always

taken a solution-agnostic approach. Following the work for BEIS Secretary of State on a space-based component through June-Agust 2020, the decision was made to move the space work to SBPP.

The work included gathering evidence which covered nearly all of the 13 critical national infrastructure use cases. The aim was to gain an understanding of the level of resilience required. There is the potential to significantly reduce the risk that is carried, and sufficiently strong evidence to demonstrate the need for a space-based component.

Phase 2 will see the delivery of the PNT Strategy (and Assured PNT Requirements) by December 2020, then deliver a system of systems integration plan and a technology and insertion plan.

Approach
Reconfigured the working groups:
- Strategy development
- Requirements definition (system of systems) - Functional and non-functional
- Integration and Technical requirements
- Skills, Education and Training
- Legislation, Regulation and Standards
- Threats, hazards and risks

There is clearly a need for the continuing contribution from industry on those delivering PNT – Working Group leads have been instructed to make sure industry is included.

Members of the PNTC who are interested in contributing should contact Andy Proctor in the first instance (Integration and Technical).

The Strategy will set out the overarching architecture of PNT in the UK, to deliver real coherence across different departments and organisations. The team has worked with the Ministry of Defence, who will be able to deliver their endorsed requirement set in the next few weeks.

ESA and CMIN
Andy Proctor (AP) updated the Committee on **ESA** and that there is still funding in NAVISP. Pipelines are full, with budget diminishing in Elements 2 and 3. Budget remains in Element 1. If members are looking to do R&D on 5G and PNT there is funding in Element 2. The ESA is attempting to generate activity in the same area to build knowledge and skills. In answer to a question from Mark Dumville (MD), AP clarified that or Element 3, there is no restriction on available budget for companies to bid for. NAVISP is an R&D and innovation fund and is not designed to fund an enduring capability. Element 1 and 2 are functionally separate.

On **CMIN**, the team is starting work again in the Space Agency. There are debates on where the ESA fits within the National Space Strategy. AP recommends for the wider CMIN that if members see this as a valuable way to partner across the space community (including R&D) then continue activities with the ESA such as lobbying and PR.

On **NAVISP**, AP requested his involvement. A strong case will need to come together for NAVISP if we want to take it forward. AP is planning an ESA/NAVISP workshop, depending on COVID restrictions. The Committee discussed the better recognition of successes: this will be taken up in a future meeting.

Space Based PNT Programme (All)
RB opened this section of the meeting outlining that government is looking at a space-based PNT capability that is more "gloves-off" - what could be done, rather than delivering something specific. RB then introduced the first speaker.

George Shaw (GS) presented the **civilian user perspective** (broader than maritime and transport). GPS delivers high capability of PNT, it is an invisible ubiquitous utility. Therefore, there are plenty of potential user questions about a new SB PNT.

User aspects of business case:
- Strategic: strength from uses linked to UK societal benefits.
- Economic: weak if users do not buy in.
- Financial: dependent on users' business cases.

GS pointed to some trends in user applications, which demand more robust PNT with dynamic data quality.

SBPP benefits for users: global capability enhancing multi-constellation GNSS; clear information for users of applications; contributing to robust user PNT solutions in challenging conditions.

Terry Moore (TM) from RIN then outlined **the role for RIN** in **user engagement**. RIN is an independent body, therefore does not lobby for one technology over another. There is the training aspect to consider. During the COVID lockdown, RIN has provided online sessions on different aspects of PNT. TM posed the question: what are the needs for SBPP in skills, education and training? A clear skills gap has been identified in space-based areas. RB agreed that it is important to ensure users can be represented in a neutral way via bodies such as the RIN.

Washington Ochieng (WO) outlined the picture when looking at the PNT landscape as it is. It is not clear how the existing capabilities within the UK's research and development landscape, particularly the academic sector, map on to SBPP. Is the **expertise** in **UK universities** being used?

WO then touched upon the importance of understanding the entire value chain, specifically the hyper-complexity of users in the front end and back end of GNSS technologies. When it comes to sustaining the actual operation and downstream services, a pipeline of skilled workforce into industry is needed: this underscores the clear and critical link between academia and industry. PNT supports daily life, therefore the embedding of PNT into system of systems requires representation of the expertise across the UK.

AP responded to WO's presentation stating that if the sector can collaborate to map expertise then this will add to the Strategy and the asks of the Strategy.

Simon Atkinson (SA) from Roke then spoke on **resilient PNT** from a system of systems, pointing to a use case example of seamless tracking for navigation indoors and outdoors. The technology and integration of space based PNT into a broader PNT architecture, with three specific areas:
- Protect: SBPP – multiple independent GNSS; detect and locate jammers
- Toughen: Self-protection applique units; Anti-jam (AJ); Anti-spoof (AS)
- Augment: Alt Nav; Supplement GPS using complementary technologies

Martin Potter (MP) finished this section of the PNTC by presenting on **Systems & Security**.

MP explained that systems should be driven by user/stakeholder needs, rather than an engineering-led approach. Stakeholders are varied and have differing needs.

Resilient PNT is a multi-faceted problem that can be tackled using a range of measures: supply chain; skills; developmental and operational considerations.

There is no one size fits all solution: system of systems approach seems like the right answer.

Key considerations: skills development and maintenance; interoperability, agility and adaptability; security "baked in"; how to manage a complex estate of PNT assets.

AOB
No AOB was raised and the Chair closed the meeting.