navisp
Industry Days 2022
Session 2: Element 1
"Enabling PNT Innovations Along the Value Chain"

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NAVISP Element 1 Manager

NAVISP Industry Days 2022

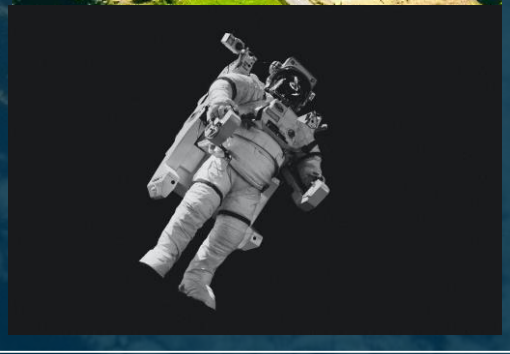
	Session 2: NAVISP Element 1 - "Enabling PNT Innovations Along the Value Chain"		
	Topic	**Speaker**	**Organization**
13:15	Introduction	S.Binda	NAVISP Element 1 Manager, ESA
13:30	Robust GNSS+, PNT Innovation for Autonomous Vehicles	H.Kuusniemi	Dir&Prof. Wasa University, R&D Prof. Finnish Research Institute
14:00	013 bis-Quantum Based Sensing for PNT	B. Battelier	iXblue/Laboratoire Photonique Numerique Nanosciences (FR)
14:20	020-Artificial Intelligence/Machine Learning Sensor Fusion for Autonomous Vessel Navigation	T. Malkamäki	National Land Survey of Finland (FI)
14:40	026-Enabling Ultra-High Accuracy Positioning in Challenging Environments	P. Henkel	ANavS (DE)
15:00	Q&A		
15:15	**Tea Break**		

navisp Element 1 Objectives

Perform feasibility studies and viability analysis for the emergence of new concepts in the PNT world (both upstream and downstream)

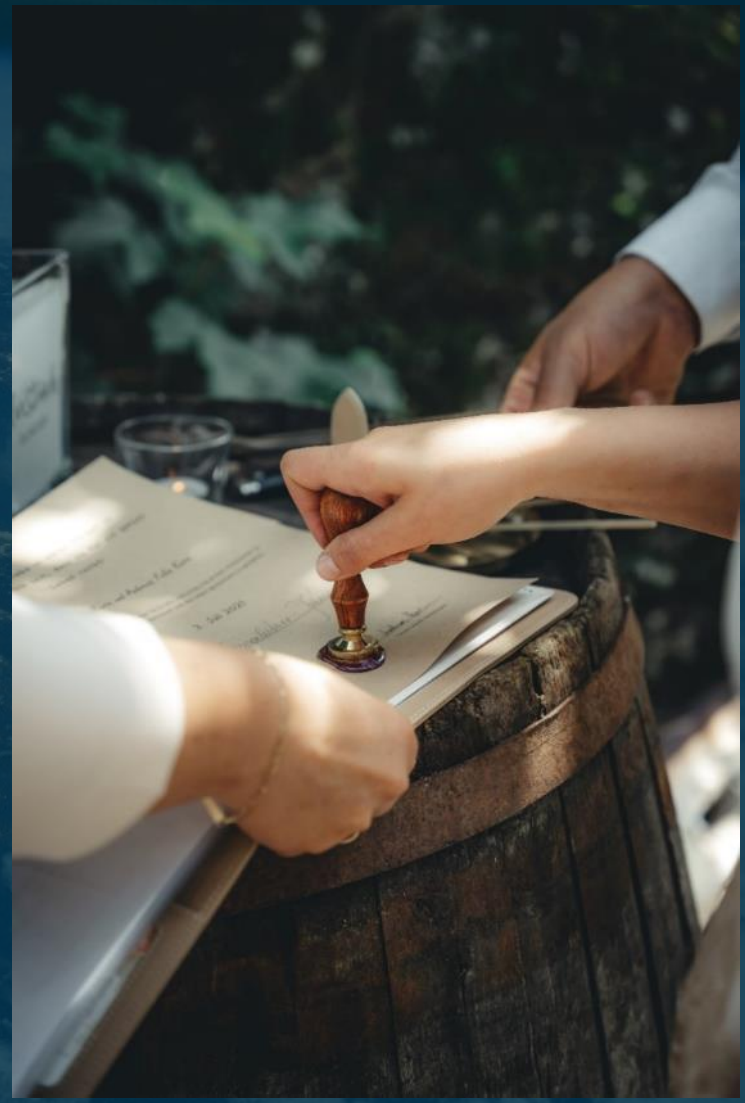
Contribute to the formulation and implementation of PNT technology strategies and roadmaps

Proof of concept of promising PNT-based services



navisp Element 1 strenghts

70	Funds engagement % (45M€ subscribed)
60	Element 1 contracts awarded
50	Funds % allocated to PNT technology Innovation objective
15	ESA's overhead % on Participating States' contribution



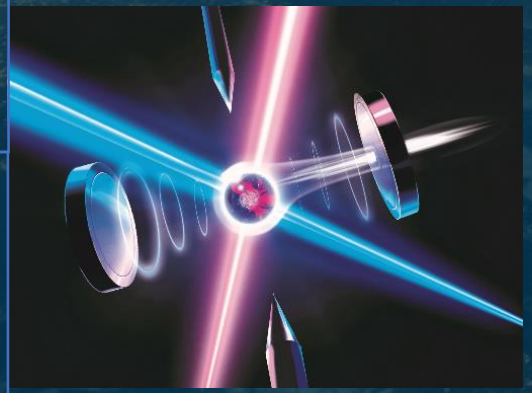
Technologies linked to PNT – on display

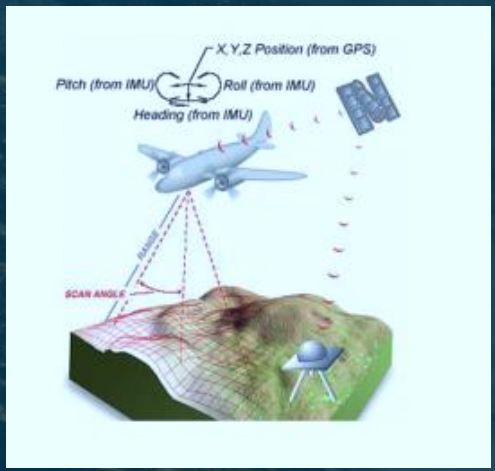
Equipment

- Innovative Clocks
- Communications (5G, LEO, Laser)
- WiFi (Round Trip Time) / RFID / UWB
- Pseudolites, Locatalites, Reflective Intelligent Surfaces
- Low Frequency (eLoran,…)
- Celestial (Pulsar, Sun, Moon, Stars,…)
- Smaller, cheaper, more accurate inertial sensors
- Magnetic, barometer, sonar
- IR, Lidar and Visual Cameras
- Quantum / Photonics
- Cryptography
- Biosensors
- Multipath, interference, impairments detection and mitigation

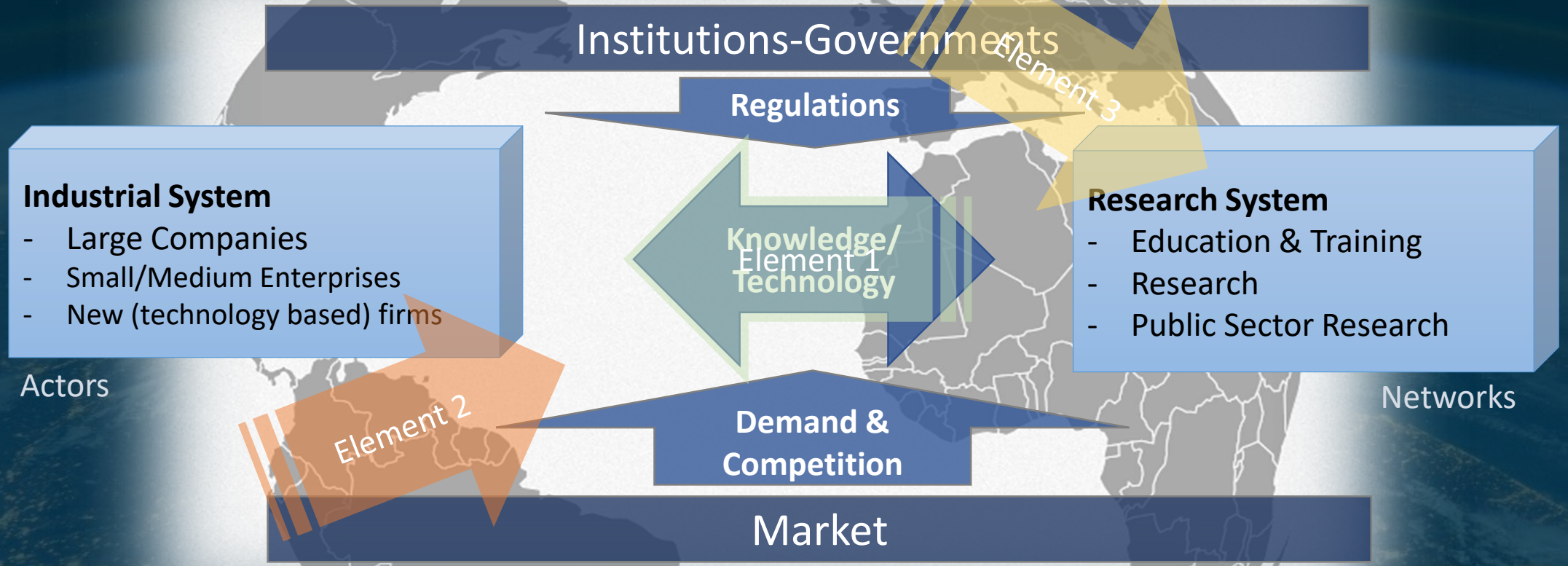
Processing/System

- High processing power
- Robustness, Resilience
- Sensor fusion
- Cooperative processing (platooning, formation flying…)
- Autonomy
- Integrity
- Digital mapping (outdoor/indoor)
- 3D Mapping aiding (Simultaneous Localization And Mapping)
- Artificial Intelligence/Machine Learning

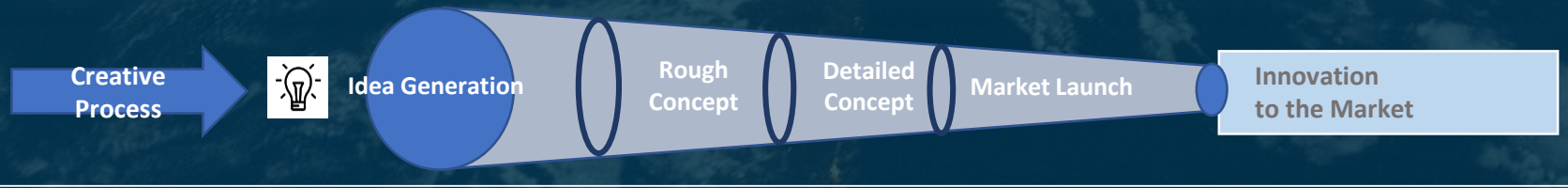




Element 1 component of nauisp Innovation Process



Courtesy S.Bandau



navisp Element 1 Workplan 2022 focus

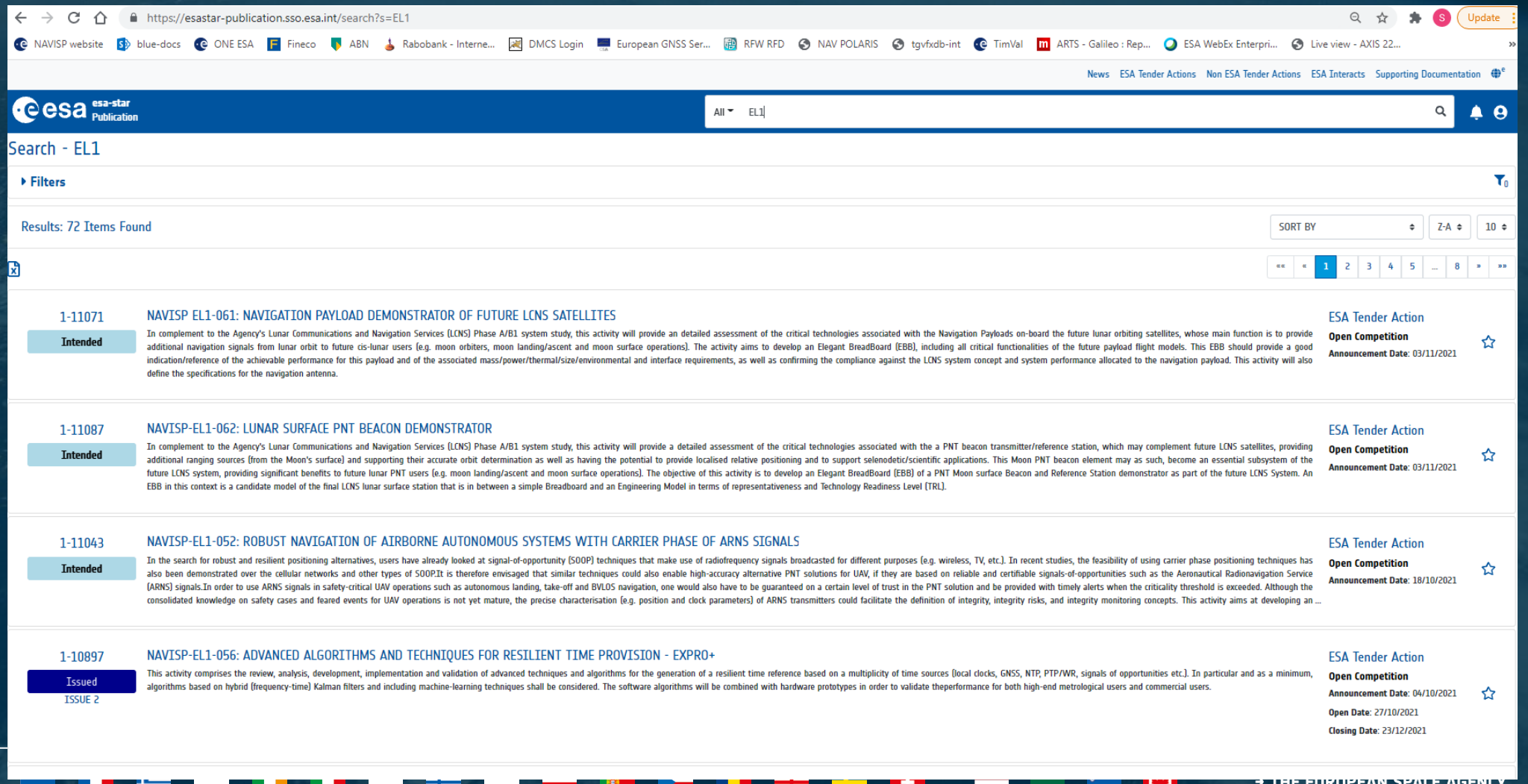
- Addressing innovative PNT concepts, techniques and technologies
- From NAVISP Advisory Committee:
  - Autonomous Transport and Green Mobility
  - Seamless PNT applications for Industry 4.0, e.g. for indoor infrastructure logistics
  - Alternate PNT timing, alternative or complementary to GNSS
  - PNT Robustness and resilience

Element 1 Workplan 2022

ID: Title		Status	Budget (k€)
NAVISP-EL1-063	RIS-aided wireless localization and mapping	Seamless PNT applications	
NAVISP-EL1-064	Block-box for an optimised GNSS spectrum monitoring network using AI	PNT Robustness and resilience	
NAVISP-EL1-065	eLoran antenna for handheld devices	Alternate PNT	
NAVISP-EL1-066	Deeply Coupled GNSS Vector tracking loop robust solution for autonomous vehicle	Autonomy	
NAVISP-EL1-067	Precision Agriculture - High precision coordinate and alignments transfer	Autonomy	
NAVISP-EL1-068	Biosensor and PNT Integration	Innovative PNT	
NAVISP-EL1-069	Enabling high performance PNT in lunar environment	linked to Moonlight	
NAVISP-EL1-070	Advanced MEOSAR Test Beacon Setup	linked to Demonstration Centres	

Find “Tender Actions” (ITTs) and submit bids

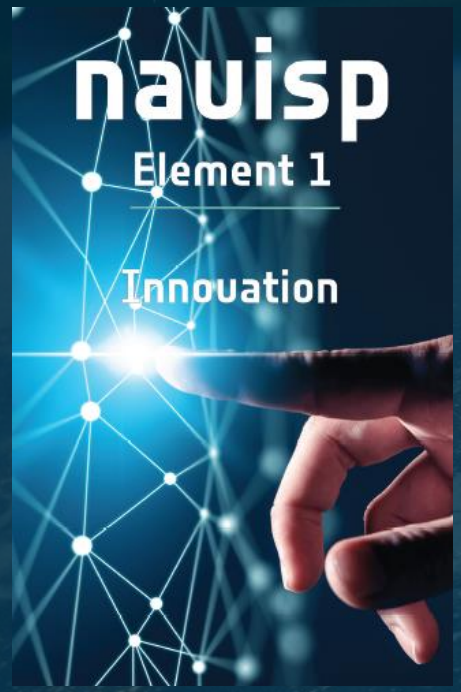
- **navisp.esa.int** general info
- **https://esastar-publication-ext.sso.esa.int/** official



Element 1 Phase 3

- Objectives confirmed
- NAVAC Recommendations
  - maintain the non-GNSS-centric view with the objective to enhance the robustness of the user's PNT
  - encourage the participation of a wider number of member states due to the positive effect on competition
  - monitor the capability to generate follow-on industrial initiatives in the PNT sector
  - include more activities to reduce regulatory risk related with the introduction of existing PNT technologies in new markets (e.g. Proof-of-Concept or demonstration activities)
  - strengthen the relationship with other public bodies, industry associations or institutions to improve effectiveness
  - discuss with non-space European key players in the GNSS/PNT markets
  - support to key PNT technology developments, e.g. GNSS chips, should be strengthened
  - implement a higher research culture by stretching the scope of activities, including high risk activities
- ESA's Executive
  - Specific technologies development prospective studies
  - Element 1 Workpackage to follow up in Element 2
  - Follow up Element 2 Thematic calls (PNT in 5G/Assisted GNSS with Imaging Sensors and 3D models for Mobility Applications)

Thanks for your attention!



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For additional questions: navisp@esa.int

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