**Appendix 1A
The Contracting Authority's needs for an idea sketch**

**Introduction:**

The Norwegian Coastal Administration (NCA) Pilot Services (NPS) have conducted an analysis of the current situation. Through in-depth interviews and quest backs, challenges and future needs have been identified. To get a good insight for you as a supplier into what these future needs and challenges are, we provide an attachment that explains how the NCA Pilot Services execute their work today.

The needs (Appendix 1A) should be read and interpreted in context with the descriptions of our pilot operations (Appendix 1B),). The future system should interact with all parts of the Portable Pilot Unit (PPU), visualized by the red box and arrow. An animation video is made available to visualize the needs in the innovation partnership[[1]](#footnote-1).

Portable Pilot Unit (PPU)

Sensors

Display

Software (ECS)

Charts

Figure 1 Portable Pilot Unit components

## *NCA Pilot Service description of needs and requirements*

The overall objective is to innovate a more robust next generation portable support system for the NCA Pilot Service, to ensure that the NPS pilots can comprehend and trust the data they employ when conducting pilotage in a simple and intuitive way(as described in Appendix 1B[[2]](#footnote-2)), with the following part objectives:

*O1: Increase robustness of the support tool*

Increase the robustness of the support tool by compensating for the lack of reliability of the vessels' Automatic Identification System (AIS) and their integrated GNSS positioning. The support system should utilize and integrate available sensor data to increase robustness of the support system. Sub objectives such as, but not limited to:

|  |  |  |
| --- | --- | --- |
| **#** | **Sub objectives** | **Category** |
| 1 | Sensor integration and sensor fusion should improve quality, integrity, and weighting of positional data – independent of vendor. | Integration |
| 2 | The future system should be prepared to receive data from other reference systems when available. | Integration |
| 3 | Information from the future system should be possible to integrate and presented into other systems  | HMI |
| 4 | The future system should use more of the data available from the ship | Data exchange with the ship |
| 5 | The future system should be able to access data relevant to the mission before and during the mission. | Data exchange with external |

*O2: Notification to relevant personnel*

Notify the pilot (operator) and others (including relevant authorities) and preferably compensate if radio frequency interference (RFI) and/or premeditated manipulation of the vessel's official navigation data has occurred to increase the robustness of the support system. Sub objectives such as, but not limited to:

|  |  |  |
| --- | --- | --- |
| 6 | The future system should be able to function in an environment with signal interference (intentional and unintentional).  | Robust PNT |
| 7 | The future system should have good protection against spoofing and meaconing. | Robust PNT |
| 8 | The future system should have good resistance to multipath and jamming | Robust PNT |
| 9 | In the event of loss of PNT[[3]](#footnote-3) from GNSS, the user should have sufficient access to PNT from other sources/services for a timeframe giving the pilot the possibility to evaluate and assess the situation and initiate proper action and response. | Robust PNT |
| 10 | The future system should be able to notify the appropriate authority when abnormal condition within PNT is detected. | Data exchange with external |
| 11 | The future system must have cyber resilience capacities.  | Maritime Cyber Security |

O3: *Provide relevant data of the vessel*

Provide data of the vessel's three-dimensional movements to increase safe navigation and efficient use of the waterways. Sub objectives such as, but not limited to:

|  |  |  |
| --- | --- | --- |
| 12 | The future system should use more of the data available from the ship | Data exchange with the ship |
| 13 | The future system should be able to access data relevant to the mission before and during the mission. | Data exchange with external |

1. <https://youtu.be/b6QwP8NEgPw> [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)
3. Position, Navigation and Timing (PNT) [↑](#footnote-ref-3)