Integrating data sources to enhance the experience for passengers with special needs through privacy aware mobile applications

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Aim

- To analyse the disabled passenger journey

- To evaluate data requirements for user scenarios

- To investigate privacy issues

- To evalute Wi-Fi localisation on trains

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Approach from passenger perspective

- Desk research on previously reported problems for mobility/visually impaired passengers
- Interviews with 6 mobility impaired and 4 visually impaired passengers
  - Identified key value propositions
- Staff interviews with customer experience management staff and station staff to refine propositions
- Evaluation of propositions with interviewed passengers

Technical Approach

- Review of
  - Data feeds (Darwin, NRE Journey Planner)
  - Localisation (Wi-Fi scanning)
  - Privacy documents (Data Protection Act, EU General Data Protection Regulation, Information Commissioner's Office Guides, BSI, NIST and ISO/IEC frameworks)
- Prototype Evaluation
  - Test Wi-Fi localisation on trains
  - Test the integration of the data feeds to address the key propositions

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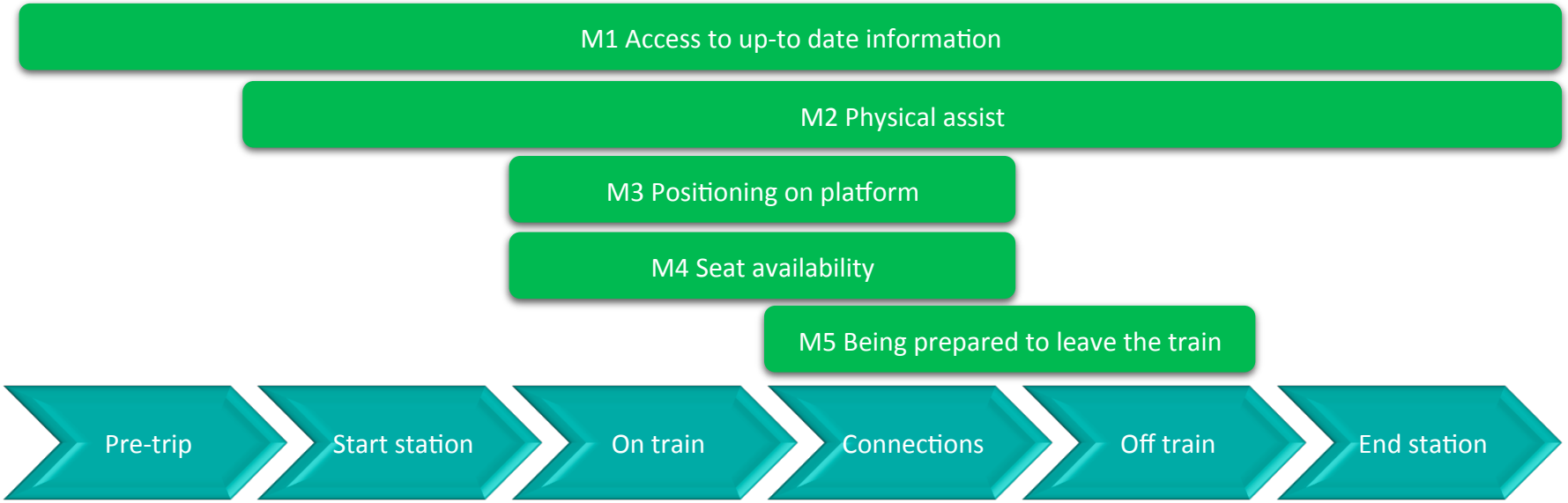
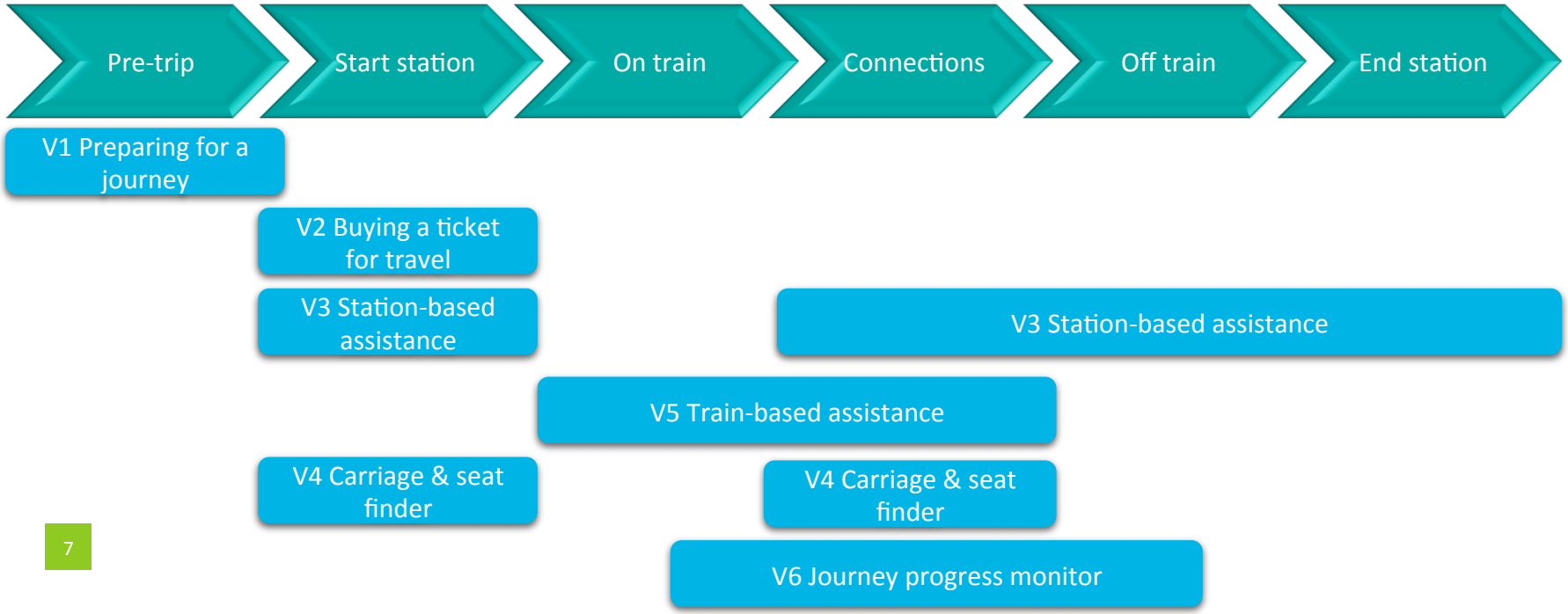
Findings

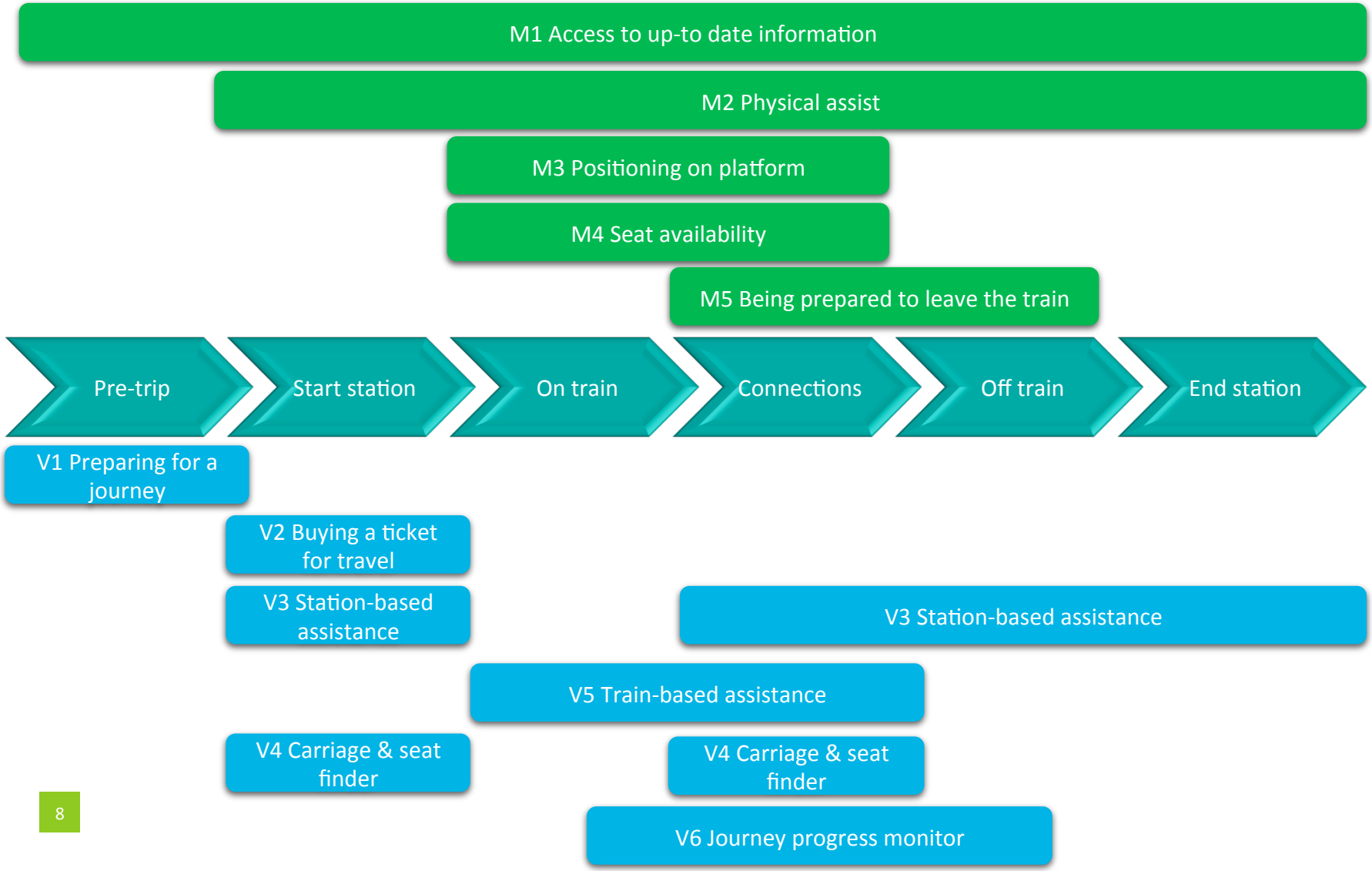
Propositions for Mobility Impaired Passengers



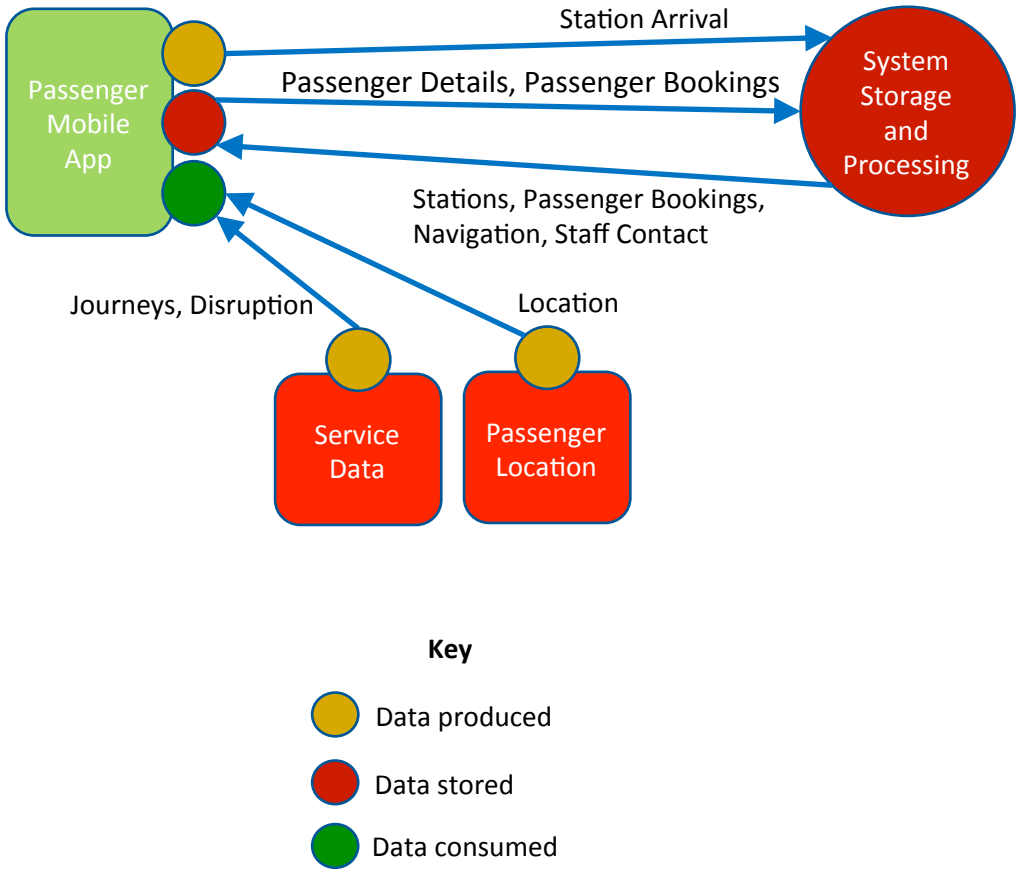
Propositions for Visually Impaired Passengers



Propositions for Mobility and Visually Impaired passengers



Prototype Findings



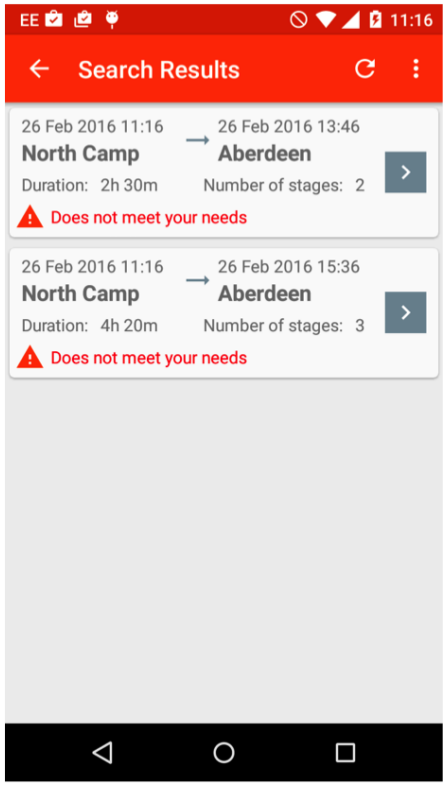
Mobile app used by a passenger to:

- Review possible journeys
- Check assistance available
- Book a journey with assistance
- Cancel a journey
- Review disruption to a journey
- Contact station and train staff

Localisation used to:

- Inform the passenger of their location on a train or station
- Assist in navigating a passenger to a platform
- Inform staff of the passenger's location
- Alert staff when a passenger is about to arrive at a station

Example Journey Search Results View and Data Source



- Shows journey options
  - Results from National Rail Enquires OJP
- Observations
  - Visual queues help review assistance
  - Current OJP makes assumptions about transfer times and requirements
  - For assistance, an automatic way of picking journeys with better transfer options and assistance is needed

V1: Preparing for a journey from home

- **Data required**:
  - Customer details
  - Journey
  - Credit card
  - Sensitive customer details
- **Security**:
  - Credit card information theft
  - Fingerprint details theft
  - Sensitive information disclosure
- **Privacy**:
  - Previous journeys might be considered private

Privacy and Data Findings

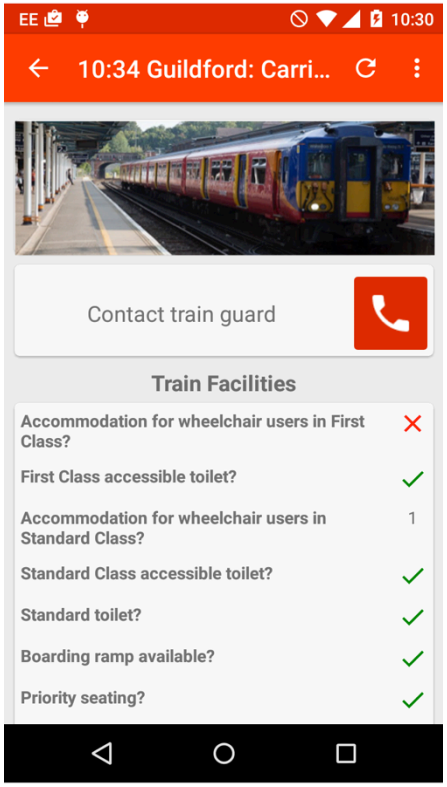
- Many standards and guidelines refer to what constitutes personally identifiable information (PII)
- Geolocation and MAC address data should be treated as PII and treated according to relevant data protection and privacy laws
- Minimise the amount of data to be collected and stored ("least privilege")
- Delete the data once it is not required anymore
- Obtaining informed consent from the passengers is critical. Not acceptable to rely on privacy notices
- **Provide an opt-in approach**

Impact and benefits

Impact of Data Provision for Passengers

- Attitudes to sharing needs and capabilities, location, travel plans, photo and name, mostly positive but variable according to context
- Recommendation on provision of improved data for visually impaired users build a mental model of route prior to their journey
- Provision of up-to-date travel information tailored to customer's journey, including information on train configurations/seat availability to allow passengers to position themselves in right place on platform
- Use of location-based services needed to help customers and station/ train staff find each other more easily and alert staff ahead of time to the needs of a passenger

Impact on Apps for Improving Customer Experience



- Journey planning API does not account assistance requirements and longer transfer times
- Wi-Fi and other localisation infrastructure data should be made available to app providers
- Real-time train facility information should be made available

Security Recommendations for Rail Industry

- Applying industry privacy and security frameworks (ISO-IEC and NIST)
- Conducting a Privacy Impact Assessment to establish impact on passengers' privacy of any new system, and application of 'Privacy by Design' principle as part of design of any new system
- Applying principle of requesting as little information as possible to provide a service (least privilege) when collecting personal data, and obtaining informed consent from users for how their personal data is used
- Anonymising or Pseudonymising, if possible, any Personally Identifiable Information to safeguard the privacy of customers

Next steps

New Research – Data for Improved Customer Experience

- ESPRC funded project September 2016 for 3 years
  - Develop a trust framework that integrates privacy and provenance considerations so that customers have more effective control over their data
  - Evaluate impact of trust framework on passenger experience

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Commercial Feasibility and Demo/Pilots

- Pilots and trials of
  - Improved data feeds
  - Apps for passengers and staff
  - Ensuring security/privacy compliance
- Full-scale operational testing

- Working with ATOC on various project

- Working with Enable-ID to apply our ongoing research to inform future product development

Questions

Thank you