Roadmap for a synchrophasor based Intelligent Supervision and Advanced Control (iSAAC) system

NASPI meeting, March 2015

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Our vision for the future of Supervision and Control

Business changing technologies will be mature around 2020

- *Ubiquitous availability of Phasor measurements at every element of the power system*
- *Availability of new generation of high bandwidth, highly connected telecommunications infrastructure*
- *Wide use of standardized communications protocols across the power system (eg: 61850 and 61970)*
- *Low cost, low maintenance computing platforms able to sustain substation environments*
- *New developments of tools for power system analysis, protection and control*

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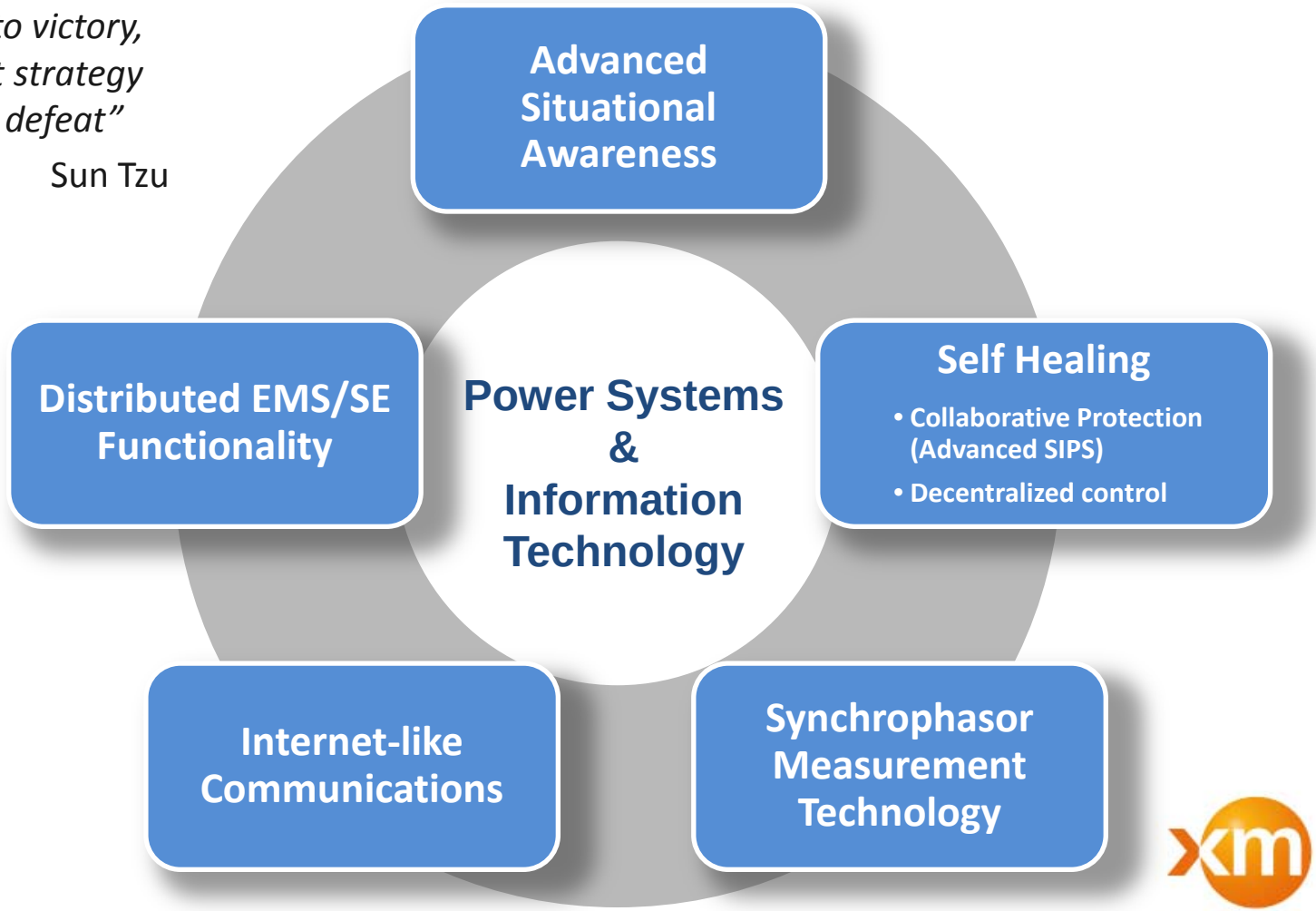
Our vision for the future of Supervision and Control

We identified five main areas that needs further development

"Strategy without tactics is the slowest route to victory, but tactics without strategy is the noise before defeat"

Sun Tzu



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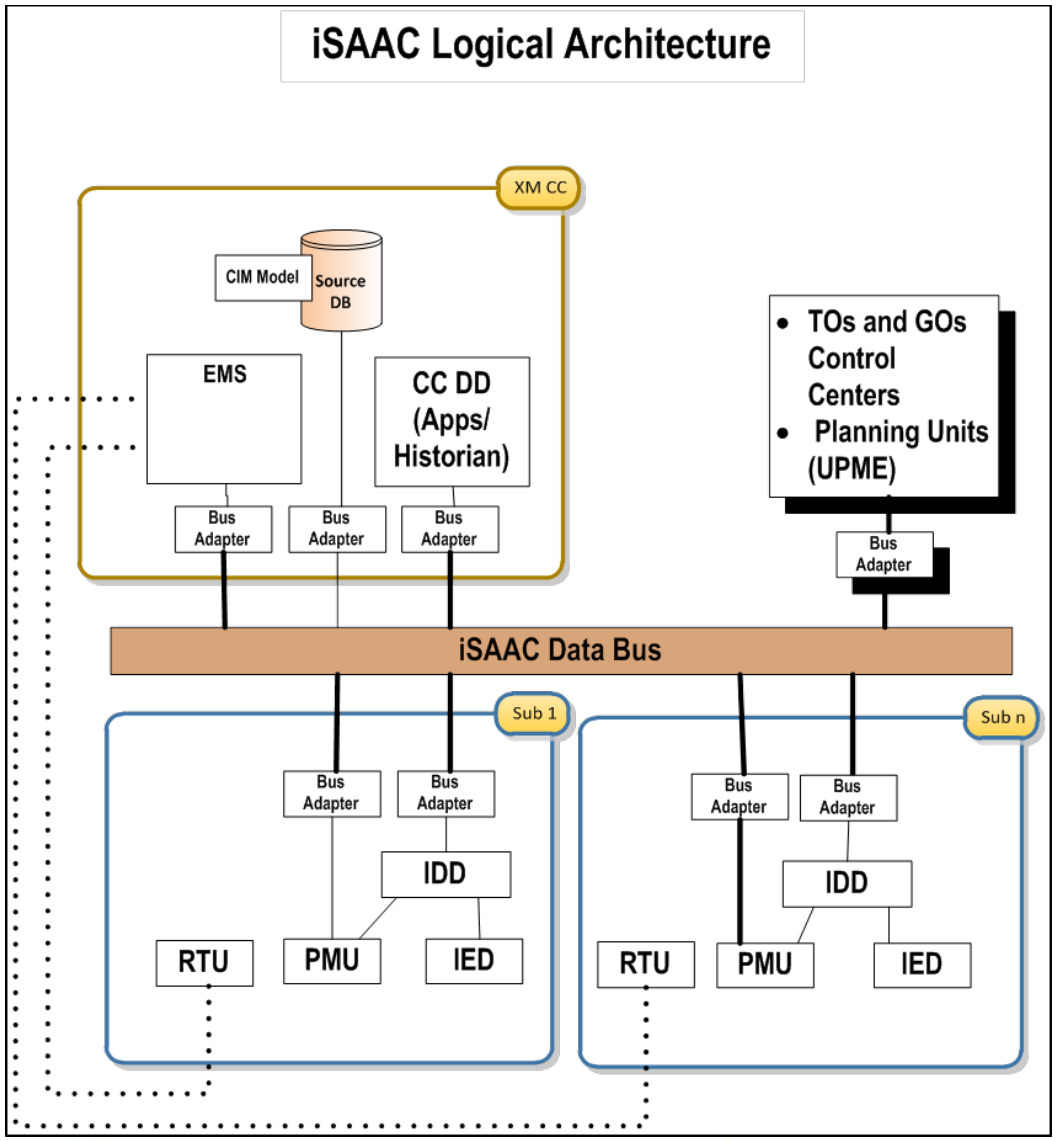
iSAAC Conceptual Design

Intelligent Supervision and Advanced Control System



The iSAAC system represents a novel concept, both from the anticipated system architecture and its related power system applications.

- *Some of the technologies needed to implement this system are not readily available as vendor offerings*
- *The multi-year implementation of iSAAC involves the R&D of some new technologies in networking, supervision and power system applications.*

The implementation Roadmap was a collaborative effort between XM and Quanta Technology, with the support of the US Trade and Development Agency

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Roadmap for iSAAC incremental deployment

Designed to achieve credible results at each stage

2015

(Current Status)

- **Working WAMS**
- Conceptual Design finalized
- iSAAC Roadmap finalized

2016/2017

- **WAMS & SCADA/EMS integration**
- Detailed Technical Requirements for iSAAC software architecture
- Technical Requirements for IDD

2020

- **Advanced supervision (no protection and control)**
- Some SIPS implemented [with PMUs+IDD]

2022/2023

- **Collaborative Protection (**no control)
- Full IDD implementation
- PMU based Volt/Var control

2025+

- **Complete iSAAC implementation**
- Frequency control

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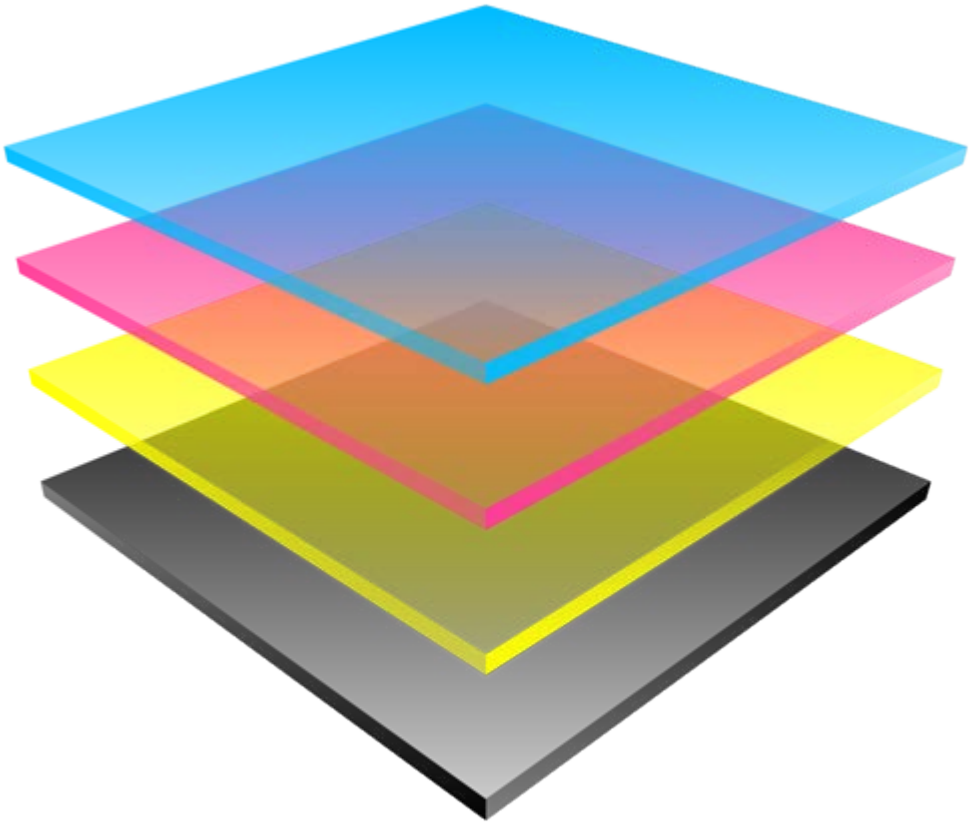
The scope of the iSAAC deployment in the Roadmap is divided into three main categories …



- Real-time PMU applications
- Offline PMU applications
- System infrastructure

Source: http://nativamaya.blogspot.com/

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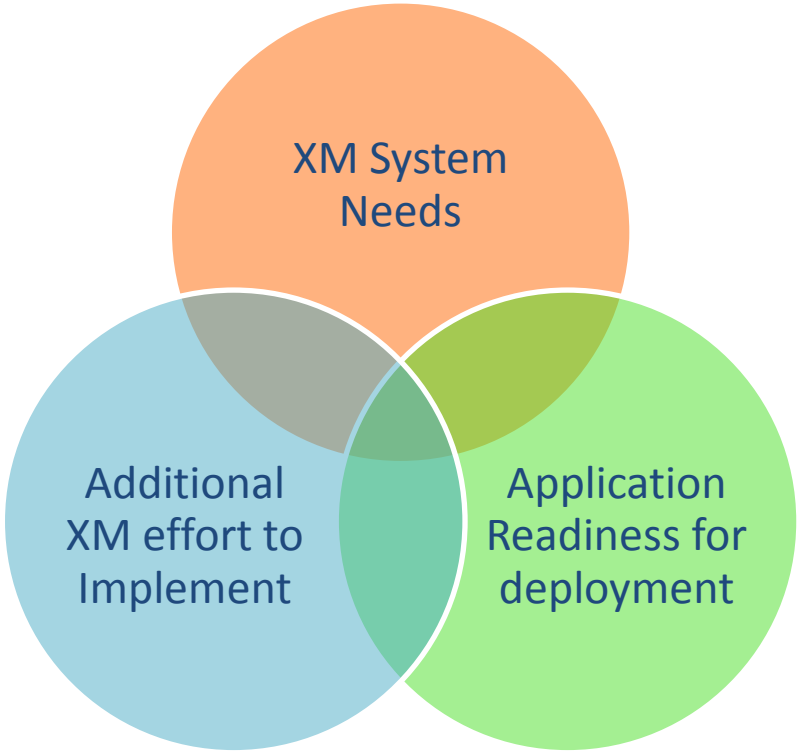
… determining the implementation priority for both offline and online applications



XM current state → Internal Survey → Gap analysis and future Scenarios → Validation of scenarios and stakeholders feedback and approval

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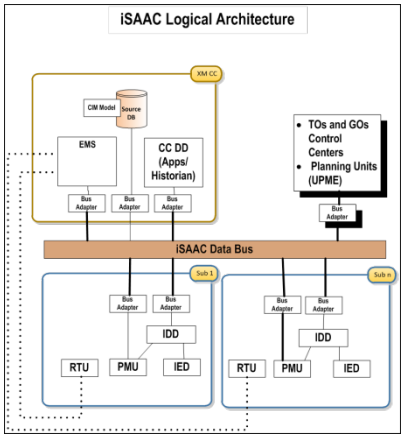
Roadmap articulation

A Joint effort between Quanta's and XM's staff

The roadmap is a **live document** that will be reviewed during each of the **rolling planning stages**

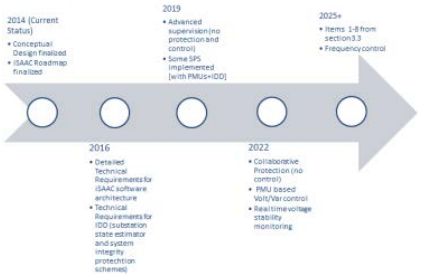
Root cause & Common ground

1. Performance metrics
2. Conceptual Design



Define Activities & sequencing LT

3. Road map



Execute key activities

4. Reqs. interface iSAAC/EMS
5. Reqs. Data Bus
6. Reqs. Gateways
7. Regulatory proposal review
8. Developmental impact
9. Environmental impact
10. Risk assessment

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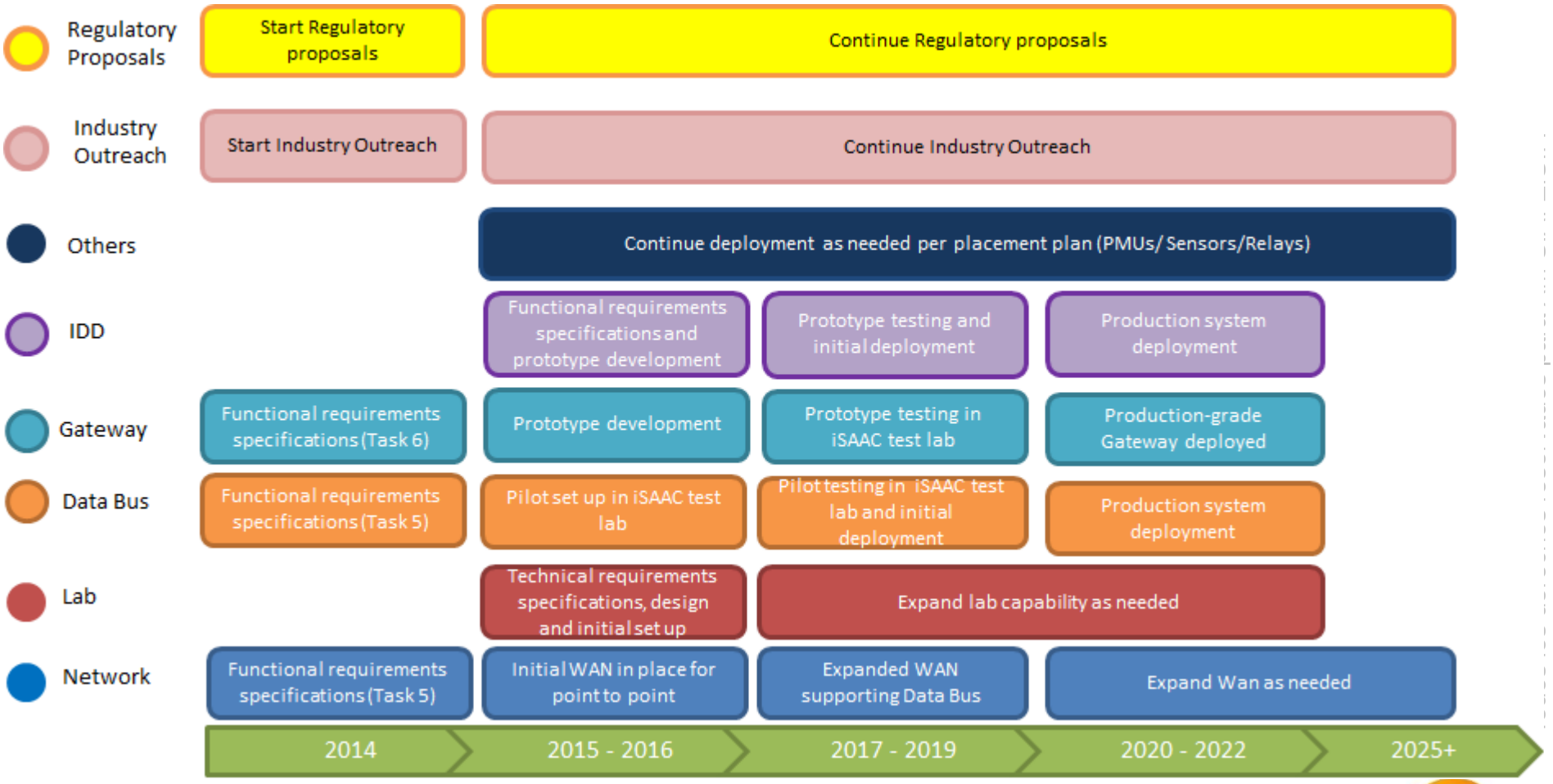
Category 1. System infrastructure



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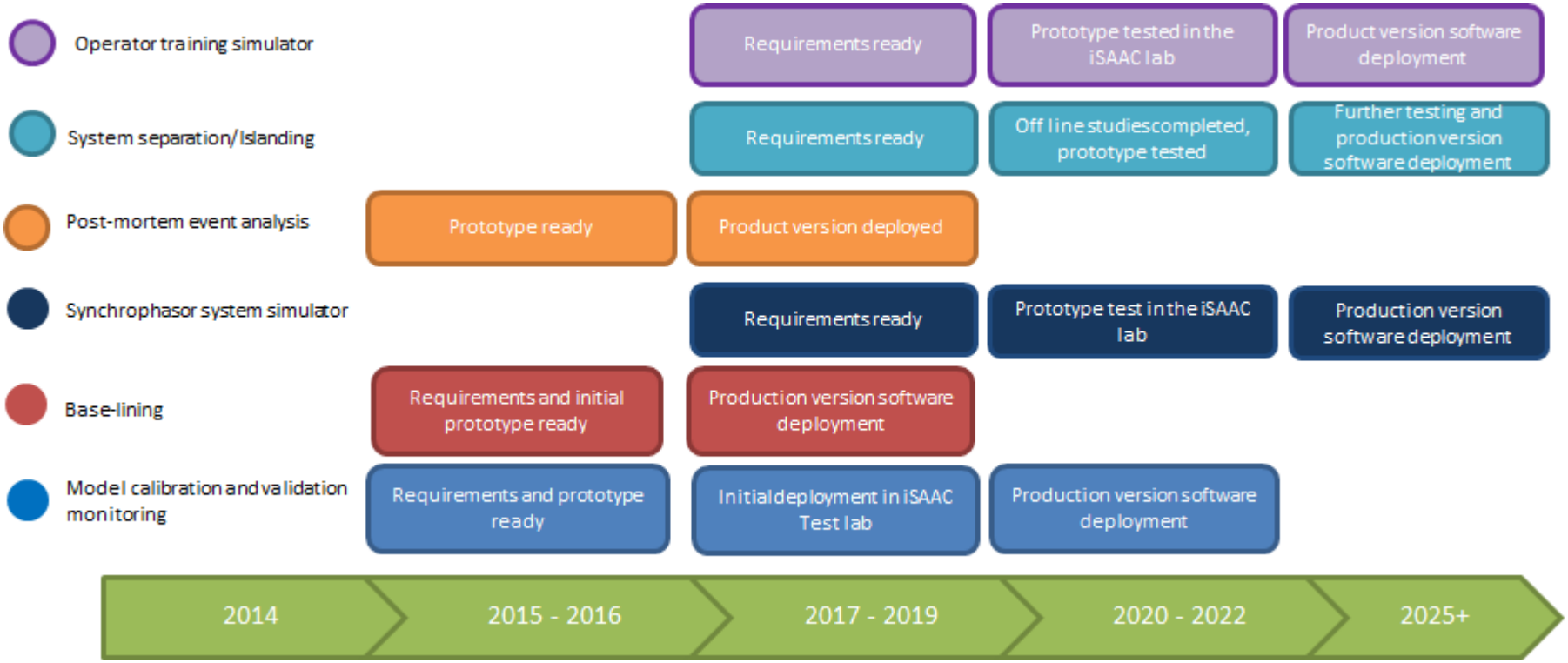
Category 2. Off line PMU applications



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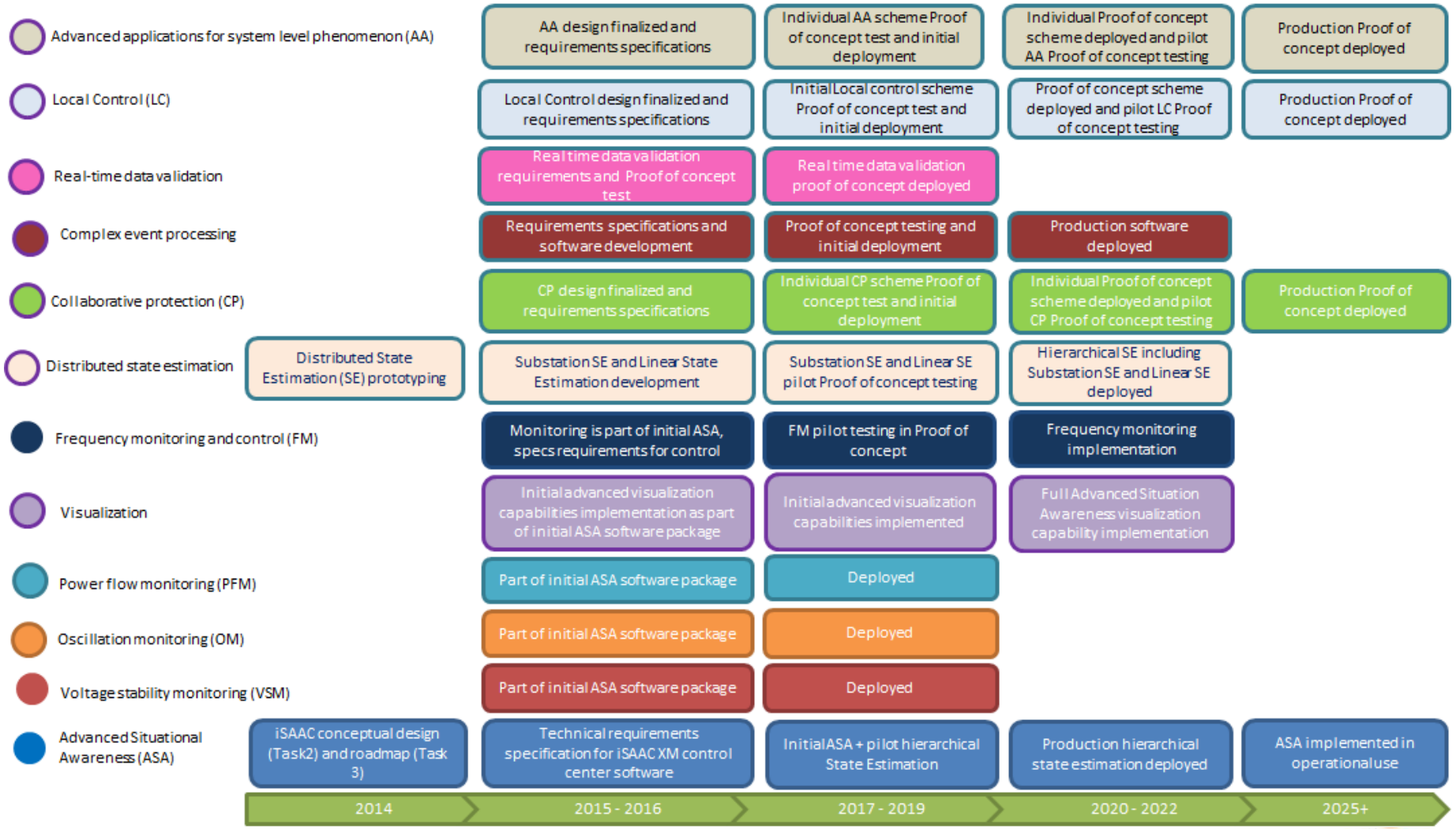
Category 3. Real-time PMU applications



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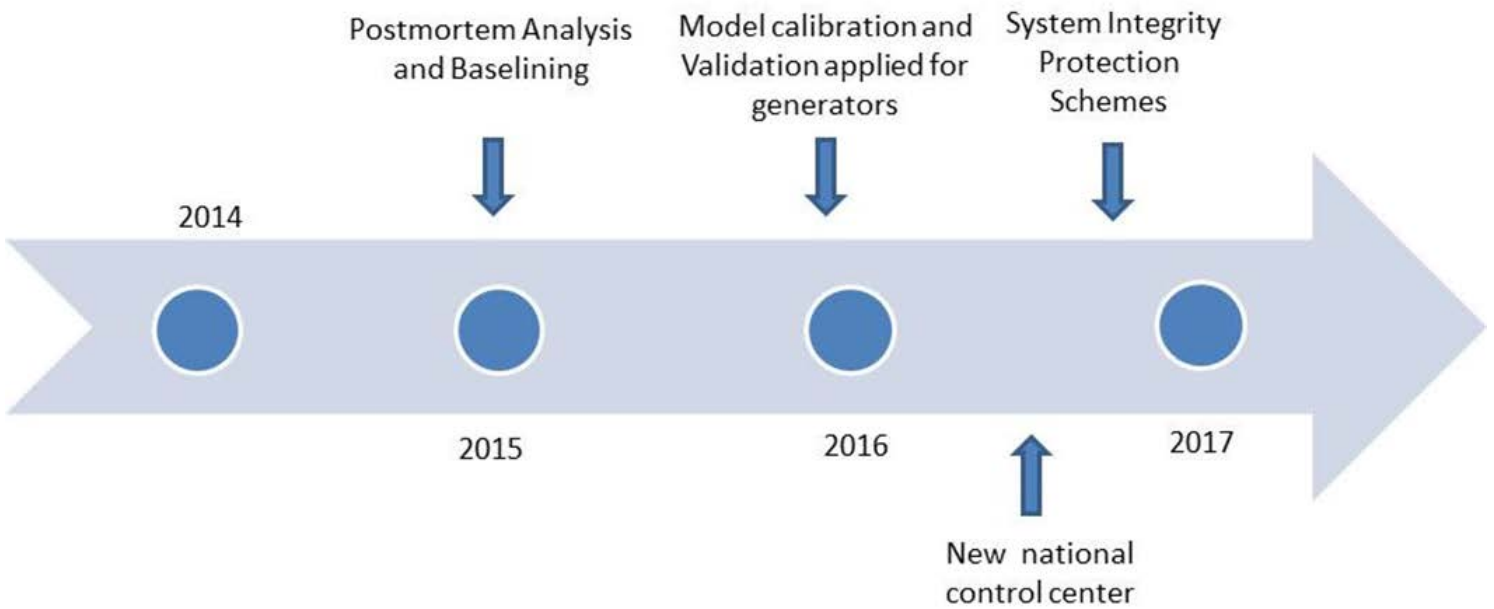
Early victories as a project management strategy

Designed to minimize long term failure risk by incremental implementation

The electric power sector and XM to work together to identify benefits of synchrophasor technology

Develop the necessary regulatory modifications that will allow the implementation of key synchrophasor applications



Testing / training facility for the development of new concepts such as databus, gateways, IDD, MPLS network.

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