Human Factors and Situation Awareness in the control room

Photo: E. Petrere

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NERC Improving Human Performance on the Grid

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Common Scenarios

Who?

Power Systems Engineers
Software developers

IT Professionals
DBAs, MCSEs, etc.

Reliability
Coordinators

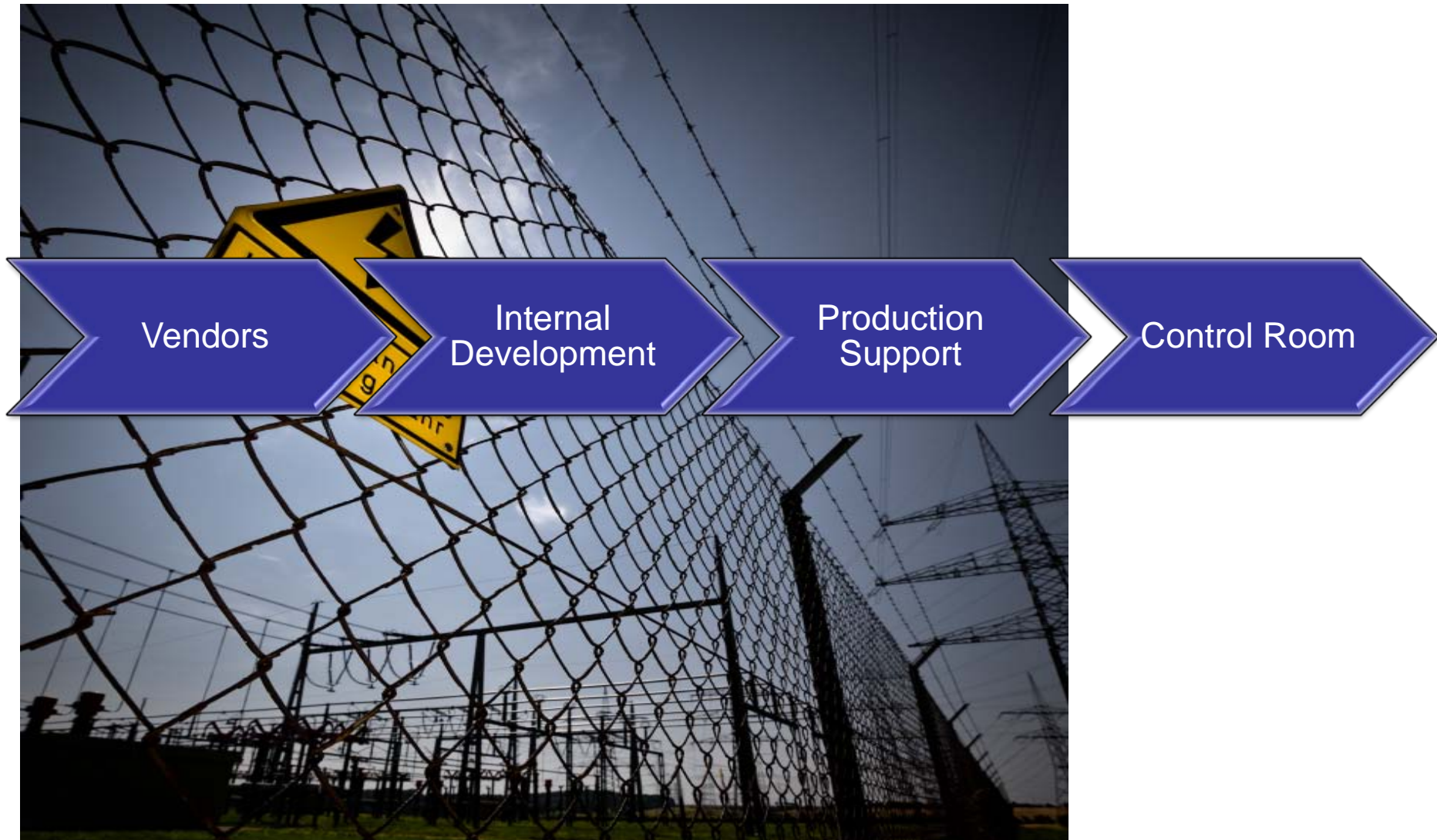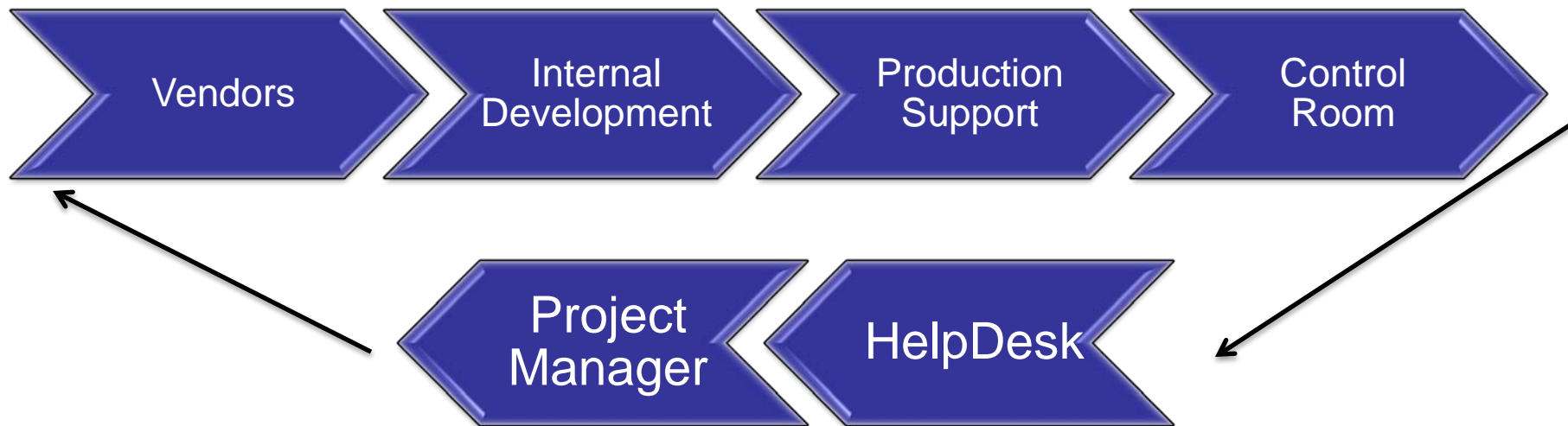| Vendors | Internal Development | Production Support | Control Room |

What?

Source Code

Release Packages

Mission-critical tools

Why?

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Common Scenarios – "Over the Fence"

Vendors → Internal Development → Production Support → Control Room

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Common Scenarios

Vendors → Internal Development → Production Support → Control Room

Project Manager ← HelpDesk

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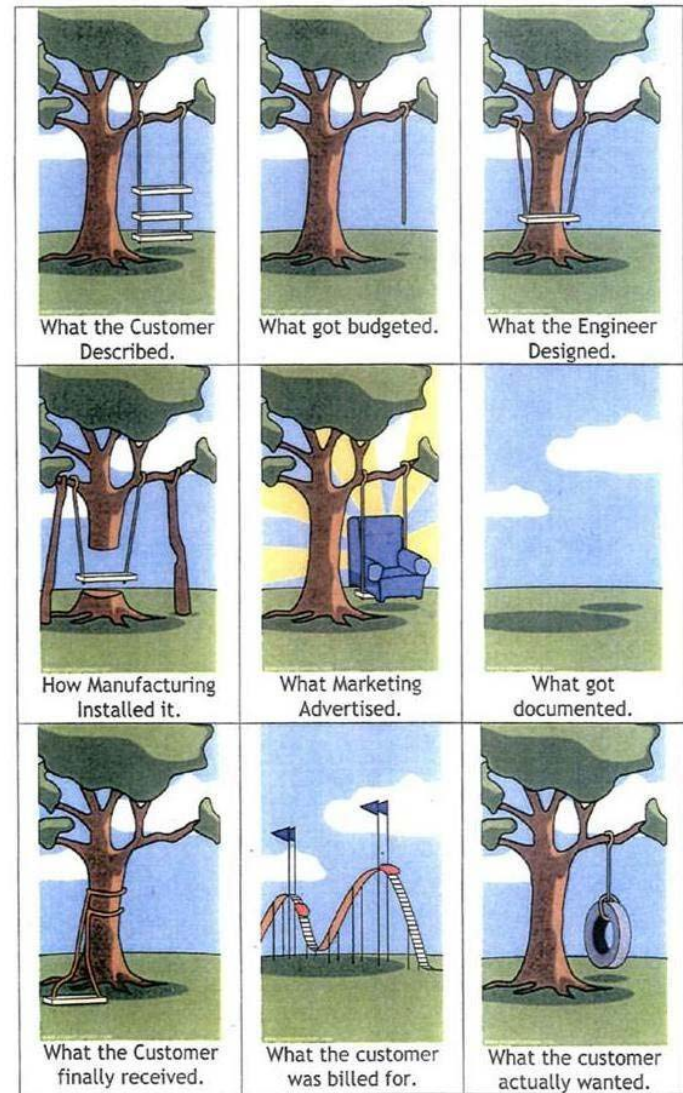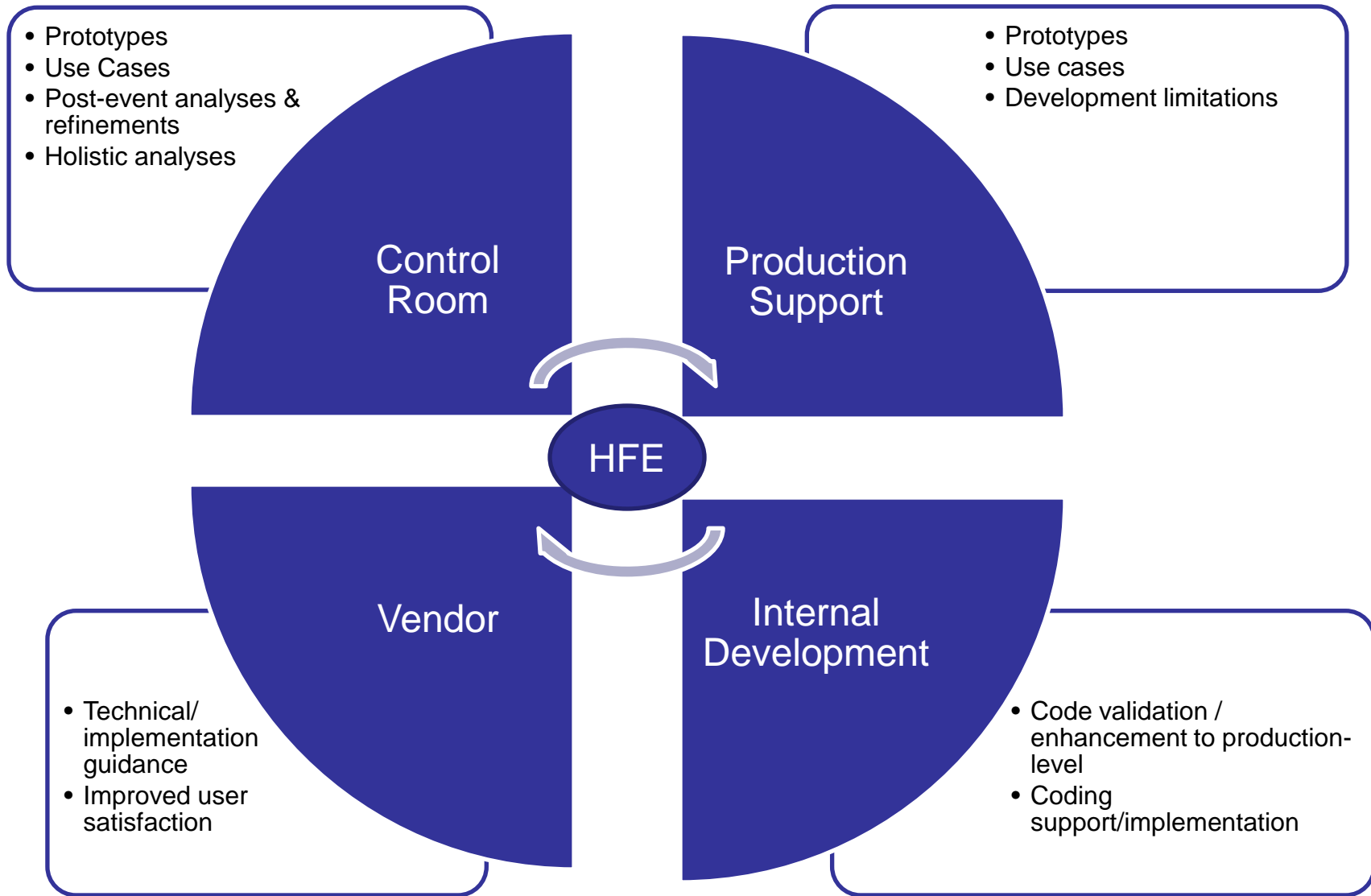
Needs communications

- **Fatigue / diet / exercise / tobacco / caffeine**

- **Reliability coordinators are not power systems engineers**
- **Power systems engineers are not reliability coordinators**
- **Collaborative process**
- **Shared stress**

- **Holistic analyses needed**
- **Agile software development**
- **Engagement of all players, leveraging different expertise**
- **Prototyping**

What the Customer Described. | What got budgeted. | What the Engineer Designed.
How Manufacturing Installed it. | What Marketing Advertised. | What got documented.
What the Customer finally received. | What the customer was billed for. | What the customer actually wanted.

http://www.soloseo.com/blog/2007/11/03/what-the-customer-actually-wanted/

Needs communications

- Prototypes
- Use Cases
- Post-event analyses & refinements
- Holistic analyses

- Prototypes
- Use cases
- Development limitations

Control Room

Production Support

HFE

Vendor

Internal Development

- Technical/ implementation guidance
- Improved user satisfaction

- Code validation / enhancement to production-level
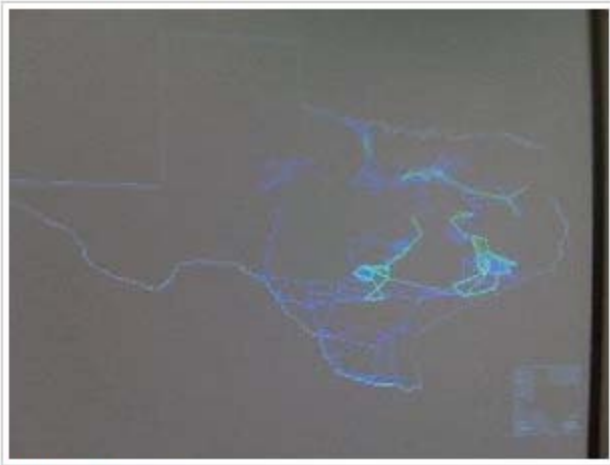- Coding support/implementation

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- **Need for wide-area and high-level views**
- **Alarming issues: "Alarm storm" / "Dust storm"**
- **Highly dynamic network model**
  - Locations of equipment / navigation between equipment
  - Naming convention changes for equipment
- **Data integration across multiple systems**
- **Increased cognitive load as operators increasingly managing more tasks with more complex systems that change more quickly.**
- **Visualization tool – business processes run by core systems**
- **Research & rapid prototype platform**
- **Macomber Map being used in control room, engineers for studying, training (Blackstart), external users.**
- **Focus on situation awareness, configuration to ERCOT control room operators and their needs.**

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