



Product Development Value Stream Mapping Manual (PDVSM)

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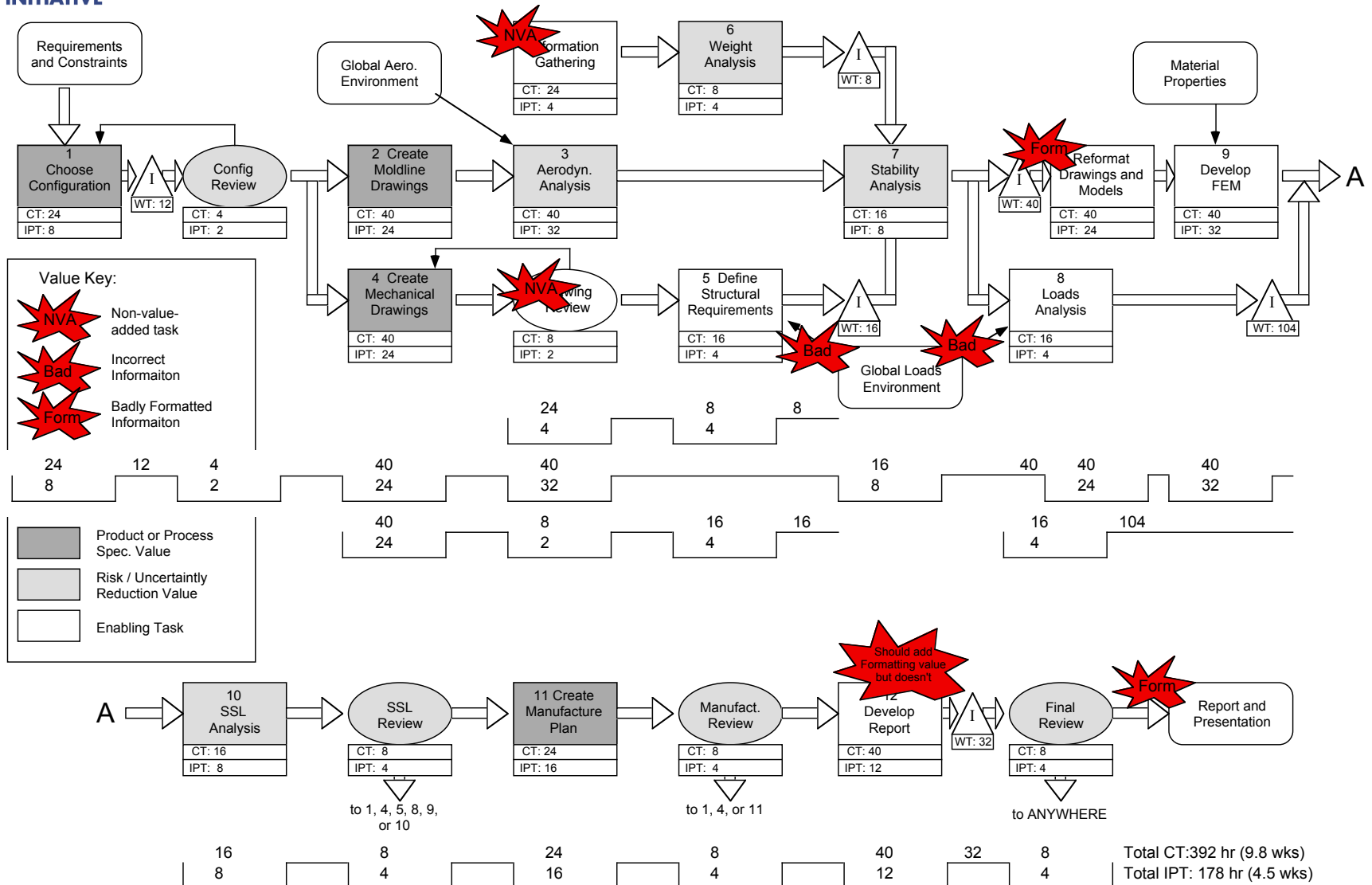
PDVSM: A Practical Guide to PD Value Stream Mapping

- **A “Rother and Shook” for Product Development**
 - More details necessary for the complexities of PD
 - Details and background for lean experts
 - Practical advice for in-the-field use
- **Repository of LAI knowledge**
 - Four+ years of PD team experience
 - References and attributions
 - Not an academic product
- **Member Best Practices**
 - Suggested “cookbook”
 - Options and resources
 - Running examples and other aids

Contents

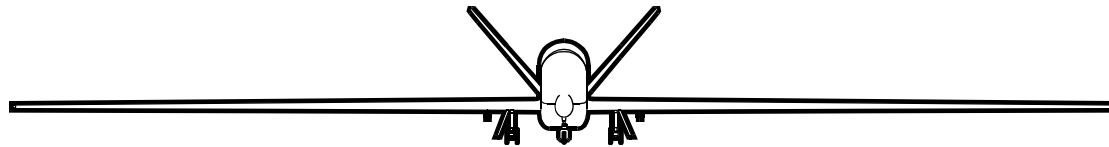
- **Focus on PD Process (Local Lean)**
- **Primer on Lean Engineering**
 - **Applying basic lean concepts to PD**
- **Basic Process Mapping Techniques**
 - **Not rocket science**
- **Member Best Practices**
 - **Bounding problem**
 - **Defining Value**
 - **Sources and uses of data**
 - **Finding waste**
 - **Improvement heuristics**
- **Running examples and other aids**

Example with Value Assessments





U.S. AIR FORCE



GLOBAL HAWK

Lean Now Initiative

Engineering Development VSM

NORTHROP GRUMMAN

Integrated Systems



Global Hawk Alpha Contracting





Lean Now...Supporting and Accelerating the Lean Transformation of Government

Lean Now

- **A Government Initiative...a Total Enterprise Team Facilitated Through The LAI Venue**
- **Leverages Collective Knowledge To Eliminate Barriers...capitalize On Government And Industry Teamwork**
- **Industries Experience In Large Scale Change**
- **Cadre Of Coaches... Subject Matter Experts**
- **Spiral Approach**

Accelerate Value Creation And Eliminate Non-essential Activity – Apply Lean Principles To Government-industry Critical Processes:

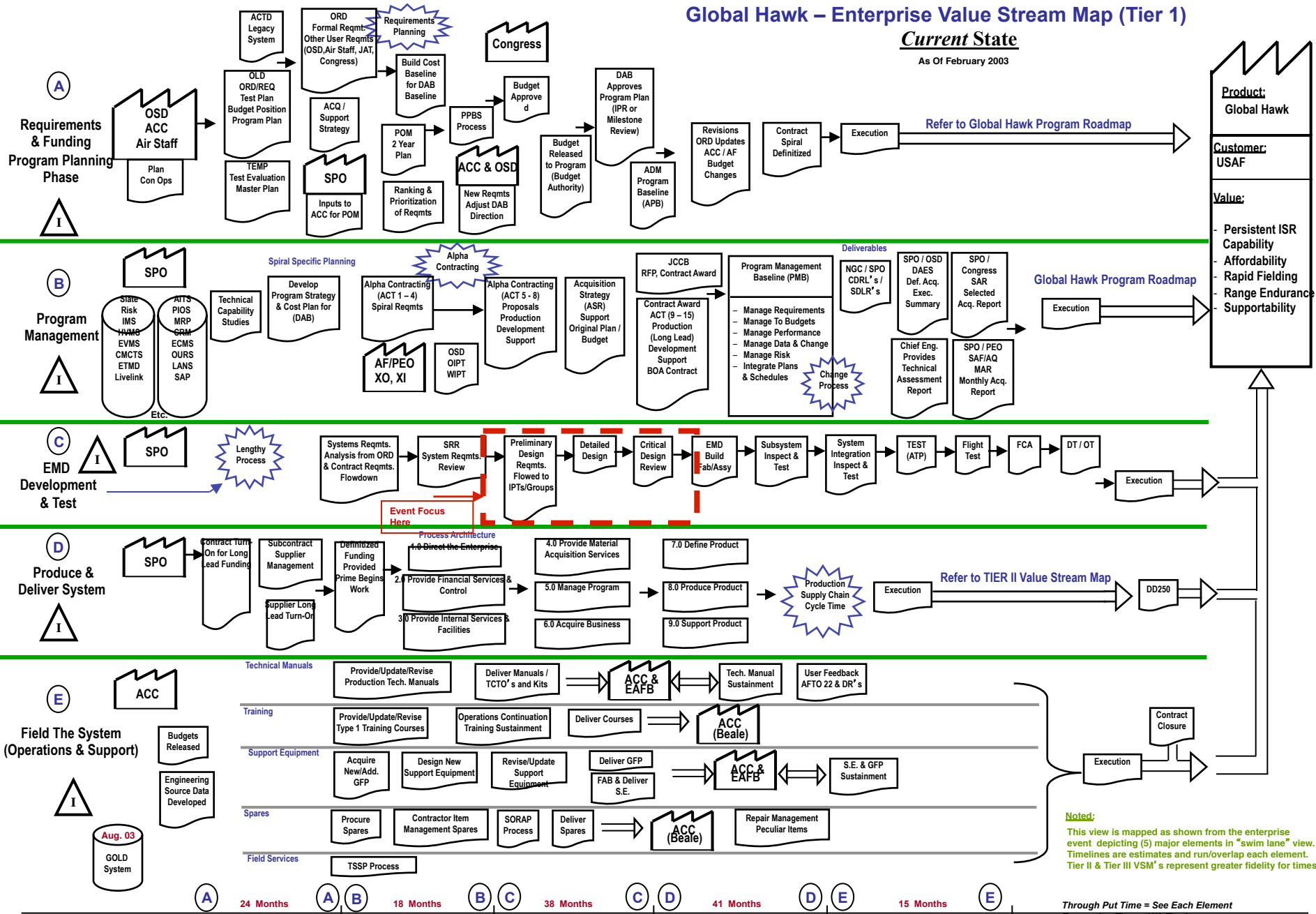
- 1.User-SPO-industry Program Interfaces**
- 2.AF-industry Business Processes**
- 3.AF-industry Operating Processes**

The right context

Global Hawk – Enterprise Value Stream Map (Tier 1)

Current State

As Of February 2003



Event Description and Objectives

- **Conduct a collaborative event involving Government, Northrop Grumman, and Key Suppliers to review the Global Hawk Engineering Development Process; Focusing on Preliminary Design Requirements and Detailed Design Processes by Defining Current State Via Value Stream Mapping**
- **Simplify Process, Reduce Cycle Time and Improve Cost**
 - **Use Global Hawk Tier I VSM as Baseline for Event**
 - **Document Process “Current State” VSM (Select Areas)**
 - **Determine Improvement Initiatives for Cycle Time Gains**
 - **Develop “Future State” Value Stream Map for Process**
 - **Create 9 Block Chart Closure Plans to Achieve Targeted**
 - **Goals for both Cost & Schedule Improvements**
- **Two teams - Component A design package (w/o sub); component B design/build team (with sub)**

PDVSM part of Integrated Training

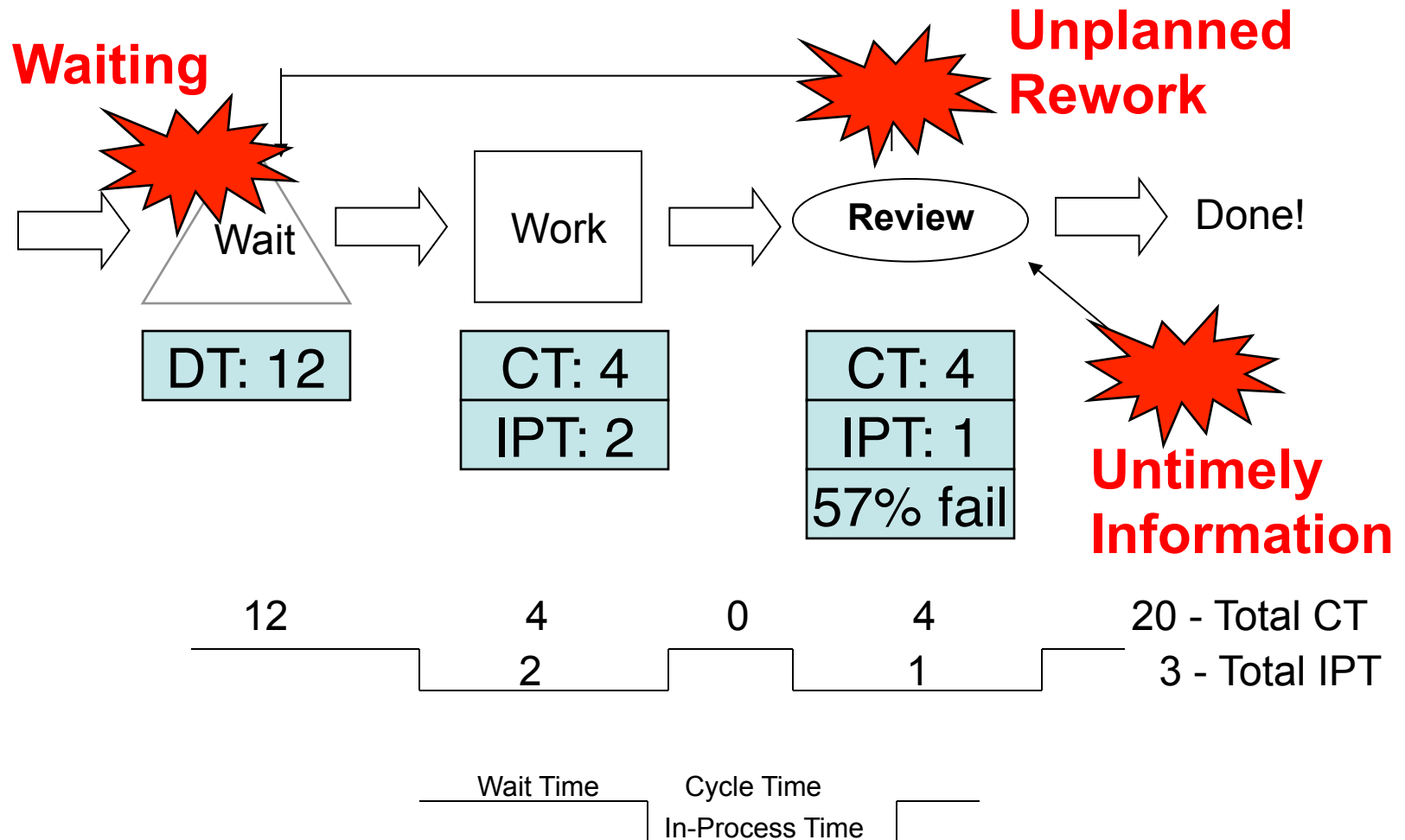
- PDVSM manual was prep-work for participants
- First afternoon was kick-off and training:
 - LAI Lean Engineering lecture (review)
 - PDVSM review
 - Lean PD Simulation (the GAME)
 - Value Stream Mapping Exercise
 - Value Definitions from key stakeholders
- Completed the “Getting Started” part of the PDVSM process

An integrated training/kick-off package

Training with Lecture, Game, and Value Stream Mapping



Game/PDVSM training featured VSM for a simulated systems



Building the VSM



Data collection

- **Process flow (in declining order of accuracy and usefulness)**
 - **Participating personnel**
 - **Floor walking**
 - **Calls**
- **Task cycle times from existing data base**
 - **key personnel “went and got it”**
 - **Wait and process times NOT separated out - approximated**
- **Capacities, rework probabilities from participating personnel (and call-ins)**

**Good data key
USEFUL effort scoped by the data
Needed data emergent**

Results

- **Component A drawing release value stream maps**
- **One of three maps created - only one that stuck to LAI PDVSM process closely**
- **Names and numbers removed**
- **Capacity calculations not shown**
- **3 panels**

Swimming-pool lanes

Times - VL very long
L long, M medium, S short
Hard data on timelines shown in a box

INPUTS

REVIEWS

STRESS

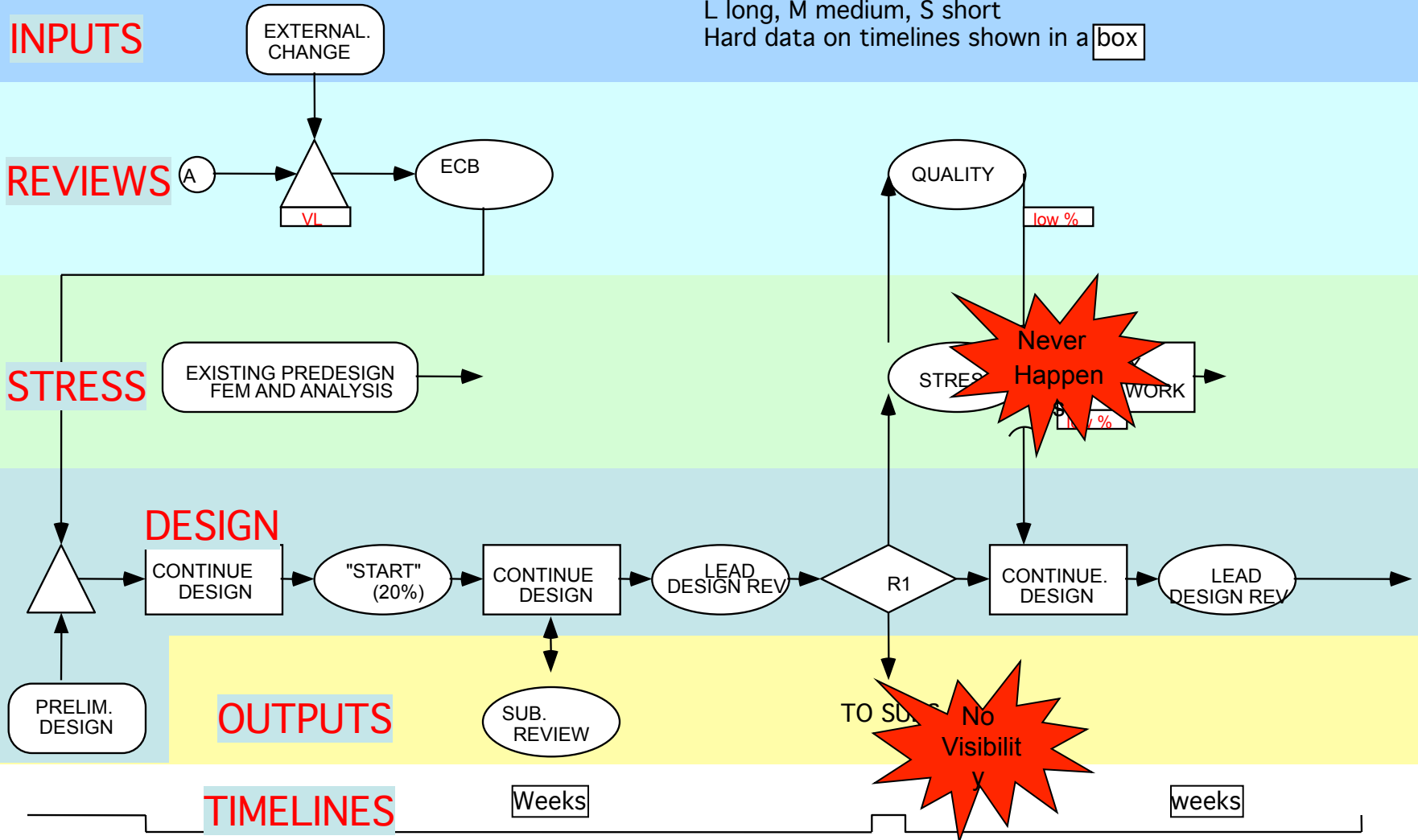
DESIGN

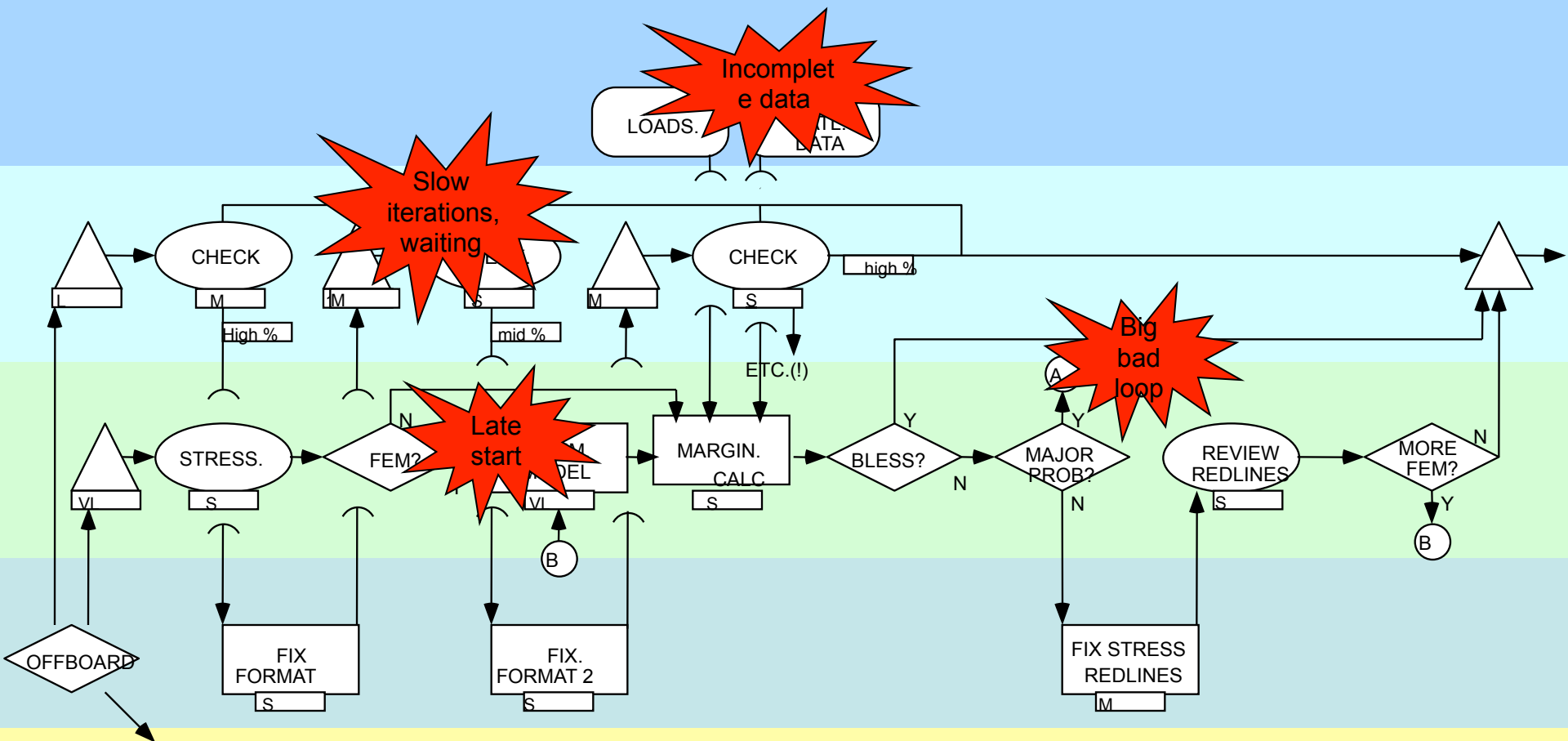
OUTPUTS

TIMELINES

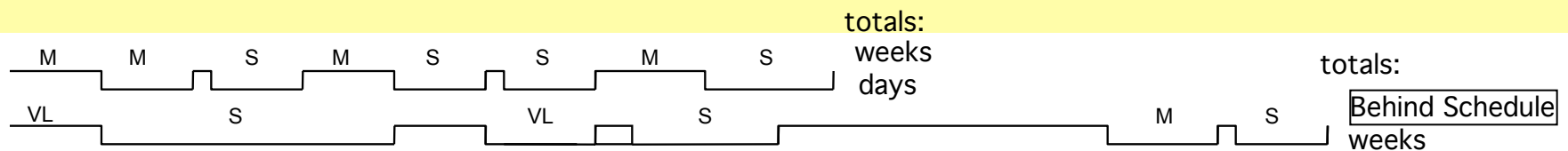
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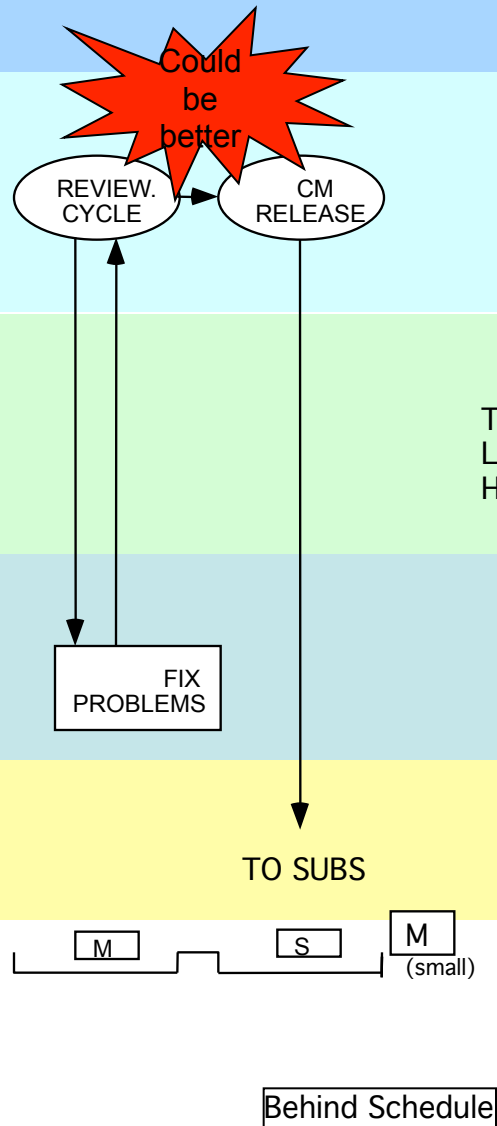
ELAPSED TIME





Designer moves to next round of drawings,
returns for fixes as required





Times - VL very long
L long, M medium, S short
Hard data on timelines shown in a box

Observations on map

- **Map reveals some problems at a glance**
 - Complexity
 - Inefficient batch and queue iterations
 - Big loops
- **DATA reveals more**
 - Early stress analysis NOT DONE
 - Stress is the long pole - sequential process and insufficient capacity
 - Inefficient/NVA-looking final review process NOT critical
- **Yet more revealed by digging a little**
 - R1 release problems
 - Remaining (unavoidable) uncertainty requires flexibility that isn't there
 - Supplier involvement (missing!)

PDVSM a good tool for Globalhawk

Observations on process

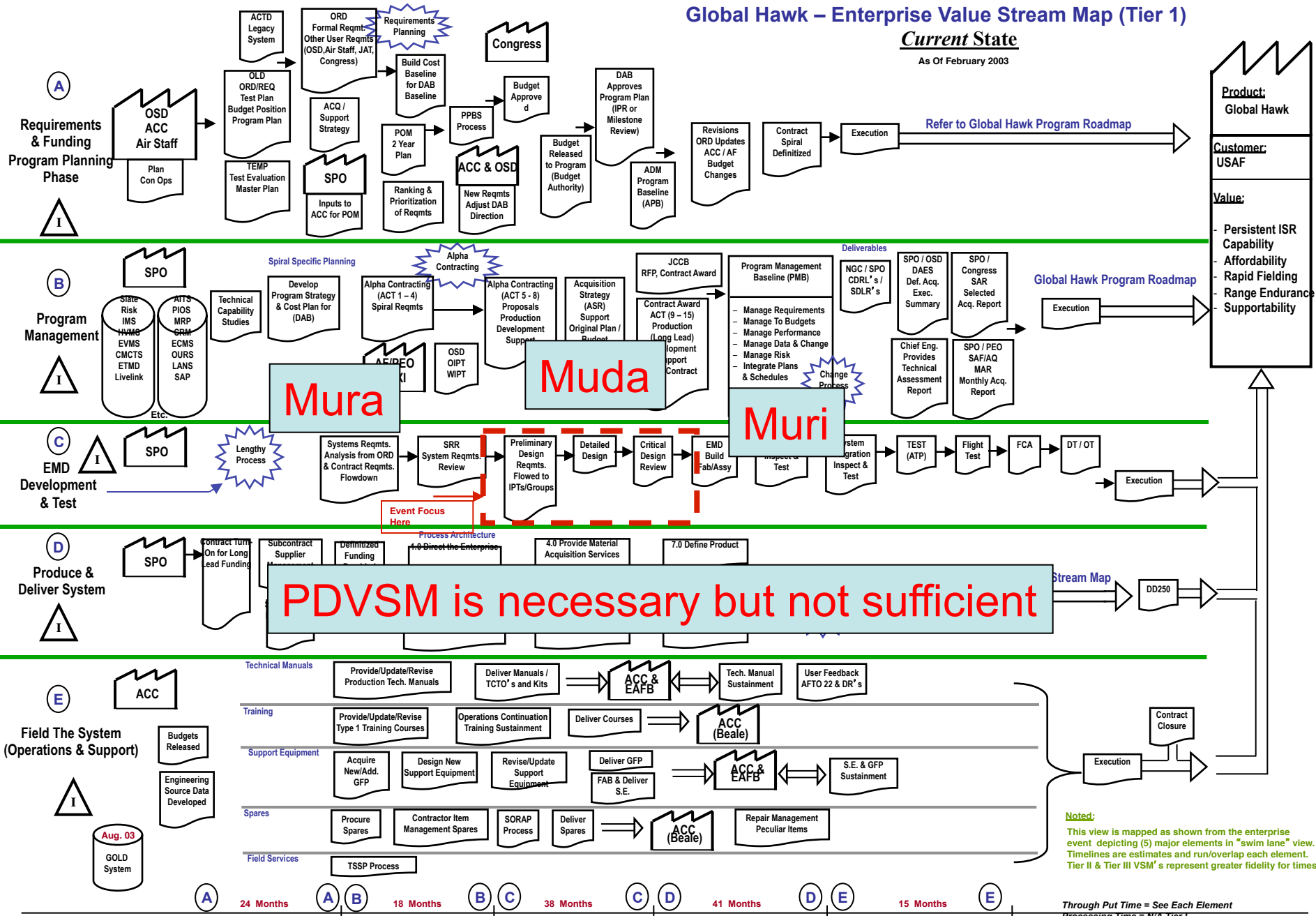
- **Method works - gets you there**
 - **Best results with team that stayed “on method”**
- **Preparation helpful (but inadequate)**
- **Training helpful (but not sufficient)**
- **Facilitation and mentoring necessary**
- **Right participants necessary (scoping)**
 - **Can’ t map areas where there is no knowledge**
- **Right data is key**
 - **Best if organization is responsive to evolving needs**
 - **Data allows correct focus, makes it credible**
- **Method adapted/improved**
 - **e.g. Swimming pool lanes, Constraint ID**

Globalhawk a good test of PDVSM

Global Hawk – Enterprise Value Stream Map (Tier 1)

Current State

As Of February 2003



Noted:
This view is mapped as shown from the enterprise event depicting (5) major elements in "swim lane" view. Timelines are estimates and run/overlap each element. Tier II & Tier III VSM's represent greater fidelity for times.

Overall Assessment of PDVSM

- **Not the answer to all questions**
- **“Not rocket science” - common sense, practical guide**
 - **Lean Engineering, Data and Metrics parts called out as particularly useful**
- **Some local improvement possible**
 - **Value definitions, improvement heuristics need work**
- **Most useful as an *integrated* tool**
 - **Game plus lean engineering material for training**
 - **Lean Now or other process framework for execution**

PDVSM Completion Plan

- **Open to input (now)**
- **One more field test (Fall)**
- **Finish PDVSM 1.0 (December)**
- **Part of an integrated tool set**

Toolkit Concepts

- **Top Level**

- EVSMA (guided for PD?)
- Enterprise TTL Roadmap
- Learning to develop concepts
- MATE-CON for front end
- CMMI or other assessment tools

plus many others

- **Mid Level**

- Warren Seering building on PDVSM
- Learning to develop/member tools for project management
- PD TTL Roadmap

- **Low Level**

- PDVSM
- Game concepts

- **Training Material to support all of above**

Do these address *your* stress?

Development of PDVSM Manual

- **March:** **Alpha Release**
 Early Reviews
 Presentation/critique at LAI Plenary meeting
- **April:** **Provided as supplement to GAME training;**
 distributed at Boeing as supplement
- **Summer:** **MIT critique and use**
- **August:** **Global Hawk Lean Now event**
 Full integration with GAME and Lean
 Engineering training
 Facilitated use for process improvement

Approximate Event Agenda (in half days)

- Intro and Training
- Team formation and **high level mapping**
- Begin detail mapping and **needs determination**
- **Data collection**, floor walking
- Complete **local mapping**
- **Future state** determination
- Formalize **next steps** (action plans)

**Adapted to meet needs of teams
More iteration than planned**