

# Nimble, LEAN approaches in Business Aviation MRO

## *The case of JetSupport BV, Amsterdam*

Arjan Stander,  
*Lecturer / Researcher, Amsterdam University of Applied Sciences*

Koen Evers,  
*Marketing & Sales Manager, JetSupport, Amsterdam*



## My bio in a nutshell

MRO environment  
(Approx. 10 yrs)



Academic (teaching / research)  
(as of 2009)





# Amsterdam University of Applied Science

- 42000 students enrolled in 2010
- 5000+ in the Technical Faculty,
- of which approx. 900 in Aviation Studies



## Since 2009 Research Focus on Aviation MRO (*lectoraat Aviation Engineering*)

Main goals:

- creating new (applied) knowledge,
- establishing professional network of participating partners,
- disseminating knowledge within the industry & existing aviation curriculum

Research Focus *lectoraat Aviation Engineering*

Process  
Optimization

Advanced  
Materials

Human Factors



# Roundtable to Define Research Topics



 **Martinair**

Koninklijke Luchtmacht 

**BOMBARDIER**

 **JetSupport**  
AMSTERDAM

 **KLM**

 **Fokker**

 **TU Delft**

## Roundtable Results (SME point of view)

- SME MRO's lag behind in the implementation of LEAN.

*"Conversely, the application of lean manufacturing within SMEs has had a slow impact in comparison to large firms" (Conner, 2001).*

- SME MRO's Enterprises (SME's) lack knowledge.
- Some MRO's are doubting the applicability of LEAN in 'their' environment.

Not  
applicable

Applicable &  
interested

JetSupport showed interest and wanted to *Just Do It*

Some of their questions:

- How can we do LEAN?
- How can we work together?
- Let's try it!

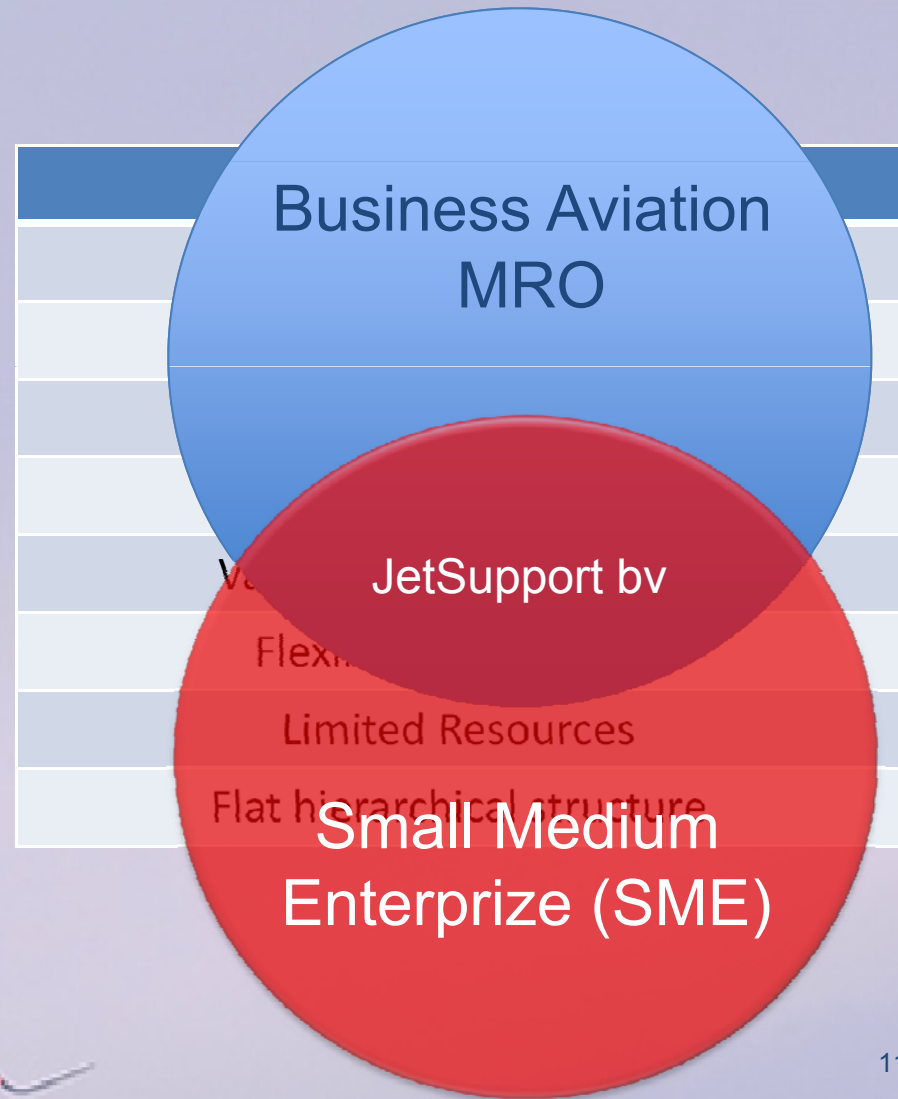
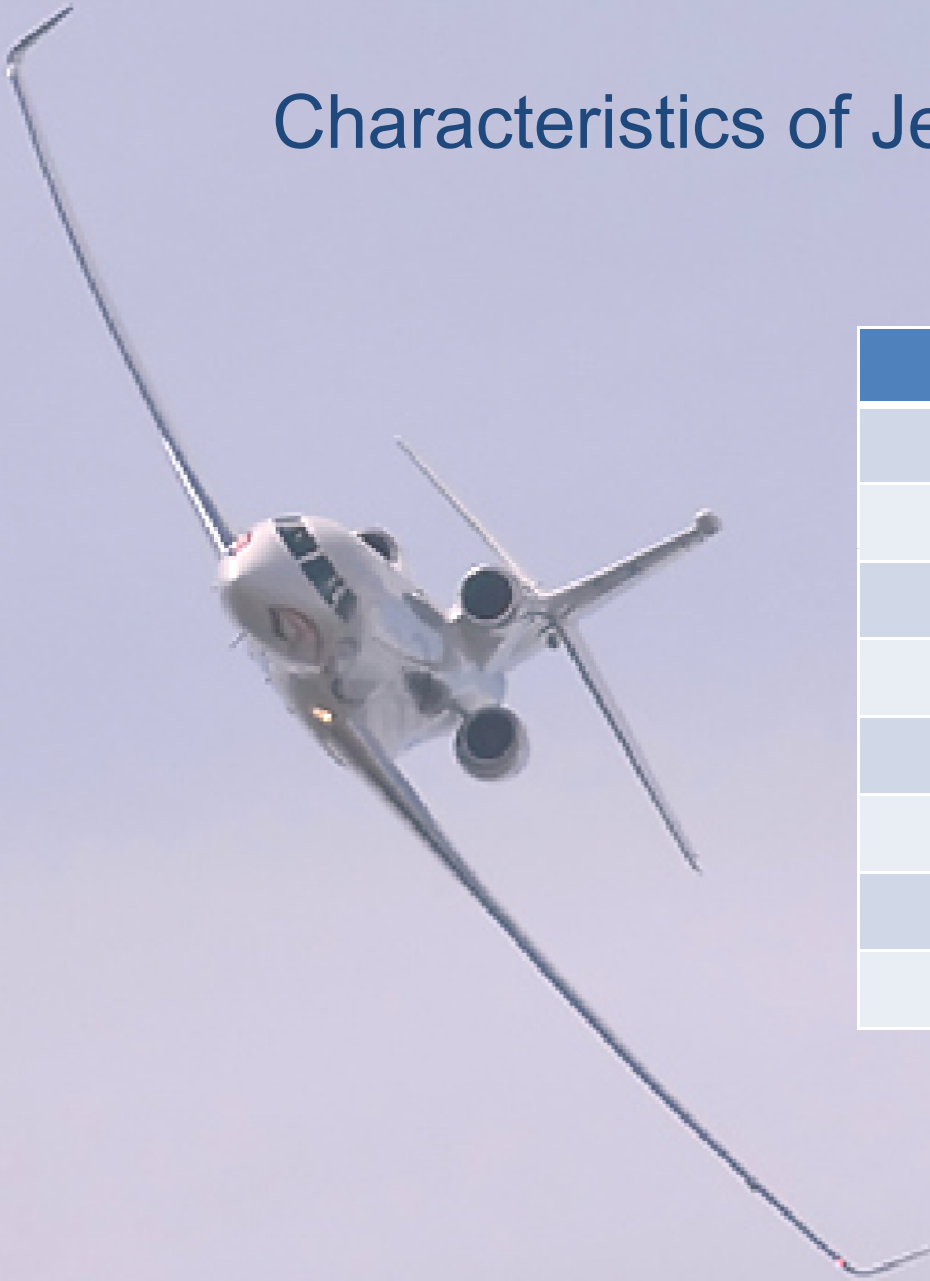




*JetSupport intermezzo, Mr. Koen Evers*



# Characteristics of JetSupport bv



*“A close cooperation between the university and JetSupport allowed for a LEAN implementation in a small business aviation MRO”*

1. Why this partnership?
2. How does it work?
3. What did we learn so far?
4. How do we continue?

## Why a partnership?

Because, for example: *... most of the knowledge about lean production is tied up in larger companies and consultant/research actors and has not been spread widely to SMEs companies.* **(Yang pingyu et al, 2010)**

*..... limited resources (skills, labor time and financial resources) cause major implementation difficulties* **(Antony et al, 2005).**

*However, management is usually small and centralized, multidisciplinary „hands-on“, informal and people oriented* **(Ghobadian et al, 1996).**

*Good top-management leadership has higher leverage in small companies and is the major critical success factor for Lean in an SME* **(Achanga et al, 2006).**

## Why a partnership?

- So, if SME's are enabled to start with LEAN their business characteristics might actually help them during the implementation.
- Thus a partnership creates that enabler..... It provides, to an certain extend, the necessary knowledge & resources to jump start a LEAN implementation.

# HOW DID WE WORK TOGETHER – *LEAN TAKE ONE*

# The Supporting Role of Students

- Students act as facilitator (e.g. preparation & guiding of sessions)
- Students digest available resources and condense it into applicable tools / methods - (e.g. MIT Roadmap to LEAN)
- Multiple senior projects in series ensure project continuity (i.e. graduation projects 2 times a year)
- Students cannot run/carry the company lean efforts, therefore clear project responsibilities are established.





## Starting Small - *take one*

- Plan (preparation): Lean pilot kick-off meeting
  - Limited process within the Product Support department
- Do: mapping the process
  - Value Stream Map Current state & Future state (Rother & shook, Learning to see, 2003)
- Check: planning and testing the new process
  - Closely measuring the process
- Act: what did we learn?
  - How should JetSupport continue



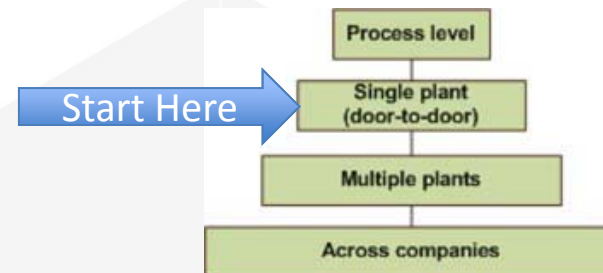
# Tryout Future State

- What did we measure:
    - How long does every single process step take?
    - How often is work interrupted?
    - How often is communication (clarification) required?
  - What did we find:
    - Significant cycle time reduction
  - However:
    - one specific department  
(Optimizing one link in the chain)
    - selected number of employees  
(Not everybody gets Lean)
- } sub-optimization

*Optimising the single departments or sub processes, will not automatically result in an improved overall process. (Smart, Maul, Childe, & Radnor, 2005)*

## First *lessons learned*

- Map the Total Value Stream
  - “Start on a door-to-door level”  
(Rother M, Shook J. (2010))
- Optimize the Total Value Stream with all involved departments
  - Ensure equal buy-in
  - Introduce lean to employees by training them
    - to ensure they **all** adopt the Lean paradigm
  - Setup a way to communicate changes
    - Make sure all employees are familiar with the changes



# LEAN *TAKE TWO*, - the bigger picture

[www.international.hva.nl](http://www.international.hva.nl)



## ACT → PLAN

- Mapping the Total Value Stream
  - In cooperation with Roland van Wegberg (Lean 6σ Blackbelt)
- Optimize the Total Value Stream with all involved departments
  - From finance to production, from mechanic to MT
- Introduce lean to employees by training them
  - Participation in Lean training Schiphol Group
- Setup a way to communicate changes
  - A3 board, daily meetings

# WHERE DO WE GO FROM HERE

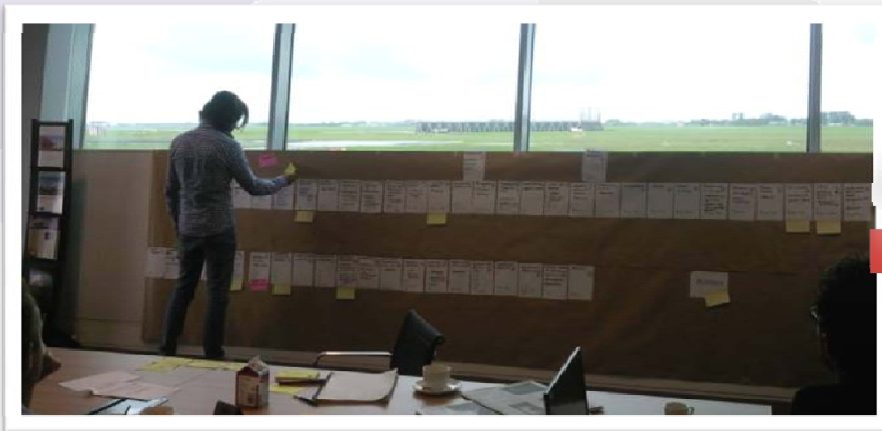
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## Where are we now?:

- Current state is created
- Inefficiencies are identified
- Future state concept is drafted

Now, how do we get there... and how do we manage it?



Current State



Future State

## Top level A3

**Background**  
 Comes out of date  
 -> Increased market volume + Revenue is declining  
 -> Overstuffed team - Key developers about to quit  
 -> Overhead costs - Time to develop games steadily increasing due to declining technical quality  
 -> Pressure to finish FASTER

**Current Condition**  
 -> Process cycle efficiency @ 3 months add value / 25 months cycle time @ 12%

**Goal / Target Condition**  
 -> 3x faster cycle time  
 -> 3x fewer escaped defects  
 -> 20% improvement in revenue

**Root Cause Analysis**  
 (Flowchart showing dependencies and team structure)

**Date:** 18 May 2009

**Countermeasures**  
 1. Cross Functional Teams - Graphics design through deployment  
 -> Predict 2x Faster Delivery  
 -> No real dependencies - now spend 75% of time waiting, negotiating  
 2. Abandon all but most promising 3 games in each queue. Do ONE game per cross functional team at a time.  
 -> 4x faster delivery from reduced task switching  
 -> Emerging games will cut 1.5 years from schedule  
 3. Engage developers in playing games and selecting ideas  
 -> 30% more profit to par with best competitor  
 -> Improved timing on which games to develop  
 -> More fun games, more popular

**Confirmation (Results)**  
 1. Cross Functional Teams  
 -> Half or much time waiting  
 2. One game at a time  
 -> Guaranteed, time to complete game is 4 months (3x)  
 -> Technical Debt decreasing - Escaped defects down by 2x as for  
 3. Engage developers in playing games and selecting ideas  
 -> One team taking time to play is producing more innovative games.  
 -> Impact on profit is TBD.

**Follow-up**  
 1. Consider more cross training of team members to reduce waiting for a specialist  
 2. Reduce difficulty of integration and deployment through  
 -> one process for waiting and selecting ideas  
 a. Recruit talent if available / available  
 b. Improve skills of best people already in company  
 c. Broaden base of participation in selection and gathering experience of everyone in company.  
 4. Continue improve if reused game components / engine, improve development method and reduce defects.

Some options:

- Simple action items?
- Hoshin planning?
- A3 method?

**Collisions robot...**

**Smart Goals...**

**Collisions robot...**

**Collisions robot...**

Departmental A3's



## What have we learned – top level (JetSupport)

1. Partnership allows for creative solution for some of SME's LEAN implementation hurdles.
2. Value Stream Mapping stimulates collective thinking. Within JetSupport, this means involvement from all levels.
3. JetSupport's size allows for door to door proces mapping, eliminating sub-optimization.
4. Continuous top management commitment & sense of urgency is paramount.

# Thank you for your attention!

Arjan Stander  
Amsterdam University of Applied Science  
[a.stander@hva.nl](mailto:a.stander@hva.nl)  
+31 (0)20 5952158