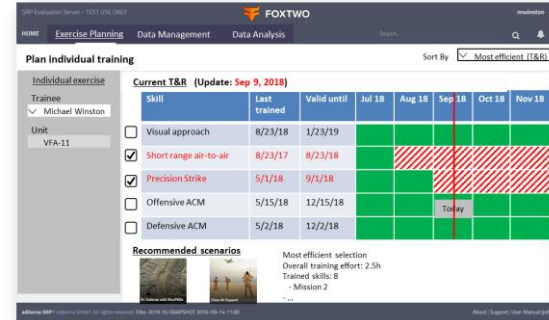


Analysis of Trainee Performance for Automating Training and Scenario Recommendations



Robert Siegfried, Tamme Reinders – aditerna GmbH

Mark Burgess – Prevailance Inc

Krzysztof Rechowicz – VMASC

About aditerna GmbH

Data Warehouse
Solutions (Big Data)

M&S, MSaaS,
NMSG, SISO (GSD), ...

Data Fusion,
Artificial Intelligence, ...



Global IT Innovator





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Current Problem Assessment

US Navy identified two of their toughest issues to solve

- Generating current readiness
- Recovering readiness

Tough problems to solve

- Not enough flight time funding to train live
- More complex aircraft and missions
- Integrated and networked tactics and weapons



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Naval Aviation Training Systems' answer

Approach

- Integrated simulators
- Integrate simulators with live ranges and aircraft (LVC)

Problem 1: Not enough SMEs

- To build training scenarios (including products)
- To analyze how we are performing / learning
- To modify scenarios based on expert analysis

Problem 2: How Naval Aviation evaluates readiness

- Funding based on antiquated T&R requirements
- Only assesses currency not proficiency



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Solution Approach

“Design and develop software technology that leverages data science and advanced computational analyses of tactical data sources to improve training scenarios and assessments, and make training more adaptive, efficient and effective.”

Team Prevailance

PREVAILANCE

- Naval Aviation Experience
- Training Experts
- Professional Consultants



- M&S experts
(Consulting, Simulation
Resource Planning,
MSaaS, ...)
- Data Warehouse and
Data Analysis expertise



- M&S Research
- Flight Simulator
- Multi-sensory
Experiences



Approach to Task

Requirements Analysis

- Concept of Operations (CONOPS)

Concept Development, Software Design

- Fleet Operational eXercise
Training for Warfighter Optimization



FOXTWO

Development of Demonstration System

- Feasibility, initial validation

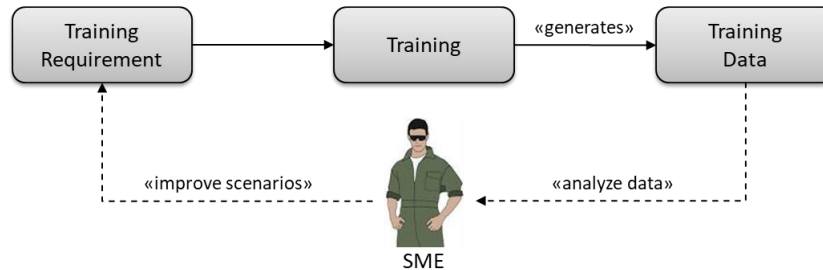




Current Situation

Generally linear with a manual feedback loop

- SME analyzes the training required
- SME recommends a scenario to meet training objective
- SME generates products and set-up for training



Improvements to scenarios and training content by SMEs
motivation and time dependent

A large amount of data is generated

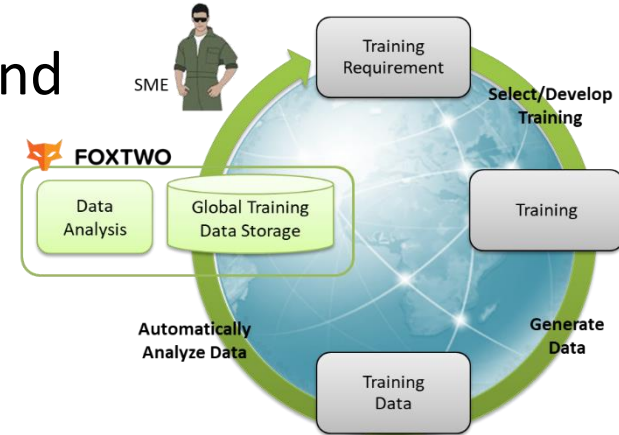
- Limited post-flight playback, with analysis and grade sheet
- Data is then erased



Vision

Training process has a feedback loop for improvements

- Generated data is not lost
- Data is stored and processed
- Data is analyzed to recommend
 - Most efficient scenarios
 - Most effective scenarios
 - Most adaptive scenarios
- Automated, iterative process





Vision

Automation supports and frees up SMEs

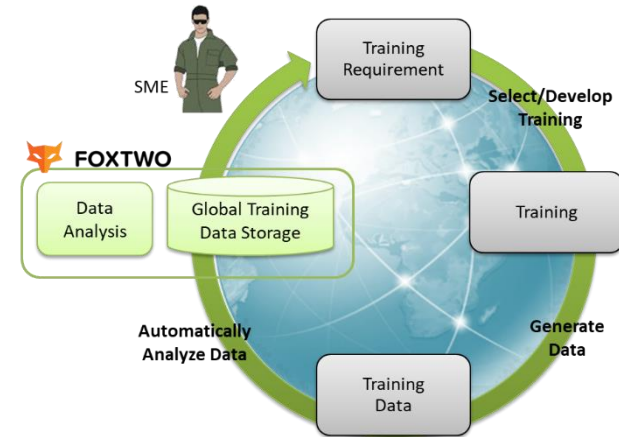
- SMEs can concentrate on trainee
- SMEs can focus on big picture

Avoid manual, routine tasks

- Shorten scenario development
- Shorten product development
- Enable consistent analysis

Holistic analysis

- Entire training vice single MOPs



Vision – medium to long-term

FOX TWO aggregates training data

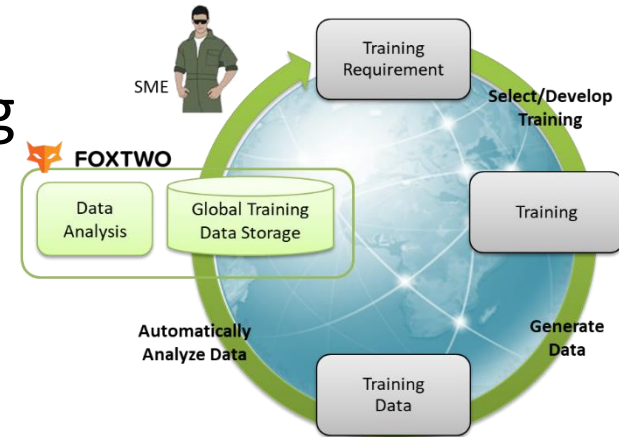
- Nothing is lost or overlooked

FOX TWO learns individual's capabilities

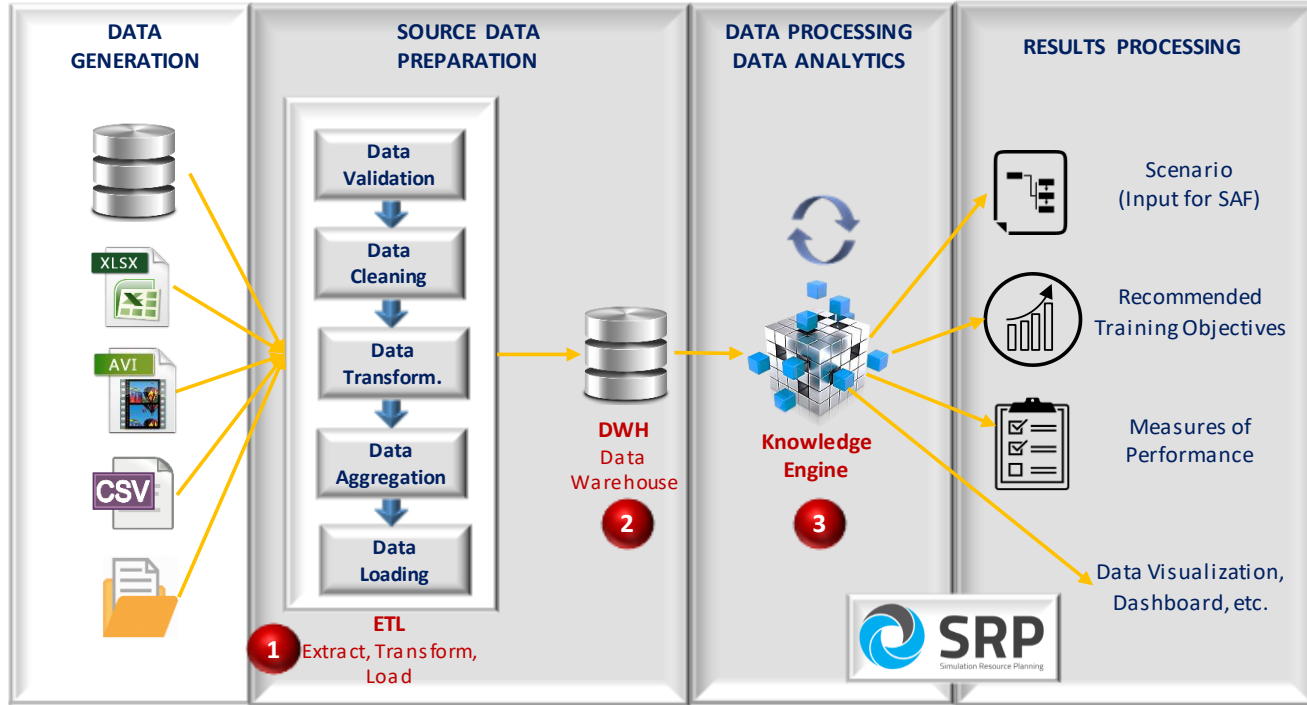
- Tailors recommendations

FOX TWO integrates into training

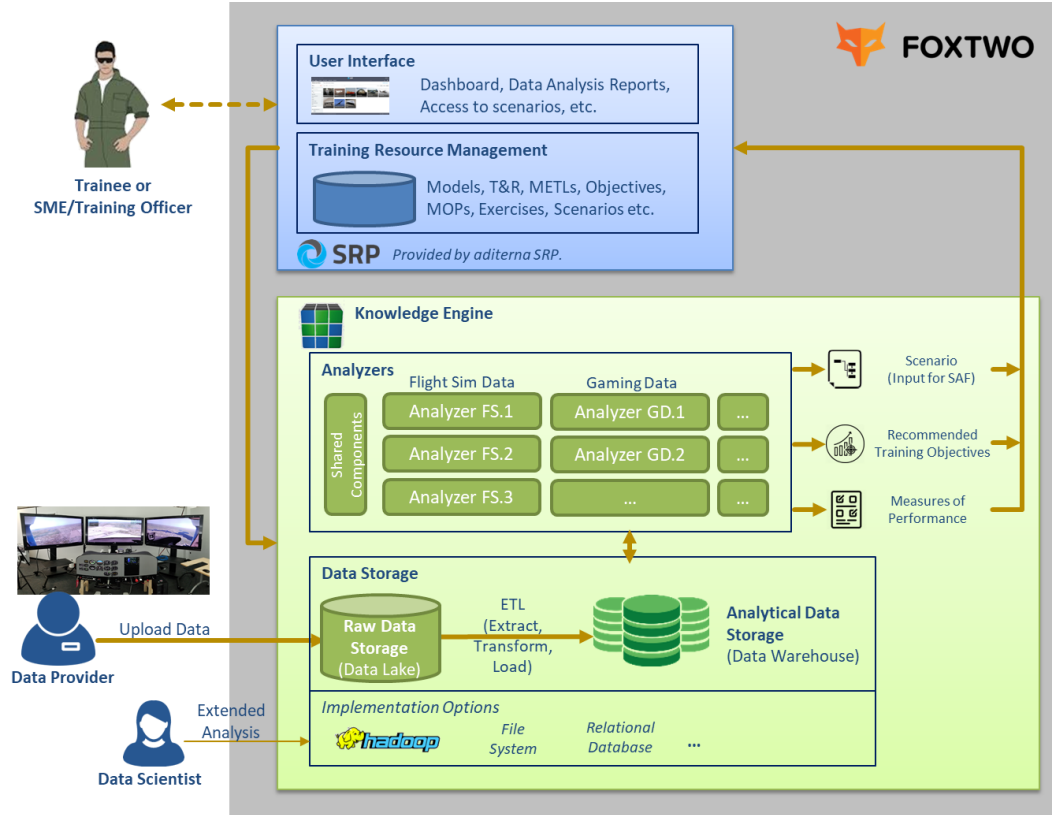
- Real-time adaptive scenarios
- Scenarios that change based on trainee performance



Concept – Process View



Concept – Building Blocks





Example Datasets

Objective: Evaluate system design and show that design objectives are met



ASSET Flight Simulator

- Very similar to operational flight simulators
- To be used for human subject experimentation

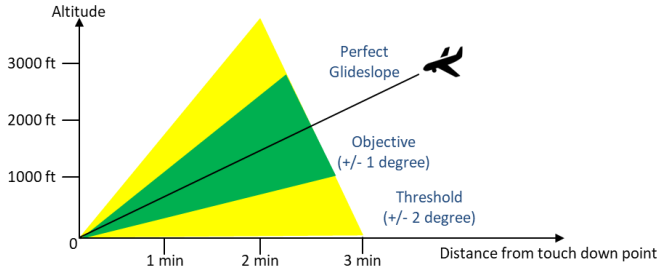


StarCraft Broodwar

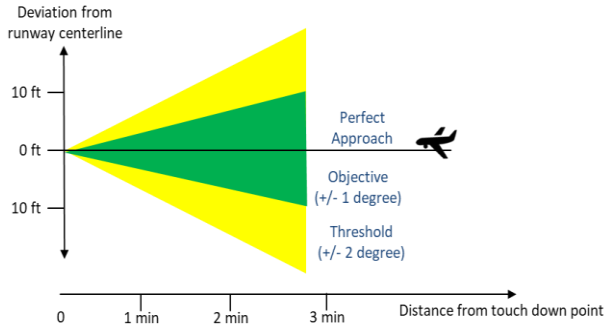
- Similar to constructive simulations
- Large volumes of data freely available

Example Analyzer

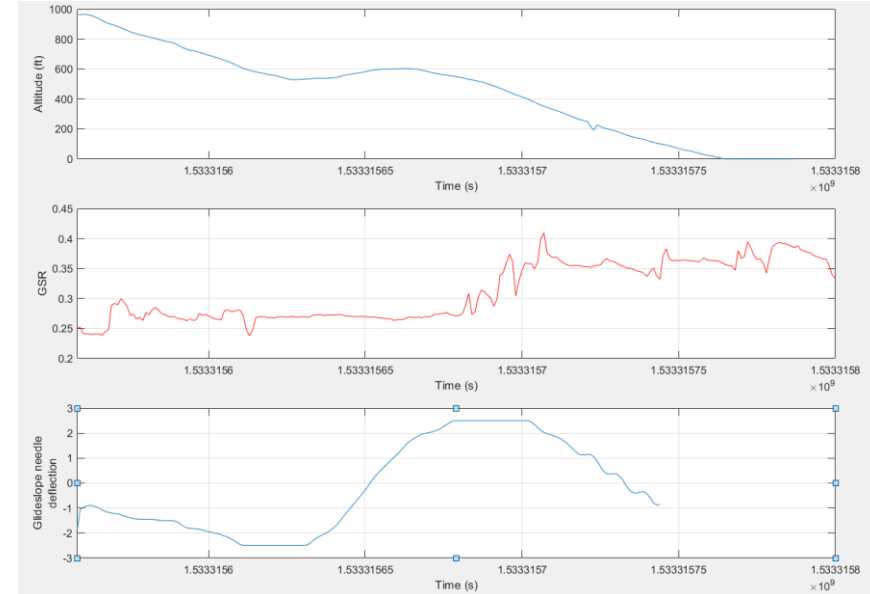
Example 1: Glideslope



Example 2: Localizer



Example 3: Physiological data from flight simulator



UI Sketch (early version)



SRP Evaluation Server - TEST USE ONLY
FOXTWO mwinston ▾

HOME
Exercise Planning
Data Management
Data Analysis
Search...
🔍
🔔

Plan individual training Sort By ▾ Most efficient (T&R)

Individual exercise

Trainee

✓ Michael Winston


Unit

VFA-11


Current T&R (Update: Sep 9, 2018)

| Skill | Last trained | Valid until | Jul 18 | Aug 18 | Sep 18 | Oct 18 | Nov 18 |
|------------------------------------------------------------|--------------|-------------|--------|--------|--------|--------|--------|
| <input type="checkbox"/> Visual approach | 8/23/18 | 1/23/19 | | | | | |
| <input checked="" type="checkbox"/> Short range air-to-air | 8/23/17 | 8/23/18 | | | | | |
| <input checked="" type="checkbox"/> Precision Strike | 5/1/18 | 9/1/18 | | | | | |
| <input type="checkbox"/> Offensive ACM | 5/15/18 | 12/15/18 | | | | | |
| <input type="checkbox"/> Defensive ACM | 5/2/18 | 12/2/18 | | | | | |

Recommended scenarios



Air Defense with ManPADs



Close Air Support

Most efficient selection
Overall training effort: 2.5h
Trained skills: 8
- Mission 2

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Summary and Way-Ahead

Demonstrated feasibility of automated training data analysis

- Reduction of SME time possible
- Consistent (and complete) training assessment

Next Steps

- Evolve demonstration system into full-featured prototype
- Integration of more Measures of Performance (MOPs)
- Validation of training improvement (human subject study)



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Point of Contact



Dr. Robert Siegfried
aditerna GmbH, Germany
robert.siegfried@aditerna.de
+49 160 736 73 29