

Learner-Aware Constructive Entities for Scalable Adaptive, Personalized Training

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This work was supported, in part, by the Office of Naval Research project N00014-1-C-0170 Tactical Semi-Automated Forces for Live, Virtual, and Constructive Training (TACSAT). The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of the Department of Defense or Office of Naval Research.

8 Mar 2017

Distribution A. Approved for public release; 43-2507-17



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Modeling human reasoning.
Enhancing human performance.

Constructive Forces (aka Semi-Autonomous Forces)

- SAFs: Constructive entities designed to support training and experimentation
 - Routinely used for virtual training
 - Increasingly integrated with live training

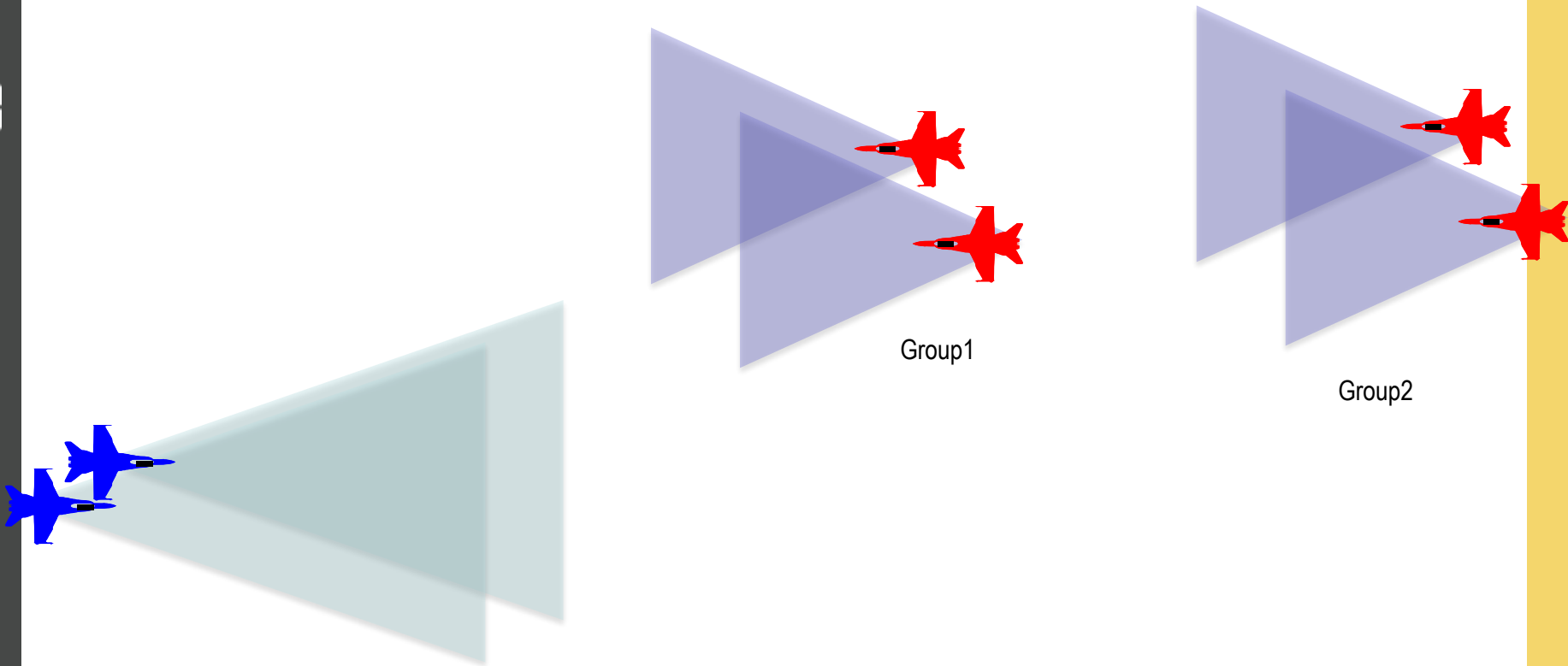
- Typical Assumption:
A “good” SAF is a tactically-realistic SAF
 - Virtual fighter pilot



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- Tactical realism is necessary but not sufficient...
 - Low-level, manual control... significant component of TCO of simulation

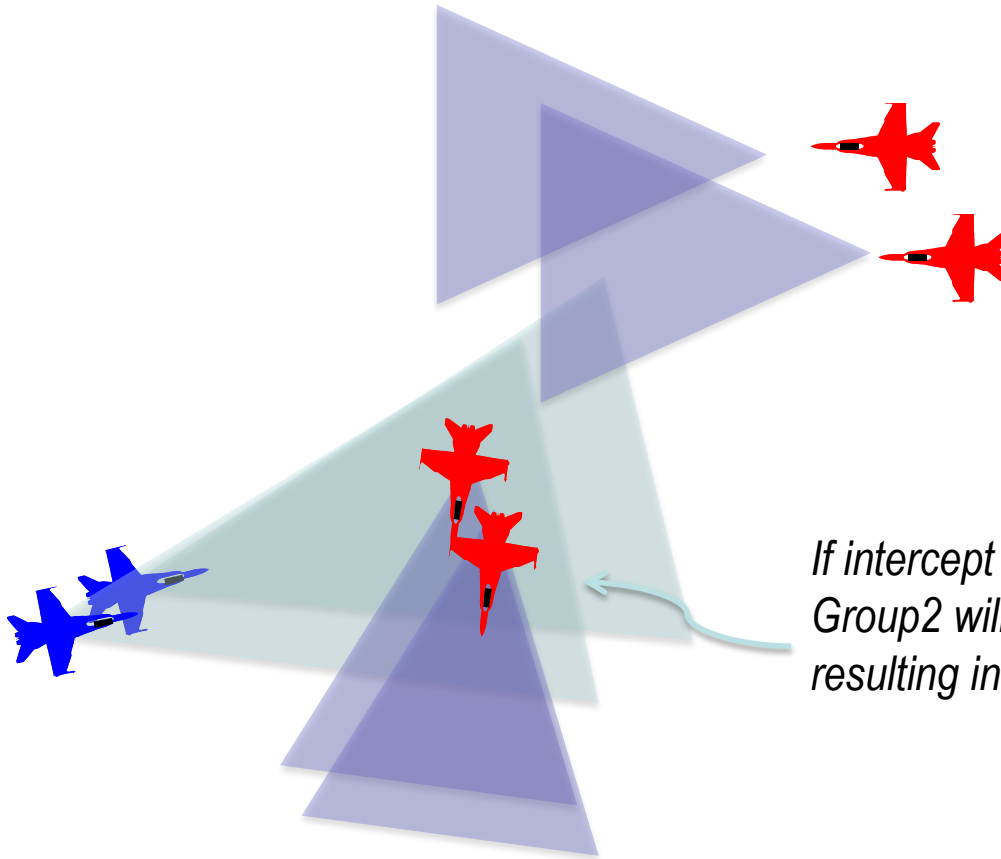
Motivating Example (1 of 3)



Instructor/Training goal: Two successive but independent engagements

- Independent: groups stay outside of factor group range
- Successive: Second intercept starts very shortly after conclusion of first intercept

Motivating Example (2 of 3)



If intercept of Group1 takes sufficient time, Group2 will close to within grouping range, resulting in an undesired 2v4 situation.

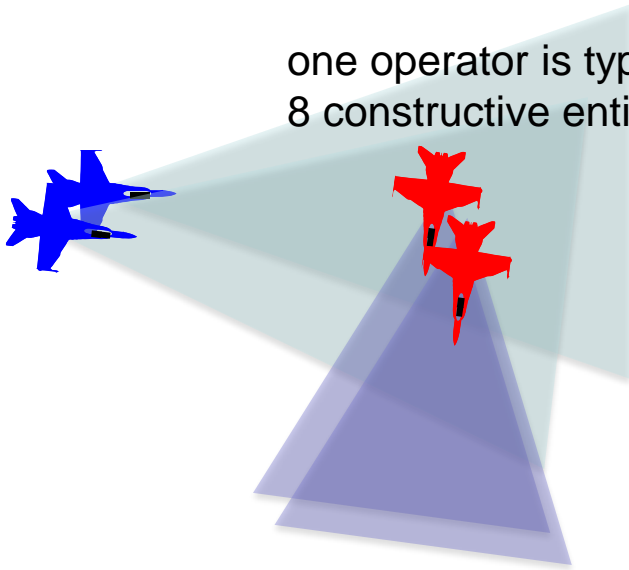
Motivating Example (3 of 3)

Because entities are not aware of training goals (two separate engagements), operators must manually intervene to direct the aircraft.



Operator manually redirects group2 heading away from group1 engagement.

one operator is typically needed for control of 4-8 constructive entities.



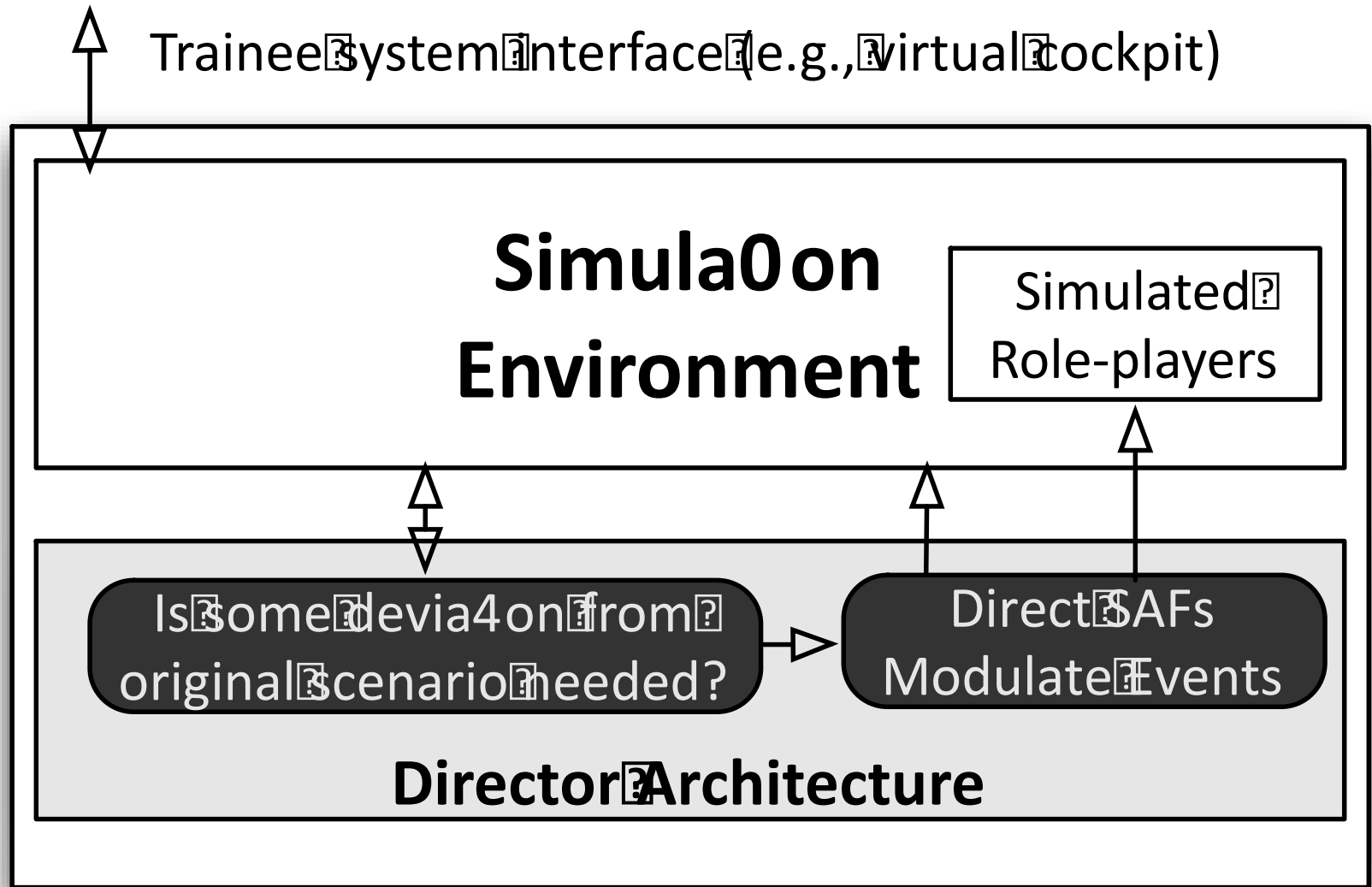
New Requirement: Learner-Aware Constructive Forces

- Constructive forces need to take into account how they are being used
 - Virtual/Constructive
 - Live/Constructive
- Individual entity behavior should be both realistic and appropriate/helpful for the exercise or event
 - Learner-aware (adaptation based on training needs/requirements)
 - Exercise-aware (adaptation based on exercise constraints and conditions)
- Specific usage contexts are not knowable in advance
 - Requirement for run-time flexibility and adaptation



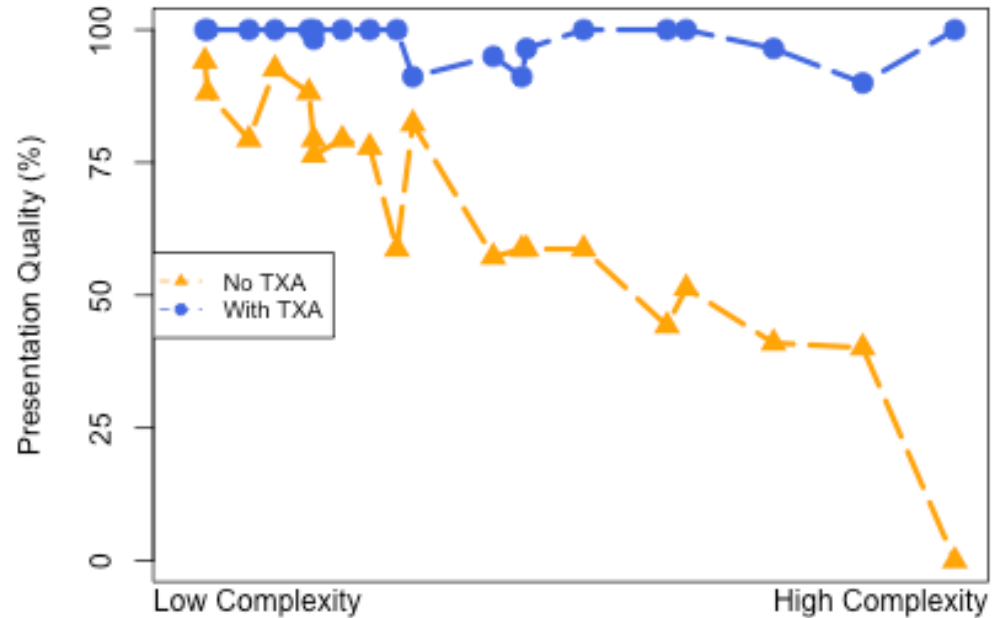
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Example Approach: Directing SAFs



Example: Training Executive Agent (TXA)

- Implementation of “Director Architecture” system architecture
 - Adapts pilot-created SAF behaviors
- Adapts “native” entity behaviors based on user-defined scenario/mission requirements
 - Coordinated action across independent groups
 - Independent action within command groups
 - Behavior adaptation based on scenario conditions (“winning”)



- Integrated in Navy distributed simulation system
 - Effective use in about a day of training
 - Significant reduction in interventions needed while ensuring desired training opportunities
 - Large-scale, complex exercises without any operators needed

Additional Information

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