

Presentation Outline

- The targeted need → The scoping study idea
- The potential research avenues
- The scoping study proposal



The trigger: Need expressed in Oct. '09

- ❑ Discussion → AAR is one of the most important phases of the training process - Needs in terms of functionalities have been raised
- ❑ Currently - To fill the gap in terms of visualization, existing commercial products have been spotted and have to be evaluated ...
- ❑ But for “specific needs”, “*futuristic* needs” – What to do?
- ❑ **Idea** - Conduct a scoping study
 - Establish a draft of the (whole set of) needs to provide direction to future AAR systems
 - Investigate if some emerging technologies / concepts could help to answer the needs

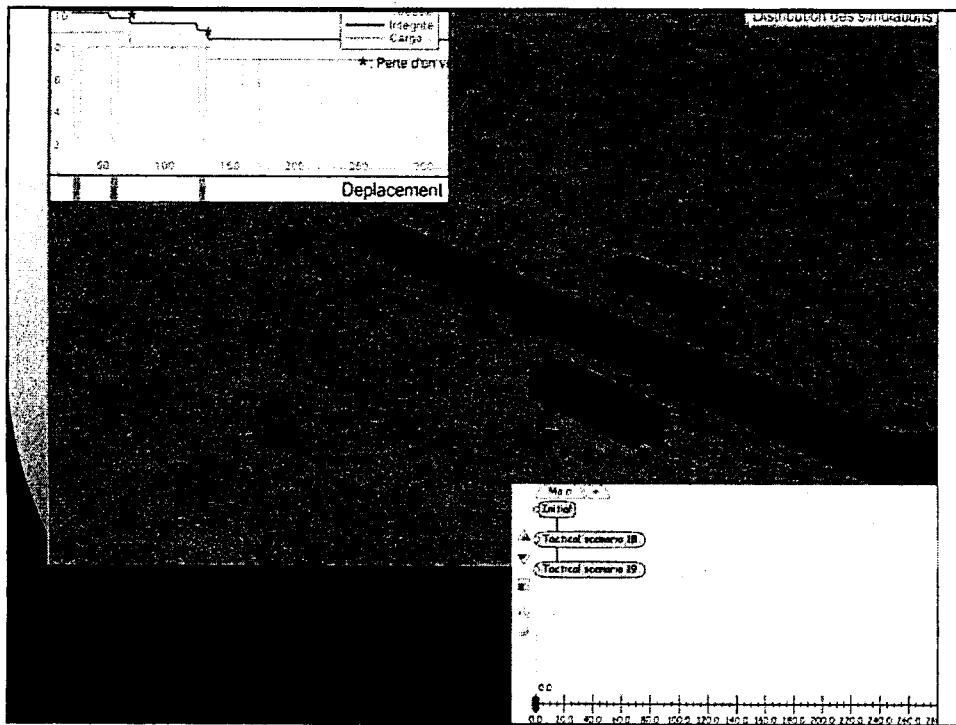
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Potential research avenue - Visualization Aspect

- ❑ To evolve AARS – Don't focus only on “AAR-tagged” systems but take a look around in different (connected) domains - in terms of commercial products / scientific research...
- ❑ TIF IMAGE project
 - Develop a complex situation / simulation analysis tool based on advanced visualization concepts (→ visualization tool has allowed to *debug* the simulation tool)
 - Developed situation analysis tool presents some similarities with basic AARS

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Other potential research avenue - Video Game Domain – realistic *gameplay*

- Example 1 : **Biofeedback *gameplay*** – could be used to provide information on the trainee (body) during a training session (such as heart rate, blood pressure, sweat, skin temperature, fatigue...).
 - This information could be used to determine if the trainee is stressed or not, under what conditions...
 - Expected benefit : Provide new metrics, new analysis for AAR and, optimizing training.



Other potential research avenue: Video Game Domain – realistic *gameplay*

- Example 2 : **Adaptive *gameplay*** could be used to tune a training session depending on the progress / performance of the trainee. If the training session is too easy or too difficult, some aspects of the training are increased or reduced.
 - Biofeedback *gameplay* could become an input for an adaptive training session
 - Expected benefit: Optimizing training

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Military fit

- AAR is one of the most important phases of the training process
- To conduct an AAR, a well-designed AARS must keep track of the conditions and the actions during an exercise to be available for review later.
- To maximize the AAR phase, the AARS should allow analysis, and interactive playback of an entire simulation training session.
- It must help both the trainer and trainee.
- High level needs could include:
 - Individual & group training sessions;
 - LVC training sessions;
 - Different levels of trainee expertise;
 - Current & incoming training system capabilities;

The idea of this scoping study was presented in October 09. It was positively received and protagonists agree to participate in group meetings to evolve the idea.



Scientific Merit

- Will provide a road map establishing a draft of AAR needs requiring the development of (new) functionalities that could benefit of emerging technologies and concepts coming from 2D/3D visualization and video game domains.
- Is a natural/logical follow-up of TIF IMAGE project which scientific merit was positively evaluated. It will consider IMAGE research results to determine if they are applicable for the Client
- Supports the *Technology Investment Strategy* by investigating *Complexity in Defense*, more precisely the challenge *4.5 Analysis of complex systems and concepts*.

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12 : Needs Definition for the Next Generation of AAR Systems

Work Plan

Duration: 1 year

Main Activities: In collaboration with the Client (DLR 6-5, DLSE 4 & DLCD):

1. Collect AAR system (today, tomorrow, future) needs;
2. Analyse needs : (a) Impact on the existing AAR systems - Integration of new functionalities...; (b) Impact on the (simulation) training systems – The need can have an incidence not only on the AAR system but also on the training system...; (c) Impact on the in/out devices (new sensors in the training environment, on trainees ...).
3. Validate the interest in new technologies & concepts, such as 2D/3D visualization, realistic *gameplays*, devices...
4. Prioritize needs (interest, cost, impact, implementation complexity...);
5. Prepare an Applied Research Project proposal;

The study will as well concern the live, virtual as constructive simulation training.

Milestones:

Workshops with the Clients (one per client + one for group)	Sept.10
Scoping Study Report (<i>Draft</i>)	Oct.10
ARP Proposal	Oct. 10
Scoping Study Report (<i>Final</i>)	March 11



12__ : Needs Definition for the Next Generation of AAR Systems

Indicative Cost Estimates

Indicative Cost Estimates	FY10/11	FY11/12	FY12/13	FY13/14	Totals
FTEs	1	2	2	2	7
Client-Group Funds	\$60,000				\$60,000
External In-Kind (CF)	\$20,000				\$20,000
External In-Kind (Partners)	\$10,000				\$10,000
Total	\$90,000				\$90,000

Contributors:

- DS: Dr. Marielle Mokhtari & Eric Boivin
- CS: Frédéric Drolet

Collaborations:

- Capt. Jérôme Robin-Thériault (Land Force Quebec Area Sim Center)
- Dr Denis Laurendeau & his team (Computer Vision and Systems Laboratory of Université Laval)

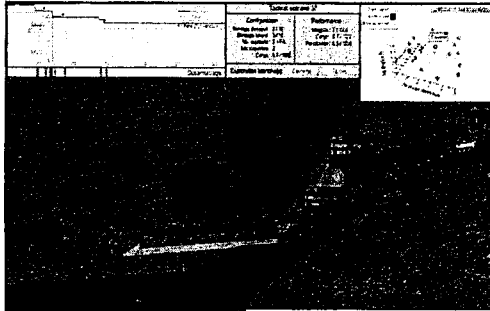
Dr Brian Goldiez and his team (~~Institute for Simulation and Training~~
University of Central Florida) (TBC)

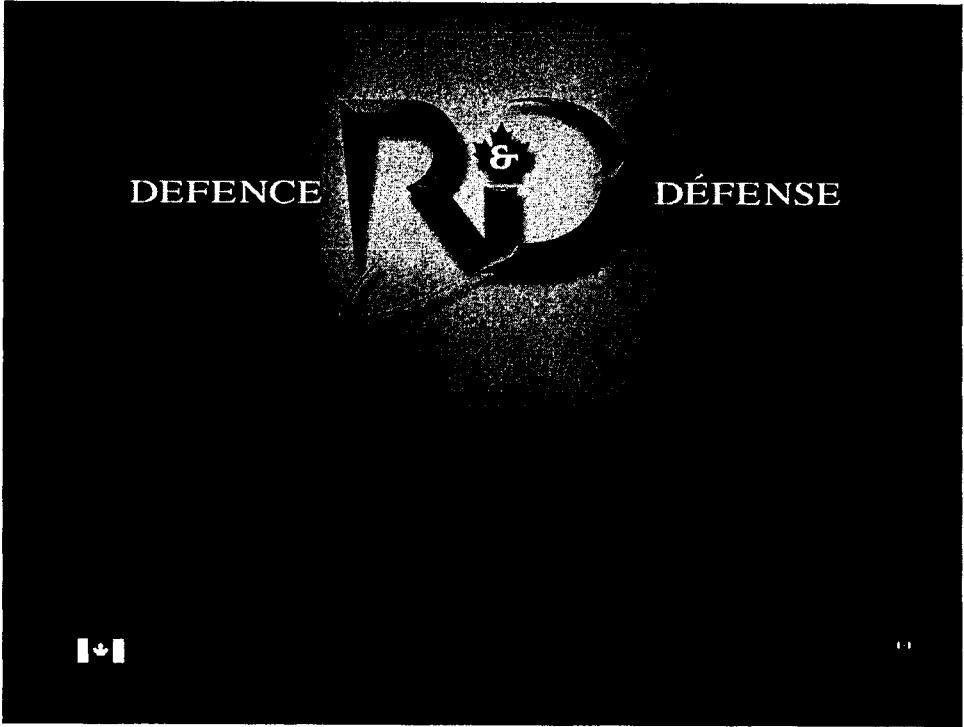


Achievability

Mainly ensured by the following elements:

- The clients support the effort
- Team members have the required knowledge
- Existing contract can be used to strengthen the definition effort during the year
- Twelve months seem sufficient to get a valuable scoping study
- During the year, on 3-year duration contract will / could be set up to be ready for the potential full ARP.

	<p>Title: 12__ - Needs Definition for the Next Generation of AAR Systems</p> <p>Project Manager: Dr. Marielle Mokhtari</p> <p>Delivered by: DRDC Valcartier</p> <p>Sponsor(s): DLR 6-5 & DLSE 4 (TBC)</p> <p>Start-End: 04/10 – 03/11</p> <p>Total Funding: \$ 90K (60K\$ + 30K\$ In-Kind)</p> <p>Total FTE: 1 PY</p>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <h2 style="margin: 0;">QUESTION ?</h2> </div> / III:0	
<p>Objective(s):</p> <ul style="list-style-type: none"> - Collect AAR system needs (LVC); <p>Challenges :</p> <ul style="list-style-type: none"> - Merge needs coming from different clients; - Define a structured roadmap of needs to be addressed; <p>S&T Strategy Challenges:</p> <ul style="list-style-type: none"> - 4.5 Analysis of complex systems and concepts <p>Hard Problems/Disruptive Technology:</p> <ul style="list-style-type: none"> - Introducing emerging technologies and concepts coming from 2D/3D visualization and video game domains (adaptive <i>gameplay</i>, biofeedback <i>gameplay</i>...); 	<ul style="list-style-type: none"> - Scoping study report; - ARP proposal; <p>Outcomes:</p> <ul style="list-style-type: none"> - The client will know how such needs must be addressed first to improve AAR systems; <p>Transition Plan:</p> <ul style="list-style-type: none"> - ARP involving DRL 6-5, DLSE 4 & DLCD <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>



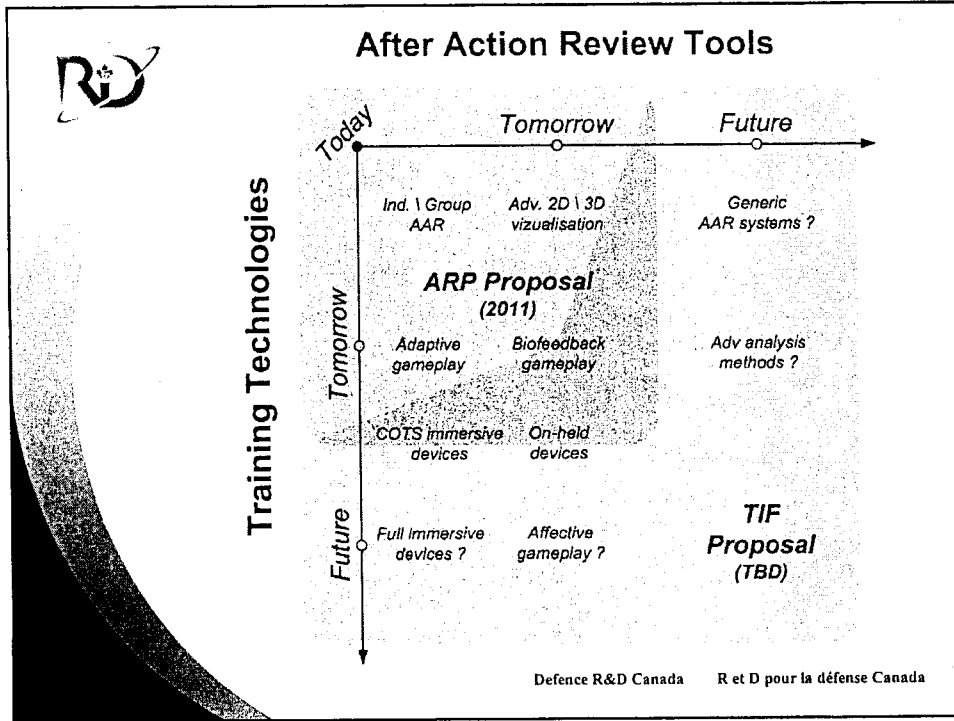


IMAGE (10bj01)

Clients: **CFD**
 Project Manager: **Michel Lizotte**
 Delivery by: **DRDC Valcartier**
 Start-End: **April 2007 – March 2011**

Resources over life of project

FTE	Contracts	Total Cost
8	\$ 685K	\$718 K

Objectives:

- Techniques and tools to understand complex situations
- Expertise in complex situations issues

*Supporting a team of specialists developing a common understanding of a complex situation using a **human guided feedback loop** involving cutting-edge techniques for knowledge **representation, simulation and exploration** of large data sets.*

Technological Challenges:

4.5 Analysis of complex systems and concepts

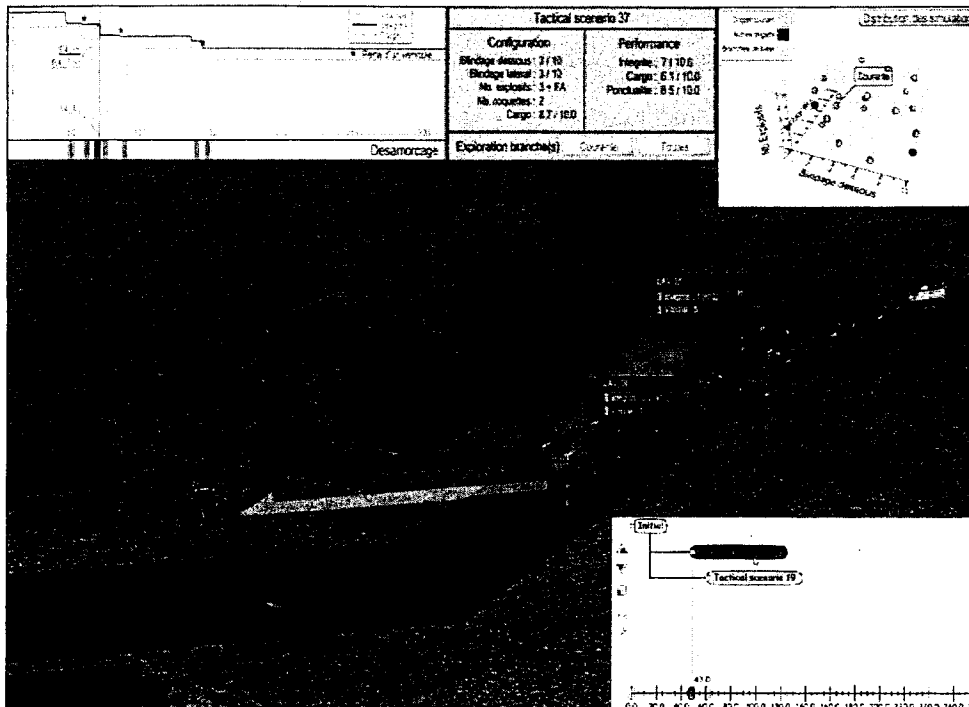
Outputs and Deliverables:

- Convoy scenario
- Prototypes (Representation, Simulation and Exploration)
- Experiences (École de psychologie)
- Demonstration

Desired Outcome:

- Client understands the need for such tools
- Client supports ARPs to pursue R&D for improving comprehension of complex situations (using an integrated suite of tools) to support strategic decision-making.

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Needs Definition for the Next Generation of AAR Systems

Sponsor: DLR, DLSE, DAT & DLCD (TBC)
 Project Manager: Marielle Mokhtari, Ph.D.
 Delivery by: DRDC Valcartier
 Linkages: IMAGE TIF; LFQA Sim; Laval University (Computer Vision and Systems Laboratory); University of Central Florida (Institute for Simulation and Training) (TBC);
 Start-End: April 2010 – March 2011

FTE	Contract	Total Cost
1	\$30K	\$60K

Objective:

Establish a structured roadmap of AARS needs – Collect needs (today, tomorrow, future) from different sources; Analyze needs: (i) Impact on the existing AARS; (ii) Impact on the (simulation) TS; (iii) Impact on the in/out devices (new sensors in the training environment, on trainees ...); Prioritize needs (according to interest, cost, impact, implementation complexity...); Validate the interest in (new) technologies & concepts from visualization, and video game domains; and Prepare an Applied Research Project proposal;
 Note - The study will as well concern the live, virtual as constructive simulation training.

Science and Technology:

Analysis tools – 2D/3D Visualization tools
 Realistic *Gameplays*

Desired Outcome:

A structured roadmap (first draft) of needs for the next generation of AARS. This roadmap has include needs related both for trainee and trainer; individual and group; live, virtual and constructive simulation training; ...

Outputs and Deliverables:

- Scoping study report including summarize of workshops with the Client, first prioritized needs and potential S&T response to the needs.
- ARP Proposal



Applied Research Project Description



Thrust:	12t	PM:	Marielle Mokhtari	Submitted:	
Title:	Needs Definition for the Next Generation of AAR Systems				
Start Date:	avr-10	End Date:	mars-11	Status:	Proposed
Delivery By:	DRDC Valcartier				
Prim. Cap.:	4. Generate Forces	Sec. Cap.:	1. C2	Horizon:	1, 2 and 3
Sponsor:	DLR, DLSE, DAT, DLCD (TBC)				

Expected Outcome

- o Needs collection for AAR systems (including current, tomorrow and future needs); This collection has to consider the likely evolution of the current LVC (simulation) training systems (LVC for Live, Virtual and Constructive);
- o To address these needs, validation of the interest in new technologies and concepts, especially in 2D/3D visualization and in those coming from the video game domain;

Approach

Workshops and analysis in collaboration with the clients.

Work Plan

Duration: 1 year - Main Activities: In collaboration with the clients:

1. Collect AAR system needs (today, tomorrow, future);
2. Analyze needs: (a) Impact on the existing AAR systems - Integration of new functionalities...; (b) Impact on the (simulation) training systems – The need can have an incidence not only on the AAR system but also on the training system...; (c) Impact on the in/out devices (new sensors in the training environment, on trainees ...).
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5. Prepare an Applied Research Project proposal;

Note - The study will as well concern the live, virtual as constructive simulation training.

Milestones	Date		
Workshops with the clients	2010-09-31		
Scoping Study Report (<i>draft</i>)	2010-10-31		
ARP Proposal	2010-10-31		
Scoping Study Report (<i>final</i>)	2011-03-31		

Resourcing Plan

Defence Scientists:

- o Marielle Mokhtari & Eric Boivin

Computer Systems People:

- o Frederic Drolet

Collaboration:

- o LFQA Sim Center (Capt. Jérôme Robin-Thériault); Computer Vision and Systems Laboratory of Laval University (Dr Denis Laurendeau and his team); Institute for Simulation and Training at University of Central Florida (Dr Brian Goldiez and his team) (TBC);

Indicative Cost Estimates	FY10/11	FY11/12	FY12/13	FY13/14	FY_nn+4	FY_nn+5	Totals
FTEs	1						1
FTE Full Costs							

Client-Group Funds	\$30 000						\$30 000
NCR Allocation							
CRC Allocation							
TIF Funds							
DIR Funds							
Local O&M Funds							
Other DND							
External Funds							
External In-Kind (CFJIC/MCE staff and facilities)	\$20 000						\$20 000
External In-Kind (access to partner sites)	\$10 000						\$10 000
External In-Kind (GOTS software)							
External In-Kind (Cat 34 level data)							\$0
Total	\$60 000	\$0	\$0	\$0			\$60 000

Outputs/Deliverables

- o Scoping Study Report
- o ARP Proposal

Supporting Information

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Thrust: 12t **Manager:** Marielle Mokhtari **Submitted:** 0

Title: Needs Definition for the Next Generation of AAR Systems

Military Fit

AAR is one of the most important phases of the training process (including performance improvement aspect). AAR can take the form of debriefing or a deeper analysis and discussion of the facts. To conduct the most adequately an AAR, a well-designed system must keep track of the conditions and the actions during an exercise to be available for review later. To maximize the AAR phase, the system should allow analysis, and interactive playback of an entire simulation training session. Furthermore, it must help both the trainer and trainee.

This proposal aims at improving the AAR phase by identifying future needs of AAR systems to be in line with "better the AAR system will be, better the training will be". This study will consider needs for:

- o Individual & group training sessions;
- o Live, virtual and constructive training sessions;
- o Different levels of trainee expertise;
- o Current & incoming training system capabilities;
- o ...

The idea of this proposal was presented to DLR 6-5 in October 09. It was positively received and protagonists agree to participate in follow-up meetings to evolve the idea. DLSE, DAT and DLCD are also targeted to participate.

Technical Merit

This scoping study supports the *Technology Investment Strategy* by investigating *Complexity* in Defense, more precisely the challenge 4.5 *Analysis of complex systems and concepts*. This study is focused in finding the road to the "best AAR system" leading to the "best training". This study will provide a road map establishing a draft of AAR needs that could benefit of emerging technologies and concepts coming from 2D/3D visualization and video game domains (adaptive *gameplay*, biofeedback *gameplay*...).

This scoping study is a natural/logical follow-up of TIF IMAGE project which scientific merit was positively evaluated (the TIF program has been established for forward-looking, high-risk, but potentially high-payoff research projects). It will consider IMAGE research results to determine if they are applicable for the clients.

Achievability

The achievability of this scoping effort is mainly ensured by the following elements:

- o The clients support the effort;
- o Team members have the required knowledge;
- o Existing contract can be used to strengthen the definition effort during the year;

- o Twelve months seem sufficient to get a valuable scoping study;
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