

VINDICO



Using GANs and LLMs to Create a Synthetic Information Wrap

Lessons of the POBL Project

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Information Injects

- Information Injects are often pre-scripted and introduced through a Master Events List (MEL) or Master Injects List (MIL).
- Take time and effort (and hence budget) to produce.
- Can be hard to adapt if player actions start to diverge from “the script”
- Tends to focus on the “golden thread”, little time to produce the “noise”
- As a result G2/G9/Influence cells often not well exercised

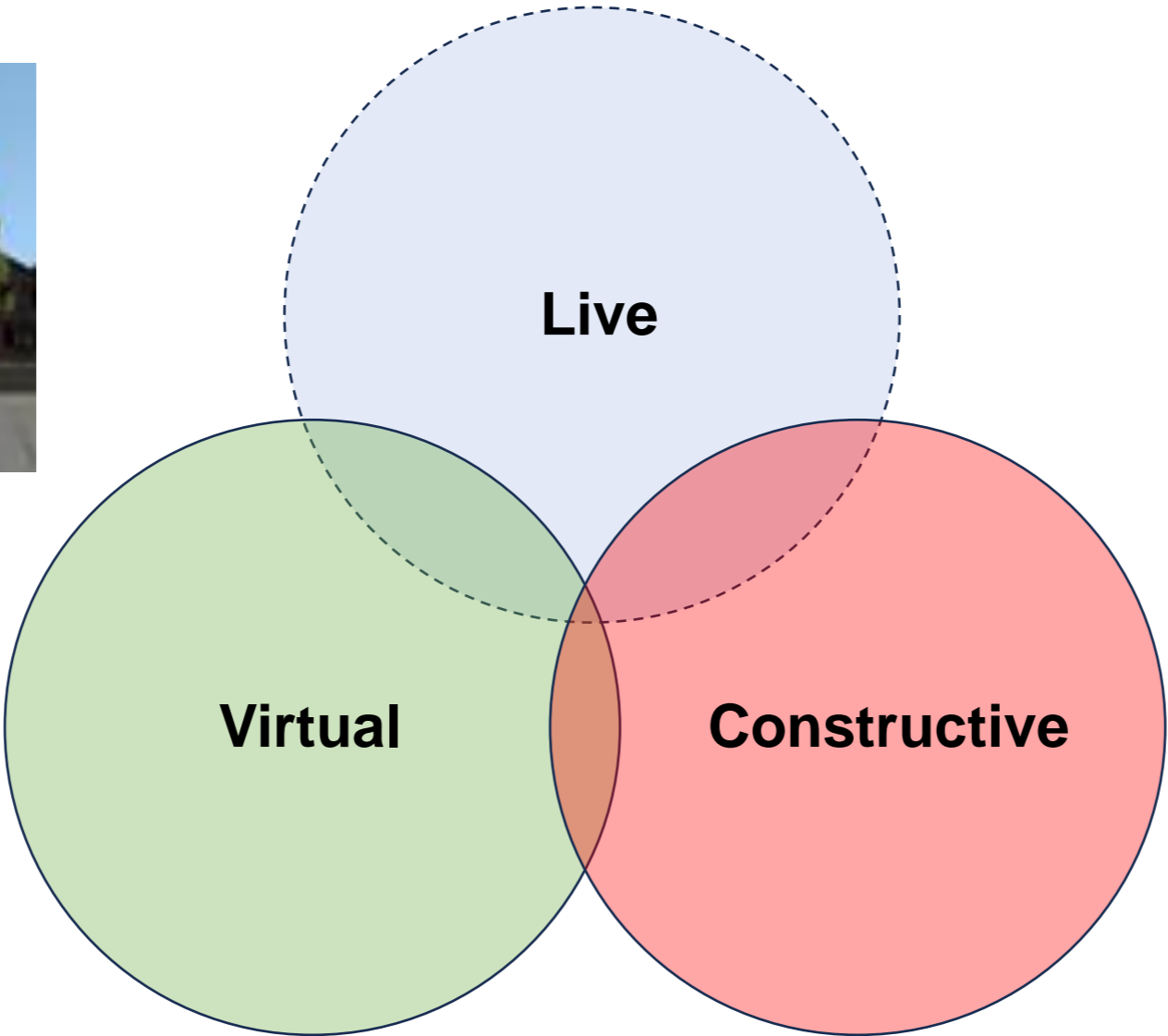
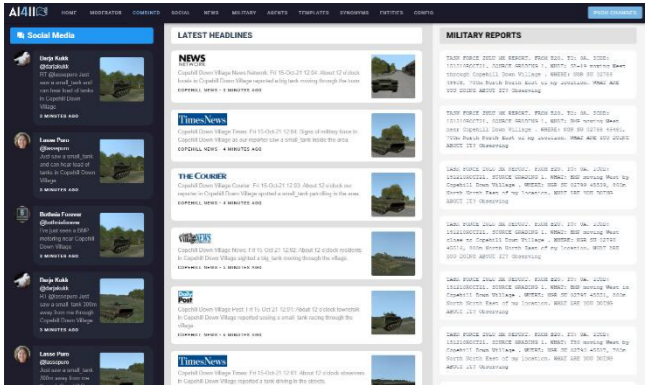
Is it possible to generate the same/similar content without high levels (or any) human intervention?



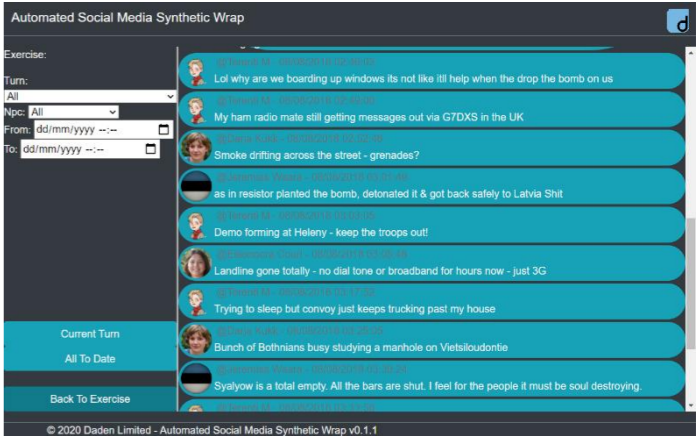
Prior Work



AI4II



ASMSW



POBL– Template & Synonym Approach



TEMPLATES

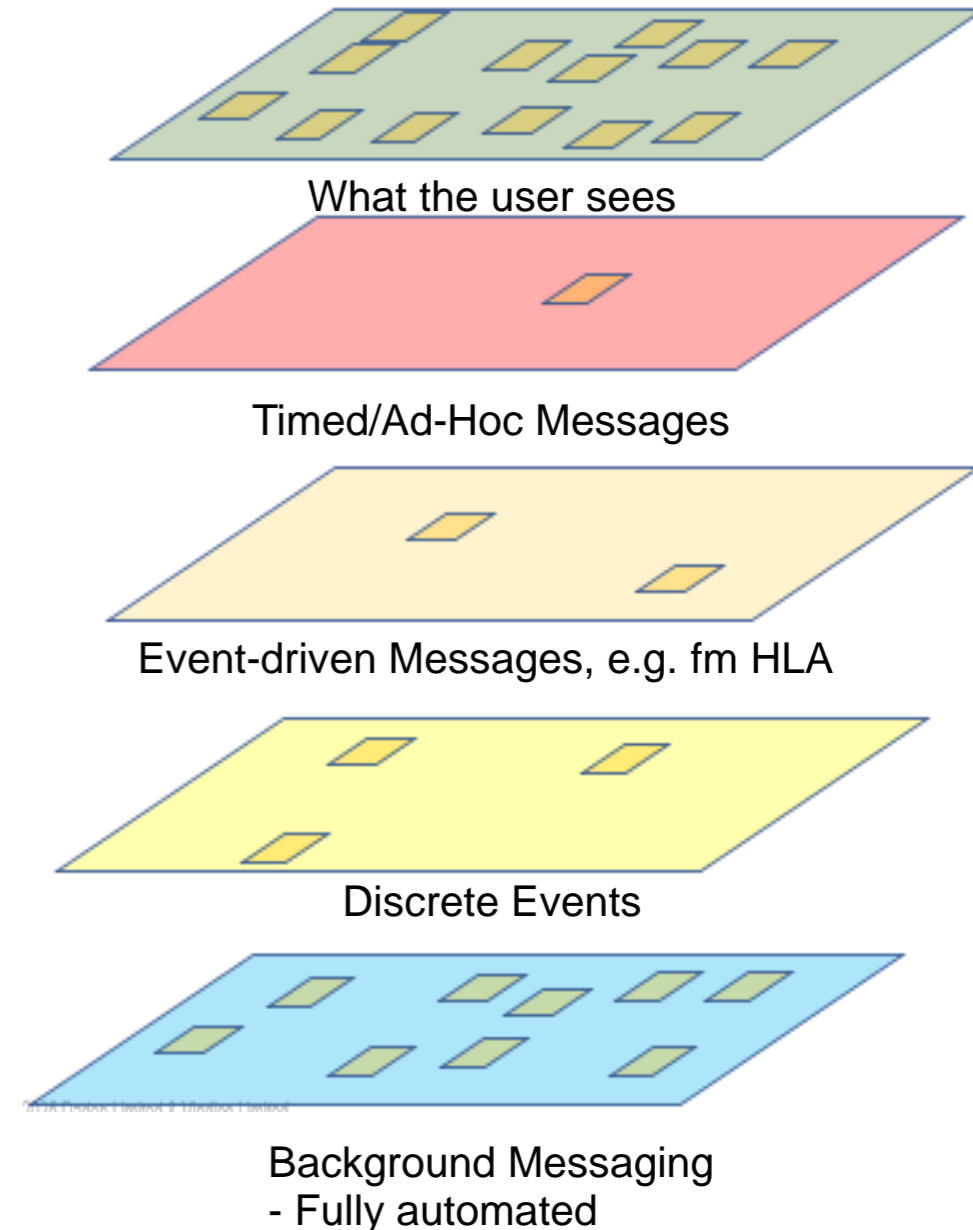
A [bignumber] protest has gathered at the [roadblock,crossroads,barriers] in front of the path up to [~key_location].

[~opposition] forces using heavy artillery in direction of [~city] region.

1 [bunch] of [soldiers] chatting just [outside]
2 [icansee] [soldiers] [shooting] [onthestreet]
3 [couple] of [tanks] [moving] [down] [thestreet]
4 [exclam]! [huge] [bang]. [tankgun] [firing] just [outside].
5 [~they] are [bombing] [us], [explosions] [everywhere]

SYNONYMS

exclam	Christ, Wow, omfg, omg, F***, holy crap
Icansee	I can see, We can see, Just seen
Bunch	Bunch, Group, Crowd



POBL Screenshots



POBL | Back | Latest Turn Dashboard | Message Moderation | DASA Demo - Scene 1 - Hostile Local Population | Timezone: GMT | 20 / 11 / 2024 12:42:00

Turn Dashboard

Turn Number: 001 | Turn Name: Hostile Local Population

Message Status: Live | Activity Scalar: 1

Turn Start DTO: 01/04/2024 12:00 | Turn Duration (Hours): 4 | Turn End DTO: 01/04/2024 16:00

Background Messaging Type: Bulk | Background Message Scalar: 0.8

Buttons: Exercise Home Screen, Save as New Turn, CSV Export, Save Turn, All Generate News Article, Turn Messages Generated, View Messages, View Agents

Blue Forces: Occupation (Open Patrolling, Soldiers Fighting, Tanks, Bombing, Sniping, Stay Behind, Counter Attack), Attitude (Aggressive), Activity Level (3)

Red Forces: Occupation (Open Patrolling, Soldiers Fighting, Tanks, Bombing, Sniping, Stay Behind, Counter Attack), Attitude (Aggressive), Activity Level (3)

Green Forces: Civil Authority - RED Hold, Civil Authority - BLUE Hold, Emergency Sics, Community Conflict, Attitude (Courteous)

Damage In The Zone: Physical Damage (2), Civilian Deaths / Casualties (3), Emotional Impact (3)

Utilities Within The Zone: Power (4), Water (3), Food / Supermarket Goods (0), Freedom of Movement (1), Gas (0), Sewerage (1), Mobile Comms (0), Fixed Comms (3), Transport (0), Medicine (2)

POBL | Back | Latest Turn Dashboard | Message Moderation | DASA Demo - Scene 1 - Hostile Local Population | Timezone: GMT | 20 / 11 / 2024 12:43:17

Moderation

Search, Date Range, Filter By Turn, Filter By Type, + New, Clear Messages, Auto Update, Latest Turn Dashboard

User Name	Type	User Handle	Turn ID	Event Name	Timestamp	Text	AI Rewrite	Rewritten?	Status	Turn Name	Delete
Lilo Laanemae	SocialMedia	@lilolaanemae	001	N/A	01/04/2024 15:57:27	Blue go home!		No	Live	Hostile Local Population	
Lilo Laanemae	SocialMedia	@lilolaanemae	001	N/A	01/04/2024 15:44:20	Somebody's shooting!		No	Live	Hostile Local Population	
Denis Petrov	SocialMedia	@denispetrov	001	N/A	01/04/2024 15:40:58	Seems to be a convoy driving past, a bit spoiled out		No	Live	Hostile Local Population	
Lilo Laanemae	SocialMedia	@lilolaanemae	001	N/A	01/04/2024 15:38:26	Demonstration really getting out of hand		No	Live	Hostile Local Population	
Denis Petrov	SocialMedia	@denispetrov	001	N/A	01/04/2024 15:33:37	groups of protestors arriving at Krasnaya Plazhchest		No	Live	Hostile Local Population	
Denis Petrov	SocialMedia	@denispetrov	001	N/A	01/04/2024 15:32:26	Thugs beginning to attack Blue soldier!		No	Live	Hostile Local Population	
Katrin Kosamets	SocialMedia	@katrinkosamets	001	N/A	01/04/2024 15:27:38	Blue go home!		No	Live	Hostile Local Population	
Lilo Laanemae	SocialMedia	@lilolaanemae	001	N/A	01/04/2024 15:23:44	Blue out, Blue Out!		Yes	Live	Hostile Local Population	
Katrin Kosamets	SocialMedia	@katrinkosamets	001	N/A	01/04/2024 15:20:29	More and more blue soldiers on the streets		No	Live	Hostile Local Population	
Denis Petrov	SocialMedia	@denispetrov	001	N/A	01/04/2024 15:19:42	Looks like militia are opening fire		No	Live	Hostile Local Population	

POBL | Back | Latest Turn Dashboard | Message Moderation | Exercise Example | Timezone: GMT | 20 / 11 / 2024 12:49:35

Social Graph

POBL | Back | Latest Turn Dashboard | Message Moderation | DASA Demo - Scene 4 - Local Militia Attacks | Timezone: GMT | 05 / 12 / 2024 16:42:53

News Feed

Show Drafts, Auto Update, 1 Second

Red Team | Wed, 01 Apr 2024 15:45:00 GMT

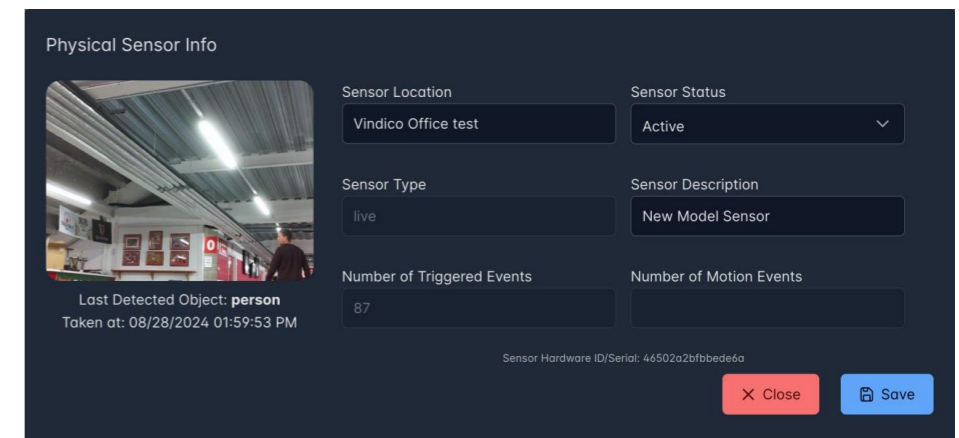
In the small Eastern European village of Zhurukta, tensions have reached a boiling point as military occupation continues to escalate. Residents are growing increasingly restless and fearful of what may come next. Local business owner Maria Kosovskiy shared her concerns with reporters: "We don't know why they're here or what their intentions are. It's making us all very anxious." Another local, Ivan Petrov, expressed his frustration: "They've taken over the town hall and won't let anyone in or out. We can't even access our own property!" As of now, the military presence has not resulted in any violent clashes, but many residents fear that it's only a matter of time before the situation turns volatile. A spokesperson for the military forces claimed that their presence is necessary for "security reasons" and urged the public to remain calm and cooperative. However, villagers are skeptical and believe that this occupation is politically motivated. The unrest in Zhurukta is just one of many instances of growing tensions between the military and civilians in Eastern Europe as political and economic instability continues to plague the region. As the situation remains unclear, villagers can only hope for a peaceful resolution.

Comment, Share

Adding Live Exercise Support



- **Sensor Selection:**
 - Single board micro computer within trap camera case, equipped with PIR (Passive Infrared) sensors for motion detection. Cellular or wifi back-haul.
 - Designed for field deployment – compact & ruggedised
- **Image Detection:**
 - TensorFlow-based object recognition models to classify entities in real-time.
 - Processed data through edge computing, ensuring rapid and localised decision-making.
 - Fed into POBL as any other external trigger message.
- **Result:**
 - Enabled real-time message generation based on detected physical activities.
 - Bridged the gap between Live and Constructive environments, ensuring seamless training integration.
- **Challenges:**
 - Limited processing power of edge devices occasionally created delays.
 - Baseline object library not well matched to military needs.



AI Enhanced Templating



■ Use Cases

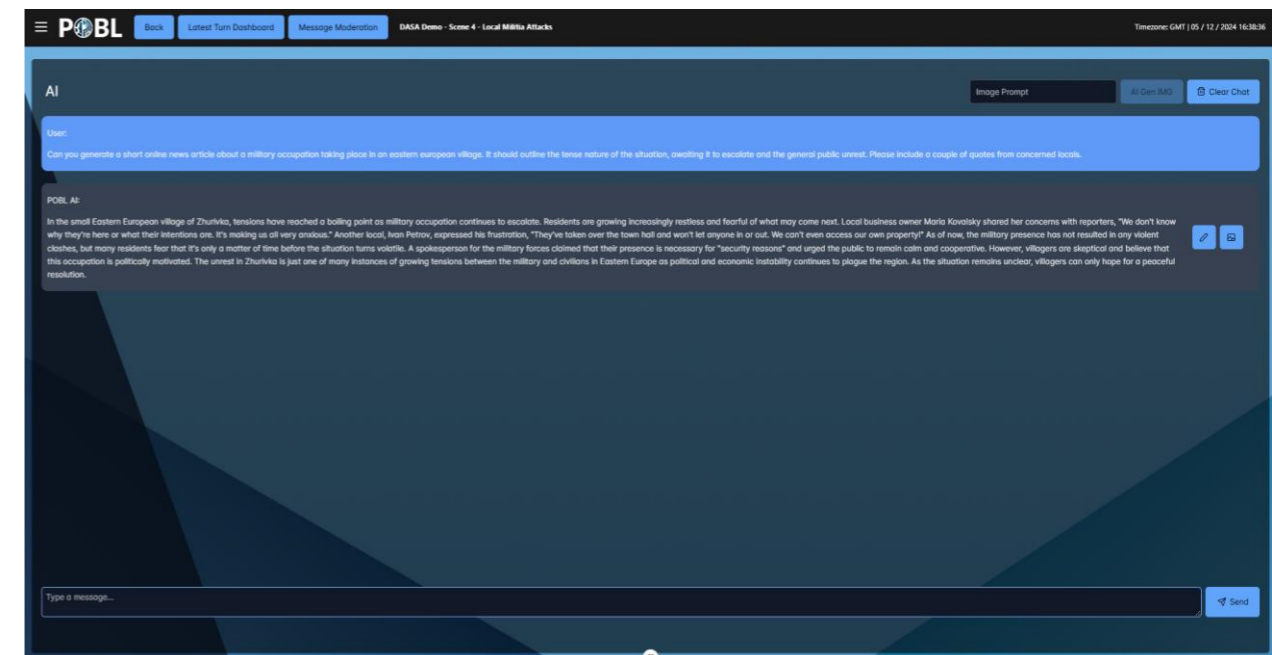
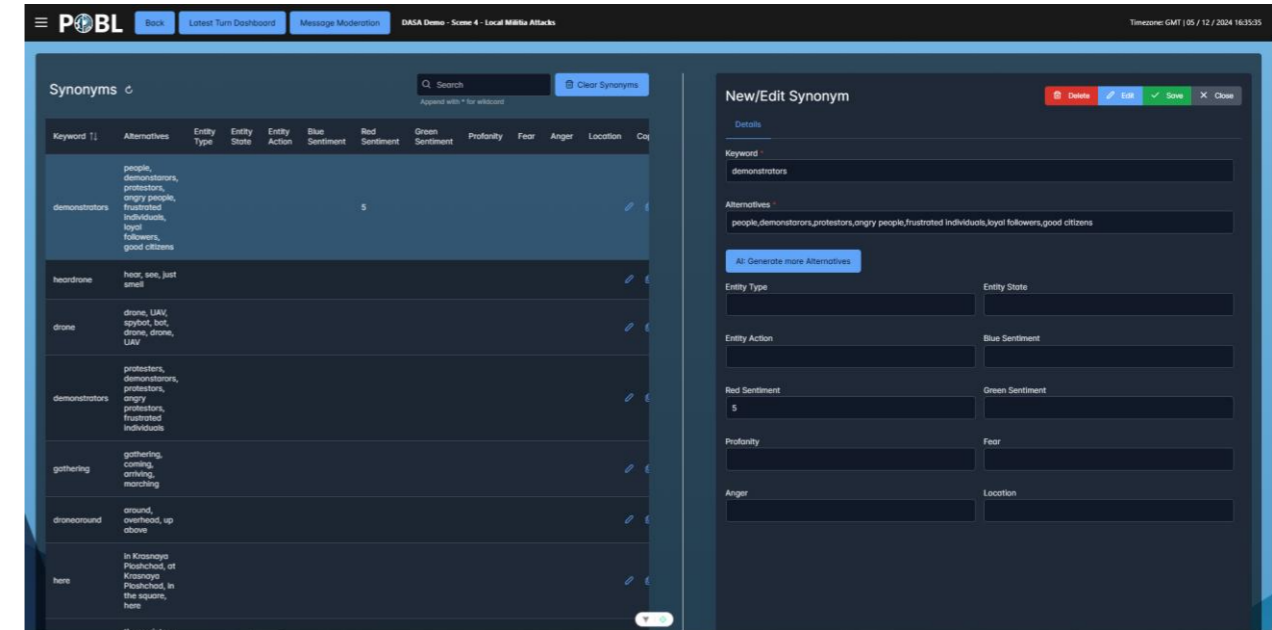
- Generating new templates
- Generating additional synonyms
- Generating avatar profiles
- Generating news reports by aggregating messages

■ Technology

- POBL employs Llama 3, a community-driven LLM. The model's capabilities were optimised to produce outputs aligned with product and exercise objectives.

■ Findings

- Good at all of these
- LLM "ethics" filters



AI for Still Imagery



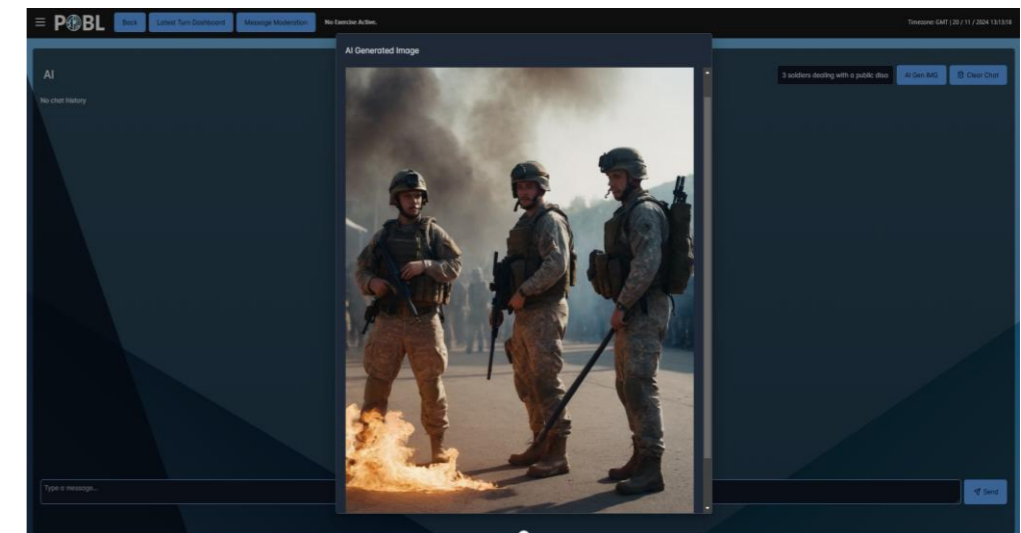
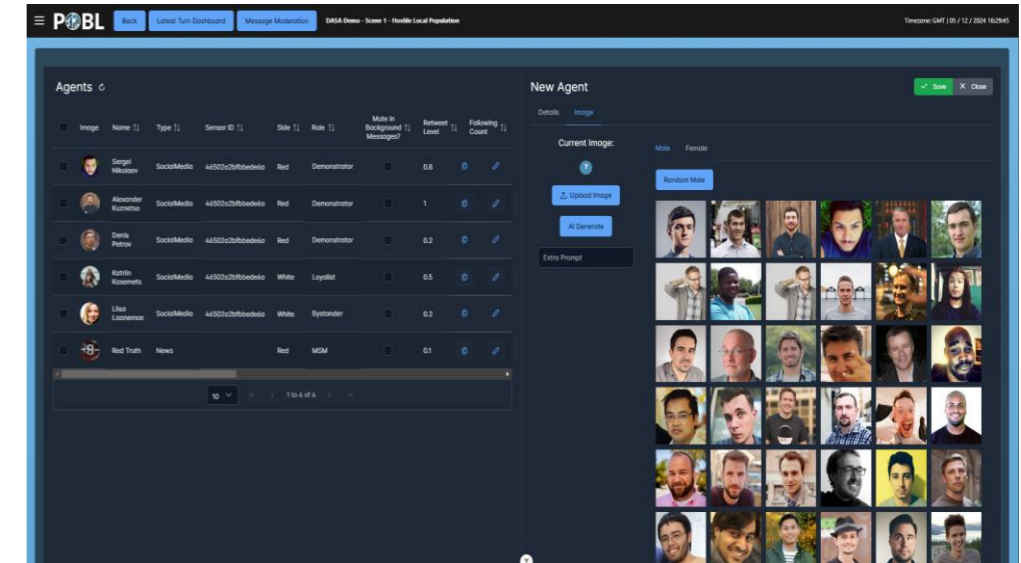
- Use Cases: Avatar profile pics, “Smartphone” pictures, Inject pictures

- Technology

- POBL incorporates Generative Adversarial Networks (GANs), specifically Fooocus AI, to create high-quality synthetic images

- Findings

- Avatar profile pics – still, so easy, key to biographical data and scenario setting
- “Smartphone” pics - reasonable, but it is hard to get consistency with what players may be seeing through other systems (e.g. VBS4) and to match the look of some potential geographical locations and even specific equipments.
- Inject pictures – good
- Video - less successful but shows promise (e.g Heygen).



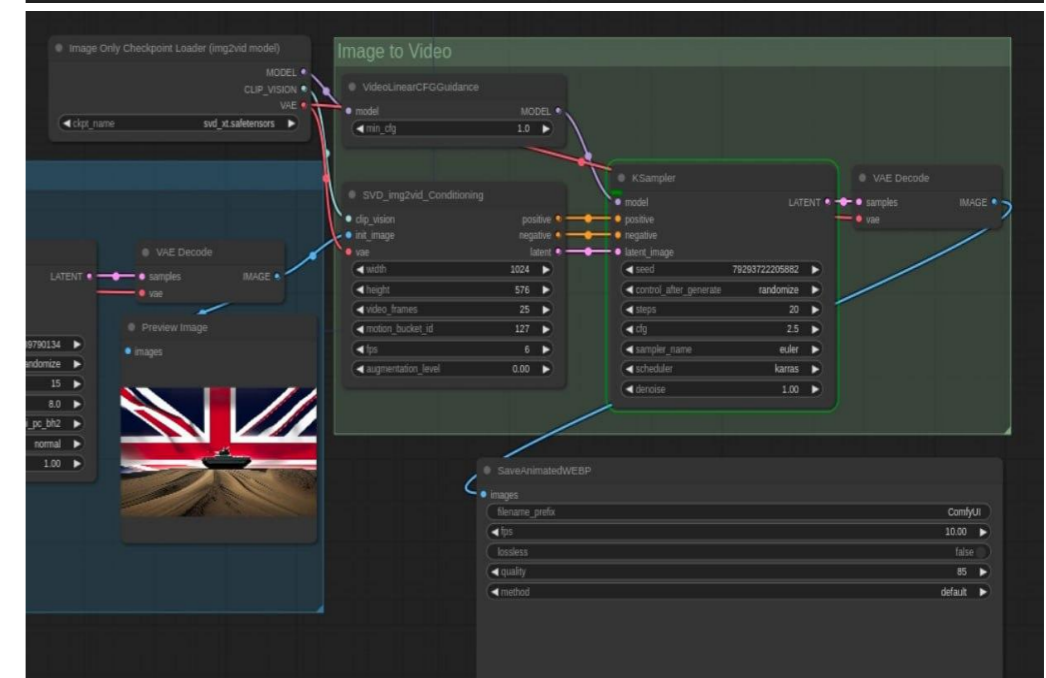
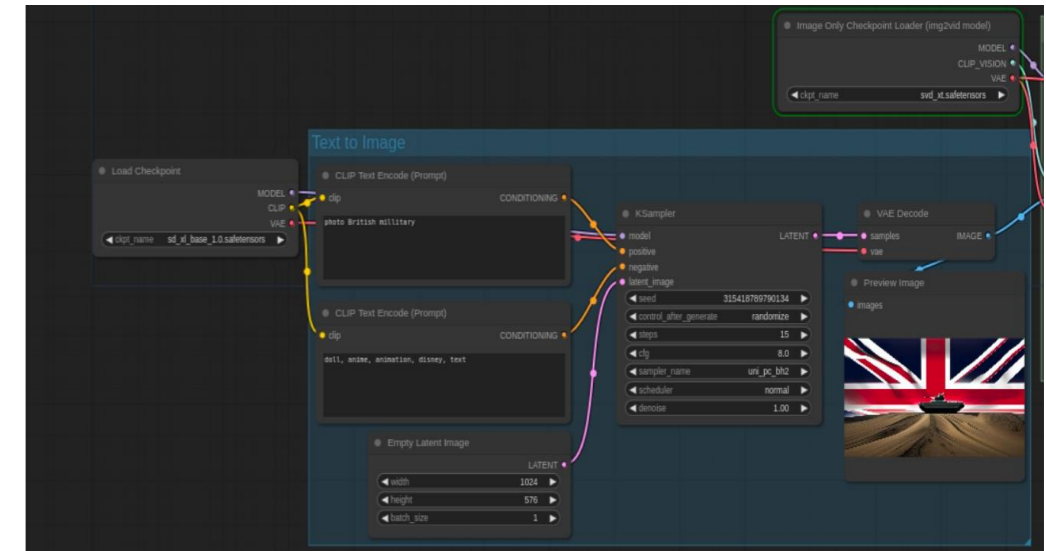
Prompt ‘3 soldiers dealing with public disorder’.

AI for Video Imagery



- Use Cases
 - Social and mainstream media video
 - Propaganda video
 - Inject video

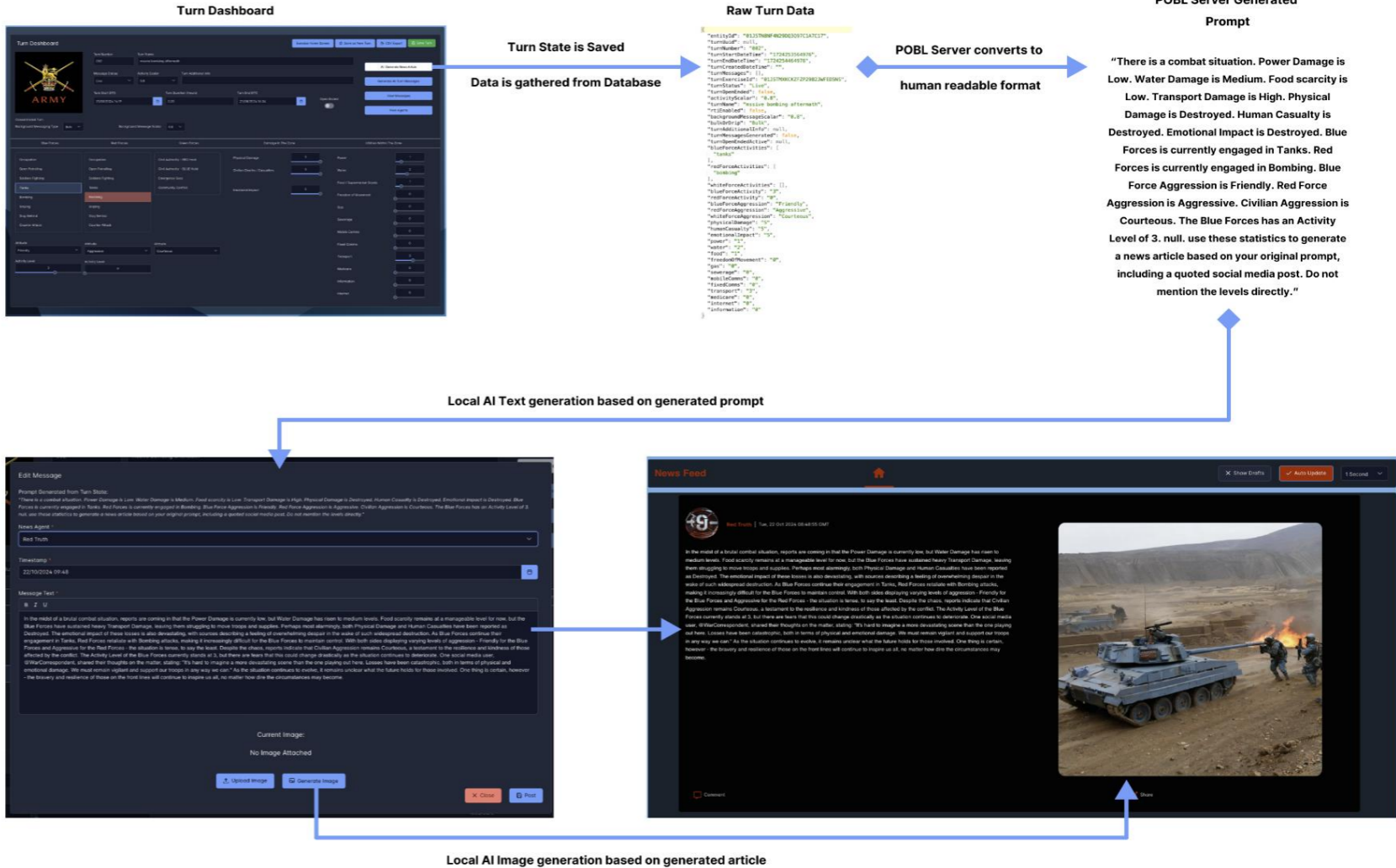
- Findings
 - Less successful but shows promise:
 - ComfyUI
 - Heygen



Direct AI Generation of Messages



- Could we bypass the templates by just feeding the AI a prompt representing all of the “turn” variables?
- Results - moderately successful, but appears to depend a lot on the prompt engineering and creating a suitable parameterised prompt for the LLM to understand. Better for “news” rather than messages.
- Hybrid – use modified templating (simpler, less synonyms) and get LLM to “rewrite” the output
 - Far more consistent
 - How give LLM the context dependent synonyms?



- Leveraged LLama 3 for text generation and Fooocus AI for image outputs, regularly assessed and fine-tuned approach for scenarios. However, limitations in pre-existing training data required careful adaptation and prompt engineering.
- Iteratively refined prompts and introduced placeholders (e.g., {@sentiment}) to dynamically adapt content based on real-time data.
- Implemented middleware for efficient data processing and caching, optimising response times without compromising quality.
- Designed workflows that ensured consistency across media modalities, but the lack of mature, defence-ready video-generation technology limited immediate applicability.
- Mitigated ethical and security concerns by hosting the AI locally within a closed network, ensuring secure data handling and ethical oversight of outputs
- Hallucinations less critical in a social/media context as just noise, but POBL moderation screen provided for pre or post publishing validation and correction
- Models run locally with pre-configured hardware and caching techniques to manage high computational demands, but scaling to larger scenarios may require additional resources and higher specification equipment.

- Reduce the time taken to craft injects for all LVC exercises – or focus that time on more “golden-thread” type injects and better hide those within the automated injects (even 5-10 min simulations generating 50+ messages)
- Enable generation of information injects without the need for additional or specialist staff – e.g. use within unit, sub-unit and even Fight Club style exercises
- Deploy useful Ops (and UAVs) without having to crew them in the simulation
- Increase the awareness of human/social/ethical consequences of actions within the simulation, and sense of media oversight
- Enable better exercising of G2/6/9 and Influence staff on simulation-led exercises

- LLMs currently best used in support of systems rather than as the core component for inject generation
- Image generation is best for very generic use cases, and video generation still has a way to go to be properly useful in near-real-time applications
- Always have a reversionary mode

- But LLMs and GANs are evolving quickly!



Moderation

Search Date Range Filter By Turn

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Lisa Laanemae	SocialMedia	@lisalaanemae	001	N/A	01/04/2026 15:46:20	Somebody's shooting!		No	Live	Hostile Local Population	
Denis Petrov	SocialMedia	@denispetrov	001	N/A	01/04/2026 15:40:58	Seems to be a convoy driving past, a bit spooked out!		No	Live	Hostile Local Population	
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Populating the World of Training



- UK MOD Defence and Security Accelerator Call
- Launched March 2023, £2.845m funding
- Seeking 12 month, £100k-£300k proposals, TRL3-6
- Part of the Audiences, Actors, Adversaries and Enemies (A3E) Human Terrain strand of the Future Collective Training System (FCTS)
- “novel and innovative proposals that will help deliver a credible, complex and representative human terrain to effectively train British Army personnel and other Land Forces operating in the land environment.”
- “a free-thinking A3E capability that delivers cues, stressors and frictions across the human, physical, environmental and information domains. This training must be seamlessly blended across **Live, Virtual and Constructive (LVC)** options, and be realistic, dynamic and adaptable to the developing exercise.”



<https://www.gov.uk/government/publications/competition-populating-the-world-of-training-phase-1>

Layered Approach

What the user sees

Timed/Ad-Hoc Messages

- Timed or written as required
- Fully manually

Event-driven Messages

- Triggers from LVC systems, e.g. by HLA

Discrete Events

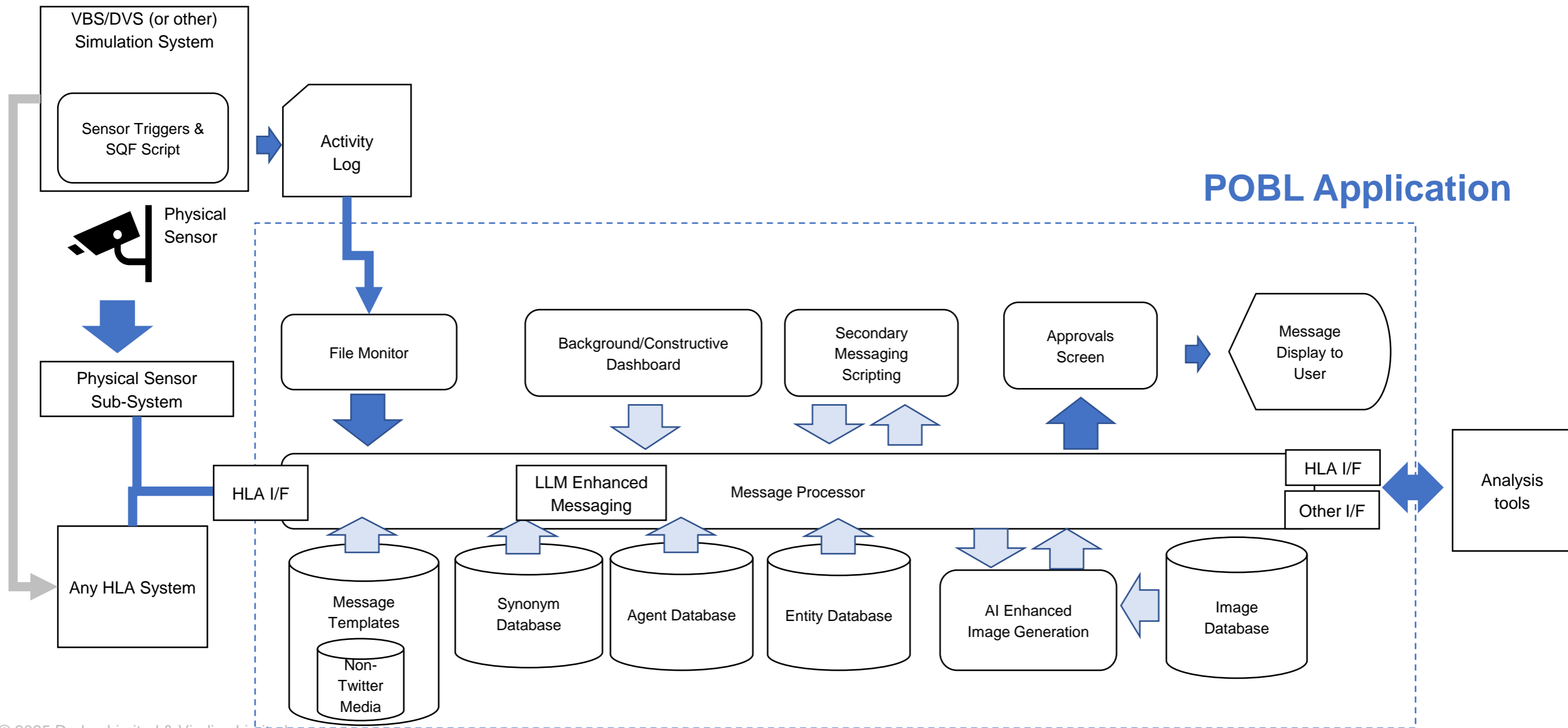
- Semi-Automated
- Events queued as required

Background Messaging

- Fully automated

- A Merged Approach
- Adding Live Exercise Support
- Using AI to Enhance Messaging
- Using AI for Still Imagery
- Using AI for Video Imagery
- Using AI to Directly Generate Messages

POBL Architecture



Opportunities & Exploitation



- POBL is now at TRL6/7.
- Continue to refine the use of AI in all areas.
- Evolve towards a more dynamic (and interactive) virtual population?

Turn Dashboard

Turn Number: 001, Turn Name: Hostile Local Population

Message Status: Live, Activity Scaler: 1

Turn Start DTD: 01/04/2026 12:00, Turn Duration (Hours): 4, Turn End DTD: 01/04/2026 16:00

Background Message Scaler: 0.8

Blue Forces: Open Patrolling, Soldiers Fighting, Tanks, Bombing, Sniping, Stay Behind, Counter Attack

Red Forces: Open Patrolling, Soldiers Fighting, Tanks, Bombing, Sniping, Stay Behind, Counter Attack

Green Forces: Civil Authority - RED Hold, Civil Authority - BLUE Hold, Emergency Swcs, Community Conflict

Damage In The Zone: Physical Damage (2), Civilian Deaths / Casualties (3), Emotional Impact (3)

Utilities Within The Zone: Power (4), Water (3), Food / Supermarket Goods (0), Freedom of Movement (1), Gas (0), Sewerage (1), Mobile Comms (0), Fixed Comms (3), Transport (0), Medicine (2)

Agent Comparison

Agent Radar Chart

Recognition Skill, Charisma, Profanity, Fear, Anger

Single Agent Bar Chart

Arisha Lebedeva

Attributes: Chastity, Profanity, Anger, Recognition Skill

Comparison: Green Sentiment, Blue Sentiment, Red Sentiment