



Regulation: Roadblock or Backstop?

A Tale of Innovation, Frustration and Better-Together with The FAA
Has SATCE Come Of Age?

seraatc.com

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**First a little story
from times of old...**

WHAT IS 'SATCE'

Simulated ATC Environment

This is how current simulators represent the world... without SATCE

The lonely road, with the instructor
keeping us on the straight and narrow line...



**But it should be this! The airport and the
skies are busy, filled with threats...**

**The highway is congested with multiple challenges —
other traffic, controllers and the unexpected!**

What does SATCE add?

- ATCs
- Other aircraft traffic
- Airport operations

LEADING TO:

- Immersion
- Crew workload
- ATC and traffic threats
- Consistent Radio/ATC training
- Reduced instructor workload



Data

**Speech
Recognition**

**Expert
Systems**

SATCE is a training technology leveraging several core
AI components

Analytics

**Synthetic Speech
(TTS)**

**Error
Detection**

*When we first considered developing
a SATCE system the vision came
from IATA and then the ICAO*

2006

**In 2006, ASTi started
development of a
Simulated ATC Environment**

2016

**In 2016 ASTi sold their first
Simulated Environment for
Realistic ATC (SERA) system**

2024

**Today ASTi has
sold 317
SERA systems**

*But only 21 have been sold to
commercial aviation, the rest are
installed in military simulators*

SERA SALES

2016 – October 2024

MILITARY
93.4% 296

COMMERCIAL
6.6% 21

So how do we explain this?

Isn't the case for SATCE obvious?

Safety

- Runway incursions
- ATC threats
- Operational environment complexity

Evolving Training Methodologies

- CBTA
- EBT
- MPL
- AQP

Environmental/Cost Concerns

- Cost of sim time vs aircraft
- Carbon footprint of sim vs aircraft

History

- "Radio chatter" requirement

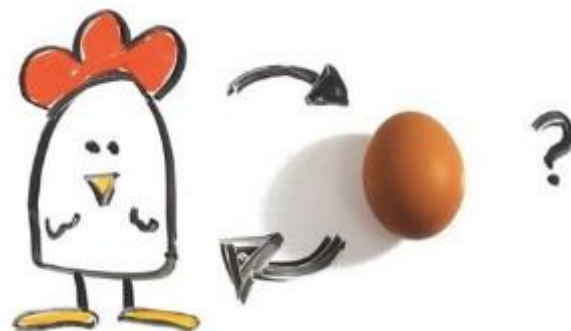
Despite all this...

Commercial Users:

"We will use SATCE when it is required by
the regulators"

The Regulators:

"We will regulate SATCE when we see
adoption by the users"



What about Military users?

What have been their experiences?

US Navy

74 SYSTEMS

- 50 T-6A VR “sleds”
- 7 T-6A OFTs/FTDs
- 5 METS OFTs/FTDs
- 12 TH-73 FTDs

Graduation rate from T-6 program improved from **91%** pre-SERA (2012-2022), to **101%** after introduction (2023).

Do we have any other data?

Embry-Riddle Aviation University

"The PILOT, or Pre-flight Immersion Laboratory for Operations Training program, an evidence-based approach that can save flight students time and money, was launched by Embry-Riddle in fall 2021."

Utilizes 10 VR-FSTDs running SERA.

The first group of 58 flight students reduced their time to first solo flight by **more than 30 percent.**

However,
the safety case
continues to build

Safety

Replicating events such as those listed below, even in the most expensive Level D simulator, until now, has been impossible:

- Haneda (Tokyo) runway incursion/crash
- FedEx/Southwest (Austin, TX) ATC error
- Delta/AA (JFK) runway incursion
- GA/Southwest (San Diego) runway incursion
- 737/ground vehicle (BWI) runway incursion
- JetBlue/GA (Boston) runway incursion
- EasyJet/GA (Bordeaux) ATC error/go-around
- Many, many more...

Who isn't sleeping at night... worried about a runway incursion becoming something worse?

The FAA, that's who!

In December of 2022 the FAA issued a Request For Information (RFI) as follows:

"To complete a feasibility assessment and to develop the requirements for Immersive Flight Simulation CRADA(s) with respect to identification of potential technologies that best satisfy the FAA's research goals."

This was then refined to identify SATCE as a specific technology of interest.

What's a CRADA?

C = Cooperative

R = Research

A = And

D = Development

A = Agreement

In simple terms this means a non-commercial, cooperative research study.

In this case a study to explore the benefits of using SATCE for airline pilot training and how such a system could be certified.

But underlying this we were told a primary driver to look at SATCE was the safety case.

Surprise!

A Completely Unknown Side Of The FAA Reveals Itself!

Perhaps I've been living under a rock, but I had no idea the FAA had the resources and personnel to handle such a comprehensive and well funded research project!

Overview

- Significant budget
- 3-year initial duration (extension likely)
- Well structured team (HF experts, aviation researchers, pilots, simulator technical team)
- Simulators, including a Level D FFS for primary evaluation
- Study design is currently "in progress"

CRADA Awarded January 2024



Progress

- Installation of SERA on A320 FTD in Atlantic City
- Flight plan development with pilots and human factors team
- Multiple flights planned to explore different aspects of the system and establish baseline
- Study design and metrics selection

Next steps

- Installation of SERA on a Level D FFS in Oklahoma City

Where does this lead?

Expected Outcomes

- FAA best practice guidelines (much faster than official rulemaking/regulations)
- Continuation of study with major US airline
- Extension of evaluation to eVTOL applications
- Certification guidance

Final thoughts and lessons learned

Sadly, I do think we, as an industry, have somewhat lost sight of why we use flight simulators for training.

We are training to meet the required paperwork, not necessarily to address the threats and safety issues faced in normal line operations.

And if you think that isn't the case, how long did it take to add UPRT to the routine training curriculum?

However, my experience working with the FAA in particular, has shown me a new facet of the organization. And even internally there is a realization that regulation is stymied in delay.

Final thoughts and lessons learned

But, it seems the corner has been turned!
To date SERA has been integrated by 20
different simulator manufacturers!

Some of the largest simulator
manufacturers are now moving to make
SATCE a “standard offering”.

By mid-2025 we expect there to be 3
independent academic studies exploring
the value that SATCE brings to pilot
training.

And right now our first lead-off MPL
training program with a major airline is
completing curriculum design that will use
SATCE 100% for their Phase 2 training.

Thank You!

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