2019
feb.

11:30 – Lunch at Visualization center (sponsored by SAAB SDATS)

13:00 – Welcome notes, round table, introduction

13:30 – Niclas Gustavsson, SDATS VP: Digital TWR 2030

14:00 – Billy Josefsson, LFV: Digital ATS and Human Performance

14:30 – Coffee break

14:45 – Tatiana Polishchuk and Christiane Schmidt, LiU: Workload Evaluation at Traditional and Remote Towers

15:15 – Valentin Polishchuk, LiU: Identifying Interesting Moments in Controllers Work Video via Dimensionality Reduction

15:30 – Coffee break

15:45 – Martin Steinheimer, Austrocontrol: Air traffic complexity and weather

16:15 – Anders Johannesson, Sjöfartsverket: Did we really? – An Introduction to Basic VTS and Remote Towers

16:45 – Active discussions

17:15 – Finish for today

18:30 – Dinner at **Enoteket** (own cost)

(Most of us will stay at enoteket for the evening, however, the Norrköping symphony orchestra has a concert (Schubert and Bruckner) that evening just 500 m from the restaurant. If you would like to go there, it starts at 19:00 and tickets are available **here**.)

09:00 – Keynote Dr. Nathan Vink, Human Performance Lead, Austro Control GmbH: When the Subjective measure is no longer enough: tales of Automation and searching for objective workload measures

10:00 – Coffee break

10:15 – Lothar Meyer, Maximilian Peukert, LFV: Safety and Risk assessment

10:45 – Wen-Chin Li, Cranfield University: ATCO's Perceived Workload and Monitoring Performance at the Traditional and Digital Tower Operations

11:15 – Giovanni Pignoni, Norwegian University of Science and Technology: Pupillometry and Eye Tracking for Cognitive workload measurement

11:45 – Discussions, take-home messages

12:30 – Closing notes

13:00 – Lunch at Renströmmen (Sponsored by LiU)


The LFV/LiU research team
(10 more not available for this photo)

2nd DATS workshop on safety & workload

DIGITAL ATS AND HUMAN PERFORMANCE

6th feb 2020 , NORRKÖPING

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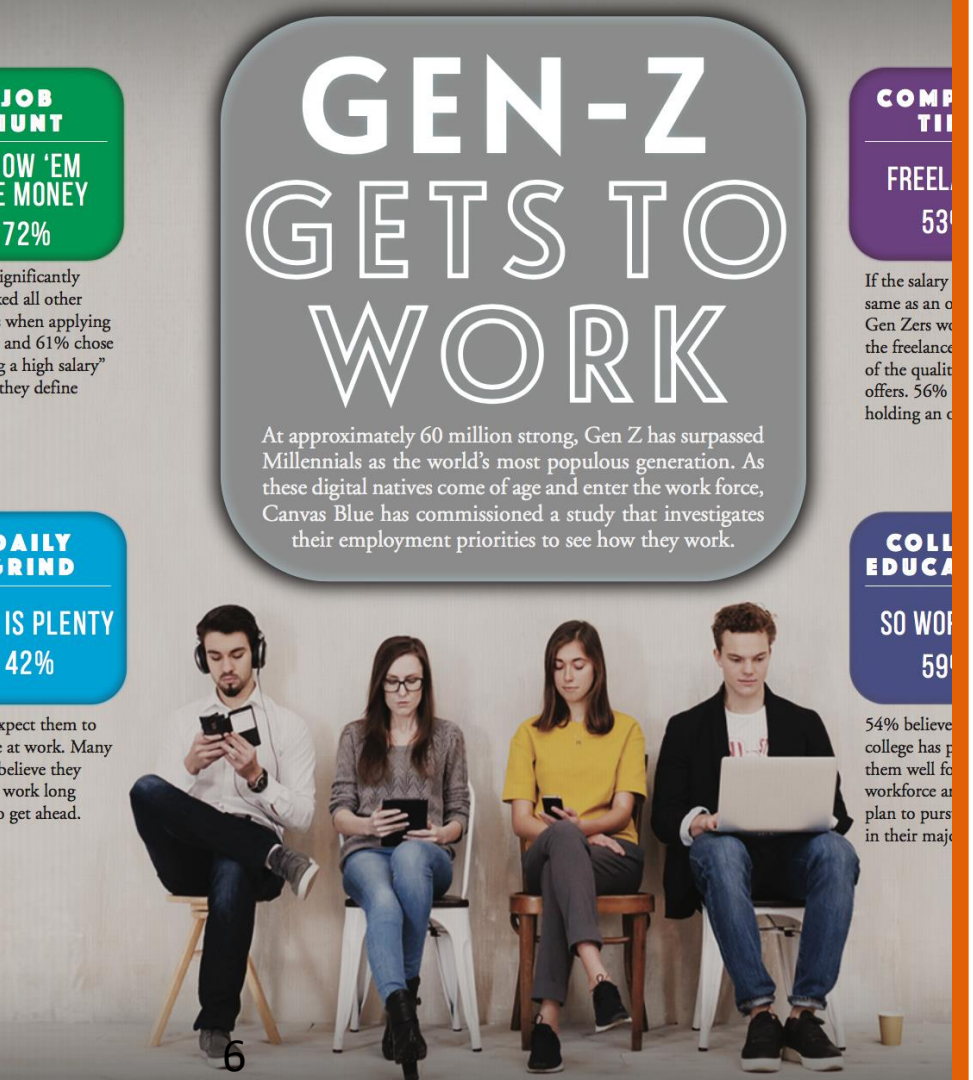
AMPLIFY TEAMWORK WITH AUTOMATION



Points

1. Overview
2. Research → Product
3. Improvement of the workplace
4. Human Performance RTS– evaluation
5. More Automation

Collaboration LFV and LiU

Science & Applied research for the aviation of tomorrow

COMMON LONG TERM PROGRAM 2012–2025

AIRSPACE OPTIMISATION CAPACITY SAFETY

STRATEGIES FOR AUTOMATION PROGRAM HUMAN-MACHINE

UTM

SPACE-TO-GROUND

CYBERSECURITY

SMART DECISION SUPPORT

UAM

AI ML

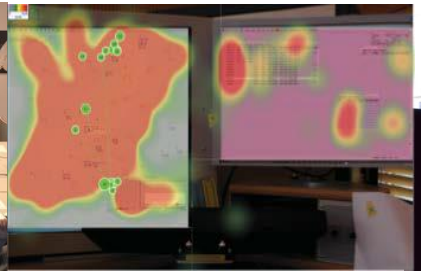
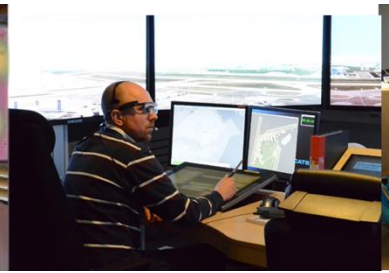
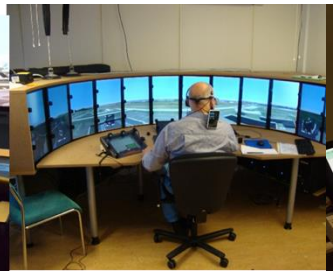
AIR TRAFFIC VISUALIZATION

ADVANCED HMI

SENSORS

LINKÖPING UNIVERSITY

SAFETY/RESILIENCE/ HUMAN PERFORMANCE


LFV & LiU collaboration , overview

Senior Researchers;

PhDs;

MsC;

Internships;

12-14

3 projects
12 paper &poster
8 people
presented to 150

15

6 projects
20 p&p
15 ppl
pres f 200

inUSe

16

12 Projects
20 p&p
20 ppl
pres f 350
COOPANS
MAritime
Chalmers
KTH
NASA
INNAXIS

17

18 projects
30 p&p
30 ppl
pres f 600
COOPANS
Maritime
TrV
Traincontrol
Chalmers
KTH
Lund TH
Eurocontrol
NASA
INNAXIS
UAE

18

18 projekt
20 p&p
35 ppl
pres f 1000 + ppl
COOPANS
Maritime
TrV
Traincontrol
VINNOVA
Chalmers
KTH
Lund TH
Eurocontrol
INNAXIS
NASA
NTU Singapore
UAE Sharjah
University
ENAC
SESAR

…

2019

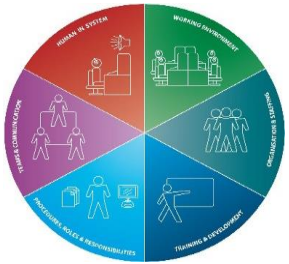
22+ projects
Papers , best papers
++
New collaborators
Sevilla Universitet
Bologna Universitet
Berkely
KAIT (Korea)
LFV Operations
TS
MIT
SESAR , Exploratory
-- Budget
--
Partners

Synergies

Monitoring function in early trials → use of standard screens for implementation

HF Case, embedded in the proess

- ✓Structured approach to adress the digitalisation of ATS on its way to RTC. HFCase examines the HF conditions and the associated process ensure that RTC is ”fit for purpose” by considering human capabilities, strengths and weakness and now regulation 373.




THIS SIDE UP
HANDLE WITH CARE
SONY

Back in 2012/14

- 3 airports
- Air Traffic and Ground Traffic
- One Controller
- Wired up

- Heatmaps
- Episode analysis

- 5-6 years later.....

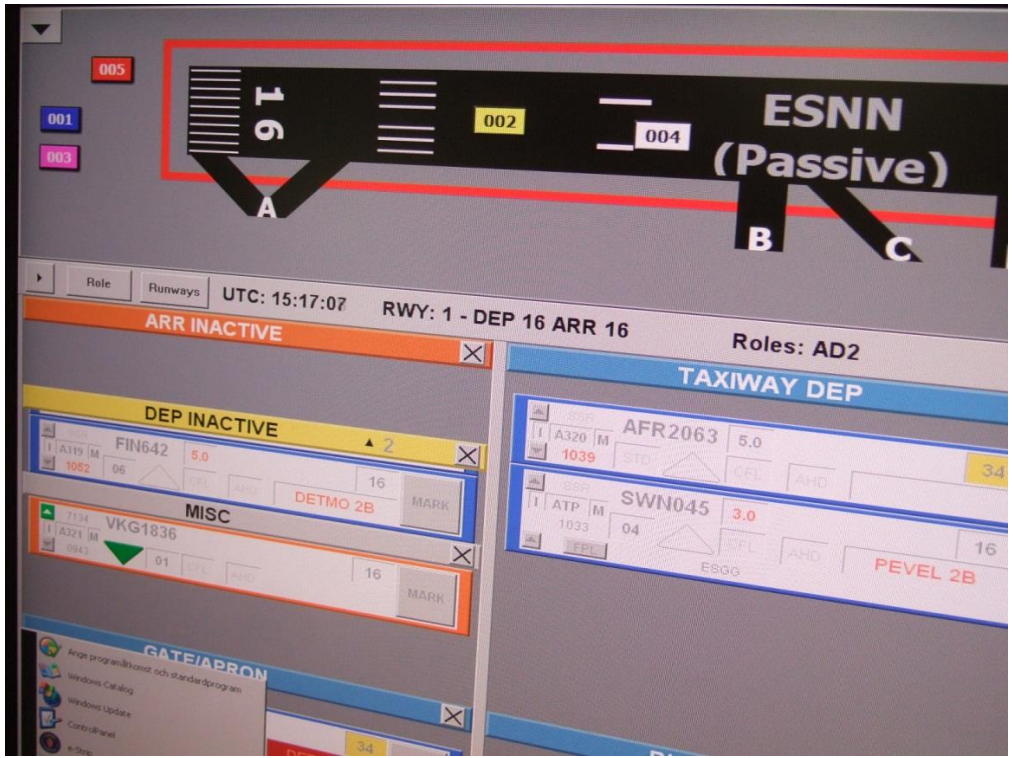
RTC evaluation by many

Remote Tower Centre – RTC Sundsvall

Co-funded by the European Union

Well Designed Technical features and high quality hardware have a positive impact on Human Performance

SAFETY improvement by system support, prevent RWI
it is appreciated by the ATCOs



Where is aircraft?

FROM

TO


RWY 11
RVR
RTC1_ESSL
AIRPORT
SENSOR AD


ESKS
SAABGROUP.COM

Recent HP assessment (2019) reveals (self assessment)

- ✓Less fatigue noted! –thanks to controlled room lighting ? / back light etc.
- ✓RWI tool and larm
- ✓Better visual cues
- ✓Management of larm supported by system
- ✓Better vigilance and attention thanks to more compact CWP (360 → 240)
- ✓Environment that supports sharing and learning, key to safety performance
- ✓E-strip, support for TGL, local flights etc
- ✓Working environment is good
- ✓Back-up available
- ✓Organisational / Harmonisation challenge noted when introducing new airports

EASA
2017/373 & 2019/004

LFV
HF Case RTC Sundsvall

Science
Human Factors Research

Each "issue" has a unique ID in order to be traceable during the project and for follow-up after execution and further development. Today the table consists of the following categories:

- Information Requirements - IR
- HMI Usability - U
- System Reliability - SR
- Automation and New Technology - AT
- Workplace environment - WP
- Physical Environment - PE
- Situation Awareness and involvement - SA
- Roles and Tasks - RT
- Working Method - WM
- Training Requirements - TR
- Organisation and Staffing - S

Used before;
Redundancy to GM2019/004

Well-proven and effective method

On-Side and
Off-Side visit

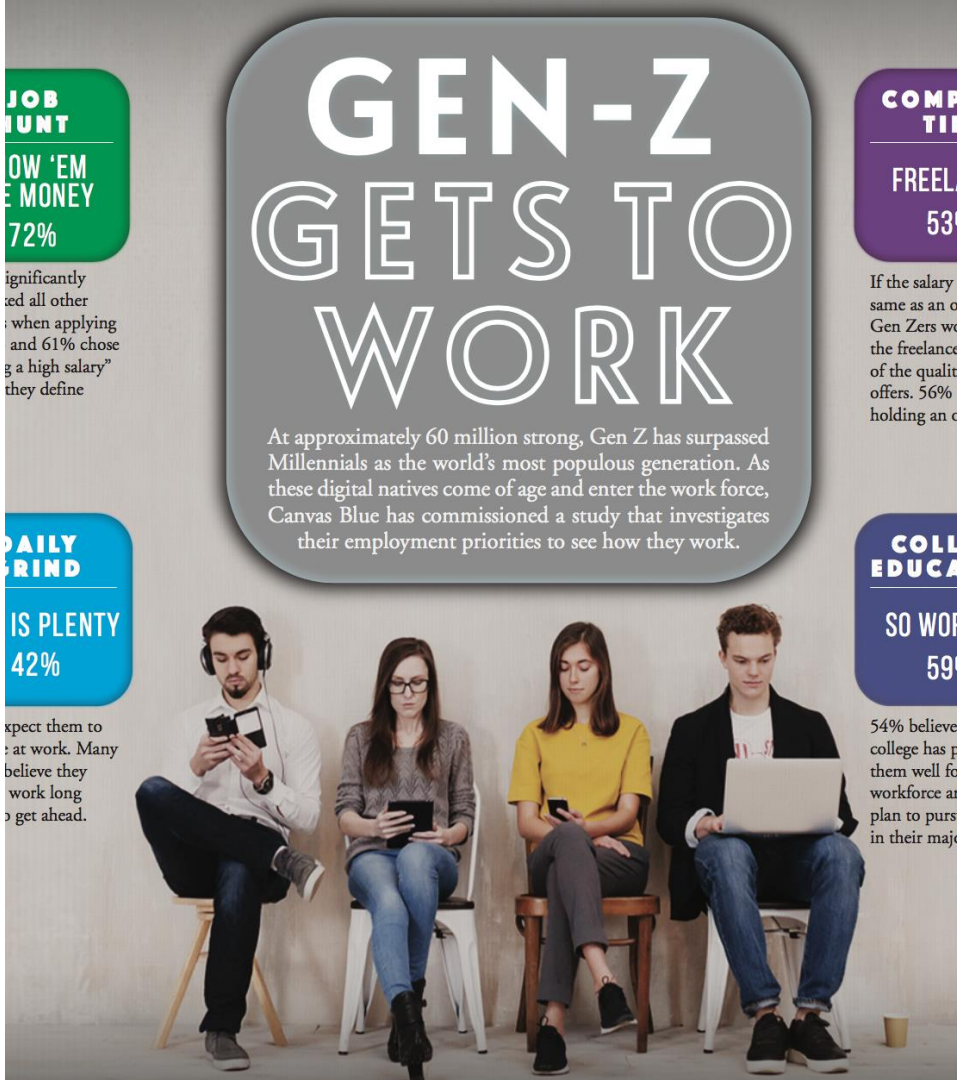
- ✓There are still options:
  -technology, methods
  -how to represent the tasks /
  how to organise the work,

- ✓Younger ATCOs typically express:
  ”This is not a problem for me,
  ”I dont think it is a problm for anyone in my generation”,
  ”Why havent we done this before?”

- ✓Older ATCOs expressed concern about capacity.

- ✓The process to introduce the RTC concept is as important as the concept itself (-:

- ✓What research is needed?



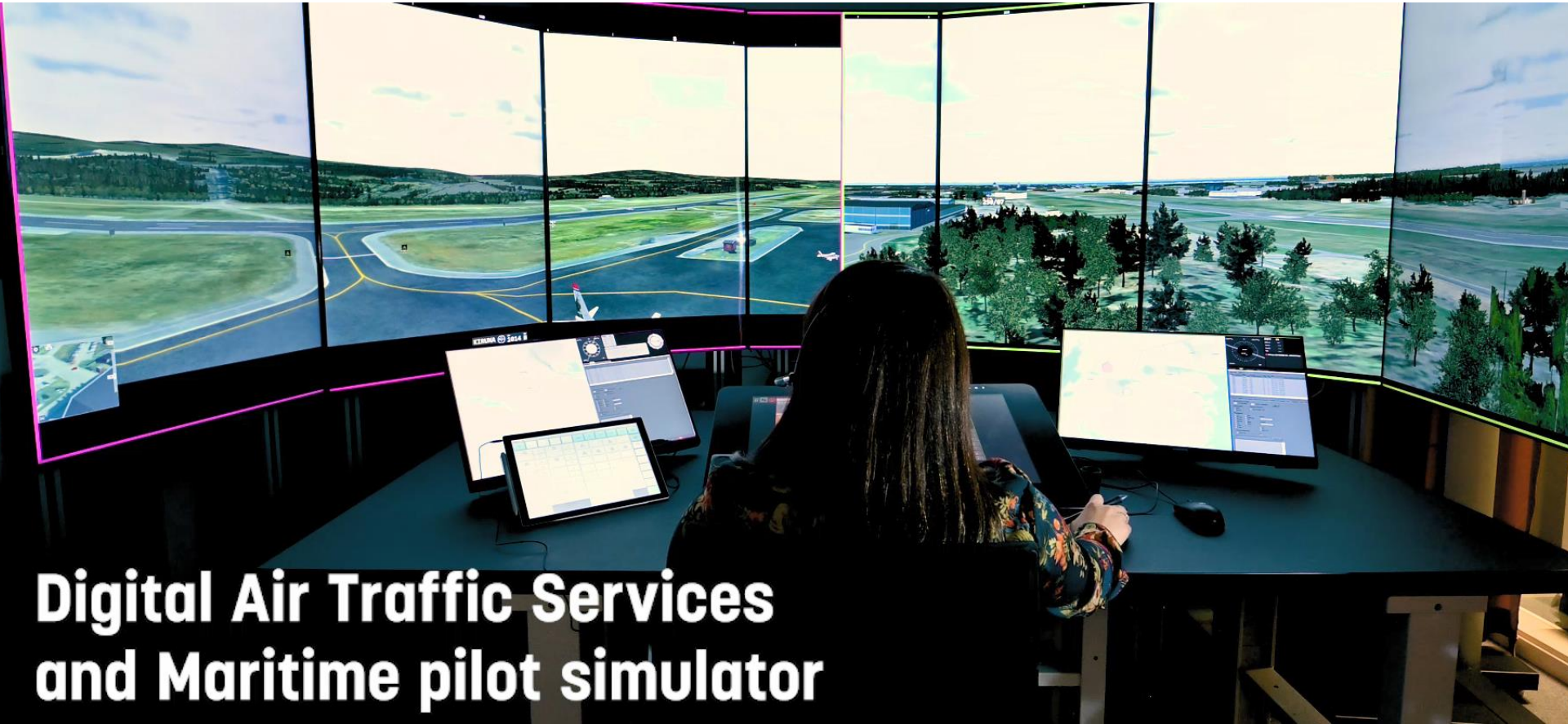
Preliminary Research areas, Automation Programme I → II

- ✓Labelinteraction (less or no need for e strip)
- ✓Workload monitoring
- ✓New sensors
- ✓VR / Augumented Reality

- ✓Attention Guidance, Speech recognistioni by AI
- ✓Automation support for training and verification of competence
- ✓Resilient Strategies for multiple information sources (RE5→X10→hybrid i/f)
- ✓Improve and speed up Risk & Safety Assessment, Human Performance Case

- ✓***We re in a never ending learning cycle from operations, with you and the DATS workshop.... so priorities above may change***

At Linköpings University on Campus Norrköping



Sample references

13.B. Josefsson, T. Polishchuk, V. Polishchuk, C. Schmidt. Scheduling Air Traffic Controllers at the Remote Tower Center. DASC 2017, St. Peterburg, USA. (Best in session)

14.B. Josefsson, T. Polishchuk , V. Polishchuk , C. Schmidt. A Step Towards Remote Tower Center Deployment: Optimizing Staff Scheduling. AIAA Journal, Published Online:11 Mar 2019, doi: hps://doi.org/10.2514/1.D0125

15.B. Josefsson, J. Jakobi, A. Papenfuss, T. Polishchuk, C. Schmidt, L. Sedov. Identification of Complexity Factors for Remote Towers. SESAR Innovation Days (SID 2018), Salzburg.

8.Lundberg, J., Svensson, Å., Johansson, J., & Josefsson, B. (2015, 1st to 3rd December 2015). Human-automation Collaboration Strategies. Paper presented at the Proceedings of the SESAR Innovation Days, University of Bologna.

9.Lundberg, J., & Johansson, B. J. E. (2015). Systemic resilience model. Reliability Engineering & System Safety, 141, 22-32. doi:http://dx.doi.org/10.1016/j.ress.2015.03.013