AMSTERDAM METRO - PROJECT REVIEW REPORT FOR RESTART OF COMMISSIONING

Dated 21/10/2021

Rev. 1.0



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Amsterdam Metro

Project review for restart of commissioning

Dated 21/10/2021

Rev. 1.0



WSP SCOPE

Amsterdam Metro have asked WSP to carry out a project review to answer the following questions;

- Q1. Has Amsterdam taken, based on your experience, reasonable steps to restart commissioning?
- Q.2 Do you see any reason to believe a successful implementation of the system on the Amsterdam network is not possible? If so, are there alternatives to the CBTC system available that have more potential success?
- Q3. What's your opinion about the current implementation strategy and in particular the Staged Commissioning approach?
- Q4. Are there any recommendations that you propose for adjusting or improving the current implementation strategy

- This presentation is in response to Q1.

BACKGROUND INFORMATION

- City of Amsterdam has been working on the implementation of CBTC based new signalling & control system since 2012
  - First CBTC commissioned on new N-S line in 2018
  - CBTC system rolled out on rest of the network in Feb'21
- Multiple occurrences of "Global Hold" since rollout of new signalling & control system
  - All Global Holds resulted due to overloading of ATS servers except on 25/09.
  - 5 Global Holds between April – June'21 (resolved in BL5.2.1.6)
  - 3 Global Holds in Sept'21 – 13/09, 24/09 and 25/09 (resolved in current BL5.2.1.6-15)
- On 24th Sept'21 ATS failed to reboot following switchover to hot standby
- Global Hold on 25th Sept'21 was erroneously influenced by the incidents of the previous day
- *On 25th Sept'21 Metro operation switched back from CBTC to legacy signalling system (VLSM)*

  (NB: It is understood that performance of the railway under VLSM remains good, the main issues are around the spares and end of life assets)
- ALSTOM have since carried out the root cause analysis of Global Hold incidents in Sept'21 and have proposed a solution to MET/GVB

PURPOSE & SCOPE OF THIS REVIEW

Q1. Has Amsterdam taken, based on your experience, the reasonable steps to restart commissioning?

WSP's methodology for response:

- WSP has carried a preliminary review of the project. Due to time constraints, WSP has taken a risk-based approach based on its experience on similar complex signalling programmes globally
- WSP's review is based on interviews of key individuals from programme (S&C), Operations (GVB) and the supplier (ALSTOM) and the information submitted during the course of the review.
- The information submitted to WSP review team includes responses to specific questions generated during the review process including root cause analysis of recent Global Holds, details of previous Global Holds (Feb - June'21) and Open defects.
- In it's review, WSP has taken a Systems Integration approach and special attention has been paid on "operational resilience"

PERSONNEL INVOLVED

- Following people were involved in review from WSP
  - 10.2.e - WSP's Global Systems Integration Expert
  - 10.2.e - Major Projects Rail Systems and Systems Integration Expert (Part time)
  - 10.2.e - CBTC, ETCS and Rail Systems Expert

- Following people from the project were interviewed by WSP team
  - Programme Delivery
    1. 10.2.e
    2. 10.2.e
  - S&C Programme team
    1. 10.2.e
    2. 10.2.e
  - Operations (GVB)
    1. 10.2.e
    2. 10.2.e
  - ALSTOM
    1. 10.2.e 10.2.e
    2. 10.2.e

REVIEW OF GLOBAL HOLDS

- ❑ Global Hold is a controlled shutdown process to gracefully bring the railway in a safe state.
- ❑ WSP carried out review of Global Holds with the project team. The root cause analysis was presented for 3- Global Holds that occurred in Sept'21 with some details of the Global Holds that occurred between Feb – June'21
- ❑ No technical safety issue identified with the Global Holds
- ❑ Global Hold on 25/09
  - All Global Holds occurred as a result of ATS server (CPU/memory overload) except the Global Hold on 25/09.
  - The Global Hold on 25/09 was erroneously influenced by the incidents of the previous day, this could have been avoided with appropriate technical support at the time.
  - The Global Hold on 25/09 points towards the procedural lapses and necessitates the need for review of operational restrictions, SRACS, work around in relation to operator/ driver workload and effectiveness

➢ Recommendation

Project should carryout further lessons learned exercise for each Global Hold considering additional aspects and situation on the day including people, technology and systems limitations to understand how it can be avoided in future or managed with a reduced impact

SUMMARY OF GLOBAL HOLDS

Date	Global Hold Description	Fix Plan
	Global Holds Feb-June'21	
12/04/2021	Issue at regulation /prediction algorithm module level	BL5.2.1.6*
25/04/2021	Issue at regulation /prediction algorithm module level	BL5.2.1.6*
16/05/2021	Working Instruction to avoid tripcode 2-issues neglected (Traffic Controller)	N/A
31/05/2021	Due to a trip remaining running from [redacted] that occurred on 30/05	BL5.2.1.6*
14/06/2021	Trip still running from the previous day	BL5.2.1.6
	Global Holds in Sept'21	
13/09/2021	GTW-DRIS (Siemens PIS) causing ATS CPU peaks and freezes	N/A
24/09/2021	ATS CPU peaks and redundancy failure	BL5.2.1.6-15
25/09/2021	[redacted] Zone Controller 3 goes in safe state – Staff focussed erroneously on ATS	N/A

N/A = Procedural issue

*Short-term fixes implemented following each Global Hold leading to more structural improvements in BL5.2.1.6 (June'21)

GLOBAL HOLDS IN SEPTEMBER'21



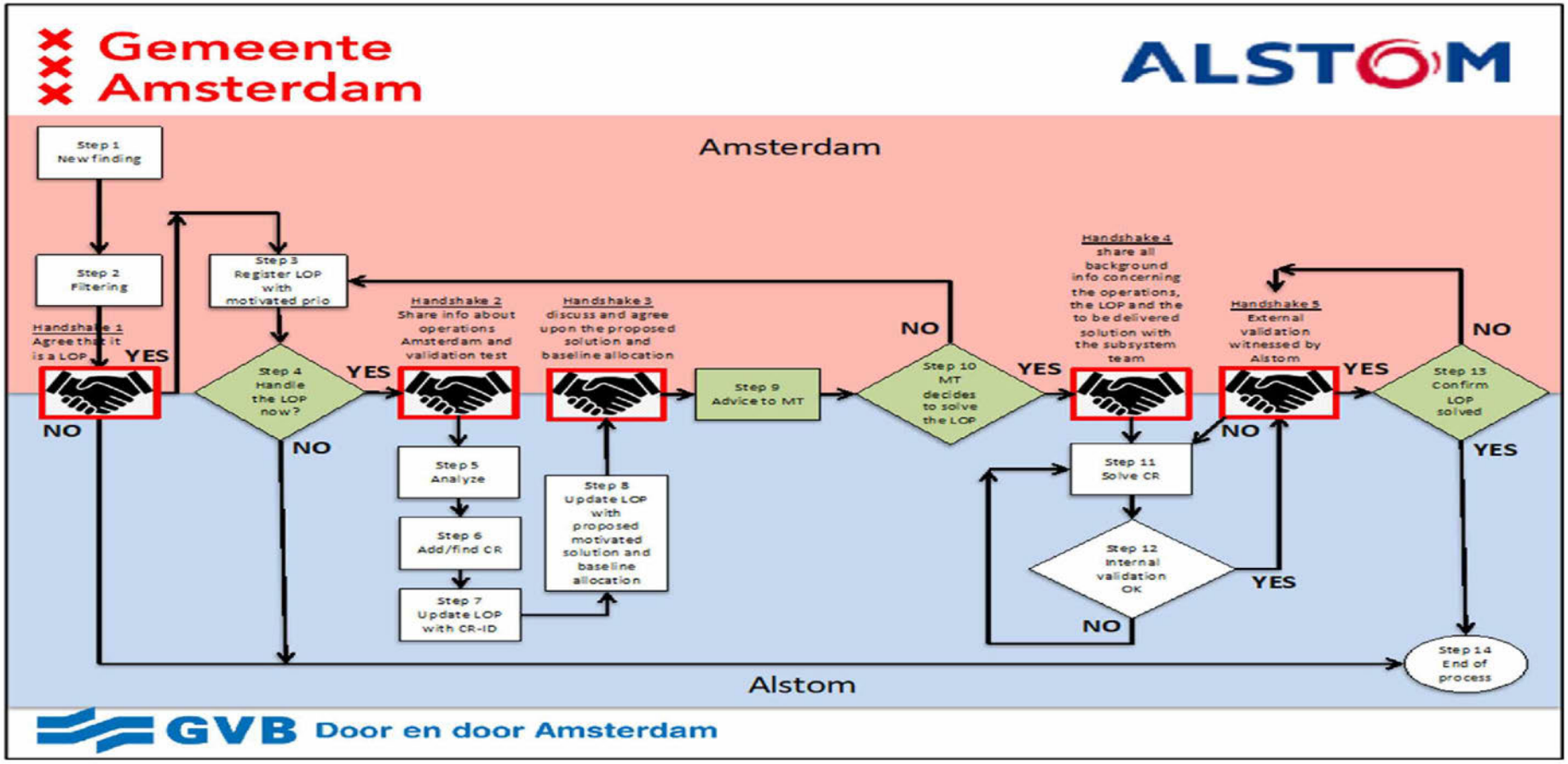
PRIORITISATION OF DEFECTS

- MET/GVB have a process in place for prioritisation of defects with ALSTOM through weekly handshake to help prioritising defects based on severity

- Findings
  - There is evidence of a growing number of work arounds, SRACs and Traffic Information Bulletins, which raises the question about workload assessment for field operations staff (e.g. TCC/ Drivers)
  - It appears that the defects related to operational work around are being de-prioritised due to other emerging issues, although this is unavoidable at times, however this should to be reviewed by the project team to avoid secondary risks associated with workload and loss of effectiveness.
  - The risk of procedural lapses is evident from Global Hold on 25/09 e.g. not following SRACs. Similar procedural lapses have also been identified during Global Holds on 16/05 and 13/09.

- Recommendations:
  - *Project should carry out workload review of operations staff workload through HF specialist team. This exercise should be repeated when there is significant change*
  - *Defect retirement plan should include a burndown of operational restrictions, workarounds and SRACs*

MET/GVB & ALSTOM HANDSHAKE - PRIORITISATION REVIEW



GLOBAL HOLD ON 25/09 - PROCEDURAL LAPSES

10.1.C



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RECOMMENDATIONS

- Recommendations (Short Term):
  - *Project should carry out further lessons learned exercise for each Global Hold considering additional aspects and situation on the day including people, technology and systems limitations to draw a resilience plan for future*
  - *More detailed plans should be put in place to allow quicker recovery in case of failures. This includes increased ALSTOM technical support on site.*
  - *Duration of technical support should take into account the learning curve of the field operations staff and should be target driven e.g. demonstration of RAMS*
- Recommendations (Long Term):
  - *Project should carry out workload review of operations staff workload through HF specialist team. This exercise should be repeated when there is significant change*
  - *Defect retirement plan should include a burndown of operational restrictions, workarounds and SRACs*
  - *Retirement of temporary fixes (patches) with a long term solution*
  - *Project should consider bolstering recovery plans. For example possibility of containing the impact of Global Holds to a smaller section rather than whole network, the response time of 2nd line and 3rd line maintenance support or providing server loading level alarms to enable manual switchover and reboot*
  - *A training plan including refresher courses for the field operations and maintenance staff*

CONCLUSION

Based on the interviews of the project personnel and information supplied, WSP review supports the re-start of commissioning with following recommendations

- *Project should carry out a further lessons learned exercise for each Global Hold considering additional aspects and situation on the day including people, technology and systems limitations to draw a resilience plan for future*
- *More detailed plans should be put in place to allow quicker recovery in case of failures. This includes increased ALSTOM technical support on site.*
- *Duration of technical support should take into account the learning curve of the field operations staff and should be target driven e.g. demonstration of RAMS*



Thank You

