ATMS – Addressing strategic risks

INTRODUCTION / BACKGROUND

This is not another “what is ATMS?” & “where are we up to?” presentation

- ARTC has been on the ATMS journey for a number of years
- First deployment of ATMS will go live in 2017
- Now that ATMS is real the focus is shifting towards planning for large scale deployment and benefit realisation
- A key benefit is improvements to the risk profile with respect to rail safety
- That is the key focus of todays presentation although questions at the end on other ATMS matters are welcome

ATMS – ADDRESSING STRATEGIC RISKS

Overview

- How does ATMS address the strategic safety risks
- What does ATMS do differently
- Case Study: Train 9104, Tarcoola, November 2012
- Case Study: Train 2AD1, Tarcoola, November 2012

ONRSR STRATEGIC RISKS

Key strategic risks in the railway environment

- Train to Train
- Train to Track worker
- Train to Person
- Train to Obstruction
- RMV & Train
- Train to Vehicle at LX
- Train Derailment
- Near Misses

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- **Train Derailment**
- **Near Misses**

WHAT DOES ATMS DO DIFFERENTLY?

1. Directly determining the position of trains
2. Providing situational awareness to Rail Traffic Crew
3. Centralising interlocking, Central Track Database
4. Directly assuring train integrity
5. Responding to changes in the environment
6. Enforcing trains before danger

WHAT DOES ATMS DO DIFFERENTLY?

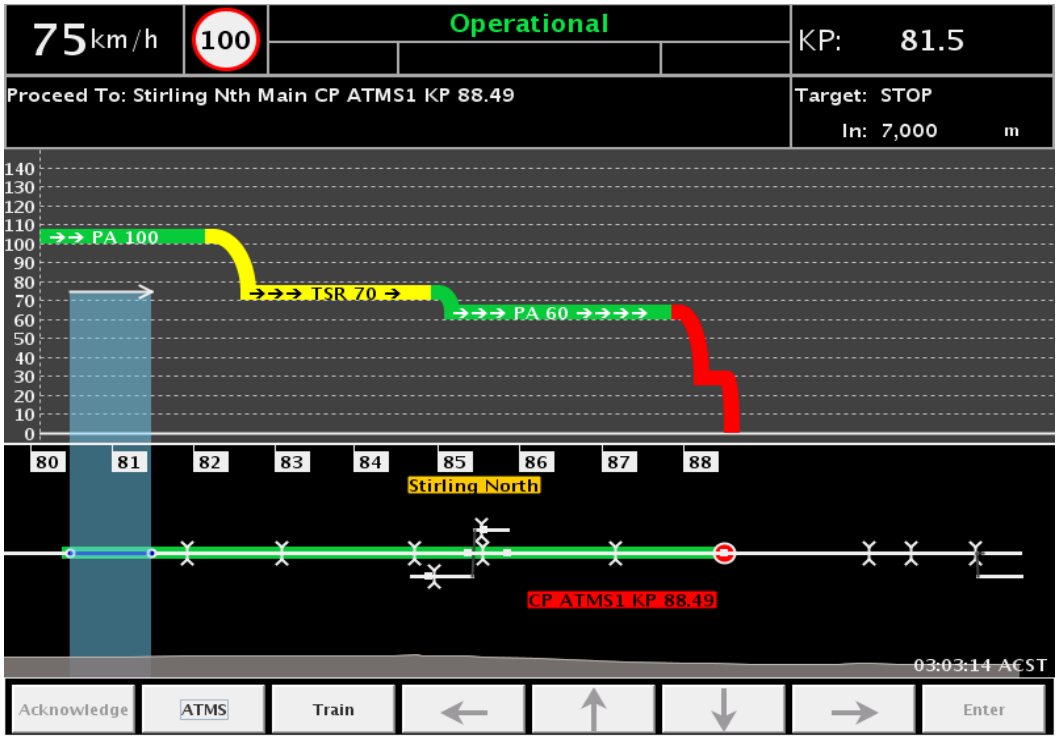
1 Directly determining the position of trains

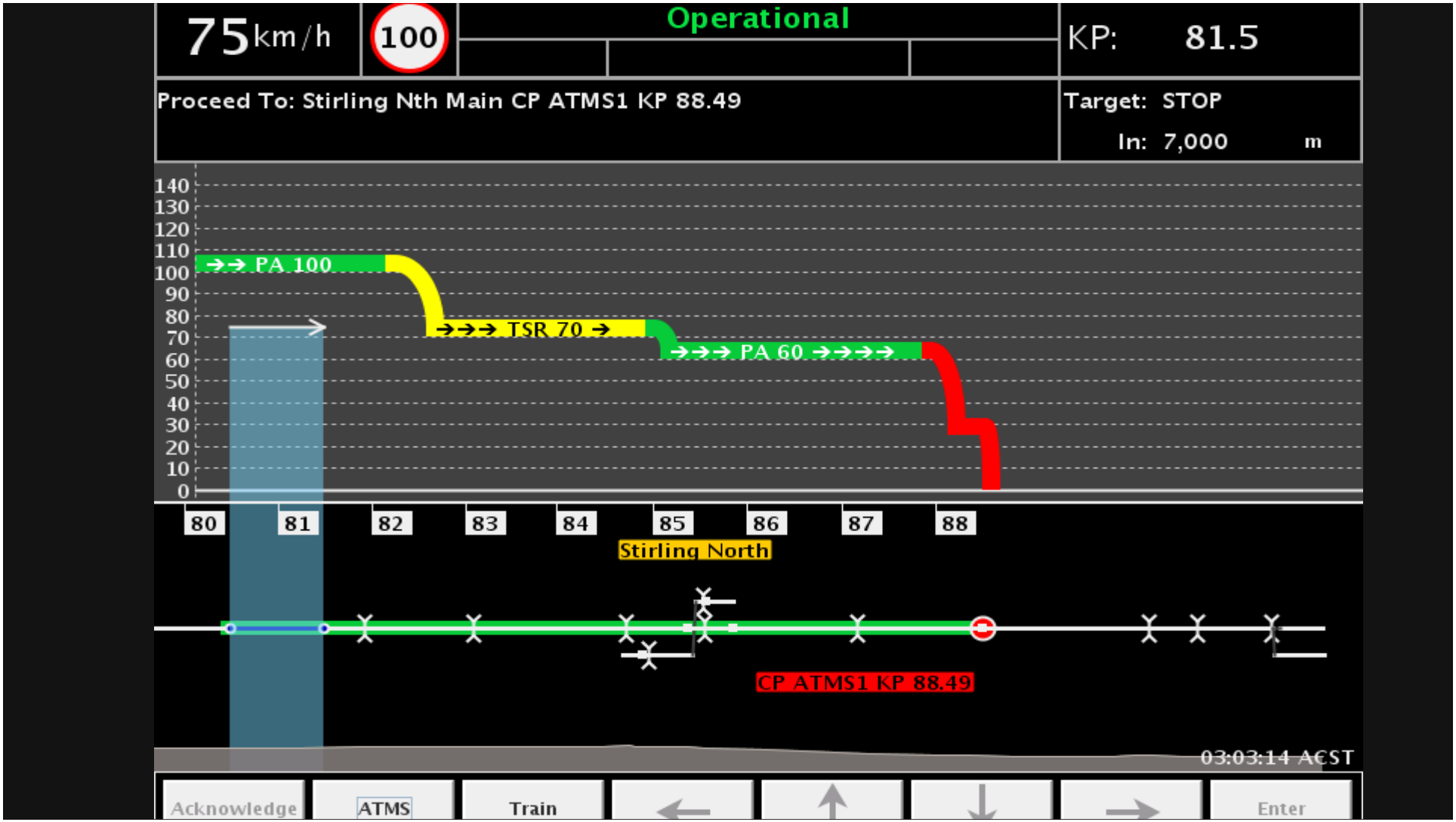
Three methods of determining position:

- Odometry inputs (train tachometer)
- Inertial reference system (feels the train move)
- Two GPS sensors (location, speed, direction)

WHAT DOES ATMS DO DIFFERENTLY?

2 Providing situational awareness to Rail Traffic Crew




75 km/h
100
Operational
KP: 81.5
Proceed To: Stirling Nth Main CP ATMS1 KP 88.49
Target: STOP
In: 7,000 m
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
PA 100
TSR 70
PA 60
80
81
82
83
84
85
86
87
88
Stirling North
CP ATMS1 KP 88.49
03:03:14 ACST
Acknowledge
ATMS
Train
Enter

WHAT DOES ATMS DO DIFFERENTLY?

3 Centralising interlocking, Central Track Database

- Every train has a knowledge of the track layout
- The central Authority Management Server polices all authorities
- One source of truth
- Devices are safety rated, certified internationally

WHAT DOES ATMS DO DIFFERENTLY?

4 Directly assuring train integrity

Three methods of assuring train integrity

- Directly measuring brake pipe at rear of train
- GPS sensor at rear of train measures position
- GPS sensor measures relative speed

WHAT DOES ATMS DO DIFFERENTLY?

5 Responding to changes in the environment

ATMS can immediately respond to:

- Points failure
- Train integrity failure
- Overrun of authority

WHAT DOES ATMS DO DIFFERENTLY?

6 Enforcing trains before danger

ATMS can minimise Safeworking incidents by:

- Alerting Rail Traffic Crew when they are near the end of their authority
- Alerting Rail Traffic Crew when they are exceeding a safe speed
- Enforcing the train if required and safe to do so

WHAT DOES ATMS DO DIFFERENTLY?

6 Enforcing trains before danger

Enforcement

TWO CASE STUDIES

Two Case studies where ATMS could have mitigated the risk:

- Train 9104, Tarcoola, November 2012
  - A train proceeded without fulfilling the conditions of its previous authority
- Train 2AD1, Tarcoola, November 2012
  - A train took an incorrect route
- Information from the released ATSB reports

CASE STUDY: TRAIN 9104, TARCOOLA, NOV 2012

Proceed authority exceeded by Train 9104

- A train was en route from Rankin Dam SA to Pelican Point SA.
- The crew had an authority to wait for a pass, and a cross at Tarcoola
- The crew received authority to proceed, on condition of the pass and cross being completed
- The crew then proceeded towards the conflicting movement, without the authority conditions being met

CASE STUDY: TRAIN 9104, TARCOOLA, NOV 2012

How would ATMS have lowered the risk of this incident?

- The Rail Traffic Crew would have graphical depiction of the end of their authority, and nearby trains
- The subsequent proceed authority would not have been issued until after the cross and pass had been completed
- The ATMS would know the exact location of all equipped trains
- The ATMS would have predictively enforced the train inside its authority

CASE STUDY: TRAIN 2AD1, TARCOOLA, NOV 2012

Proceed authority exceeded by train 2AD1

CASE STUDY: TRAIN 2AD1, TARCOOLA, NOV 2012

Proceed authority exceeded by train 2AD1

- A train was en route from Adelaide, SA to Katherine, NT
- The train was authorised to travel to Northgate, branching before Tarcoola
- The train did not take the line to Northgate, instead continuing through Tarcoola
- The error was not immediately noticed due to the absence of train detection

CASE STUDY: TRAIN 2AD1, TARCOOLA, NOV 2012

How would ATMS have lowered the risk of this incident?

- The position of trains would have been directly determined
- The points would have been electronically controlled by ATMS
- The Rail Traffic Crew would have a graphical layout of the environment to aid their situational awareness
- In any event, the train would have been enforced immediately the wrong route was taken.

SUMMARY

This ATMS platform allows us to:

- Demonstrate the benefits to the rail community, with a view to enabling more territory
- Integrate new ideas to the platform – protection for track crew, fuel minimisation…
- Learn from our experiences, and help other railways make the environment safer

Questions

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