HS2 Automated Progress Assurance

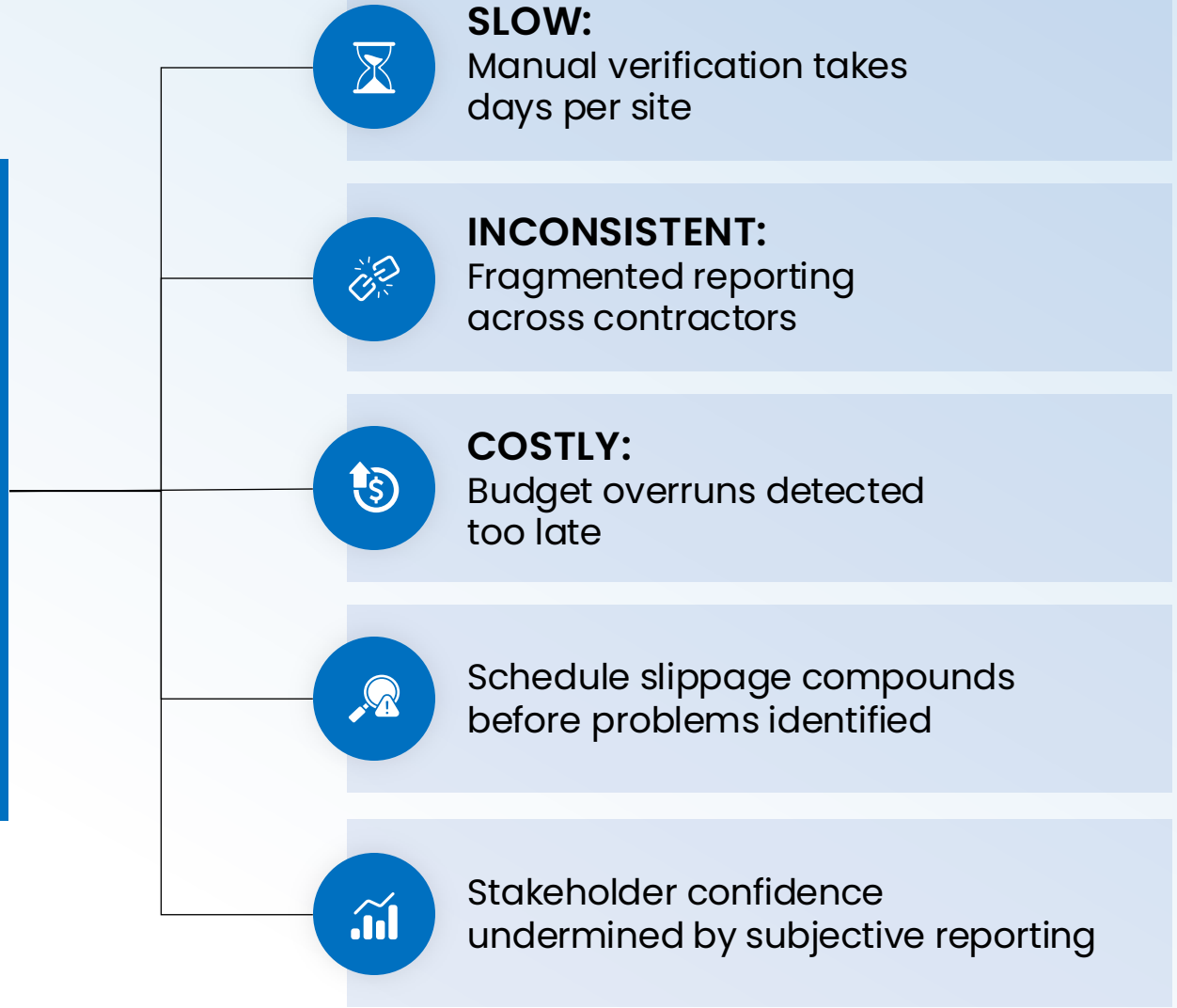
Using Hyperspectral Imaging, AI & LiDAR

HS2 Accelerator 8.0

The Challenge

"WHAT HAVE WE ACTUALLY BUILT THIS MONTH?"

Currently takes DAYS to answer.



SLOW:
Manual verification takes days per site

INCONSISTENT:
Fragmented reporting across contractors

COSTLY:
Budget overruns detected too late

Schedule slippage compounds before problems identified

Stakeholder confidence undermined by subjective reporting

Everyone Uses LiDAR + AI. Nobody Sees Inside.

INDUSTRY STANDARD APPROACH

Doxel | Buildots | LiDARit | Mach9

- LiDAR-equipped robots scan sites
- 360° cameras match images to BIM
- AI processes LiDAR data automatically
- Generate 2D/3D engineering models
- Track visual progress and detect delays
- Provide project progress information

THE GAP: WHAT THEY CANNOT DO

- Cannot verify material quality
- Cannot detect internal defects
- No material evidence in reports
- Destructive testing still required

LINEARLABS: THE COMPLETE SOLUTION

Everything they do + Patent Pending Hyperspectral imaging

+ Hyperspectral Imaging

- Material quality verification
- Internal defect detection
- Non-destructive assurance

+ Usable Intelligence

- 3D colour coded visualisation
- One-click PDF reports

Our Solution

Google Maps for Construction

4-8 WEEK DEVELOPMENT

- Multi-sensor data capture from 1-2 pilot sites
- AI-powered point cloud processing
- 3D interactive progress dashboards
- Automated assurance reports

EXPECTED VALUE

95% reduction in reporting time

40+ hours

saved per site monthly

Technical Approach

OUR SECRET SAUCE: Hyperspectral Imaging

Captures 100+ spectral bands to verify material quality without destructive testing

Hyperspectral Imaging

- Verify concrete strength
- Detect defects early
- Validate material quality
- Non destructive testing

LiDAR & Point Clouds

- Millimeter-level 3D scans
- Automated BIM comparison
- Precise geometry verification
- All weather capable

Deep Learning AI

- Computer vision models
- 95%+ detection accuracy
- Multi-sensor integration
- Continuous learning

INTEGRATION: Microsoft Azure • Microsoft Fabric ready • RESTful APIs • Enterprise security

Feasibility & Delivery

4-8 Week Timeline

WEEK 1-2

Setup

Site selection, BIM ingestion, sensor deployment

WEEK 3-4

AI Development

Model training, Point cloud proc, BMI alignment

WEEK 5-6

Dashboard Build

3D visualisation, Reporting engine & Alert system

WEEK 7-8

Validation

Testing & deployment, Live demo & Documentation

RISK MITIGATION

Data access delays
Immediate requirements gathering with HS2

Weather affects capture
Flexible scheduling, all weather LiDAR

Core technology
Already proven with validated proof of concept

CRITICAL DEPENDENCIES

- BIM models & site access (IFC/Revit supported)
- Weekly HS2 check-ins (minimal overhead)

Expected Impact

reduction in reporting time

40+ hours

Hours Saved Per Site Monthly

2–3

Weeks Earlier Risk Detection

SUCCESS METRICS

Accuracy:
Detection vs manual verification

Time:
Reporting cycle reduction

Stakeholder:
User acceptance ratings

Quality:
Report quality & usability

Long-Term Value

- Scalable to 100+ sites
- Enhanced stakeholder confidence
- Foundation for predictive analytics

Team Capability

WHY WE ARE THE RIGHT TEAM

Deep expertise in HSI, computer vision, and large scale infrastructure projects

Core Capabilities

HSI EXPERTISE

5+ years developing applications for construction material analysis

AI/ML

Deep learning specialists with enterprise-scale deployments

DATA ENGINEERING

BIM integration, point cloud processing

PAST DEPLOYMENTS

Infrastructure monitoring:
93% accuracy, 60+ hours saved per cycle

Public sector platforms:
Enterprise-grade security & compliance

Point cloud analytics:
Automated change detection at scale

Key Lessons

- Start with clear metrics, validate early
- Build in security from day one
- Simple visual interfaces for stakeholder buy-in

Next Steps

IMPLEMENTATION PATH

Site Selection & Kickoff
Identify pilots, establish access, align on success criteria

4-8 Week Build
Deploy sensors, integrate BIM, validate AI models with weekly updates

Live Demo & Decision
Review metrics, validate results, plan scale-up to production

reduction in reporting time

40+
Hours Saved

100+
Sites (Future)

READY TO TRANSFORM HS2'S DELIVERY ASSURANCE