



ARTIFICIAL INTELLIGENCE ADOPTION IN HPC

DRIVING INNOVATION, PERFORMANCE & DEVELOPMENT

Prepared by: Rector Nchabeleng, Marius Auret &
Julie Courtnage



science, technology
& innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA



CSIR
Touching lives through innovation

OVERVIEW

HPC is leveraging Artificial Intelligence (AI)

- To enhance efficiency, research, innovation and decision-making across its Programmes.
- For content creation, reporting, scientific analysis, automation, knowledge management and technology development.
- HPC Programmes are adopting AI while maintaining appropriate human oversight.
- Presentation shows AI use as:
 - % usage
 - AI Deployment and Innovation Archetypes
 - Unique Applications





AI

OUR COMMON AI APPLICATIONS

AI-ASSISTED KNOWLEDGE & CONTENT WORK

Across HPC business units, AI is being used to enhance how we create, analyze, review, and communicate knowledge—enabling better insights, faster delivery, and greater impact.



2 RESEARCH & ANALYZE

AI accelerates research, summarizes complex information, and analyzes content to uncover insights and key themes.



4 REPORT & COMMUNICATE

AI helps prepare reports, infographics, metadata, and other communication materials for internal and external stakeholders.



6 SEARCH & FIND

AI improves our ability to find information—including emails and documents—using natural language and vague descriptions.



7 CALCULATE & FORMAT DATA

AI supports complex calculations, data aggregation, and formatting for accurate and structured outputs.



1 CREATE & DRAFT

AI helps us draft and refine reports, proposals, presentations, documents, emails, and other professional content.



3 REVIEW & SUMMARIZE

AI supports peer review, summarization of lengthy documents, extraction of key points, and content synthesis.



5 DOCUMENT & STRUCTURE

AI assists in creating documentation, frameworks, templates, and governance or administrative content.



8 PLAN & SUPPORT DECISION-MAKING

AI helps organize information, build frameworks, and provide analytics to support planning and informed decisions.



All Units
USING AI FOR
KNOWLEDGE &
CONTENT WORK



**BUILT ON HUMAN
OVERSIGHT**

Across all units, human expertise, judgment, and ethical use remain at the core of how we apply AI to deliver value and impact.



**Responsible
Use**



**Human
Oversight**



**Better Insights,
Greater Impact**

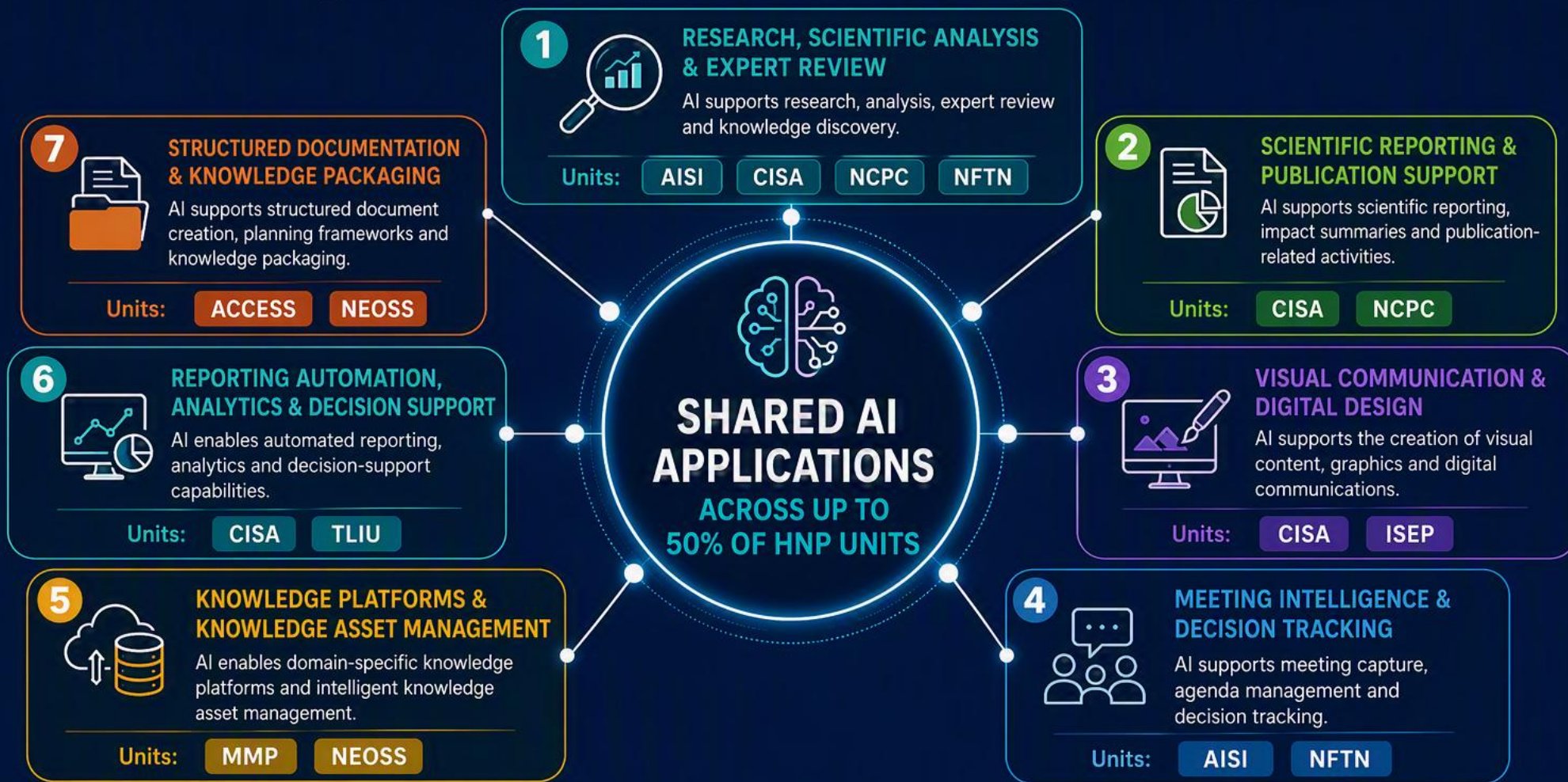


CSIR
Touching lives through innovation

AI APPLICATIONS SHARED BY MULTIPLE HNP UNITS

ACROSS UP TO 50% OF HNP UNITS

Applications adopted by multiple HNP business units, excluding organisation-wide AI uses



These AI application areas are adopted by **multiple HNP business units** but are **not organisation-wide**, bridging the gap between common productivity uses and specialised, unit-unique innovations.



CSIR
Touching lives through innovation

AI DEPLOYMENT & INNOVATION ARCHETYPES

- **Horizontal AI Capabilities**
Advanced & Knowledge-Centric AI Applications
- **Vertical AI Innovations**
Sector-Specific & Platform-Based AI Innovation

ADVANCED & KNOWLEDGE-CENTRIC AI APPLICATIONS

AI applications focused on knowledge work, content, analysis, communication, documentation and organisational capability development



ACCESS

Alliance for Collaboration on Climate and Earth Systems Science



Professional content generation and writing

Drafting/refining reports, proposals, presentations and high-level content



Procurement documentation

Drafting RFPs, scopes of work and performance measurement matrices



Contract and legal support

Summarising contracts and translating legal language into everyday English



Administrative workflow automation

Identifying ways to automate repetitive administrative tasks



Data & financial analysis

Complex financial calculations, structured reporting and data aggregation



Strategic planning support

Synthesising information and developing project management frameworks



AI-powered email search

Locating emails using vague descriptions beyond traditional Outlook search



AISI

Aerospace Industry Support Initiative



Research support & brainstorming

Research on industry topics and quick brainstorming of potential focus areas



AI-assisted meeting minutes

Use of Co-pilot for minute taking to reduce time spent listening to recordings

(Under Consideration)



CISA

Circular Innovation South Africa



Impact-focused summaries

Short, impact-directed summaries of funded grant project deliverables



Infographic generation

Creating infographics for visual display of complex issues



Subject matter analysis

Analysis to inform journal reviews and funding proposal reviews (no unpublished uploads)



Conceptual frameworks

Developing frameworks to inform publications (e.g., book foreword outlines)



Deep content analysis

Analysing lengthy scientific reports and extracting key issues relevant to SA/Africa



Code & analytics automation

Developing code to automate reporting and analytical tasks



ISEP

Innovation Support and Enablement Programme



Website content & graphics

Creating website content and design graphics



Legal document creation

Drafting and preparing legal documents



Digital platform concepts

Designing digital platform concepts based on existing research



Email tone & grammar

Improving email tone and grammar



Social media designs

Creating social media content and designs



Letters & committee documents

Creating invitation letters, terms of reference for committees and more



NCPC

National Cleaner Production Centre



Document peer review

Using AI to conduct document peer reviews



AI training & capability development

Comprehensive AI training delivered to staff



Scientific report writing & analysis

Using Co-pilot to write and analyse scientific reports



NEOSS

National Earth Observation and Space Secretariat



AI-assisted metadata generation

Automatically drafting metadata and documentation from author-uploaded resources



Structured authoring workflow

Controlled three-step workflow: upload, generate and review



Human oversight & validation

Author reviews and approves AI-drafted content before publication



NFTN

National Foundry Technology Network



Content creation & productivity (Copilot)

Supporting content creation, research and productivity



Writing & information gathering (ChatGPT)

Assisting with writing, brainstorming and information gathering



Writing quality improvement (Grammarly)

Improving grammar, spelling, clarity and writing quality



Meeting management (Decisions for Teams)

Supporting meeting management, agendas and decision tracking



Secure information management (Cloud)

Enabling secure storage, access and sharing of digital information



These applications enhance how we create, analyse, communicate, review and manage **knowledge**, building **capability** and improving **organisational effectiveness** across HPC.



CSIR
Touching lives through innovation

SECTOR-SPECIFIC & PLATFORM-BASED AI INNOVATION

AI Embedded in Operational Systems, Platforms, Ecosystems and Industry-Specific Solutions



AISI

Aerospace Industry Support Initiative

Autonomous UAV Intelligence

- AI and machine learning for UAV navigation
- Obstacle avoidance
- Autonomous subject tracking

AI embedded in autonomous aerospace systems.



MMP

Mandela Mining Precinct

Mining Readiness & Human Change Intelligence

- Exemplar Learner Management System
- Assessor upskilling
- TRL assessments
- HRL assessments
- Change-readiness assessments
- Support for deployment of modern mining technologies

Knowledge Mine Platform

- Development of an MMP-specific ChatGPT
- Mine-specific AI solutions
- AI combined with mining rulesets
- Foundation for bespoke AI applications for mines

AI embedded in mining modernisation, readiness and knowledge platforms.



NEOSS

National Earth Observation and Space Secretariat

GEO Knowledge Hub Platform

- AI-assisted creation of knowledge packages
- Automated metadata generation
- Automated documentation drafting

Intelligent Knowledge Management Workflow

- Upload → Generate → Review workflow
- Author review and approval process
- Human oversight before publication



RISP

Regional Innovation Support Programme

AI-Enabled Innovation Ecosystems

- Limpopo LCX ICT Hub
- Regional Innovation Network Platform (RINP)
- Limpopo Science Park
- AI capabilities incorporated into innovation infrastructure development

AI supporting regional innovation ecosystems and innovation hubs.



TLIU

Technology Localisation Implementation Unit

Localisation & Industry Intelligence Platforms

- ERP-enabled AI opportunities
- ISO management-system integration
- Company benchmarking
- Company profiling
- Localisation decision support

AI-Enabled Reporting & Analytics

- AI reporting functionality
- Analytics capability
- Decision-support functionality
- TLIU Portal enhancement

Industrial Inspection Applications

- AI applications for non-destructive testing (NDT)
- AI embedded in industrial localisation, performance platforms and inspection technologies.

SECTOR-SPECIFIC & PLATFORM-BASED AI INNOVATION



These AI applications extend beyond knowledge productivity and are embedded within specialised systems, platforms, industry environments and innovation ecosystems that support HPC's strategic mandate.



UNIQUE APPLICATIONS OF AI BY HPC BUSINESS UNITS

• Applications used by only one business unit •



AISI

Aerospace Industry Support Initiative

Autonomous UAV Intelligence

- AI and machine learning for UAV navigation
- Obstacle avoidance
- Autonomous subject tracking



AI embedded in autonomous aerial systems.



CISA

Circular Innovation South Africa

AI Code & Analytics Automation

- Development of computer code
- Automation of reporting
- Automation of analytical tasks



AI used to generate code and automate analytical workflows.



ISEP

Innovation Support & Enablement Programme

Digital Design & Creative Outputs

- Website graphics and content
- Social media designs
- Digital platform design concepts (based on existing research)



AI for creative and digital design production.



MMP

Mandela Mining Precinct

Mining Readiness & Change Intelligence

- Assessor upskilling using AI
- TRL assessment
- HRL assessment
- Change readiness assessment
- Support for technology deployment in modernising mines



AI for mining technology, human readiness and change management.



NCPC

National Cleaner Production Centre

AI Capability Development

- Comprehensive AI training for staff
- Workforce AI capability development
- Organisational AI readiness



AI used to build organisational AI capability and skills.



NEOSS

National Earth Observation & Space Secretariat

AI Metadata & Knowledge Asset Curation

- AI-assisted creation of metadata and documentation
- Controlled 'upload, generate, review' workflow
- Human review and validation before publication



AI streamlines knowledge package creation while ensuring human oversight and accuracy.



RISP

Regional Innovation Support Programme

AI-Enabled Innovation Ecosystems

- AI capabilities considered for regional innovation hubs
- AI-enabled innovation network platform (RINP)
- AI considered in development of Limpopo Science Park



AI used to enable regional innovation infrastructure and ecosystem development.



TLIU

Technology Localisation Implementation Unit

Industrial Intelligence & Inspection Applications

- Company benchmarking and profiling with AI insights
- Localisation intelligence and decision support
- AI-enabled reporting and analytics in TLIU Portal
- AI for non-destructive testing (NDT) activities



AI applied to localisation, industrial benchmarking and NDT inspection.



These unique AI applications are used by only one HPC business unit, reflecting specialised domain needs, advanced innovation, and differentiated capability across HPC.



**Thank You • Dankie • Ngiyabonga • Enkosi • Ngiyathokoza
Ke a leboga • Kea leboha • Ndi a livhuwa • Ndza khensa**

Driving Innovation, Performance & Development
Through Responsible AI

