KANSAS CITY NSC National Security Campus

managed by Honeywell FM&T

1949 ★ 2024

DIGITAL TRANSFORMATION WEBINAR: SMART FACTORY

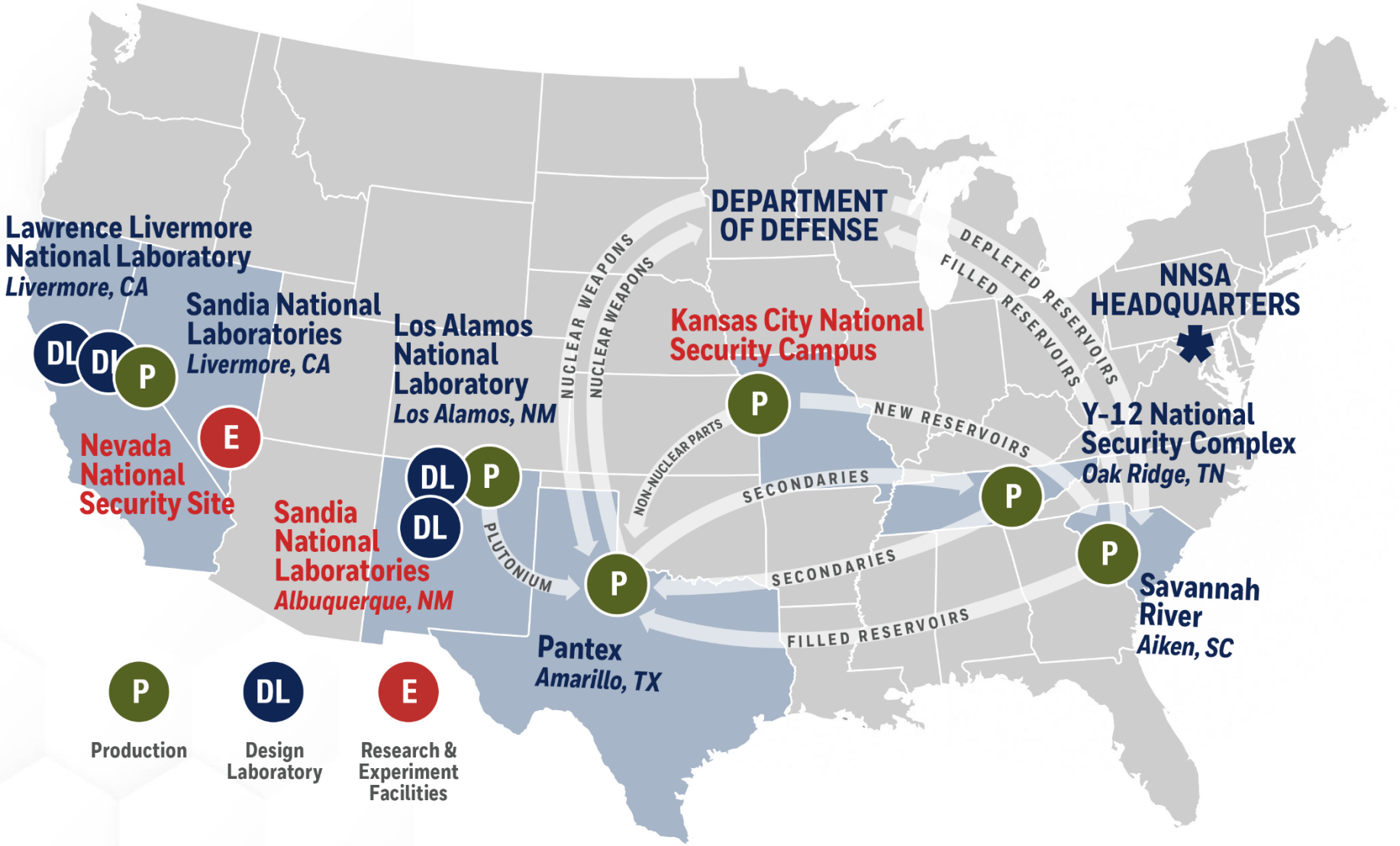
JUSTIN TALLEY, PHD

Senior Technical Manager
Advanced Manufacturing Engineering,
Integrated Supply Chain

Unlimited Unclassified Release / NSC-614-6405 / August 6, 2024

The Department of Energy's Kansas City National Security Campus is managed and operated by Honeywell Federal Manufacturing & Technologies, LLC under contract number DE-NA0002839

NUCLEAR SECURITY ENTERPRISE

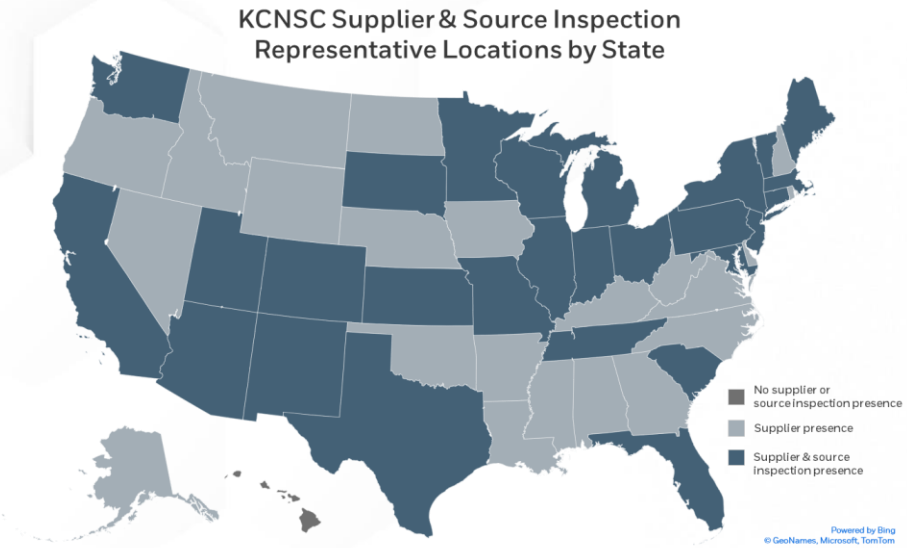


Honeywell's Presence

- **Honeywell Federal Solutions, Washington D.C. oversees:**
  - Kansas City National Security Campus
  - Nevada National Security Site
  - Sandia National Laboratories
  - Oak Ridge Reservation (DOE EM efforts)

KCNSC SUPPLY CHAIN

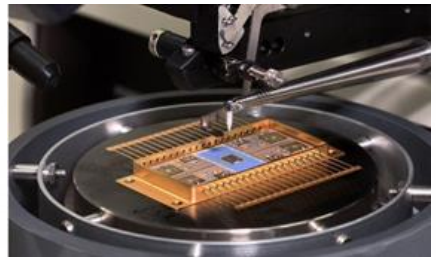
KCNSC's supply chain consists of the network between suppliers, manufacturing and customers



60 source inspectors supporting 28 states and growing

4,900+

Suppliers for procured material, equipment, services and supplies
311 qualified to supply production material



214,000

active part numbers (sku numbers) across 204 process technologies that are supported through both make and buy sourcing strategies.

7.6M

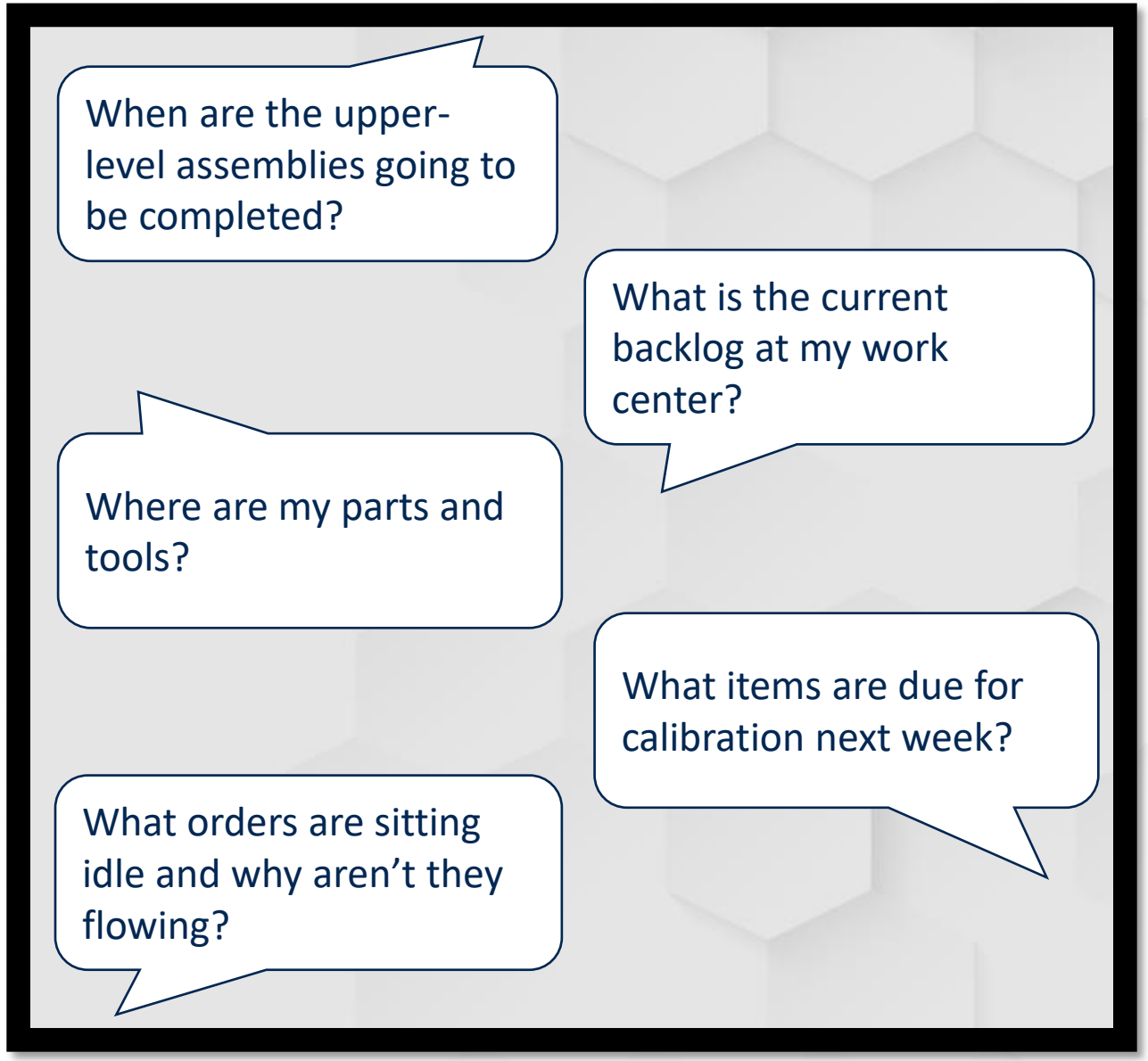
purchased product pieces accepted on 18,054 jobs with 248 inspectors

326,347

shipped parts in FY23, 303k for directive schedules.

FACTORY BY THE NUMBERS

- **30,000+ open work orders**
- **2,000+ work centers**
- **2M+ pending operations**
- **Complex multi-year components**
- **~7000 employees**
  - 5000 salary
  - 2000 represented
- **Three-shift operations**
- **Multi-site operations**
- **Multiple business systems used to manage production**



SMART FACTORY MODERNIZATION

VISION

To ADVANCE the KCNSC's manufacturing CAPABILITY to meet the national security needs of TOMORROW

MISSION

Deliver **SMART** SOLUTIONS to increase production CAPACITY in support of the NUCLEAR DETERRENT

PURSUIT

ENHANCED CONNECTIVITY
We empower our people with technologies and data integrations to improve manufacturing outcomes

INCREASED RESPONSIVENESS
We deliver on commitments by predicting needs and responding before impacts are realized

PERFORMANCE
We deliver more by optimizing existing capacity

IMPROVED

KANSAS CITY NSC National Security Campus

KCNSC SMART FACTORY IS …

Implementing state-of-the-industry tools in a secure production environment

Integrating data streams to accelerate and improve decision making processes

Delivering solutions to increase capacity on the production floor

Increasing value-add time by reducing manual processes

Platform for continuous improvement of factory operations

Addressing Challenges of High Mix, Low Volume, Secure Production Environment

EARLY RESULTS IN FIRST DEPARTMENT

- Decreased oldest Idle work order entry from ~4,000 days down to <100 days
- Tracking 2000+ work orders in the SF app; reducing time spent searching
- Reduced time to close NCRs and Holds; action owners name on persistent display
- 35% reduction in idle work orders; supervisors have better visibility to meet parts moving
- Leveraging accessibility of data on the production floor to accelerate the Q&A process
- Using the Work Order Priority app to communicate and successfully execute priority scope

Reducing time spent data mining, planning, and waiting by 1700 hours per month

SMART FACTORY REBOOT (SEPT 2022)

BEFORE		AFTER
Many	→	Concentrated
exploratory projects in work with localized implementations		**focus and implementation of high-impact technology in a targeted area/department**
Focus	→	Measurable
on proof of concept		**impact via existing operational performance metrics and baselines**
Tech. Pilot	→	Area Launch
improvements		**scale: successes across the factory**

Large Volume of Project Activity With Localized Value »
Down-selecting the Critical Few to Enable Broad Value Realization

SMART FACTORY DEPLOYMENT

FIRST LAUNCH: SEPT 2023

1 Department
Custom web app deployed providing production flow info

3 Persistent Displays
Real-time data displayed on the production floor

34 Part Tracking Kiosks
Physical location and priority of parts digitally tracked within 56k ft^2

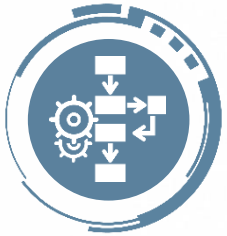
36 Machines Connected
Real time usage status and predictive maintenance needs identified

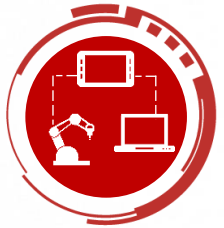
1 Tablet
Enable supervisor access to information on the floor

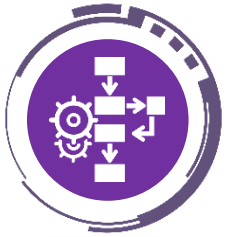
WORK IN PROGRESS: SEPT 2024


7 Depts


26 Displays


209 Kiosks

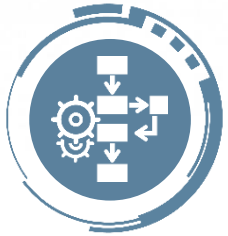

70+ Machines

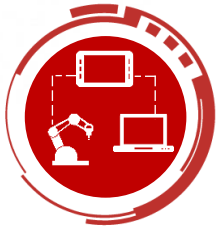

23 Tablets

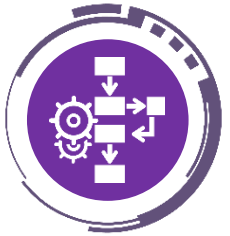
FUTURE: JUNE 2025


All Depts


50+ Displays


500 + Kiosks


100+ Machines


175+ Tablets

SMART FACTORY FOCUS AREAS

Smart Factory App

Persistent Displays & Part Tracking Kiosks

Wireless Tablets

Connected Machines

Data aggregation, real-time systems, & validation

Scalable tech stack, development and testing architecture

Lean manufacturing evaluations

Collaboration with numerous organizations

IT and physical infrastructure enhancements

Cybersecurity approvals

Machine status & predictive maintenance

Procurement, inventory mgt, install coordination

Training development and communications plan

CAPABILITIES

- **Integrated, verified, real-time data from core business systems**
- **WebApp built on scalable tech stack to support all departments**
- **Digital signage solution to display data 24/7 without user login**
- **Unclassified WiFi, Passive RFID, and Bluetooth (tablets, scanners, ballbar)**
- **IIoT software to manage machine data captured from variety of sensors**

Part Tracking Kiosk

Persistent Display

WiFi Supervisor Tablet

Fluid Analyzer

IIoT PLC Enclosure

Focused Implementation of Multiple Capabilities to Deliver Systemic Improvements

SMART FACTORY WEBAPP

TIER DASHBOARD

Live critical metric data for ISC Tier 1 and Tier 2

WORK ORDER ISSUES

Quickly understand and take action to address issues impacting product flow.

FACTORY MAP

Quickly identify location of parts/work orders and monitor department health.

PRODUCT FLOW

Indicates where action is needed to improve/meet delivery dates.

WORK ORDER TRACKER

Centralizes all Smart Factory data around a work order

PART TRACKING

Identify and/or track a part's physical location

WORK CENTER STATUS

Proactively manage work and respond to work center health issues.

WORK ORDER PRIORITY

Ensures the factory is working the right parts, at the right time

NCR TRACKER

Creates stickers and track physical location, integrated with Part Tracking and all data

SMART FACTORY BENEFITS

Create digital connection points across every production department in under 2 years

- Manufacturing departments will have awareness of each other
- Ability to track location of work orders anywhere in the factory
- Visible change, physical realization of Digital Transformation

Common, real-time, trusted toolset for the entire factory

- Addressing manufacturing floor needs with rapid solution mindset
- Single UI for production data to enable optimized planning and real-time decisions

Establish groundwork for NSE complex-wide Digital Thread and Digital Engineering

- Data collection, integration, and analytics required for the future is being matured in Smart Factory now

Estimated ROI of 400%+ based on early results of time savings from initial capabilities

- Multiple capabilities being implemented in FY25+ to drive ROI significantly higher

Rapid Digital Transformation is Possible

CAPABILITIES IN PROGRESS

WebApp Enhancements:

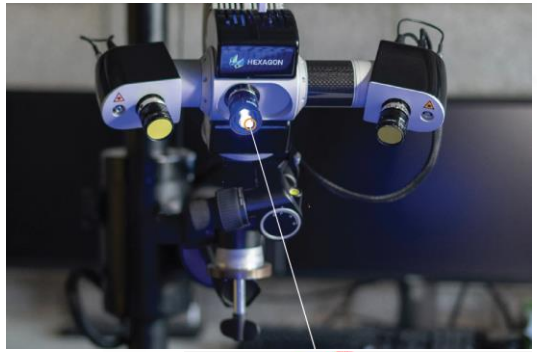
- Plan of the Day Tool, Predictive Modeling, Assembly Verification, Command Center, SPC visualization, …

Operational Assistants:

- Image analysis tools as visual inspection aids
- Structured light scanners to accelerate dimensional inspections
- Automated check of items/materials prior to use & create digital record
- Automated machine service tickets

Expanding Existing Capabilities:

- Unclassified WiFi tablets for all Supervisors in the factory
- Item tracking beyond work orders (tools, gages, fixtures, etc.)
- Vibration & temperature sensors for machine health monitoring



Smaller Wins Compounding Into Bigger Wins

LESSONS LEARNED

1. Need site level priority
2. Agile approach, factory is the customer
3. Solve systemic plant-wide problems
4. Use Lean principles before technology
5. Leverage COTS, address LA/VTR use
6. KCFO critical to success, many RA's
7. End state communicated to floor
8. Factory is embracing the solutions
9. Dedicated team focused in one dept
10. Architect for rapid improvements
11. Internal WebApp, COTS backend
12. Invest time in scalable tech stack
13. Do not underestimate data issues
14. Machine prioritization strategy
15. Communication with external partners
16. Machine connection strategy & ROI
17. Life cycle funding
18. Critical to monitor IT change plans
19. Some metrics/benefits take time
20. …

Smart Factory Playbook is Available for Other NSE Sites to Leverage

QUESTIONS?