



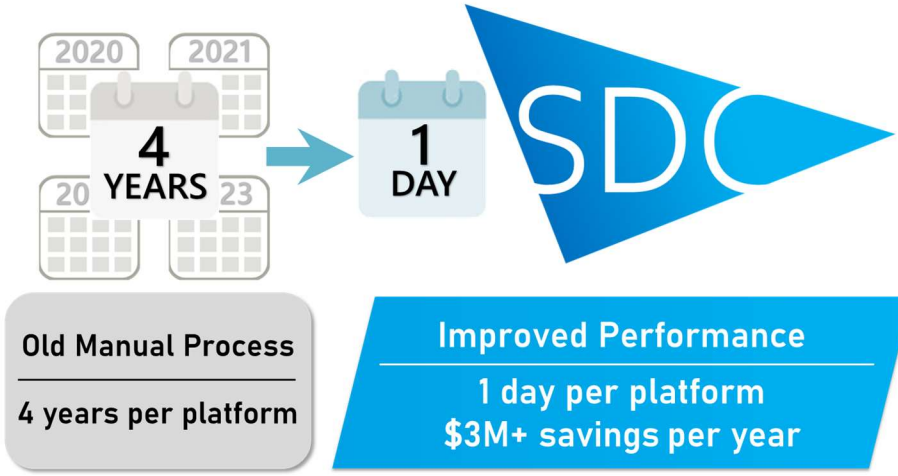
Smart Data Cleanser

Just-In-Time Maintenance Risk Discovery

Cybernet's Smart Data Cleanser (SDC) learning algorithm corrects coding errors in Air Force maintenance records and accomplishes in one day what previously took experts four years.

Work Unit Code (WUC) correction auto-filters generated by SDC now touch every C-130 and C-5 arriving at Robins AFB, and have saved est. \$3M+ annually in unscheduled maintenance and freed thousands of expert hours.

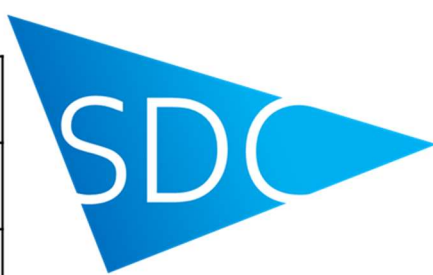
4 Years of Work in 1 Day



Enhanced Maintenance Data Analysis

Before

✘	11000
✘	11300
✘	11400
✘	24000
✘	46100



SDC uses machine learning to make corrections without expert input

After

✓	1154K
✓	11311
✓	1143T
✓	2413F
✓	4611C

SDC corrects record coding based on description in maintenance record

Maint. records miscoded to general categories do not support analysis

Automated Maintenance Code Correction

Encapsulates data cleansing expertise of a rare Subject-Matter Expert (Gerry Falen) and now outperforms experts in speed, quality, and quantity of filter generation.

White-box validation approach with human-readable filters keeps human in-the-loop.

Turn-key, cross-platform filter generation w/o expert input through platform agnostic approach. Corrects WUCs and extensible to codes like How Mal and Action Taken.



Smart Data Cleanser

Performance

Platform	Fewer Miscodings	Filtering Coverage	Filters Generated	Execution Time
C-5	15%	48%	15k	1 week
KC-135	18%	57%	26k	1.5 weeks
C-130	22%	64%	50k	2 weeks

430,000x faster than manually developing 4-5 filters a day for one platform over 4 years

Impact



C-5 SPO Benefit:

- 500 person hours saved annually in RA/MAP analysis filtering
- Enabled real time data cleansing to support Rapid response for 107's, 202's, TARS, and DR



KC-135 SPO Benefit:

- Cost avoidance of \$3.5M to develop their own systems from scratch
- No subject matter expert input required to generate filters



C-130 SPO Benefit:

- Eliminated need for manual cleansing, allowing redistribution of 600 person hours towards MECSIP related analysis
- Allowed further redistribution of analyst time towards pre-induction analysis

Specifications

Software: Version 3, continuously developed over the last 10 years. Java-based, leveraging Weka Machine Learning Library

Codes Corrected: Work Unit Codes, How Mal and Action Taken (FY'24)

Applicability: Currently applicable to 16+ Air Force platforms, and any platform with alphanumeric codes and text-based record descriptions

Current Users: AFLCMC-RSO's Condition Based Maintenance Plus (CBM+) Program Office, Robins AFB C-130 and C-5 SPO. Data cleaning tool MDM embedded in RSO's PANDA platform was created to execute code correction filters generated by SDC.

Data Cleansing Stages and Filter Types: Seven stages, Ten types

Filtering / Filter Generation Speed: 43.2k records/hour avg.

Filters Generated: 7.5k filters per 1M records avg.

Correction Rate: Corrects 12% of miscodings avg.

Coverage Rate: Scrubs 56% of records avg.

Tools Included: Maintenance Record Explorer V3

“Revolutionary for managing legacy USAF maintenance data”

-Section Chief, AFLCMC/WLNEB, C-130 Hercules Division Structures and Integrity Engineering

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