AUXIL
FLEET MANAGEMENT SYSTEM

Mining production and maintenance teams require reliable data and reporting tools.

Mining Art developed AUXIL as a cost-effective solution aiming to overcome a lack of:

- production data and no real-time control on field equipment.
- proper communication between field and office personnel.
- historical information and reporting for effective production decisions.

Primary collected data:

- Time Usage Metrics – Availability, Use of Availability, Utilization with the detailed information about each delay or down event.
- Production cycles with performance metrics (hang, queue, spot, load, etc) and detailed context – material, grade, operators, loading/dumping locations, etc.
- GPS position and traveled distances.
- Fuel consumption.
- Engine hours.
- Tires usage.

However, Fleet Management System (FMS) main goal is to make any production transparent by realible data, AUXIL provides modules to improve real-time control and operation –

- Dynamic task assignments.
- Fueling/Shiftchange optimization.
- Material Blending.
- Pre-start checklists.
- Components tracking.
- Machine guidance for drills and shovels with high-precision navigation.

AUXIL integrates with onboard equipment controllers (VIMS, VHMS, Cense, Contronics, RCS, etc) to further extend data analysis and improve real-time control and automation.
Tire pressure measurement system integration is also supported.

AUXIL uses a serially produced onboard computer (Advantech, Ruggon, Winmate, Nexcom) that can be easily purchased and supported all around the world. Computer allows not only to connect any industrial interface (CAN, COM, J1939, DI) to collect information from onboard telemetry controllers, but also supports various types of wireless communication: LTE, WIFI, Bluetooth. Integrated NFC reader simplifies operator registration on equipment.

AUXIL enables safer production by the equipment speed, operator fatigue and restricted area control modules.

Key Product Benefits

- From-the-shelf hardware with OEM 2 year warranty that simplifies the original purchase and further support. We encourage our customers to procure onboard computers for the project themselves.

- AUXIL is developed on technologies (Javascript, Python) that allow fast and efficient system adoption to the mine needs. AUXIL code is open for customizations.

- Web-based applications for both field and office personnel.

- APIs to integrate with other mine systems.

- Low requirements for server infrastructure and no need for 3rd party auxilary licences.

- All-in-cost per unit including hardware, software licenses and all project services is **5000 - 6000 $** depending on the final scope. Estimation calculated for 30 unit project;

- Technical support – no recurring services fees. Mine pays for the completed support activities based on hourly rates.

MINING ART

EQUIPMENT OPERATOR GUI

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Onboard AUXIL application enables interaction between equipment operator and Central. GUI is highly customizable to meet any customer requirements.

Operator	Hüseyin Han	**SOS**
Equipment	47-122	8:08
State	READY from 7:56 (13 min.)	Cycles:0
Reason	Üretim	
GPS:	Speed 0.03 km/h	
Fueling 997l.	**Weight** 100 t.	
Tires pressure	126 127	
	128 132 127 127	●

Menu	Full	At: 46-201
		In:3 min. empty

Real time	State	Exit
Reports	Messages	Map
Enghrs	Prestart	Spillage
Settings		

...eed 0.04 km/h

...ight   124 t.

Tires pressure	126 127	
	128 132 127 127	●

Menu	Full	At: 46-201
		In:2 min. empty

19:03
Cycles:21

Time Login ▾	Operator	First Load	Las...
2020-11-11 08:50:40	Трохим Виктор Вячеславович	2020-11-11 09:05:30	2020-11-11 18:58:28

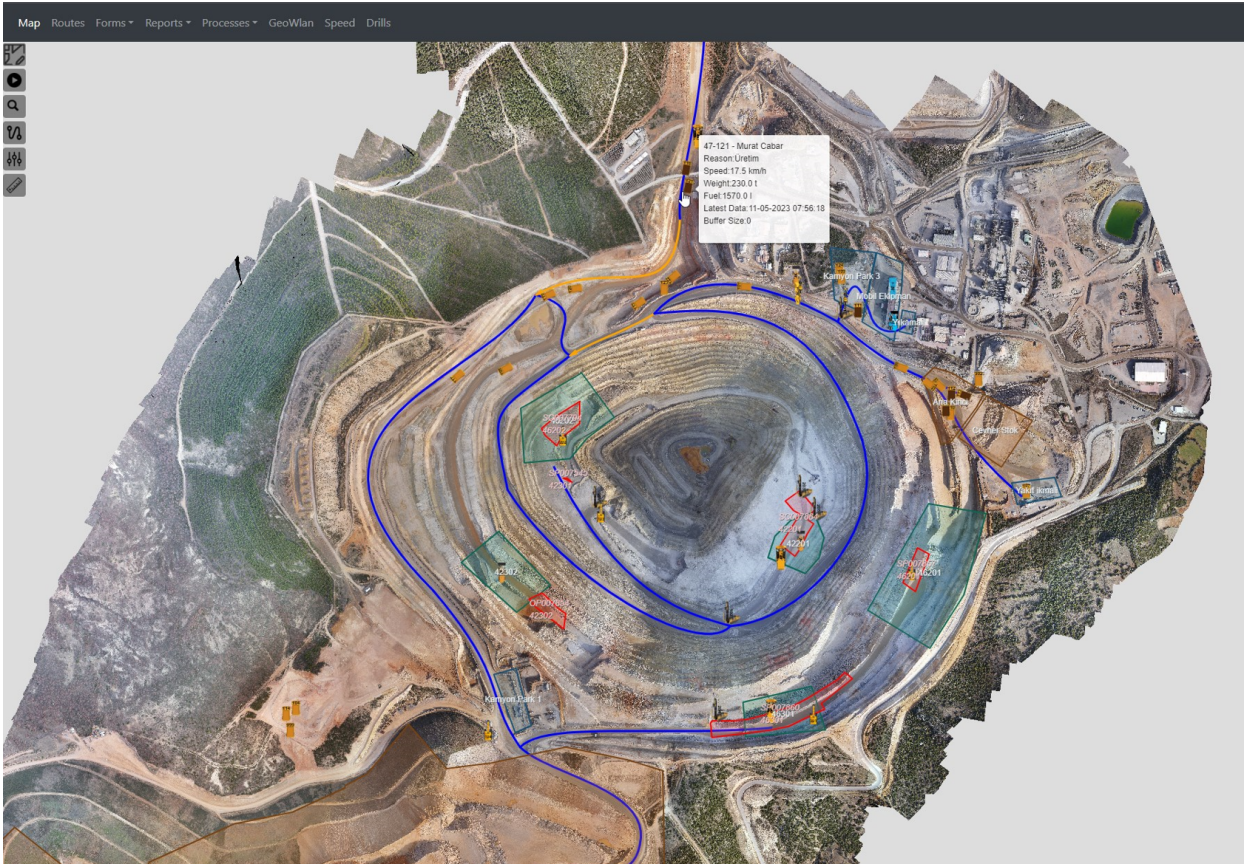| CYCLES	Status Data Quality, %	Cycles Data Quality, %
21	100	100

Routes			Cycles		
Shov	Dump	Cycles	Shov	Dump	Cycles
11	КМС.Отвал 2	8	50	КМС.Отвал 2	4
11	Мастерская	1			
4	КМС.ПП.2	5			

Menu	First Bucket	At: 50
		In: 4 m.

CENTRAL APPLICATIONS

AUXIL provides 2 primary applications for dispatcher – **PitMap** and **PitRoute**
PitMap represents current mine configuration where dispatcher defines loading/dumping locations, road network, polygons for objects and tracks current equipment position and state.

PitRoute represents the current state of all equipment in a schematic way in accordance with the production cycle. Together with PitMap it allows to effectively control and manage mine operation.

REPORTING

AUXIL has integrated web-based reporting with a set of standard reports. System is open for new reports development as well as integration with other mine reporting tools or BI systems.

Shovels productivity by shift hour

Shovel	Ore,t	Waste, t	Total, t ▾	1	2	3	4	5	6	7	8	9	10	11	12
8	0	9175	9175	1735	2611	2867	1962	-	-	-	-	-	-	-	-
1	0	8494	8494	1894	2264	2265	2071	-	-	-	-	-	-	-	-
7	0	7410	7410	1835	1779	2151	1469	176	-	-	-	-	-	-	-
2	0	6733	6733	1851	2359	1975	548	-	-	-	-	-	-	-	-
3-92	4539	415	4954	1072	1067	1597	1218	-	-	-	-	-	-	-	-
42	401	2116	2517	805	663	654	395	-	-	-	-	-	-	-	-
36	1948	0	1948	525	509	386	528	-	-	-	-	-	-	-	-
40	0	1617	1617	683	807	-	127	-	-	-	-	-	-	-	-

Shift
2020-11-12 08:00

Current Time
12:17:56

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