

EXEBENUS

▀ PULSE

Release Notes

With the Exeбенus Pulse 1.5 release, Exeбенus remains committed to increasing productive time while reducing nonproductive and invisible lost time during drilling and completions operations. The Exeбенus Pulse Run module, the main feature of this release, is a paradigm shift in the recognition, validation and tracking of operating procedures, permitting the driller to focus on the execution itself.

Automatic activity and time tracking redefine performance execution and monitoring

Because Exeбенus Pulse digital procedures connect to the real-time data stream, activity tasks are automatically recognized and validated, making procedure tracking easy and simple. Deviations from plan are automatically flagged and nonconformance is recorded. Insights and comments added by the rig crew as the procedures are being executed become available for future consideration as lessons learned or best practices. Checks and risks are manually checked off using a tablet at the rig site, and the monitoring center can review deviations, update procedures and issue updates as required.

The activity timeline, including planned, start, end and idle time, is automatically recorded as the procedure is executed and is instantly made available for daily drilling reports (DDR) and after-action reviews (AAR). This effectively removes potential errors in manually noted records. Insights into the cause of invisible lost time can be highlighted and explained. Team comments made during operations are available for continuous improvement routines. Insights can be detailed and shared globally or locally depending on the severity or applicability of the situation.

What's new in brief

FEATURE	SHORT DESCRIPTION
Automatic activity recognition	<ul style="list-style-type: none"> Tracking of operating activities such as drilling, reaming, back-reaming, tripping-in, tripping-out when connected to WITSML/real-time data stream Users can view and follow procedure execution as it goes step-by-step Notifications show when deviating from planned activities and operating limitations Explanations and comments can be added during operation
Manual start/stop/skip of custom procedure	User can choose to start/stop/skip a procedure step
Automatic time and depth log	<ul style="list-style-type: none"> Overview table shows all operation times and depths Automatic time tracking of start/end time for procedure steps and functions is based on real-time sensor data Automatic calculation of idle time Notifications are shown Alarm messages are listed
Comments log	<ul style="list-style-type: none"> Fast access and overview of all communication All communication between project team members is recorded and time stamped, showing procedure mode. Comments can be added to a procedure in all states, including Active and As Run Traceability of activities
Alarm log	A log showing all alarms, including their date, type, time, depth, message, and level (severity)
Operations tab	<ul style="list-style-type: none"> Procedure management relative to event and phase, wellbore, well section and hole size Drag & drop, filtering and search functions Overview of procedures, their status (mode) and completeness Only procedures permitted relative to user's permissions are visible
Customized PDF output	Customizable to include company logo, BHA/toolstring, and well schematic

Procedure template	<ul style="list-style-type: none">• Generate a procedure for the next well using an As Run procedure from a similar well• Create a new template from any procedure using the copy icon• All information in the approved procedure, except local insights and comments, are copied• Draft procedures automatically inherit updates of the latest information from the Exebenus Pulse Library, e.g. new insights that match the assignments in the draft
Ad-hoc procedure function	<ul style="list-style-type: none">• Add ad-hoc functions to a procedure while in Active mode• Rig crew can track operational changes on-the-go and swiftly manage upcoming deviations
Lessons learned	Add lessons learned during operation (Active/As Run procedure) for the daily drilling report (DDR) and after-action activity review, trackability and reporting
Administration setup	<ul style="list-style-type: none">• New tools to manage user's access and permissions• Flexible setup for groups, positions and users to limit access and permissions

Release highlights

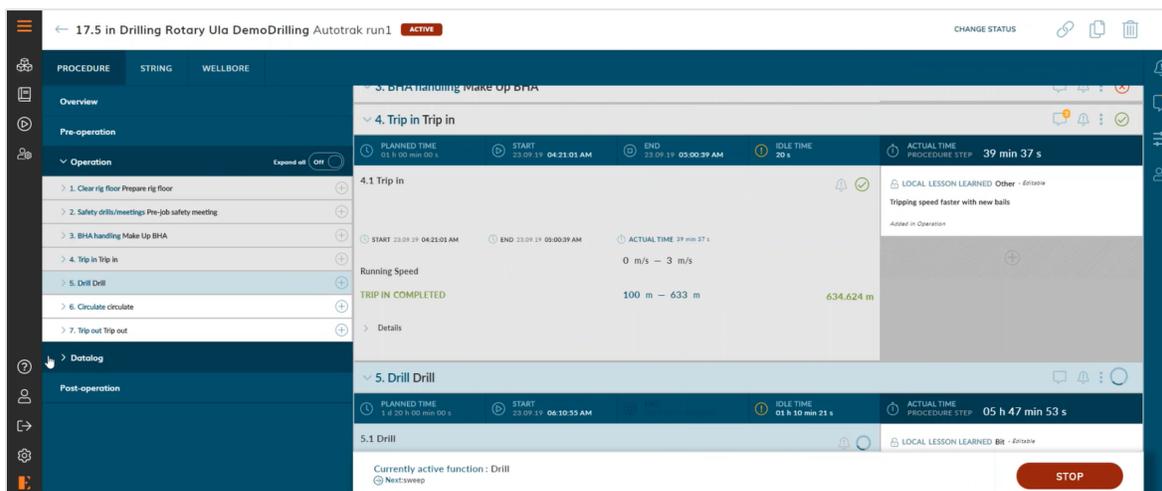
Automatic activity validation and tracking

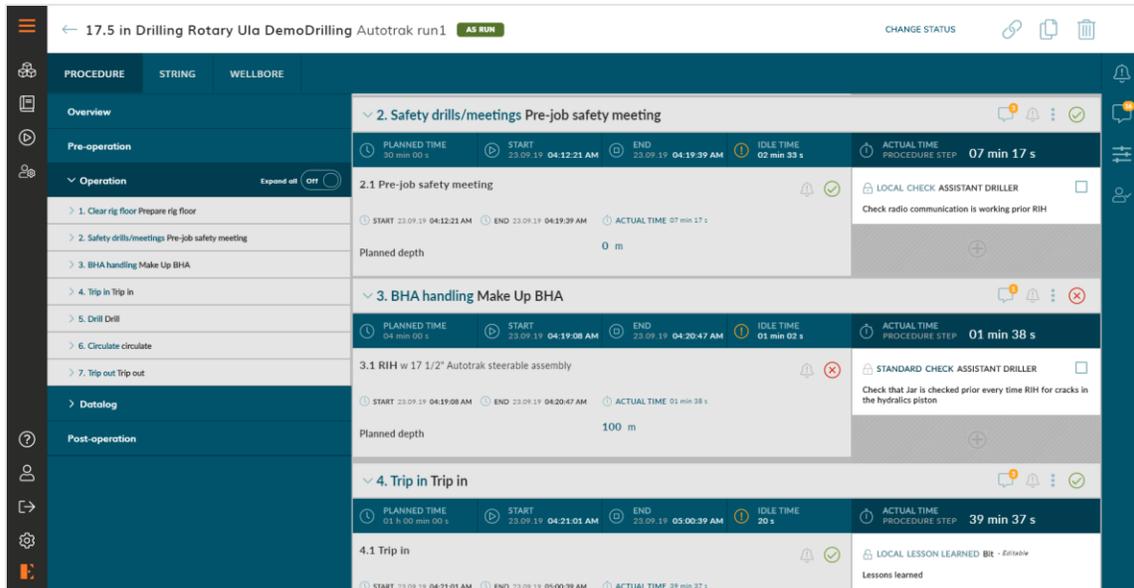
An Exebenus Pulse procedure is truly digitalized, which means the tool, its activities, parameters and tasks are defined and connected in unique relationships. With the real-time data feed, the Exebenus Pulse Run module applies the structure and connections provided in the digitalization to recognize, validate and track the procedure steps.

WARNINGS/ALARMS	EXPLANATION
Successful	The action was performed as described within the boundaries provided
Deviation within [operating] limits	The action was performed with deviations, but within the operational, task and function limits provided. Additionally, a severity warning is issued – low, medium, high.
Unsuccessful/terminated	The action was not performed or not completed, e.g. tripping-in terminated. An alarm is issued alongside the procedure step. Additionally, a severity warning is issued – low, medium, high.

ON-THE-GO AD-HOC FUNCTION ADDITION

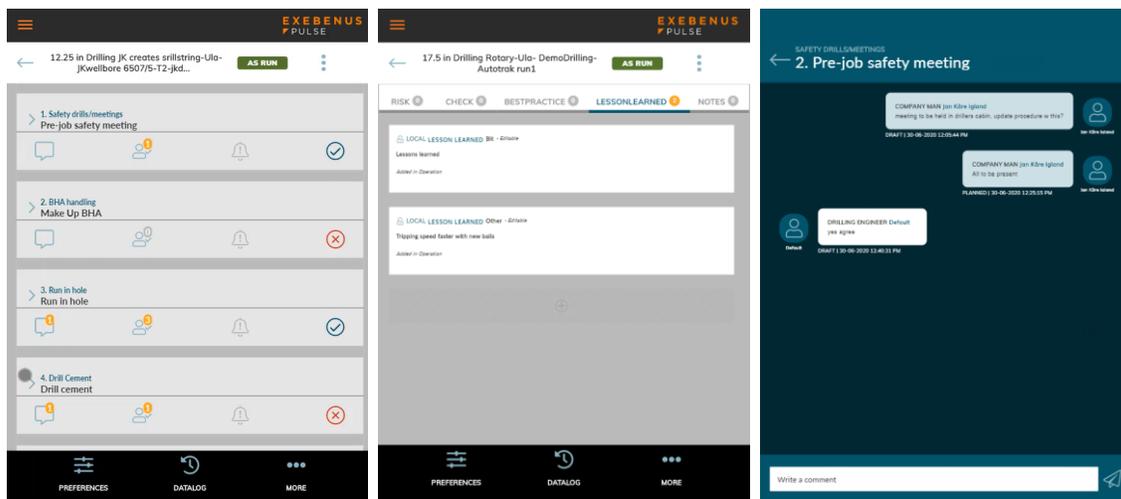
The user can flag the instance with a comment for later review or notification to the team. An ad-hoc function can be added to a procedure step, available for immediate action and tracking. If a contingency procedure is prepared, it will show in the procedure step. The crew can activate it and continue operations without further delay.





TABLET VIEW FOR RIG CREW

The rig crew can activate and track the operating procedures on a table. Since the tablet format is smaller than the PC format, the information is compressed, however the functionality is the same.



COMBINING AUTOMATIC AND MANUAL TRACKING

In execution, manual interventions are frequent in pre-operation when managing checklists, during operation while making up tools, and in post-operation when closing out risks and checklists. Exebenus Pulse allows a mix of manual and automatic tracking of procedures.

Some tasks still require manual actions. As in social media, Exebenus Pulse tags unstructured information, such as checks, risks and lessons learned, to structured procedures, making it accessible and available at relevant times to improve performance.

Automatic activity tracking in combination with manual tracking – start/stop/skip procedure step – allows personnel to be in control of the operation and brings performance monitoring to a new level.

Smart, automated logging of time and communication

Smart, automated activity logging and tracking of planned, actual (start and end) and idle time as the procedure steps are executed facilitate efficient operations management, DDR and AAR reporting. By viewing planned and actual activities and their times side-by-side, it is easy to validate the accuracy of the planned procedure's timetable, see the impact of deviations on the plan, and recognize and acknowledge potential lessons learned and changes to performance for future operations.

Operation	Start	Stop	Planned Time	Actual Time	Idle Time	Planned Depth	Actual Depth	More
2. Pre-job safety meeting	23.09.19 04:12:21 AM	23.09.19 04:19:39 AM	30 min 00 s	04d 00:07:17s	+0d 00:02:33s			
2.1 Pre-job safety meeting	23.09.19 04:12:21 AM	23.09.19 04:19:39 AM		07 min 17 s		0 m	0 305 m - 27.615 m	
3. Make Up BHA	23.09.19 04:19:08 AM	23.09.19 04:20:47 AM	04 min 00 s	04d 00:01:38s	+0d 00:01:03s			
3.1 RH	23.09.19 04:19:08 AM	23.09.19 04:20:47 AM		01 min 38 s		100 m	27.615 m - 27.371 m	
Lower block				0 d 0 h 0 min 0 s			27.615 m	
Keep block position steady	23.09.19 04:19:08 AM	23.09.19 04:20:47 AM		01 min 39 s			27.615 m - 27.371 m	
4. Trip in	23.09.19 04:21:01 AM	23.09.19 05:00:39 AM	01 h 00 min 00 s	04d 00:39:37s	+0d 00:00:20s			
4.1 Trip in	23.09.19 04:21:01 AM	23.09.19 05:00:39 AM		39 min 37 s		100 m - 633 m	27.371 m - 634.624 m	
5. Drill	23.09.19 06:10:55 AM		1 d 20 h 00 min 00 s	04d 01:54:14s	+0d 01:10:21s			
5.1 One	23.09.19 06:10:55 AM			01 h 54 min 14 s		633 m - 2008 m	674.858 m	
6. circulate			30 min 00 s	0 d 0 h 0 min 0 s	+0 d 0 h 0 min 0 s			

The Exebenus Pulse Comments log provides an overview of all communication between the rig crew, service personnel and office team, capturing operational insights and greatly simplifying and improving understanding of what took place during hazardous or unplanned events for reporting and KPI tracking.

Date	Commented On	Commented By	Sub-Level	Comment	Status
30.06.20 10:53:27 AM	PROCEDURESTEPTYPE	Default	Trip in	test trip in comment	ACTIVE
30.06.20 10:53:05 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	Trip in	Trip in started - to slow?	ACTIVE
30.06.20 10:52:38 AM	PROCEDURESTEPTYPE	Default	Clear rig floor	okay for Active	ACTIVE
30.06.20 10:44:07 AM	PROCEDURESTEPTYPE	Default	Clear rig floor	okay after refresh	APPROVED
30.06.20 10:42:33 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	BHA handling	OK to make up	APPROVED
30.06.20 10:42:18 AM	PROCEDURESTEPTYPE	Default	Clear rig floor	okay	DRAFT
30.06.20 10:40:45 AM	PROCEDURESTEPTYPE	Default	Clear rig floor	yes agree	DRAFT
30.06.20 10:40:31 AM	PROCEDURESTEPTYPE	Default	Safety drills/meetings	yes agree	DRAFT
30.06.20 10:25:15 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	Safety drills/meetings	All to be present	PLANNED
30.06.20 10:21:21 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	Clear rig floor	Ok to clear rig floor prior meeting	PLANNED
30.06.20 10:06:34 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	Trip in	Validate running speed	DRAFT
30.06.20 10:05:44 AM	PROCEDURESTEPTYPE	Jan Kåre Iglund	Safety drills/meetings	meeting to be held in drillers cabin, update proc...	DRAFT

Flexible setup to manage users and their permissions

To accommodate the various organizations that companies put in place to manage their 24/7 operations, Exebenus Pulse has exceptionally flexible and easy user management with respect to roles, responsibilities and permissions. During operations, the administrator can add, delete and modify the organizational setup to accommodate changes.

Administration management ensures that service companies are treated according to contractual obligations and that the various companies are protected as needed.

The screenshot shows the 'Administration' group management page. The header includes a back arrow, the group name 'Administration', a world map icon, and fields for 'Region' (Undefined), 'Status' (Active Group), and 'Rig' (Undefined). The main content is divided into three sections:

- GROUP DESCRIPTION:** A text field containing 'Administrators' with an edit icon.
- NUMBER OF APPROVER POSITIONS:** A visual indicator showing 0 positions, with a note '0 Approver Positions' and 'Min 1 and max 6 positions'. Below are icons for 1 through 6 positions.
- GROUP POSITIONS:** A table listing positions and the number of users in each group.

Position	Users in group
Approvers (for testing)	1
Company Man	1
Default Position	4
Drilling Engineer	0
System Administrator	0
- GROUP MEMBERS:** A table listing individual users with their usernames, positions, and user statuses.

Username	Position	User Status
Agnar Kordt	Default Position	Inactive
ak user	Default Position	Inactive
akshay	Default Position	Inactive
Alexander	Default Position	Active
Anne Siw	Approvers (for testing)	Active
Jan Kåre Igländ	Company Man	Active

The screenshot shows the user management page for 'Jan Kåre Igländ Igländ'. The header includes a back arrow, the user name, a world map icon, and fields for 'Organization' (Exebenus), 'Status' (Active User), and 'Email' (jki@exebenus.com). The main content is divided into three sections:

- USER CREDENTIALS:** Fields for 'Username' (jki@exebenus.com), 'Password', and 'Expire Date' (Never).
- USER POSITIONS:** A table listing positions and the user's status in each group.

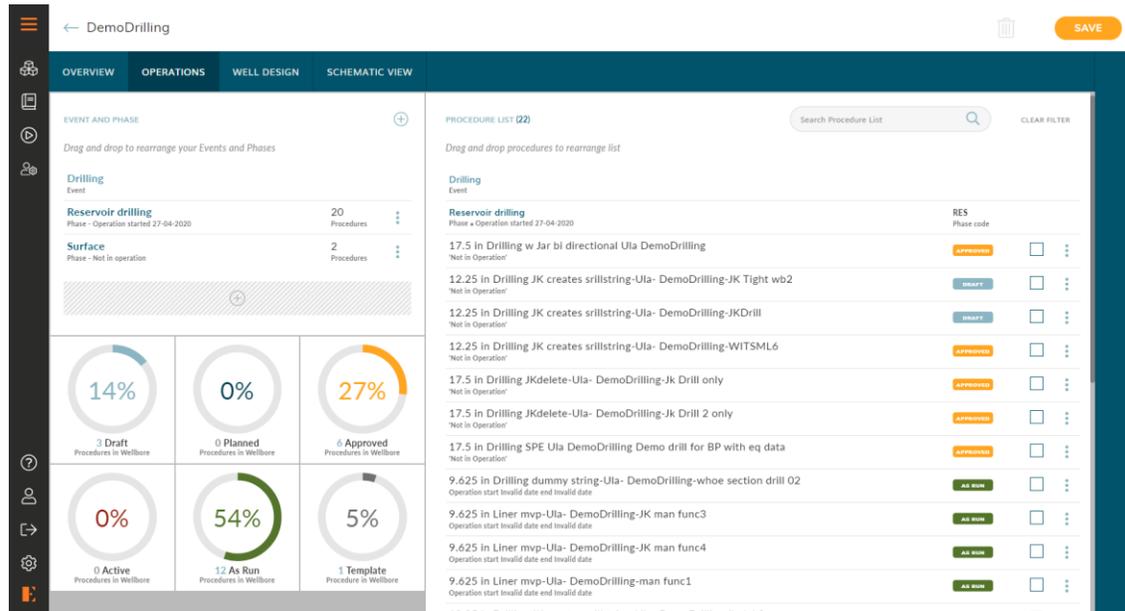
Position	User Status
Approvers (for testing)	Default Position
Company Man	Position
Default Position	Position
Driller	Position
Drilling supervisor	Position
System Administrator	Position
- USER GROUPS:** A table listing groups and the user's position and status within each group.

Group name	Position in group	Group Status
Administration	Company Man	Active
PDF test group	Driller	Active
Stines test group	Company Man	Active
Stines test group	Driller	Active
Thight wb group jk	Company Man	Active

Easy access to events and phases in Operations tab

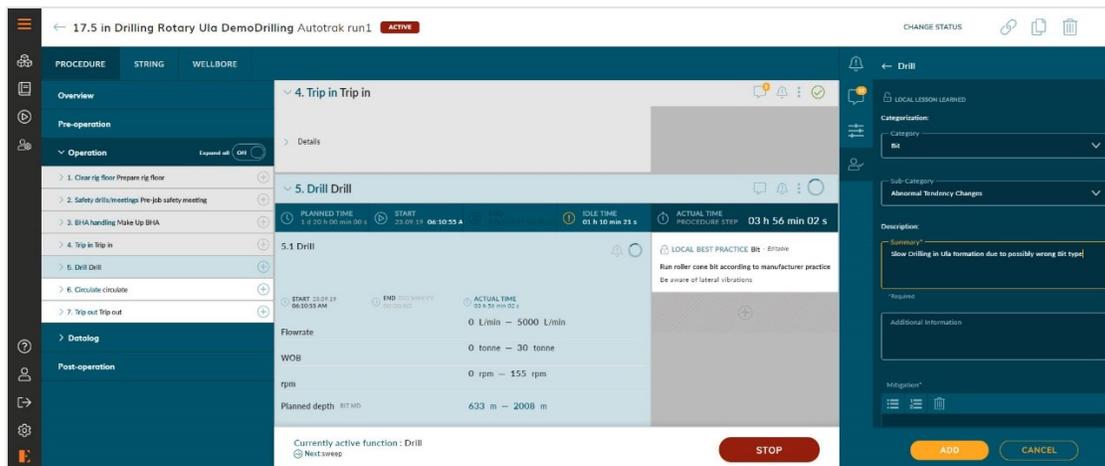
Exebenus Pulse release 1.5 introduces a new Operations tab. The tab gives the user an overview of a wellbore with respect to events, phases and procedure completeness, in addition to the familiar procedure listing.

The user has multiple filtering alternatives for browsing the available operating procedures and for getting a quick overview of the wellbore status.



Adding lessons learned in Active and As Run mode

The ability to add lessons learned is now available for procedures in Active and As Run mode, making it easier for the rig crew to quickly record their experiences as they occur. It also makes it simpler to prepare for reviews and to potentially elevate experiences to global lessons learned.



Customization of PDF export

Even though the Exeбенus Pulse procedures are available digitally on PCs and tablets, a PDF version of the procedure is easy to create.

The Exeбенus Pulse PDF procedures can be customized by the administrator to reflect the corporate standard:

- With/without company logo
- With/without BHA/toolstring drawing
- With/without well schematics

FIELD	Ula	PHASE	Reservoir drilling	
	APPROVED			
17.5 in Drilling Rotary-Ula- DemoDrilling-Autotrak run2				
RIG	test12	SECTION	17.5 (in)section Open hole	
WELL	DemoDrilling	OPERATION TYPE	Drilling	
WELLBORE	DemoDrilling	STATUS	Approved	
APPROVED BY		1-07-2020		
COMPANY MAN Jan Kåre Igland Igland				
STATUS				
<ul style="list-style-type: none"> • 13-3/8" Float Collar Depth: xxxx m • 13-3/8" Casing Shoe Depth: 1044 m. • Fluid in well: seawater. • 18-3/4 BOP pressure tested on stump to 240 bar • BOP Configuration: Annular – UPR (9-5/8" Casing Rams) – BSR – MPR (3-1/2" x 7-5/8" VBR) – LPR (5-1/2" Fixed Rams). 				
OBJECTIVES				
<ul style="list-style-type: none"> • Drill 17-1/2" Hole to Final TD at ± 2008 m MDDF. • TD Criteria: 4 m TVD above GWC (2012m TVDSS) 				
OPERATIONAL CONSTRAINTS				
PARAMETERS	MIN LIMIT	MAX LIMIT	UOM	COMMENTS
ECD	1	2	sg	
Flowrate (mud pumps)	0	5000	L/min	
Hookload	30	150	tonne	
Stand Pipe Pressure	0	200	bar	
RPM	0	200	rpm	
Running Speed	0	3	m/s	

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