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Report

CODAC Core System Version 7.0 Release Notes

This note is a supplementary document for CODAC Core System (CCS) to provide users with information on the changes introduced with the release of the CCS 7.0 version.

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Change Log

CODAC Core System Version 7.0 Release Notes (7GEYSS)

<i>Version</i>	<i>Latest Status</i>	<i>Issue Date</i>	<i>Description of Change</i>
v0.0	In Work	02 Mar 2022	
v1.0	Approved	15 Mar 2022	First upload.

CODAC CORE SYSTEM VERSION 7.0 RELEASE NOTES

[ITER_D_7GEYSS](#)

This note is a supplementary document for the CODAC Core System (CCS) to provide users with information on the changes introduced with the release of the CCS 7.0.0 version.

Additions for CCS 7.0.0 are kept in separate, clearly marked paragraphs; new version numbers in tables are underlined or in **bold** typeface.

See **warnings** in these notes for changes that may have a significant impact on existing I&C applications. Those that are present since previous versions are indicated with a **reminder**.

This document is complemented with on-line information that is available at the [CODAC Core System Community Pages](#) that provides the CCS users with the up-to-date status of:

- The [documentation](#)
- The [changes](#) introduced in each components (improvements and bug fixes)
- The [known issues](#) in the 7.0.0 version
- The [roadmap](#)
- The [training](#) material, which will be updated for hands-on workshops.

Warning I&C projects developed with a previous versions of CCS shall be migrated following the instructions available in the [CODAC Core System Migration Guide \(7JCFUD\)](#).

Main changes in CCS 7.0.0

1. The base system has been updated to Red Hat Enterprise Linux 8.5, a new major version.
Migrating existing machines will need a re-installation.
2. The Control System Studio suite has been upgraded to version 4.8.0, which allows signing both logbook entries and shifts.
3. All EPICS IOCs have the QSRV server for the pvAccess protocol linked in and enabled. This will also apply to migrated projects.
4. The OPC UA Device Support has been updated to version 0.9.2, supporting OPC UA Security features.

COMPONENTS UPDATE

	Components	6.0	6.1	6.2	6.3	7.0.0
<u>Operating System</u>	RHEL	7.4	7.4	7.4	7.4	8.5
<u>EPICS</u>	EPICS Base	7.0.1	7.0.2	7.0.3.1	7.0.4.1	7.0.6.1
	EPICS Base Java				7.0.6	7.0.7
<u>Shared Units</u>	Java	1.8.0	1.8.0	11.0.3	11.0.3	<u>11.0.13</u>
	Eclipse	4.6.3	4.7.3	4.11.0	4.16.0	4.20.0
	PostgreSQL	9.6.2	10.5	10.5	10.5	12.9
	Tomcat	8.5.13	8.5.13	8.5.13	8.5.13	9.0.46
	Firefox	52.3.0	52.3.0	52.3.0	52.3.0	91.4.0
<u>Control System Studio</u>	CS-Studio	4.5.2	4.6.202	<u>4.6.310</u>	4.7.802	4.8.0
<u>Self Description Data</u>	SDD tools	6.0	6.1.2	6.2.1	6.3.1	6.4.0
<u>Maven Tools</u>	Maven tools	6.0	6.1.2	6.2.0	<u>6.2.1</u>	6.2.1
<u>Health Monitoring</u>	Health Mon	1.7	2.0	2.0.1	2.0.1	2.0.1
<u>PLC Driver</u>	S7PLC ASYN	1.5	1.6	<u>1.6.1</u>	<u>1.6.2</u>	1.6.2
	SPSS (300/1500)	3.4/1.0	3.5/1.1	3.6/1.1	3.6/1.1	3.6/1.1
<u>TCN Support</u>	TCN API	3.3.0	<u>3.3.1</u>	3.3.2	3.3.2	3.3.2
	TCNd	5.2.0	<u>5.2.3</u>	5.2.3	5.2.3	5.2.3
	Unified PTPd	1.1	1.2.1	1.2.1	1.2.1	1.2.1
<u>SDN Support</u>	SDN API ¹	2.2.0	2.2.0	2.2.0	2.2.0	2.2.0
	SDN Archiver	1.1.0	1.2.0	<u>1.2.1</u>	1.2.1	1.2.1
<u>DAN Support</u>	DAN API	3.1.0	3.2.1	<u>3.2.3</u>	<u>3.2.4</u>	3.2.4
<u>Logging Library</u>	LOG API	1.3.4	<u>1.3.7</u>	1.3.7	1.3.7	1.3.7
<u>NI Sync</u>	NI SYNC	2.2.0	<u>2.2.1</u>	2.2.1	2.2.1	2.3.0
	NI SYNC EPICS	2.1.2	2.1.2	2.1.2	2.1.2	2.1.2
<u>PXI-6259</u>	PXI-6259	2.5.1	<u>2.5.3</u>	2.5.3	2.5.3	2.6.1
	PXI-6259 EPICS	2.6.1	2.6.1	<u>2.6.2</u>	<u>2.6.3</u>	2.6.3
<u>PXI-6528</u>	PXI-6528	1.3.1	1.3.1	<u>1.3.2</u>	1.3.2	1.4.0
	PXI-6528 EPICS	1.3.4	1.3.4	1.3.4	1.3.4	1.3.4
<u>PXIe-6368 / PXIe-6363</u>	PXIe-6368	3.0.0	3.0.0	<u>3.0.1</u>	3.0.1	3.1.0
	PXIe-6368 EPICS	1.5.0	1.6.1	1.6.1	<u>1.6.2</u>	1.6.2
<u>NI RIO</u>	NI RIO	2.1.0	<u>2.1.1</u>	2.1.1	2.1.1	3.1.0
	IRIO EPICS	1.1.2	1.1.2	1.1.2	1.1.2	1.1.2
<u>OPC UA</u>	OPC UA Support	p0.9.2	0.5.1	<u>0.5.2</u>	0.9.2	0.9.2
	OPC UA library	1.5.5	1.5.5	1.5.5	1.5.5	1.7.4

Legend **Bold:** new version (major/minor) – Underlined: new version (bugfix)

¹ Although still used by the SDD generated programs, the templated SDN API will eventually become deprecated in favour of the SDN Core library. For all new developments, it is recommended to use the SDN Core library.

1 Operating System

The RHEL version is RHEL 8.5.

The Linux kernel version is 4.18.0-348:

- 4.18.0-348.7.1 for the default installation
- 4.18.0-348.7.1.rt7.137 for the RT enhanced installation (MRG-R).

Major Changes:

- Package management is done by DNF (YUMv4). The “yum” command provides compatibility with the traditional YUMv3 command line interface.
- The system provided Python version is Python 3.6 (up from 2.7 under RHEL 7). There is no default “python” command anymore.
- The default display server is “Wayland” used by Gnome Display Manager. The classical X-Server is still provided.
- The default network packet filtering (firewall) uses “nftables”, which has replaced the earlier “iptables” framework. By default, CCS does not use the Linux firewall.

2 Installation Tools

Main enhancements:

14294	Installation Tools	Provide more informative error message if codac-initialize fails to register the system
13681	Installation Tools	Provide codac-subscription-manager tool to allow organization level management of the Satellite server subscriptions

Main bug fixes:

13854	Installation Tools	Installation Tools Registration fails with "Multiple activation keys found for X organization" error message
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3 CODAC Packaging and OS Integration

Main enhancements:

14255	Packaging	Provide common package for realtime systems
13839	Packaging	Generic CCS user accounts should be created in a standalone and optional package
13604	Packaging	Default spec file package should be made optional
12296	Packaging	Logging of codac-configure activity

Main bug fixes:

14264	Packaging	CODAC packages must not be created with "autoprov" rpm build feature
14453	Packaging	codac-configure produces error message "command not found" for dan sdn and ten configure
14283	Packaging	codac-configure fails if /etc/codac/networks file is missing
10642	Packaging	Eclipse applications report unsupported password stores error

4 EPICS

CODAC Core System uses EPICS 7. It comprises the modules previously versioned as EPICS Base 3 (3.15.5 in CCS 5.4.0) and the additional modules formerly known as EPICS V4.

Details for all the community maintained EPICS components included in the CCS 7 distribution are available in the [EPICS Community Modules Roadmap for CCS 7.x \(6C4XTJ\)](#).

The versions included in this release are the following:

Module	Version
EPICS 7 C++	7.0.6.1
EPICS 7 Java	7.0.7
PVXS	0.2.1
AreaDetector²	Core: 3.11 SimDetector: 2.10
ASYN	4.42
Autosave	<u>5.10.2</u>
Busy²	<u>1.7.3</u>
CA Gateway²	<u>2.1.3</u>
Calc	<u>3.7.4</u>
CaSnooper	2.1.2.3
JCA	<u>2.4.6</u>
Multi-Core Utilities	1.2.2
Modbus	3.2
PCAS	<u>4.13.3</u>
pvaPy	4.0.3
pyDevSup	1.2
PyEpics	3.5.0
Sequencer	<u>2.2.9</u>
Std	<u>3.6.3</u>
StreamDevice	<u>2.8.22</u>
VisualDCT	2.8.2

Main enhancements:

14408	EPICS Base	Link PVA libraries into IOC by default
14005	EPICS Base	Remove deprecated "eget" command line tool
13778	EPICS Extensions	Update EPICS Wireshark CA/PVA dissector
12737	EPICS Extensions	Add caPutLog support to the EPICS CA Gateway

Main bug fixes:

11698	EPICS Extensions	Suppress unused EPICS_EXTENSIONS environment variable
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5 Shared Units

Changes:

- The Eclipse framework has been updated to version 4.20.
- The PostgreSQL database has been updated to version 12.9.
- The Apache Tomcat web server has been updated to version 9.0.
- The Firefox web browser has been updated to version 91.

² The RPMs are not installed as part of a CCS system profile. They shall be installed as required, see the CCS 7.x EPICS Roadmap for details.

6 Control System Studio (CS-Studio)

6.1 Enhancements

6.1.1 Logbook Extensions

Entry tables format

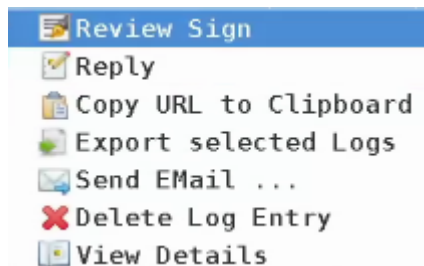
Logbook entries tables are by default shown in an expanded format on multiple lines.

Entry owner

The owner of a logbook entry for a creation or modification is the authenticated user via login. When specified, the Python API assigns the owner of an entry.

Review and sign

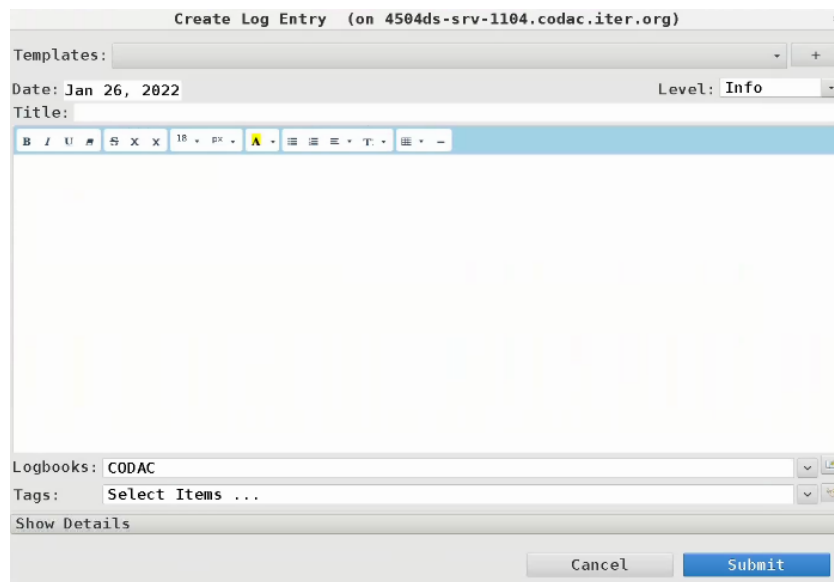
Via a right-click on a logbook entry, one can review and sign it:



A new dialog opens to add more details.

Logbook entry title

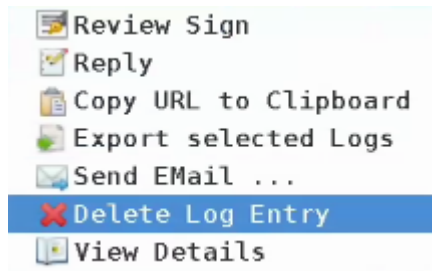
As required by Operation, the logbook entry create dialog has now a separate title field:



For entries entered in previous releases, the first line of the description is taken as title.

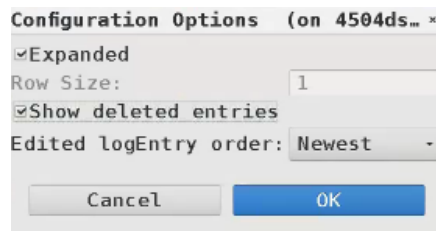
Delete entry

It is now possible to delete an entry via a right-click:



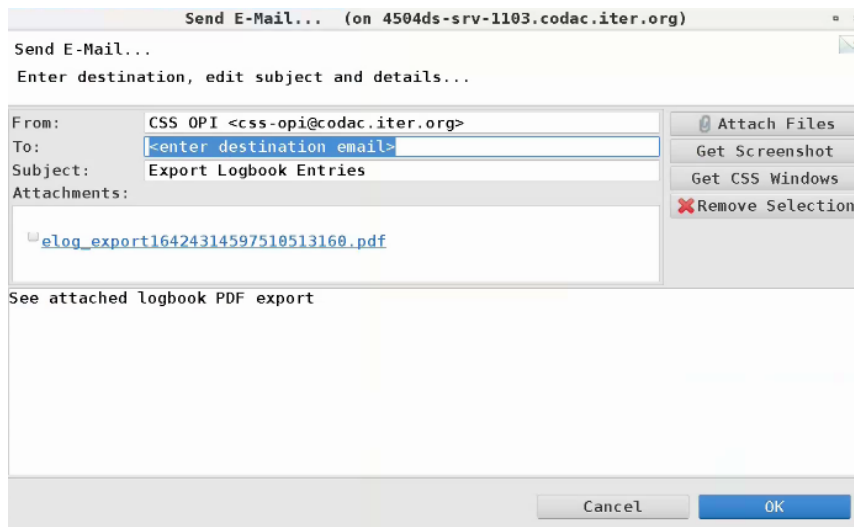
A new dialog opens for confirmation.

It is possible to list the deleted entries from the Log Tree view by selecting the option “Show deleted entries” which is unselected by default:



Send entry by email

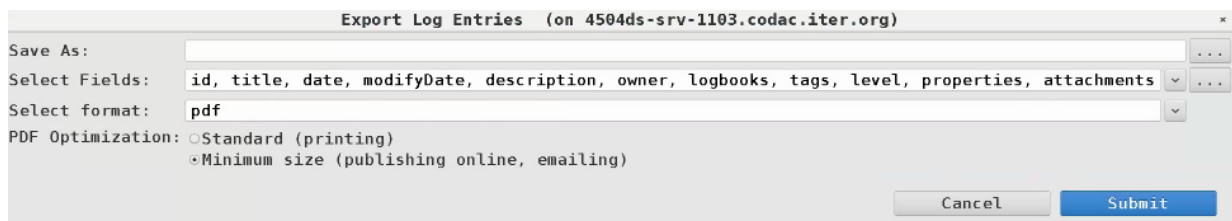
Logbook entry send email new option first exports the selected entries in a PDF report and attaches it to the Send E-Mail dialog:



An email address autocomplete has also be developed based on history.

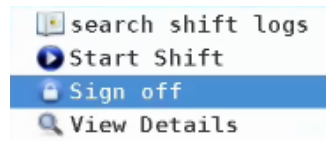
Entries PDF report optimisation

PDF logbook entries export optimised size new option:



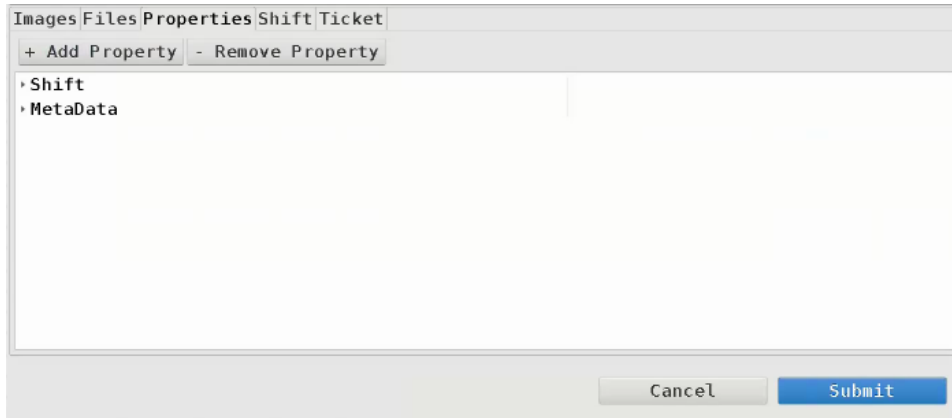
Shift sign

Once a shift ends, it is now possible to review and sign it via the new option Sign off:



Entry property and attribute

It is possible to add and remove properties and attributes. This could be used to add a component tag or any operation property.



Logbook enhanced WebUI

Logbook WebUI is aligned with CS-Studio GUI features, including the rich text editor, reply, delete, review and sign entry options.

6.1.2 Operator Interface (BOY) Enhancements

According to human factor requirements, some graphical widgets have been improved:

- Scaled widget: the PV value font size is adapted for 4K resolution
- Choice widget: tick box and radio button size increased

The flashing of animated SVG for transient states like opening or closing is smoother.

It is now possible to configure a linking container background as transparent.

IO color-coding includes COS states:

```

# System Status
IO System UNDEFINED= 235,235,235
IO System OFF= 235,235,235
IO System NOT READY= 250,12,14
IO System READY= 0,204,255
IO System INITIALISING= 255,155,0
IO System INITIALISED= 0,255,0
IO System EXECUTING= 0,255,0
IO System POST CHECKS= 255,155,0
IO System ABORTING= 250,12,14
IO System ABSENT= 235,235,235
IO System LOCAL= 255,255,255
IO System FAULT= 250,12,14
IO System SAFE= 255,0,255
IO System ERR= 255,0,255

# System partition
IO System EXCLUDED= 255,0,255

```

IO System REQUIRED= 35,180,35
 IO System INCLUDED= 50,150,230

6.1.3 Alarm System (BEAST) Enhancements

The alarm server has a new option to be started in maintenance mode.

jms-send utility new option to allow switching an alarm server in normal or maintenance mode.

6.1.4 Other Improvements

For operation:

- New home user shortcut into CSS default workspace to store reports and data export
- css-dbmanager analyse and vacuum skip the raw tables
- ETL script has been optimised as well as logstash JDBC statement for ELK dashboards.

6.1.5 Table of Main Enhancements

10728	CSS BEAST	Support for alarm node's "severity PV name" as BEAST datasource
14064	CSS BOY	Linking container transparent background property missing
13954	CSS BOY	Choice Widgets improvements based on HOF change request
13952	CSS BOY	Scaled Widgets improvements based on HOF change request
13840	CSS BOY	IO color coding updates for operation
13763	CSS BOY	Symbols Library upgrade >> animated svg
13762	CSS BOY	Upgrade to and support for Jython 2.7.2
13690	CSS BOY	Upgrade LiClipseText to 2.3.0
13625	CSS BOY	Upgrade and integration of Batik 1.14 for SVG image support in BOY
13770	CSS ELog	ELOG >> allow opening multiple logbook entry editors
13667	CSS ELog	ELOG >> New entry option to "Send Email"
13666	CSS ELog	ELOG >> New "Delete entry" option to the log table and log tree
13639	CSS ELog	ELOG >> Create a new entry shall allow to add any property/attribute
13635	CSS ELog	ELOG >> Shift Sign Off
13634	CSS ELog	ELOG >> multiple logbook entries table and tree views
13632	CSS ELog	ELOG >> Logbook entry review and sign feature
13537	CSS ELog	ELOG >> align WebUI features with CS-Studio GUI
13536	CSS ELog	ELOG >> add "Entry title" field
12674	CSS ELog	ELOG - Owner of the entry should be the authenticated user
14102	CSS General	ELK JDBC query optimization
14056	CSS General	Support and upgrade to jca 2.4.6, pvaccess 5.1.6, pvdata 6.1.6
13960	CSS General	ETL script optimization
13711	CSS General	css-dbmanager "analyze" and "vacuum maintenance" operations shall ignore the raw tables
13638	CSS General	Support for Red Hat 8
13628	CSS General	CS-Studio community code integration
13623	CSS General	Support of ELK stack last version (7.12)
13621	CSS General	Support of PostgreSQL JDBC driver 42.2.19
13619	CSS General	Upgrade, migration and support for PostgreSQL12
13616	CSS General	Support of Eclipse 2021-06 (4.20)
13539	CSS General	pvAccess support for element of complex structure with many levels of normative types
13332	CSS General	CS-Studio E-Mail >> add history autocomplete

6.2 Bug fixes

6.2.1 Logbook

Many fixes including:

- Enlarge + icon in the log tree history
- Entries table refresh
- PDF export with attachment file name including special characters
- Template import wizard more robust
- Logbook content restore
- Configuration issues including wrong preference, database schema missing property after an upgrade, and codac-configure extension to specify all logbook services

6.2.2 Operator Interface (BOY)

- Infinite loop parsing macro
- Unexpected interaction between tabbed container and choice buttons
- OPI controls look inactive when the focus is lost
- OPI display gives the focus to child screen right away
- Navigation issues for operation
- LED animation rules can be adapted for normative types
- XY Graph widget limits for normative types
- WebOPI fixes including navigation contextual navigation, XY graph widget, new window opened for a new OPI.
- WebDatabrowser plot mean and count integration.

6.2.3 Alarm System

- No failover for jms-send utility
- jms-send makes use of default CS-Studio configuration

6.2.4 PV Access

- Connection issue fix and access to complex structures with many levels of normative types improvements.

6.2.5 Table of Main Bug Fixes:

13283	CSS BEAST	PV Access in CS-Studio operator interface - pvConnectionTimeout on AlarmPV and ArchivePV
13677	CSS BEAUTY	Web Databrowser >> Properties >> Value Axes --> Mean and Count not updated
13176	CSS BEAUTY	Web Databrowser >> Properties >> Value Axes --> tick boxes are inactive
14137	CSS BOY	Navigation within mimics limited to 5 levels
14098	CSS BOY	BOY unexpected interaction between widgets Tabbed Container and Choice button
14043	CSS BOY	Navigation within mimics doesn't work with integrated OPI RPMs
13871	CSS BOY	WebOPI >> Open in a new window opens in sub-area of current page
13280	CSS BOY	PV Access in CS-Studio operator interface - LED animation according to alarm severity doesn't work
13279	CSS BOY	PV Access in CS-Studio operator interface - XY Graph limits from PV doesn't work
13860	CSS ELog	elog-configure allows to configure the database user and password
13725	CSS ELog	Logbook service preferences "lacks valid authentication" issue
13594	CSS ELog	css-dbmanager restore logbook database content (migration) issue

13380	CSS ELog	ELOG >> Log Tree >> improve Logbook entry history
13724	CSS ELog	Elog database schema >> MetaData property is missing after an upgrade
13865	CSS General	OPI display gives the focus to child screen right-away
13278	CSS General	PV Access in CS-Studio operator interface - reconnection issue after PVA server restarts

6.3 Known Bugs and Limitations

Bug	13986	BOY >> Reordering widgets in outline view makes them lose properties
Bug	14164	ELOG >> view query save and restore issue
Bug	14170	ELOG >> multiple editor selection issues
Bug	14236	ELOG >> deleted entry >> return state by the service is incorrect
Bug	14314	ELOG >> File attachment >> fails to open PDF and CSV/XLSX files
Bug	14308	CS-Studio launcher scripts support of multiple instances and user arguments
Bug	14171	ELK - Import saved objects fails
Bug	13281	PV Access in CS-Studio operator interface - RPC VTable result column order issue
Bug	13282	PV Access in CS-Studio operator interface - RPC VTable result boolean cast issue

7 Self Description Data Tools

Note that in CODAC Core System 7.0 the version of SDD Tools is **6.4**. This is intentional and reflects the fact that no significant changes were made to SDD Tools in this release.

Main enhancements:

13593	SDD Editor	Support array fields in a DAN structure
13076	SDD Editor	Support - IOC-Mon adds EPICS callback queue monitoring
12720	SDD Editor	OPC UA: SDD requests and generates unneeded (SPSS related) data
13433	SDD General	Add basic support for CVVF (verification and validation framework)
13552	SDD Translator	Sort the PVs before writing to .db or .csv file
12889	SDD Translator	Remove full path names in EPICS template/substitution mechanism
12185	SDD Translator	Catch missing database ("could not open connection") exception
12076	SDD Translator	Translator output folder should default to the current folder

Main bug fixes:

14120	SDD Editor	performance issue in projects with DAN variables and multiple DAN sources
14071	SDD Editor	Variables added to multiple DB files after modifying "Generate one IOC per PLC" option
14062	SDD Editor	DAN: Variable not found error on Import Program Details - only 50 DAN variables recognized on the import
14053	SDD Editor	EPICS configuration for variables declared on Interlock PLC are not exported to .xml
13999	SDD Editor	Broken PLC communication: invalid memory request
13957	SDD Translator	Cubicle monitoring PVs not generated (remaining fixes after 6.3.1)
14250	SDD Editor	Cannot instantiate System Template created by user if there is no PLC in the project
12839	SDD Editor	hibernate exception on importing Excel with duplicate PVs
11959	SDD Editor	Once COS-PSOS mapping is defined it cannot be removed
14368	SDD Sync	sdd-sync-direct release 0.15.2
13785	SDD Sync	SDD sync load does not support ps:location without positionIndex
14287	SDD Translator	S7 simplecommand records in generated DB may show unexpanded

		CBS1/CBS2 macros
14284	SDD Translator	System health monitoring PV for PCF have wrong INP field value
14107	SDD Editor	Export to XML does not respect user-defined name and compression
13849	SDD Editor	Invalid index error when renaming Cubicle in I&C Navigator
13848	SDD Editor	Removing Cubicle in I&C Navigator does not remove deployed variables under Slow Controller Editor
14289	SDD Translator	S7 simplecommand records are instantiated by generated DB and substitutions file

Notable remaining issues (if you run into one of these, please contact CODAC support):

14278	SDD Editor	PVs marked as not visible on HMI require DRVL, DRVH, LOPR and HOPR fields defined
14281	SDD General	Incorrect st.cmd for POC devices
14280	SDD Translator	Only one of many instantiated user templates for POCs appears in generated DB file
14277	SDD Editor	SDD-editor doesn't generate the files and records correctly for PXI6259
13440	SDD Editor	Beauty.xml generated by SDD-Editor doesn't not contain PV related to cubicle monitoring
11507	SDD Editor	Importing from another project via XLS files fails
13557	SDD Sync	POS.h and COSPSOS_BUIL_F000.st file are not getting created while loading via sync-direct

Versions of SDD reference data in this release (no changes):

- PBS snapshot version 20210125;
- CBS snapshot version 20210125;
- GBS snapshot version 20190204;
- TTT snapshot version 20210125;
- AAAA snapshot version 20160613;
- SS snapshot version 20140129;
- Units of measure snapshot version 20180130;
- Equipment catalog snapshot version 20190205, including:
 - ITER slow controller catalog 333J63 v4.1 (11 Aug 2017);
 - ITER fast controller catalog 345X28 v2.7 (19 Dec 2018).

8 Maven Tools

Main enhancements:

14121	Maven commands	CODAC units should support different granularities of unit testing
13364	Maven commands	Provide new packaging include for Python packages, modules and scripts
12623	Maven commands	Unit tests fail for I&C projects containing a program that is not a service

Main bug fixes:

13599	Maven commands	I&C projects without any scan file should not produce an empty -scan RPM
13252	Maven commands	Instantiation of IOCs with `mvn newioc` produces xstream warnings
12304	Maven commands	Migration with `mvn migrate` from CCSv5.4 corrupts content of navigation XML files having several tags on one line

9 Health Monitoring

No changes.

10 PLC Driver

SPSS versions:

- SPSS v3.6 for S7-300/400
- SPSS v3.5 for S7-400H
- SPSS v1.1 for S7-1500

Bug fixes:

11612 S7 EPICS Driver Loss of communication when losing time synchronization on redundant CPU

11 TCN/PTP Support

No changes.

12 SDN Support

Bug fixes:

14054 SDN Archiver sdn-plot is broken since CCS6.3.0

13 DAN/UDA Support

Main enhancements:

14364 UDA Add a utility to retrieve the metadata content given pulseid, metaname
14363 UDA Clients Add a python utility to list user metadata header
14300 UDA Clients uda-get-variables: provide an option to only list variables which has data
14046 UDA Add "dectype=env" that provides one timestamp and (min,avg,max)
13587 UDA Clients Make uda-get-data method return last point before start time and first point after end time
13261 UDA Provide a REST interface for UDA server
11919 UDA Clients Provide an API to get block header attributes

Main bug fixes:

14339 UDA Clients uda-get-pulses shall list always the last N pulses instead of the first N pulses
13841 UDA Clients Public header files include namespace directive

14 Logging Library

No changes.

15 NI Sync

No changes.

16 PXI-6259

Bug fixes:

14263 PXI-6259 Linux Reset command doesn't set AO value to 0

17 PXI-6528

No changes.

18 PXIe-6368 / PXIe-6363 (X-Series)

No changes.

19 NI RIO

The RIO open source driver officially supports NI FlexRIO 797X boards (Kintex-7).

20 OPC UA

The low level client library (Unified Automation SDK) has been updated to version 1.7.4.

The OPC UA Device Support has been updated to version 0.9.2. This version includes full support for OPC UA Security.



*OPC UA Security is enabled by default.
To connect to any OPC UA server without security, you must set the option*
sec-mode=None
for the concerned session(s).

Using OPC UA Security is not trivial and needs careful planning and consideration. Please refer to the OPC UA User Manual for more details.

The iocShell interface has changed. The old commands are still supported, but they emit a deprecation warning. Please refer to the OPC UA User Manual for more details.

21 Other Components

No changes.

DOCUMENTATION UPDATES

Document	ID	6.0	6.1	6.2	6.3	7.0
CODAC Core System v7.0 Release Notes	7GEYSS					v1.0
CODAC Core System Overview	34SDZ5	v6.1	v6.2	v6.2	v6.3	v7.0
CODAC Core System User Manual	43PSH9	v3.10	v3.11	v3.12	v3.13	v3.14
INSTALLATION & SUPPORT						
CODAC Core System Installation Manual	33JNKW	v6.0	v6.0	v6.1	v6.5	v7.0
CODAC Core System Migration Guide	7JCFUD	v5.7	v5.8	v5.9	v5.10	v5.11
DEVELOPMENT & TESTING						
CODAC Core System App Development Manual	33T8LW	v5.5	v5.6	v5.7	v5.8	v5.8
SDD Editor User Manual	32Z4W2	v8.7	v8.8	v9.0	v9.1	v10.0
SDD Synchronization Guide	46AAXR	v1.18	v1.18	-	-	
How to include a new I/O module in SDD	A4WQDZ	v2.0	v2.0	v2.0	v2.0	v2.0
Maven Editor User Guide	7MT2YC	v5.8	v5.9	v5.10	v5.11	v5.11
System Health Monitoring Variables	35XFCY	v1.19	v2.0	v2.0	v2.0	v2.0
Logging library - Software User Manual	QEK784	v1.5	v1.5	v1.5	v1.5	v1.5
CONTROL SYSTEM STUDIO						
CODAC Core System CS-Studio User Guide	QVBYD8	v1.2	v1.3	v1.5	v1.6	v1.6
OPI Standardisation - CSS BOY Edition and Runtime	7367JQ	v1.9	v1.10	v1.11	v1.11	v1.12
OPI Standardisation - CSS BOY Industrial Symbol Library	A69URK	v2.1	v2.2	v2.2	v2.2	v2.3
SLOW CONTROLLERS (PLC) and OPC UA						
SPSS User Manual	G4UMX5	v2.2	v2.6	v2.6	v2.6	v2.6
s7PLCAsyn EPICS Driver User's Manual	PJAHXJ	v1.9	v1.10	v1.10	v1.10	v1.10
PLC Sample Guide	2N8C3M	v4.2	v4.2	v4.2	v4.2	v4.2
OPC UA Integration User Manual	32N6MJ			v1.1	v1.3	v1.3
FAST CONTROLLERS - I/O						
NI Sync Linux Device Driver User's Guide	2PLQ4P	v2.7	v2.7	v2.8	v2.8	v2.8
NI Sync EPICS Driver User's Guide	33Q5TX	v2.14	v2.14	v2.14	v2.14	v2.14
NI PXI-6259 Linux Driver User's Guide	32GTJY	v1.19	v1.19	v1.19	v1.19	v1.19
NI PXI-6259 EPICS Driver User's Guide	3DEY52	v2.12	v2.12	v2.12	v2.12	v2.12
NI PXI-6528 Linux Driver User's Guide	3ZHxQ9	v1.8	v1.8	v1.8	v1.8	v1.8
NI PXI-6528 EPICS Driver User's Guide	433VEW	v1.13	v1.13	v1.13	v1.13	v1.13
NI X-Series Linux Device Driver User's Guide	3LTMR6	v1.7	v2.0	v2.0	v2.0	v2.0
NI X-Series EPICS Driver User's Guide	3P4N3R	v1.9	v1.9	v1.9	v1.9	v1.9
NI-RIO Linux Device Driver User Manual	LW3UFH	v2.10	v2.10	v2.14	v2.14	v2.15
NI-RIO EPICS Device Driver User Manual	RAJ9P8	v1.7	v1.7	v1.7	v1.7	v1.7
IRIO Library user's manual	RATM8Z	v1.3	v1.3	v1.3	v1.3	v1.3
IRIO Design Rules for LabVIEW for FPGA	QQMYTY	v1.4	v1.4	v1.4	v1.4	v1.4
FAST CONTROLLERS – HPN						
TCN API - Software User Manual	N4XTGG	v1.16	v1.16	v1.16	v1.16	v1.16
PTPd User Manual	U2TTSZ	v1.4	v1.4	v1.5	v1.5	v1.5
TCNd User Manual	MUYN6	v2.6	v2.6	v2.7	v2.7	v2.7
SDN Software User Manual	B7SKFU	v2.12	v2.13	v2.13	v2.13	v2.13
SDN Archiver User Manual	SD29MG	v1.4	v1.5	v1.7	v1.7	v1.7
RTF User Manual	WBZDRJ		v2.4	v2.4	v2.4	v2.4
DAN User Manual	Q6GULS	v3.0	v3.2	v3.6	v3.9	v3.9
UDA User Manual	TPLTKG	v2.0	v2.0	v2.0	v2.1	v2.2
Data Visualization Tool User Manual	4N9E8W				v1.3	v1.3