Bently Nevada
a Baker Hughes business

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Orbit 60 Series Update: Dispelling the rumors – 3500 is NOT being obsoleted!

Introduction

Welcome to our 8th article focused on Orbit 60. Even though, the real topic here is 3500 lifecycle, the question is only raised by the introduction of the Orbit 60 Product line. A quick update on Orbit 60 before we start. Customers have been receiving their Orbit 60 systems since August 13. Systems have shipped to sites around the world with over 100 more in the manufacturing que. Our TSI and SIL 2 systems will be available to ship June 30, 2022. Contact your account manager for ordering information.

Our past articles have focused on the cyber security, hardware, and configuration aspects of the system, you may follow the links below to access them:

- Q1 2020 Orbit Article – Introducing Orbit 60
- Q2 2020 Orbit Article – Available to Quote – Explore the Cost Savings
- Q3 2020 Orbit Article – Now – Less Spares!! – How to Choose Input Modules
- Q4 2020 Orbit Article – System Fundamentals – Output Cards
- Q1 2021 Orbit Article – Cyber Secure Condition Monitoring!
- Q2 2021 Orbit Article – Orbit Studio Configuration Software
- Q3 2021 Orbit Article – API 670

As we have been placing an emphasis on our new Orbit 60 platform, it is only natural that our loyal 3500 customers become concerned about its life span. Bently Nevada has had a well-publicized five-phase product life cycle program for several decades now. Our 3500 product line is still firmly in the "Current Product" phase, or Phase 1.

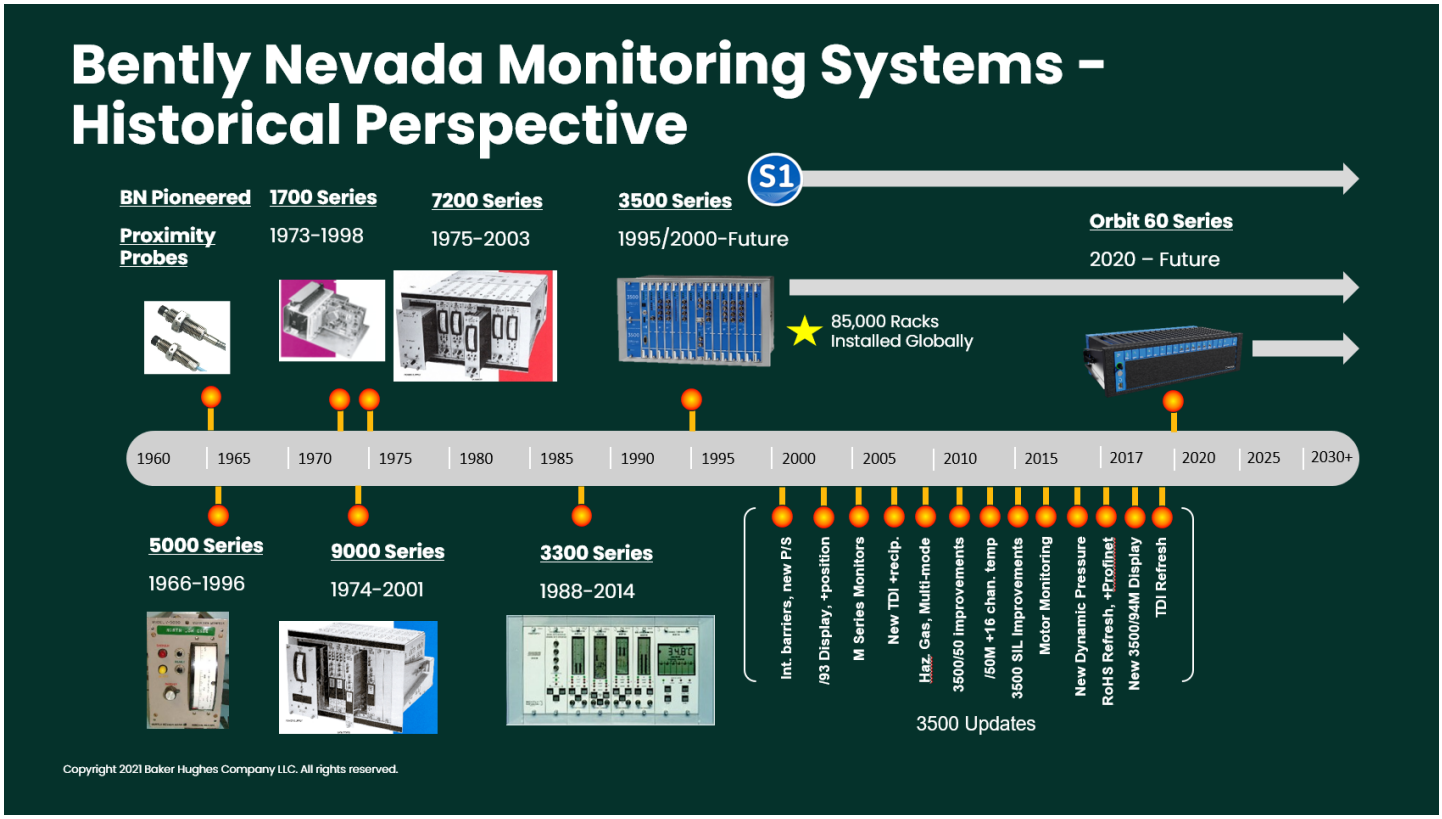
- **Phase 1** – Current Product, Hardware is released for sale with full support including ongoing enhancements, custom modifications, new spare parts, and full repair capabilities.
- **Phase 2** – Same as Phase 1, however no new enhancements are planned. Custom modifications can be made but are discouraged. Last time buys for new systems are typically announced several months[1] before the product is transitioned to phase 3.

[1] While reasonable efforts are made to provide timely notices, Baker Hughes cannot guarantee minimum timeframes for advance notification.

- **Phase 3** – Spares Only – No new installations are sold, however new spare parts (including existing custom modifications), repairs and support are provided as in phases 1 & 2. A notification of last time buys for spare parts is typically announced several months[2] before the product is transitioned to phase 4.
- **Phase 4** – No Spares, Limited Support – New spares are no longer available, and support is limited to repair, exchange, or remanufacture (subject to component availability). Notice of last date to repair is typically issued several months[3] before transitioning to Phase 5.
- **Phase 5** – Obsolete – The product has no or limited support[4] and is not recommended for continued use in machinery protection applications. Customers are advised to migrate to an appropriate replacement product with the assistance of their Baker Hughes technical specialist.

Now that we are familiar with the 5-phase life cycle plan, please also recall that Bently Nevada has a long history of supporting our products for two to three decades as can be seen in the infographic below.

The 3500 product line itself has been active since 1995, that is over 26 years ago and still in P1 product lifecycle stage, impressive. Back in 1995, design and manufacturing of systems was vastly different than it is today. We at Bently Nevada had just started manufacturing with surface mount components that were software configurable.



This meant no more desoldering and resoldering (7200) or jumper changing (3300) for configuration changes. Channel density was also doubled as well, with four channels per card, making the system smaller and more powerful than any of our predecessor systems. For these reasons and more, the 3500 has been our most successful monitoring product ever, with more than 85,000 systems installed globally.

The 3500 system has been completely redesigned twice since its introduction to adapt to the ever-changing electronics market. True to Bently Nevada's tradition of backwards compatibility, though, a board manufactured in 2021 will work perfectly well in a chassis made in 1995. In fact, without looking at the boards themselves, it is difficult to know which version you have (except for the first redesign which introduced the Orbit with the M2 in its center). Along the way we were able to significantly reduce the component footprint on the board, and in our most recent redesign, in 2017, make the system RoHS compatible while updating to the latest generation electronics.

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[4] Continued support availability during this phase is subject to change without notice.

For those unfamiliar with RoHS, it is a European Union regulation that prohibits the sale of products that contain hazardous metals such as cadmium, lead and arsenic. While this is primarily a European Union initiative, most states in the U.S. and many other, non-European Union countries have adopted similar regulations. The goal is to reduce the environmental effects and health impacts of electronics. By removing these hazardous substances, it makes electronics manufacturing safer at every stage of its life cycle. From the folks who are handling the raw materials during assembly, to the products final resting place (presumably a landfill or electronics recycling program). This is a big win for us humans, as it helps us sustain and take better care of our planet and employees.

Our most recent redesign offers an often-overlooked advantage, and that is that all its components are updated to the latest available technology. New components mean less obsolescence from our suppliers, which in turn means that we can support 3500 for a longer amount of time. The latest redesign means that we can expect the product life cycle to remain in phase 1 or 2 for a much longer period. Currently, we expect this to be until about 2027. Phase 3 is anticipated to last an additional 5 to 8 years or until approximately 2032 to 2035. Phase 4 will be in effect until we can no longer procure the necessary components to perform repairs. This is anticipated to be at minimum, another 3 years, but likely longer, taking us to around 2038 or beyond for a minimum of 17 more years of support. This is a remarkable story of planned and continued support of the 3500 system for over 45 years!

One other point that is worth making is that our suppliers typically have a similar life cycle plan for the components we purchase. This allows us to make "lifetime" buys when we are alerted that a component is nearing its end. These "lifetime" buys, allow us to purchase enough of these components to build units through our product's anticipated end of life, thus extending our ability to support you, and manufacture into the future.

So, contrary to the rumors, Bently Nevada is NOT obsoleting the 3500 system for quite some time. We are offering both options, 3500 or Orbit 60, to align with any upcoming project. We expect our new flagship platform, Orbit 60, will overcome 3500 sales in the next 2 to 3 years, which aligns with transitions from 7200 to 3300 and 3300 to 3500. In theory, this is due to both industry awareness as well as projects that get scoped prior to the product's introduction, hence why we introduced Orbit to the world about two-years ago.

Now that we have dispelled the "obsolescence" rumors, let's revisit why transitioning your 7200, 3300 or 3500 Condition Monitoring and Protection systems to Orbit 60 is a great idea.

Cyber security

As mentioned earlier, prior to about 1998 when the Clinton administration identified 14 critical infrastructure sectors in the private domain including power generation and the oil & gas industries, cyber security was virtually unknown. Further, not much was done about it either until nearly ten years later, when the North American Electric Reliability Corporation (NERC) and the Federal Energy Regulatory Commission (FERC) introduced cyber security reliability standards for power generation. Today, with ransomware attacks routinely in the news, Cyber Security couldn't be more top of mind for most organizations, not just those 14 critical infrastructure sectors identified in the 1990's.

Orbit 60 has also been designed with Cyber Security at the top of our list of customer needs. For this reason, we split the system configuration and Condition Monitoring modules. They are no longer the same physical part, which allows us to separate their functionality as well. The subject is so deep, and our answer so complete, we recommend reading our Q1 2021 Orbit article on the subject. Suffice to say that if you have any Cyber Security concerns, Orbit 60 is what you are looking for. It has been designed to meet security level 4 (the highest level) of the IEC/ISA-62443 standard. To give you an idea of what this means, security level 4 Prevents the unauthorized disclosure of information to an entity actively searching for it using sophisticated means with extended resources, IACS[5] – specific skills, and high motivation.

As an added bonus, our new, Orbit 60 design allows you to simplify your network infrastructure by eliminating the need for complex firewalls and/or costly data diodes.

Orbit 60's new Communication Gateway module will also allow you to pass stranded data from other systems on your control network through to your business network. This added capability can also help you save network complexity and cost.

Distributed I/O

Orbit's bridging capability (later release) will allow you to connect up to six different chassis into one system. There are several advantages to this architecture including lower installed cost, fewer redundant modules, and the shortening of cable runs. Many of our customers want to locate their monitoring racks more than a thousand feet (as the wire runs) from their machine. This can result in signal loss and/or ground loops. Orbit 60 with bridging handles these with ease, allowing distances of up to two kilometers from chassis to chassis.

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[5] IACS – Industrial Automation and Control Systems

Centralized processing

In Orbit 60 the input/output, i/o, cards are simply analog to digital converters. Their task is to digitize the waveform and stream the signal to the backplane of the chassis. The Processor module then reads that signal, and just as its name implies, processes it, providing us with all the requisite trended variables (Direct, 1X & 2X amplitudes & phases, gap voltage, etc.).

Our new processor has more than 100 times the power of our older processors, enabling new capabilities including multiple band pass filters, and world class Roller Element Bearing and gearbox diagnostics.

By consolidating the processing functionality, we were also able to consolidate the types of i/o cards, bringing the choices down to eight. But that's not all, we were also able to design and offer a ninth, new card type that brings in positive powered transducers such as your typical industrial accelerometer.

We are forecasting that 90% of all applications will utilize only one type of i/o card, the PAV, which accepts Proximity Probes (including Keyphasors®), Negatively biased accelerometers as well as Velomitors. This significantly reduces the number of spares that a customer may want to carry.

SIL 2

Many of our customers have started to request Safety Integrity Level certification. Orbit 60 has been designed to be at a minimum, SIL 2 compatible, and SIL 3 capable. 3500 has SIL 1, 2 and 3 capabilities , when specified. This feature is not currently released but will be available soon.

Size

From a footprint perspective, the standard Orbit 60 chassis is half the height of a 3500 rack, and only 70% of its depth. Of course, there may be times when you will want to replace a 3500 with an Orbit 60 system. For these situations, either a blanking plate or a double height rack with 29 slots (compared with the standard height's 19 slots) can be ordered.

Number of channels

As with 3500, each of the Orbit 60 cards can handle 4 channels of input. Unlike 3500, the versatile i/o of Orbit 60 allows us to input any combination of accelerometers, velomitors, proximitors, Dynamic Pressure sensors, Keyphasors®, or magnetic pickups on a single four-channel PAV card.

Further, in a 3500 rack, there are 14 available slots (three others are taken up by power supplies and System Interface Module, SIM), for a maximum of 56 inputs (with no relays, communication gateways, etc.). The Orbit 60 on the other hand, has 20 slots, however, it also has some shared infrastructure cards that will take up a few slots. These include a SIM, two-Processor Modules, and a two-slot Condition Monitoring Module. This results in 15 usable slots, or 60 inputs. If the 6U (larger, 3500 sized) chassis is used, the channel density goes up even further. With 29 slots available, and again using 5 infrastructure slots, the maximum number of 4 channel inputs goes up to 96. Orbit 60 however has a limit of 88 vibration transducers, so we would actually exceed its capability if we filled all those slots with vibration cards. Chances are though, that if you are assembling a system of that size and capability, you will also want to add relays, communication gateways and maybe some recorder outputs or temperatures as well.

No jumpers

When the 3500 system evolved from the 3300 system, we eliminated all of the jumper selectable options on the main cards, and made them software configurable. That doesn't mean that we eliminated all the jumpers, however. The 3500 still has some jumper selectable options on a few i/o cards, notably the 3500/42 proximitor/seismic monitor, which is our most popular monitor.

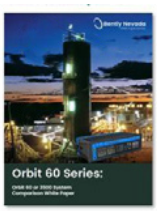
In Orbit 60, we have finally vanquished all jumpers, and have made all options software configurable.

New configuration software

Orbit Studio is our new configuration software for Orbit 60. We believe that you will find it to be quite a bit easier to use, especially if you are familiar with System 1 Evolution's layout. Our goal was to provide a familiar experience across our major software platforms. For more information, please see our Q2 Orbit article which was devoted to Orbit Studio. We also recently presented a Beyond the Basics webinar that demonstrates a guided practice of configuring an Orbit 60 using the software. We believe that you will find this useful the first few times you use the software.

Next steps

Our teams are excited to discuss Orbit 60 in more detail, we have multiple technical white papers available for a deeper dive into the following topics. Please reach out through the contact us link below to receive a copy and we will connect you with your local expert.



Orbit 60 Series or 3500 Detailed Comparison

This document details the difference between Bently Nevada's Orbit 60 Series machinery protection system and the 3500 system.

Orbit 60 Data Security Condition Monitoring Module

This document is intended to describe how the Condition Monitoring Module in the Orbit 60 Series Monitoring System provides a secure solution with full high-resolution data to external networks without jeopardizing the operation of the protection functions.

Orbit 60 Series Bridging Concepts

Bently Nevada introduces the concept of bridging with the Orbit 60 Series system architecture.

Coming Soon: Protection Schemes & 3500 Retrofit White Papers

Orbit 60 request form

Learn more about Orbit 60

- Data sheet
- Fact sheet
- Product video – Orbit 60 teaser
- Product video – Orbit 60 full length
- Orbit 60 Series and System 1: Bloomberg TV
- Houston Chronicle: Bently unveils the Orbit 60
- Turbo Machinery Magazine – Bently Nevada's new platform
- Why Orbit 60? Why now?
- Q1 2020 Orbit article – Introducing Orbit 60
- Q2 2020 Orbit article – Available to Quote – Explore the cost savings
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