

## Product Test Review

### FX – Functional eXperience test.

#### *The Nobi Smart Lamp*

Smart lamp packed with cameras and sensors.

The vendor website can be found [here](#).



### Product Review Summary

Updated May 2023

The Nobi Lamp represents the modern collision of aesthetic product design and technology. It is a sophisticated fall detection and prevention system, powered by artificial intelligence (AI), housed in an everyday object, namely a ceiling mounted pendant lamp.

With it's updated look, the Nobi has a modern, lighter aesthetic. This version is available for delivery in North America starting in October 2023 (planned).

The lamp tracks activities such as sleeping, lying in bed, and moving around, has 2-way communication during a fall event, and connects to peripherals such as scales, blood pressure cuffs, and panic biting via bluetooth.

The lamp is installed by an electrician, requires a WiFi connection, and does not require calibration.

A mobile app is used to set up the lamp and view alerts, activities, images, etc. A web app is also available as a dashboard and to set up system parameters, view alerts, activities, images, and history.

The individual can be represented as a stick figure for privacy.

## Target Market

The product targets 3 markets:

- 1) Retirement Home market - operators can deploy this selectively or community-wide as a technological complement to the care they provide.
- 2) The Consumer market - intended for use by the adult child or designated caregiver to monitor the senior for falls and activity.
- 3) The Home Care market - operators can use this as a technological aid that complements care being provided to seniors in their communities.

## Test Results

The first thing we noticed was that the lamp looks good, and is fairly light weight. In fact, Nobi has won acclaimed design awards in both Germany and Belgium, in 2022 and 2021 respectively. It really represents the fusion of form and function, where the technology dissolves into the fabric of daily life - it is in fact hidden in plain sight.

Getting the lamp up and running was quick and simple. After the lamp is installed by an electrician and connected to WiFi, the mobile app is used to claim the lamp and enter some information about where it's installed. The lamp then runs through a configuration sequence, and it's ready to use.

This version 1 hardware has 4 cameras in the lamp, covering 4 quadrants of vision, which are used to detect falls. All the AI processing is done on the lamp ("at the edge"), so that falls can be detected even if an internet connection is not available.

If the lamp detects a fall, it verbally checks with the individual to confirm that a fall has happened, and if so, it alerts a caregiver via an autogenerated phone call. The caregiver can initiate a 2-way audio conversation from the received phone call,

thereby being able to speak with the individual. Once help has arrived and the needed support provided, the caregiver can close the event using the app. All incident information is available through the mobile and web apps, including camera images showing what led to the fall. The individual can be shown as is, or represented as a stick figure for privacy. Images can also be turned off completely, though this negates the benefit of seeing the fall sequence timeline (i.e. the events leading up to the fall). A timeline feature allows the caregiver to “see” the individual remotely in real-time (again as full images or as a stick figure representation), which is useful to see current state.

Fall prevention is achieved by the lamp turning on its up-lighting when the individual sits up in bed, and then illuminating the full down-lighting when the individual stands up. This feature can optionally be disabled.

This functionality works in reverse also - the lamp gradually turns itself off if it detects the individual lie down in bed for a period of time.

Setting up integrations to peripherals such as a scale, and panic button was easy. The mobile app guides you through the pairing process clearly. All the data gathered by the scale, or blood pressure cuff, etc, is automatically transmitted to Nobi and stored in the individual’s profile, viewable in the app.

Nobi has several rebuilt integrations to nurse call systems, so operators can maintain the simplicity of a common user interface for staff, while reaping the benefits of Nobi’s functionality. These integrations to date are with European systems, so we would like to see Nobi also build integrations with North America systems.

Overall, the Nobi lamp is an impressive device both aesthetically and functionality. The fall detection worked reliably, to a range of 4-5 meters radius in our test suite. The additional features all work well and are useful. The user experience is excellent, which is consistent with the focus on user-centric design throughout the product.

### **Commercial Readiness**

Nobi has made it easy for operators to adopt and onboard this product through ease of installation, setup, form factor, and usefulness. They have two versions of the mobile and web apps: one for the retail consumer (single room), and one for multi-unit enterprise customers with full hierarchies for suite, neighbourhood, building, etc.

Both make managing the lamps simple and straightforward. Nobi has done well thinking through the user experience both for the individual and for the operator, so the barriers to entry are minimized.

Though the product originates in Europe, and is in fact assembled in Belgium, Nobi has obtained the necessary certifications for the product to be sold in North America (CSA, UL, FCC).

We believe there is strong product-market fit for Retirement Home operators, Home Care operators, and also the retail Consumer market.

Operators may express concern with the unit price of a lamp, at roughly \$2,000 CAD each (normalized for currency fluctuations). However, that lamp is guaranteed for 7 years, which makes it \$286/year, or \$0.78/day. Operators simply need to ask themselves if fall prevention and detection is an important focus area.

For larger suites, more than one Nobi might be needed, or a Nobi and a Nobita. The Nobita is a flush mount version with a smaller radius of coverage of 2.5m but the same functionality (\$1,000 CAD). We did not test the Nobita, but given it's a similar technology package, would expect similar performance. Multiple lamps work in unison in a single suite, ensuring a consistent user experience and performance.

In addition to prebuilt integrations with several systems, Nobi has well documented APIs online, enabling it to be integrated into other nurse call systems, for example.

## **Product Roadmap**

We see this product as ready for market right now.

Nobi's new hardware version simplifies some of the camera technology they use, based on their in-market learnings over the last few years.

New functionality in development includes breathing and coughing monitoring. This represents their entry into ambient detection of vital signs and similar parameters, using radar technology.

To accommodate lower ceiling heights (e.g. in North America), Nobi has a non-pendant version of the Nobi Lamp, referred to as Nobi Ceiling which mounts directly to the ceiling.

Based on their learnings, Nobi has also transitioned the Nobita from using radar technology to camera technology to reliably identify falls. (Side note: within the industry, we are seeing camera technology emerge as the winner for fall detection – it seems radar is simply not working well enough.)

Essentially, Nobi has built a hardware platform on which to iterate their software offering, and this first version of software is impressive. They will continue to refine the hardware, but the primary area of focus and evolution will be in the software, where they are experimenting with measuring an individual's vitals such as heart rate, temperature, etc, passively using the camera technology.

From an enterprise perspective, the only thing missing are performance dashboards. These are currently in development, though the utility of these is questionable if Nobi is integrated into a nurse call system (e.g. Notify).

## Review Details

### Packaging

The packaging was efficient, intuitive, protective, and professional. Our box had a marketing sleeve on it that once slipped off the box was impossible to put back on, though this was inconsequential.

### Installation

Installation of the Nobi is the same as hanging any electrical fixture, so an electrician is required. The pendant lamp comes in 2 pieces: the ceiling mount dome, and the drum of the lamp itself. The dome is mounted to the ceiling outlet box similar to any lamp. The three electrical wires are terminated into a junction box in the dome by sliding the wires in.

The drum of the lamp is attached using 3 steel cables that can be cut to the desired drop length or slid into the drum. Nobi recommends the drum be at 7ft (~2m) above floor level. An included cable connects the dome to the drum. On the dome side the cable, cut to length, terminates by inserting the 3 wires matched to those from the outlet box. On the drum, the cable has a single orientation connector that plugs into a receptacle on the drum. In total, this takes 15-30min and can be done by one person, though when hanging the drum, two people make it easier. Remember that this lamp is intended to always be on, so it should not be on a light switch.

### Configuration

Once the Nobi is powered on, you can connect to it using the mobile app via bluetooth. From there, the app guides you through the process of claiming the lamp (taking a photo of barcode in the app - clever!), and connecting it to WiFi. The lamp will then go through a sequence of confirming a WiFi connection, downloading a firmware update, and getting its base configuration from the Nobi cloud. Each of these steps is well explained in a short manual, and at each step the Nobi lamp provided visual indicators of success, such as turning green, flashing blue, etc. The lamp calibrates itself, so it doesn't require the user to identify where the floor is, or otherwise intervene in the calibration.

The user does need to set up a profile for the individual using the room (i.e. the senior), and one for the caregiver to be alerted in case of events.

The entire configuration of the lamp takes less than 30 minutes.

## Peripherals

Connecting peripherals by bluetooth like weight scales, on/off toggle switches, panic buttons, and more, is easy and intuitive with the in-app guide. It takes a minute or so per peripheral.

## Overall Functionality

### Privacy

There are 3 options for privacy settings for each resident/individual: 1) show full body images, 2) redact images to show only stick figure representations, and 3) do not show any images. Options (1) and (2) allow the viewing of the fall sequence timeline, or the real-time check in.

### Fall Detection

In our testing, we found this to be accurate each time we tested it, within about a 4-5 meter radius (the 4m boundary was set by the shape of our room and an adjacent room with a double door opening to the test suite).

Since Nobi asks for the individual to confirm a fall when it detects one, if the verbal response by the individual is anything but a “no”, a call for help is initiated. This is a clever failsafe, and a way of training the AI, which results in fewer false alerts being initiated.

The lamp will only consider a fall detected if it “sees” the individual on the floor for 12 consecutive seconds or more, so when testing this feature, testers need to be cognizant of this delay.

A detected and confirmed fall then triggers a phone call to the caregiver listed (a “robo-call”), with a prerecorded message saying who has fallen. The caregiver can press #1 to initiate a 2-way audio bridge to the lamp, to speak to the fallen individual. This is a great feature as it allows the caregiver to check in on the severity of the situation, reassure the individual, and provide an estimate as to when help will arrive. Within the app, a 2-way audio bridge can be initiated anytime during an active incident.

From the app, the caregiver can also view the sequence of events leading up to the alert, in 1 second increments, or initiate a real-time view of current state. This too is

very useful to assess current state and severity of the incident, as well as troubleshoot why the fall occurred. These images are also available historically, after the incident is closed as resolved.

When closing the incident, the caregiver can provide the reason for the incident, confirm that it was the resident that had fallen, etc, again serving to train the AI and provide resolution information.

An active incident is also displayed on the dashboard of the web app that might be installed at the nurses station. The profile card of the resident will show there is an active fall incident in progress. Clicking into the profile card allows the same active incident functionality described above – 2-way communication, image review, real-time status images, etc.

### **Multiple People**

Nobi currently does not distinguish separate individuals, and works best when only one person is within it's view. We found that during fall demos the lamp mistakenly noticed movement from bystanders, thereby not triggering a fall alert. Currently this limits the Nobi to use with a single resident per suite.

**Recommendation:** It would be great if Nobi was able to distinguish between several individuals by learning their movements or faces, but without having to manually set these up or teach the lamp during configuration. This is of value to operators since up to 30% of independent living suites are occupied by couples.

### **Two-way Communication**

This feature worked well, with good clarity and sound quality on both ends.

### **Activity Tracking**

The system tracked activities well enough it seemed, though more extensive testing would be required over a longer period of time with a larger sample population to assess this feature more completely.

### **Activity Triggers**

Just recently released, on the web app this is called "Monitoring Configurations", which enables the setting of activity-based triggers such as resident out of bed, sitting up in bed, in bathroom, or no resident detected. This allows for automated



checkins, negating the need for caregivers to manual check to see if residents are up and about. For example, a trigger could be set for resident out of bed. Nobi has a good explainer video [here](#).

### **Documentation & Videos**

Nobi has built out a comprehensive FAQ ([here](#)), along with manuals and guides. The team at Nobi is also very supportive with specific guides or user manuals as required, and the support team has been responsive and helpful, resolving our inquiries quickly and successfully.

The vendor has a YouTube channel, [here](#), mainly with product background videos.

### **Mobile App & Web App**

Both the web and mobile apps are comprehensive in their functionality, have a well designed and logical user interface, and provide a good user experience. It is clear that care has been taken with both the design and the utility of these apps.

Some of the nomenclature (for example, "Housing Units") is non-typical in North American, but clearly maps to communities, villages, or neighbourhoods, as determined by the enterprise structure.

### **Extensibility**

Well documented integrations are available, making it fairly straight forward to integrate data from this system into a nurse call system or other higher order resident management or care app.

## Purchase Options

Purchasing is available directly from the vendor or through affiliates, since sales are currently only done as B2B transactions.

Our purchase was made by contacting the vendor directly and working with their sales team. Their team was helpful and informative. Once our order was received, the lamp arrived within a week or so. Note that current shipping is from Europe, so some time needs to be allowed for delivery.

Note also that the associated invoice is in euros, and so needs to be paid accordingly in euros. We expect that once Nobli has local distribution, sales and invoices will be in local currencies.

Nobli has expanded purchase options beyond one-time purchase (capital cost) to include a subscription model over 7 years (the guaranteed lifetime of the hardware).

To make it easier to estimate the cost of Nobli products, they have built a useful online calculator tool that can be found [here](#). This enables calculation both as a one-time purchase and as a recurring monthly subscription. Note that the currency the calculation is done in is Euros.

If you would like to learn more about the Nobli lamp, we would be happy to address any questions you may have. Feel free to contact us at [info@agetechlabs.ca](mailto:info@agetechlabs.ca).

If you are ready to purchase a Nobli lamp, we can point you in the right direction. Feel free to reach out to us at [info@agetechlabs.ca](mailto:info@agetechlabs.ca).

## Product Specifications (as tested)

- Warm and cold LEDs for general lighting
- RGB LEDs for status lighting
- Infrared LEDs for night vision
- Both down and uplight
- Downlight:
  - 2700K Warm White (2384lm)
  - 6500K Cold White (2560lm)
- Uplight:
  - 2700K Warm White (592lm)
  - 6500K Cold White (640lm)
- 4 x 3.4MP IR sensors covering complete room
- HiFi class audio
- 50W output power
- 4 microphones for directional sound capture
- Noise canceling and beamforming software processing
- Wifi supported: 802.11b/g/n standard
- Bluetooth supported: Bluetooth 4.0 & Bluetooth 3.0+HS
- G.hn Power Line Communication supported for internal communication
- 256-core NVIDIA
- Memory 4GB 128-bit LPDDR4 Memory
- 1.33 TFLOPs
- 450mm diameter x 200mm height
- 3.2 KG

## Document History

We periodically update the information in this review. This is a quick view of what's been updated and when.

Original release	March 1, 2023	Full FX review.
Update	May 16, 2023	New look hardware; Product Description; Product Roadmap;

## Some Things to Keep in Mind

We hope you find our reviews helpful and instructive, and we do our very best to ensure they continue to provide value for both operators and vendors.

Here are some key points to keep in mind:

- **We aim to be suitably comprehensive in our testing.** Our testing aims to get a representative view of the product's function and performance, and to test the vendor's specific claims, in the real-world. The testing is not exhaustive, meaning that we do not test an infinite number of times, and we do not test every use case permutation. We aim to test the majority of use cases or permutations we believe would be of highest value to operators, so it is possible we did not test for your use case. If you cannot find something you are looking for, please reach out to us at [info@agetechlabs.ca](mailto:info@agetechlabs.ca).
- **We aim to be impartial in our testing and reviews.** We follow an adapted scientific method (reference [here](#)) so that our testing is structured and has grounding in science and applied engineering. However, we are human, and that means we bring our biases, likes, and dislikes to this process. Following the scientific method is meant to limit the impact of those on our testing and reviews, but sometimes our enthusiasm (or the opposite), may come through in our reviews.
- **We aim to provide a representative view of product function and performance.** Our testing and reviews do not guarantee performance or function of the product. Our goal is to provide a representative view of the how the product works, its areas of strength, and its limitations, as we see them. However, this does not guarantee how the product might work for you or your use case.
- **We are product agnostic.** We aim to provide an operator-centric, "how it works in the real-world" view of product functionality and performance, so in alignment with our impartiality, we are not product promoters. *Our testing and review of a product is not an endorsement in any way.* We do this work so operators can make more informed decisions of their own, and so vendors can receive some candid feedback to evolve their product.