



A (total) beginner's guide
to **lab automation**

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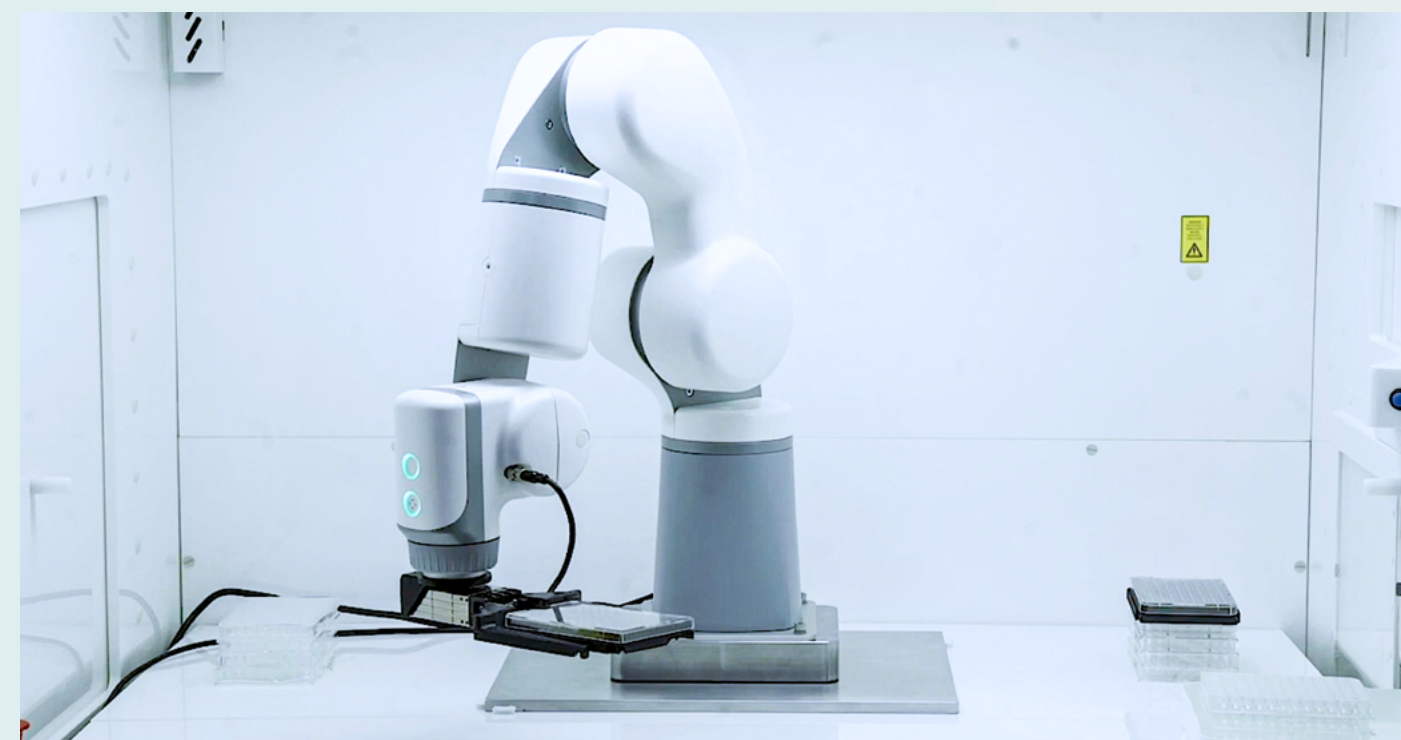
In this quick guide, we outline a simple checklist for success when you're just starting out with lab automation



Labs today are ripe for automation. Not only does integrating robotics into lab workflows allow workers to more effectively reproduce experiments, streamline throughput and increase efficiency, automation can also make their work lives much more satisfying – and much less repetitive.

'Integrating robotics into labs allows workers to more effectively reproduce experiments, streamline throughput and increase efficiency'

Although automation has existed in labs since the late 50s, lab robots of the past have been bulky, expensive and inaccessible. But the last few years have changed the game. New innovation in hardware and software has made robots far more accessible and affordable. And the benefits are unmistakable. Yet getting started can be intimidating for a load of reasons, from cultural resistance, to lack of knowledge about the best vendors.



To help make the process more straightforward, we've put together a short guide outlining the core steps on your journey to automation. This checklist isn't exhaustive (planning requirements inevitably vary business to business, industry to industry) but it's a great starting point for your team.

Benefits of lab automation

Before we get started, let's quickly look at the impact of lab automation. Here are some of the (many) benefits of integrating robots into your team's day-to-day:

- 1 Increased walkaway time for your staff**, so they can focus on analysing results and planning the next protocol, as well as avoiding repetitive strain injuries
- 2 A safer working space**. With robots automating some of the more dangerous jobs, your staff don't need to risk hazardous environments - and social distancing can be comfortably ensured
- 3 Increased reproducibility of results** by removing human error
- 4 Greater throughput** making your experiments and processes more efficient and faster
- 5 A serious reduction in operational costs** as a result of all the above

Now, let's start at the beginning.



Project ownership and stakeholders

The first step is to identify who in the organisation is going to be affected by automation, how you're going to assign responsibility and how to approach educating your team. This can be covered with three key steps:

✓ Assign a project owner and define your project team

Who will own the project overall and be responsible for its success? Will different team members be accountable for various aspects of the deployment? Who needs to be updated on progress?

✓ Understand your various stakeholders and champions

What people in your lab, or which departments, are advocates of automation? Who will be flying the flag and who has control of the budget?

✓ Educate the team well in advance

It's incredibly important to address any concerns well before you start the automation process. Some colleagues may (understandably) worry about job security, or about working with the new technology. To help ease these concerns, focus on the benefits the robot will bring: Taking on some of the most repetitive jobs, enabling them to work more efficiently and freeing them up to focus on more interesting tasks.



Project mapping

Mapping out your project is the next step to help you understand where automation is going to be most beneficial for your team. We'd recommend approaching it like this:

✓ Outline your objectives

You must understand the urgent drivers for this robot/s. Why are you considering this investment in robotics? What problem are you trying to solve? What are you working towards and what do you hope to achieve?

✓ Audit your current manual processes and workflows

In order to prioritise, consider the manual processes you currently have in place in your lab, from specimen receipt through reporting of results. How are they managed? Where are the biggest bottlenecks right now?

✓ Prioritise your processes

You should automate your quickest wins first. In the lab, this is normally the work that's the most repetitive and routine, or particularly time-consuming and requires a lot of precision. So, start by automating just one machine or a small part of the process and then build from there. For example automate the plate loading into a liquid handler, before adding in an incubator or plate reader to automate an entire assay.



✓ Measure and set manual baselines

In order to assess success and ROI later, you'll need to know what you're benchmarking against. Understand your baselines for throughput, time spent on the process, cost, reproducibility and more.

✓ Understand what success will look like

Where are you now and where do you hope to be? What indicators are you looking for to prove that automation will have been a success? How will you measure success in your lab, and what payback period are you looking for?

✓ Create your project plan and timeline

Break down the integration step by step. Are there experiment goals you have to hit, such as a number of specimens processed? If so, work the timeline backwards and factor in buffer time for unforeseen delays.

Preparing your environment

Mapping out your project is the next step to help you understand where automation is going to be most beneficial for your team. We'd recommend approaching it like this:

Scope out technical requirements for the robot

How heavy are the loads you will need the robot to carry? What level of reach, accuracy and repeatability do you require? What daily runtime will you require?

Scope out technical requirements for peripherals

What kind of [end of arm tooling or gripper](#) do you require? Will it be provided with your robot? Can you build it in-house or will you need to acquire it from a specialist supplier?

Scope out integration requirements

Will you need to integrate with a liquid handler, microplate reader or other integrations? If so, do you have the necessary technical resources in-house to own this aspect of the project, or will you need to work with an integration partner?

Prepare your workspace

Where and how will your robot be mounted? Can it attach to the existing lab bench or equipment, or will you need to engineer a new platform to sit alongside your equipment and team?

Define any safety requirements

Will humans be working alongside the robot? If so, make sure any identified risks are mitigated against. Ensure any end of arm tooling is also included in [risk assessments](#).

Testing and optimisation

Before you fully integrate a robot into your lab, you should first test out what you want it to do and find if there are any ways to optimise the process. These steps should help:

Define your test period

Define the process(es) you will be testing and the time period over which you will be testing before you start using the robot in the lab.

Understand the test metrics that matter

What will you be measuring and how often? Who will be responsible for measurement and reporting? What indicators of success are you looking for?

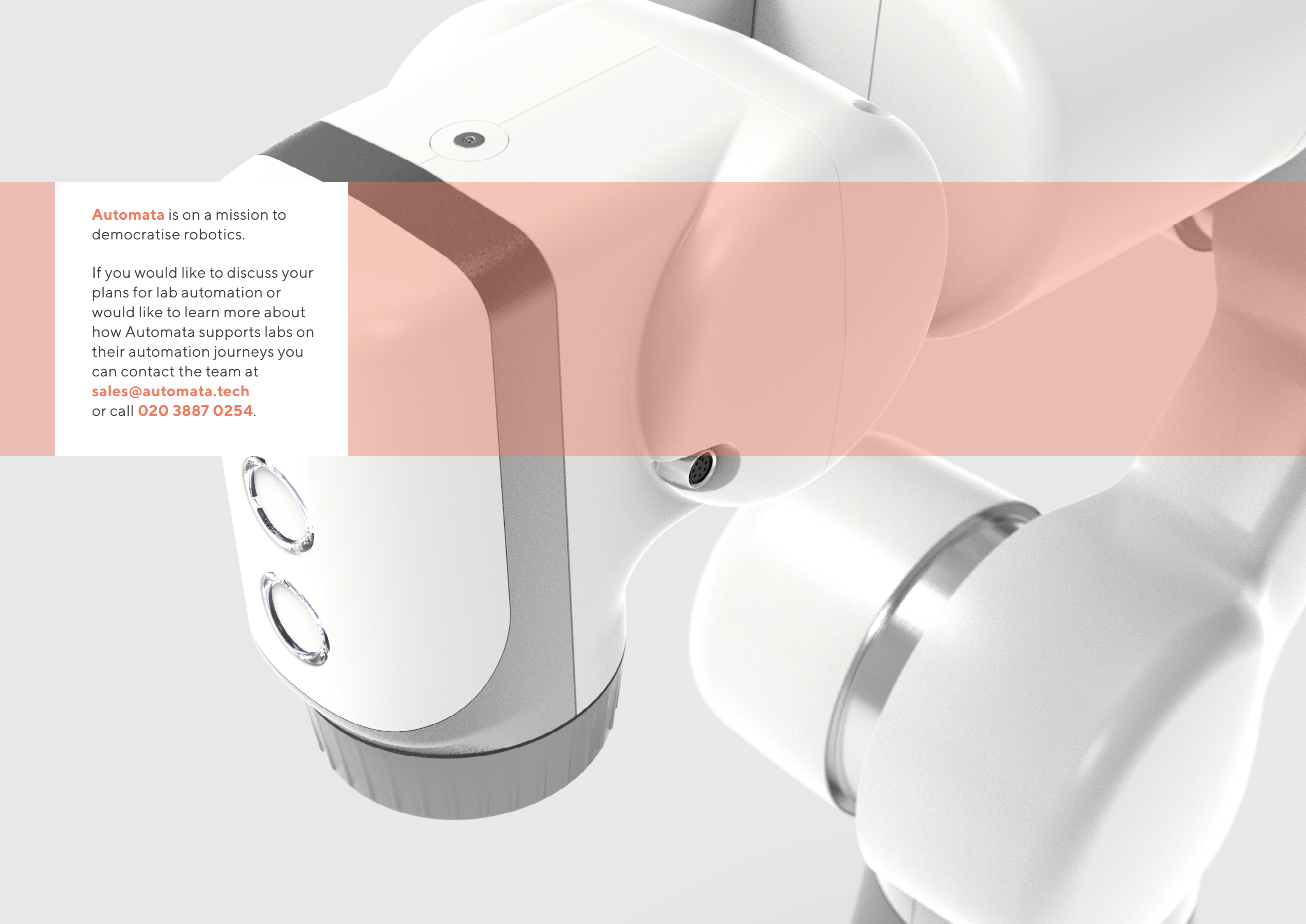
Moving from testing to deployment

When you've acquired your robot and tested it thoroughly, it's time to put it to work! To make sure that you're getting the most out of lab automation, follow these final steps:

- ✓ **Set clear KPIs and outline a review and reporting schedule**
What targets do you need to hit? Who do you need to keep apprised of progress and how often?
- ✓ **Roll out a training programme**
Who will be using the robot day to day? What training and upskilling will they require?
- ✓ **Communicate clear ownership**
Who is responsible for daily management of the robot in the lab? Who is responsible for any changes or adjustments to programming if required? Who is responsible for maintenance, reporting and data?

Finally, keep it simple, but design for scale. This is particularly important if it's your first lab robot. Start with the one or two simplest processes to automate and use them as an opportunity to learn, ensure the whole team is up to speed and to help prove the business case for future lab automation projects.





Automata is on a mission to democratise robotics.

If you would like to discuss your plans for lab automation or would like to learn more about how Automata supports labs on their automation journeys you can contact the team at **sales@automata.tech** or call **020 3887 0254**.



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