Frequently Asked Questions (FAQ) about MEMS development

Q: Why should I develop a new MEMS technology with AMFitzgerald instead of with a foundry?

A foundry's main business is high-volume wafer manufacturing. Their facility, equipment, staff, and job-queuing is optimized for production. A foundry's profitability depends critically on high utilization of its expensive resources, so the needs of production customers with large orders are prioritized. In this environment, development projects often suffer from lack of attention.

AMFitzgerald's business is focused on technology development. Our expert staff will process your wafers, not line operators. This allows important process data to be gathered at every step by our engineers, who have the discretion to make immediate mid-process corrections. We can iterate and manage risk more tightly, resulting in faster prototype development and a richer set of proprietary data on your design and process.

Q: But if I develop first with AMFitzgerald, won't I pay a penalty when I have to later transfer my project to a foundry for volume production? It seems more efficient to develop directly at the foundry.

It may seem so, but in practice, it's ultimately faster and less expensive to start with us. Our main value as expert developers is de-risking your design and process as quickly as possible, and generating IP along the way which you will own outright. Owning the IP will enable you to shop around and choose from among several foundries.

Because of our collegial relationship with most foundries' engineering teams, we can execute a very efficient transfer, with expert-to-expert communication. Foundries are happy to receive transfers from us because they know we have already eliminated the major process risks. As a result, they will offer better pricing to you if they perceive lower risk for the transferred project.

Beginning development with a foundry creates a number of risks for a customer. First, unless the foundry is already comfortable with your device technology, you may be charged more because of the perceived process risk of new technology. Your project may get sidetracked in favor of priority production customers, stretching out the development timeline. If you don't have MEMS expertise on your staff, you may have trouble managing the foundry team or any debugging. Finally, if the foundry is designing for you or incorporating its own process modules, you may have to share IP ownership with the foundry.

Q: AMFitzgerald fabricates prototypes at a university facility. How can I be sure the process developed will be achievable in a production fab?

UCB Marvell Nanolab was built brand new in 2009 and has modern 150 mm equipment, with many workhorse tools you would find at any production foundry. However, we know that no two facilities have identical equipment sets. During development, we prioritize using generic processes which we know can be run at any competent MEMS foundry.

The key information we will develop is not the runsheet, which cannot move from fab to fab, but the process tolerances that are essential to your device performance and its yield. When we transfer your project to a foundry, we will provide this essential data to the foundry engineers, and we'll teach them how we executed your prototypes.

Q: I already have a relationship with a foundry, and/or I want to use a particular foundry's process platform to build my sensor. How can AMFitzgerald help?

We can optimize any MEMS design for a specific foundry's capabilities. We would use the foundry's design kit and any process information as input to our design process. Then we would arrange fabrication of the prototypes directly at the foundry. (In this scenario, prototypes would not be fabricated by AMFitzgerald.)

Using a foundry's existing process platform is an excellent option when you need sensor customization, not innovation. The platform helps speed time to market because the time and risk of new process development is eliminated. However, the foundry owns the process IP, which means that the design we develop can only be fabricated by that specific foundry. If in the future, you have a need to change foundries, device re-design will be necessary.

Q: AMFitzgerald's team seems small. How can it manage a full development project?

Actually, our team is the same size as most core design teams at the largest MEMS manufacturers. We rely on our many external partners to provide the sub-specialty expertise one might find within a vertically-integrated company. As a result, we operate with the capabilities of a 100+ person company.

Our company puts heavy emphasis on up-front project planning and coordinated project execution with partners. As a rule, we seek to minimize meeting time and rely on our administrative assistants to execute non-technical tasks. This enables our technical staff to spend nearly all of their time doing client work, which makes them highly effective.

Q: How do you handle IP?

Simply. You, the customer, will own whatever we create for you ("work made for hire"), such as the design and process flow design (the sequence of steps to fabricate your device). As per US and EU patent law, if our staff contributes materially to your patent, we must be named as inventors, however, the ownership rights will be assigned to your company.

If you teach us a specific proprietary process, it's your IP and we won't reuse it. However, if while doing your project, we make improvements on existing processes we already know, then we retain the right to reuse that new know-how.