

# No step without the customer

How customers are instrumental in product development

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The development of new products is a well structured process within ABB. For a variable speed drive, for example, it can take up to two and a half years from the definition of the initial concept to market introduction.

During that time the ongoing issue for the developers is to find out what customers actually expect from the new drive.

This investigation is an art in itself because customers favor their own application-specific details and would like the perfect drive designed specifically to meet their own precise needs.

## Collaboration gateway

Product development as well as technology development and research at ABB follow a structured process based on a sequence of well defined gates. Progression to the next gate is prohibited until all tasks relating to the previous gate have been completed.

There are eight gates or project phases <sup>1</sup> that are referred to as “go/no go” decision points:

- Gate 0: Project kick off
- Gate 1: Project planning finalized
- Gate 2: Project execution starts
- Gate 3: Confirm execution
- Gate 4: Start product introduction
- Gate 5: Product market launch
- Gate 6: Close project
- Gate 7: Retrospective investigation of project

A business based decision point determines whether or not to continue or terminate a project based on benefits, status, resources, technology and risks. Customer involvement is required at each step and is instrumental in ensuring a successful product launch. In some steps they are especially integrated to answer crucial gate questions. For example:

- *Gate 1:* Is it clear which kind of product we want to create from the customer and competition perspective and is the project scope clear?
- *Gate 4:* Do we want to start the product introduction activities at full scale? What feedback has been received from Alpha-pilot customers<sup>1)</sup> and selected applications?
- *Gate 5:* Is the product ready for general release? What feedback has been received from Beta-pilot sites<sup>2)</sup>?

Do customers “need” what they “want”?

ABB attempts to acquire feedback at various stages of the Gate Model from a broad selection of customer types including end-users, OEMs, system integrators and channel partners. However, overall development is directly influenced by feedback between Gates 0 and 1. It is here where it is essential to clearly distinguish between the “needs” and the “wants” of a customer. It may be that the designers can then satisfy these needs in a novel way.

Finding out what customers actually expect from a new drive is an art in itself because they would like the perfect drive designed specifically to meet their own precise needs.

For example, one customer demand was for a small size ABB industrial drive unit. Recent technology developments have seen the inverter modules dramatically decrease in size thereby reducing the average length of the MultiDrive to half its previous size. However, to further economize on space, engineers designed these small modules so that they could be tilted inside the drive cabinet.

In another development, current-carrying copper cables could not be made any smaller and so ABB designers created an innovative pedestal construction that now allows the power unit to slide out of the drive so the cabling can be reached.

**Developing a high performance drive**  
Recently, ABB launched a new generation of high performance machinery drives, referred to as ACSM1 and aimed at demanding motion control applications <sup>2</sup>.

The concept should open up a new era in drive technology with its ability to control several different motor types. Rather than being just a drive for special servo motors, it can control standard induction motors, synchronous and asynchronous servo and high torque motors with various feedback devices.

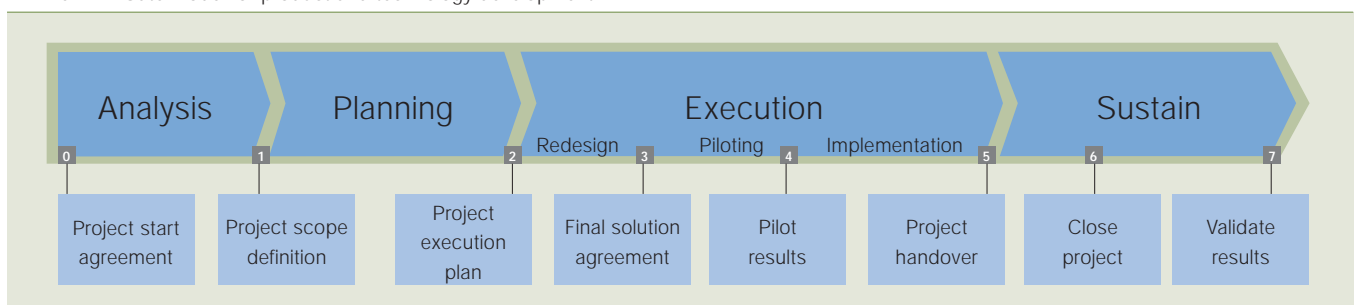
But aiming for such a powerful platform also runs the risk of offering the customer too many features. After all, if a drive with servo-like performance could control all motor types, then almost all applications could be served, a risk in itself as the focus of the development could easily get lost. In any case, no customer wants to pay for features they will never use.

To avoid this trap in product development ABB uses two different approaches: selecting lead customers and consulting reference groups.

### Factbox 1 UniLift Control Technologies Ltd

UniLift Control Technologies Ltd is part of the Pickering Lifts Group, an independently owned organisation specialising in lift design, manufacture, installation and service in the UK and Europe. The group employs over 500 people, including 150 at its UK manufacturing site.

<sup>1</sup> The ABB Gate model for product and technology development





### Working with lead customers

One application of ABB's high performance drive system is elevators. To ensure the right features were further developed, ABB solicited the help of one of the world's leading elevator manufacturers, Italy's UniLift Control Technologies Ltd <sup>Factbox 1</sup> in Milan, and its system integrator, Starlift.

Beginning at Gate 1, ABB needed to know precisely what features UniLift was seeking; what their priorities were, and what was and wasn't available on the market. Equally as important for ABB was a true understanding of elevator technology which encompassed lift manufacturing and the industry's own culture and processes.

ABB's new generation of high performance machinery drives, ACSM1, is aimed at demanding motion control applications.

It is important to have a clear picture about the entire system and how it relates to the elevator application before tackling the drive and shaft level details. At a system level, for example, there are many possible combinations of solutions and each can influence the performance of the elevator system.

What became apparent early on in the discussions was that many basic features of the ABB high performance drive were already suitable for elevators. These included:

- The ability to control synchronous motors, which are gaining in popularity within elevators
- Two control variants, speed and torque or motion control for different control philosophies

#### Footnotes

<sup>1</sup> Alpha-pilots are functional prototypes based on fast prototype tooling.

<sup>2</sup> Beta-pilots are functional prototypes based on final mechanical tooling and are manufactured on an actual production line.

<sup>3</sup> A braking chopper is used for dissipating braking power away from the direct-current rails of an AC drive system.

- Wide range of feedback interfaces giving freedom to select the best speed or position control setup
- Different communication options
- Integrated braking chopper

Additional features needed were also identified:

- *Battery supply support* – needed to allow the elevator cabin to move to the next level after a loss of mains power
- *Safe torque off functions* – is a cost efficient way of stopping the elevator cabin according to industry standard EN 81-1.

Along with an enhanced customer relationship, the venture between ABB and UniLift has created fertile ground for future visionary ideas and open-minded innovations. These include four to six different set points for speed, a specific s-curve (jerk) control for some speed settings, and the handling of gear and roping ratios with the possibility of a direct set-up of cabin movement parameters.

### The value of reference groups

Apart from external customers, ABB also runs reference groups made up of a cross section of internal representatives who are at the heart of daily customer activity in various industries. These reference groups therefore bring

a good mix of direct customer feedback to the product development process.

Such a group, made up of ABB personnel from eight countries was used during the development of the liquid cooled ABB industrial drive. Each team member represented an industry in which liquid cooled drives could be applied. The industries represented included marine, wind power, offshore production platforms, and pulp and paper.

The use of reference groups and lead customers throughout the development process helps to both increase the focus and broaden the base of applications

Among the findings from the group was the need for a much smaller drive footprint. This demand is driven by several industries where space is a premium. Offshore applications, on board ships, cranes and the nacelle of wind turbines would certainly benefit from smaller devices.

Alongside this requirement is the need for a smaller, yet high powered brak-

2 The new ABB ACSM1 drive unit



## Collaboration gateway

ing chopper<sup>3</sup>). The braking chopper of previous drive generations was too large to fit into the required smaller footprint. At the same time the market was waiting for one with a power range that extended up to 5,600 kW.

Recent technology developments have seen the inverter modules dramatically decrease in size thereby reducing the average length of the MultiDrive to half its previous size.

### Customers play their part

Basic performance and promised features of new products have to be

extensively tested: a win-win opportunity for the customer and ABB.

For the ABB high performance machinery drive, UniLift benefited by being able to influence product specification and by getting direct and real experience with lift features.

For the larger liquid cooled ABB industrial drive, the German vertical drilling machine manufacturer, Herrenknecht Vertical GmbH **Factbox 2**, agreed to act as a pilot customer. They reckoned the potential of the liquid cooled drive to meet the unusual needs of the company's "Terra Invader 350" vertical drilling machine (designed for geothermal drilling to depths of 6,000 meters) was good. What particularly interested the company was the small drive size combined with its high power output, and

### Factbox 2 Herrenknecht Vertical

Founded in 2005, Herrenknecht Vertical is an ISO 9001 certified company of the Herrenknecht group, specializing in the manufacture of deep drilling rigs. The custom-manufactured rigs, which are silent, safe and particularly efficient, allow for the development of geothermal energy sources and oil, gas or water at a depth of 3,500 to 6,000 meters. The competence team of Herrenknecht Vertical is supported by partners from industry and science, independent consultants and the Herrenknecht group, which is the leading solution provider in the field of mechanized tunneling systems and services.

[www.herrenknecht-vertical.de](http://www.herrenknecht-vertical.de) (June 2007)

Herrenknecht Vertical GmbH needed a drive system with one MW power in a container of less than one cubic meter.

### The fringe benefits of collaboration

By using reference groups and lead customers throughout the whole development process it is possible to both increase the focus and broaden the base of applications.

Customer involvement not only provides valuable insight on the subject but also helps to bring more discipline into the internal process. Engineers and researchers are always confronted with the customer needs and with that they have a tighter grip on the development.

The fact that ABB is the world's leading supplier of drives reflects its close links to customers already in the R&D phase.

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