Savia™

Digital Bionics

Natural wisdom
captured in technology

PHONAK
hearing systems

Natural wisdom captured in technology

Nature has bestowed the Snow Owl with a wondrous ability to adapt to its environment continuously. Savia is the first hearing computer to implement the unique capabilities of biological systems using state of the art digital technology – we call it **Digital Bionics**.

Savia with Digital Bionics: Effortless hearing in all environments.

Savia with Digital Bionics - the greatest revolution since the introduction of digital technology

The bionic principle inspires outstanding technological solutions using the optimized approach of biological systems. Applying the bionic principle, Phonak offers revolutionary solutions to significantly improve the quality of life for your clients. Savia is the first system to exploit the full potential of digital technology. The unique combination of cutting edge hard- and software innovations leads to a new level of user satisfaction.

Savia is packed with an impressive list of revolutionary bionic solutions like SoundNavigation, Real Ear Sound and digital SurroundZoom, all inspired by Nature's wisdom. Savia state-of-the-art digital technology allows natural, effortless hearing.

The remaining challenges of modern communication

The introduction of digital technology has been a milestone in hearing instrument innovation. The resulting products have truly improved the communication abilities of hearing impaired people. Phonak has been instrumental in introducing true digital innovations such as the adaptive digital AudioZoom and PersonalLogic. To fulfill the ultimate promise of digital technology, the remaining key challenges have to be met:

- Effortless hearing in an infinite number of environments
- Understanding in the presence of multiple noise sources
- Natural localization abilities
- Comfortable communication in echo-filled environments
- Feedback-free unoccluded fittings
- Intuitive and effortless fitting of sophisticated features

Savia – the quantum leap

The Savia system architecture, together with the newly developed iPFG fitting software, addresses all of these challenges in a unique and integrated way. The key Savia functionalities can be grouped into the following main clusters:

AutoPilot

Optimal audibility, comfort and intelligibility in an infinite number of listening situations.

AutoPilot automatically navigates through the auditory environment by precisely analyzing and classifying the sound scenes. SoundNavigation then compiles a powerful set of customized functionalities. For ultimate convenience AutoPilot also detects telephone and FM signals. EasyPhone and EasyFM switch to the appropriate input or program – automatically.

AutoFocus

A new dimension in multi-microphone control

AutoFocus restores natural localization ability and provides unsurpassed speech understanding in the presence of multiple interfering sound sources. It offers two outstanding innovations in the use of microphone technology: digital SurroundZoom, the unique 20 channel beamformer, and Real Ear Sound breakthrough technology, restoring the ear's natural localization abilities – also for BTE users.

SoundCleaning

Ease of listening and comfort without compromise

SoundCleaning, with High Resolution Noise Canceler and Wind Noise Management, scans and effectively eliminates the disturbing components in each signal. Together with the unique Savia EchoBlock and the Feedback Phase Inverter they enhance listening comfort and speech understanding significantly.

DataLogging

Facilitates communication between you and your client

DataLogging with User Preference Tuning is a unique tool for client follow-up and counseling – providing objective client feedback for better tuning results. Savia learns about each user's personal hearing preferences and empowers you to optimize settings accordingly. It is the next best thing to being with your client 24 hours a day.

iPFG Successware

Transforms the raw potential of Savia into personal user benefits

A completely new Phonak fitting software has been designed to match the unique fitting capabilities of Savia. Never before has a software fitting package offered so many opportunities for success.

AutoPilot

Effortless hearing through next generation automatic performance

The complex signal processing capabilities of biological systems are reflected in the unique performance and sophistication of Savia's Bionic Perception Processing. At the heart of this technology the AutoPilot subsystem recognizes a multitude of sound environments in 20 channel resolution, using a sophisticated, experience-based, classification system. Once the sound environment has been identified, the automatic SoundNavigation smoothly activates the optimum parameter set to meet the identified listening target.

For ultimate convenience, AutoPilot also automatically detects telephone and FM signals. EasyPhone and EasyFM switch to the appropriate input or program – automatically.
Only AutoPilot is able to adapt to the richness of natural sound environments and respond with a unique level of flexibility to meet all clients' hearing expectations, everywhere.

After a long day in the office, Cathy Davies is looking forward to a relaxing evening at home. While out on the street, her listening expectation is sound awareness without too much amplification of traffic noise. Once at home she turns on the stereo. As a music lover, she expects her hearing system to perform very differently, providing a full, rich sound.

The Savia solution

Savia with SoundNavigation identifies the sound scene correctly and automatically fades into the respective base program. Cathy's hearing comfort in the street is assured, in the same way that her pleasure of music is complete. Savia accomplishes this transparently and automatically.

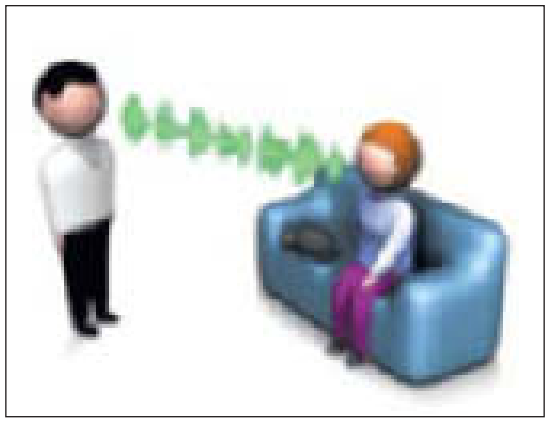
SoundNavigation

Optimal automatic performance in an infinite number of environments

The acoustic environment is ever changing and individual, but research shows that everyday situations can be grouped into four main clusters, which cover virtually every listening situation. The clustering and the respective hearing expectations are consistent across all subjects, at the same time they vary significantly from each other. In each of these four basic clusters the hearing system has to meet the specific hearing expectations. These findings are the foundation for the unique SoundNavigation automatic.

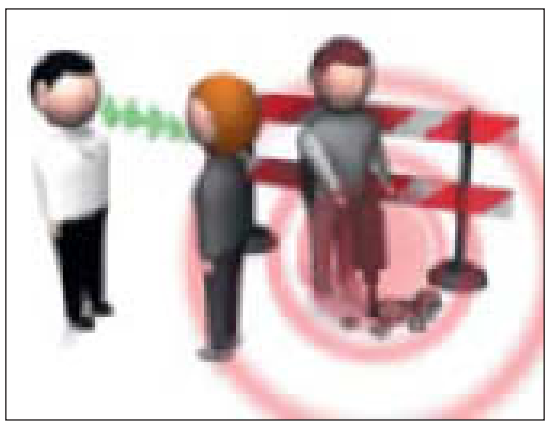
The 4 basic hearing expectation clusters

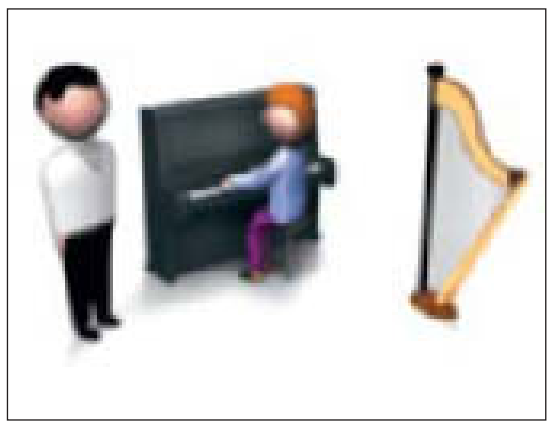
Calm situations
Hearing expectation:
Overall sound awareness and effortless hearing.



Noise only
Hearing expectation:
Awareness of sound environment (audibility) or noise suppression (comfort), depending on personal preference.

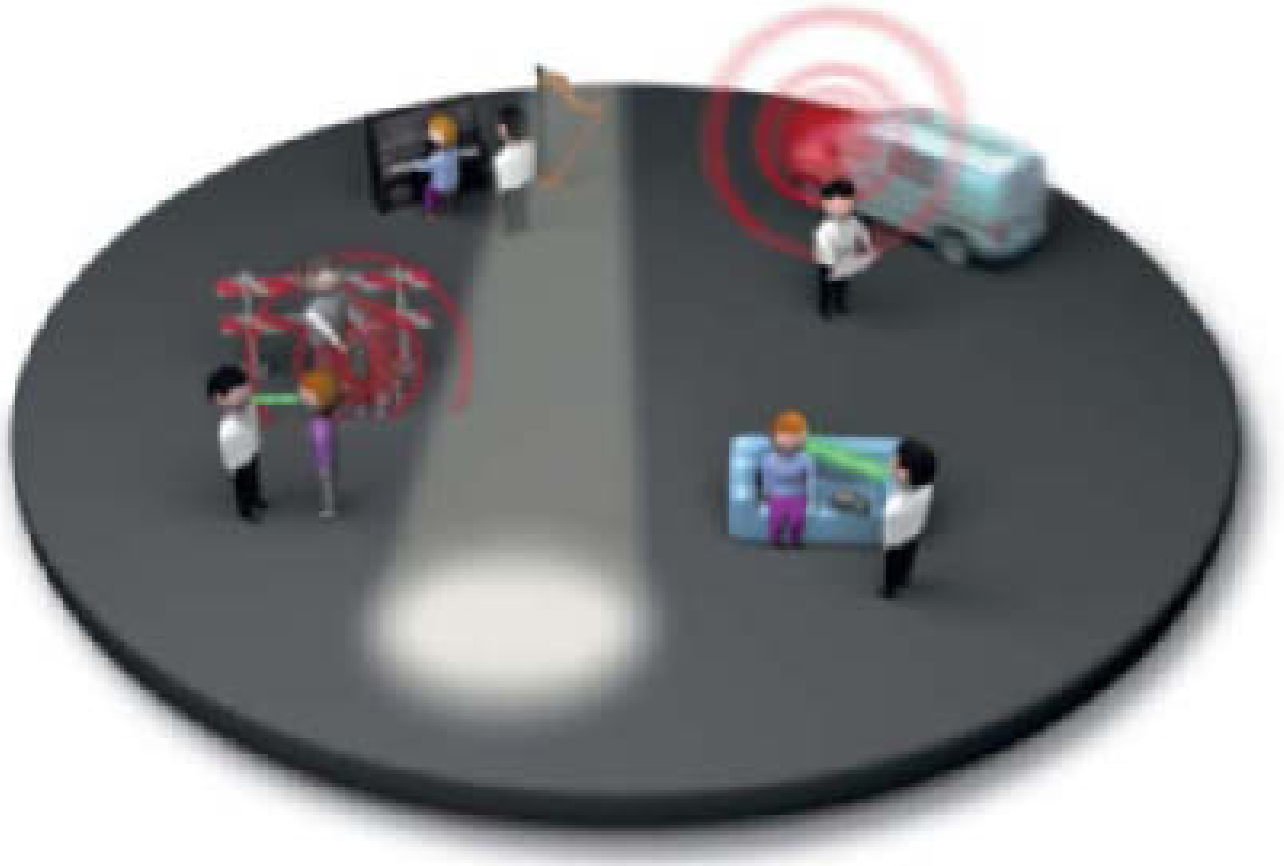
Speech in noise
Hearing expectation:
Focus on speech intelligibility while effectively suppressing multiple noise sources.





Music
Hearing expectation:
Rich, full, undistorted sound.

Traditional hearing solutions try to meet the 4 hearing expectations by modifying parameters of a single base program. The advantage of the Savia multi-base approach is that each of the 4 hearing expectations is separately addressed by a fully dedicated and highly adaptive program. The multi-base approach also facilitates fine tuning significantly due to the independent nature of each base program. Only with the Savia multi-base automatic is it possible to fully address the richness of each individual's hearing expectations. Fading smoothly between the 4 base programs, SoundNavigation ensures optimal performance in an infinite number of environments.



Conventional digital hearing instruments try to find the best parameters of one multi-purpose base program to achieve a reasonable compromise. Any fine tuning for one specific hearing expectation is done at the expense of all the other situations.

Each of the Savia base programs addresses specifically one of the hearing expectation clusters. Like four independent computers, each base program finds the optimum system configuration for the specific sound environment. Fine tuning for each specific hearing expectation can be done independently.

EasyPhone and EasyFM

Redefining user friendliness

While the effectiveness of telephone use and FM technologies has long been recognized, many users do not benefit from these features because they fail to activate them at the right time. EasyPhone and EasyFM ensure automatic access to these highly useful features for a wider user group. AutoPilot constantly scans the listening environment to detect telephone or FM signals.

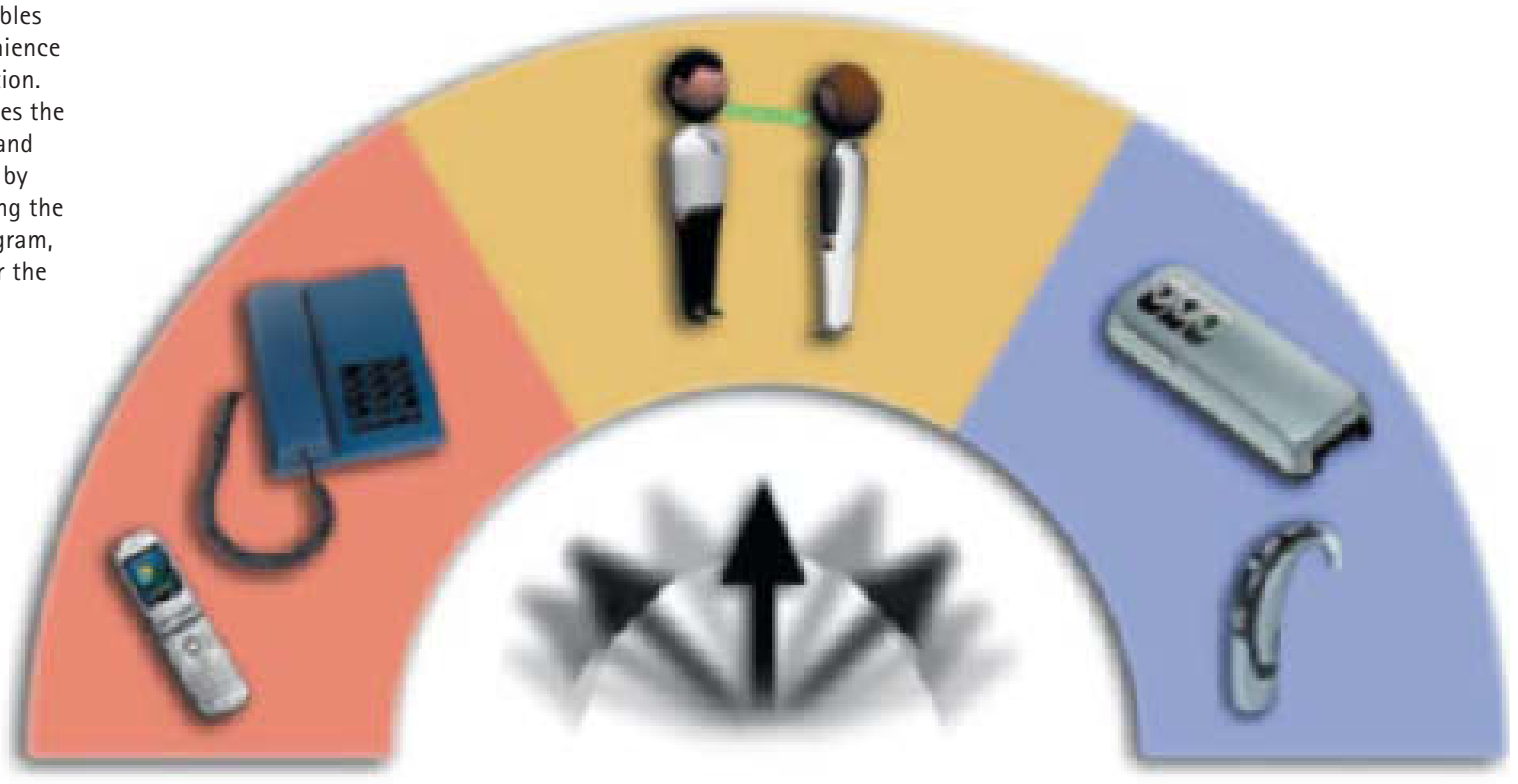
EasyPhone

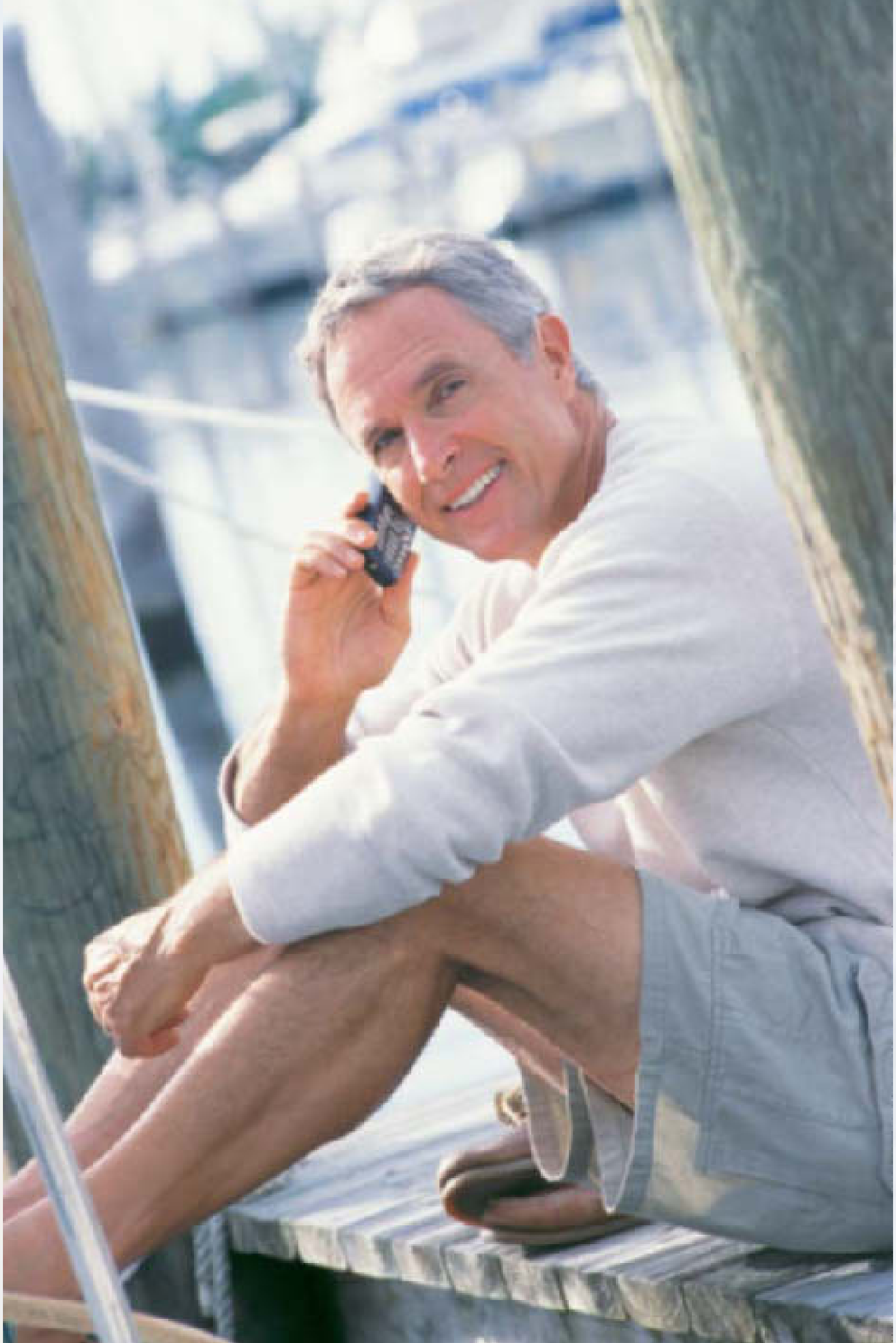
Savia switches to the selected telephone program (either T-coil or acoustic phone) when the telephone receiver is placed near the instrument. The Feedback Phase Inverter ensures feedback-free conversations. EasyPhone is also compatible with wireless and cellular phones.

EasyFM

Savia is the first hearing instrument that recognizes the presence of an FM signal. Once this is recognized, Savia activates the FM program automatically. This breakthrough feature will make the outstanding benefits of FM appealing to a wider range of users.

Savia technology enables a new level of convenience in input source selection. The AutoPilot identifies the correct input source and responds accordingly by automatically selecting the appropriate base program, the phone program or the FM program.





AutoFocus

Natural localization and exceptional performance in the presence of multiple noise sources

AutoFocus brings a new dimension to multi-microphone control. Once AutoPilot has selected the correct base program and adapted the relevant system settings, the most appropriate AutoFocus option is activated.

Savia features three alternative microphone modes: omnidirectional, Real Ear Sound, and digital SurroundZoom. Real Ear Sound, a world first, brings the advantages of a CIC microphone placement to a BTE restoring natural localization abilities. The digital SurroundZoom is the only directional microphone system with 20 channel resolution selectively suppressing multiple noise sources.

Returning from work, Linda Palmer would like to discuss the upcoming important meeting with her partner Graham. They are at the train station where the noise of the trains, track maintenance and music from street performers compete with their conversation.

The Savia solution

Savia with AutoFocus enables Linda to conveniently carry out a conversation in this very difficult listening situation by activating the digital SurroundZoom. It suppresses the multiple annoying background noise sources simultaneously, while enhancing her speech understanding.

Real Ear Sound

The most natural hearing experience ever achieved in a BTE

The human pinna is a design masterpiece. Its shape and position on the head create frequency dependent directionality which is used by the brain to localize sound. Front-to-back localization uses frequency dependent intensity cues to determine the sound origin. This cue differentiation is essential not only for front-to-back localization, but also for natural sound perception.

The pinna front-to-back localization abilities are lost when the microphone is placed behind the ear. This impacts users' orientation abilities as well as their sound perception. Spontaneous user acceptance and long-term satisfaction are negatively affected.

As a world premiere, Savia's Real Ear Sound is able to re-introduce natural localization abilities to users of Behind The Ear instruments.

Restoring the frequency dependent pinna effect requires the ability to adjust directivity in a significant number of frequency bands. Real Ear Sound uses the 20 channel high resolution filter bank to restore front-to-back localization and natural sound perception.

Real Ear Sound is a revolution in hearing instrument sound processing.

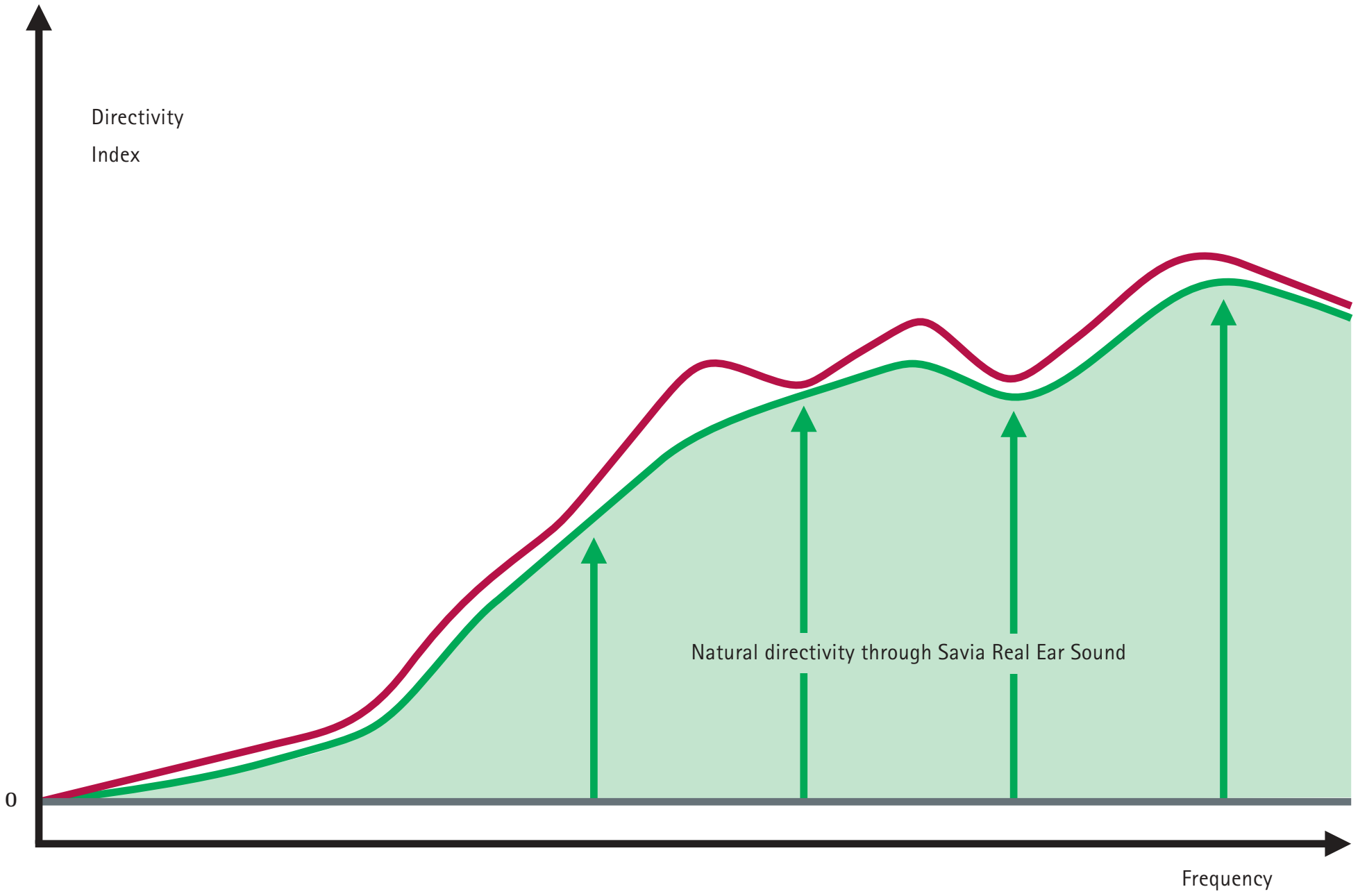
Hearing with natural front-to-back localization

Loss of localization cues due to microphone position behind the ear

Restored localization with Real Ear Sound

Real Ear Sound

Restoring localization and natural sound perception



Natural frequency dependent directivity of the pinna

With the microphone position behind the ear the pinna's directivity is lost

Real Ear Sound restores the natural directivity of the pinna

Digital SurroundZoom

The new benchmark in multi-microphone technology

Phonak was first to introduce multi-microphone technology and the first to take directionality into the digital age with adaptive AudioZoom. With Savia digital SurroundZoom technology, a new milestone has been set. Digital SurroundZoom is the first high resolution beam former with 20 independent beams.

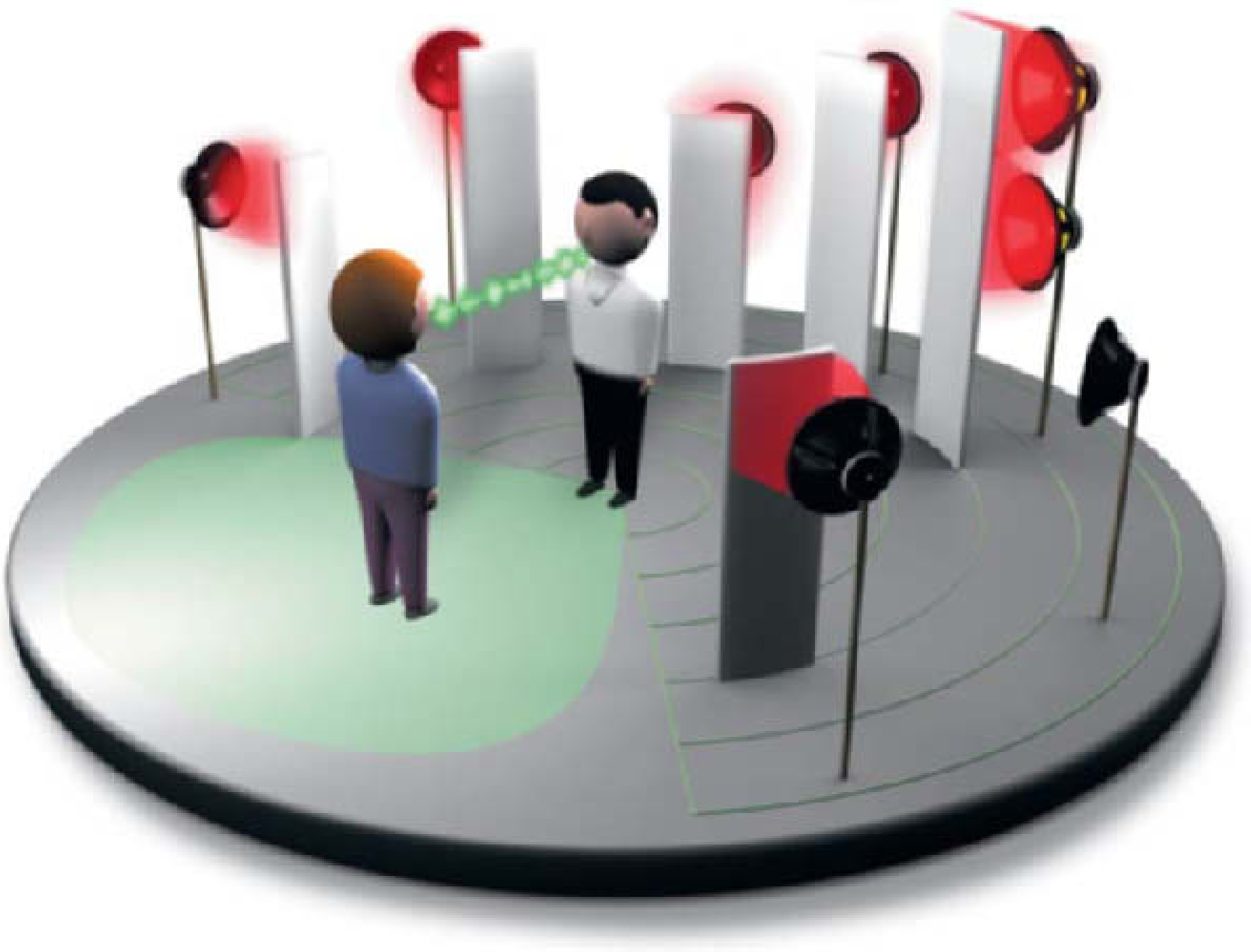
In order to fulfill the hearing expectation of understanding speech in complex situations, a hearing system has to be able to suppress the noise effectively while enhancing intelligibility. It has been clearly established that directional technology is the most effective way to achieve high levels of user benefit and satisfaction.

Before Savia, only a single or a very limited number of noise sources could be suppressed. Day to day listening situations, however, contain multiple and moving noise sources. Digital SurroundZoom splits the incoming signals into 20 independent channels and identifies the strongest noise source per channel. Once the noise source has been identified, the digital SurroundZoom calculates the optimal directivity per channel. This ongoing real-time process also tracks moving noise sources.

Digital SurroundZoom, the new benchmark in multi-microphone technology, is able to address the actual complexity of real life communication challenges by selectively suppressing multiple noise sources.

The desire to enhance speech over noise for easy understanding can now be fulfilled in a dimension never seen before.

Current directional systems can only suppress a single or a very limited number of noise sources.



Digital SurroundZoom can locate and simultaneously suppress multiple noise sources, enabling Savia users to better meet the challenge of communication in noisy environments.

SoundCleaning

Comfort and ease of listening without compromise

SoundCleaning is another essential step in the Savia signal processing path. A range of innovative features scan the signal to identify and eliminate disturbing components. The smooth and effective interaction of the SoundCleaning elements results in unprecedented transparency of sound.

The four SoundCleaning elements are:

- the novel EchoBlock
- the high performance Feedback Phase Inverter
- the effective High Resolution Noise Canceler
- and the unique Wind Noise Management

Together they guarantee ultimate sound comfort and ease of listening.

Alison Wright has been looking forward to the reunion with her friends for ages. She is keen to actively participate in the conversation. Speech understanding in this echo-filled restaurant is a real challenge.

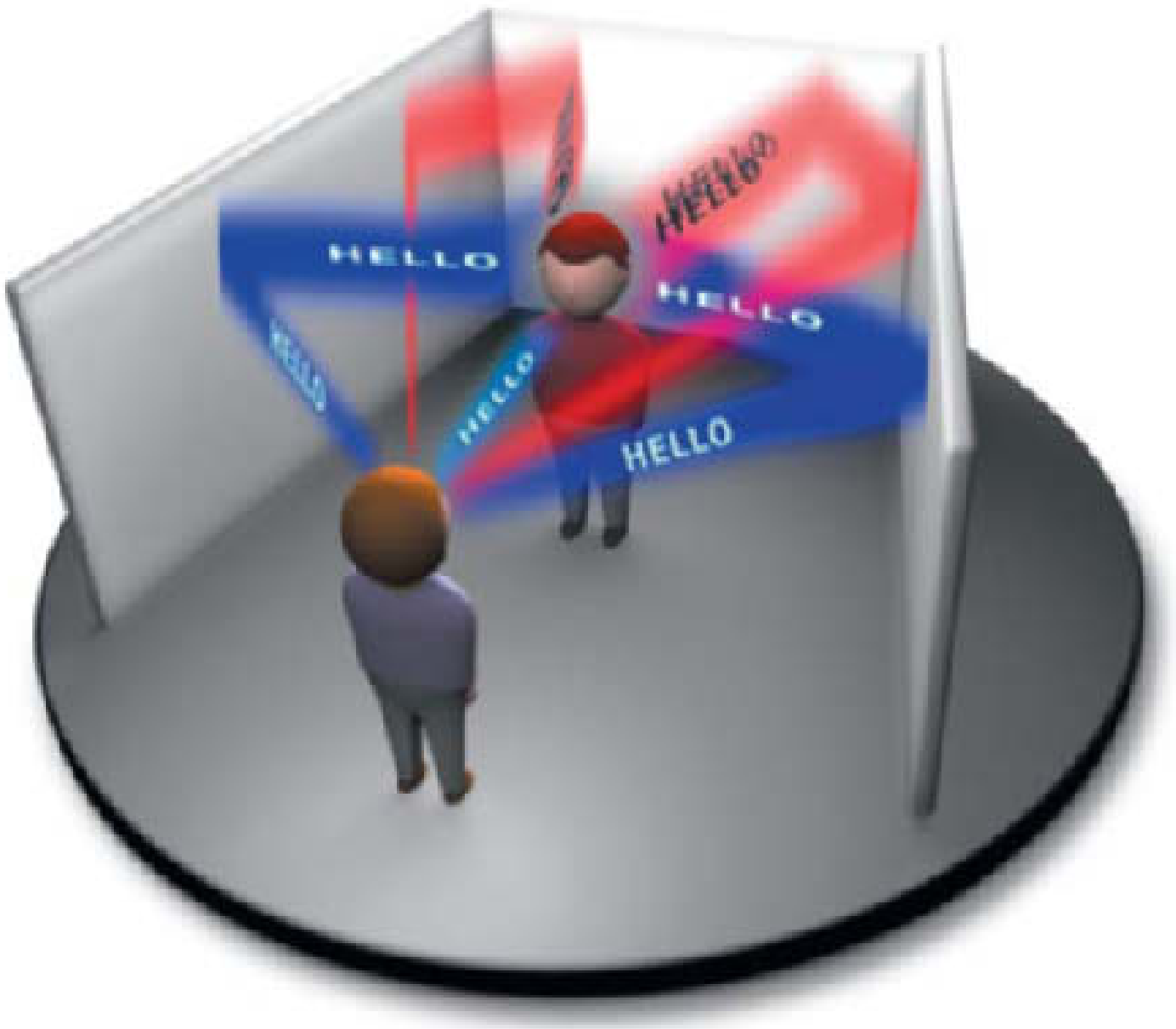
The Savia solution

The Savia SoundCleaning technology with EchoBlock simultaneously addresses the background noise and the negative effects of the echo on the signal. Alison can effortlessly follow and enjoy the conversation.

EchoBlock

Before Savia, many hearing aid users avoided echo filled environments, leading to reduced participation in social activities. In the presence of echo, the signal arriving at the hearing aid microphone is blurred and distorted. Understanding in such circumstances requires high levels of listening effort. Social interactions that should be enjoyable become a burden. Until today, this key communication challenge has not been addressed.

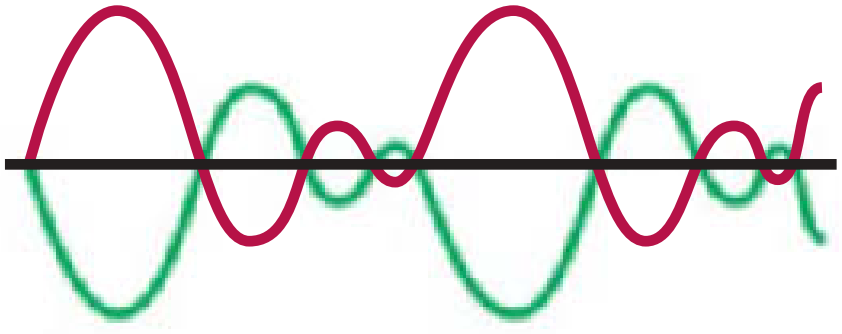
EchoBlock is another Savia world premiere. It cancels the disturbing reverberant components of the signal by restoring the natural temporal envelope. Ease of communication in echo filled environments is dramatically improved by eliminating the smearing effects and by deblurring the speech signal. EchoBlock reinstates effortless hearing and pleasurable social interaction.



In reverberant environments the signal reaching the ear is blurred and distorted. EchoBlock reinstates effortless hearing by removing the disturbing components and restoring important speech cues.

Feedback Phase Inverter

Suppressing feedback efficiently is a key requirement of modern hearing systems. In Savia, once feedback is detected by the Feedback Phase Inverter, an anti-signal cancels it instantly, without gain loss. Thanks to this highly sophisticated feedback suppression technology, users are freed from annoying and embarrassing whistling. The Feedback Phase Inverter together with the new adaptive Phonak Digital fitting formula, enables hassle-free open fittings. With Savia, open fitting users have the best of both worlds: the comfort of unoccluded hearing coupled with excellent speech intelligibility.



The Feedback Phase Inverter principle
The feedback signal (red) and the phase inverted signal (green) cancel each other out, eliminating feedback without gain loss.

High Resolution Noise Canceler

The new High Resolution Noise Canceler ensures easy listening in demanding environments by blocking unpleasant sounds. It instantly isolates and attenuates affected frequencies, enhancing the perception of speech. The Noise Canceler works in 20 independent channels allowing suppression of noise components without affecting important speech cues. The resulting clean sound enables effortless participation even in noisy environments.

Wind Noise Management

For hearing instrument wearers, wind noise can spoil the pleasure of being outdoors. Wind arriving at the sound inlet creates turbulences that saturate the sensitive microphone membrane. An unpleasant loud wind noise is heard. Addressing this challenge is a major step towards increasing user satisfaction.

In Savia, wind noise is suppressed through a combined mechano-electronical process. First, the Phonak Wind & Weather microphone protection significantly reduces the microphone turbulences caused at the inlet. Electronic wind noise elimination is only feasible if microphones are out of saturation. In a second step, the Wind Noise Suppressor identifies the characteristics of the remaining noise and suppresses it.

Savia sophisticated Wind Noise Management brings back the pleasure to outdoor activities.

iPFG Successware

Transforms the raw potential of Savia into personal user benefits

The new Phonak Fitting Guideline, iPFG, transforms mere software into your successware. The three basic design objectives behind the development of iPFG have been: client-centered fitting, intuitive workflow and easy control of technical sophistication. iPFG has met these challenges with a straightforward and easy to use software fitting package. The iPFG highlights:

- Graphical user interface that matches your fitting style
- DataLogging with User Preference Tuning – a unique tool for client follow-up and counseling
- Savia Insight – end-user demonstration of Savia capabilities
- iCOSI – a needs assessment tool with direct fitting link
- Sound Type Tuning – new fitting tool based on sound examples and direct user feedback

Never before has a software fitting package offered so many opportunities for success.

David Lilley has been wearing his Savia for 3 weeks. He is returning for a follow-up appointment. David is very satisfied with the performance of Savia in his daily life. When asked, he says that on very rare occasions he turned down the volume, but he does not recall what these situations were.

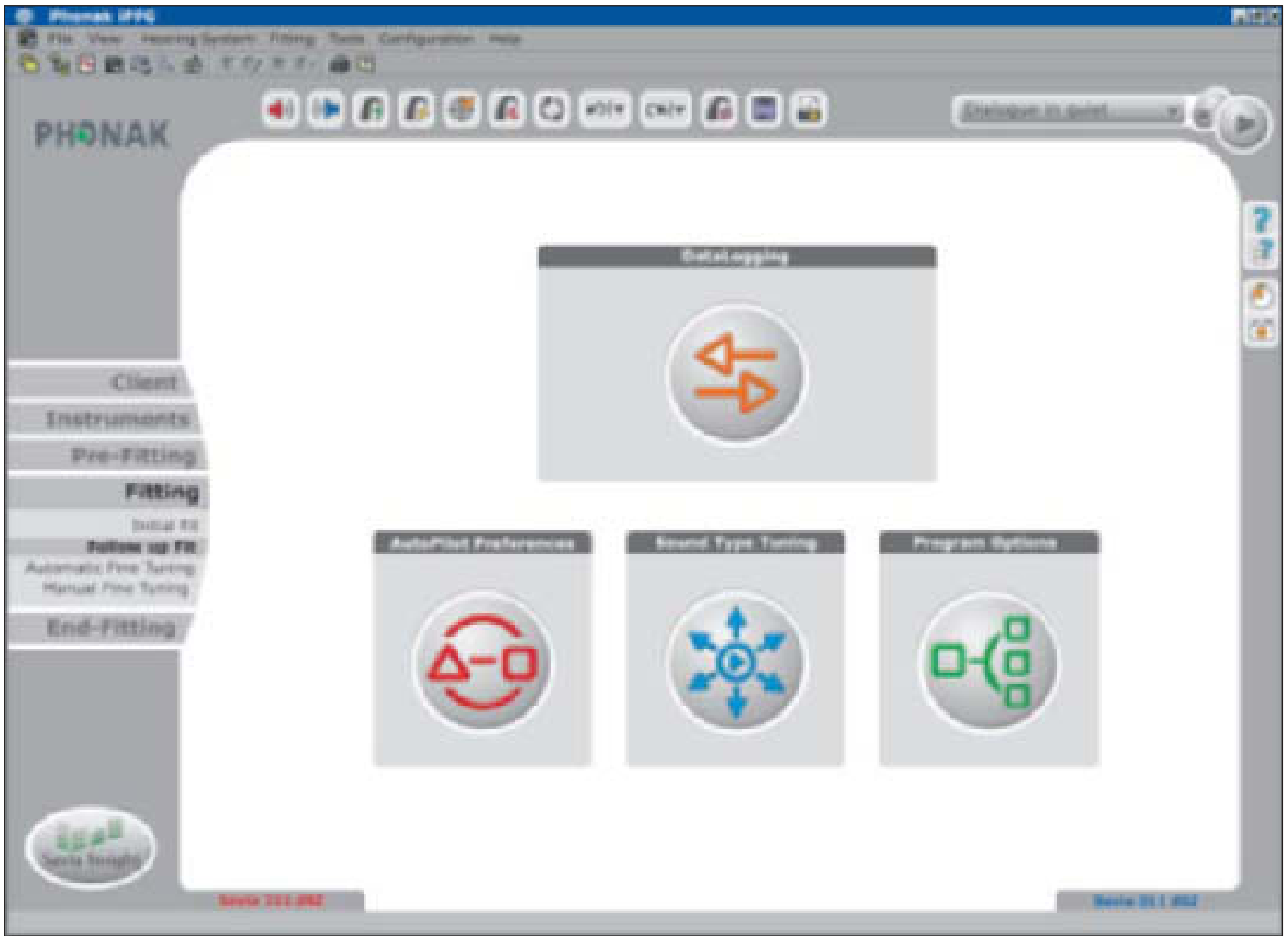
The Savia solution

When connecting Savia to iPFG, the logged data is read and displayed. User Preference Tuning shows that the volume changes were applied in the noise-only situations and on average were 3 dB in both ears. With one click, changes are applied. The combination of professional expertise and the Savia DataLogging results in higher user satisfaction.

iPFG

Turns mere software into your successware

The new iPFG is a perfect blend of decades of experience in designing fitting software, input from professionals worldwide, and the latest findings in the field of user ergonomics and design. The result is an attractive and intuitive graphical user interface that guides you through the fitting process. The iPFG workflow and fitting tools allow easy control of complex technologies.



The new iPFG intuitive workflow and attractive and functional design support your fitting success.

DataLogging with User Preference Tuning

The next best thing to being with your client 24 hours a day

Users often have difficulties providing precise feedback regarding their daily listening situations and their respective loudness preferences. Savia DataLogging is a major breakthrough in client follow-up and counseling. It logs hours of wear, automatic and manual program use, as well as manual volume changes in each environment. At the next appointment, the stored data is read into iPFG and the results are displayed in a clear graphic. The resulting use profile can then be used to support fine tuning decisions and user counseling. This tool is especially important for counseling of first time users who often fail to gain full understanding of how to operate their hearing systems. The logged data give you insight into their real life use of amplification.

User Preference Tuning analyzes the raw data collected in order to propose optimal volume corrections per base program. The information is presented to you and the suggested action is displayed. Your final decision on needed changes is based on the combination of logged data, patient feedback and your professional experience.

Phonak keeps you and your experience at the center of the fitting and fine tuning process.

Thanks to DataLogging with User Preference Tuning, Savia learns about each user's personal hearing preferences and empowers you to optimize it accordingly. The DataLogging information actively supports your counseling and fine tuning decision.

Savia Insight

End-user demonstration of Savia capabilities

Savia Insight is a modern and attractive demonstration tool that allows your clients to hear and see how Savia works. It helps gain insight into the significant benefits of the core features of Savia: AutoPilot, AutoFocus and SoundCleaning. Savia Insight will convince your clients of the impact of Savia on their quality of life.

Savia Insight lets your clients hear and see the outstanding benefits of Savia.

iCOSI

A needs assessment tool with direct fitting link

iPFG is the first fitting software to fully integrate COSI into the fitting process. iCOSI is a comprehensive needs assessment tool that takes into account and prioritizes the client's hearing goals. Taking the process a significant step further, iCOSI integrates this information into fine tuning automatically. This results in substantial improvement in client satisfaction. iCOSI is another example of the client-centered iPFG approach.

Sound Type Tuning

A new fitting tool based on sound examples and direct user feedback

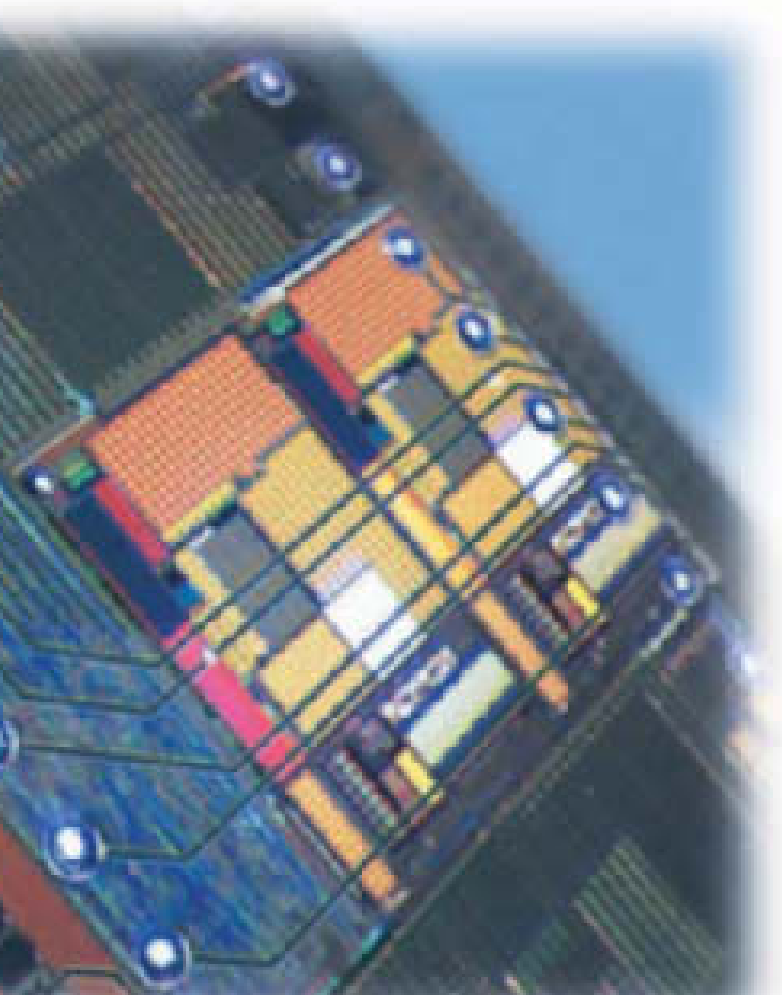
Phonak has developed Sound Type Tuning especially for Savia. This is an easy-to-use tool for efficient fine tuning of the multi-base SoundNavigation programs. You select the appropriate sound type based on client input, and iPFG automatically offers the appropriate audio track for verification. Sound Type Tuning ensures that fine tuning actions are automatically applied to the appropriate base program. Complex and sophisticated technologies have never been so easy to fit and adjust.

The unique Sound Type Tuning tool enables easy and effective fine tuning of all 4 base programs. Based on the selected sound type, iPFG automatically applies the desired changes to the appropriate program.

Savia™

A balanced combination of technology and design

The latest technologies in semi-conductor design, software architecture and audiological science have been used to achieve the overwhelming performance and benefits of Savia. The heart of Savia is the world's smallest, most powerful digital signal processor manufactured in state-of-the art submicron technology. More than 6,000,000 transistors packed into a chip the size of 2.7 x3.7 mm are the horsepower behind the industry's most advanced digital system.



The new Savia BTE housing has been designed to match its high-tech core. The result is a perfect balance of elegance and functionality. While developing the new housing, special attention was given to three guiding principles: appealing modern shapes, cosmetics on and in the ear, and optimal ergonomics for users of all ages.

Actual size of the complete electronic module at the heart of Savia

Savia Behind The Ear

The beauty of performance and flexibility

The new Savia BTE housing was designed to address the diversity in personal tastes and individual usage patterns. The attractive palette of single and two tone colors positions Savia alongside other high-tech communication devices.

In the design process, major attention was given to user ergonomics. The ideal shape and function of user controls was identified using an evolutionary approach involving a large number of users. Savia offers three field-replaceable volume control options, focused on ergonomics or on minimal visibility or no VC at all.

The design-integrated FM receiver ML9S offers superb aesthetics as well as hassle-free handling. The newly designed super-compact audio shoe serves as an interface to the universal MLxS receiver.

The three easily exchangeable volume control options to suit all client needs.

Savia In The Ear

Astonishing flexibility and performance

To meet the wide range of wishes and needs of all users, Savia offers a large number of In The Ear models and options.

The biggest challenge was met by placing all of Savia's technological innovations on a chip small enough to build into a tiny CIC. This has led to a number of key innovations.

- A miniature CIC that is remote controllable, a perfect alliance between cosmetics and convenience.
- The full benefits of digital SurroundZoom technology in a small and attractive In The Canal design.
- A wide range of options such as EasyPhone, T-coil and user controls.

All the Savia In The Ear models are available with Phonak eShell technology. These electronically created shells are hypoallergenic, exceptionally durable and more easily retained in the ear.

Savia Open

Unplug your clients' ears

Users with a sloping or mild hearing loss have the highest hearing expectations for their amplification system. They are not prepared to compromise on any aspect of their active lives. They demand the best in clarity, performance and convenience. The sophisticated Savia processing is the obvious choice to meet these demands.

Savia with the Phonak OpenSound technology offers the perfect open fitting solution. The adaptive Phonak Digital fitting formula together with the Feedback Phase Inverter provides the ultimate balance between comfort and intelligibility. The Phonak Fit'nGo Kit allows instant fitting of the Savia Open BTE. The small Savia In The Ear open solutions are available for users who appreciate discretion.

Savia Open offers the ultimate balance between cosmetics, comfort and performance.

A complete hearing system for individual hearing solutions

Savia In The Ear – 6 models including a tiny CIC, a CIC with a remote control, a canal with and without SuroundZoom, and a power ITE. A wide range of options allows further individualization to personal user needs.

Savia Behind The Ear – The Savia BTE design is new, attractive and comfortable to wear and use. The 3 Savia BTE models cover all amplification needs, from open to power.

Remote control selection – Savia can be operated with three different remote control options – the WatchPilot2, the SoundPilot2, and the new miniature KeyPilot2. Discreet and convenient user control including binaural synchronization.

Wireless communication – Savia BTE models are compatible with a wide range of FM options including the unique SmartLink SX with Bluetooth capabilities, and the new CROSLink.

The ground-breaking features of the Savia system provide a new dimension in hearing care solutions

The Savia Advantages

The AutoPilot advantage

Seamless automatic activation of fully personalized programs ensuring optimal audibility, comfort and intelligibility in an infinite number of listening situations.

The AutoFocus advantage

Restores natural localization ability and provides unsurpassed speech understanding, even in the presence of multiple noise sources.

The SoundCleaning advantage

By effectively eliminating the disturbing components in each signal, listening comfort and speech understanding are significantly enhanced.

The DataLogging advantage

Learning about each user's real-life hearing preferences, significantly facilitates communication between you and your client.

The iPFG Successware advantage

A completely new Phonak fitting software designed to match the unique fitting capabilities of Savia. iPFG Successware transforms the raw potential of Savia into personal user benefits.

The Technology & Design advantage

A perfect balance between the most powerful digital signal processing technology and a highly attractive ergonomic design.

Savia, the wise choice for you and your clients

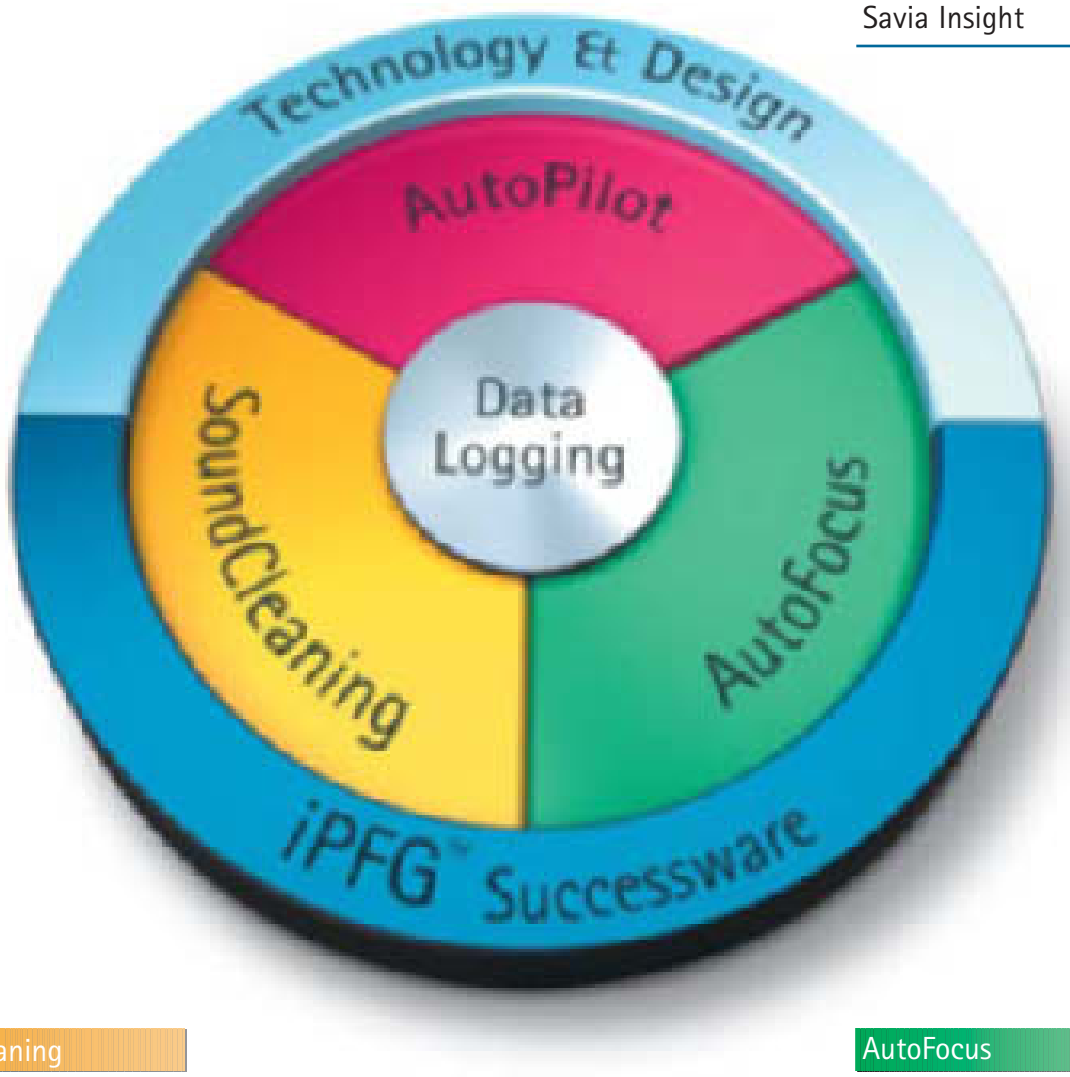
Savia conceptual anatomy

AutoPilot

- SoundNavigation
- EasyPhone
- EasyFM

iPFG Successware

- DataLogging with User Preference Tuning
- iCOSI
- Sound Type Tuning
- Savia Insight



SoundCleaning

- EchoBlock
- Feedback Phase Inverter
- High Resolution Noise Canceler
- Wind Noise Management

AutoFocus

- digital SurroundZoom
- Real Ear Sound

Savia™
Digital Bionics

The greatest revolution since the introduction of digital technology

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PHONAK
hearing systems

Savia™

Digital Bionics