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SIRIUS 6.0 – Piano Keys that Grow Your Hands[1]

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1 artigo de palestrantes do evento, convidadas a publicar sua pesquisa no Anais devido à relevância da temática dentro do contexto brasileiro.

Abstract: The SIRIUS 6.0 Future Initiative promotes narrower keys by integrating piano manufacturing, piano performance and music physiology. SIRIUS 6.0 keyboards have an octave size of 152.4 mm (6.0 inches), half a key narrower than usual. Even pianists who can reach a tenth on standard keyboards (6.5) report a freer playing, less effort, more precision, and finer sound balance. Most adapt quickly. Some can even transfer a certain ease back to 6.5 keyboards. Founded in 2020 in Stuttgart, the initiative is based on hand span data (male and female pianists), links between musculoskeletal disorders and small finger spans, historical fortepiano key sizes, the gender gap in elite piano competitions, and research on DS6.0® keyboards (USA). After a four-year pilot phase, Europe's first interchangeable SIRIUS 6.0 keyboard for a Steinway D was inaugurated in Stuttgart in 2024. Universities in Nuremberg, Innsbruck, and Munich have already joined the SIRIUS 6.0 Future Initiative.

Keywords: Narrower keys; Finger span widths; Performance potential; Equal opportunities; Prevention.

SIRIUS 6.0: Teclas que fazem as mãos crescerem

Resumo: A Iniciativa Futura SIRIUS 6.0 promove teclas mais estreitas desde 2020 pela HMDK Stuttgart. Ela baseia-se em dados de tamanho de mãos de pianistas, relações entre distúrbios musculoesqueléticos e pequenas aberturas entre os dedos, tamanhos históricos de teclas de fortepianos, desigualdade de gênero em concursos de piano de alto nível e pesquisas sobre teclados DS6.0® (EUA). Os teclados SIRIUS 6.0 são aprox. meia tecla mais estreitos por oitava que o teclado padrão (6.5). Mesmo pianistas que alcançam uma décima em teclados 6.5 relatam, por exemplo, mais liberdade, menos esforço e mais equilíbrio sonoro ao tocar no 6.0. A maioria se adapta rapidamente, e alguns até conseguem transferir certa facilidade de volta aos teclados 6.5. Após uma fase piloto de quatro anos, o primeiro teclado intercambiável SIRIUS 6.0 para um Steinway D foi inaugurado em Stuttgart, em 2024. Universidades de Nuremberg, Innsbruck e Munique já aderiram à iniciativa.

Palavras-chave: Teclas mais estreitas; Abertura entre dedos; Potencial de performance; Igualdade de oportunidades; Prevenção.

Figure 1. Hammer actions with SIRIUS 6.0 keyboard
resp. with original 6.5 standard keyboard for Steinway No. 531803.

Photo: Silvia Molan, 2023.

1 CONTEXT

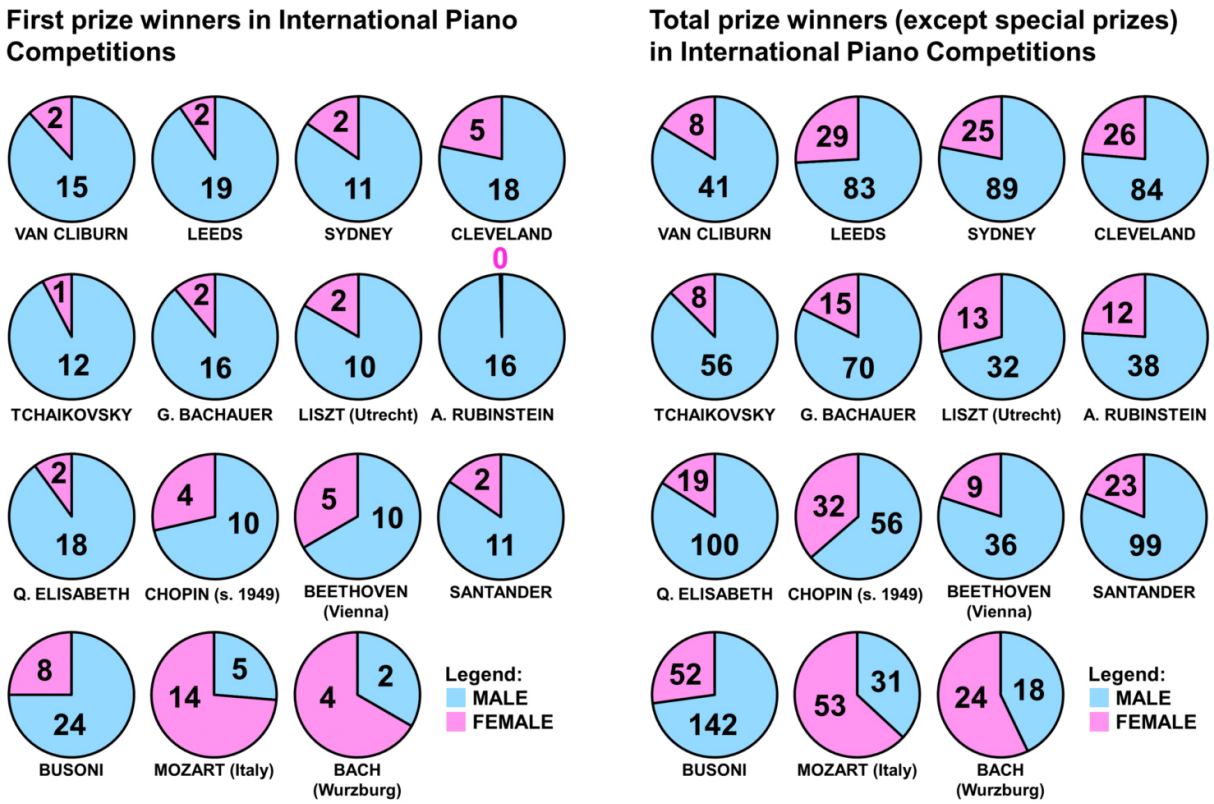
Links between small and medium spans (especially 1-5 or 2-5) and playing-related musculoskeletal disorders in pianists are well described in music physiology, musicians' medicine and piano playing technique. What seems to be crucial is not only the spreading of the fingers involved, up to the individual limit of the range of motion (Sakai, 2006; Sakai, 2010; Spahn, 2015; Wagner, 1982; Wagner, 2005; Wagner, 2012), but also extreme ulnar abduction of the wrist when

playing (individually too) large intervals at the edge of the keys, especially in the middle register of the keyboard (Wohlwender, 2015b; Wohlwender, 2019). This inhibits, among others, the long finger muscles in the wrist. Narrowing of blood vessels, nerves and tendon sheaths as a result of persistent deviation from a neutral wrist position is also considered to be a risk factor for focal dystonia (Hildebrandt, 2019).

Of course, in the complex interaction of all hand characteristics (from the forearm to the upper arm and to the seat) pianists know various strategies to compensate for small (thumb) spans in an artistically coherent and physiologically appropriate way: suitable repertoire, clever hand distribution, individual fingerings, artistic pedaling (Deahl; Wristen, 2017), alternative key contact points (Wohlwender, 2019) and differential practice methods (Widmaier, 2016) are some of the factors that open up healthy playing fields. In Martin Widmaier's latest article you can find them congenially synchronized (Widmaier, 2024).

Nevertheless, many pianists wish(ed) to have larger hands. Josef Hofmann's 6.3 keyboard (octave 5 mm below the standard, 1930, according to 1911 plans (Steinway & Sons, 1986)) and Daniel Barenboim's 6.2 keyboard (octave about 7 mm below the standard (Kimmelman, 2008)) are two prominent examples of feeling more comfortable with slightly narrower keys. Links between large finger spans 1-5 and greater success respectively small and medium finger spans 1-5 and less or no success in piano competitions with Romantic repertoire (and wide chords) are well documented. At international piano competitions, men win first prizes about four times more often than women. In Bach and Mozart competitions, it's roughly the other way around (Boyle, 2024c).

Figure 2. Prize winners of International Piano Competitions since the 1960s:
a) 1st prizes b) all prizes (without special prizes).



Source: BOYLE, 2024c.

Comparing young and adult piano and violin prizewinners might be surprising at first glance: Female violinists aged 19-26 win around 59 % of the first prizes, whereas female pianists only win around 29 %. In the 11-14 age group, girls outperform boys in both instruments. Later the results diverge (Boyle, 2024a).

Figure 3. Winners (male/female) of piano and violin competitions
in the age groups 11-14, 15-18 and 19-26.

Source: BOYLE, 2024a.

To be sure, the relationships in both studies are multicausal. However, musicality alone can hardly explain the difference in success.

2 NINTHS FOR (ALMOST) EVERYONE

To comfortably reach tenths on 6.5 standard keyboards, you need a span width 1-5 of 22-23 cm (Boyle, 2024b). The mean value of the span 1-5 for male pianists is 22.7 cm at maximum spread (Wagner, 2005, p. 281; Zurich Centre for Musicians' Hands). The mean value for female pianists is 20.7 cm, i.e. 2.0 cm below (which is almost a white key: 2.36 cm). This allows a comfortable ninth. Only 10 % of female pianists reach a span width 1-5 of 22.3 cm. Conversely, for almost 90 %, tenths are quite strenuous, hardly or not at all reachable. For about 40 %, ninths are rather strenuous, hardly reachable or not at all reachable, which is very rare among men.

An Australian study measured the span width 1-5 of 473 male and female pianists and found mean values of 22.6 and 20.1 cm, respectively (Boyle; Boyle; Booker, 2015, p. 67). The difference of 0.6 cm in the mean value for women compared to Christoph Wagner's data can be explained mainly by the high proportion

of Asian pianists whose mean was 19.8 cm. The different measuring from the middle of the fingertip to the middle of the fingertip (Wagner, 2005) or from the outer edge of the thumb to the outer edge of the 5th finger (Boyle et al., 2015) may also have had a minimal effect. The larger the span, the less the effect.

Figure 4. Maximum span widths 1-5 of female and male pianists (thumb – fifth finger).

SPAN WIDTH 1-5 RH	male pianists	female pianists
arithm. mean Wagner 2005 111 m / 105 f	22,7 cm	20,7 cm
arithm. mean Boyle et al. 2015 159 m / 314 f	22,6 cm	20,1 cm

PIANO **Span width 1-5 – RH**		MEN (111)	WOMEN (105)
Arithm. mean (mm)	R	226,7	207,4
Min. – Max. (mm)	R	201 – 260	178 – 237

Deciles (mm)	D1	D2	D3	D4	D5	D6	D7	D8	D9
MEN	212	216	220	223	226	231	234	236	241
WOMEN	194	198	200	203	206	210	215	217	223

Source: Boyle; Boyle; Booker, 2015; Wagner, 2005.

So is the 1880 DIN standard for piano keyboards mainly intended for large European men's hands? Of course, means only show a tendency for a large group. The individual maximum with the span 1-5 (RH) ranges between 17.8 and 23.7 cm for female pianists and between 20.1 and 26.0 cm for male pianists – which means scopes between an octave and a twelfth across genders.

Boyle et al. concluded that the standard keyboard is too large for 87 % of women and 24 % of men, considering the breadth of the repertoire (Boyle; Boyle; Booker, p. 57).

3 SIRIUS 6.0 PIANO KEYS

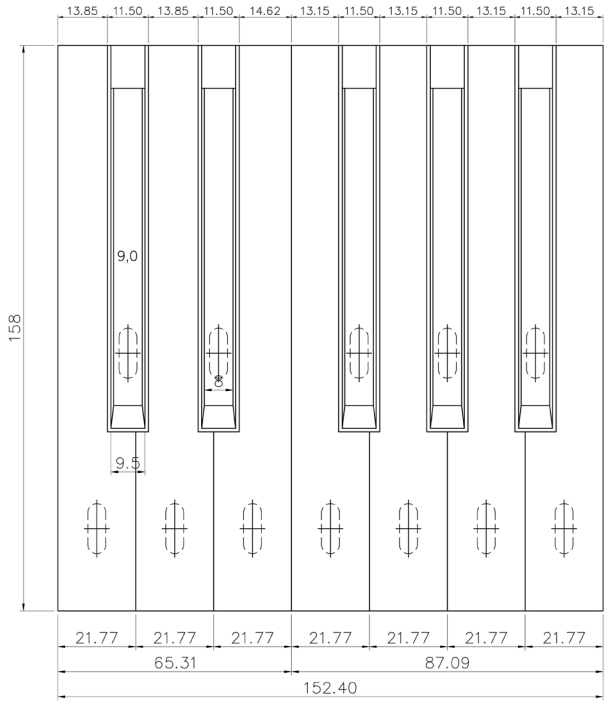
In spring 2024 Europe's first interchangeable SIRIUS 6.0 keyboard for a Steinway D concert grand was inaugurated at the University of Music and the Performing Arts (HMDK) Stuttgart – "a milestone in equal opportunities for pianists," so Axel Köhler, Rector of the HMDK Stuttgart (Boyens, 2024). 19 students and teachers (also from the University of Music Nuremberg) played works from J. S. Bach to Kapustin and from classical to jazzy improvisations at the Premiere "SIRIUS 6.0 meets Steinway D on stage" on April 13, 2024 and at the Deuxième as part of the 4th International Stretto Pianos Festival on May 26, 2024. The pianists' maximum span 1-5 ranged from almost a ninth to almost a twelfth. In the discussion

rounds, they described their playing feel on the narrower keys and their experiences when switching from the 6.5 standard to the SIRIUS 6.0 keyboard and back again (see below and Fig. 7). The 2024 milestone followed a four-year pilot phase with the SIRIUS 6.0 prototype, a Yamaha GB1 baby grand with SIRIUS 6.0 keyboard from Laukhuff (Wohlwender, 2020).[2]

SIRIUS 6.0 keyboards have an octave size of 152.4 mm or 6.0 inches. Compared to standard keyboards (165 mm / 6.5 inches), the octaves are 12.6 mm narrower. Hands 'grow' about half a key per octave.

The black keys on SIRIUS 6.0 keyboards are 9 mm wide at the top, 0.5-2 mm narrower than usual. Towards the 9.5 mm base, they are therefore slightly steeper than usual. The gap between *F sharp* and *G sharp* is 15.1 mm wide at the bottom, which is 0.5-1 mm narrower than on standard keyboards. The distance between *F sharp* and *G sharp* at the upper edges is about 16.1 mm, which is 1-2 mm less than usual. Since black keys on standard keyboards offer an astonishing variety, the deviations fluctuate.

Figure 5. Key design (front division) of the SIRIUS 6.0 prototype.



Source: Laukhuff, February 15, 2017. The value "9.0" was added by Ulrike Wohlwender after the replacement of the black keys in December 2019.

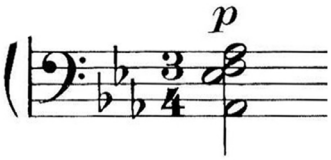
2 The Laukhuff company (Weikersheim) was dissolved in 2021.

In total, the 88 (or 52 white) keys of SIRIUS 6.0 keyboards are 8.5 cm (3 inches) narrower than standard keyboards. Correspondingly, the lateral cheek blocks are wider. The further the keys are located in the bass or treble register, the greater the angle behind the fallboard. At the rear end of the keys, the brass capstans touch the wippen heels of the hammer action in exactly the same place as on standard keyboards.

The development of the SIRIUS 6.0 keyboard was inspired by the DS6.0® keyboard of the American keyboard maker David Steinbuhler (Pennsylvania/ USA), who has been producing keyboards in alternative scales since 1991. Together with Christopher Donison, he established the DS Standard® (Donison-Steinbuhler, DONISON, 2000). DS6.0® keyboards have an octave size of 153 mm. The black keys are 8.6 mm wide at the top and 8.9 mm wide at the bottom, making them slightly narrower and edgier than SIRIUS 6.0 keyboards. On the other hand, the spaces between the keys are slightly larger.

Figure 6. Playing feel of a 32-year-old pianist who majored in piano (max. span ≤9) when playing the first chord of the 1st movement of Beethoven's Sonata op. 31 No. 3 (Allegro).

„I have to start like this,
and that's already tension."



„Octaves feel so much easier
than on the standard keyboard."

Source: Wohlwender; Molan, 2022b.

4 EXPERIENCES

Since February 2020, students and teachers have been able to gain experience with the SIRIUS 6.0 prototype in a practice room at the HMDK Stuttgart. For the first time at a European university of music, an alternative keyboard size was tested in a modern grand piano (or upright piano). Due to the temporary coronavirus restrictions, guests only had sporadic access until early 2022. On the occasion of the video productions for the Stretto Piano Festivals 2021 (Wohlwender; Molan, 2021) and 2022, the Concert & Get Together on 4/21/2022 (first in-person event; Wohlwender, 2022) and the symposium "SIRIUS 6.0 in context – Keyboards with narrower keys – Artistic, historical, physiological, psychological, pedagogical, social and piano construction perspectives" on 11/19/2022 (Wohlwender; Molan, 2022b) the SIRIUS 6.0 prototype was temporarily set up on the podium two floors upstairs in the OPR concert hall.

The 25 quotes listed in Fig. 7 (Wohlwender; Molan, 2024) come from 22 students, alumni, teachers and guests with major piano who played in the 2022 or 2024 concerts, or from guests with at least two hours of playing time on the SIRIUS 6.0 prototype. They are ranked according to the formal degree of pianistic excellence. Furthermore, the individual maximum interval that can be reached with thumb and fifth finger on a 6.5 standard keyboard is indicated (e.g. "≤9" = up to a ninth). The number of quotes in the three categories "PLAYING FEEL on SIRIUS 6.0", "ADAPTING from 6.5 standard to SIRIUS 6.0" and "BACK to 6.5 standard" varies, as we extracted them from individual feedback or contributions in roundtables.

Quotes were taken from the roundtables on 13 April and 26 May 2024 (marked with *), the video series "Sharing Experiences with SIRIUS 6.0 ..." on the HMDK Stuttgart YouTube channel, or feedback from guests (X) who visited us in 2024. The latter refer to the SIRIUS 6.0 prototype. In the PLAYING FEELING category, one student is quoted twice, once for herself and once with regard to her duo partner. Across all categories, one pianist is cited twice.

Regarding PLAYING FEEL, the following aspects were emphasized: greater ease, greater freedom, stronger focus on interpretation, less fatigue, playability

of wide chords and tenths, a more powerful sound, a more differentiated sound balance, a more beautiful dosage of weight during wide stretches, and the ability to practice in greater detail.

Only one pianist with remarkably broad fingertips (maximum span: a tenth) reported that the spaces between the black keys were actually too narrow for him. Apart from that, it is remarkable that quite a number of pianists with a span 1-5 of a tenth, an eleventh or even just a twelfth felt more comfortable with the SIRIUS 6.0 keyboard than with 6.5 standard keyboards – especially with regard to less fatigue and better sound control.

Figure 7. Statements from student and teachers with concert experience on SIRIUS 6.0 keyboards resp. two guests with two hours playing time (x).

PLAYING FEEL on SIRIUS 6.0

„You have more freedom to focus on the interpretation."* *Bachelor student, female, ≤9*

„I was able to practice relatively long and very detailed. On the standard I would have taken a little break."* *Master student, male, ≤9*

„I have tried [Prokofieff] on SIRIUS, and for the first time I was able to hear the chords for myself, how they sounded."* *Master student, female, ≤9*

„It was so narrow that you can't actually press the key completely down."* *Master student, male, Impro, ≤10*

„Octaves feel so much easier than on the standard keyboard." *Master student, female ≤9*

„Thanks to SIRIUS I am really able to play the tenths."* *Master student, male, ≤9*

„I had this feeling: this must be what it feels like to have bigger hands." *Concert Exam student, female, ≤9*

[Duo partner, ≤9] „Suddenly he was able to produce a more powerful sound."* *Concert Exam student, female*

„I feel more free on the Sirius 6.0 keyboard – it is simply less strenuous to play on it."
Concert Exam student, female, ≤10

„After practicing [Liszt's Mazeppa], I somehow had no arm fatigue at all. Usually, I'm so exhausted."*
Alumna Concert Exam, female, ≤10

„I am amazed at how much easier the Chopin Etudes become … [Playing Beethoven] I hardly recognized my own sound (voicing, sound balance)."[x] *Pianist, female, ≤9*

„With the SIRIUS 6.0 keyboard, I had a better sense of how to dose the weight in the tenths and elevenths."*
Piano lecturer, male, ≤11

„It's about playing with the other fingers more freely while playing octaves."* *Piano lecturer, female, ≤10*

„SIRIUS 6.0 helps us to improve the control of hand movement." *Piano professor, male, ≤11/12*

"The smaller keyboard gives more pianists more confidence to be able to play the things that they would like to play."* *Professor piano improvisation, male ≤10*

„For a woman, my hands are rather larger than average. I was really surprised that my sound had changed completely."* *Piano professor, female, ≤10*

ADAPTING from 6.5 standard to SIRIUS 6.0

„It seems to happen relatively quickly, somehow intuitively, even though you have played on the 6.5 for so many years.“* *Bachelor student Jazz, male, ≤10/11*

„I was fascinated by how quickly the relaxation of the hand outweighed the unfamiliarity.“* *Master student, female, ≤9*

„The more I played on SIRIUS, the less time I needed. Eventually... maybe about five minutes.“* *Master student, male, ≤9*

„After 5 minutes, my thought was literally: Now I'm home again.“* *Alumna Master, female ≤8/9*

„You learn to adapt. It's normal this back and forth.“* *Piano lecturer, female, ≤10*

„If you have already experienced this surprise, it takes much shorter time to feel comfortable..“* *Piano professor, female, ≤10*

BACK to 6.5 standard

„Switching from SIRIUS 6.0 to the standard size, the greater ease even transfers a bit.“ *Concert Exam student, female, ≤10*

„Also a positive effect when returning to the standard keyboard.“ *Jazz piano professor, male, ≤11*

„Back home at my grand piano, I really benefited from practicing on the SIRIUS!” ... [4 days later] “I never thought it would have such a lasting effect!”[x] *Concert pianist, female, ≤9*

Source: Wohlwender; Molan, 2024.

ADAPTING from the 6.5 standard to the SIRIUS 6.0 keyboard has been described as a (normal) learning process. Becoming familiar with the narrower keys accelerates with more frequent playing experience. To date, “a much shorter time” or “about five minutes” would be enough to feel comfortable. One pianist spoke of (intuitively relative) “quickly”. Of course, there were warm-up times on the concert instrument and on the SIRIUS 6.0 prototype shortly before the concerts.

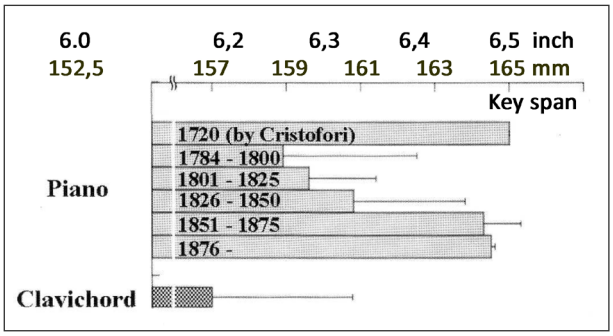
RETURNING to the 6.5 standard after practicing on SIRIUS 6.0 keyboards, in several cases a certain ease was experienced. In one case it lasted for four days.

5 NARROWER KEYS – A SEARCH FOR TRACES

According to Naotaka Sakai, who measured 75 historical fortepianos in New York, Vienna and Hamamatsu (Japan), octave sizes between 1784 and 1800 had an average of 159.2 mm, which is 5.8 mm narrower than today’s standard, with deviations of +/- 3.6 mm. In the first quarter of the 19th century, the mean value was 159.3 mm (according to the statistics in Sakai’s text; his graph is not entirely

conclusive here), i.e. only 0.1 mm higher and on average 5.7 mm below today's standard, with deviations of +/- 1.8 mm. Between 1826 and 1850, the mean value increased to 160.8 mm, an average of 4.2 mm below today's standard, with deviations of +/- 3.0 mm (Sakai, 2008).

Figure 8. Keyboard sizes of historical fortepianos 1720-1876. Excerpt from Sakai 2008. Sakai's octave size for 8 keys was converted to 7 by the authors, who also added the unit "inch".



OCTAVE SIZE fortepianos	mean mm / inch	difference DIN standard	distribution in mm
1784-1800	159,2 mm 6,27 inch	- 5,8 mm	155,6-162,8
1801-1825	159,3 mm 6,27 inch	- 5,7 mm	157,5-161,1
1826-1850	160,8 mm 6,33 inch	- 4,2 mm	157,8-163,8

Source: Sakai, 2008.

Thus, from a historical perspective, the parallel existence of alternative keyboard sizes around an octave size of about 159 mm was common between 1784 and 1825. It was only around 1880 that the later DIN standard of 165 mm per octave was established in keyboard manufacturing. Most of today's concert repertoire was composed for narrower keys (with less key depth).

Josef Hofmann was the first pianist of the 20th century to perform on a modern grand piano with narrower keys. From 1930 onwards, he played on keyboards with octaves of about 6.3 inches (5 mm narrower), based on his own plans from 1911 (Steinway & Sons, 1986).

It is not known whether the "concert grand piano with curved keyboard" made by the Pianofortemanufaktur Rud. Ibach Sohn (Wuppertal) and located in the depot of the Leipzig Museum of Musical Instruments, was used in concerts. The 6.0-inch curved keyboard was designed around 1910 by Australian Ferdinand Clutsam "to better suit the characteristics of the human hand." (Museum of Musical Instruments Leipzig, 2023).

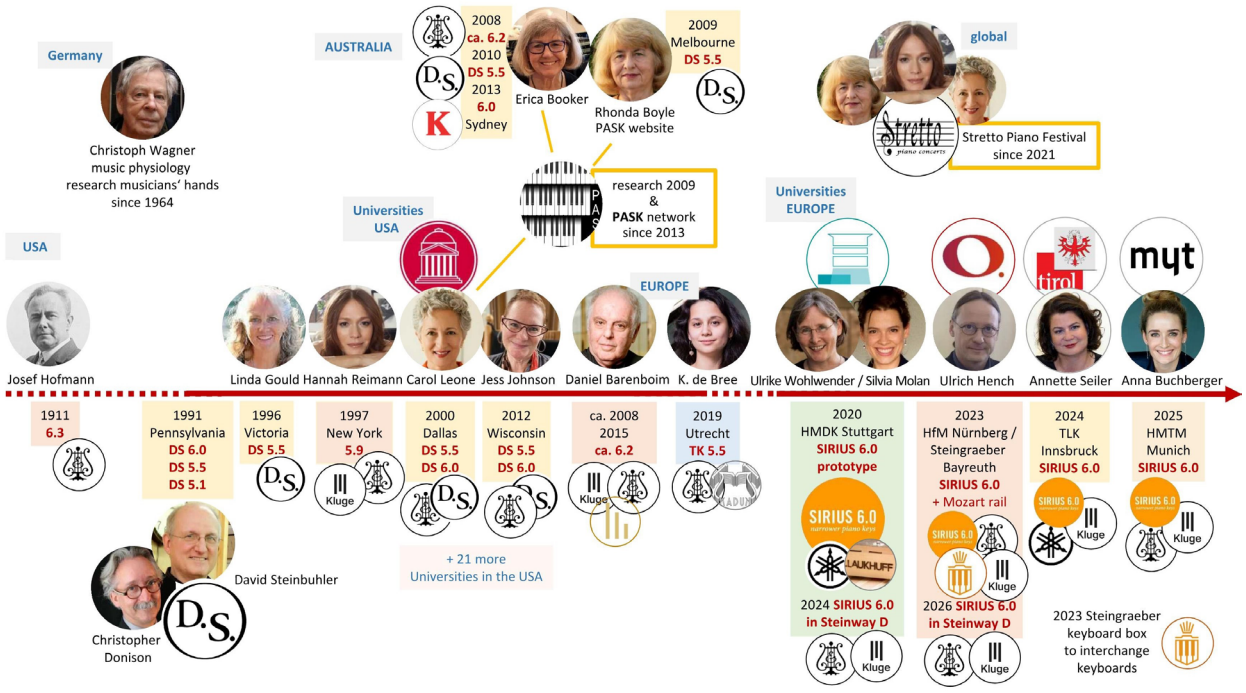
In 1991, many decades later, David Steinbuhler in Pennsylvania (USA), at the request of the conductor and pianist Christopher Donison, and with reference to Christoph Wagner's hand research (Wagner, 1988a; Wagner, 1988b, Wohl-

wender, 2015a), began to develop alternatively-sized keyboards, initially with 6.0 inches, later also with 5.5 and 5.1 inches per octave (Donison, 2000).

In 2000, Carol Leone at Southern Methodist University Dallas was the first pianist and university professor to introduce and research DS6.0® keyboards at a university. Meanwhile, the SMU Dallas has eight DS5.5® and DS6.0® keyboards. Case studies (Leone, 2003, Leone, 2015) have been conducted, as well as research on adaptability (Boyle; Boyle; Booker, 2015) and on the fit of span, repertoire, and keyboard size (Butler; Leone, 2019). From 2014 to 2018, at the initiative of Carol Leone, participants in the Dallas International Piano Competition had a choice: 6.5 standard, DS6.0® or DS5.5®.

To date, 21 universities in North America have followed the SMU Dallas example, often with DS5.5® keyboards as well (PASK). In many cases, the launch was facilitated by the non-profit DS Standard Foundation, which was established in 2018. It loans DS6.0® and DS5.5® keyboards for C6/C6X, C7/C7X and CFX Yamaha grand pianos around the world – free of charge, for one year. Recipient institutions only have to cover the shipping costs (DS Standard Foundation).

Figure 9. The spread of narrower keys in modern grand and upright pianos (especially in universities of music) with the key figures in pianism, research, keyboard and piano manufacturing.



Source: Wohlwender; Molan, 2024.

This is how the first DS6.0® keyboard with hammer action came to Brazil in 2022, initiated by Silvia Molan in cooperation with the SIRIUS 6.0 Future Initiative of the HMDK Stuttgart. Installed in a Yamaha C7X grand piano at the renowned piano store “A Loja de Pianos” in São Paulo, it is the first time in Latin America that pianists can experience this new dimension. Solo recitals and chamber music for the International Piano Stretto Festivals 2022 and 2023 have already been recorded there, illustrating the potential of narrower keys.

As early as 1997, Hannah Reimann (New York) asked Kluge Klaviaturen (Remscheid/Germany) to manufacture a 5.9-inch keyboard for her Steinway M, which subsequently was installed by Steinway & Sons (Stevens, 1997). Under her direction, the two-week International Stretto Piano Festival has been held annually since 2021, connecting worldwide concerts on narrower keys in-person and online (Stretto Piano Concerts). So far, 80 % of the pianists have come from the USA, half of them have played on 6.0 keyboards and half of them on 5.5 keyboards.

Kluge Klaviaturen also produced the 6.2 keyboards in Daniel Barenboim’s older Steinway concert grand piano (<2008) and in his “New Piano”. When the newly developed Maene-Barenboim grand was presented in 2015, other features were highlighted: straight strung construction, brass wound bass strings, etc. However, a comparative illustration does not make a secret of the narrower keys – about 7 mm per octave. (Maene; Barenboim, 2015).

In 2013, Erica Booker in Sydney purchased one of the few grand pianos with a 6.0 keyboard that Kawai had temporarily offered. Her unique piano studio with 6.5 standard, 6.2, 6.0 and DS5.5® keyboards has already been involved in several research projects, most recently in a study of muscle tension in relation to individual span widths when playing on different keyboard sizes (Chi; Halaki; Booker; Boyle; Ackermann, 2021).

The worldwide network “Pianists for Alternatively Sized Keyboards” (PASK) was founded in 2013 by Carol Leone, Rhonda Boyle and Erica Booker. Since then, Rhonda Boyle has hosted the PASK website to bundle and network development, research and global players of the ”stretto keys”.

6 FROM THE SIRIUS 6.0 PROTOTYPE TO THE CONCERT GRAND WITH INTERCHANGEABLE SIRIUS 6.0 KEYBOARD

In Europe, the University of Music and Performing Arts Stuttgart was the first to kick things off. While earlier plans with European piano and keyboard manufacturers had proven to be too costly, in 2019 the chance arose to acquire a Yamaha GB1 baby grand with a 6.0 keyboard from Laukhuff after two years of private ownership. The decisive factor for the purchase was that the black keys could be optimized. They became wider at the top: 9 mm instead of 7.8 mm.

As “SIRIUS 6.0”, the baby grand was welcomed by the two authors on January 31, 2020 in a practice room at the Stuttgart State University of Music and the Performing Arts – easily accessible for students and teachers, next to an upright piano with a 6.5 standard keyboard for comparison. As it became clearer and clearer with each feedback that the SIRIUS 6.0 keyboard meets professional pianistic standards, Ulrike Wohlwender and Silvia Molan founded the SIRIUS 6.0 Future Initiative. It enables experiences and exchange of experiences on narrower keys, and is dedicated to their distribution and further development for professionals as well as amateurs. Overarching goals are the greater unfolding of artistic potential with improved sense of security and accuracy, greater efficiency in practice time, a tonally richer, more shaded sound, the prevention of playing-related disorders, equal opportunities in piano competitions, gender justice, and the encouragement of worldwide piano manufacturing for series production.

From 2021, the SIRIUS 6.0 prototype was occasionally used on stage for video recordings for the global Stretto Piano Festivals (Wohlwender; Molan, 2021). The public premiere took place on YouTube: On May 20, 2021, the video “SIRIUS 6.0 – a piano that grows your hands” went online – just in time for Christoph Wagner’s 90th birthday. Around the first Concert & Get Together at the HMDK Stuttgart on April 21, 2022 and the second recording series (Wohlwender; Molan, 2022a), the desire for a concert grand with SIRIUS 6.0 keyboard matured among students and teachers.

In spring 2022, Kluge Klaviaturen was already open to the idea of manufacturing an interchangeable SIRIUS 6.0 keyboard with hammer action for a

Steinway D concert grand piano at the HMDK Stuttgart. Due to the coronavirus boom in piano manufacturing and some technical issues, the project was initially postponed. One year later we received the “green light” from Kluge and the cost estimate from Steinway & Sons Hamburg for the Steinway D grand piano no. 531803.

In mid-July, with the start of the semester break, the original keyboard was sent to Remscheid for measurements. In September 2023, the grand piano was shipped to Hamburg for the precise fitting of the interchangeable keyboard. On December 20, 2023, the grand piano arrived at Steinway & Sons Stuttgart with two hammer actions: the original one with the 6.5 standard keyboard and the new one with the SIRIUS 6.0 keyboard. Further fine adjustments were made, especially at the hammer action storage box. On February 15, 2024, the Steinway D concert grand with SIRIUS 6.0 keyboard could be played for the first time at the HMDK Stuttgart (Wangner, 2024).

One-third of the funding was provided by a donation campaign and crowdfunding in the first half of 2024, and two-thirds by special funds of the HMDK Stuttgart.

7 FIRST FOLLOWERS

In 2023, the Nuremberg University of Music has joined the SIRIUS 6.0 Future Initiative. On the initiative of Ulrich Hench, a Steinway M with a SIRIUS 6.0 keyboard has been placed in a practice room, along with an upright piano with standard 6.5 keyboard for comparison (Hench; Kries, 2023). The Piano Manufactory Steingraeber had been commissioned to retrofit the grand piano. Since then, the family-run business from Bayreuth has been the first European piano manufacturer to offer its upright and grand pianos as “Respectful Pianos” with SIRIUS 6.0 keyboard, also combined with Mozart rail to reduce the key depth to 8-9 mm. Another unique invention from Steingraeber is the mobile box for interchanging keyboards (Steingraeber, 2023). In May 2024, the Steingraeber-Haus Bayreuth has been the first concert hall in Europe to present a solo recital on a (salon) grand piano with SIRIUS 6.0 keyboard, performed by Silvia Molan.

In January 2025, the Tyrolean State Conservatory Innsbruck (Austria) became the third university to join the SIRIUS 6.0 Future Initiative, providing a Yamaha GC1 grand piano with SIRIUS 6.0 keyboard. The initiator, Annette Seiler, had already recorded a solo recital for the 1st International Stretto Piano Festival in 2021 on the Stuttgart SIRIUS 6.0 prototype.

In spring 2025, the University of Music and Theatre Munich will become the fourth university in Europe to be equipped with a SIRIUS 6.0 keyboard. Piano Fischer (Munich) has been commissioned to retrofit a Steinway B grand piano.

Several private retrofits of SIRIUS 6.0 keyboards in pianos and grand pianos were also completed in 2023 and 2024. So far, the most experienced piano technicians in Germany are Harald Schlecker (Waiblingen), Piano Manufactory Steingraeber (Bayreuth) and Piano Fischer (Stuttgart/Munich/Ulm).

In 2024, the German Pension Insurance approved 10,000 euros for the installation of a SIRIUS 6.0 keyboard in the grand piano of a 60-year-old opera repetiteuse with diagnosed rhizarthrosis in both hands at a university of music as a “technical aid for workplace equipment as a benefit for participation in working life” (German Pension Insurance, 2024).

8 OUTLOOK

The SIRIUS 6.0 Future Initiative is based on more than 20 years of experience with DS6.0® keyboards in higher education in the United States, starting at SMU Dallas, and accompanied by research. Experience with DS6.0® keyboards dates back to 1991. At least 87 % of women and 24 % of men can benefit from 6.0 inch octaves.

Fortepianos from 1784 to 1850 were on average about 5 mm narrower per octave than today’s 6.5 standard keyboards. Apart from different key widths, historical fortepianos provide a huge variety of mechanics (touch, key depth, etc.) With each instrument you explore, your flexibility expands in multiple dimensions. When playing modern uprights and grand pianos with SIRIUS 6.0 keyboards, only one parameter changes.

With 6.3 inches and about 6.2 inches per octave, the custom-made pianos of Josef Hofmann and Daniel Barenboim correspond roughly to the average value of historical fortepianos. Daniel Baremboim's public support and encouragement of the global Stretto Piano Concerts underscores the seriousness and artistic dimension of alternative keyboard sizes.

The octave size of the 6.0 keyboards from Clutsam, Steinbuhler and SIRIUS is based primarily on the individuality of the pianists' finger span widths 1-5, i.e. primarily ergonomic and less historical.

After five years of experience with the two Stuttgart SIRIUS 6.0 keyboards and the quantum leap from the baby grand to the Steinway D concert grand, it can be said that the pianists' artistic goals could apparently be realized (decisively) better than on 6.5 standard keyboards, with less (over)strain, longer endurance and less practice time. For pianists with medium and small finger spans, 6.0 keyboards are a big step towards more equal opportunities. Children and teenagers would also benefit from smaller keyboard sizes, as would seniors, as joint mobility decreases with age.

When people talk about keyboards with narrower keys, the first question is usually about adaptation. It's understandable that some pianists are initially skeptical about the sense of security on stage with a SIRIUS 6.0 keyboard: Will I accidentally touch other keys? Will the muscle memory for the 6.5 keyboard prevail in an adrenaline situation? After all, SIRIUS 6.0 keyboards are an innovation that challenges more than 140 years of tradition and may cause some initial uncertainty.

The positive feedback is clear: Pianists who have occasionally played on SIRIUS 6.0 keyboards since 2020 report that their adaption time has been drastically shortened or even completely eliminated, allowing them to go on stage with a sense of security. Someday, adapting from 6.5 to 6.0 keyboards in concert preparation will probably be just as intuitive as adjusting to key weight, pedal, acoustics, light, etc.

With custom-made keyboards for universities of music as well as for professional and amateur pianists, German piano manufacturing has recent-

ly been showing an innovation potential which was previously unimaginable. The challenge now is to reduce the costs for fixed and interchangeable keyboards through further innovation and series production.

In the long term, a more flexible coupling and decoupling of keyboard and hammer action on grand pianos (instead of the +/- 12 wood screws) and of keyboard frame and keybed on upright pianos (instead of the fixed screw connection) would be desirable, so that 6.5 and 6.0 keyboards could be easily interchanged in teaching studios and concert halls.

In Brazil, the widespread adoption of such innovations may still face some challenges compared to Europe. But who knows? A country renowned for its creativity and experimental boldness, might have technicians ready to engage in developing an innovative, even more practical, and affordable solution? The construction data of the SIRIUS 6.0 keyboard is freely available, enabling local production in Brazil. This would reduce dependency on import taxes and mitigate the impact of currency fluctuations. Furthermore, the partnership agreement between Mercosur and the European Union opens exciting opportunities for additional markets (Governo Federal do Brasil, 2024).

Meanwhile pianists are invited to visit “A loja de Pianos” to experience the playing feel and increasing performance qualities “with bigger hands”. Institutions may consider the offer of the DS Standard Foundation for a one-year-loan of the DS6.0® keyboard.

The star SIRIUS is far away but it’s shining. It may take 20-50 years – but what about having interchangeable keyboards on stages and in teaching rooms, and the individual optimal keyboard size at home?

Together with the PASK international movement the SIRIUS 6.0 Future Initiative of the University of Music and Performing Arts Stuttgart is happy to support anyone who wants to produce and distribute narrower piano keys. We are right at the transition from practice-oriented descriptive documentation to systematic research at the interface of piano manufacturing, piano performance, music physiology and musician’s medicine – for more fulfilled and healthy piano playing.

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