

Around the idea of transface¹

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Introduction

The main purpose of this article is to elaborate and justify the *invention*, in the sense of Simondon⁵, of the notion of "transface" thanks to a "cooperation"⁶, between philosophy and design, making it a "composite"⁷ notion. This neologism is elaborated to solve first of all a *problem*⁸ of design. In HMI, *human-machine interfaces* designate "the set of software and hardware devices allowing communication between a computer system and its users"⁹, and are mainly conceived as "surfaces" to touch. But how can we think and design certain interfaces that are not based on what is commonly called "surfaces", and therefore on "touch"? Thus, interfaces such as Air+Touch¹⁰, Hologram in my Hand¹¹, Ultrahaptics¹², Sublimate¹³, Abracadabra¹⁴, Phantom sensations¹⁵,

¹ translation of: Giroud, G, Letondal, C, and Pauchet, S. 2022. Autour de l'idée de transface. In Proceedings of Colloque International "Vivre par(mi) les écrans: passé et avenir", Université Jean Moulin III, IRPhil, 27-29 avril 2022, in press.

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⁵ G. SIMONDON, *Imagination et invention*, Paris, Presses Universitaires de France - PUF, 2014, p. 139, 141-142

⁶ R. SENNETT, *Ensemble - Pour une éthique de la coopération*, P.-E. Dauzat (trad.), Paris, Albin Michel, 2014, p. 15.

⁷ M. SERRES, « Tempo: le compositeur », dans F. L'Yvonnet et C. Frémont (éd.), *L'Herne - Michel Serres*, Paris, L'Herne, 2010, p. 56-59.

⁸ G. SIMONDON, « La résolution des problèmes (1974) », dans *La résolution des problèmes*, Paris, Presses Universitaires de France/Humensis, 2018, p. 61.

⁹ P. LEVY, *Les technologies de l'intelligence. L'avenir de la pensée à l'ère informatique*, op. cit., p. 200.

¹⁰ Xiang 'Anthony' Chen, Julia Schwarz, Chris Harrison, Jennifer Mankoff, and Scott E. Hudson. 2014. Air+touch: interweaving touch & in-air gestures. In Proceedings of the 27th annual ACM symposium on User interface software and technology (UIST '14). Association for Computing Machinery, New York, NY, USA, 519–525. <https://doi.org/10.1145/2642918.2647392>.

¹¹ Bach, B., Sicat, R., Beyer, J., Cordeil, M. and Pfister, H., 2017. The hologram in my hand: How effective is interactive exploration of 3D visualizations in immersive tangible augmented reality?. *IEEE transactions on visualization and computer graphics*, 24(1), p. 457-467. <https://ieeexplore.ieee.org/document/8019876>.

¹² T. CARTER *et al.*, « UltraHaptics: multi-point mid-air haptic feedback for touch surfaces », dans *Proceedings of the 26th annual ACM symposium on User interface software and technology*, New York, NY, USA, Association for Computing Machinery, 2013, p. 505-514. <https://doi.org/10.1145/2501988.2502018>.

¹³ Leithinger, D., Follmer, S., Olwal, A., Luescher, S., Hogge, A., Lee, J. and Ishii, H., 2013, April. Sublimate: state-changing virtual and physical rendering to augment interaction with shape displays. In Proceedings of the SIGCHI conference on human factors in computing systems, p. 1441-1450. <https://doi.org/10.1145/2470654.2466191>.

¹⁴ Harrison, C. and Hudson, S.E., 2009, October. Abracadabra: wireless, high-precision, and unpowered finger input for very small mobile devices. In Proceedings of the 22nd annual ACM symposium on User interface software and technology, p. 121-124. <https://doi.org/10.1145/1622176.1622199>.

¹⁵ Jinsoo Kim, Seungjae Oh, Chaeyong Park, and Seungmoon Choi. 2020. Body-Penetrating Tactile Phantom Sensations. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3313831.3376619>.

InnerGarden¹⁶, and Touchéo¹⁷ allow us to question these implicit conceptions since they propose mid-air interactions, augmented reality (AR), virtual reality (VR) or combinations between them. Thus, touch is present when the mid-air interaction technique involves solid objects, but also when it uses the haptic signal to simulate touch (Ultrahaptics, Phantom sensations). In the same way, the surface intervenes either as a touched object (Air+touch, Touchéo, Sublimate), or as a physical or logical reference frame for the mid-air gesture (Air+touch, Ultrahaptics, Abracadbra, Sublimate, Hologram in my Hand).

Therefore, how to theorize and design interfaces, which are not conceived as surfaces, and which are, according to the formula of the researchers Janlert and Stolterman, "faceless"¹⁸? If, according to them, the interface is a surface¹⁹, then what can mean an ([inter]faceless interaction)²⁰, i.e. without interface understood and reduced only to the surface (*surface-free interaction*)²¹?

Problems

The difficulty is twofold. First, from a design point of view, how to understand and design interfaces without surfaces? Historically²², "interactive systems make an increasingly rich use of display surfaces, whether windows or screens and projection surfaces"²³, so that currently, the display screen is the most familiar surface for interacting with the computer²⁴, to the detriment of other types of interface. These interfaces are then what Flusser calls "signifying surfaces"²⁵ which reduce the four dimensions of space-time to the two dimensions of the surface, in which the meaning is inscribed or transmitted, in a more or less "user-friendly" way.

¹⁶ Roo, J.S., Gervais, R., Frey, J. and Hachet, M., 2017, May. Inner garden: Connecting inner states to a mixed reality sandbox for mindfulness. In Proceedings of the 2017 CHI conference on human factors in computing systems, p. 1459-1470. <https://dl.acm.org/doi/10.1145/3025453.3025743>.

¹⁷ Martin Hachet, Benoit Bossavit, Aurélie Cohé, and Jean-Baptiste de la Rivière. 2011. Toucheo: multitouch and stereo combined in a seamless workspace. In Proceedings of the 24th annual ACM symposium on User interface software and technology (UIST '11). Association for Computing Machinery, New York, NY, USA, 587–592. <https://doi.org/10.1145/2047196.2047273>.

¹⁸ L.-E. JANLERT et E. STOLTERMAN, « Faceless Interaction—A Conceptual Examination of the Notion of Interface: Past, Present, and Future », *Human-Computer Interaction*, vol. 30, n° 6, 2 novembre 2015, p. 507-539.

¹⁹ *Ibid.*, p. 523.

²⁰ *Ibid.*, p. 508.

²¹ *Ibid.*, p. 525.

²² For a genealogy of display surfaces: B. D. GEOGHEGAN, « An Ecology of Operations: Vigilance, Radar, and the Birth of the Computer Screen », *Representations*, vol. 147, n° 1, University of California Press, 1^{er} août 2019, p. 59-95 ; C. GERE, « Genealogy of the computer screen », *Visual Communication*, vol. 5, n° 2, 1^{er} juin 2006, p. 141-152 ; L. MANOVICH, *Le langage des nouveaux médias*, R. Crevier (trad.), Dijon, Les Presses du réel, 2010, p. 203-233.

²³ P. BUCHER et S. CHATTY, « Qu'est-ce qu'une surface d'affichage? Une analyse rétrospective », dans *IHM 2009, 21ème Conférence Francophone sur l'Interaction Homme-Machine*, Grenoble, 2009, p. 3-12. <https://hal-enac.archives-ouvertes.fr/hal-01022261>.

²⁴ J. COUTAZ, C. LACHENAL et S. DUPUY-CHESSA, « Ontology for Multi-surface Interaction. », dans *Human-Computer Interaction INTERACT '03: IFIP TC13 International Conference on Human-Computer Interaction*, Zurich, 2003 (DOI : 10.13140/2.1.1324.6407)

²⁵ V. FLUSSER, *Pour une philosophie de la photographie*, J. Mouchard (trad.), Belfort, Circé, 2004, p. 9 ; V. FLUSSER, « "Line and Surface" Main Currents in Modern Thoughts 29 (3), 1973 », E. Eisel (trad.), dans *Writings*, Minneapolis/London, University of Minnesota Press, 2002, vol. 6, p. 21-34.

Secondly, on the conceptual level, the terms "surface" and "touch" act, according to Bachelard's formula, as "epistemological obstacles"²⁶. Their meanings are ambiguous, as they are derived from everyday empirical experience and refer to an implicit metaphysics.

Thus, Gibson²⁷ defines the term surface in relation to medium and substance: whereas the medium is that which allows animals to move as well as light, sound and smell to be transmitted, and the substance that which does not freely transmit air or smell, and which does not allow the movement of bodies, then the surface is that which separates the substances from the medium, and which, because it is relative to a substance, persists and has an *affordance* for the being that perceives it. There is thus a surface only of a substance and only insofar as it is carrying an invitation relative to a given living being. As for Stroll²⁸, he distinguishes the *A-Surface* or *Abstract Surface* which is subdivided into LS (*Leonardo Surface*), interface between two states of matter without being part of one of the two matters, and DS (*Divisible Surface*) external surface which delimits an object, from the *P-Surfaces* or *Physical Surfaces* itself subdivided into SS (*Somorjai Surface*), surface which is situated at the atomic level, and OS (*Ordinary Surface*), surface of the current objects.

These two approaches of the "surface" are problematic because they presuppose, on the one hand, that any surface is an external surface *of something*²⁹, whereas there is not necessarily a substance posed beforehand in these interactions, and on the other hand, that the surface being devoid of depth, unlike the medium, cannot be crossed, something contradictory with these interactions.

The term "touch" is subjected to the same difficulties. If this one designates at first sight the whole of the cutaneous sensations according to the various types of receptors of a living being, it remains that it is not reducible to its only "somato-physiological" dimension. Not only this last makes the interiority show and reciprocally³⁰, but besides, the touch is necessarily intentional as touch *of* within a given field³¹. The "small world"³² of the touch has this of specific, compared to the other senses, to be the "sense of the presence"³³.

This conception of the "touch" presupposes then a "metaphysics of the presence"³⁴: the touch is conceived as immediate, that is to say devoid of mediation, participating then in the illusion of a "haptic intuitionism"³⁵. However, since Aristotle³⁶, we know that the touch is not immediate, but mediate, since it necessarily requires a *medium (metaxu)*, how can we think a mediation which in the case of these interactions is not "touched"?

Consequently, to think and to conceive these new interactions requires to emancipate itself from these two conceptions by recognizing the necessary existence of an between which acts as medium.

²⁶ G. BACHELARD, *La formation de l'esprit scientifique*, Paris, Librairie Philosophique J. Vrin, 1993, p. 13.

²⁷ J. J. GIBSON, *Approche écologique de la perception visuelle*, O. Putois (trad.), Bellevaux, Dehors, 2014.

²⁸ A. STROLL, *Surfaces*, Minneapolis, University Of Minnesota Press, 1988.

²⁹ B. HOOKWAY, *Interface*, Cambridge, Massachusetts ; London, England, MIT Press, 2014, p. 12-15.

³⁰ G. CHAZAL, *Interfaces : Enquêtes sur les mondes intermédiaires*, Seyssel, Editions Champ Vallon, 2002.

³¹ M. MERLEAU-PONTY, *Phénoménologie de la perception*, Gallimard, Paris, 1945.

³² *Ibid.*, p. 256.

³³ G. GIROUD, « Toucher l'interface, interfacer le toucher », *SHS Web of Conferences*, vol. 130, EDP Sciences, 2021, p. 6 ; J. BRUN, *La main et l'esprit*, Genève, Labor et Fides, 1986, p. 112.

³⁴ J. DERRIDA, *De la grammatologie*, Paris, Editions de Minuit, 1967, p. 36.

³⁵ J. DERRIDA, *Le toucher, Jean-Luc Nancy*, Paris, Editions Galilée, 1998, p. 139.

³⁶ ARISTOTE, *De l'Ame*, J. Tricot (trad.), Paris, Vrin, 1995.

However, this medium is not only an interface that establishes a relation between faces, "facing" as much as "making faces"³⁷, since it is a new modality of the interface *with* and *without* "surface" that can be crossed. Under these conditions, we will name it "*transface*", in the sense of face *through*³⁸, distinct at the same time from the *interface* (face *between*) and from the *surface* (face *on*).

Hypothesis of the *transface*: the *medium* as the *through*

The "*transface*" acts as a *medium*³⁹, in the sense that it functions as a medium, i.e. as an operator of mediation, rather than being a medium existing in itself. As a figure of the between (syncategorem), the medium designates a relation, not a substance (categorem)⁴⁰. The *transface* is thus thought in a relational way, and not in a substantial way. As a medium, it establishes a relation with something other than itself. Since there is only a medium to access this *otherness*, then the *transface* is the medium in the sense of intermediary, condition of access to this otherness. However, unlike a neutral intermediary, as a mediator, it "interrupts, modifies, complicates, diverts, transforms and makes emerge different things"⁴¹. In this sense, there is an *operation* of the mediation which "makes appear a structure or which modifies a structure"⁴². Since "the operation realizes the transformation of a structure into another structure," then just as "the operation is a μεταξύ between two structures"⁴³, so the medium is a μεταξύ. He is then the "through"⁴⁴ that transforms the relation and thus the connected beings by altering them⁴⁵, thus maintaining the otherness of the mediated beings. Mediation is thus only apprehended negatively and indirectly by the *effects*⁴⁶, and not positively and directly.

Mediation is then characterized by three operations. First of all, it *transits* (*transire*) in the double sense of *transiting* and *being transited*⁴⁷. On the one hand, it makes transit, i.e. it makes pass what is in transition, i.e. the flow; on the other hand, it makes transi, in the sense that it makes pass away, i.e. it immobilizes the flow, in the manner of a substance. Under these conditions, it maintains, according

³⁷ B. HOOKWAY, *Interface*, op. cit.

³⁸ For indication, in French, according to Serres, « *entre* vient de *en*, dedans, à l'intérieur, et de *trans*, à travers, dehors, ailleurs » (M. SERRES, *Le gaucher boîteux. Puissance de la pensée*, op. cit., p. 170).

³⁹ We follow here the orthographic recommendations of Bardini who distinguishes *medium* from *mass-media* and *mediums* (T. BARDINI, « Entre archéologie et écologie », *Multitudes*, n° 62, n° 1, 18 avril 2016, p. 159-168).

⁴⁰ J. DERRIDA, *La dissémination*, Paris, Seuil, 1972, n. 29, p. 274.

⁴¹ B. LATOUR *et al.*, « Entretien avec Bruno Latour. Les médias sont-ils un mode d'existence? », *INA Global*, vol. 2, 2 juin 2014, p. 147.

⁴² G. SIMONDON, « Allagmatique », dans *L'individuation à la lumière des notions de forme et d'information*, Grenoble, Jérôme Millon, 2005, p. 559.

⁴³ *Ibid.*, p. 561.

⁴⁴ F. JULLIEN, *L'écart et l'entre. Leçon inaugurale de la Chaire sur l'altérité, 8 décembre 2011*, Paris, Editions Galilée, 2012, p. 54.

⁴⁵ S. KRÄMER, *Medium, Messenger, Transmission. An Approach to Media Philosophy*, Amsterdam, Amsterdam University Press, 2015 ; D. MERSCH, *Théorie des médias : Une introduction*, E. Alloa, S. Baumann et P. Farah (trad.), Dijon, Les Presses du réel, 2018.

⁴⁶ D. MERSCH, *Théorie des médias*, op. cit. ; A. R. GALLOWAY, *The Interface Effect*, Cambridge/Malden, Polity Press, 2012 ; J. DERRIDA, *Marges de la philosophie*, Paris, Les Editions de Minuit, 1972.

⁴⁷ F. NEYRAT, *Atopies. Manifeste pour la philosophie*, Caen, Nous, 2014, p. 71.

to Whitehead's formula, a "fluctuating equilibrium" between a "metaphysics of flow" and a "metaphysics of substance"⁴⁸.

Then, it *transduces* (*transducere*) in the sense of Simondon, insofar as it operates a taking of form never completely completed, by allowing the individuation of a metastable field which, concealing a potential energy, will take shape from an external germ which will come to structure it, in the paradigmatic way of the crystal⁴⁹. Thus, the operation of translation can modify the representation of something, as in Touchéo where a 2D object can be promoted into a 3D object, or make it change its input modality, as the operation of deposition in Sublimate which transforms a virtual form into a physical form. Similarly, in Air+Touch, the gesture takes shape in a double space, that of the surface where it is segmentation and context, and that of the air where it is function (fig. 1).

Finally, it *translates* (*translatare*) in the double sense of *transferring*, i.e. transporting a thing from one place to another, and *translating*, i.e. passing from one language to another⁵⁰. The operation of translation is placed on the "breach of the between-languages"⁵¹, never totally on the side of a language to the detriment of the other. By being situated in this in-between, mediation remains in the gap of an "untranslatable"⁵², maintaining the otherness of what is to be translated. This operation then implies an "intelligence"⁵³ that "selects", that is to say "filters"⁵⁴ what is to be translated, thus allowing to establish a common "intelligibility"⁵⁵ between what is translated. This translation necessarily takes place with digital interfaces, since their function is to translate human meaning into the nonsense of the digital, and vice versa⁵⁶. Thus, in Sublimate, there is a translation of coordinates in physical space into coordinates in the interface, preserving the otherness in what is not detected by the space of capture, even combining several systems of coordinates.

The three effects of the *through* of the *medium*

Since mediation can only be apprehended through its *effects*, then there are three of them: on the one hand, the medium is *traversable*, on the other hand, it can be *traversed*, and finally, it is experienced in a *crossing*.

The traversable medium

The medium is said to be *traversable* because it is first of all a *limit* which, according to its etymology (*limes*), separates as much as it connects without it being itself something. It is "that 'nothing-in-

⁴⁸ A. N. WHITEHEAD, *Procès et réalité: Essai de cosmologie*, D. Charles et al. (trad.), Paris, Gallimard, 1995, p. 341.

⁴⁹ G. SIMONDON, *L'individuation à la lumière des notions de forme et d'information*, op. cit., p. 33.

⁵⁰ A. BERMAN, « De la translation à la traduction », *TTR : traduction, terminologie, rédaction*, vol. 1, n° 1, Université du Québec à Trois-Rivières, 1988, p. 23-40.

⁵¹ F. JULLIEN, *L'écart et l'entre*, op. cit., p. 63.

⁵² J. DERRIDA, « Des tours de Babel (1985) », dans *Psyché. Invention de l'autre*, Paris, Galilée, 1987, p. 203-235 ; B. CASSIN, « Les intraduisibles », *Revue Sciences/Lettres*, vol. 1, 2013. <https://doi.org/10.4000/rs1.252> ; B. CASSIN, *Eloge de la traduction. Compliquer l'universel*, Paris, Fayard, 2016.

⁵³ B. HOOKWAY, *Interface*, op. cit., p. 43.

⁵⁴ Y. CITTON, « Créolecture et politiques membraniques », *Multitudes*, vol. 3, n° 22, 2005, p. 203-211.

⁵⁵ F. JULLIEN, *L'écart et l'entre*, op. cit., p. 64.

⁵⁶ B. BACHIMONT, *Le sens de la technique : le numérique et le calcul*, Paris, Les Belles Lettres, 2010.

common' through which communication takes place"⁵⁷, where it maintains the otherness of what is connected while making possible a commonality between them. Moreover, there are two modalities of the limit: the limit-frame and the limit-porous.

The limit-frame is the limit insofar as it operates a closure on what it frames and which directs our perception. Firstly, for Simmel⁵⁸, the limit of the frame of a work of art allows to constitute it as a unit closed on itself. Secondly, the limit-frame directs our perception, so that the frame is, with the bottom and the plan, according to Marin, one of the devices which constitutes "the general framing of the representation"⁵⁹. Under these conditions, as Dalmasso summarizes it, the cut that operates the frame refers, as others (window, grid, curtain, door, threshold, mirror, etc.)⁶⁰, "as much to systems of representation of the visual space as to *symbolic forms*"⁶¹ in the sense of Panofsky⁶². Thus, in Touchéo, the space of gestural interaction is *delimited* by a physical frame, composed by a multitouch surface and a semi-transparent mirror. Another form of boundary-frame is the less perceptible one of the capture space of the device, which requires a visual supplement where one can visualize the hand and the virtual objects, although this capture frame is often invisible, as it is the case in Abracadabra or Air+Touch.

The porous-limit the limit as it passes through. In the literal sense, porosity is the property of a body to be endowed with pores, derived from *porus* "conduit, passage", i.e. interstices ensuring the passage of liquid or gaseous fluids, itself derived from *peirein* "to cross from one side to the other", constituted of the Indo-European root *per-* "to cross"⁶³. The limit is either porous, or non-porous, that is to say aporetic, in the sense of what concerns an *aporia*, "the non-passage, or rather the experience of non-passage"⁶⁴. The porous-limit is then at the same time "path"⁶⁵ and "link"⁶⁶ as the two orientations of the word *peîrar* reveal it. As Vernant and Détienne analyze it, "a certain type of path can take the form of a link that enchains, and reciprocally, the action of linking sometimes takes on the appearance of a crossing, of a path"⁶⁷. Thus, Ultrahaptics is an example of a porous boundary perceptible by touch, since the device is made of ultrasounds that the hand can cross. In the same way, in Hologram in my Hand, this boundary-porous can be offered as a visual path where the user can use a sheet of cardboard to operate selections or cutting planes in a scatter plot (fig xx). As for the sand of InnerGarden or the pimples of Sublimate, they signal, by their resistance, to the aporetic dimension.

⁵⁷ J.-L. NANCY, « Rives, bords, limites (de la singularité) », dans *Le poids d'une pensée, l'approche*, Strasbourg, La Phocide, 2004, p. 130.

⁵⁸ G. SIMMEL, « Le cadre, un essai esthétique », K. Winkelvoss (trad.), dans *Le cadre et autres essais*, Paris, Gallimard, 2003.

⁵⁹ L. MARIN, « Le cadre de la représentation et quelques-unes de ses figures », *Cahiers du Musée national d'art moderne*, vol. 24, Art de voir, art de décrire II, 1988, p. 64.

⁶⁰ A. C. DALMASSO, *Le corps, c'est l'écran. La philosophie du visuel de Merleau-Ponty*, Sesto San Giovanni, Mimesis, 2018, p. 229.

⁶¹ *Ibid.*, p. 230.

⁶² E. PANOFSKY, *La perspective comme forme symbolique*, Paris, Les Editions de Minuit, 1976.

⁶³ *Dictionnaire historique de la langue française*, 5e édition, Paris, Dictionnaire Le Robert, 2019, entrée « Pore », p. 2838.

⁶⁴ J. DERRIDA, « Apories. Mourir - s'attendre aux "limites de la vérité" », dans *Le passage des frontières. Autour du travail de Jacques Derrida*, Paris, Galilée, 1994, p. 313. Aporie provient d'*aporia* composé du privatif *a-* et du substantif *poros* « chemin, passage ».

⁶⁵ J.-P. VERNANT et M. DETIENNE, *Les ruses de l'intelligence. La mètis des grecs*, Paris, Flammarion, 1993, p. 272.

⁶⁶ *Ibid.*, p. 275.

⁶⁷ *Ibid.*, p. 276.

In addition, this limit of the medium only lets through what has been *machined*. The medium is not a machine, that is to say a particular technical object⁶⁸ (tool, instrument...), but it functions *like* a machine. Following the analyses of Deleuze and Guattari, the *machine* is what emits a flow *and* what cuts this same flow⁶⁹. Thus, the medium *machine* by producing flow and cutting it according to three modalities: the "cut-preparation"⁷⁰, the "cut-detachment"⁷¹ and the "cut-remains"⁷². Consequently, the medium is traversable when it produces flow that will cross it, and that it cuts it according to the modalities evoked, so that the whole of the flow does not cross, since it is necessarily cut. Thus, in Touchéo, although a 3D physical space is provided to visualize the virtual objects above the tactile surface, only the multitouch flow allows to manipulate these 3D objects from a dedicated widget (fig. yy).

Crossing the medium

Only that which can pass through the medium, i.e. "the in-between of the flow"⁷³, and not that which subsists, i.e. the substance. Whereas the substance since Aristotle only formally and necessarily subsists under the contingent material accidents, the flow cannot not pass since Heraclitus⁷⁴ or Lucretius⁷⁵. Moreover, in the passage, coming from *passus*, "spreading of the legs", it is the gap which makes possible the step and thus the passage. The passage is then a matter of transition, that is to say of a "between-forms"⁷⁶, in the sense of a passage from a form to another by a gap.

The medium *controls* what crosses. As Hookway⁷⁷ reminds us, the term control is originally derived from *contrarotulus*, "register kept in duplicate to check accounts by comparison", composed of *rotulus*, the "little wheel" (*rota*), i.e. the rolled up written sheet of paper, and specifically the register of administrative acts, then later, the text that a theater actor has to learn, and by extension, the role that a person plays within society. In this sense, the medium *controls* (without emphasis) in the sense that it assigns a *role* to the flow. Furthermore, since the *contre-rolle* duplicates the original, then it does not exist in itself, but only to check the commonalities and discrepancies between the two. Finally, from Deleuze, the term *control* (with emphasis) is understood as "a modulation, like a self-deforming molding that would change continuously from one moment to the next, or like a sieve whose meshes would change from one point to another"⁷⁸. To cross the medium then implies that the flow is controlled in the sense of what modulates a role. Thus, Sublimate controls the combined

⁶⁸ F. REULEAUX, *Cinématique. Principes fondamentaux d'une théorie générale des machines*, A. F. Debize (trad.), Paris, Librairie F. Savy, 1877, p. 523 ; L. MUMFORD, *Technique et civilisation*, D. Moutonier (trad.), Paris, Seuil, 1950, p. 19-22 ; C. MITCHAM, *Thinking through Technology. The Path between Engineering and Philosophy*, Chicago ; London, The University of Chicago Press, 1994, p. 166-165 ; G. SIMONDON, *L'invention dans les techniques : Cours et conférences*, J.-Y. Chateau (éd.), Paris, Seuil, 2005, p. 86-101.

⁶⁹ G. DELEUZE et F. GUATTARI, *L'Anti-Oedipe. Tome 1, Capitalisme et schizophrénie, édition 1995 augmentée*, Paris, Editions de Minuit, 1972, p. 7, 44.

⁷⁰ *Ibid.*, p. 43-44.

⁷¹ *Ibid.*, p. 47.

⁷² *Ibid.*, p. 48.

⁷³ F. JULLIEN, *L'écart et l'entre, op. cit.*, p. 57.

⁷⁴ HERACLITE, *Fragments*, M. Conche (trad.), 4e édition, Paris, Presses Universitaires de France - PUF, 1998, p. 455, fr. 132.

⁷⁵ LUCRECE, *De la nature des choses*, B. Pautrat (trad.), Paris, Le Livre de Poche, 2002, p. 487.

⁷⁶ F. JULLIEN, *Les Transformations Silencieuses*, Paris, Editions Grasset & Fasquelle, 2009, p. 22.

⁷⁷ B. HOOKWAY, *Interface*, Cambridge, Massachusetts ; London, England, MIT Press, 2014, p. 24.

⁷⁸ G. DELEUZE, « Post-scriptum sur les sociétés de contrôle », dans *Pourparlers 1972-1990*, Paris, Minuit, 2003, p. 242.

flows of the gesture, which crosses the physical space structured by the pimples and the augmented space of the visual form, of the gaze, which crosses the see-through AR device as well as of the video through the mirror thanks to the roles assigned and mutually controlled to adjust the interaction.

The experience of crossing the medium

The *crossing* implies to *cross* the medium without however being reduced to it. Following Ingold, we will say that the *crossing*⁷⁹ is characterized by the fact of being crossed, unlike the transport which remains indifferent to what it crosses. On the one hand, the crossing is carried *out* in the world, and not *on* it, by remaining on its surface as is the transport⁸⁰. On the other hand, it associates locomotion and perception, where transport distinguishes them⁸¹. Thus, Sublimate proposes a crossing thanks to the operations of deposition and sublimation which are often multimodal, combining the touch, the vision, and the movement of the body.

The crossing includes a pathic dimension since it is affected by what it crosses. Under this condition, there is a "spectral"⁸² dimension of the crossing making of what crosses an "in-between"⁸³. Thus, Phantom Sensations proposes a "spectral" sensation of crossing of the body, produced by the perception of a haptic signal on both sides of a part of the body, giving the illusion of a crossing of the signal.

Finally, although this crossing can be described phenomenologically in terms of lived experience (*Erlebnis*), it must however first be understood according to its *ex-periri* etymology, "the crossing of a danger", that is to say of a test (*Erfahrung*)⁸⁴. The crossing is not without *perils* that constitute this movement of crossing as crossing. If all experience is a crossing, then it can always go *wrong*, in a left-handed way, because it is perilous, but also be "inventive" or "adventurous"⁸⁵.

Conclusion

The concept of "transface" is therefore conceived to answer the insufficiencies of interfaces reduced to "surface" and "touch". As a "face through", the transface is an interface which, on the one hand, passes through itself, on the other hand, implies an entity which passes through it, and finally, affects what passes through it by altering it. Distinct as much from tactile interaction as from tangible interaction, this new conception of the interface ensures not only interactions with and without physical surfaces, but also and above all interactions that can be traversed according to the three stated modalities.

⁷⁹ The term "crossing" is understood here as a synonym of Tim Ingold's "wayfaring" (T. INGOLD, *Une brève histoire des lignes*, S. Renaut (trad.), 1^{re} éd., Bruxelles, Zones Sensibles, 2013, p. 101).

⁸⁰ *Ibid.*, p. 103.

⁸¹ *Ibid.*, p. 105.

⁸² J. DERRIDA, *Spectres de Marx : L'Etat de la dette, le travail du deuil et la nouvelle Internationale*, Paris, Editions Galilée, 2006 ; F.-D. SEBBAH, « Traces numériques: plus ou moins de fantôme(s)? », dans C. Larsonneur *et al.* (éd.), *Le sujet digital*, Dijon, Les presses du réel, 2015, p. 114-126.

⁸³ S. MARGEL, « La société du spectral. L'automate, la marionnette et la star », dans *La société du spectral*, Paris, Lignes, 2012, p. 45-62.

⁸⁴ P. LACQUE-LABARTHE, *La poésie comme expérience*, Paris, Christian Bourgois éditeur, 2015, n. 6, p. 30-31 ; J.-L. NANCY, « Rives, bords, limites (de la singularité) », *op. cit.*, p. 107, 135 ; J. DERRIDA, « Apories. Mourir - s'attendre aux "limites de la vérité" », *op. cit.*, p. 314.

⁸⁵ M. SERRES, *Le gaucher boiteux. Puissance de la pensée*, Paris, Editions Le Pommier, 2017, p. 12.