that bears the brunt of the moral and legal responsibilities when the overall system malfunctions".5 (Elish, 2019) But even here it is evident that a better understanding of the concepts defined above can help. The problem of many hands, for example, or those of scapegoating and buck-passing are essentially problems of attribution of causal liability which can be addressed at least to some extent by greater transparency and explanation. A tendency to accept software flaws as inevitable suggests a failure in accountability that could be addressed directly, while trade secrets and scheme complexity go directly to requirements of transparency and interpretability respectively. And Elish's moral crumple zone arises precisely because of an inaccurate placement of liability resulting from the failure of those earlier concepts; a situation that a more accurate form of accountability, supported by the other integral concepts, could prevent. If the correct form of accountability is thus identified, and the related concepts of transparency, interpretability, and accountability are deployed as necessary to support it they can as a whole provide a structure which renders those deploying a system "answerable" to those affected by it in a manner which provides concrete remedies and incentives.Nissenbaum, for example, lists four main barriers to accountability in "a computerized society" as being the problem of many hands; a complacent tendency to accept software flaws as inevitable; a tendency to use "the computer" as a scapegoat and the tendency of software producers to deny accountability while leaving it to their software licensees who are least well placed to be accountable (Nissenbaum, 1996). Diakopoulos adds that problems also arise from lack of enforcement of accountability mechanisms that might be in place and from a tendency to game and manipulate any standards used, to which we might add the difficulty of specifying sufficiently precisely the level of compliance necessary in any given case. Diakopoulos also notes the lack of accountability that can arise from trade secrets (Diakopoulos, 2015) (a clash also noted by Bennett, 2013), the use of legacy code which cannot easily be reconstituted, or by the pure complexity of the scheme used. Elish suggests that in turn the resulting gaps in accountability tend to be filled by a "moral crumple zone" in which "the human in a highly complex and automated system may become simply a component...Linking the Two Maps: Viewing the Other Concepts Through the Lens of Accountability Not only does this more structured understanding of accountability help us to avoid disorder in that context, it also allows us understand more specifically what might be entailed in each of the other concepts outlined above.Conclusion In conclusion, as intelligent systems are deployed in an ever wider variety of contexts, those responsible for their governance have responded by developing a series of overlapping abstract concepts which aspire to regulate its operation.But it is also clear that when it is accountability for an autonomous system that is at stake this process must be fully interdisciplinary, involving both the relevant discipline and technologists or computer scientists on both substantive and procedural fronts.Indeed in some instances, such as the GDPR for example, the form of accountability will affect not only the quality of the information available when required (reviewability, transparency and interpretability) but also enhance the onus on the system operator to provide (push) that information (explainability, or indeed explanation).This is imperative both because the accountability discipline (law, politics, etc.) must fully understand the relevant technology in order to provide an optimal form of accountability and because, conversely, technology can in fact underpin and help to realize that accountability (Naja et al., 2021).Data & Policy e7–19 https://doi.org/10.1017/dap.2021.37 Published

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online by Cambridge University Press 7.There is a variety of taxonomies of accountability in the literature.6.

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