**Validation of inputs in multiphysics simulations**[1] JOHN WRIGHT,
PSFC-MIT — In multiphysics simulations involving integration of originally separately developed components, there are several opportunities for error in the specification. Both syntactic, set, and semantic validity are of concern as well as intercomponent consistency. Syntactic validity requires that formatting of the input files to the components are correct, such as proper syntax in XML files or proper spacing and ordering in text files lacking markup. Set validity is the requirement that inputs conform to the type and range or set of values permitted. Semantic validity is the assertion that inputs are sensical and logically internally consistent - that is they belong to the set of possible intended inputs. These semantic constraints are sometimes explicit in the codes, but are more often unstated or unenforced. Possibly included in semantic validity is consistency between component inputs so that inputs that are assumed to be the same actually are. We describe the application of XML technologies to these problems: XML schema for set consistency, XForms for manipulating the inputs in the form of an XML instance coupled with XML style sheet transforms to ensure correct input syntax, and XML ontologies to enforce semantic constraints.

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