

OpenVSP

Integrated Flowpath Modeling

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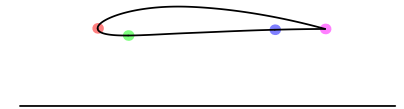
- Simplify propulsive flowpath modeling
 - Geometry
 - Analysis
- Many ways to model geometry
 - Must choose a single representation / intent
 - Geometry built to suit
 - Challenges for buried flowpaths
- IFM Goals
 - Maintain flexibility in geometry modeling
 - Enable flexibility in representation / intent
 - Improve support for buried flowpaths

} $N \times (1:1)$

} $N:M$

Geometry Modeling & Identification

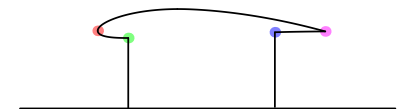
Flowthrough



Flowpath



To Face



To Lip

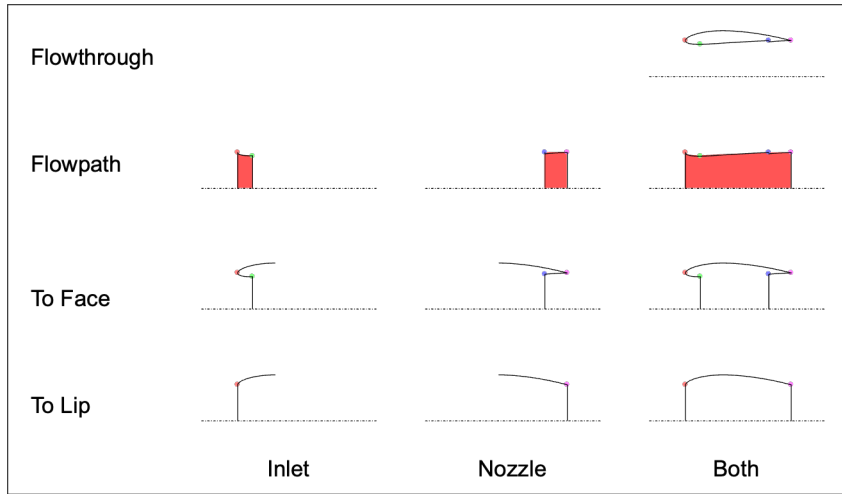


Inlet

Nozzle

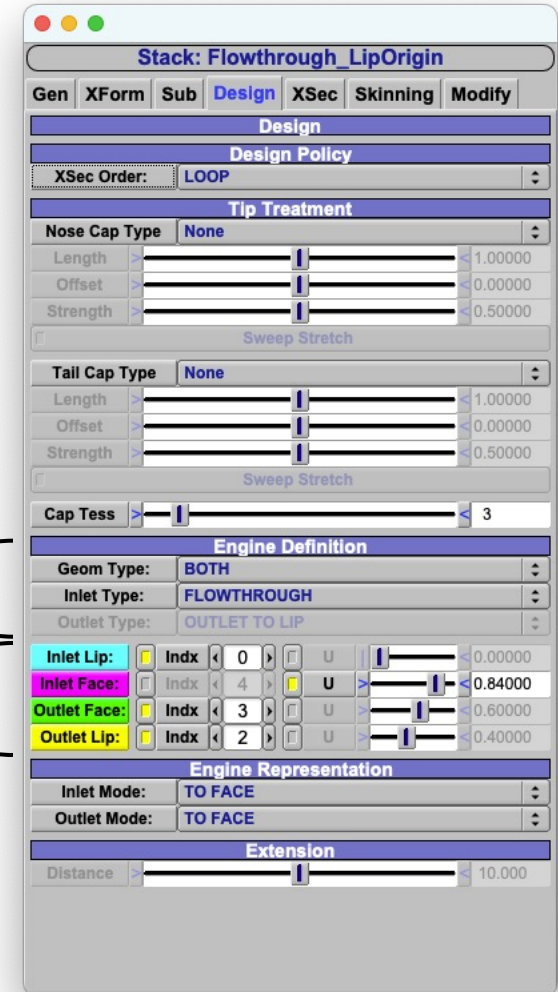
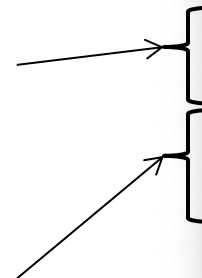
Both

Geometry Modeling & Identification



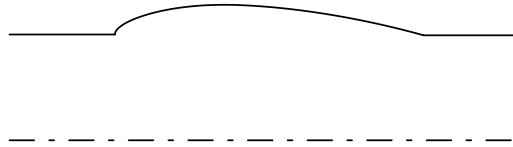
Geometry Model
Specification

Key Section
Identification

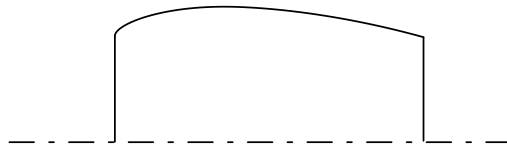


Representation & Intent

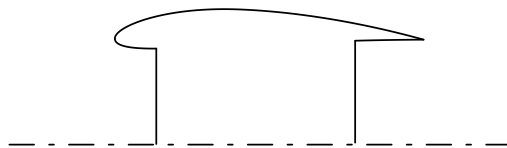
Extend



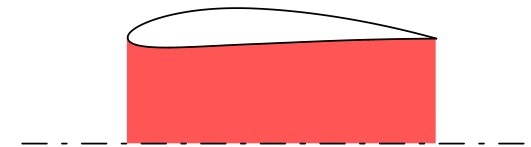
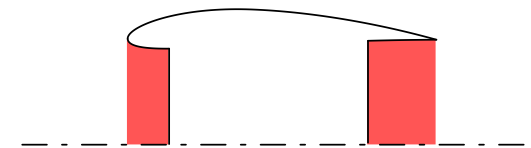
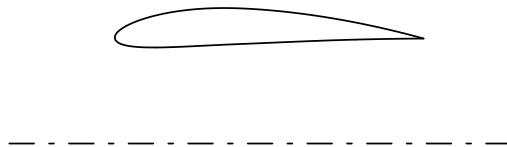
To Lips



To Faces

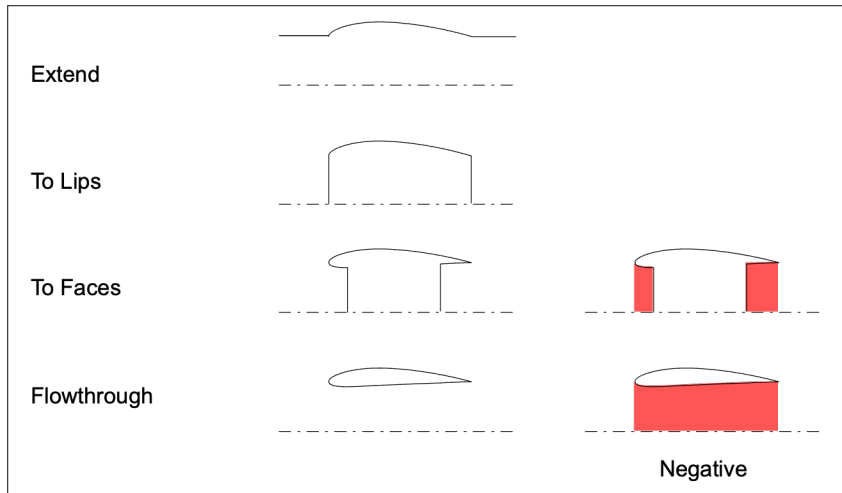


Flowthrough



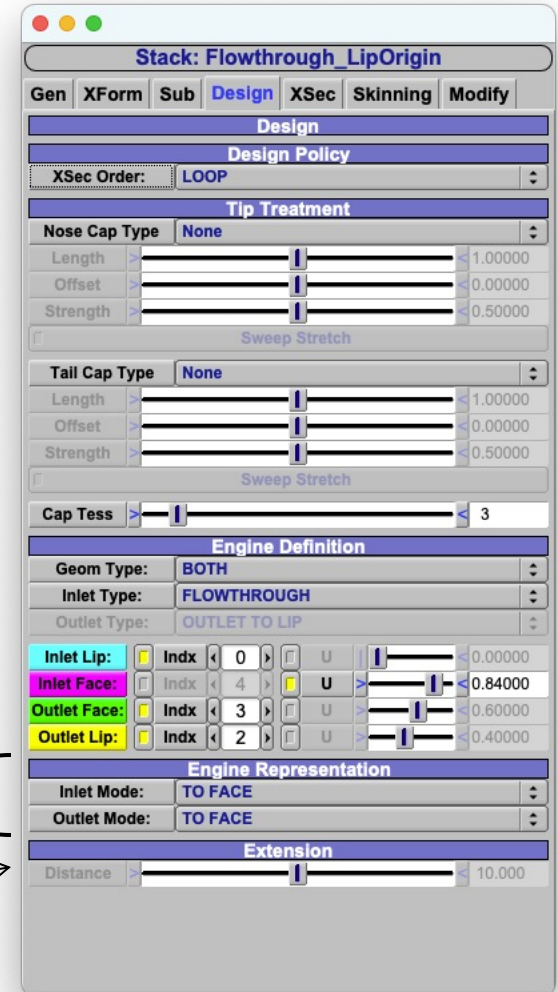
Negative

Representation & Intent



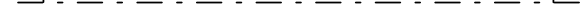
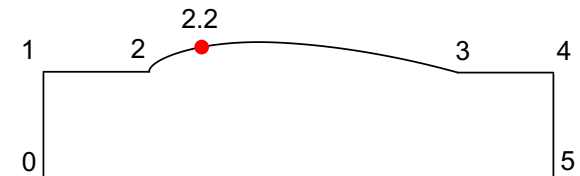
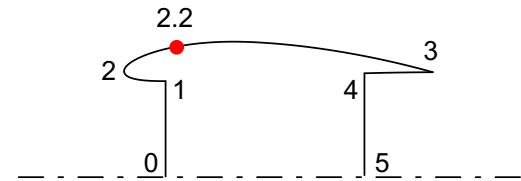
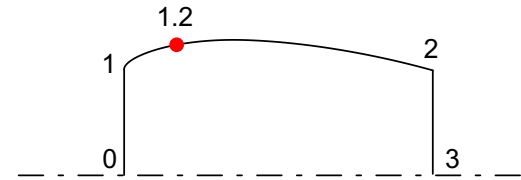
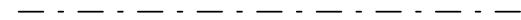
Representation
Specification

Extension Distance



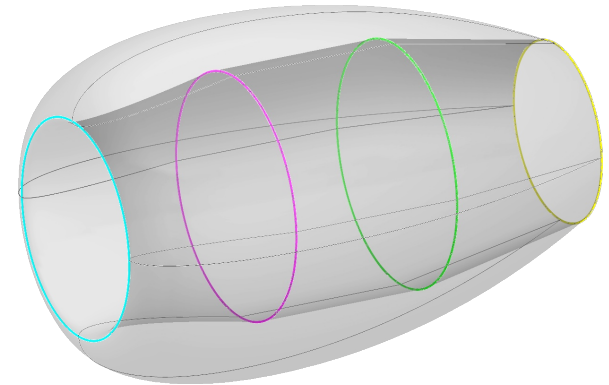
U Parameter Variation

- U Parameterization of geometry changes with representation.
- U value of a fixed point can change.
 - Subsurfaces
 - Probe / Ruler
- Number of U 'segments' can change.
 - Tessellation on a per-segment basis.
- Fractional segments can exist.
- This feature had a long tail of unexpected consequences.



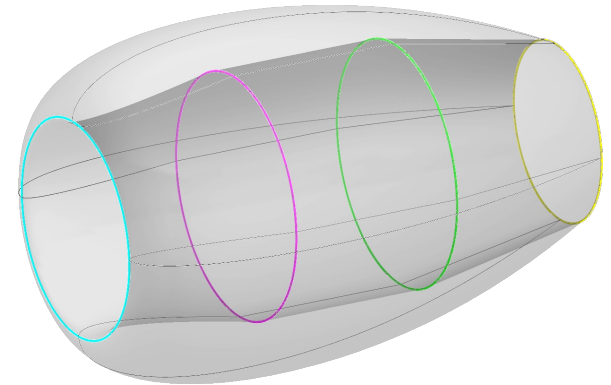
Required Changes

- Base geometry modifications
 - 'Coincident' positive / negative faces
 - CompGeom & family
 - CFDMesh & family
- Unexpected consequences
 - Measure (Probe / Ruler)
 - Structure FixPoint
 - Hinge
 - CFDMesh Sources
 - Subsurfaces
 - Tessellation
 - Attachment
 - More...



Deferred Changes

- Unexpected consequences
 - Wave drag integration
 - Texture mapping
 - Automatic subsurface creation



Demo

Questions?