FRIENDSHIP SYSTEMS and CAESES®

FRIENDSHIP SYSTEMS

Continuous growth

- Growing team with 22 people right now
- Steady increase of revenue even during the pandemic
- Rising customer base in all fields
- Even stronger technical foundation with CAESES 5
- Very positive response to CAESES 5
  - Speed up through parallelization
  - Better usability via cleaner GUI

Common denominator

Energy efficiency

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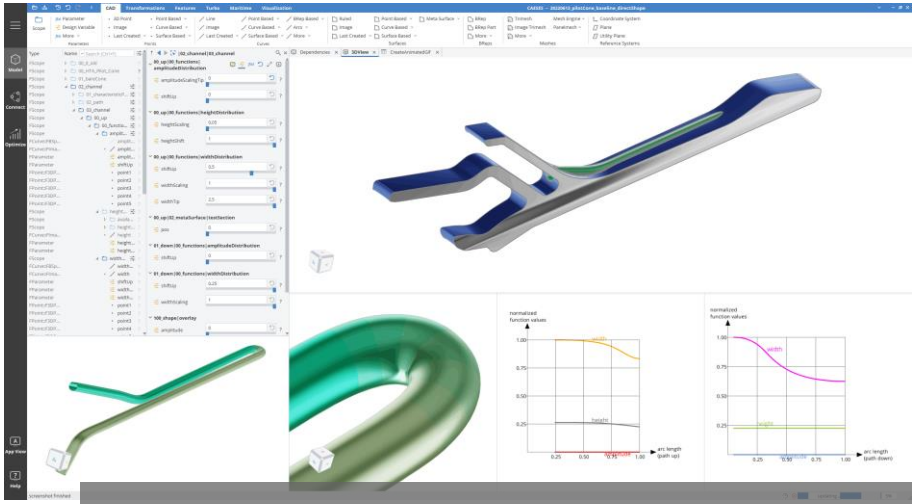
Simulation-driven design (SDD)

- 2002: “Never heard of it!”
- 2007: “It worked for a double-ended ferry.
  But does it really work for a container carrier, too?”
- 2012: “We can do this by hand.
  And simulations are not reliable enough anyway.”
- 2017: “Well, we would like to try it, too.”
- 2022: “All of our designs undergo SDD.”



J.C.R. Licklider, 1965

“People overestimate what can be done in one year, and underestimate what can be done in ten.”

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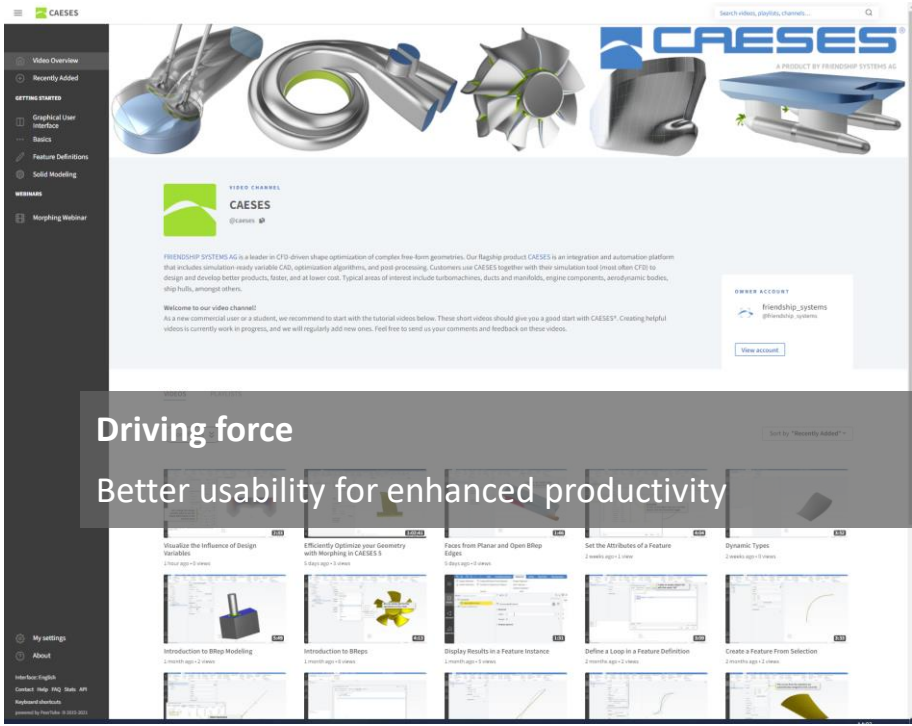
CAESES 5.1

- Released this summer
  - More documentation and new video platform
  - Easier access to design velocities
  - Bi-directional coupling of points
  - Dynamic object types



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R&D and investments

- Four ongoing R&D projects
  - AutoPlan (EU project within MarTERA)
  - DEffProForm (German project financed by BMWK)
  - MariData (German project financed by BMWK)
  - SDD-fAMe (project within ProFIT)
- Upcoming EU project
  - RETROFIT55 (Horizon Europe)

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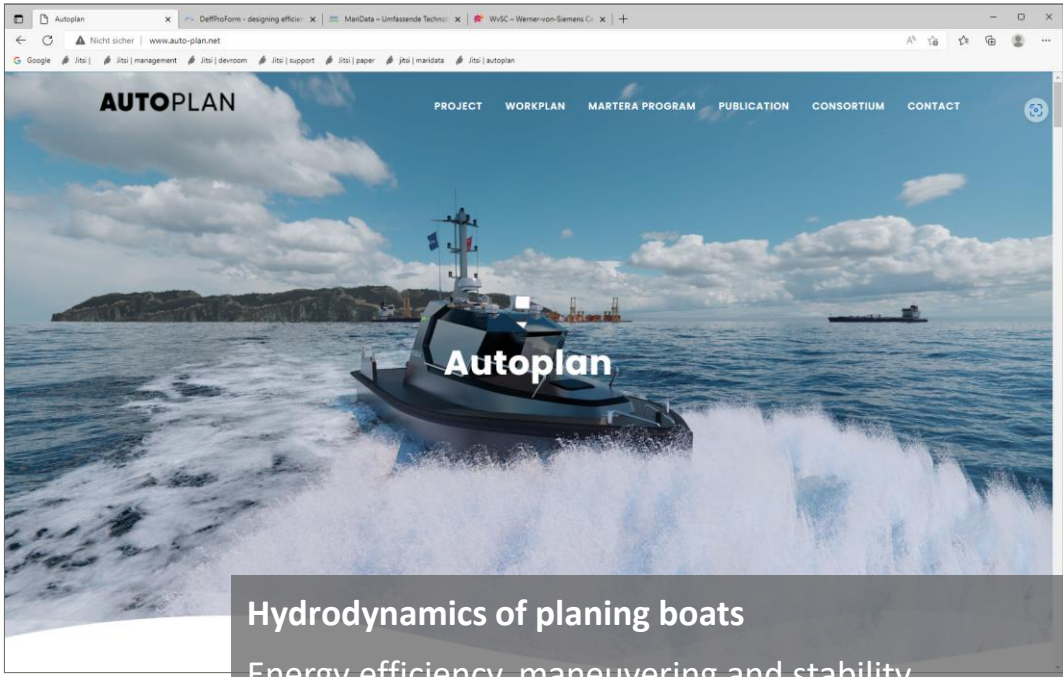
AutoPlan | www.auto-plan.net



Hydrodynamics of planing boats

Energy efficiency, maneuvering and stability

ptj Projektträger Jülich Forschungszentrum Jülich

MarTERA ERA-NET COFUND

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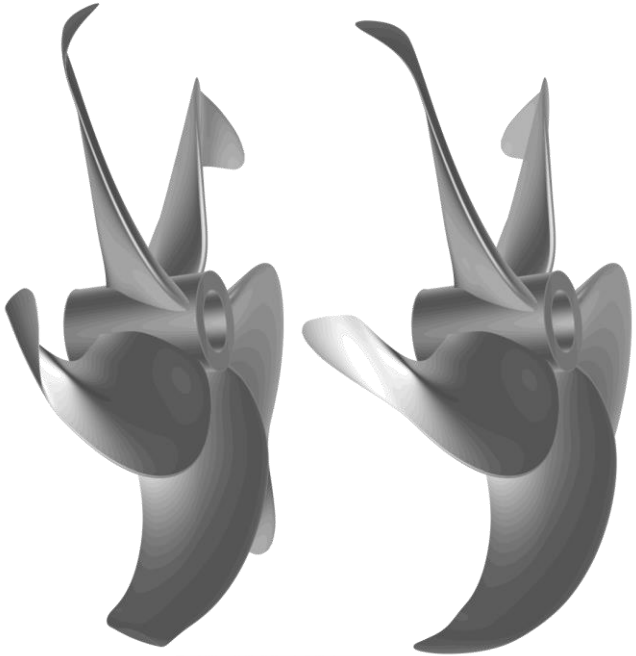
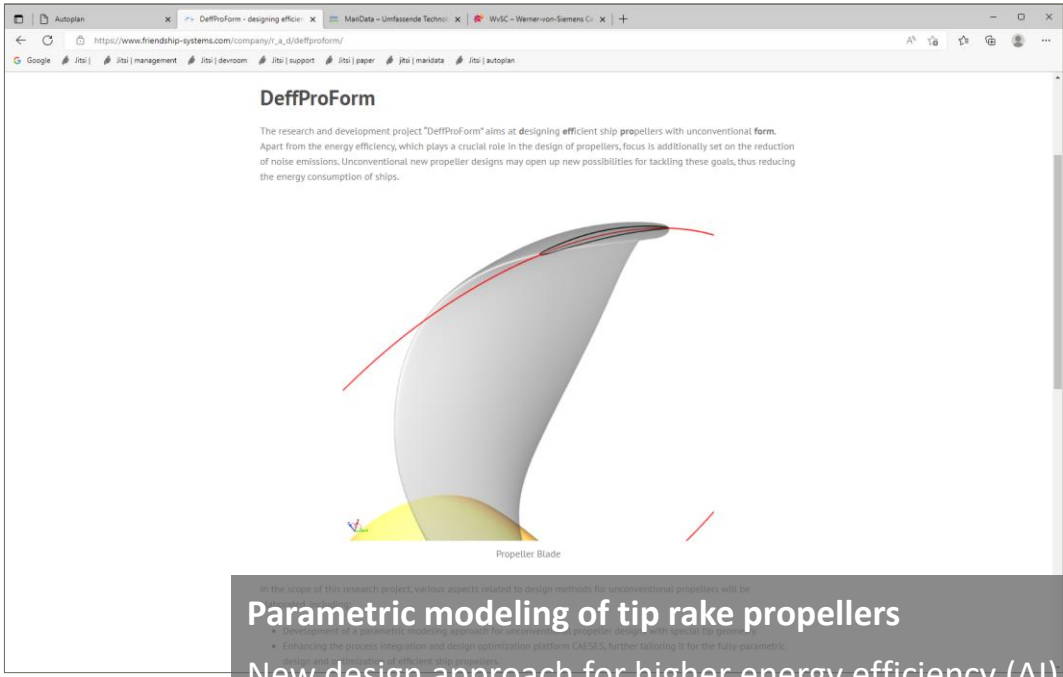
DEffproForm





Parametric modeling of tip rake propellers

New design approach for higher energy efficiency (AI)

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

Projektträger Jülich Forschungszentrum Jülich

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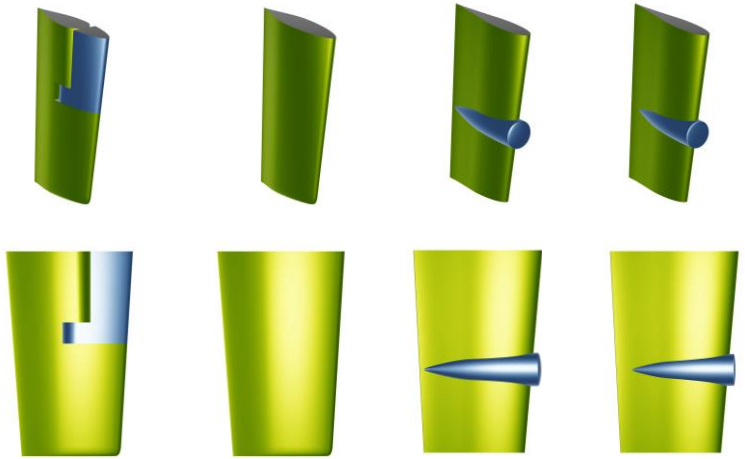
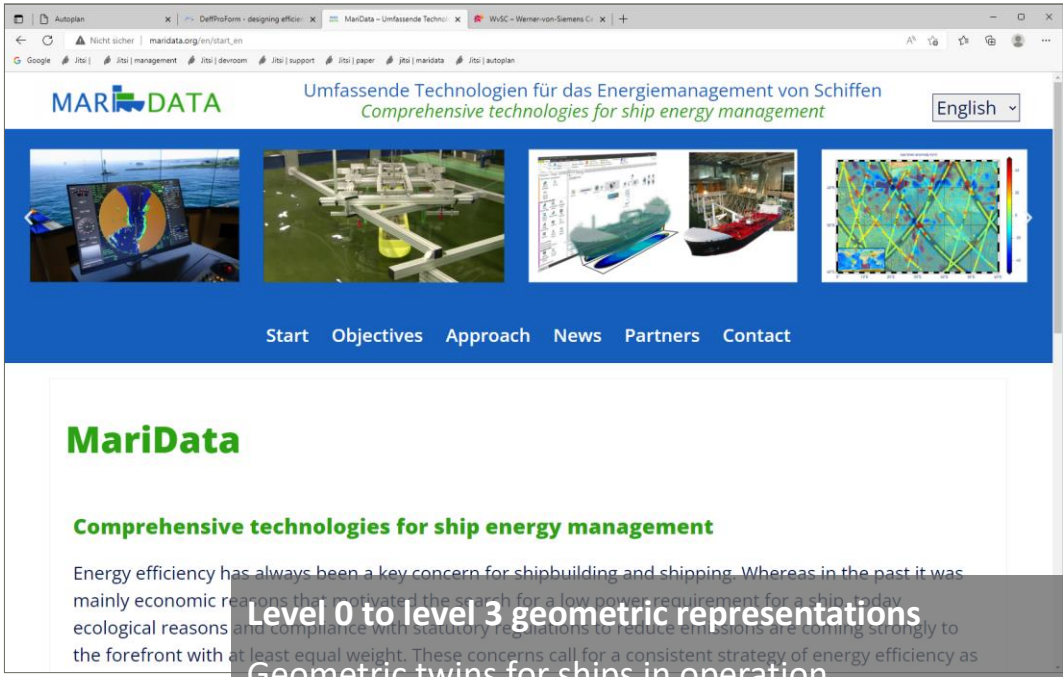
MariData | maridata.org





Level 0 to level 3 geometric representations

Geometric twins for ships in operation

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Federal Ministry for Economic Affairs and Energy

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Forschungszentrum Jülich

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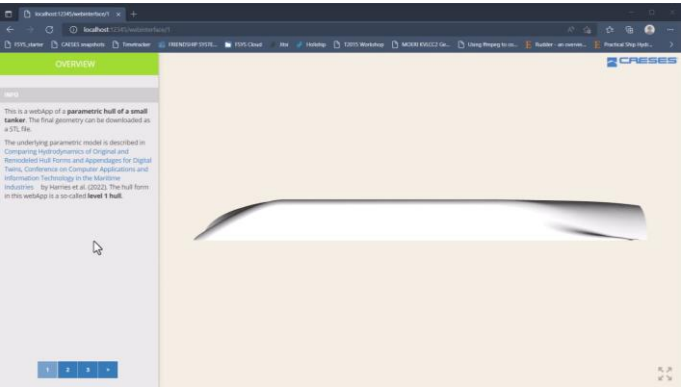
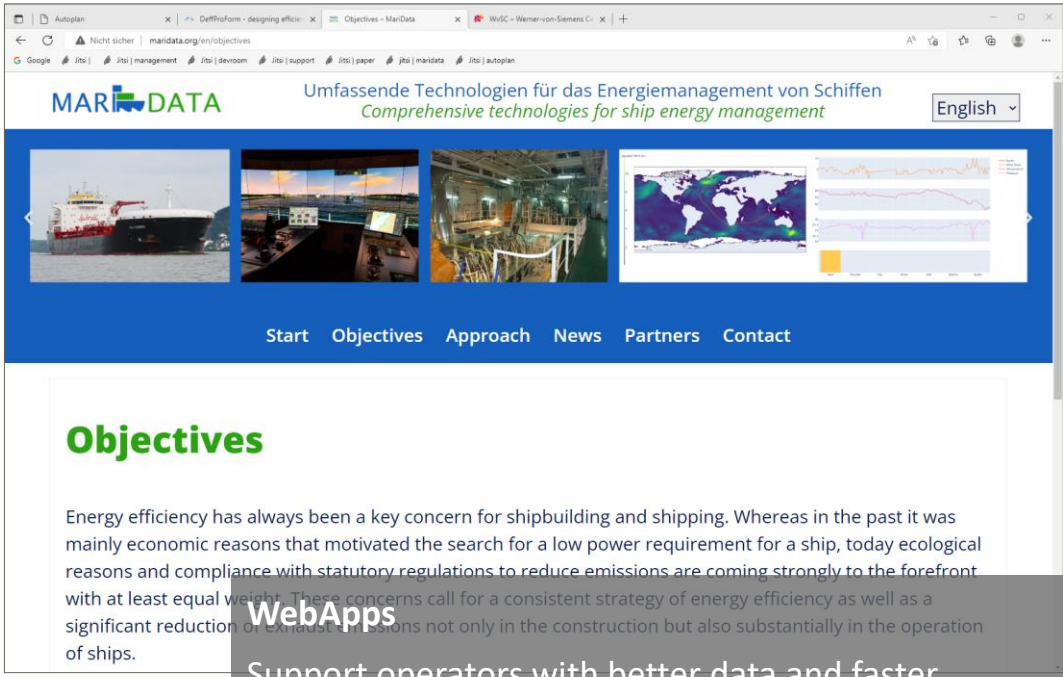
MariData | maridata.org





WebApps

Support operators with better data and faster

Supported by:
Federal Ministry for Economic Affairs and Energy
on the basis of a decision by the German Bundestag
Projektträger Jülich Forschungszentrum Jülich

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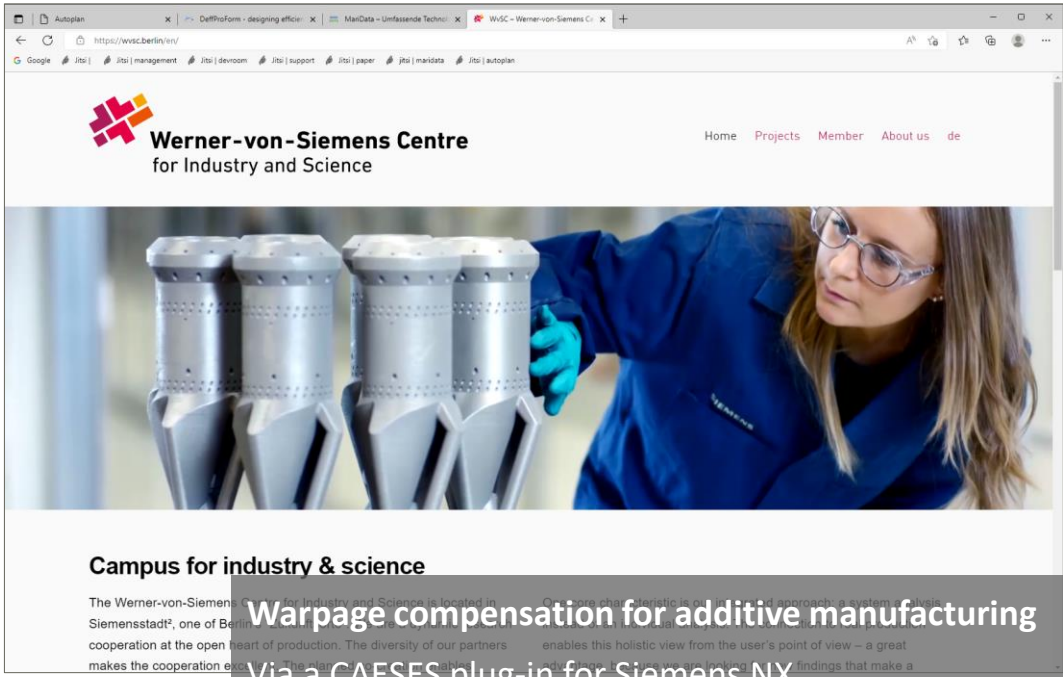
SDD-fAMe within WvSC e.V. | wvsc.berlin



Warpage compensation for additive manufacturing

Via a CAESES plug-in for Siemens NX

EUROPÄISCHE UNION
Europäischer Fonds für
Regionale Entwicklung

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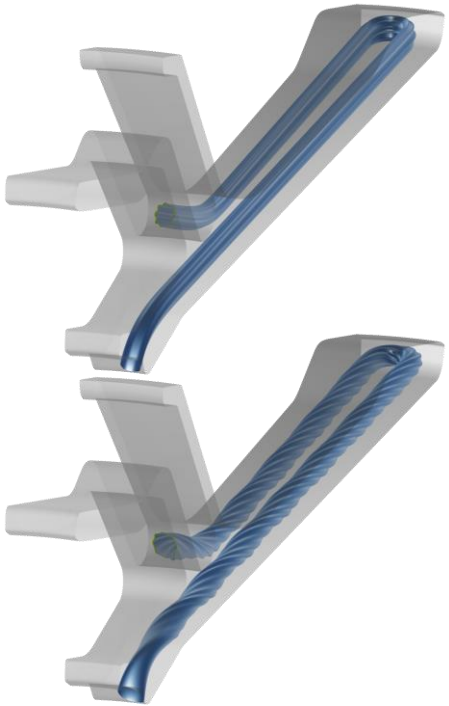
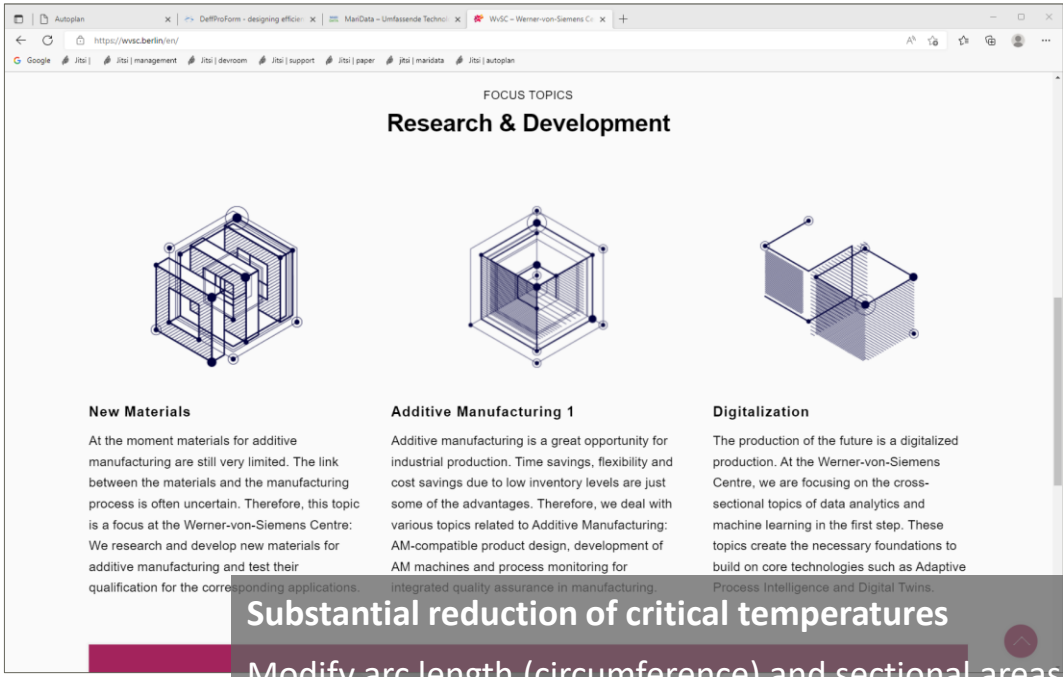
SDD-fAMe within WvSC e.V. | wvsc.berlin





Substantial reduction of critical temperatures

Modify arc length (circumference) and sectional areas

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Europäischer Fonds für Regionale Entwicklung

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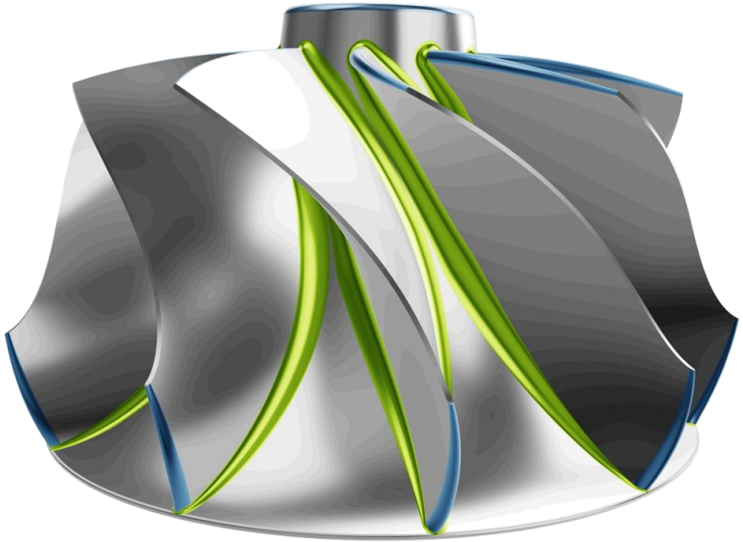
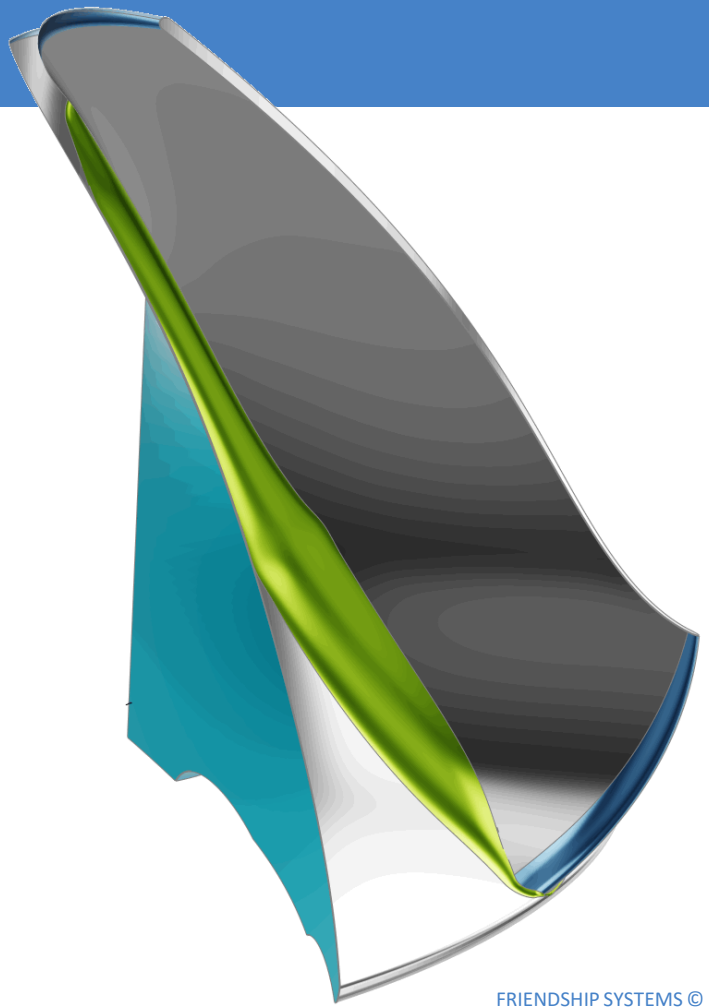
Variable fillets





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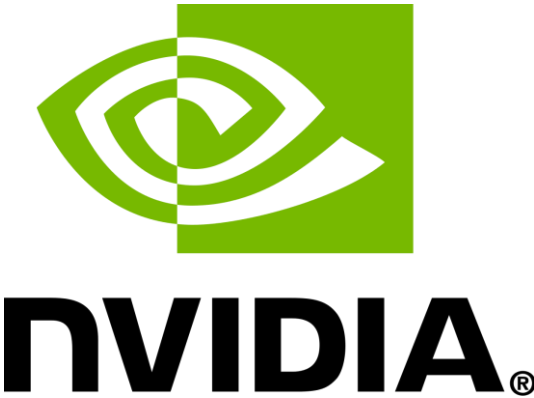
Current developments and additional cooperations

- Further improvement of Principal Component Analysis (PCA)
- More Artificial Intelligence (AI) and machine learning in optimization
- Easier modeling and cleaner projects
- Workspaces for dedicated workflows
- Tighter cooperation with CAD kernel developers since NVIDIA took over US-based SMS



Overarching strategy

Cooperate and bring cool stuff together instead of reinventing the wheel time and again

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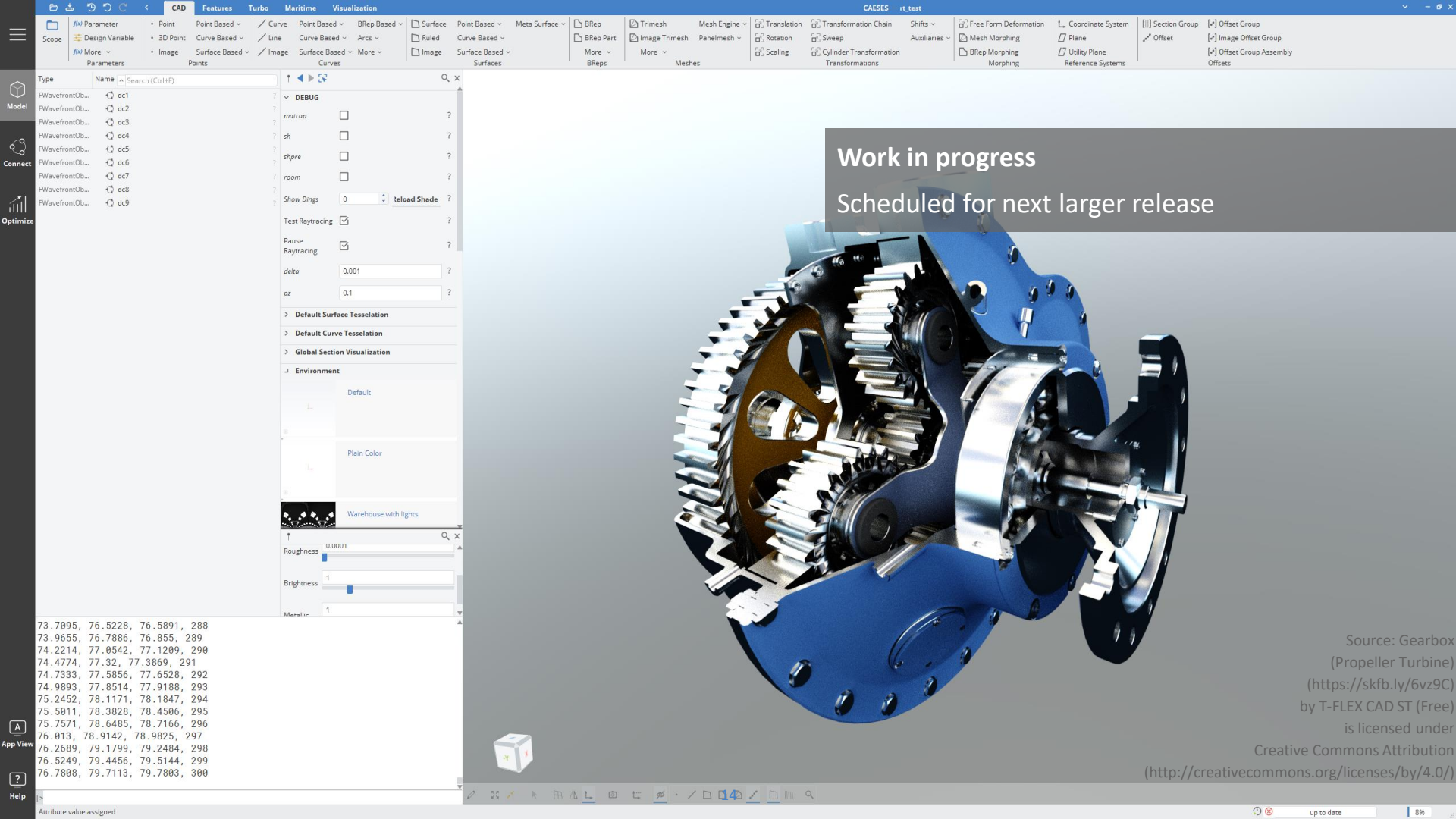
CAD
Features
Turbo
Maritime
Visualization
CAESES – rt_test
Model
Connect
Optimize
App View
Help
DEBUG
matcap
sh
shpre
room
Show Dings
teload Shade
Test Raytracing
Pause Raytracing
delta
0.001
pz
0.1
Default Surface Tesselation
Default Curve Tesselation
Global Section Visualization
Environment
Default
Plain Color
Warehouse with lights
Roughness
Brightness
Work in progress
Scheduled for next larger release
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76.2689, 79.1799, 79.2484, 298
76.5249, 79.4456, 79.5144, 299
76.7808, 79.7113, 79.7803, 300
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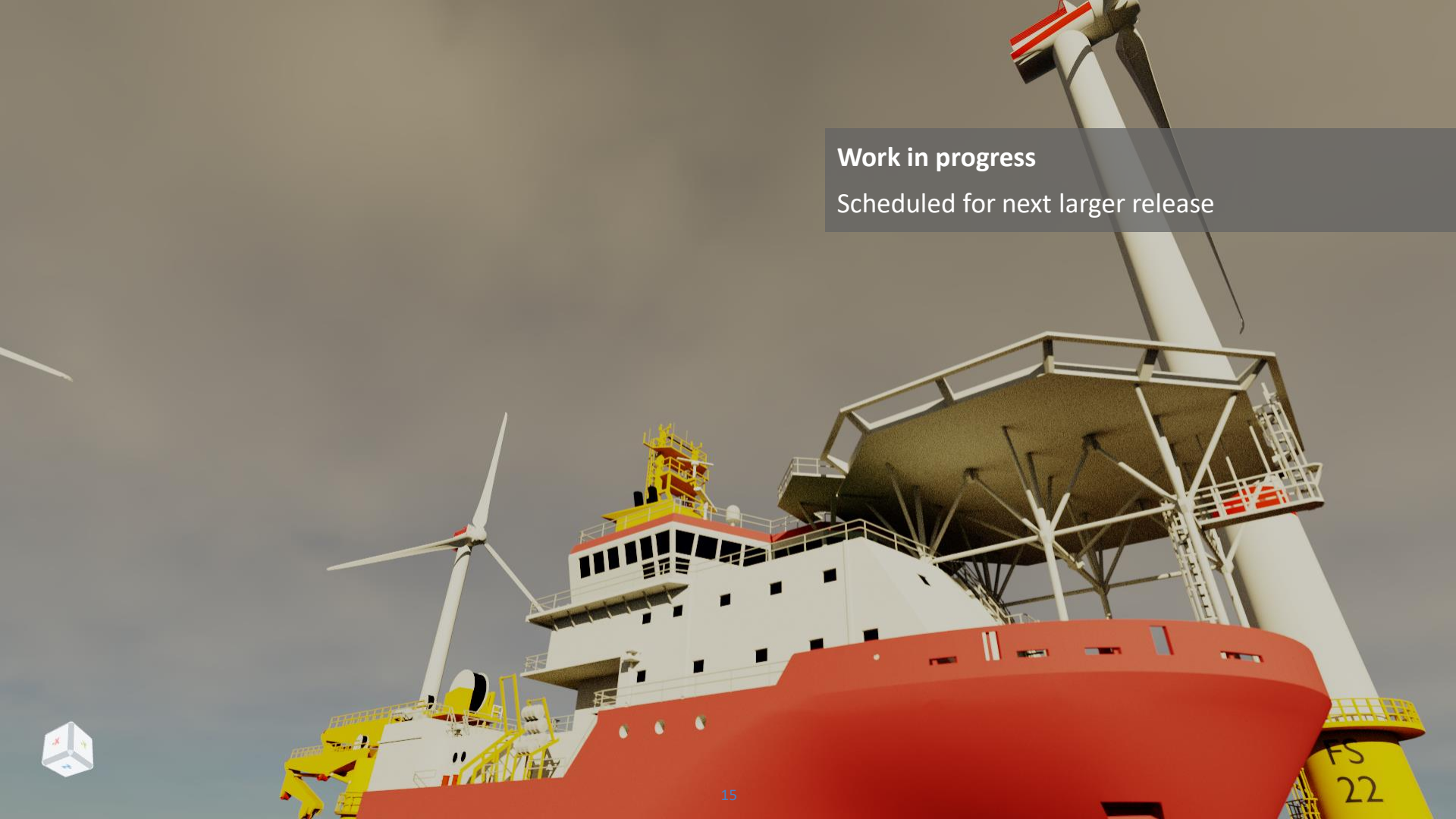

Work in progress

Scheduled for next larger release

N.B.

This is the rising sun

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