



CAESES®



USERS MEETING

SEP 18-20, 2019



FRIENDSHIP SYSTEMS

CAESES 5 beta and Current Developments

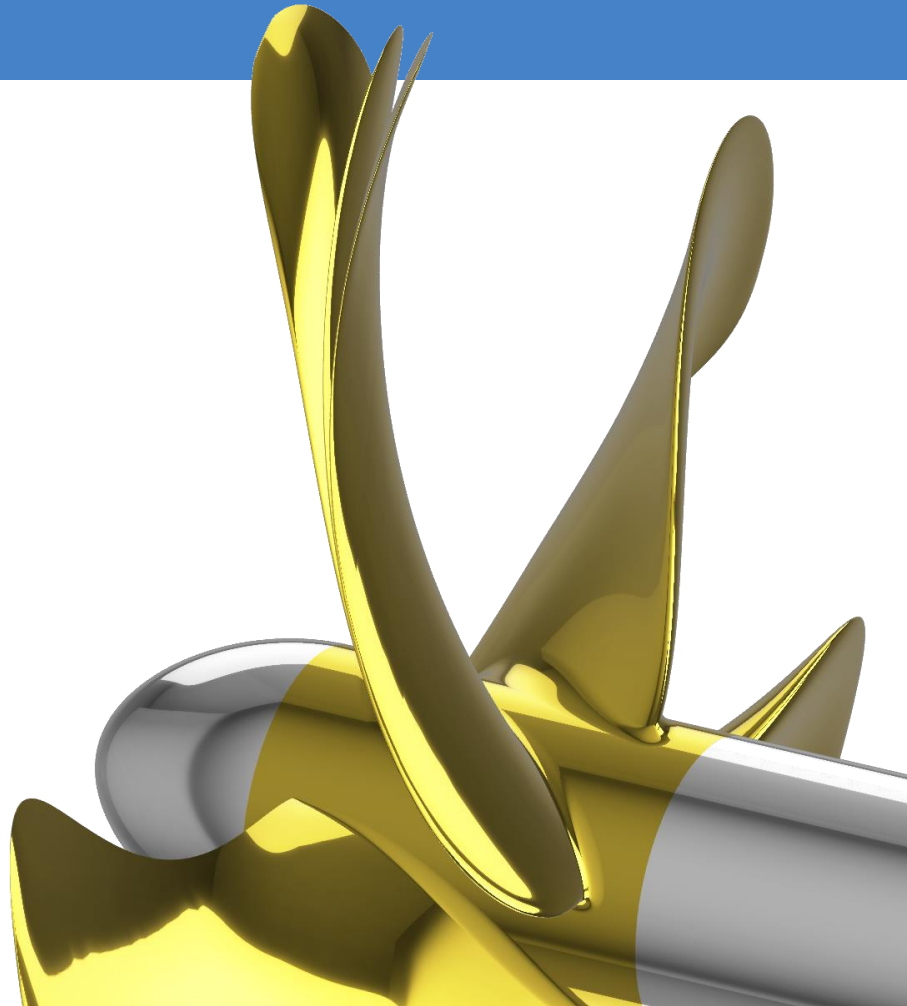
Claus Abt and Dr. Stefan Harries
Berlin, September 19, 2019



FRIENDSHIP SYSTEMS

Contents

- CAESES 5 beta
- Roadmap
- Current developments from R&D
- Networks and partners
- Conclusions

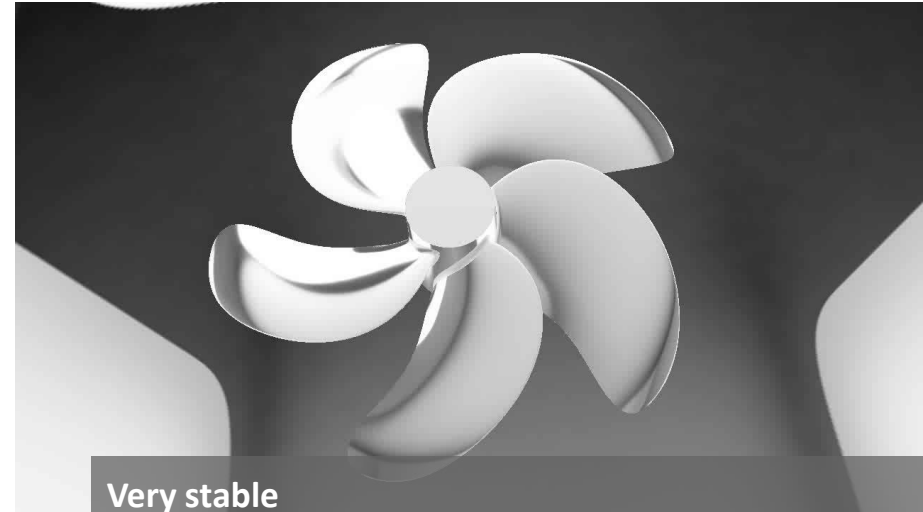


CAESES 5 beta



CAESES 5 beta

- 5++ years of continuous development
- Fully parallelized and improved core
 - Much faster on modern multi-core processors (and still faster for sequential updates)
 - Asynchronous updates
 - Completely new 3d view (basis for more interactivity)
- Extensively tested
 - Nightly tests with 250 internal projects
 - Utilized in R&D projects
 - Manually tested with selected external projects



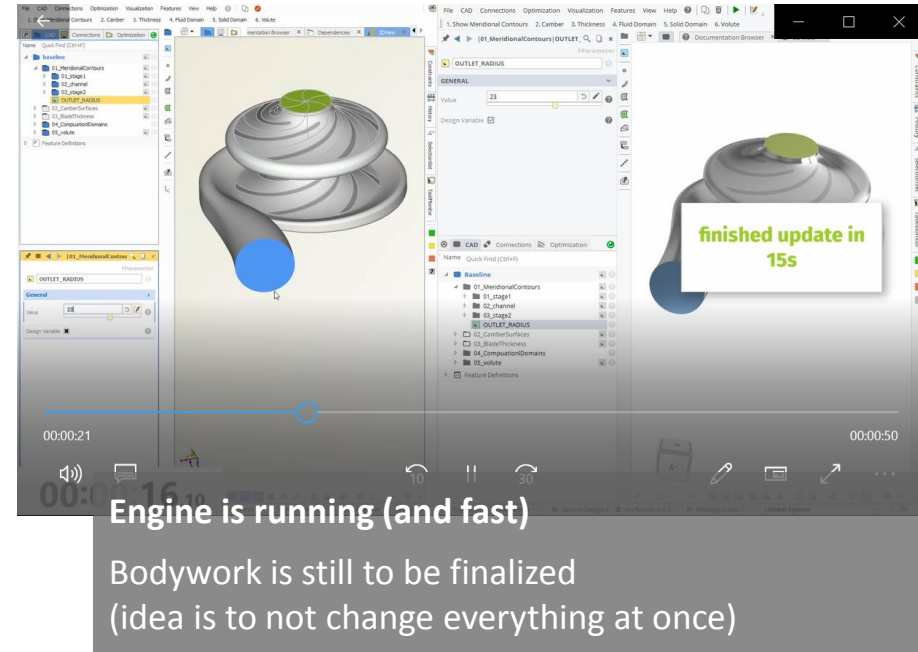
Very stable

Still, experience from the last 15 years and four major releases have taught us that external tests are recommended



CAESES 5 beta

- Decision is to
 - Tag it CAESES 5 beta (instead of CAESES 5.0)
 - Run a three-months public test phase
 - Gather feedback
 - Receive wishes
 - Discover missing things
 - Identify and repair bugs
- Invitation to users within M&S
 - Test CAESES 5 beta (speed up your work)
 - Get weekly builds (e.g. with bug fixes)
 - Offer selected projects for testing at FRIENDSHIP SYSTEMS



CAESES 5 beta

- Additional license during three-months test phase
 - Get a web-floating license
 - Run different projects concurrently in both CAESES 4.4 and CAESES 5 beta
- Decision to be taken at the end of test phase
 - Highly stable
 - Even for challenging projects?
 - “Residual” of bugs reported small?
 - Functionality comprehensive enough?
 - New UX gives added value?

WELCOME TO CAESES

Welcome to CAESES!
As a new user, please register and request a new license. It will only take a few seconds until you can start your trial.
Existing users can either import an offline license file or provide the address of a local float license server.

NEW USER

REGISTER

Do you need an offline license for a computer that has no Internet connection?
Then [export a license request file](#).

EXISTING USER

LOGIN

ADD LOCAL SERVER

IMPORT LICENSE FILE

Need help? [Contact our support team](#).

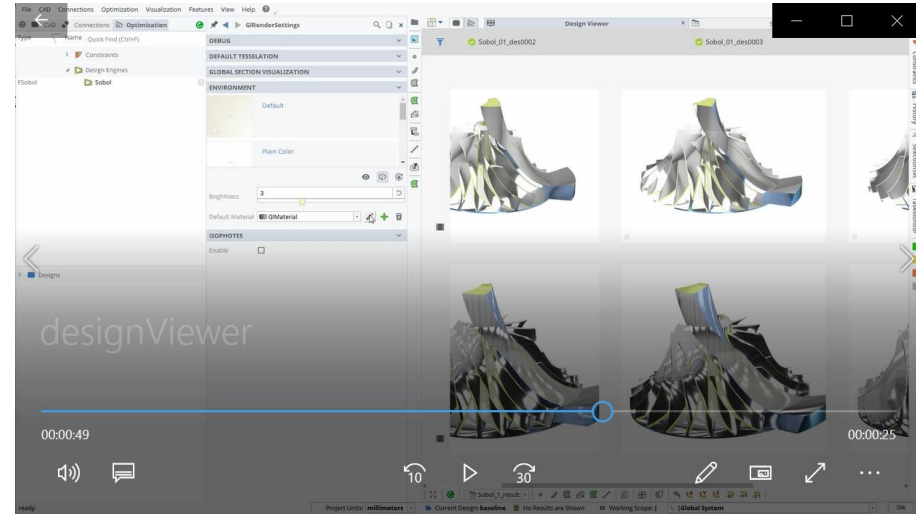
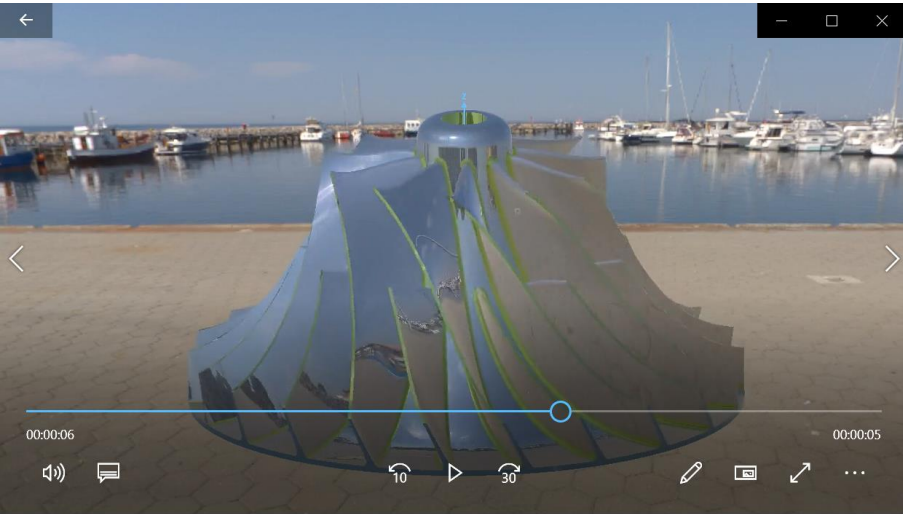
QUIT

New license system

Faster and easier administration

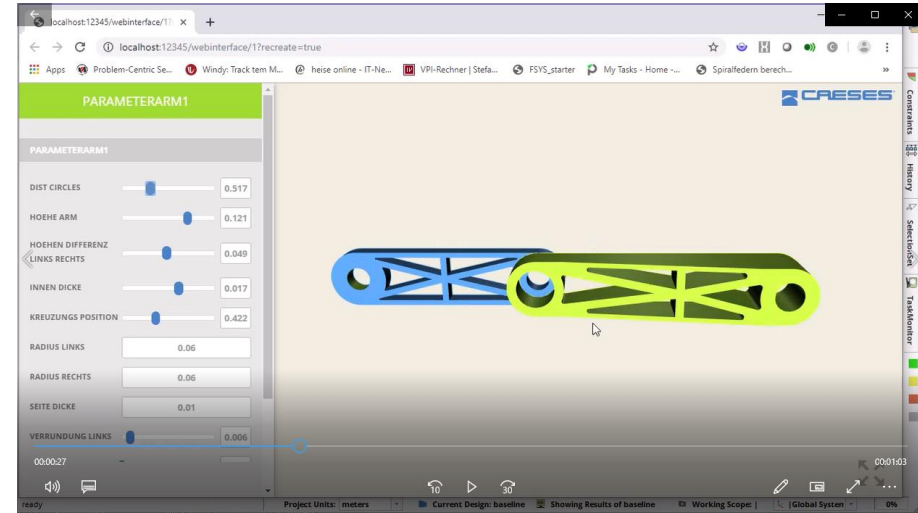


Advanced rendering and updated design viewer

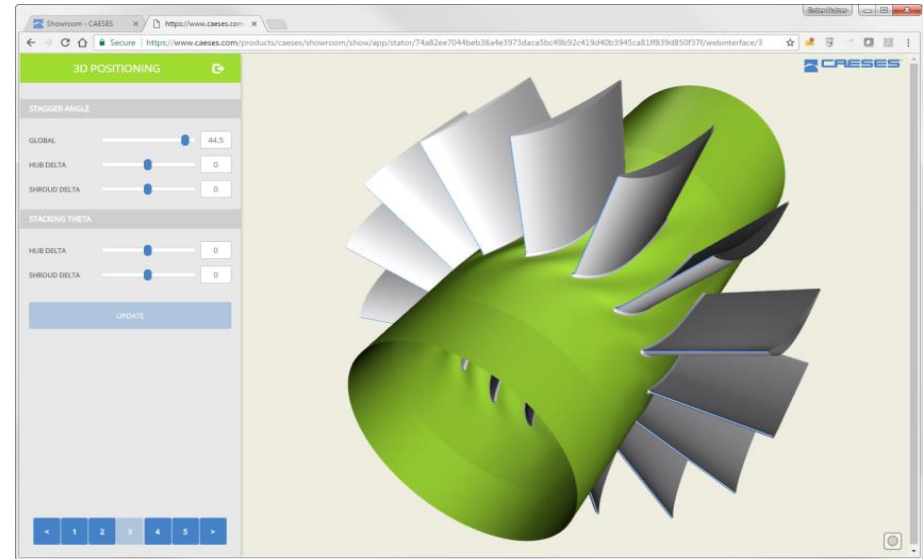
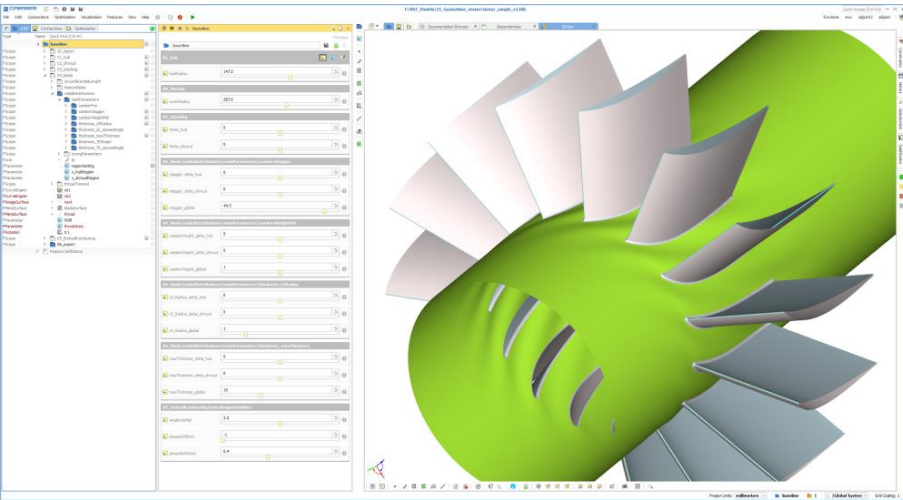


AppView

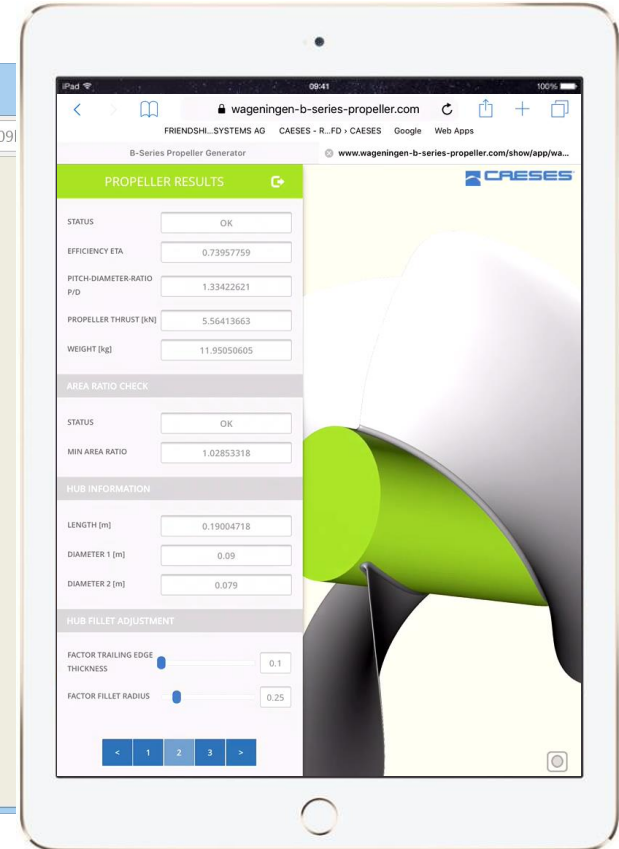
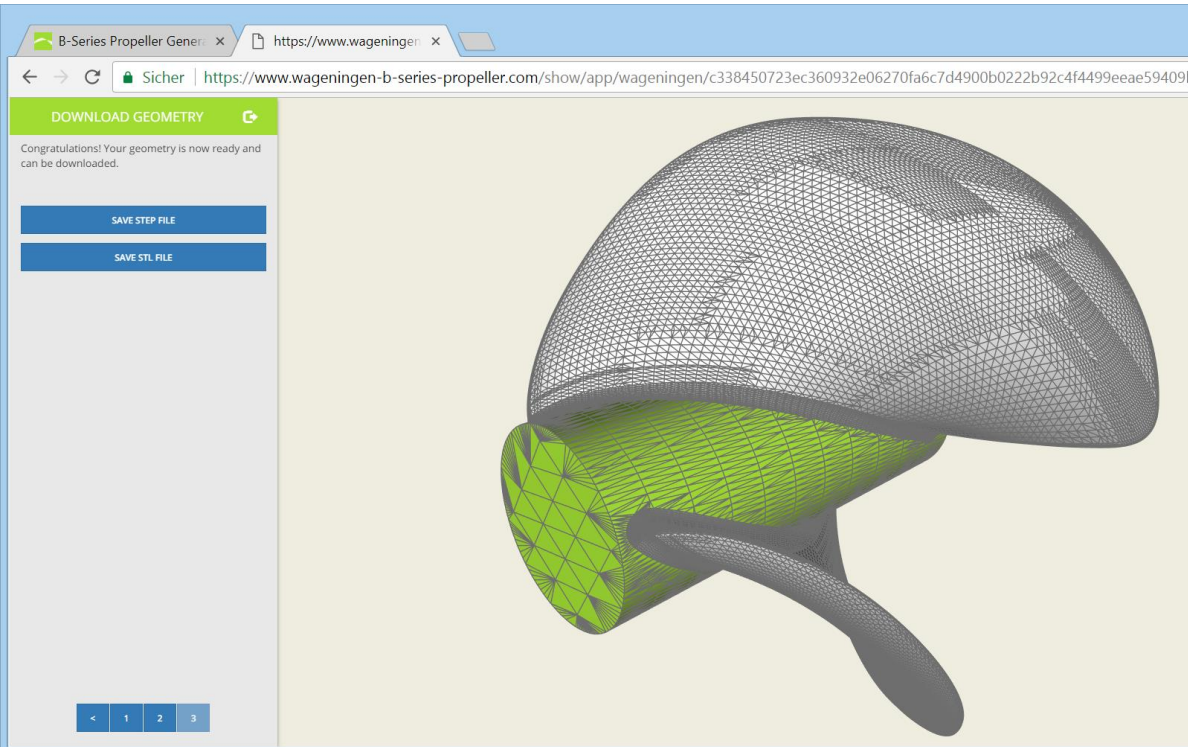
- Simplify workflows
- Allows building
 - Web services
 - Easy-to-use interfaces for colleagues
- Switch between
 - Standard GUI
 - Reduced parameter controls
- Preset views on selected geometry



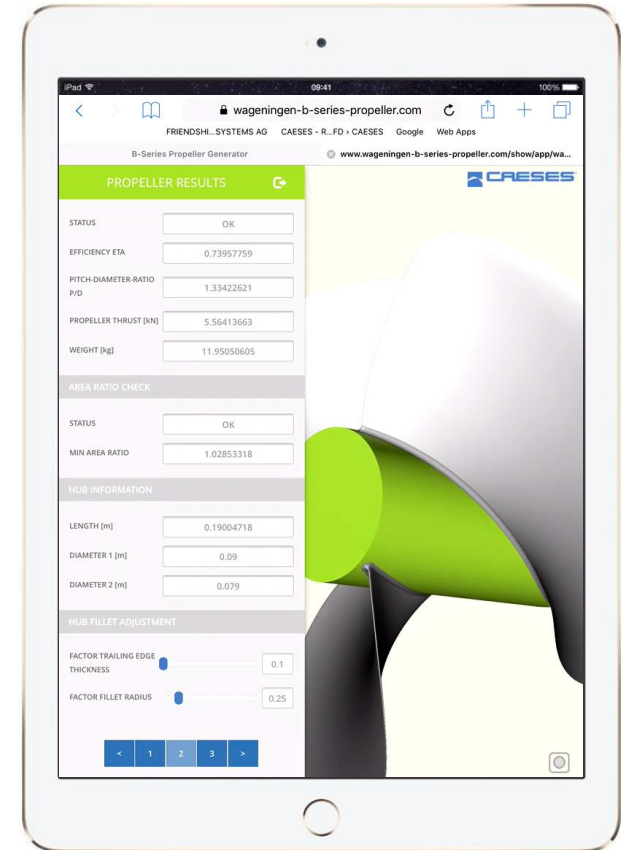
webApps



webApps



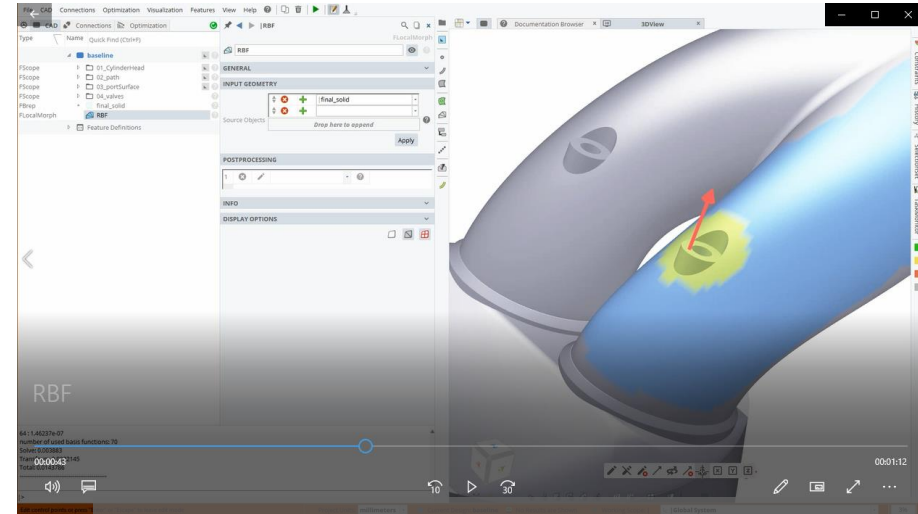
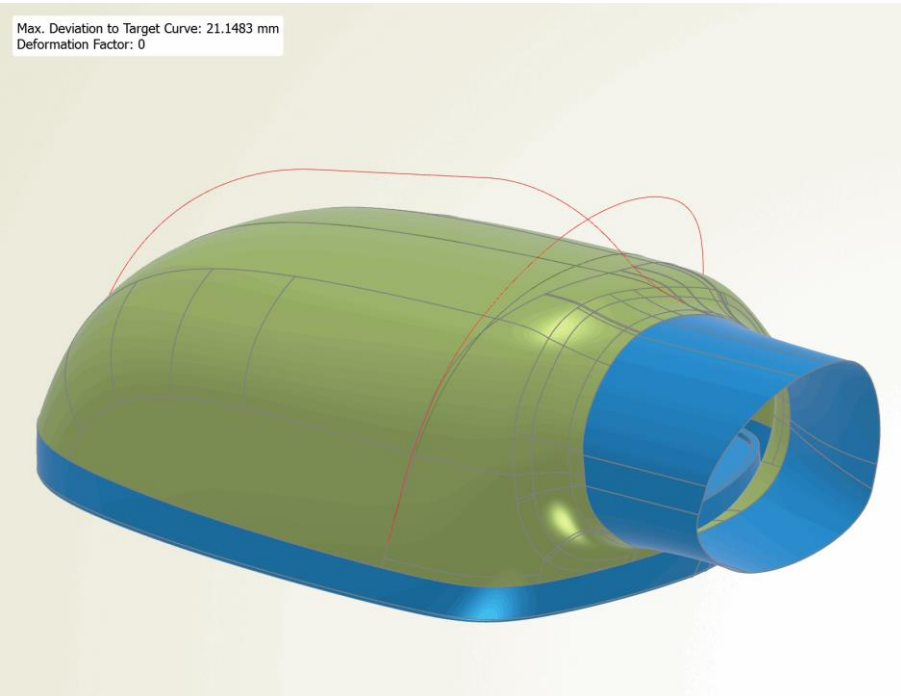
Wageningen B-series propeller



Roadmap

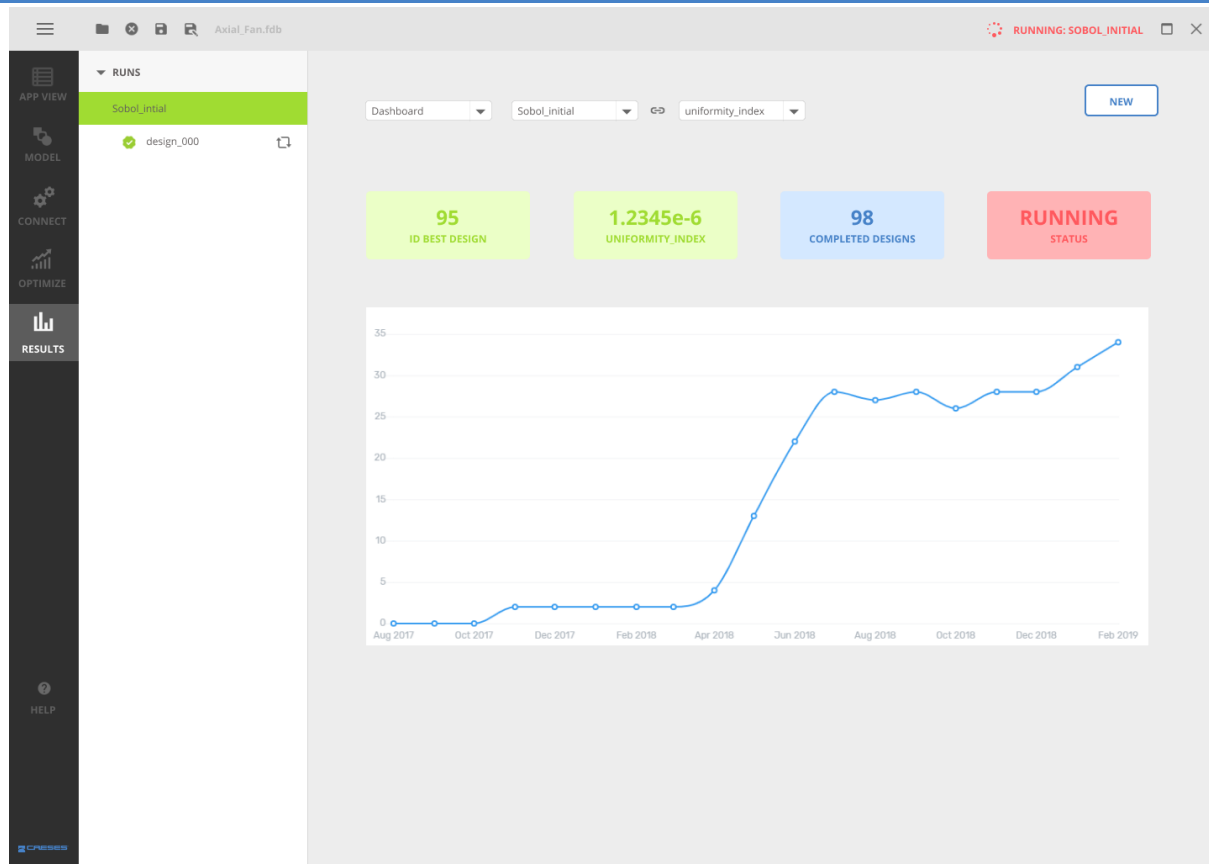


Interactive modification of geometry



Radial Basis Functions (RBF)
Ease-of-use and cool UX





















Redesigned license management

- Inside CAESES
 - License related requests can be handled within CAESES (e.g. change of hardware) [partially available already]
 - Improved support for multi-license set-ups
 - Request of trial license for additional features within CAESES
- New license portal (web interface)
 - Ability to define license administrators for each company
 - Administrators can manage licenses (e.g. add/remove users)

LICENSE SELECTION



Please select your license below. You can also [import an existing license file](#) for this computer, or manually [add a local float server](#). If you still can't find your license or need support, please [contact us](#).

ID	TYPE	NODES	LICENSE INFO	ACTIONS
7429	 Float (Prepaid 5/20 h)	1 / 1	 Commercial Use	  
7429	 Float (Prepaid 5/20 h)	1 / 1	 Commercial Use	  
7429	 Float (Prepaid 5/20 h)	1 / 1	 Commercial Use	  

☒ Remember selection

You are logged in as [uharek@friendship-systems.com](#).
[Logout](#) / [Switch user](#).

CANCEL

START CAESES



Current developments from R&D



Holistic design and multi-disciplinary optimization

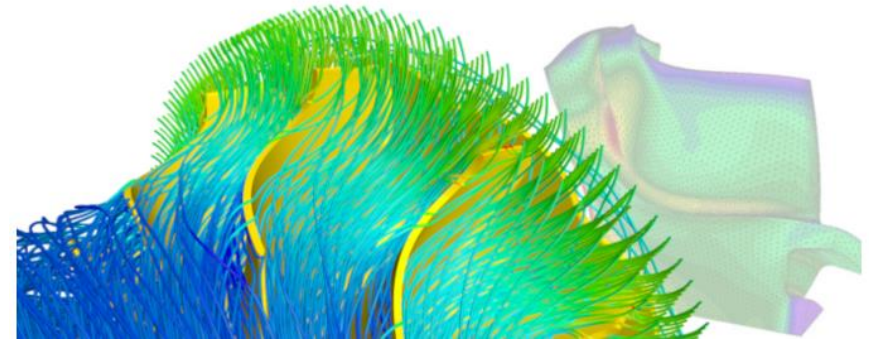
HOLISHIP Session

Do you want to learn more about pioneering ship design? The vastly increasing complexity of European built ships and maritime structures as well as the growing number of rules and regulations call for novel concepts of product design and testing. We dedicate a full morning session to the latest developments of a thrilling maritime research project called HOLISHIP that bundles the vast expertise of 40 European partners!

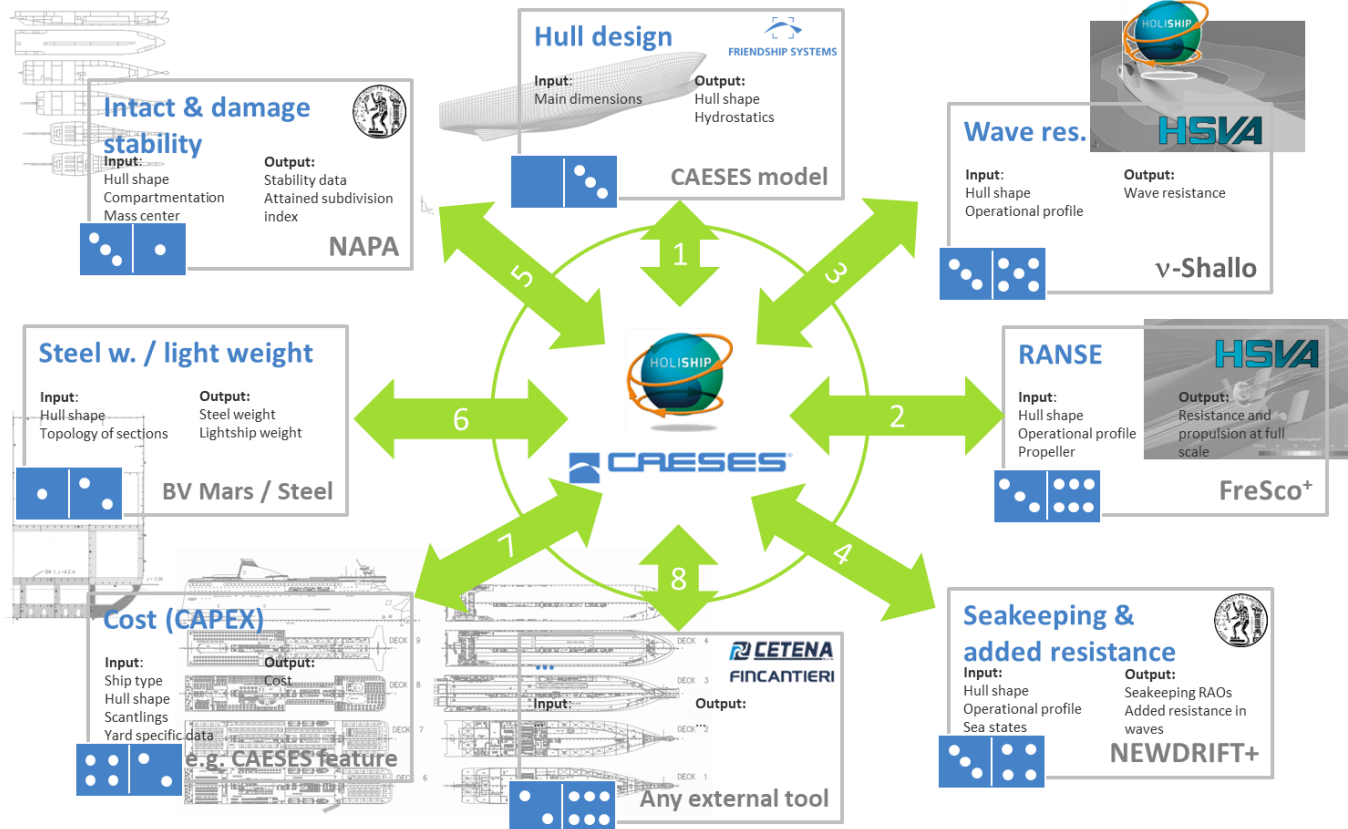


GAMMA Session

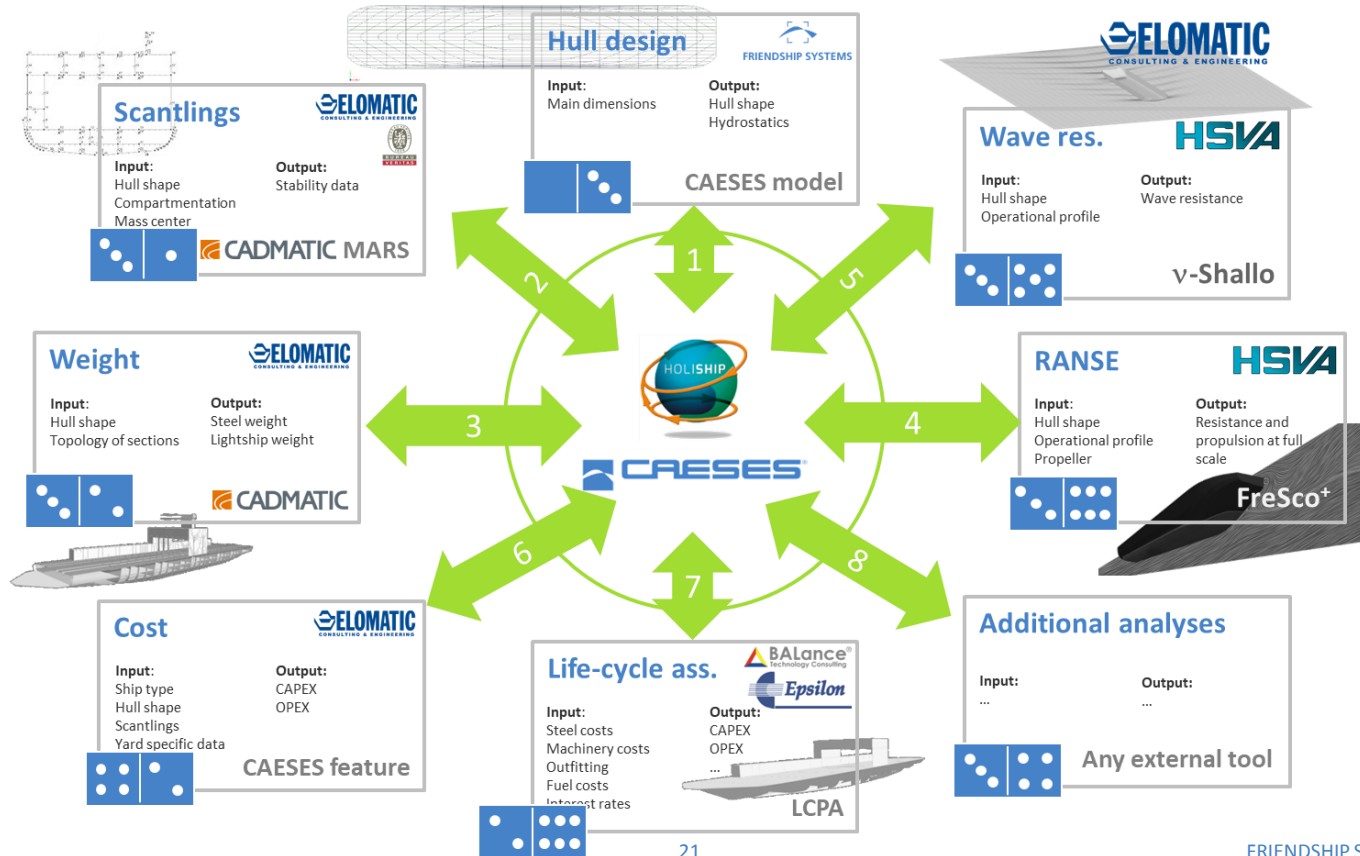
Being a parallel event of the HOLISHIP session, there will be a stunning session about the design of large diesel turbochargers. In the research project GAMMA, the shape optimization of turbochargers is really pushed to the limits! The presenters of this session will dig into new revolutionary optimization strategies as well as incredible automated workflows, to massively accelerate the full design process. How to save months of work? Join this session to find out!



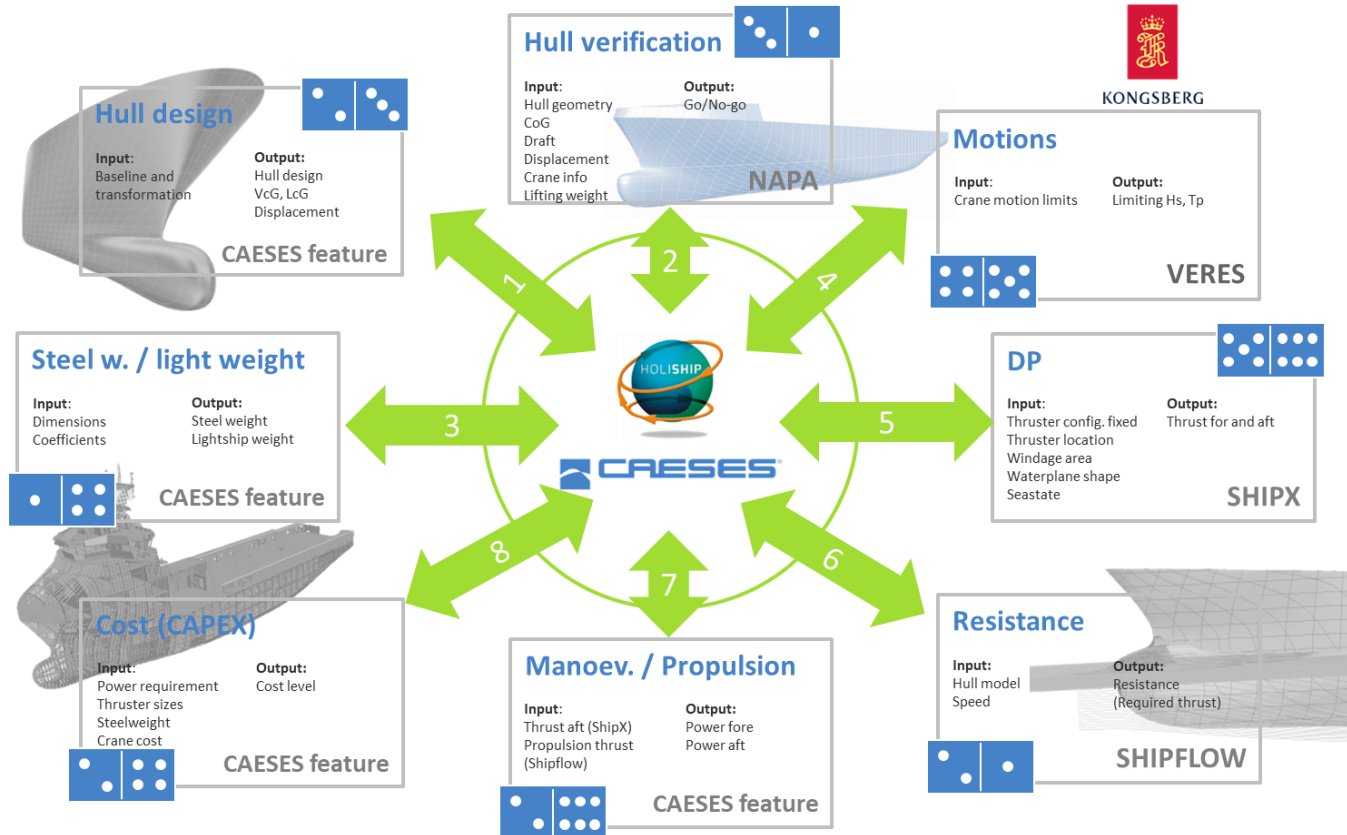
Synthesis model for a RoPAX ferry



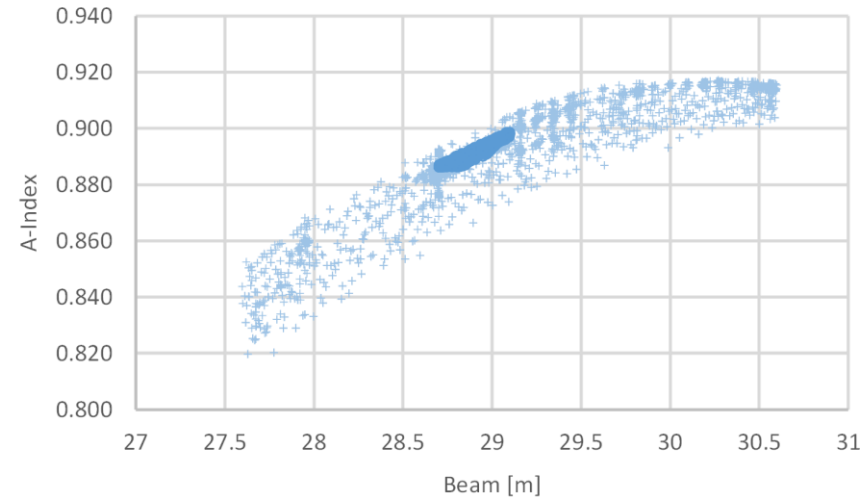
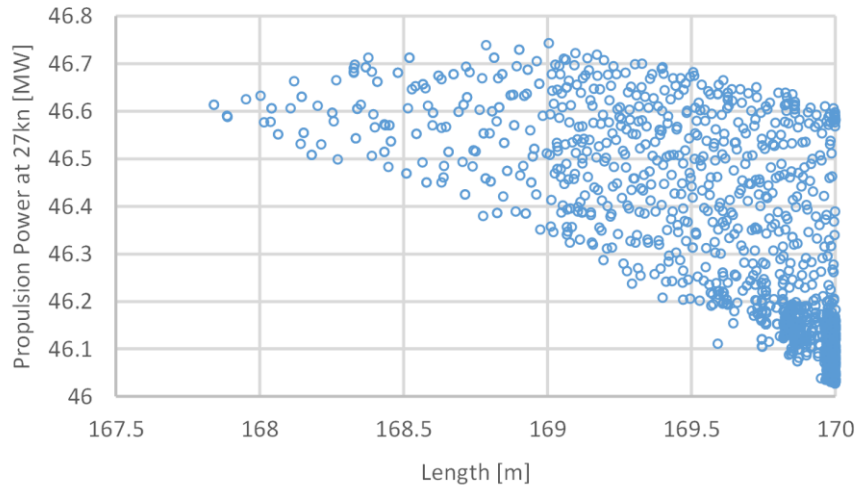
Synthesis model for a double-ended ferry



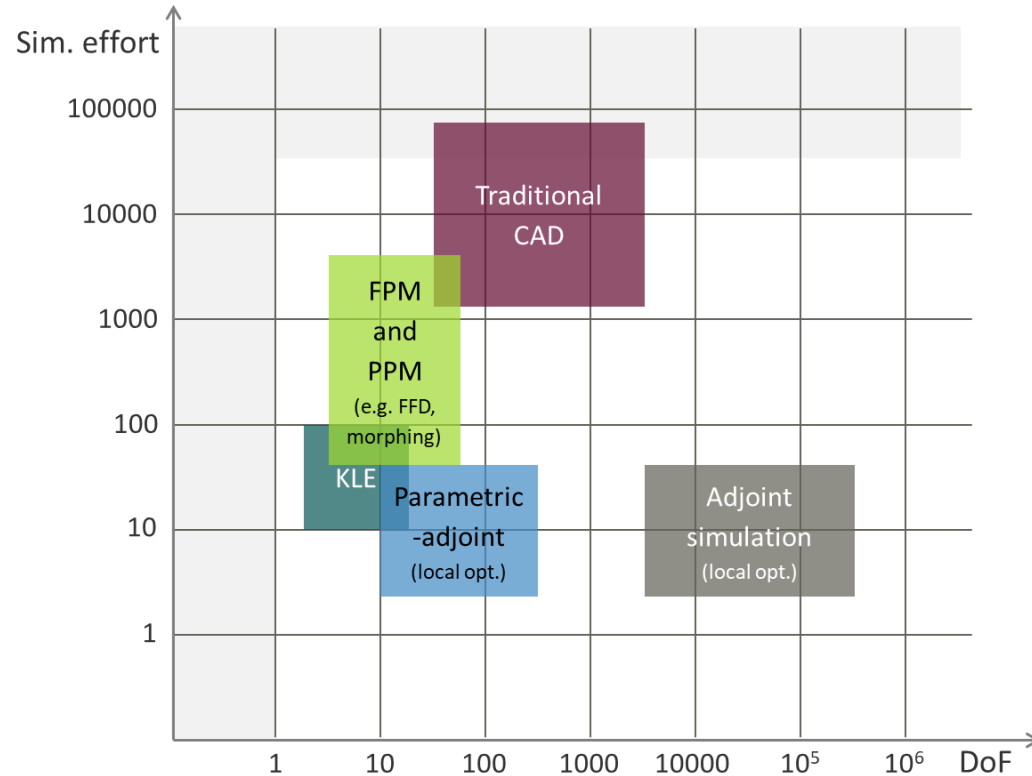
Synthesis model for an OSV



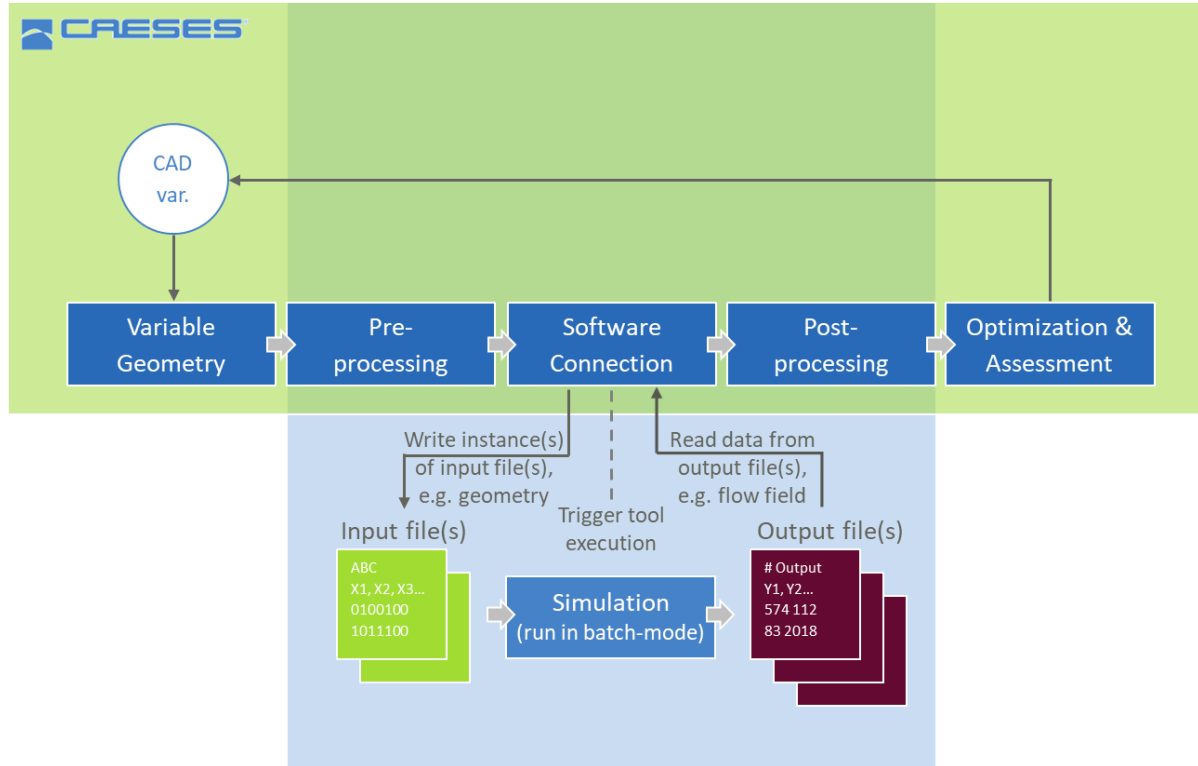
Interested in more information: HOLISHIP Session



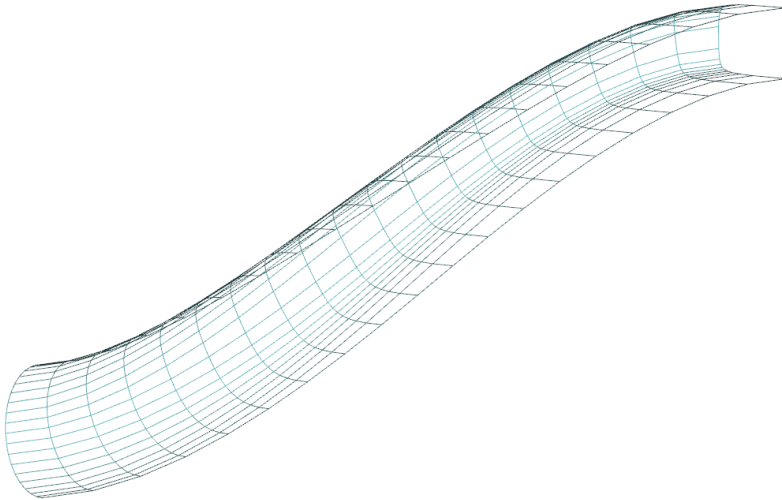
Speeding up simulation-driven design



Standard process



Optimization of a duct



	Design Variable	Lower	Value	Upper
1	pathControlX	0.1	0.5	0.8
2	pathControlZ	0.1	0.5	1
3	tangentPathStart	0.05	0.15	0.25
4	tangentPathEnd	0.05	0.15	0.25
5	heightControlX	0.3	0.5	0.7
6	heightControlZ	0.2	0.5	1

Design space reduction

First super.parameter: 83.8% variability

First and second: 92.1%

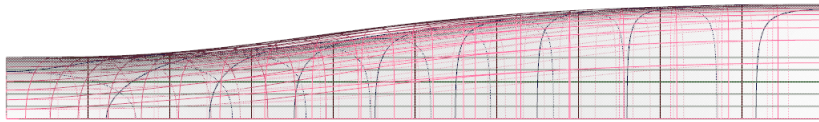
First three: 95.8%

First five: 98.5%.

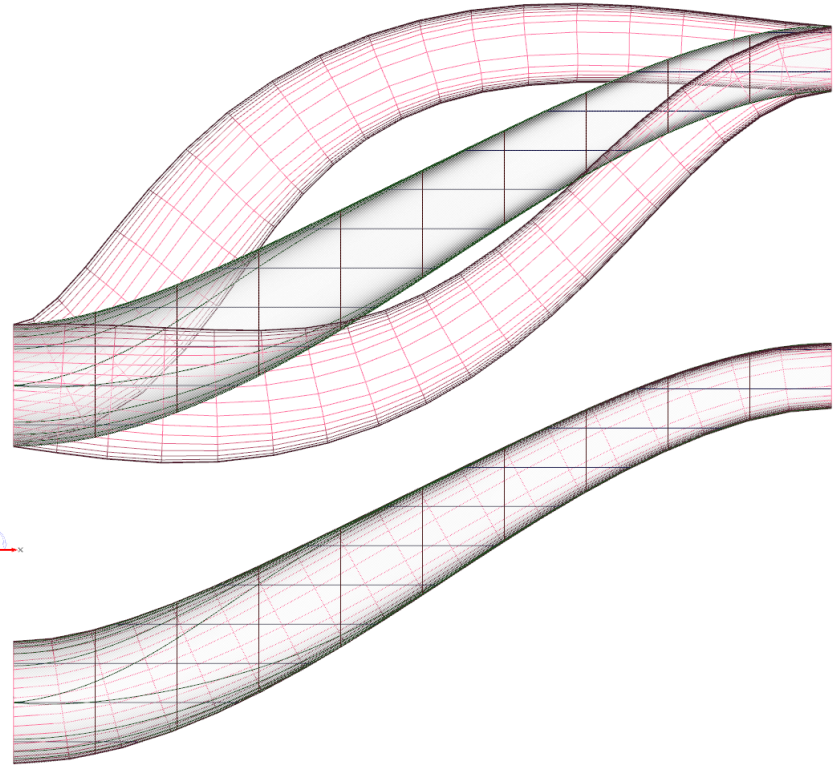
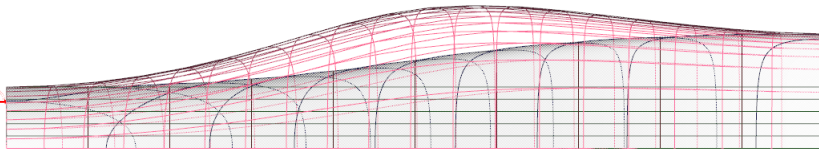


Design space reduction via Karhunen-Loève Expansion (KLE)

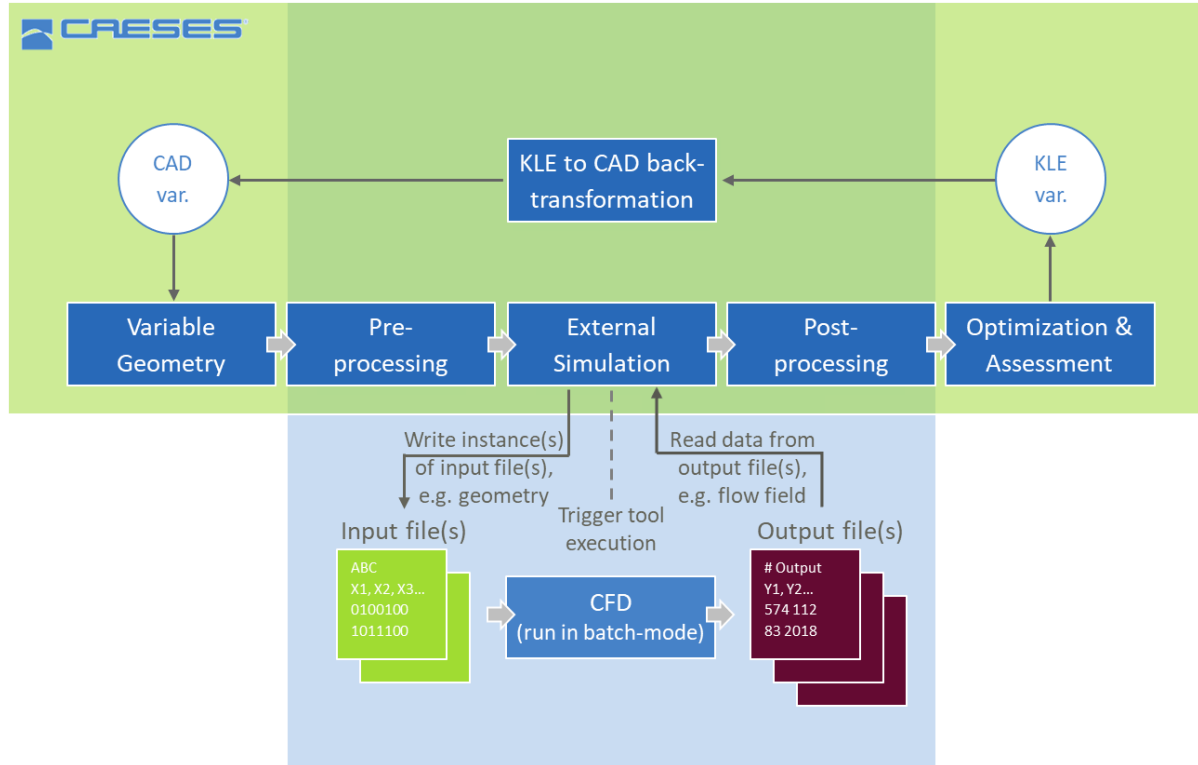
First super parameter (KLE mode 1)



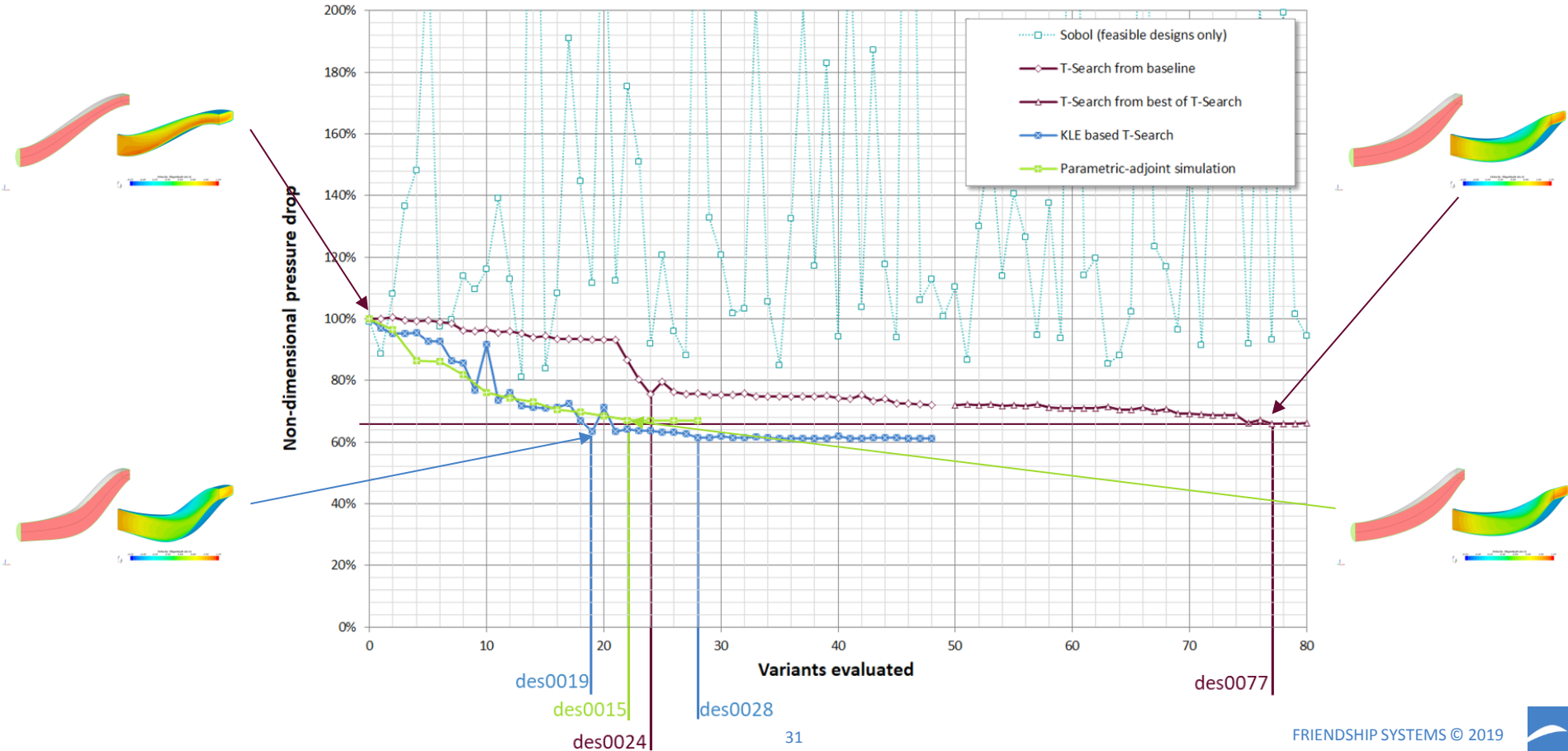
Second super parameter (KLE mode 2)



KLE process



Substantially speed up simulation-driven design

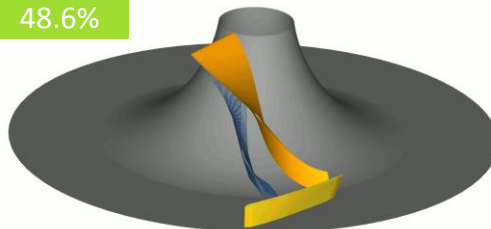


Interested in more information: GAMMA Session

Design Variables				
	Design Variable	Lower	Value	Upper
1	ANGLE_HUB	-10	0	10
2	ANGLE_SHROUD	-10	0	10
3	MID_SHIFT_DELTA	-2	0	2
4	MID_SHIFT_POS	0.3	0.5	0.8
5	BETA_HUB_LE	40	45	50
6	BETA_HUB_TE	45	50	55
7	BETA_SHROUD_LE	25	30	35
8	BETA_SHROUD_TE	40	41.7	50
9	BETA_TanFactor_HUB_LE	0.4	0.5	0.6
10	BETA_TanFactor_HUB_TE	0.4	0.5	0.6
11	BETA_Tan_HUB_LE	-45	-45	-35
12	BETA_Tan_HUB_TE	-65	-60	-55
13	BETA_TAN_SHROUD_LE	-15	-10	-5
14	BETA_TAN_SHROUD_TE	-40	-35	-30
15	THETA_DELTA_SHROUD_LE	-10	-2	0
16	THETA_DELTA_SHROUD_TE	-10	0	10
17	Diff_BETA_HUB_LE	17	19	25
18	Diff_BETA_HUB_TE	28	37	44
19	Diff_BETA_SHROUD_LE_Delta	-4.5	-2	3.5
20	Diff_BETA_SHROUD_TE_Delta	-5	-1	8
21	Diff_BETA_Tan_HUB_LE	-30	-20	-10
22	Diff_BETA_Tan_HUB_TE	-7.5	0	10
23	Diff_BETA_Tan_SHROUD_LE	-30	-20	-10
24	Diff_BETA_Tan_SHROUD_TE	-10	10	20
25	Diff_THETA_DELTA_SHROUD_LE	-15	-3	8.5
26	Diff_THETA_DELTA_SHROUD_TE	-5	0	5

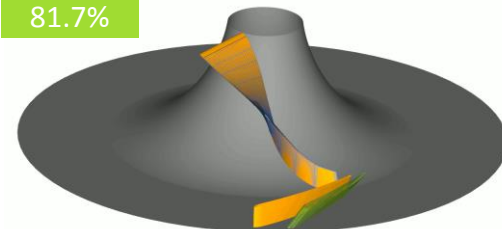
KLE mode 1 – main blade

48.6%



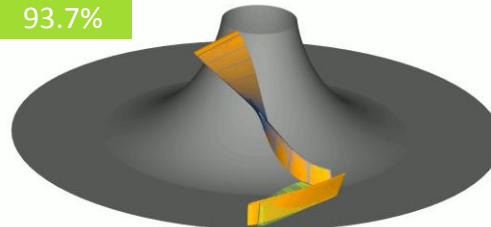
KLE mode 2 – diffuser

81.7%



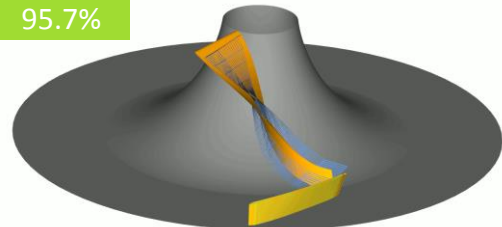
KLE mode 3 – diffuser

93.7%



KLE mode 4 – main blade

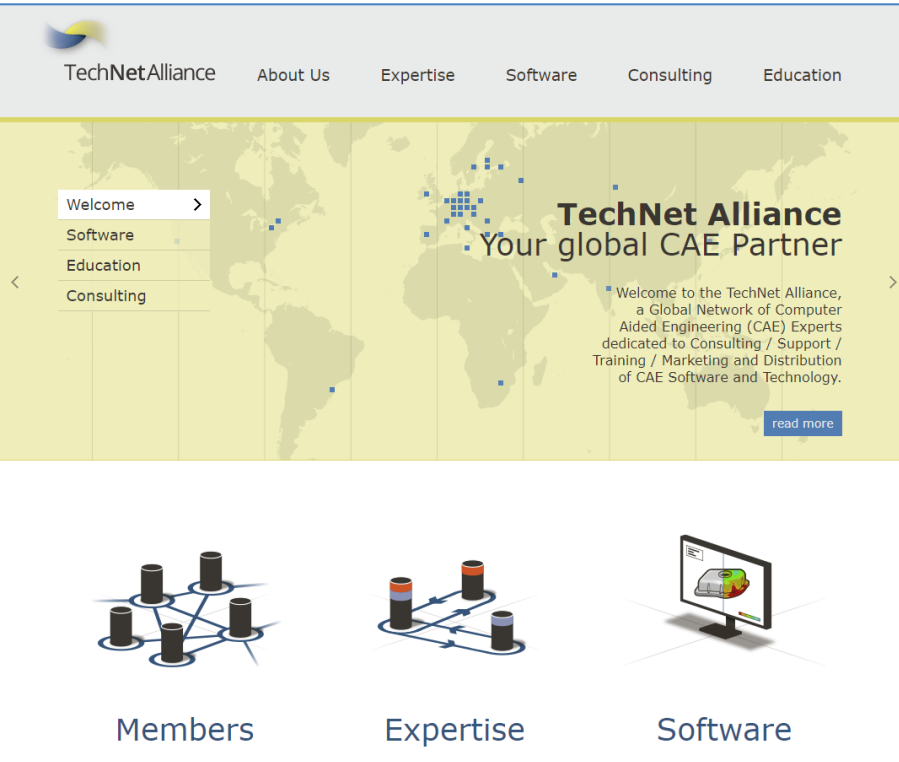
95.7%



Growing network of partners



Growing network of partners



The screenshot shows the TechNet Alliance website. At the top is a navigation bar with links: TechNetAlliance, About Us, Expertise, Software, Consulting, and Education. Below the navigation bar is a large banner featuring a world map. On the left of the banner is a sidebar menu with 'Welcome' (selected), Software, Education, and Consulting. The main text on the banner reads 'TechNet Alliance Your global CAE Partner'. Below this, a paragraph describes the alliance as a global network of CAE experts. A 'read more' button is at the bottom right of the banner. At the bottom of the page, there are three icons: a network of nodes labeled 'Members', a network of nodes with arrows labeled 'Expertise', and a computer monitor showing a 3D model labeled 'Software'.

TechNetAlliance About Us Expertise Software Consulting Education

Welcome >

Software

Education

Consulting

TechNet Alliance
Your global CAE Partner

Welcome to the TechNet Alliance, a Global Network of Computer Aided Engineering (CAE) Experts dedicated to Consulting / Support / Training / Marketing and Distribution of CAE Software and Technology.

[read more](#)

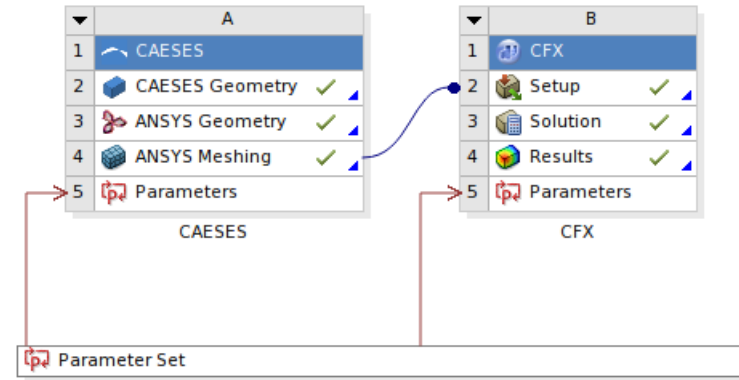
Members Expertise Software



Werner-von-Siemens Center for Industry and Science e.V.

Additive manufacturing (AM), digital twins and Internet-of-Things (IoT) in and from Germany's capital region

- CAESES is integrated in the ANSYS Workbench
- Parameter sets give access to all parameters of a CAESES project
- Parameters can be controlled
 - Manually by the user
 - Automatically via the DesignXplorer or OptiSLang
- CAESES is executed in batch mode



ANSYS Workbench - Parameter Set

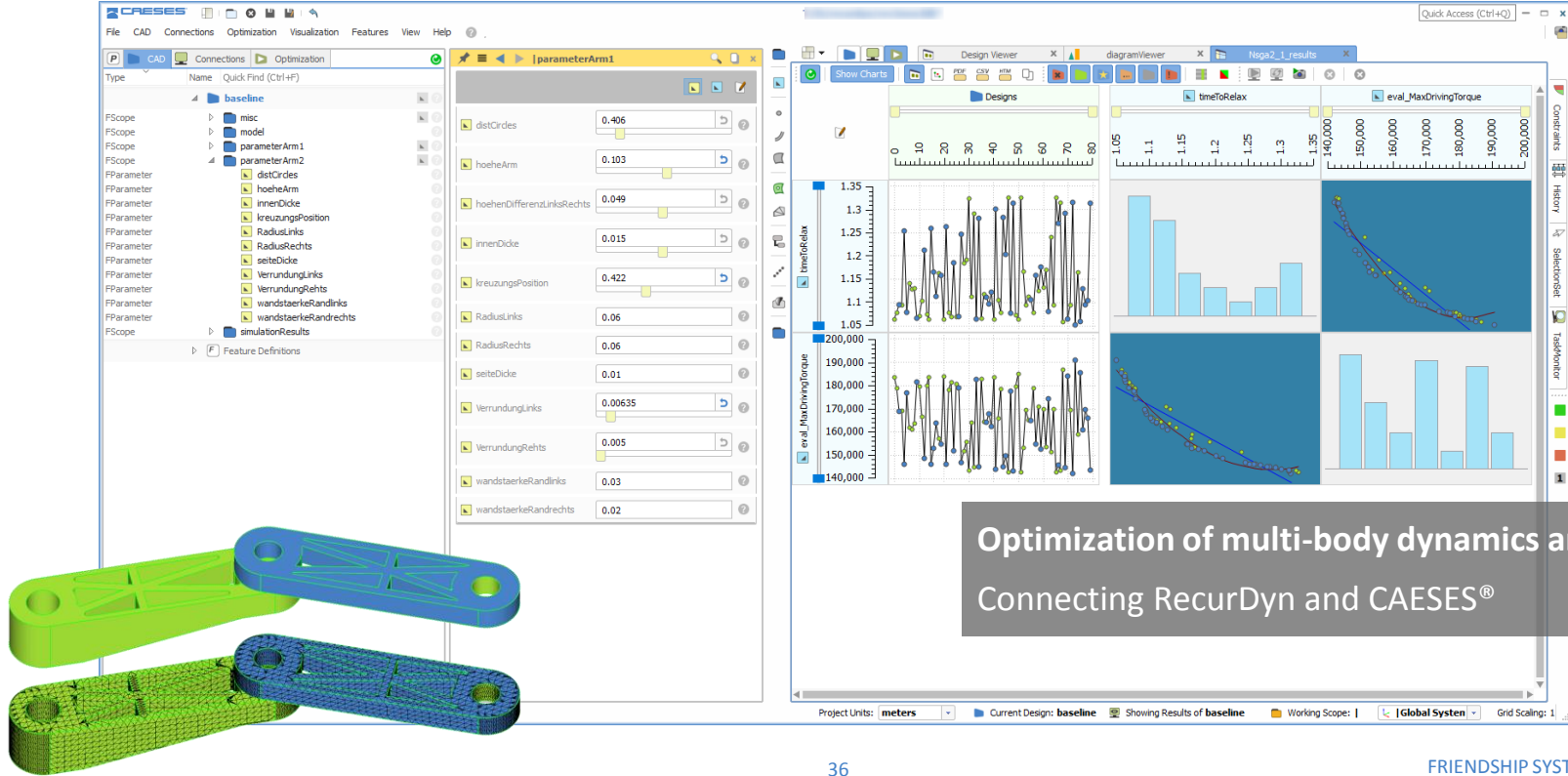
Update All Design Points

Toolbox: Parameter Charts, Parameters Parallel Chart (all), Parameters Chart

Outline of All Parameters				
	A	B	C	D
1	ID	Parameter Name	Value	Unit
2	Input Parameters			
3	CAESES (A1)			
4	P1	[00_parameters]ALPHA	25	
5	P2	[00_parameters]CORNERRADIUS	0.2	
6	P3	[00_parameters]INLETSIZE	0.3	
7	P4	[00_parameters]R_MAIN	400	
*	New input parameter	New name	New expression	
9	Output Parameters			
*	New output parameter		New expression	
11	Charts			

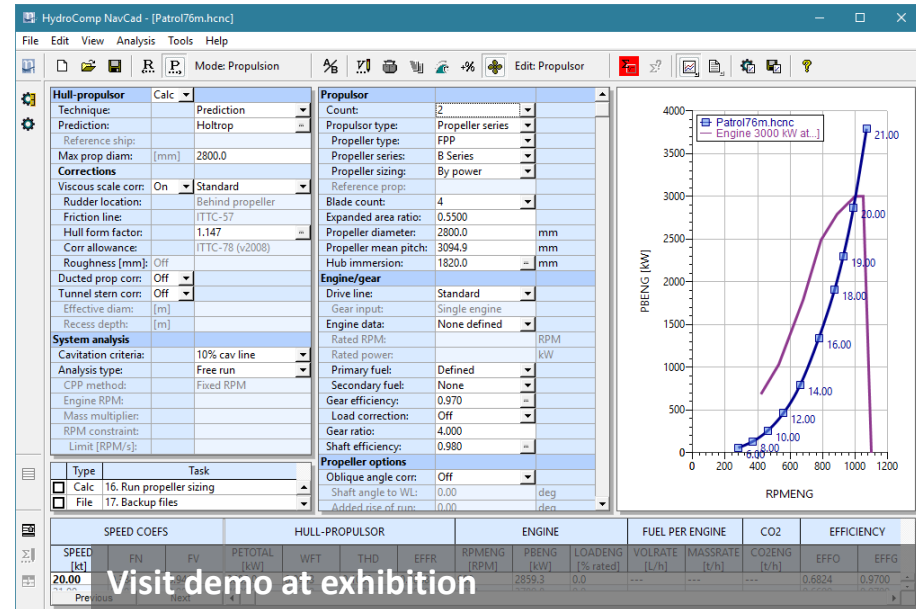
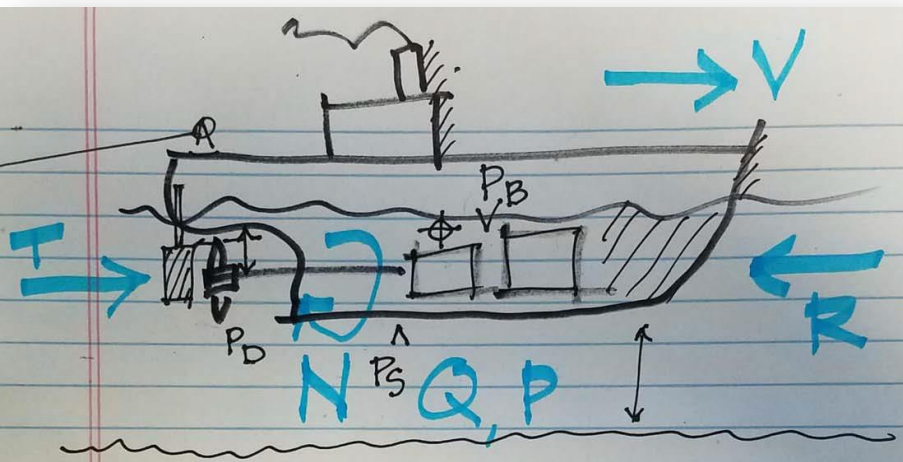
Table of Design Points				
	A	B	C	D
1	Name	P1 - [00_parameters]ALPHA	P2 - [00_parameters]CORNERRADIUS	P3 - [00_parameters]INLETSIZE
2	DP 0 (Current)	25	0.2	0.3
*				

Optimization of multi-body dynamics with FunctionBay



Optimization of multi-body dynamics and structures
Connecting RecurDyn and CAESAS®

Tight integration of NavCad with HydroComp



Tight integration of NavCad with HydroComp

The screenshot displays the CAESES software interface, which is tightly integrated with NavCad and HydroComp. The interface is divided into several panels:

- Left Panel (Tree View):** Shows the CAD model structure. Under the 'baseline' folder, there is a 'Sobol_01' folder and a 'Sobol_02' folder. The 'Sobol_02' folder contains a list of design points (Sobol_02_des0000 to Sobol_02_des0009).
- Top Panel (Design Viewer):** Displays the CAD model of the design point selected in the tree. The design point is 'Sobol_02_des0000'.
- Right Panel (Results Table):** Shows a table of results for the selected design point. The table has columns for 'beam', 'designDraft', 'height', 'LOA', and 'relBeamWL'. The data is as follows:

Design Point	beam	designDraft	height	LOA	relBeamWL
Sobol_02_des0000	11.5	4.25	8.5	82.5	0.97
Sobol_02_des0001	11.75	4.125	8.75	81.25	0.98
Sobol_02_des0002	11.25	4.375	8.25	83.75	0.96
Sobol_02_des0003	11.375	4.1875	8.625	80.625	0.985
Sobol_02_des0004	11.875	4.4375	8.125	83.125	0.965
Sobol_02_des0005	11.625	4.0625	8.375	81.875	0.955
Sobol_02_des0006	11.125	4.3125	8.875	84.375	0.975
Sobol_02_des0007	11.1875	4.15625	8.3125	83.4375	0.9725
Sobol_02_des0008	11.6875	4.40625	8.8125	80.9375	0.9525
Sobol_02_des0009	11.9375	4.03125	8.5625	84.6875	0.9625

A semi-transparent overlay in the bottom right corner contains the text:

Visit demo at exhibition
Start at 4:40 pm

The bottom status bar shows the following information:

- ready
- NON-COMMERCIAL EDITION - License for Mr. Donald MacPherson
- Project Units: meters
- Current Design: baseline
- Showing Results of baseline
- Working Scope: |

Visit our sponsors at the exhibition



Remember the raffle
Just four stamps 😊

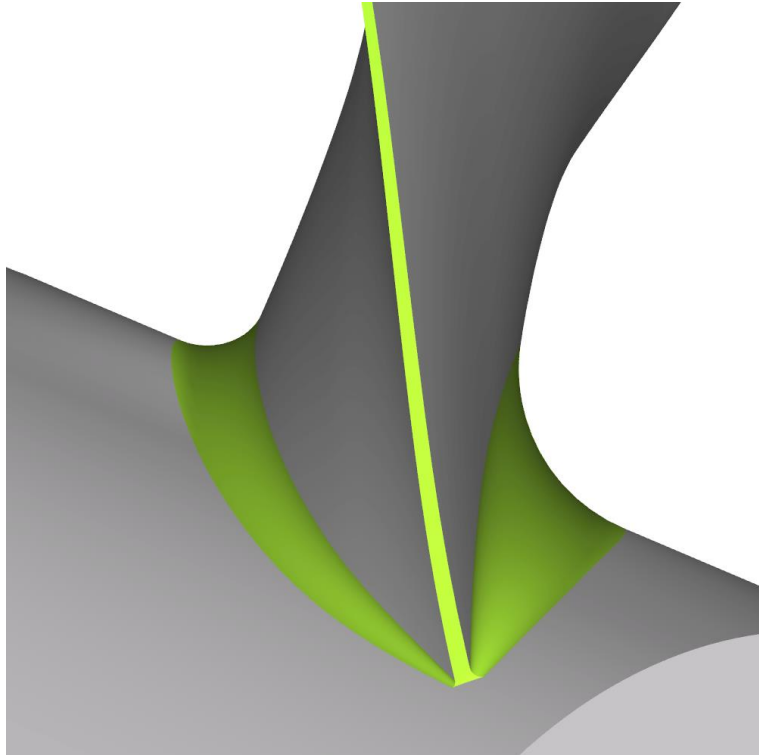


Conclusions

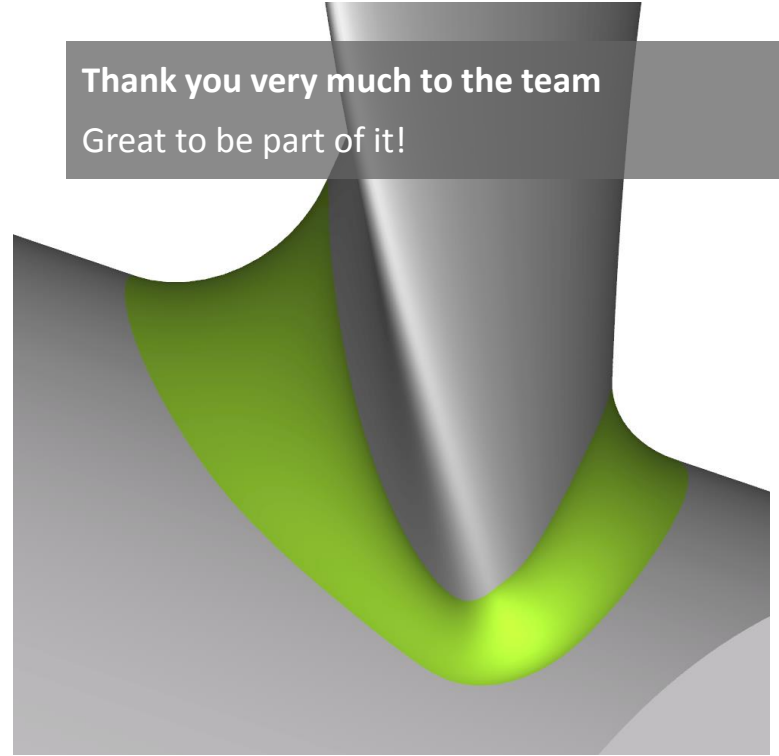
- CAESSES 5 beta released and now available
- Continuous investments are made
 - R&D
 - Faster simulation-driven design (e.g. KLE for dimensionality reduction)
 - Holistic design and integration
 - Work spaces and webApps for ease-of-use
 - Growing networks
- Clear roadmap
 - Usability and UX
 - Easier license management
 - Steady extension of robust variable CAD (e.g. morphing)



Thank you very much for working with us!



Thank you very much to the team
Great to be part of it!



www.friendship-systems.com

Claus Abt and Dr. Stefan Harries

harries@friendship-systems.com

