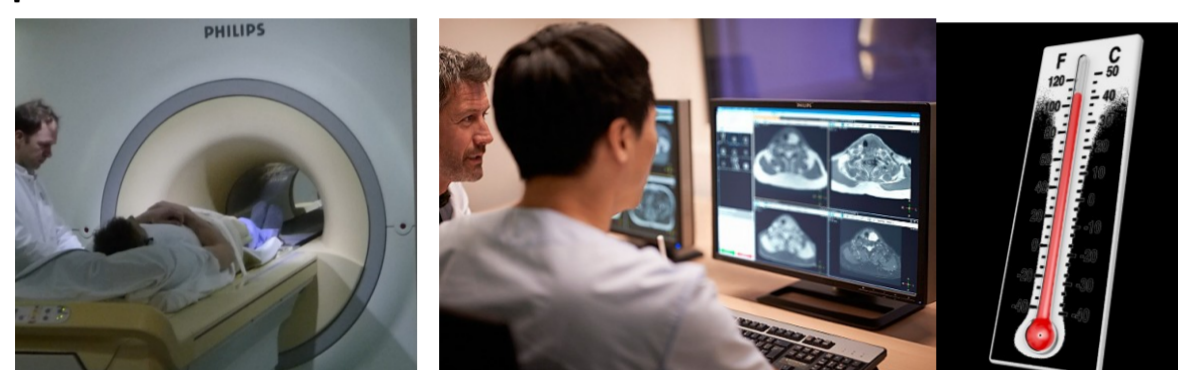


Domain



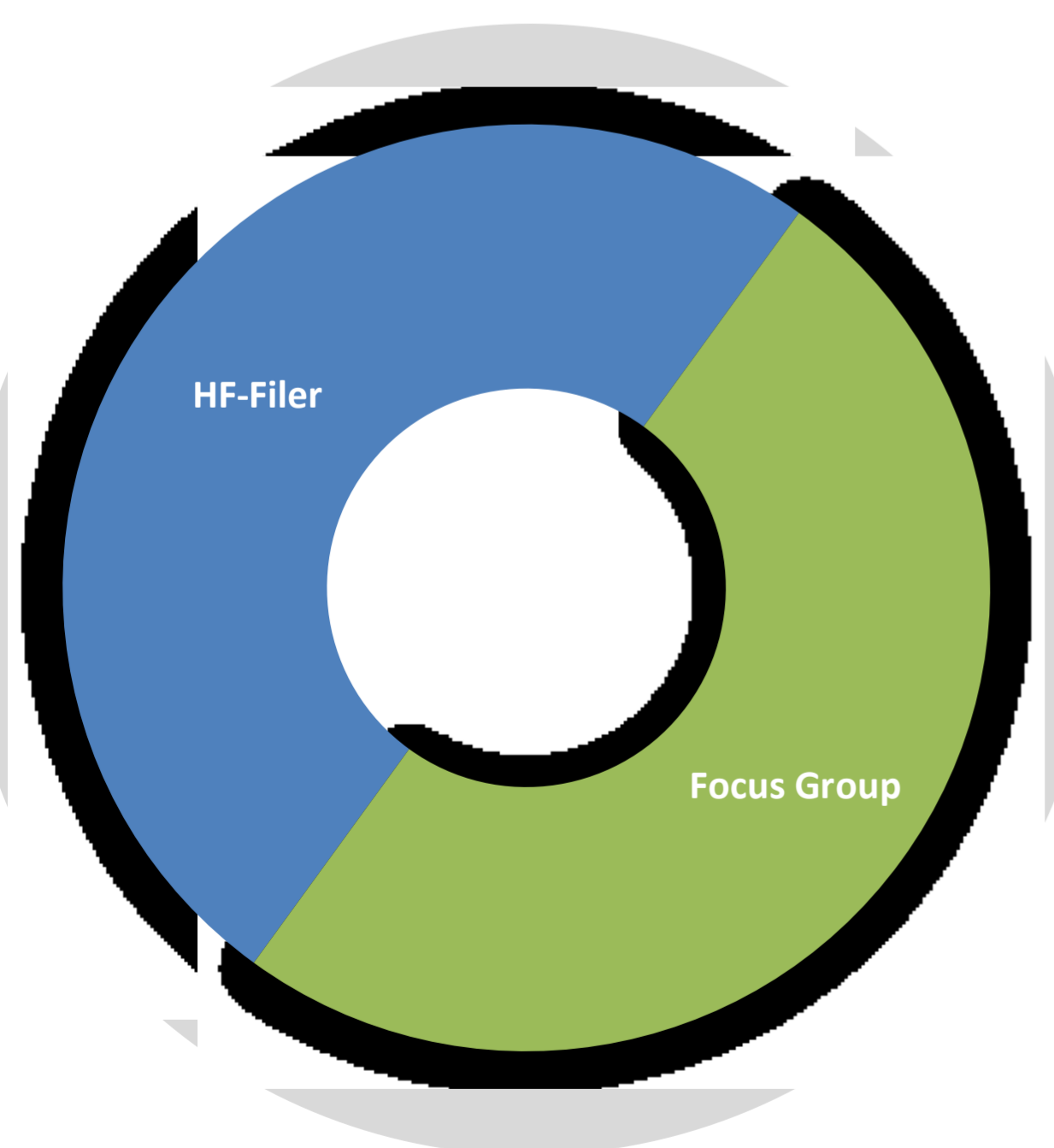
Motivation

One of the most demanding challenges with ultra-high field MRI is the assessment of power absorption in the tissues during a parallel transmit MRI examination.



The absorbed power may cause potentially dangerous temperature rise and is usually determined in advance by simulations using one or two generic patient models. However, this number is too small to cover the anatomical variation of patients. Therefore, a database with many models has been created. The MRI work flow will include selection of the correct model. Tooling for this purpose has been designed by and for researchers but its usability and intuitivity is insufficient for regular clinical MRI operators. Together with partners from the HF community an approach has been setup to arrive at a user interface that is to be used intuitively by regular MRI operators.

Applied MTTs



Current State: Tailored HF-RTP

Database Contraction:

The **models** of 23 volunteers with Body Mass Index (BMI) from 21.5 to 28 and age between 26 and 61 were built and stored in the database.

Model	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23
Age	40	51	61	54	49	49	50	52	52	45	40	60	38	39	56	39	39	26	36	28	55	33	55
Height	1.78	1.98	1.96	1.77	1.83	1.84	1.88	1.87	1.7	1.75	1.76	1.8	1.84	1.77	1.76	1.83	1.95	1.93	1.78	1.83	1.73	1.72	1.97
Weight	78	100	96	75	90	82	92	98	65	80	74	86	81	68	85	80	100	95	73	75	75	64	95
BMI	24.6	25.5	25	23.9	26.9	24.2	26	28	22.5	26.1	23.9	26.5	23.9	21.7	27.4	23.9	26.3	25.5	23	22.4	25.1	21.6	24.5

Tab.1: Volunteers Data

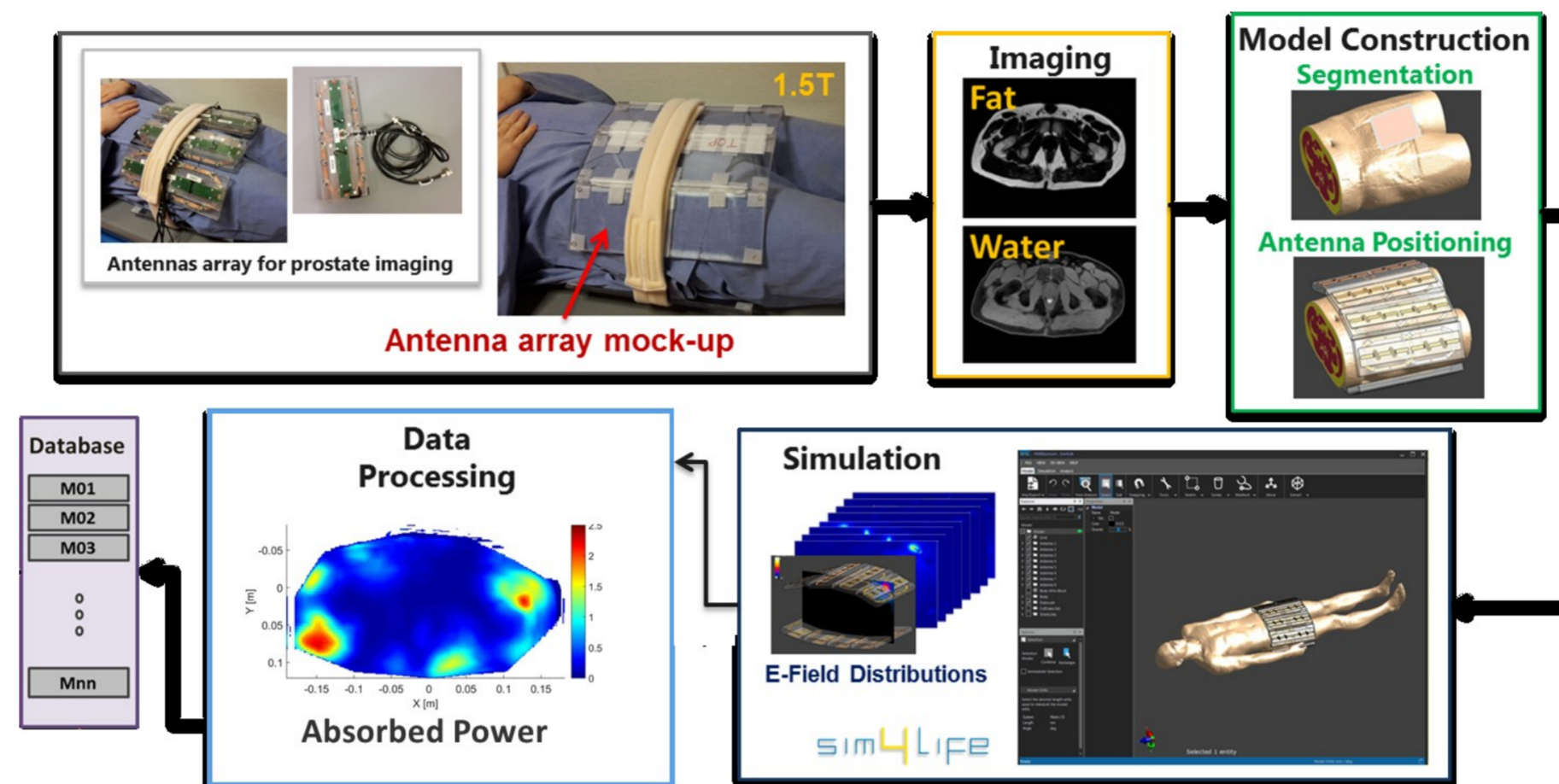


Fig.1: Pipeline for Database Contraction

Interface Design Approach:

In cooperation with the Scienza Nuova Research Center, a first **Focus Group** session was organized and, by means of **HF-Filer**, the human factors data have been included into the system engineering workflow at the same level as other more technical development information.

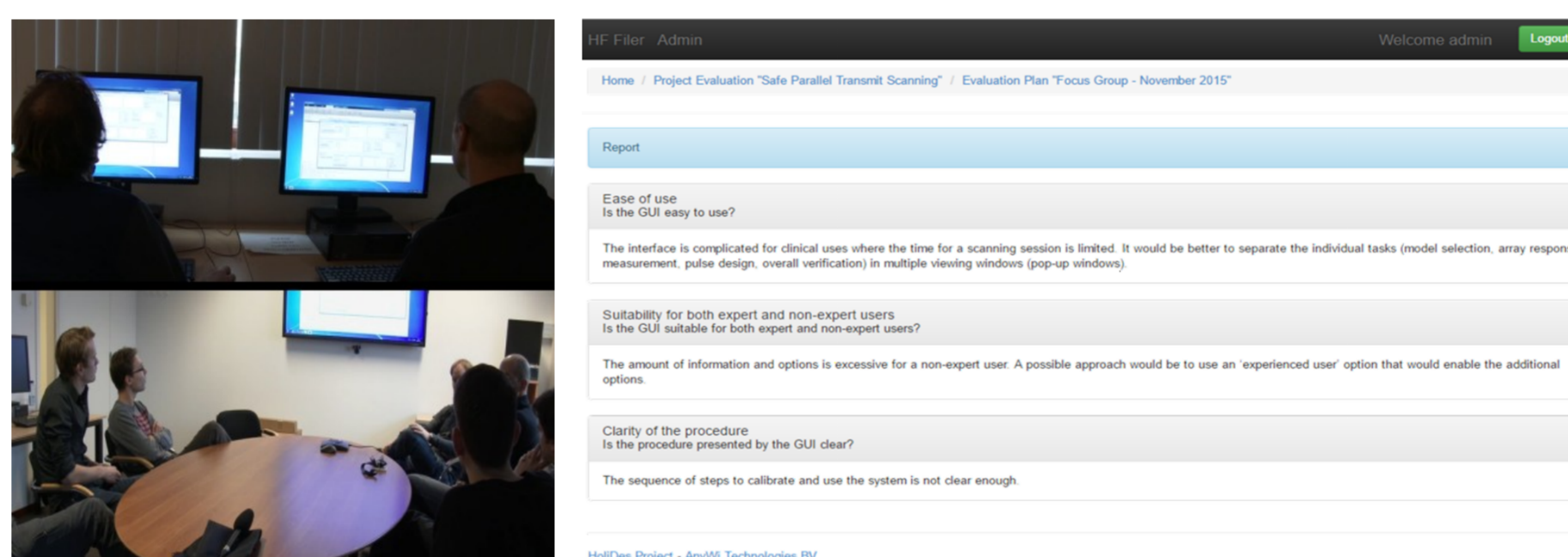


Fig.2: First focus group and evaluation report for the preliminary design of the interface

The interface was suitably adapted, a second **Focus Group** session was organized.

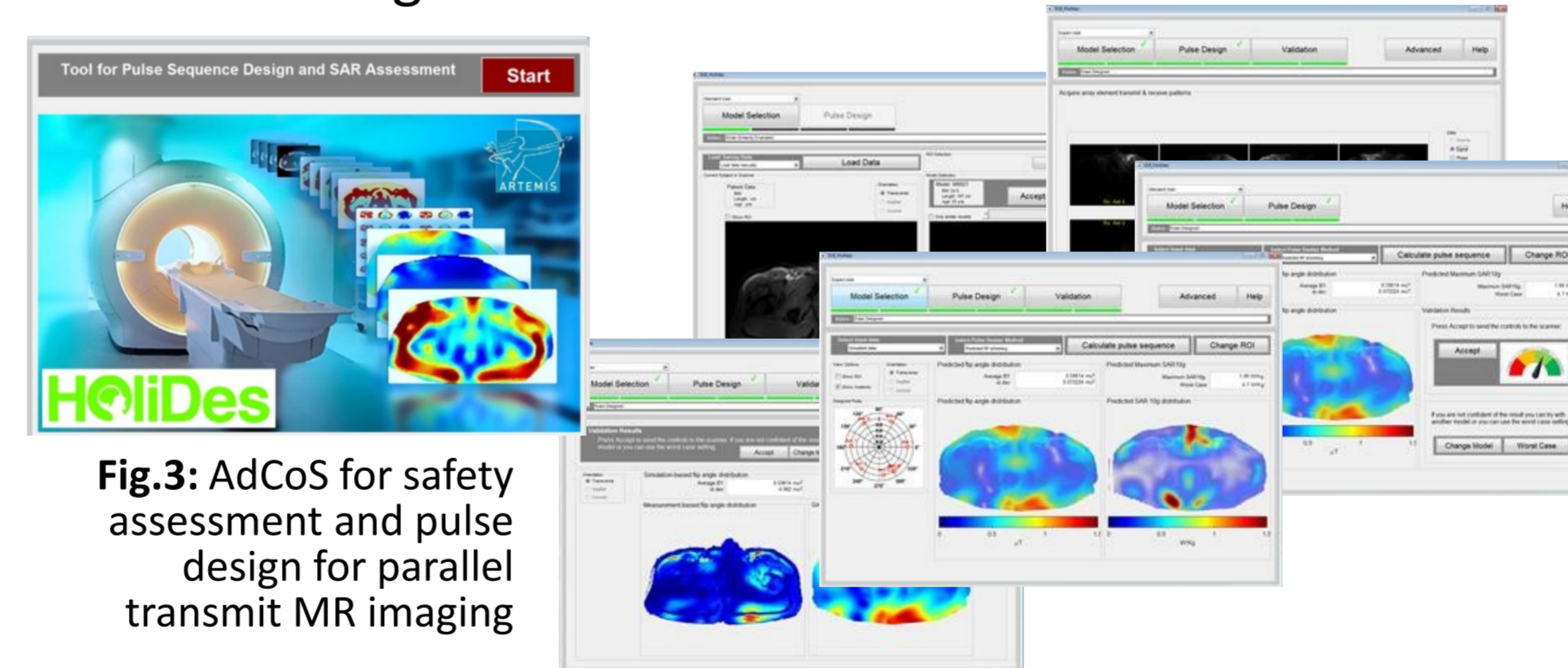


Fig.3: AdCoS for safety assessment and pulse design for parallel transmit MR imaging



Fig.4: Second focus group to evaluate the new version of the AdCoS

Results

Performance Indicators:

- **Ease of use:** this indicator describes the attitude of the HMI to guide the user through the calibration phase of the 7 T scanner.
- **Suitability for non-expert users:** this indicator expresses the attitude of the interface to provide sufficient information to complete the process in an efficient and safe manner for both experienced and novice users.

	MEASURE BEFORE	MEASURE AFTER
EASE OF USE	0%	65%
SUITABILITY FOR NON-EXPERT USERS	0%	50%

Tab.2: Performance indicators

The interface has been judged improved compared to the previous version. Some minor changes have been suggested and already implemented in the last version.

The Holidés project has enabled the UMC to come in contact with a network of human factors experts and related best practices. This has resulted in a reduced distance between researchers and MRI technologists who finally use the system, which enable the transition from research to clinical application for multi-transmit systems.



Fig.5: High-quality images obtained within safe power limitations

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