

# MODUS

AUTOMOTIVE • ENGINEERING CONSULTING



...all tested.

**MOTORBIKE**

**Validation Profile**

**Modus is internationally operating for validating automotive products,  
specifically in the real automotive world  
for OEMs and 1st Tier Suppliers**

**The main objective is to give a client's benefit by anticipatory analysis  
of product quality, especially focused onto reliability.**

Permanent test sites  
include locations in

**Spain:** Cadiz-Jerez & Almeria-Mojacar

**Germany:** Frankfurt & Munich

**Slovakia:** Banska-Bistrica



# The MODUS of Validation

has to be :

- **objective**
- **reliable**
- **true**
- **neutral**

should be :

- **integrated**
- **customer oriented**

**System Validation in the real world provides also answers to questions which in an ideal world of simulation have not been asked yet.**



# System Validation

of

**entire vehicle**

interdisciplinary

**in the holistic-system**

existing with the interactions

of automobile in the **real world**

time optimized testing

under the aspects of **reliability and quality.**

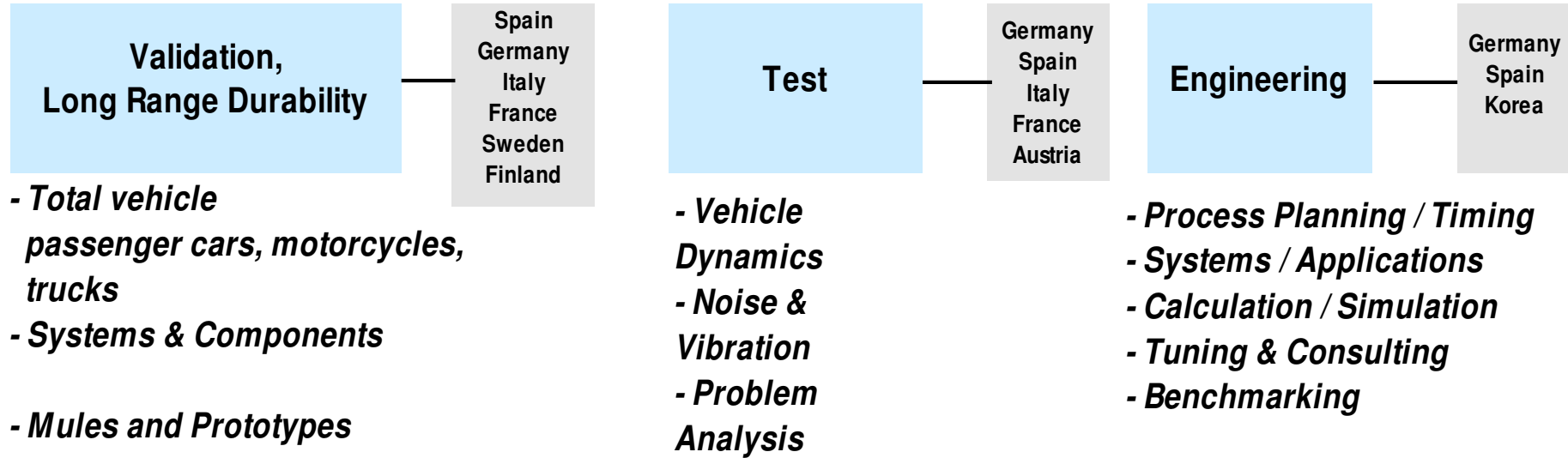
**requirement :**

**– only one**

**⇒ Customer satisfaction**



# Validation-Test-Engineering



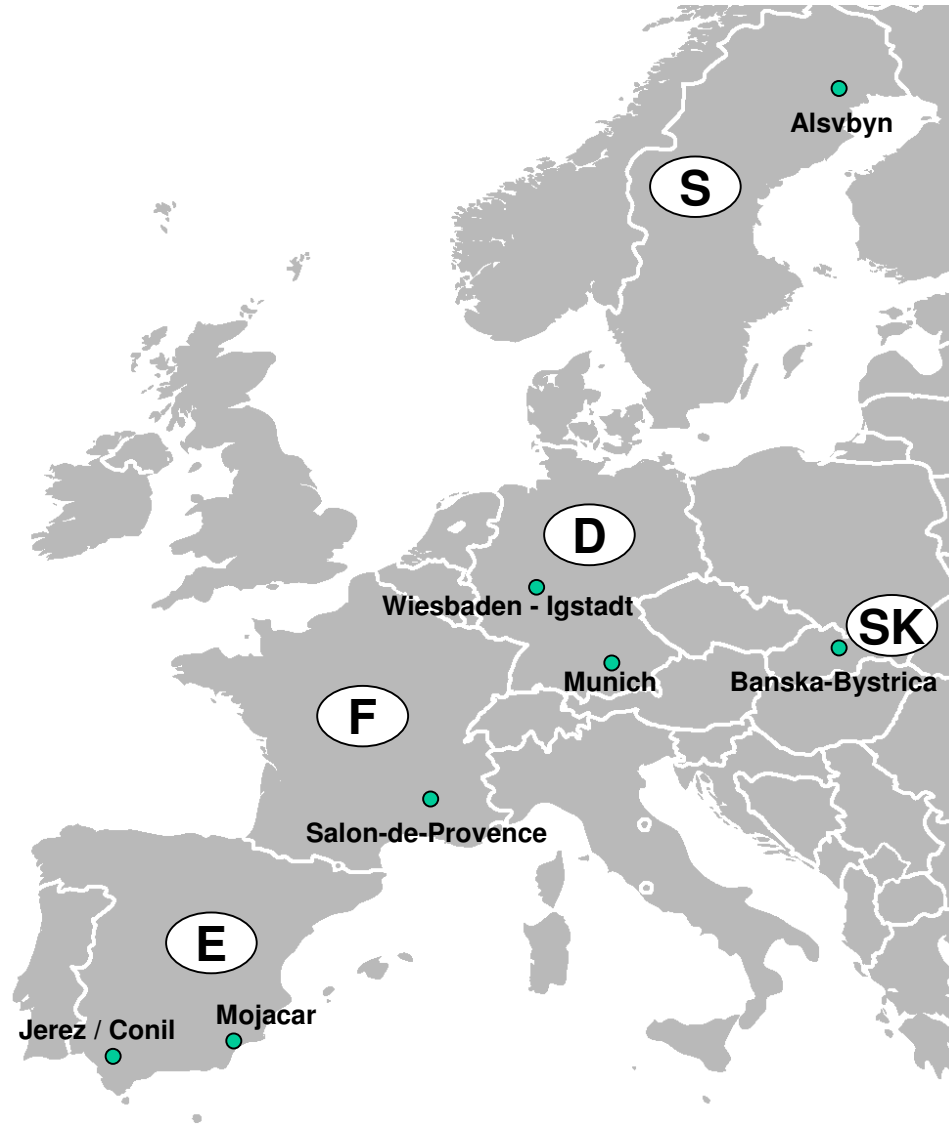
## Motorbike Validation Experience 1993 – 2008 : 3,66 mio. km

Brand	%
<b>BMW</b>	<b>80</b>
Yamaha	8
Honda	8
KTM	2
Rotax	1
Harley Davidson	1

Performed in Country	%
<b>Spain</b> (Conil, Jerez, Mojacar)	<b>27</b>
<b>Canary Islands</b>	<b>14</b>
<b>Germany, Austria, Italy</b>	<b>25</b>
<b>France</b>	<b>34</b>



# Operation Areas Europe



# Operation Areas Andalusia

## Cadiz

Regional Characteristics: heat, rain, wind, dust  
 Diversity of Roads: rough surface, bad/good country,

race track`s: Jerez, Cartagena,

### Lateral & Vertical Stress

## Almeria

Regional Characteristics: high humidity & desert conditions

Diversity of Roads: high mountains, beach side - rapidly to high mountains,  
 high friction on road surface

### High Lateral Stress

### Test Advantages

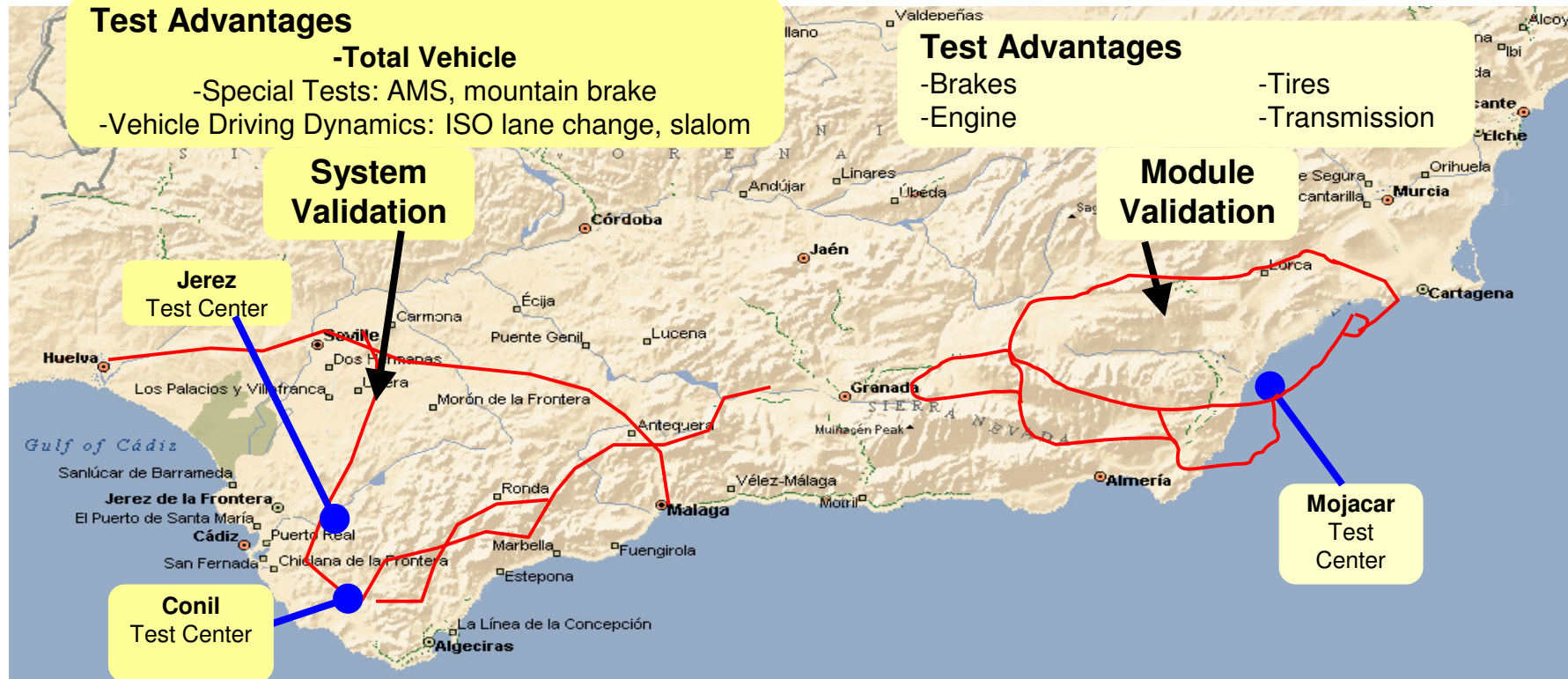
- Total Vehicle
- Special Tests: AMS, mountain brake
- Vehicle Driving Dynamics: ISO lane change, slalom

### System Validation

### Test Advantages

- Brakes
- Engine
- Tires
- Transmission

### Module Validation



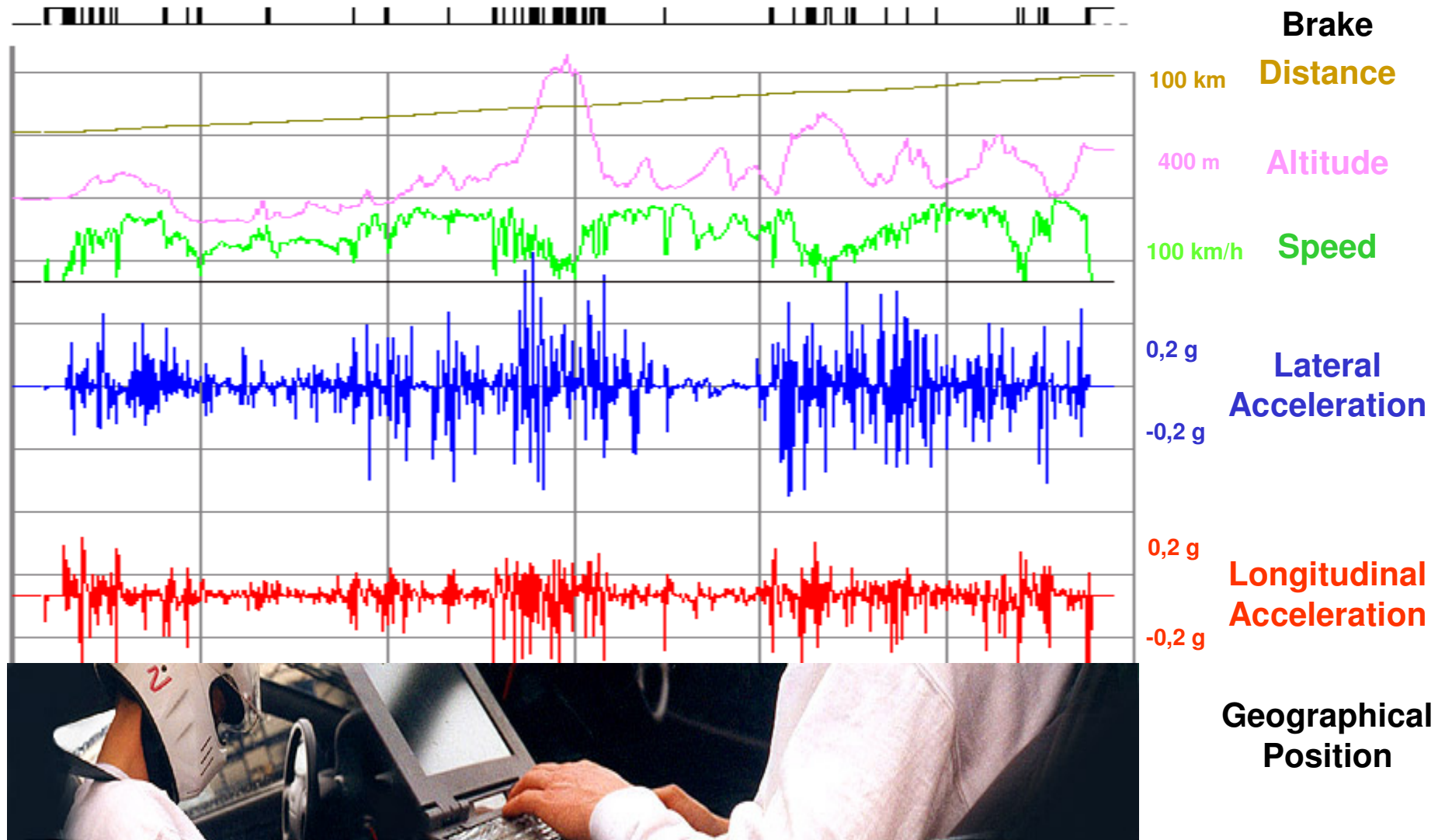


# Test Run Control by GPS

to know every second what happened



100 % of driven test mileage logged by all cars



# Subjective Evaluation - Index

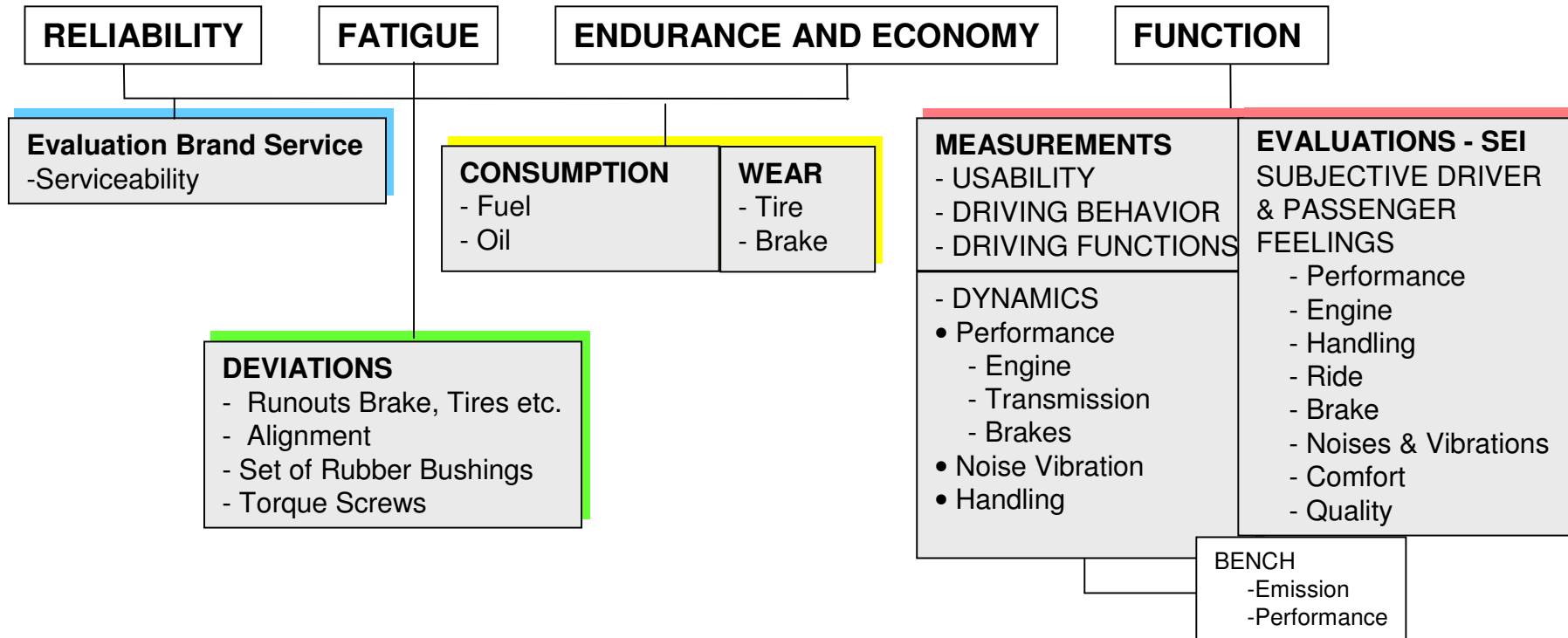
SEI

Reliability or function of a unit (e.g. performance, brake effectiveness, driving characteristic, operability of levers and switches, etc.)											
is far better than expected	... is excellent	...good	... satisfying	... barely acceptable	unpleasant	poor	... inacceptabl	vehicle immobile, breakdown	safety risk for driver or environment		
				this defect disturb to the passenger and/or the environment			this defect disturb only to the driver				
Etire vehicle; my behaviour, my reaction, if this was my car											
I am overwhelmed	the technical solution tops my expectations	my expectations are completely fulfilled (100 %)	I do nothing to change the state	I have the complaint corrected at the next planned visit in my authorized workshop	if there comes one more complaint, to my authorized workshop	I drive ... before schedule, as soon as possible, to any	yes, but carefully to the next car workshop	a) I try to make the car go, or b) I ... have the vehicle towed to workshop	I park the vehicle at once and ...		
10	9	8			<b>I, the customer...</b>						
			7			discontented	disappointed	worried and annoyed	really angry	think about going to court	
					6						
							5	4	3	2	1



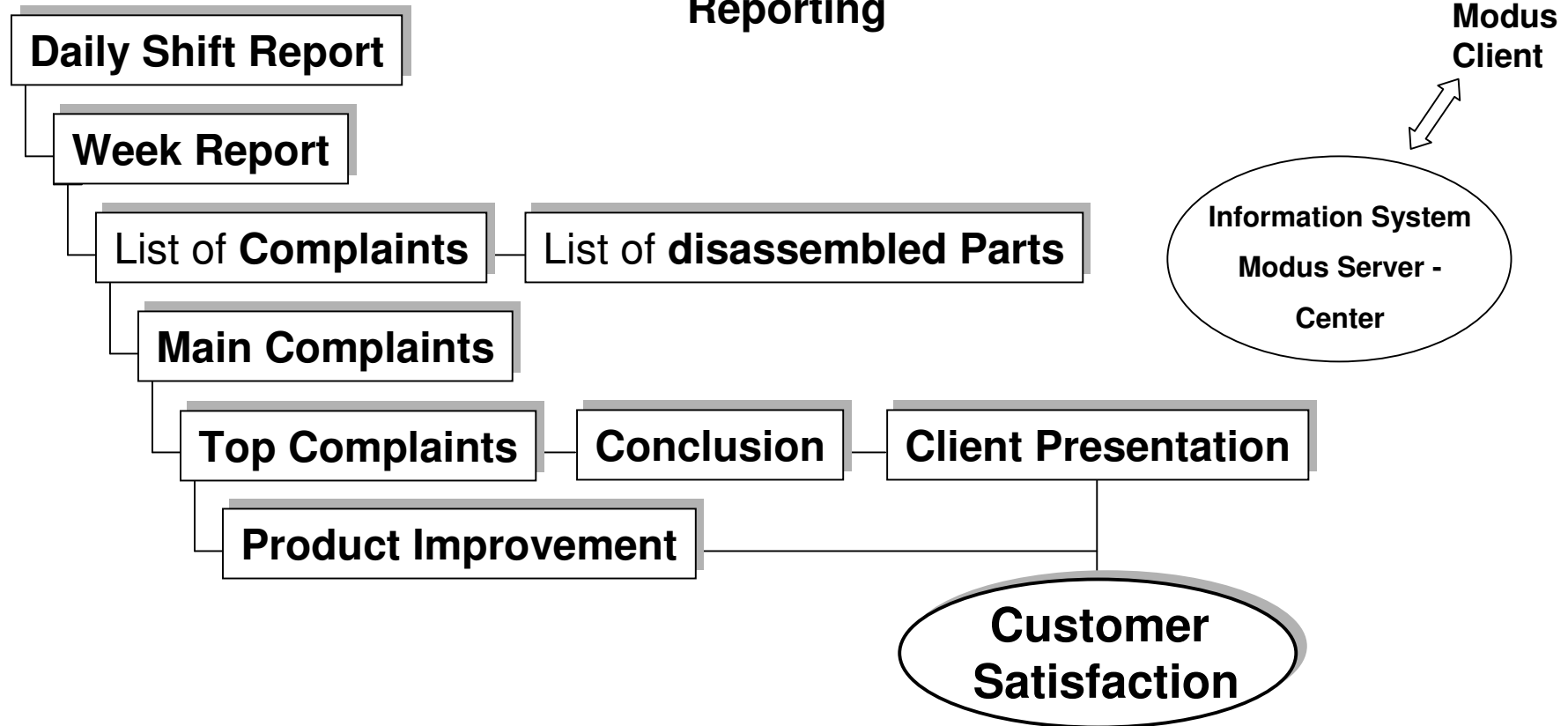
# Validation Service

## Test Subjects



# Validation Service

## Reporting



## The Increase of Real System Validation

**creates the anticipatory mode of reliability**

**and leads to the necessary improvements of Quality**

- **less costs for warranty and recall actions -**
- **higher benefits for Supplier and OEM -**

