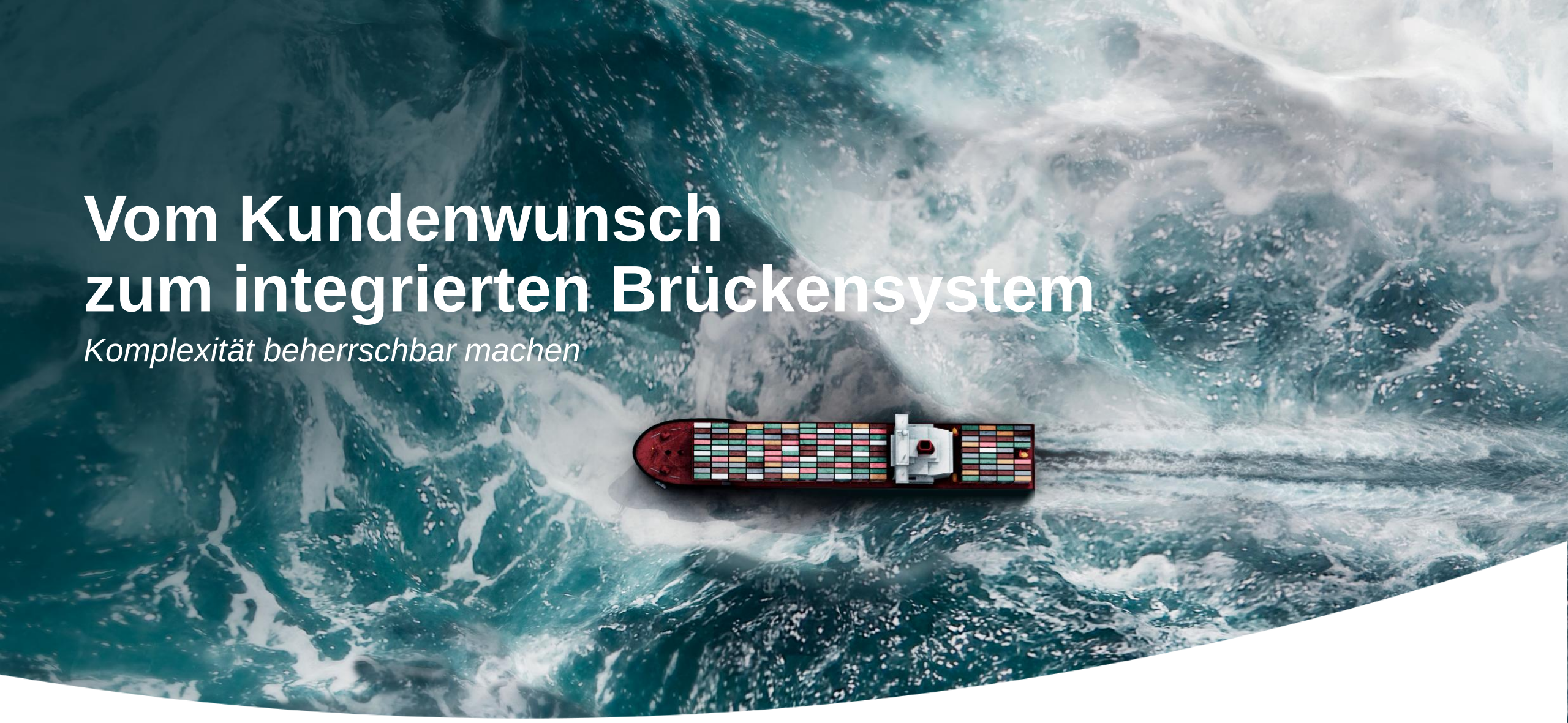


ANSCHÜTZ

Vom Kundenwunsch zum integrierten Brückensystem

Komplexität beherrschbar machen



ANSCHÜTZ

Christian Rabe | Systems Engineer
Wilko Bruhn | Project Manager

Hamburg, 05. November 2026


120+ Years
experience in navigation
700+
employees worldwide
Systems and products for commercial and navy vessels
Expertise from **20.000+** vessels
1.500+
integrated navigation systems delivered
26.000+
gyro compass systems delivered




SIR DAVID ATTENBOROUGH



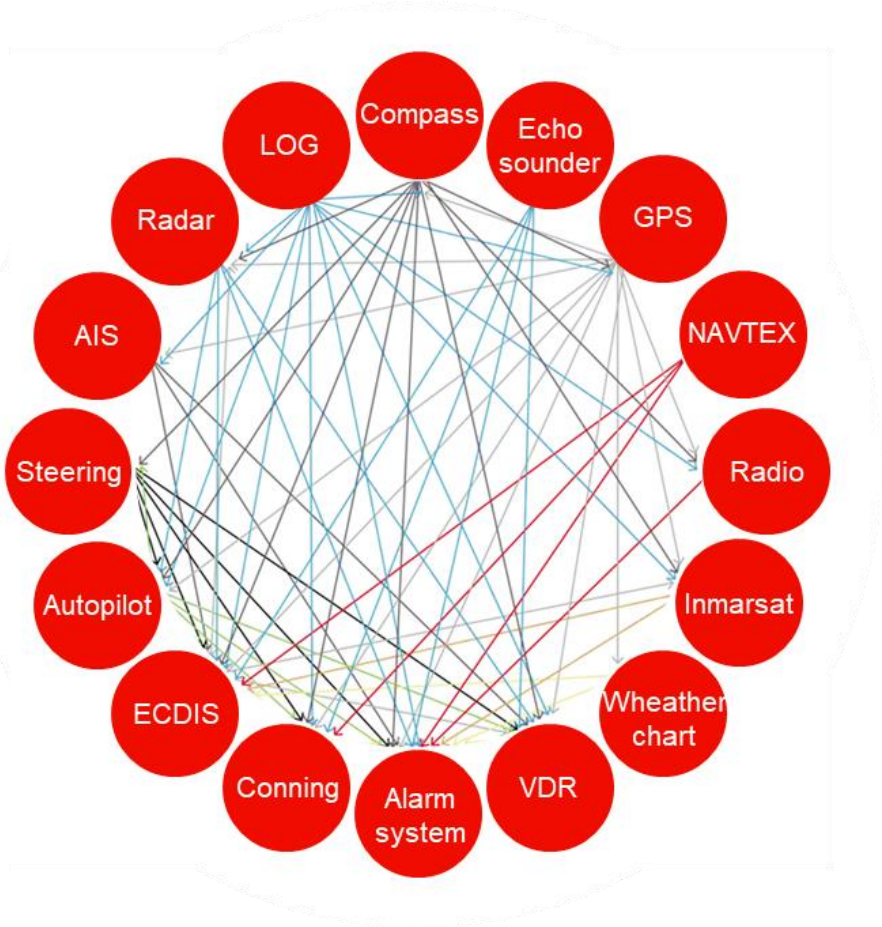




© PG/CMN NAV



Conventional bridge systems



Conventional ships bridges provide only a **limited situational picture,** as they contain:

- Too many single units and interconnections
- More sources of error, no redundancy handling
- Confusing system interaction, multiple alarms
- Unclear data distribution, no data validation
- Inconsistent data/ data presentation
- Different operating logics (no standardised user interface)

Highly complex situation for the bridge team: a **risk to safe navigation**

Integrated bridge systems



Main characteristics and benefits:

1. **Multifunctional workplaces**
   ‘Any function at any workplace’ principle

2. **Full sensor integration within a single network**
   Provision of validated and reliable information across the whole system

3. **Central alert management**
   Safe decision making and reduction of human error

4. **Standardised, intuitive user interfaces**
   Ease of use and reduction of training requirements

Integrated Bridge Systems increase **situational awareness** and support navigators to fully **concentrate on traffic monitoring**

Inquiries come in various forms…

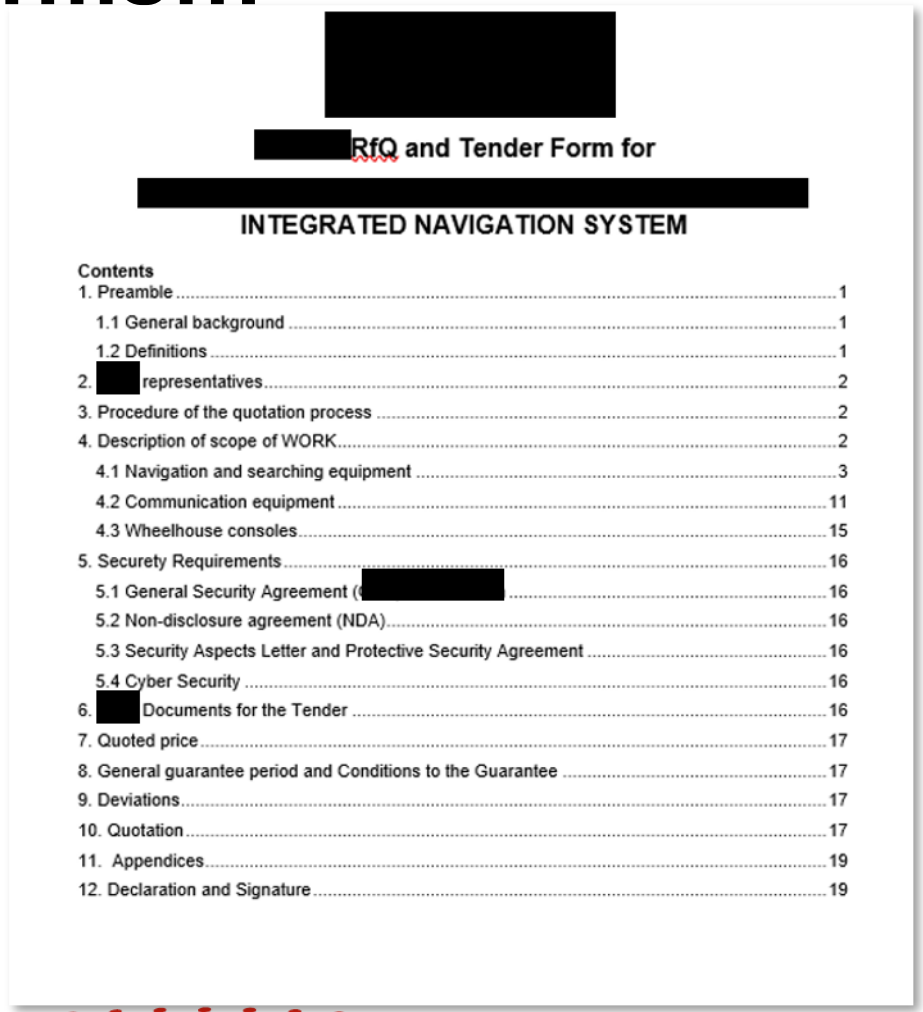
We have a request from local shipyard for a bridge equipment package for a newbuilding [redacted]. Client needs our quotation as quickly as possible, to submit their tender offer.

The package needs to cover the following equipment: X-band radar solid-state, S-band radar solid-state, ECDIS, and a Conning display. Full technical specification for each is below.

Could you let us know what you can offer against this spec, along with budgetary pricing and delivery lead time? Thank you

1. ECDIS
- Marine-type control station: keyboard, tracker ball, USB, min. 19" Full-HD display, UPS, console start button
- Route and voyage planning tools; preset configuration restore function
- Display of vessel outline, AIS targets/data/messages, ARPA targets, NAVTEX messages
- AIS/ARPA target association […]

2. Conning
Display including at minimum:
- GNSS position and longitudinal azimuth
- Roll, pitch (amplitude)
- Water depth
- Air temperature, atmospheric pressure
- Wind speed and direction […]



[redacted]

[redacted]RfQ and Tender Form for

[redacted]

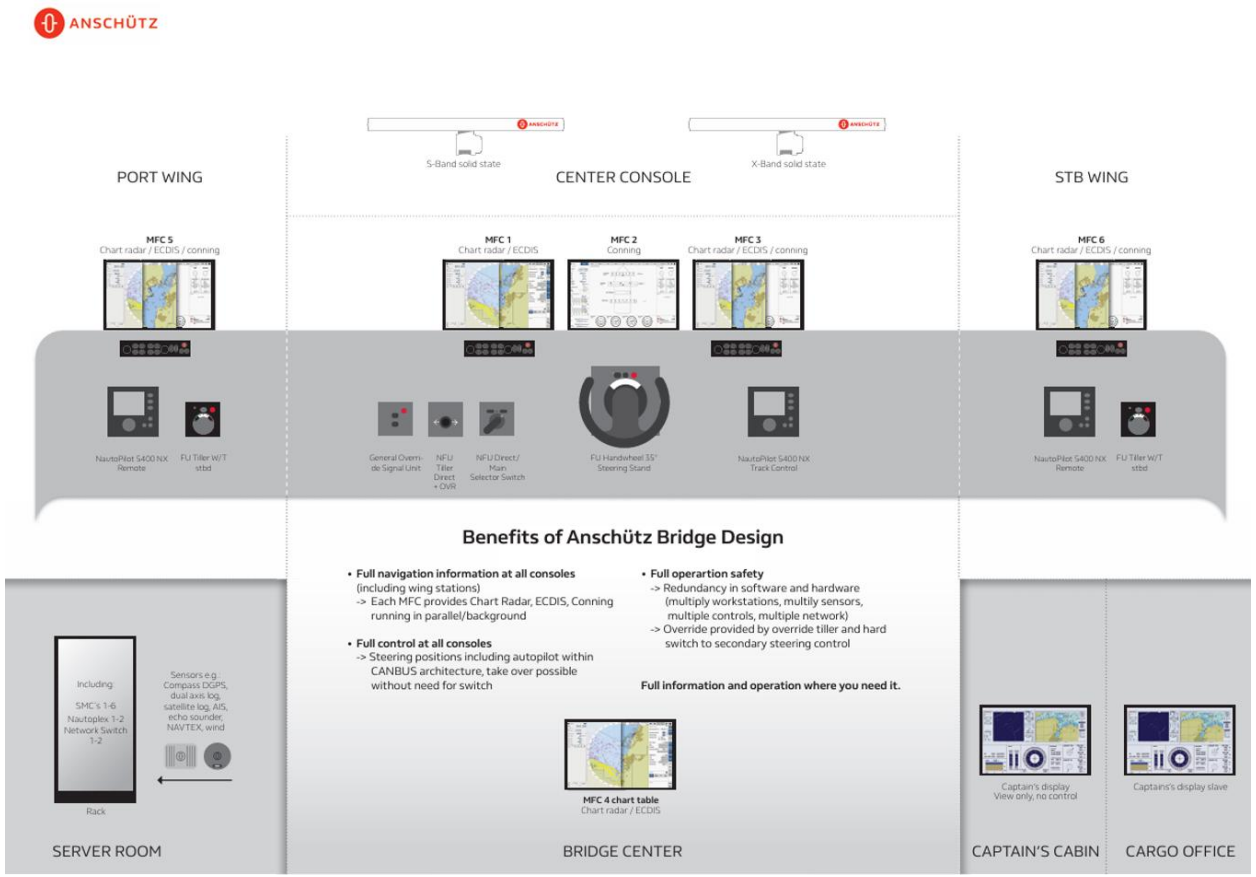
INTEGRATED NAVIGATION SYSTEM

Contents

1. Preamble 1
1.1 General background 1
1.2 Definitions 1
2. [redacted] representatives 2
3. Procedure of the quotation process 2
4. Description of scope of WORK 2
4.1 Navigation and searching equipment 3
4.2 Communication equipment 11
4.3 Wheelhouse consoles 15
5. Securety Requirements 16
5.1 General Security Agreement ([redacted] 16
5.2 Non-disclosure agreement (NDA) 16
5.3 Security Aspects Letter and Protective Security Agreement 16
5.4 Cyber Security 16
6. [redacted] Documents for the Tender 16
7. Quoted price 17
8. General guarantee period and Conditions to the Guarantee 17
9. Deviations 17
10. Quotation 17
11. Appendices 19
12. Declaration and Signature 19

ANSCHÜTZ

… leading to an offer



ANSCHÜTZ

Offer No.: 25Wzl031-02

2.1.2 Equipment

Bst.: 9203

AN3050SST, AN3020G160 1 Anschuetz SST X-Band 8Ft 230V/50Hz
Solid State X-Band Transceiver Up
Color: 9010 Pure white

100W X-Band IMO Radar Transceiver Solid State Pulse Compression
8 foot antenna array
Low peak power, high energy radiation
Fully coherent design
Adaptive pulse train, allowing optimized energy transmission
Fully digital signal generation and processing
Multiple user selectable frequencies
Low maintenance
230V / 50Hz

Bst.: 9859

1 Workstation for Synapsis NX
With PSU

Synapsis NX workstations use standardized marine PCs. The specific function of a dedicated workstation is defined using the software modules. This allows for high scalability and easy upgrades or extensions.

- Powerful, long-life Small Marine Computer
- State-of-the-art Synapsis NX system architecture
- Solid state hard drive
- Powerful I7 processor

Comprising:
770-010.NG030: 1 Small Marine Computer V3
TBE38N0-1954-MC3: 1 Ergonomical trackball 38mm flush mount
: 1 Power Supply Unit 230VAC-24VDC-10A

Bst.: 9861

2 Workstation for Synapsis NX
with Synapsis Operator Panel + PSU

Synapsis NX workstations use standardized marine PCs. The specific function of a dedicated workstation is defined using the software modules. This allows for high scalability and easy upgrades or extensions.

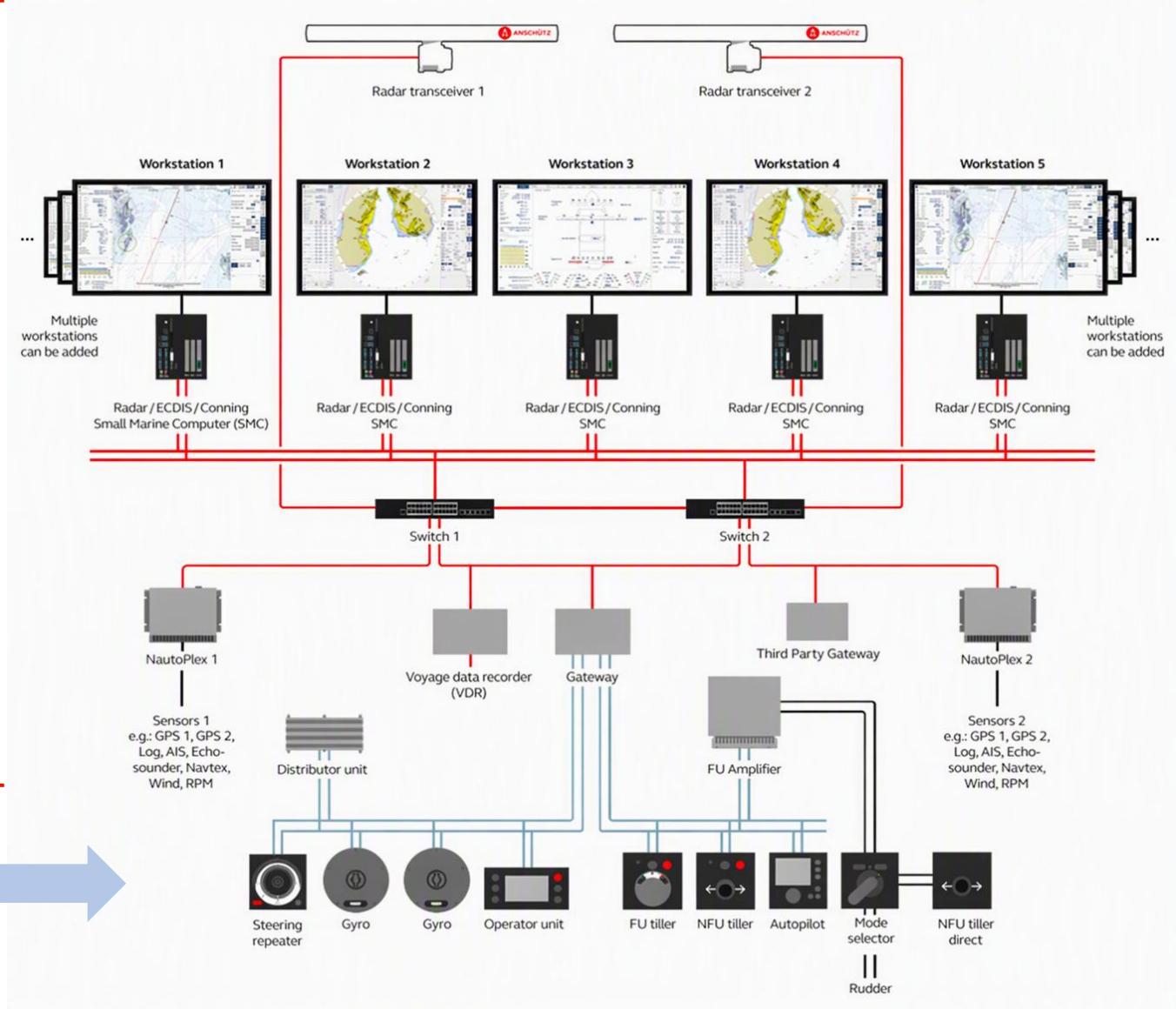
- Powerful, long-life Small Marine Computer
- State-of-the-art Synapsis NX system architecture
- Solid state hard drive
- Powerful I7 processor

ANSCHÜTZ

Synapsis NX

Synapsis components

Embedded products



ANSCHÜTZ

Official INS requirements

INTERNATIONAL MARITIME ORGANIZATION

publishes

SOLAS Carriage Requirements

- International Convention for the Safety of Life at Sea (SOLAS) publishes safety standards for shipping
- SOLAS Chapter V Reg. 19 = carriage requirements for shipborne navigational systems and equipment

detailing

IHO International Hydrographic Organization

chart-specific inputs

Performance Standards

- Define minimum standards for mandatory equipment
- e. g. MSC Standards
  - MSC.252(83) for INS
  - MSC.232(82) for ECDIS
  - MSC.192(79) for Radar

derivation

ISO IEC

publish

Test Standards

- Definition of how devices are to be tested to ensure compliance with performance standards
- e. g. ISO, IEC Standards
  - IEC 61924-2 for INS
  - IEC 61174 for ECDIS
  - IEC 62388 for Radar

member of

Flag States

- Countries under whose flag a ship is registered, and therefore having supervisory authority
- Have to make sure, international standards are transferred into local law
- E. g. EU member states

European Commission

publish

input for

appoint

Type Approval Authorities

ABS, DNV, Bureau Veritas, RINA, CCS, Lloyd's Register

In EU called "Notified Bodies"

Regional Requirements

- Referring to international Performance and Test Standards but containing regional additions
- In EU: Implementing Regulations (MED IRs)
- Other countries like China, USA, UK, Russia have their own rules

carry out

regional basis for

Type Approval

- Certification of mandatory equipment
- Production must strictly be carried out in accordance with the type approved design
- Type approval is valid for up to 5 years

- EU: MED Type Approval
- UK: UKCA Type Approval
- USA: USCG Type Approval
- China: CCS Type Approval

- European conformity marks:

Marine Equipment Directive (MED)/ „Wheelmark“ (EU)

UK Conformity Mark for Marine Equipment

Red Ensign mark (UK)

ANSCHÜTZ

Compliance with classification regulations

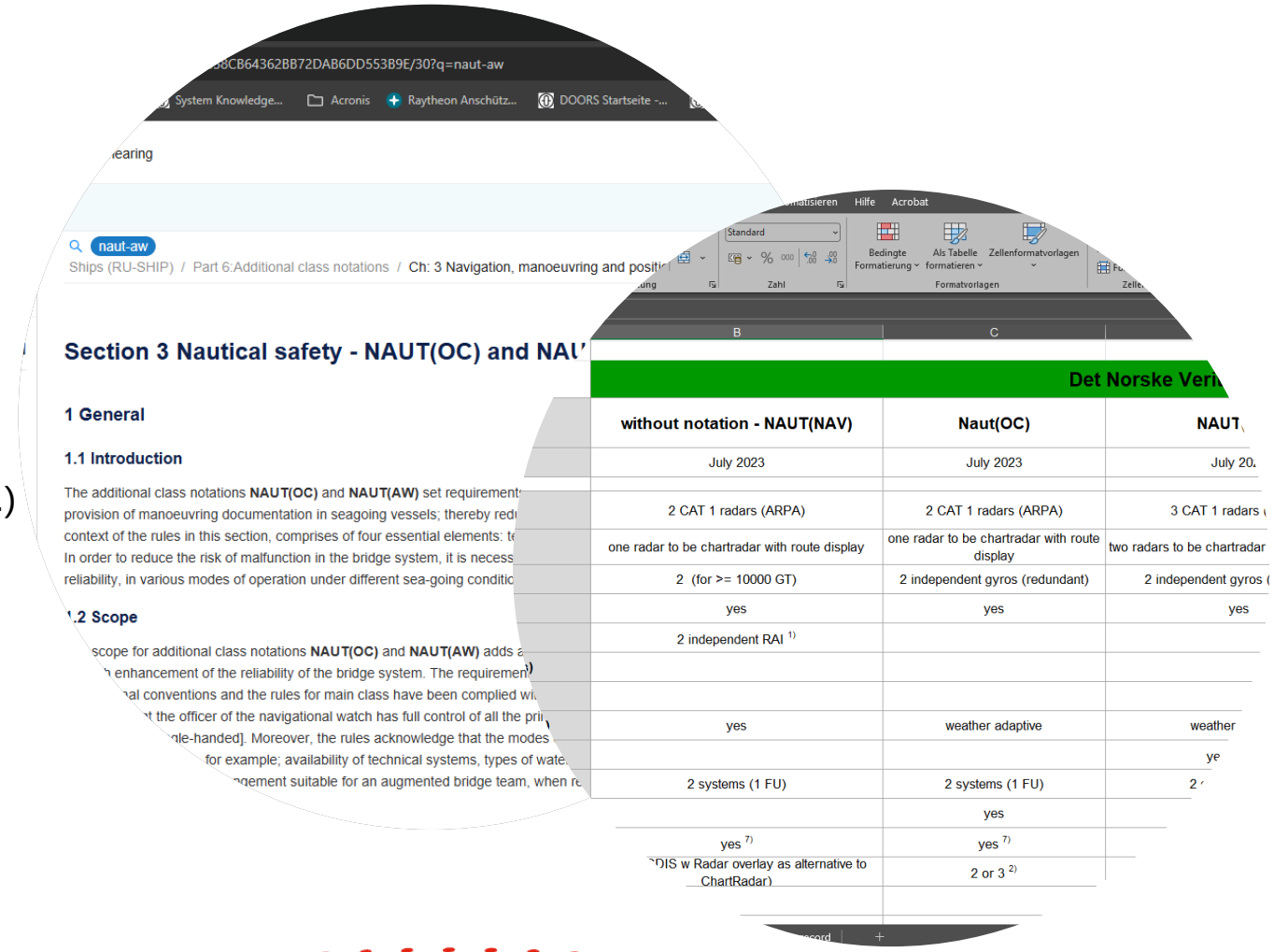
- Type of classification society
- Additional class notations

⇒Impact on interfaces with the vessel

(BAM, power supply supervision, bulkheads info, etc.)

⇒Impact on documentation package

(FMEA, etc.)



Navigation system integration challenges

Legacy/ refit systems

- Existing sensors



4...20 mA / ±10 V

- Analogue-to-serial-converter

RS-422

Cyber security compliance

- IACS UE E26/ E27
  valid for new ships
  contracted since July 1st 2024



I020 - System function description
I030 - System block diagram
I320 - Software change handling procedure
Z254 - Commissioning procedure
Z251 - Test procedure

New systems

- Radar/ ECDIS/ Conning
- Third-party systems



Digital interfaces

Navigation / bridge network

RS-422	UDP	LWE via UDP	Gateway/ Firewall
IEC 61162-1	IEC 61162-1	IEC 61162-450	if required

Interface diversity

4...20 mA | ±10 V | RS-422 | UDP | LWE

High time pressure

Many interfaces coordinated within a short project timeframe

Undefined systems

Not all systems and interfaces are ordered or finalized

ANSCHÜTZ

Technical clarification of the different interfaces

ANSCHÜTZ
Project Engineering

Interface Specification [redacted]

Data Exchange between Anschütz and third party systems

Overview

This document describes the data exchange between Anschütz and other systems.

1 Network infrastructure for Synapsis

1.1 Propulsion data (NACOS automation -> Anschuetz)

Data exchange between SYNAPSIS INS and propulsion system is realized by serial RS422 connection.
Baud rate for transmitting is 4.800 baud.

NACOS is using NMEA0183 telegrams regarding IEC61162-1. Therefore, NACOS system provides 1 RS422 interfaces for transmitting data.

Data exchange (bow thruster and azipod data) is realized by RS422 based connection in the following way:

To/ From	To/ From port	baud rate	To/ From	To/ From port	Exchanged Data
NACOS automation	tbd	4.800	Nautoplex, system no. 35/55	CH 1	RCTRD,1 (bow thruster) RCTRD,0 (azipod stbd) RCTRD,2 (azipod port)

The NACOS system and the SYNAPSIS INS shall be configurable to use alternative COM ports and baud rates for NMEA data exchange.

Plain NMEA sentences according to IEC 61162-1, edition 5 are used. No NMEA headers, binary headers, or tag blocks are used.

Details for thruster and azipod data are described in chapter 2.

Raytheon Anschütz
Engineering

1.2 Security system

The security system shall communicate with the SYNAPSIS INS via UDP.
Following IP addresses and ports should be used for communication.

Synapsis MFC3 IP settings (UDP data transmitter):
IP address: 192.168.50.36
Subnet mask: 255.255.255.0
Gateway: 192.168.50.253

Security PC IP settings (UDP data receiver):
IP address: 10.10.192.1
Subnet mask: 255.255.255.0
Gateway: 10.10.192.254

Source and destination port will be 12001

From -> To	From IP address	From port	To IP address	To port	Exchanged NMEA data with talker
MFC3 -> security system	192.168.50.36	12001	10.10.192.1	12001	INTTM, INOSD, INRSD, INRMC, INHDT, INZDA, INGGA, PANZHRP

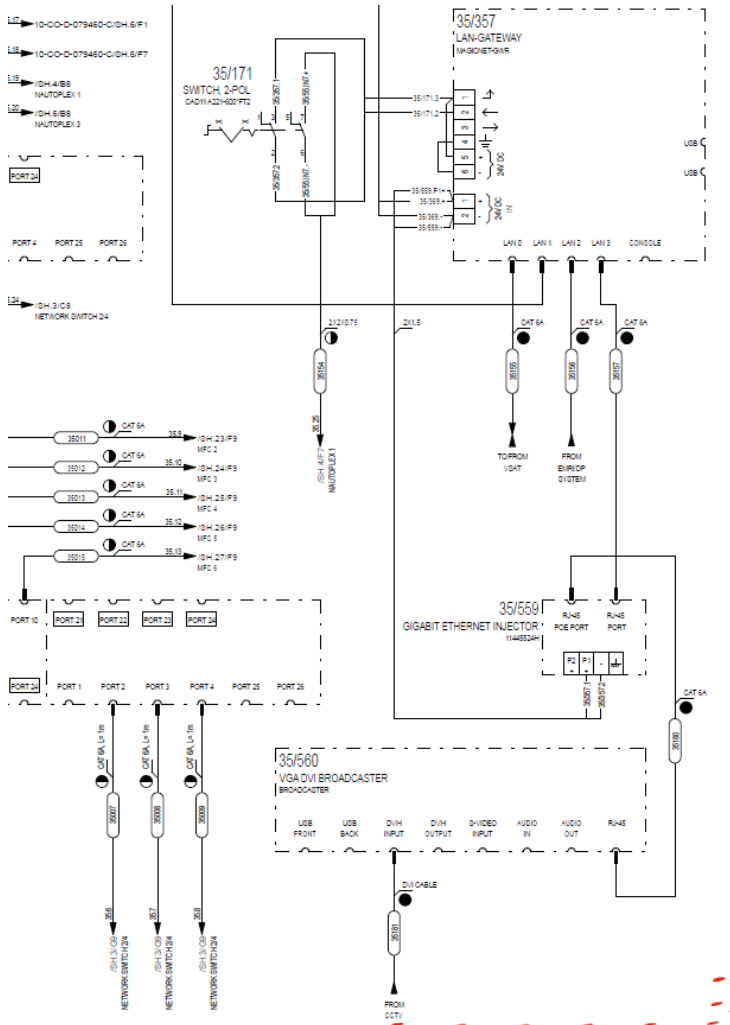
1.3 CCTV flagpole camera

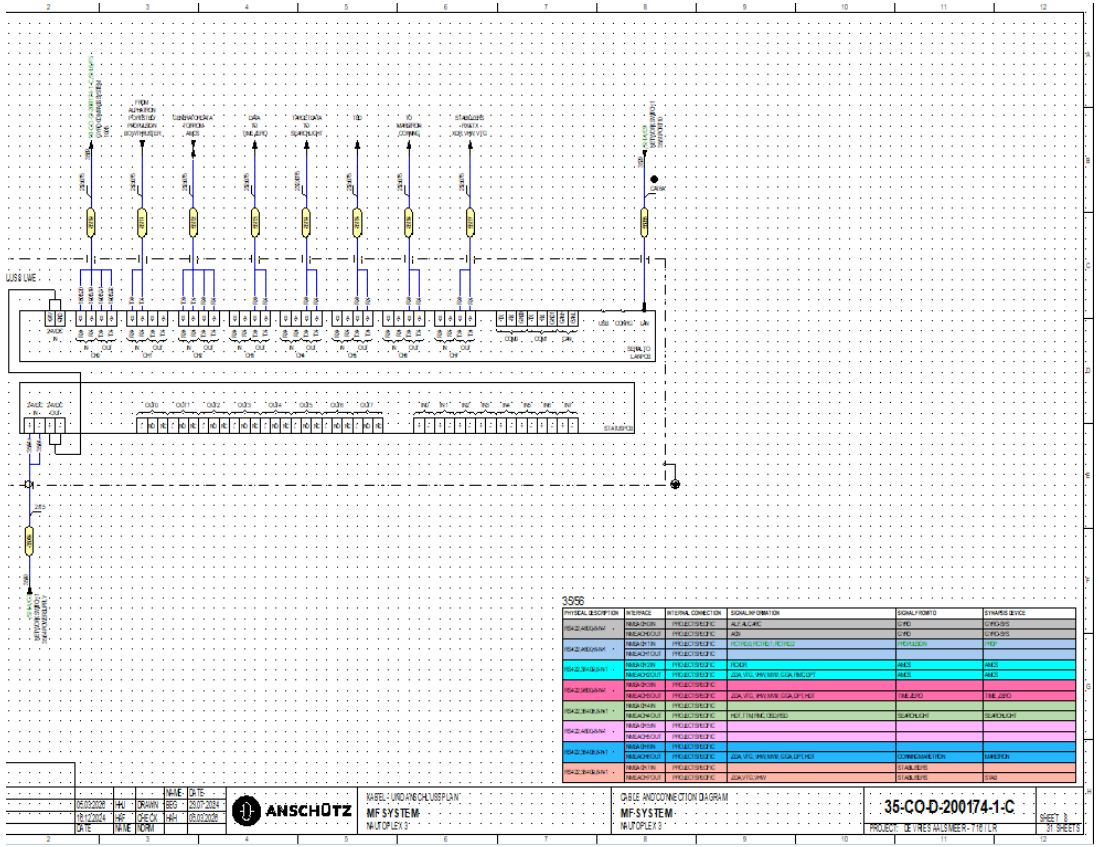
The CCTV system shall communicate with the SYNAPSIS INS via RTSP stream.
Following RTSP settings should be used for communication.

CCTV transmitter IP settings (rtsp stream: rtsp://192.168.52.1/????):
IP address 192.168.52.1
Subnet mask: 255.255.255.0
Gateway: 192.168.52.254

CCTV receiver IP settings (Conning bridge and wing Conning)
IP address: 192168.50.0
Subnet mask: 255.255.255.0
Gateway: 192.168.50.254

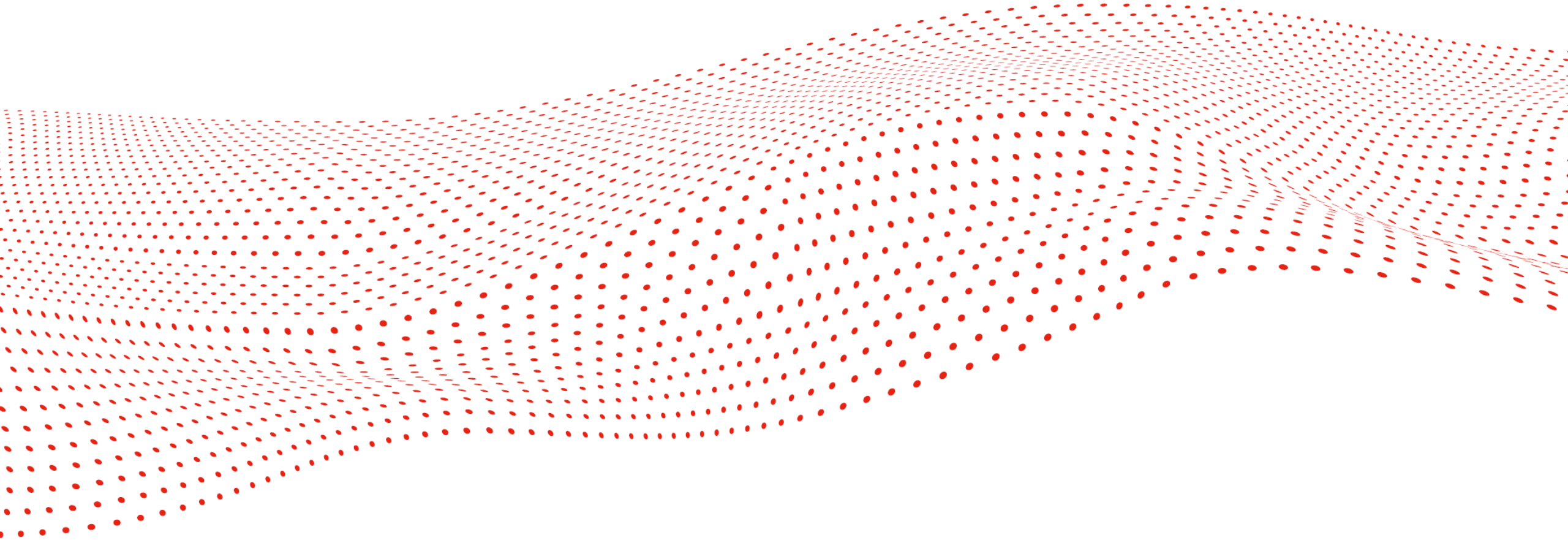
Technical documentation of different interfaces





ANSCHÜTZ

Thank You



ANSCHÜTZ