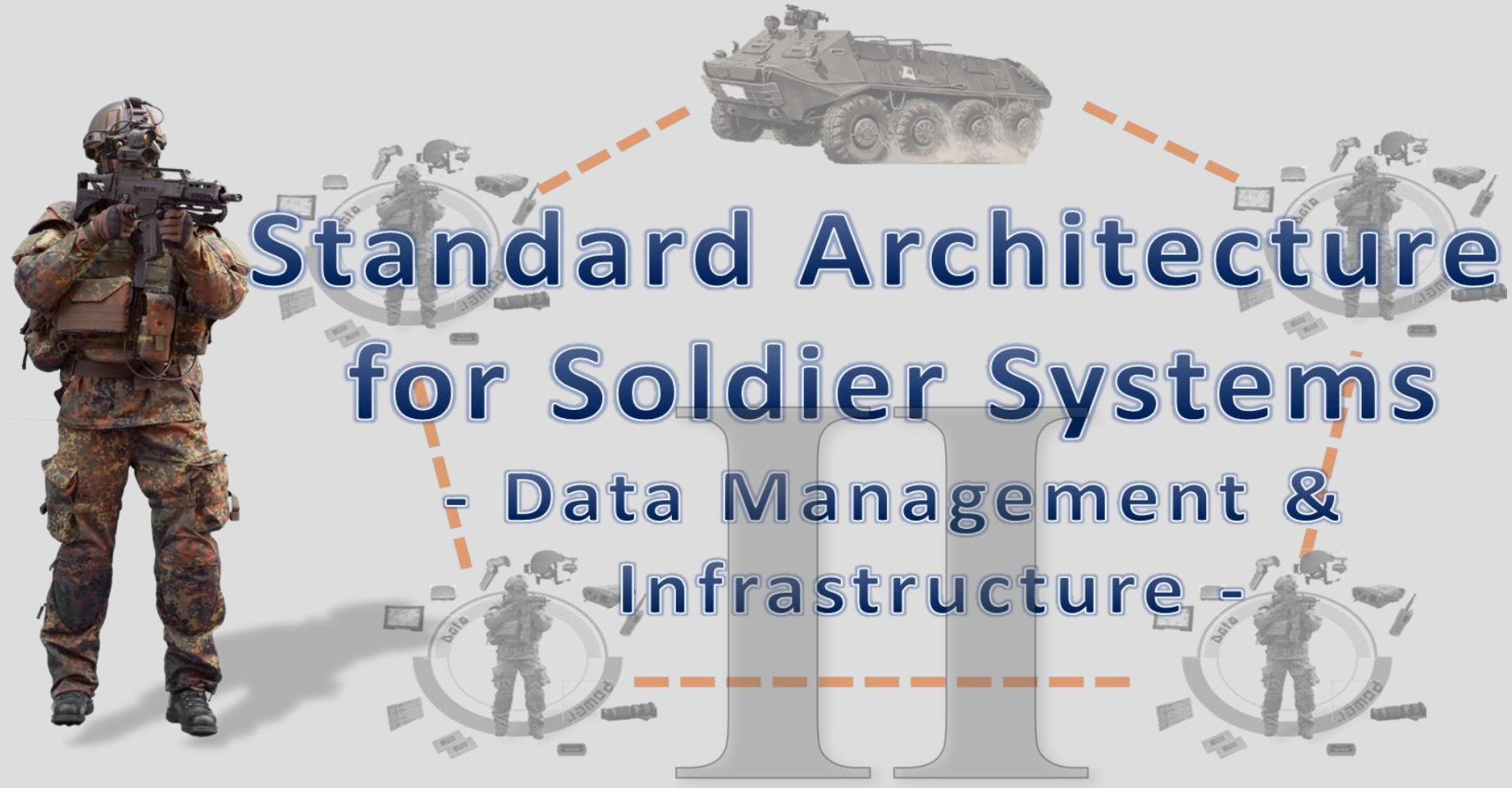
RHEINMETALL DEFENCE | gmv | TNO innovation for life | LARIMART a LEONARDO company | EUROPEAN DEFENCE AGENCY



Standard Architecture for Soldier Systems

- Data Management & Infrastructure -

II

Industry Workshop
16.CAT.OP.131
Brussels, 6st September 2017

STASS II

Cost Benefit Estimation and Roadmap

Dr. Norbert Härle, Rheinmetall

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STASS II Design v2 – Table of Contents

- ALL VIEW
- BACKGROUND VIEW
- STAKEHOLDER ENGAGEMENT
- **CAPABILITY VIEW**
- OPERATIONAL VIEW
- SERVICE ORIENTED VIEW
- SYSTEM VIEW
- TECHNICAL VIEW
- BUSINESS VIEW

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STASS I Business View

- **General**
  - power aspects of IT based system are distributed throughout the whole system and should not be considered separately
  - difficult to setup a business model for an Open Soldier System Reference Architecture without data part
  - STASS I business view already assumes that a complete architecture is available (power and data management and infrastructure)
- **STASS addresses specific market**
  - nations with procurement agencies
  - users separated from procurement
  - relatively low numbers for products
- **Major Benefits**
  - enabling future requirements and keeping soldier systems on state of the art
  - major benefits for the user (the soldier)
    - flexible, powerful, performant and state of the art system (which would be quite costly without STASS)
- **Business Model Structure**
  - Covered
    - **Value Proposition** (the Dismounted Soldier System compliant with STASS)
    - **Value Architecture** (the main stakeholders and their network)
  - Only Rudimentarily Covered
    - **Value Finance** (the financial aspects)

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STASS Approach - Value Proposition

The product

- **Soldier Squad System**
- **Individual Role Specific Soldier Systems**
- **Sub-Systems and Components**
- **Training and Simulation Equipment**
- **Services**
  - logistics
  - adapting to specific mission profiles
  - integrating new capabilities
  - upgrade and innovation

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STASS Approach - Value Proposition

Product Improvements through Open Architecture

- **Procurement**
  - reduced Life Cycle Cost
    - Reduced Procurement Costs (lower cost for sub-system and integration)
    - possibility to procure a base system which is gradually extended over time
  - Procurement of systems better adapted to users' need
    - early assessment of systems and their suitability by fast integration of prototypes with available sub-systems
    - procurement is able to choose suitable sub-systems
    - ability to carry out integration by governments (civil personnel, soldiers, etc.), procure directly from Tier 2
- **Users**
  - state of the art equipment by continuous, cost efficient upgrade of sub-systems and therefore
    - better performance
    - more and better capabilities
  - easily adaptable to specific mission needs because of modularity and flexibility
  - interoperability and possibility to exchange sub-system with other systems and other nations which have systems which comply with the architecture
  - increased reliability by higher Technical Readiness Levels (TRLs)

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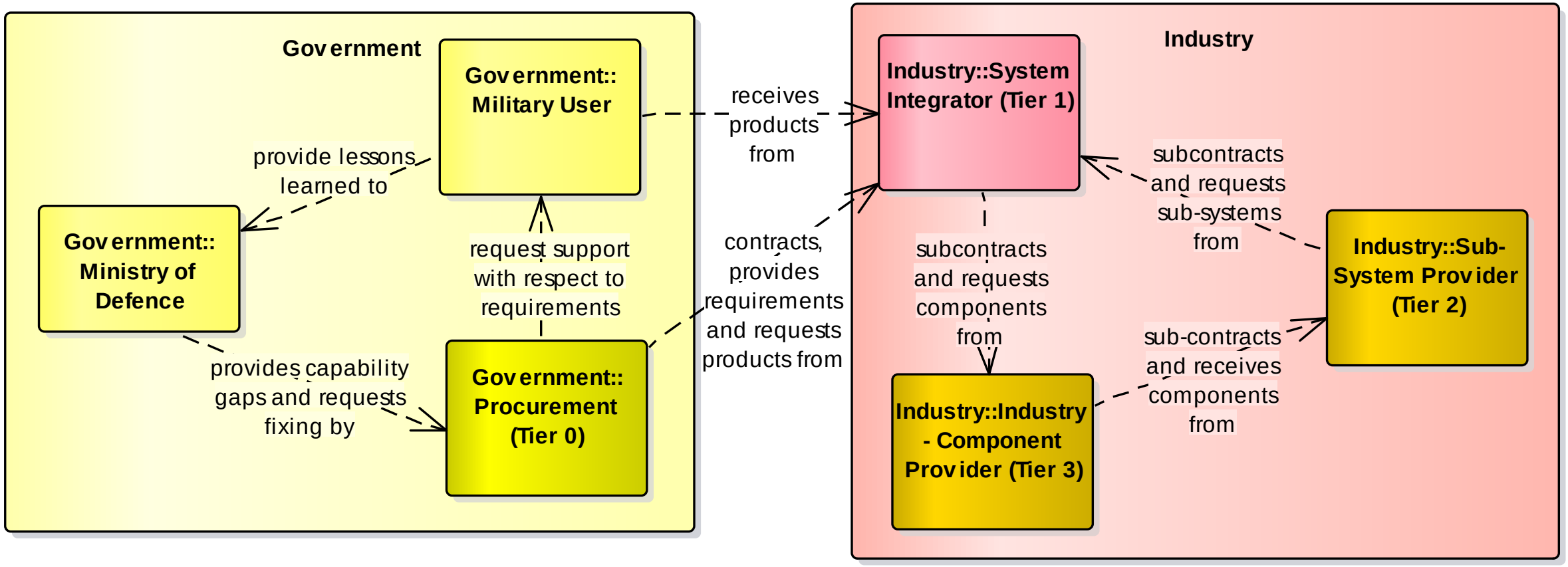
STASS Approach - Value Architecture (incl. value network)



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STASS Approach – Value Finance

Aspects to be considered

- **Current Situation with Respect to European Soldier Systems**
  - still in development (most nations without a modern Soldier System)
  - nations with very different requirements and budgets
  - nations often use national company as system integrator
  - “optimal” Soldier System not established yet, still many approaches exist
  - soldier system developed for one country cannot be sold to another country (different requirements, nation system integrator, etc.)

- **Cost Types**
  - Fixed Costs
    - Development
    - Salaries
    - Rents
    - Physical Manufacturing Facilities
  - Variable Costs
    - Volume of goods
  - Economy of Scale
    - larger companies with larger volumes reduce cost even more
  - Economies of scope
    - larger scope of operation, same marketing activities or distribution channels may support multiple products

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STASS Approach – Value Finance

Aspects to be considered

- **Phases for STASS Implementation**
  - Phase 0
    - today's business with today's soldier systems
  - Phase 1
    - transition phase from legacy to a complying soldier system
      - extra costs for standardisation and modification of current products
      - system-integrators need to develop a new business model
  - Phase 2
    - steady state

- **Soldier System Life Cycle**
  - Acquisition
    - Research and Technology (Before First Procurement, Continuous from Lessons Learned, Specific to Upgrades and New Generations)
    - Investment (First Procurement, Upgrade, New Generations)
  - Operation & Maintenance,
    - Ownership
    - Training
    - Operation
    - Logistics
    - Maintenance
  - Disposal

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STASS Approach – Value Finance

Aspects to be considered

- **Main Financial implication of STASS**
  - investment
    - lower integration efforts
      - mainly integration development (fixed cost) not integration production (variable costs)
    - reduced sub-system costs because of
      - increased sub-system production numbers and
      - increased sub-system provider (third party) competition.
    - reduced upgrading cost for sub-systems
      - just exchanged or
      - easy integration
  - logistics
    - reduced variety sub-systems or component
  - maintenance
    - modularity,
    - fewer number of different types
    - easy integration of new sub-systems

- **Further Aspects to be Considered**
  - Soldier System with current capability
  - Soldier System with extended capability (only affordable with STASS)
  - Upgrade of Soldier Systems
  - Start with basic Soldier System and then extend with time
  - Development and maintenance of STASS standard
  - Upgrade legacy sub-systems to STASS subsystems

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STASS Approach – Value Finance

- **Approach**
  - sales forecast
  - expenses budget
  - cash-flow statement
  - income projections
  - assets and liabilities
  - breakeven analysis
  - Saving by comparing Soldier Systems
    - complying with STASS
    - complying with STASS during transition phase
    - complying with STASS in steady state
- **Sensitivity Analysis**
  - vary critical parameters
  - observe how result deviates

Wirtschaftlichkeitsnachweis für Entwicklungsvorhaben inkl. Sensitivitätsanalyse

Entwicklungsvorhaben: Muster — Grundrechnung

1. Entwicklung der Zahlungsströme (TEuro)

Periode	Summe	2010 0	2011 1	2012 2	2013 3	2014 4	2015 5	2016 6	2017 7	2018 8	2019 9	2020 10
Nettoumsatzerlöse	159.600					17.850	17.850	16.800	17.850	19.950	69.300	
Erlöse aus dem Verkauf von Prototypen	0											
Sonstige Einnahmen	0											
	0											
	0											
	0											
Summe Einnahmen	159.600	0	0	0	0	17.850	17.850	16.800	17.850	19.950	69.300	0
HK-Stundenleistung	15.808					1.768	1.768	1.664	1.768	1.976	6.864	
im eigenen GB gefertigte Lagerteile	0											
Lieferungen/Leistungen anderer GB's	0											
Fertigungsmat., Streckenmat.,Fremdleistungen	84.968					9.503	9.503	8.944	9.503	10.621	36.894	
Minderbeaufschlagung	0											
sonstige Leistungen(beaufschlagungsunfähig)	0											
sonstige Leistungen/Partnerleist.(ohne Aufschlag)	0											
	0											
	0											
	0											
Summe Herstellkosten	100.776	0	0	0	0	11.271	11.271	10.608	11.271	12.597	43.758	0
Gewährleistungskosten	7.342					821	821	773	821	918	3.188	
Vertriebskosten (geschäfts-/produktbereichsindividuell)	10.080					1.127	1.127	1.061	1.127	1.260	4.378	
Sonderkossten (geschäfts-/produktbereichsindividuell)	0											
	0											
	0											
Summe umsatzabhängige Kosten	118.198	0	0	0	0	13.219	13.219	12.442	13.219	14.775	51.324	0
Entwicklung	4.970	1.670	2.358	942								
Serienreifmachung	1.416			229	1.000	187						
Dokumentation	2.000					2.000						
Markteinführung/Zulassung	0											
sonstige Einmalkosten	0											
AfA / Demo-Ktr	1.122	246	566	310								
	0											
	0											
Summe umsatzunabhängige Kosten	9.508	1.916	2.924	1.481	1.000	2.187	0	0	0	0	0	0
Summe Selbstkosten	**127.706**	**1.916**	**2.924**	**1.481**	**1.000**	**15.406**	**13.219**	**12.442**	**13.219**	**14.775**	**51.324**	**0**
Summe Einnahmen	159.600	0	0	0	0	17.850	17.850	16.800	17.850	19.950	69.300	0
Einnahmen - Ausgaben / Cash-flow	**31.894**	**-1.916**	**-2.924**	**-1.481**	**-1.000**	**2.444**	**4.631**	**4.358**	**4.631**	**5.175**	**17.976**	**0**
Cash-flow kum.		**-1.916**	**-4.840**	**-6.321**	**-7.321**	**-4.877**	**-246**	**4.112**	**8.743**	**13.918**	**31.894**	
Deckungsbeitrag		0	0	0	0	4.631	4.631	4.358	4.631	5.175	17.976	0
Deckungsbeitrag kum.		0	0	0	0	4.631	9.262	13.620	18.251	23.426	41.402	
Zahlungsreihe	31.894	-1.916	-2.924	-1.481	-1.000	2.444	4.631	4.358	4.631	5.175	17.976	0

		Perioden										
Diskontierungszinssatz (dezimal)	0,10											
Diskontfaktor	1,10	0	1	2	3	4	5	6	7	8	9	10
Cash-flow abdiskontiert	**12.869**	**-1.916**	**-2.658**	**-1.224**	**-751**	**1.669**	**2.875**	**2.460**	**2.376**	**2.414**	**7.624**	**0**
Cash-flow kum.		**-1.916**	**-4.574**	**-5.798**	**-6.549**	**-4.880**	**-2.005**	**455**	**2.832**	**5.246**	**12.869**	**12.869**
Deckungsbeitrag			0	0	0	238	113	51	26	14	23	0
Deckungsbeitrag kum.			0	0	0	238	352	402	428	442	464	464
			FALSCH	FALSCH	FALSCH	FALSCH	FALSCH	WAHR	FALSCH	FALSCH	FALSCH	#DIV/0!
Amortisation:			0,00	0,00	0,00	0,00	0,00	5,81	6,19	8,17	8,69	#DIV/0!
			5,81									

2. Wirtschaftlichkeitsbetrachtung

Interner Zins:	32,3%
Kapitalwert (Teuro):	12.869
Kapitalrückflußdauer (Jahre):	5,81

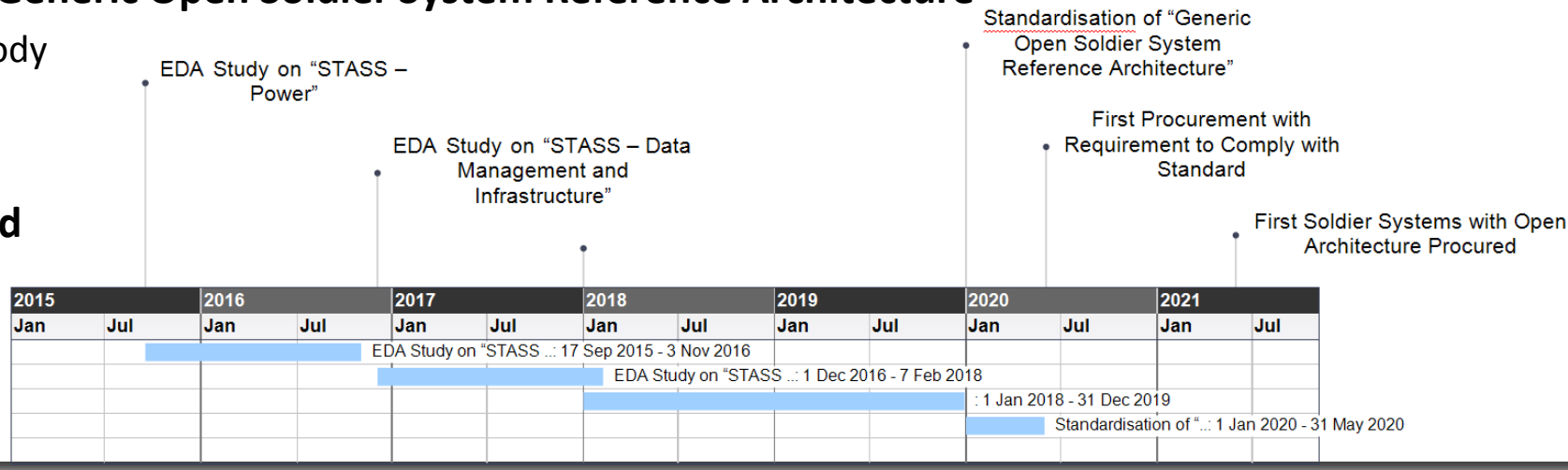
3. Ergebnisse der Sensitivitätsanalyse

Parameter:	1. Absatzpreise geringer um	2. umsatz-abhängige Kosten höher um	3. umsatz-unabhängige Kosten höher um
Veränderung:	5%	5%	5%
Interner Zins	26,8%	28,3%	31,0%
Kapitalwert Teuro	8.839	9.884	12.467
Kapitalrückflußdauer (Jahre):	6,62	6,37	5,98

Beispiel

Brainstormed Roadmap

- **2016: EDA Study on "STASS – Power"**
  - Small paper study with few companies focusing on power
- **2017: EDA Study on "STASS – Data Management and Infrastructure"**
  - Small paper study with few companies focusing on data management and infrastructure
- **2018-2019: EU Prepratory Actions on Defence Research, 2017, "Research in Technology and Products in the Context of Force Protection and Solider Systems, topic "Generic Open Soldier System Architecture"**
  - Reduction of standardisation risk by technical validation and demonstration
  - Result ready for standardisation
- **2020: Standardisation of "Generic Open Soldier System Reference Architecture"**
  - Standardisation with Standardisation Body
    - ASD, CEN, NATO, etc.
- **2020 onwards: Procurement with Requirement to Comply with Standard**



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