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PREFACE BY THE EDITOR

The private FOM University of Applied Sciences understands its educational mission as an addition to the German university landscape. With the creation of part-time study courses in economic sciences it allows employees to further their career opportunities whilst helping enterprises adapt to the challenges of demographic developments and increased qualification requirements.

Founded in 1991 on the initiative of industry associations, the FOM works closely with enterprises and business federations. With its present series of publications the FOM has taken another step towards the dovetailing of theory and practice. The series provides both lecturers and students with a forum to discuss empirical results, innovative concepts and well-founded analyses, whilst a wide publication of their academic work can be presented to the professional public. Some excellent PhD theses by FOM lecturers have also found their way into this series.

Our hearty thanks go out to Dipl.-Kfm. Bjørn Lillegraven and Prof. Dr. Marcus Helfrich who supervised Ekaterina Muromskaya Master of Business Administration thesis as first and second supervisor respectively.

This paper looks at the specifics of risk and contract management for space industry considering international commercial programmes with particular respect to the contracts with the European Space Agency (ESA). ESA procurement practices and contracting approach were examined within the related regulatory framework focusing on the pricing practices with relation to the contract type. Core concept analysis of the risk management for ESA space programs included risk assessment methods, risk management process and related control measures during the contract execution as a part of the strategy to achieve profitability and overall program success.

By adding another facet with this series we hope to enrich the active and fertile dialogue between university and practice. As publishers we are glad to be able to pay tribute to prominent academic achievements with this edition.

Essen, February 2017

Prof. Dr. Burghard Hermeier
Rector

Prof. Dr. Thomas Heupel
Prorector for Research

PREFACE BY THE SUPERVISOR

Permanently increasing competitive constraints and cost pressure attach increasing importance to risk management in companies. Furthermore, companies are legally obligated to introduce systems to manage risk in a systematic and process based manner.

Nevertheless, risk management plays an important role not only on company level. In particular, in projects a conscious and systematic approach to handle risk is indispensable since the impact of projects on the success of companies is rising.

External as well as internal projects increase in volume and become more complex. Steadily shortened product and innovation cycles and tightening customer requirements concerning technology and schedule are just some of the reasons.

Practice and experience, however, show that there is only marginal affinity to do more than the minimum legal requirements ask for. Instead of a proactive, systematic and process based management of risk nonsensical checklists are produced to pretend responsible and good governance. This is all the more surprising as the importance of risk management as an integral part of successful project management is emphasised in all the relevant literature. Often originating from the company culture also psychological factors seem to play a role: humans tend to repress risk rather than pin pointing them and who wants to play the great worrier or scaremonger if management urges to deliver a project without problems.

Moreover, successful project management – in particular in external projects – does not start when the contract is signed: it already begins in the phase of project planning and tender preparation. Already at this stage a systematic risk management has to be implemented in order to identify, qualify and quantify risks and changes and develop the necessary measures to either mitigate or exploit them for the sake of the project. This is the only way to arrive at a realistic planning of cost and schedule as the basis for an entrepreneurial decision. Many risks also can be covered or mitigated in the project contract during the negotiation phase – but only if they are known upfront.

Ekaterina Muromskaya takes up this approach from our seminar in her master thesis. At the example of the probably most challenging project of European space industry, the navigation system Galileo, she analyses possibilities for industry to cover and at least mitigate project risks within the frame of the contractual conditions. She successfully works out the necessity that risk and contract management have to go hand in hand to optimize the results. For the interested reader, it is not rocket science to recognize that this approach is not at all specific for space industry but can be easily transferred to any project driven environment in other industries.

Munich, January 2017

Mag. Bjørn Lillegraven

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LIST OF ABBREVIATIONS

AC	Actual Cost
AR	Acceptance Review
ATV	Automated Transport Vehicle
BAC	Budget At Completion
CBS	Cost Breakdown Structure
CCN	Contract Change Note
CDR	Critical Design Review
CP	Ceiling Price
CPFF	Cost-Plus Fixed Fee
CPIF	Cost-Plus-Incentive Fee
CR	Cost Reimbursement
CSDP	Common Security and Defence Policy
DCP	Development Cost Plan
DG	Director General
EAC	Estimated cost value At project Completion
EADS	European Aeronautic Defence and Space Company
EC	European Commission
ECP	Engineering Change Proposal
ECSS	European Cooperation for Space Standardization
EGNOS	European Geostationary Navigation Overlay Service
ELDO	European Launcher Development Organization
EMITS	Electronic Mail Invitation to Tender System
EO	Earth Observation
EPA	Economic Price Adjustment
ESA	European Space Agency
ESA GCC	General Clauses and Conditions for ESA Contracts
ESP	European Space Policy
ESRO	European Space Research Organization
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EV	Earned Value
FA	Framework Agreement
FFP	Firm Fixed Price
FP	Fixed Price
FPE	Fixed Price with Escalation
FPEPA	Fixed Price Economic Price Adjustment
FPU	Fixed unit price
FRR	Flight Readiness Review
GCT	General Conditions of Tender
GDP	Gross Domestic Product
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
GPS	Global Positioning System

GSM	Global System for Mobile Communications
HRM	Human Resource Management
HQ	Head Quarters
HRSD	High Resolution Satellite Data
ITM	Integral Total Management
IPC	Industrial Policy Committee
IPP	Industrial Procurement Plan
IPR	Intellectual Property Rights
ISIC	International Standard Industrial Classification
ISS	International Space Station
ITAR	International Traffic in Arms Regulations
ITT	Invitations-To-Tender
MPP	Milestone Payment Plan
MS	Member States
OEM	Original Equipment Manufacturer
ORR	Operational Readiness Review
PA	Product Assurance
PDR	Preliminary Design Review
PNT	Positioning, Navigation and Timing
PPP	Public Private Partnership
PRR	Preliminary Requirements Review
PRS	Public Regulated Service
RBS	Risk Breakdown Structure
RFI	Request for Information
RFQ	Requests-For-Quotation
SCT	Special Conditions of Tender
SME	Small- and medium-sized Enterprises
SOW	Scope Of Work
SRM	Supplier Relationship Management
STEP	Social Technical Economic Political environmental analysis
TC	Target Cost
TEB	Tender Evaluation Board
TFEU	Treaty on the Functioning of the European Union
TM	Time and Material
TRL	Technical Readiness Level
WBS	Work Breakdown Structure
WP	Work Package

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