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Appendix A: Interview Guide

Topic area / Focus	Key Question	In-depth/follow-up Option
Introduction	Can you briefly describe the role you or your organisation plays in German space travel/security policy?	
Overall Strategic Change	What are the biggest changes you have noticed in German space policy since Russia's war of aggression in Ukraine compared to before?	
Impact of the war in Ukraine on space strategy	In your opinion, to what extent has the war in Ukraine changed the strategy and priorities of German space policy?	+ How do you assess the decision to end cooperation with Russia? + Do you see any long-term economic impact on the German space industry? + How has cooperation with other partner countries (e.g. the USA, ESA member states) changed?
Space and security	Do you see a change in the perception of space travel as a security-related issue?	+ How would you assess the current balance between international cooperation and the pursuit of strategic autonomy in German space policy? + How is Germany trying to protect itself? + Do you see an 'emancipation' of German space policy?
Dependencies on partners	Do you believe that the current geopolitical changes will lead to even greater dependence on certain countries, particularly the US, in the space sector?	+ What risks and opportunities do you see in this increased dependence? + Do you have any recommendations for German space policy to better address future crises?
Open additions	Is there anything else you would like to add on this topic that we have not yet addressed?	

Themenblock/Fokus	Schlüsselfrage	Vertiefende/Nachfrageoption
Einstieg	Können Sie kurz beschreiben, welche Rolle Sie bzw. Ihre Organisation in der deutschen Raumfahrt / Sicherheitspolitik spielen?	
Strategische Gesamtveränderung	Was sind die größten Veränderungen, die Sie in der deutschen Raumfahrtpolitik seit dem russischen Angriffskrieg in der Ukraine im Vergleich zu vorher wahrgenommen haben?	
Wirkung des Ukrainekrieges auf Raumfahrtstrategie	Inwieweit hat der Krieg in der Ukraine Ihrer Meinung nach die Strategie und die Prioritäten der deutschen Raumfahrtpolitik verändert?	+ Wie beurteilen Sie die Entscheidung, die Zusammenarbeit mit Russland zu beenden? + Sehen Sie langfristige wirtschaftliche Auswirkungen auf die deutsche Raumfahrtindustrie? + Wie hat sich die Zusammenarbeit mit anderen Partnerländern (z.B. USA, ESA-Mitgliedsstaaten) verändert?
Raumfahrt und Sicherheit	Sehen Sie eine Veränderung in der Wahrnehmung von Raumfahrt als sicherheitsrelevantes Thema?	+ Wie würden Sie die aktuelle Balance zwischen internationaler Kooperation und dem Streben nach strategischer Autonomie in der deutschen Raumfahrtpolitik bewerten? + Wie versucht sich Deutschland abzusichern? + Sehen sie eine „Emanzipation“ der deutschen Raumfahrtpolitik?
Abhängigkeiten von Partnern	Glauben Sie, dass die aktuellen geopolitischen Veränderungen zu einer noch stärkeren Abhängigkeit von bestimmten Ländern, insbesondere den USA, im Raumfahrtsektor führen werden?	+ Welche Risiken und Chancen sehen Sie in dieser verstärkten Abhängigkeit? + Haben Sie Empfehlungen für die deutsche Raumfahrtpolitik, um zukünftigen Krisen besser begegnen zu können?
Offene Ergänzungen	Gibt es etwas, was Sie zu diesem Thema noch anmerken möchten, das wir bisher nicht angesprochen haben?	

Appendix B: Transcript Expert Interview Situation

Expert interview: _____

Location: _____

Date: _____

Duration: _____

Name and Position of the interview Partner: _____

Age: _____

Contact Details: _____

Background information on the interviewee's biography:

Interview setting: _____

Conversation atmosphere: _____

Description of the course of the interview: _____

Special aspects in the discussion of individual topics:

Important notes/data for follow-up:

Confidentiality/Anonymization: _____

Follow-up contact agreed: _____

Appendix C: Transcription Guide

Rule	Description	Example
Standard Orthography	All words are transcribed according to standard spelling rules. Dialects or colloquial shortenings are written in standardized form.	“I have done that.” instead of “I’ve done that.”
Verbatim transcription	Spoken content is transcribed word-for-word, excluding filler words (“uh”, “um”), only if they are relevant to the statement.	“So (uh) I think this is important.”
Speaker labels	The interviewer is labeled as S1 , the interviewee as S2 .	S1: How do you feel about this? S2: It’s hard to say.
Non-verbal utterances	Only included if they change the meaning of the statement. Placed in square brackets.	“Yes [laughs] that really happened.”
Pauses	Short pauses don’t get mentioned, longer pauses are marked with (...) and can include duration in seconds, e.g., (5 sec.).	“I think (...) this could work.”
Incomplete sentences / interruptions	Sentence interruptions are marked with a dash.	“Well, I actually wanted to– but then it was too late.”
Unintelligible passages	Unclear words are marked with [unintelligible].	“That was in [unintelligible] very complicated.”

Appendix D: Category System

Category	Sub-category	Characteristic/Defintion	Anchor example	Code Rule
K1: Impacts on German Space Activities		This category includes all statements relating to secific or expected changes in German space strategy. It covers political, security, economic and technological adjustments that influence Germany's objectives, priorities, partnerships or measures in the field of space.	‘With the start of the war in Ukraine, many collaborations were halted. This in turn led to a launcher crisis in Europe. Europe had no access to space for a month or just under a year after the last Ariane 5 rocket was launched, but the first Ariane 6 rocket had not yet been launched.’ (Space Company: pos. 9)	At least one characteristic; references to changes; coding is applied to anything that can be interpreted as having an impact on German space activities and thus also on the strategy.
	UK1.1: Increased Security Dilemma	This category includes all statements that point to an escalation of security policy uncertainties through measures taken by one or more states, leading to mutual mistrust or strategic instability. (Townsend, 2020; Enholm, 2024); References to greedy, expansionist states (Glaser in Enholm, 2024: 49; He, 2012: 162); unclear or opaque intentions of other states, especially aggressors (Jervis, 1978: 187, 194; Enholm, 2024: 53)	‘We first need to see how we respond to Russia producing as much weapons and ammunition in three months as the whole of Europe does in a year. And that includes in the space sector.’ (Space Company: pos. 22)	At least one characteristic; anything that can be interpreted as a security dilemma and thus also as having an impact on strategy is coded.
	UK1.2: Termination of Cooperation with Russia	This category includes all statements relating to the termination of cooperation with Russia in the field of space travel.	‘Well, I would say that politically it made sense to cut off this cooperation.’ (Space Company: pos. 22)	At least one feature; anything that can be interpreted as a reference to, assessment of, or classification of the termination of space cooperation

				with Russia is coded.
	UK1.3: Military Perspective / Securitization	This category includes all statements relating to the increasing securitisation of and heightened military perspective on German space travel.	‘Since the war in Ukraine, it can be said that the perspective on military issues has generally changed in Germany and not only in Germany, but throughout Europe. There is greater openness towards defence in general and military space travel in particular. Many defence issues are also linked to space technologies.’ (Space Company: pos. 9)	At least one characteristic; anything that can be interpreted as a reference, assessment or classification of the changing military perspective or increased focus on security policy in Germany is coded.
	UK1.4 Revelation of US- Dependence	This category includes all statements relating to the revelation of US dependence. Both before the outbreak of the war and afterwards.	‘There is, of course, a certain dependence on American capabilities, at least in terms of launch capabilities.’ (Space Politician: pos. 25)	At least one feature; anything that can be interpreted as a statement about the dependencies of American capabilities is coded.
	UK1.5: War in Ukraine as a Catalyst	This category includes all statements referring to the fact that the war in Ukraine has acted as a catalyst/accelerator, reinforcing processes and perceptions.	‘And accordingly, the Russia question is simply an accelerator, but not a game changer.’ (Space Politician: pos. 49)	At least one characteristic; anything that can be interpreted as a statement about the impact of the war in Ukraine is coded.

	UK1.6: Increased Awareness of Threats and Risk Perception	This category includes all statements referring to the fact that the war in Ukraine increases the perception of threats and risks and highlights weaknesses and shortcomings.	‘So the urgency is already recognised that strategies or certain programmes must definitely be pushed forward’ (Space Company: pos. 13)	At least one characteristic; anything that can be interpreted as a statement regarding the disclosure of weaknesses and risks is coded.
	UK1.7: Legal Refinement	This category includes all statements referring to the fact that the war in Ukraine has led to legal adjustments and tightening in Germany. hat.	‘It's the little things, such as in the space law or in the key points, that you see something appearing that might not have been there three years ago.’ (Space Politician: pos. 45)	At least one characteristic; anything that can be interpreted as a statement regarding legal clarification or change in Germany is coded.
	UK1.8: More Explicit and Strategic Communication	This category includes all statements referring to the fact that the war in Ukraine has led decision-makers to communicate more clearly and strategically.	‘But now we also have the issue of security becoming increasingly important in politics.’ (Space Politician: pos. 13)	At least one characteristic; anything that can be interpreted as a statement for clearer communication is coded.
K2: Indicators of Hedging		This category includes all statements that reflect typical elements of the hedging strategy. Strategic restraint and flexibility instead of fixed alliances (Tunsjø, 2011: 65; Goh, 2006); parallel cooperation with multiple actors (Cheng-Chwee, 2024: 47); Mixed signals to keep political options open (Cheng-Chwee, 2024: 48); Behaviour as a middle power in a multipolar system, especially when protective power is waning (Tessman, 2012: 192)	‘So there, too, we have freed ourselves somewhat from too close a dependence on the Americans. And accordingly, I actually see European autonomy as extremely secure.’ (Space Politician: pos. 29)	At least one characteristic; anything that can be interpreted as an indicator of hedging as a strategy in German space policy, both in the past and in response to Russia's war of aggression in Ukraine, is coded.
	K2.1: Increased Certainty	This category includes all statements referring to the fact that certainty	‘We need to think more in terms of how we can	At least one characteristic; links to threats;

	About Primary Threats	about a threat from Russia has become clearer/increased as a result of the war. (Cheng-Chwee, 2024: 47)	protect ourselves against Russian aggression.’ (Space Company: pos. 22)	anything that can be interpreted as an increase in threat is coded.
	K2.2: Doubts About the Reliability of the Main Ally	This category includes all statements that refer to doubts about the reliability of the USA as a key ally (Cheng-Chwee, 2024: 47).	‘It may well be that we get off more lightly with Trump. After all, he is our main strategic partner.’ (Space Politician: pos. 58)	At least one characteristic; references to doubt/unreliability of the USA; irrationality of its decisions
	K2.3: Restraint and Appeasement	This category includes all statements referring to Germany pursuing a policy of restraint and appeasement; sending mixed signals, vague positioning (Koga, 2018: 638).	‘We are still keeping a low profile, as is often the case with security policy issues’ (Space Politician: pos. 41)	At least one characteristic; references to vague formulations; restraint; appeasement
	K2.4: Middle Power Behavior in a Multipolar System	This category covers all statements referring to Germany as a middle power and/or a country operating in a changing multipolar environment with limited scope for action. Influence of other countries.	"Germany does not see itself as an independent player in space. We are involved in cooperation agreements. We are also trying to move towards autonomy. (Space Company: pos. 42)	At least one characteristic; links to international order; restriction of German freedom of decision-making/room for manoeuvre; other players decisive
	K2.5: Orientation Toward Autonomy and Resilience	This category includes all statements that refer to Germany expanding its autonomy and resilience capabilities, or plans to do so.	‘So there, too, we have freed ourselves somewhat from too close a dependence on the Americans. And accordingly, I actually see European autonomy as extremely secure.’ (Space Politician: pos. 29)	At least one characteristic; links to resilience and autonomy; independence; strengthening of personal skills; development of national and European systems and projects

	K2.6: Diversification of Cooperation	This category covers all statements relating to Germany diversifying its cooperation and planning and implementing projects with various partners.	‘But new things can emerge from these ruins, because when it comes to lunar exploration, we have Ariane 64 and a lunar lander that is scheduled to launch for the first time in 2030, just a few years from now. And in the meantime, we have agreed with the Japanese to carry out a few things on the moon.’ (Space Politician: pos. 29)	At least one feature; links to cooperation projects; projects with different partners; new partnerships
K3: Characteristics for Balancing		This category includes all statements that point to classic characteristics of a balancing strategy. Military rearmament, expansion of national defence capabilities, promotion of technology (He, 2012: 157; Salman & Geeraerts, 2015: 5) Strengthening one's own position against actual or potential threats (Chatterje, 1972; He, 2012: 156).	‘But not that this increases the probability, but rather that we are saying we are prepared and take this seriously and are addressing it to our opponents. They will then have to deal with an even stronger defence capability.’ (Space Politician: pos. 9)	At least one characteristic; anything that can be interpreted as an indicator of balancing as a strategy in German space policy, both in the past and in response to Russia's war of aggression in Ukraine, is coded.
	K3.1: Non-Military Positive	This category covers all statements relating to non-military positive balancing; expansion and improvement of one's own civil infrastructure.	‘And for 10, 15 years now, attempts have been made to build this up step by step. Now also with the national satellite Herz, which you should look at in this context. And that is an instrument for secure telecommunications that cannot be	At least one characteristic; reference to non-military, civil; infrastructure; improvement and expansion;

			disrupted like other communications via the radio frequency spectrum' (Space Politician: pos. 41)	
	K3.2: Non-Military Negative	This category includes all statements referring to non-military negative balancing; political and diplomatic strategies aimed at isolating or ending cooperation.	And those were sacrifices. [...] They said they would continue operating the space station, okay, but only as an absolute exception. Otherwise, it is clear, also from my point of view, that it was an absolute must to end it immediately and painfully. There are far too few consistent signals, and this was at least one of them. And accordingly, it was something that was accepted and where you then say, okay, it was necessary." (Space Politician: pos. 17)	At least one characteristic; references to isolation; decoupling; consistency; hard cuts
	K.3.3: Military Positive	This category includes all statements relating to positive military balancing; expansion of own military capabilities in space; emphasis on own deterrence capabilities.	'But not that this increases the probability, but rather that we are saying we are prepared and we take this seriously and are addressing it to our opponents. They will then have to deal with an even stronger defence capability.'	At least one characteristic; expansion of military infrastructure; increase in military spending; change in military perspective; prioritisation of military benefits

			(Space Politician: pos. 9-10)	
	K3.4: Military Negative	This category includes all statements that refer to negative military balancing; Immediate weakening of the opponent		At least one characteristic; sabotage; deliberate disruption; military attacks
K4: Explana-tory Ap-proaches		This main category contains all statements that provide clues to possible explanations for answering the research question.		
	K4.1: Early Hedging	This category is used to code all statements that suggest that Germany had been hedging for some time, especially before the outbreak of the war.	‘As I said, this line has been implemented technologically for 10, 15 years at DLR, in the national programme and now also in future EU programmes. So Russia is not the game changer’ (Space Politician: pos. 41)	At least one characteristic; reference to long-standing programmes; previous diversification/desire for autonomy; little strategic change; low element of surprise
	K4.2: Russia strategically subordinate	This category covers all statements explaining that Russia's withdrawal as a cooperation partner had no major impact on Germany; Russia was not a strategic partner.	‘But in the long term, I believe that the growth of the German space industry does not depend on working with Russia – neither that it would be extremely good or extremely bad – but rather we need to think about what we can do from within Germany and	At least one characteristic; References to relativisation of the effects; Greater significance of other partners; Weakness of Russia

			Europe or, for example, in cooperation with the USA' (Space Company: pos. 34).	
	K4.3: Budget and Implementation Hurdles	This category applies to all statements that suggest that there are primarily internal implementation problems in Germany that are having a negative impact on the strategy or slowing it down.	'That's why, yes, there is openness, but it's currently failing in practical implementation, and yes, of course, not least because of the budget, because savings have to be made everywhere, but space travel is affected by the cuts. I just wanted to mention the word bureaucracy again here, which is a major hurdle.' (Space Company: pos. 13)	At least one characteristic; connection to bureaucracy; administrative processes; institutional barriers; budget constraints
	K4.4: Germany as a Status-Quo State	This category applies to all statements that indicate that Germany sees itself as a status quo state or can be classified as a security-seeking state; its primary goal is self-preservation, with a tendency towards cooperation. (Jervis, 1978: 194) Avoidance of confrontation (Kai He, 2012: 162)	'There is a very strong European identity, even in some areas. And of course, there are financial reasons for this, because Germany clearly recognises that we do not have the capacity to do so, as space travel is very expensive.' (Space Company: pos. 38)	At least one characteristic; Limited ability to act; Realistic self-assessment; Maintaining the status quo

Appendix E: Codesystem

List of Codes	Memo	Frequenzy
<i>Codesystem</i>		126
<i>Explanatory Approaches</i>	Explanatory Approaches for strategic Behavior of Germany	0
<i>Early Hedging</i>	Developments such as securitisation, diversification of partnerships and efforts to achieve autonomy were already apparent beforehand. In a sense, Germany was 'prepared'.	4
<i>Russia strategically subordinate</i>	Germany's dependence on cooperation with Russia was not so great that it came as a shock and brought about lasting changes to German space strategy.	4
<i>Budget and Implementation hurdles</i>	Developments in space take years, if not decades. Not least because of bureaucracy, but also due to the technical challenges involved, space travel is planned with a long-term perspective.	10
<i>Germany a Status Quo State</i>	Germany is a status quo state. A status quo state, on the other hand, only wants to be strong enough to protect itself and tends towards cooperation. (Jervis, 1978: 194) Or also a security-seeking state. (He, 2012: 162)	10
<i>Impacts on German Space Activity</i>	Russia's war of aggression in Ukraine has had an impact on Germany's space strategy. The nature and extent of the impact are irrelevant at this stage.	0
<i>Increased Security Dilemma</i>	The security dilemma for Germany has been exacerbated by the war in Ukraine. Russia has clearly shown itself to be a greedy state and is extending its threatening behaviour to Germany. At the same time, Russia's intentions regarding the extent to which it wants to shift Europe's borders remain unclear. America is losing its reliability as a key ally.	7
<i>Termination of Cooperation with Russia</i>	The security dilemma has become so significant for Germany that it has been compelled to terminate its cooperation with Russia. All statements regarding the termination of cooperation	3
<i>Military Perspective / Securitization</i>	Greater openness towards defence and military space activities	7
<i>Revelation of US-Dependence</i>	In terms of launch capabilities in particular, Germany was temporarily dependent on the United States due to the loss of Russia as a cooperation partner.	5
<i>War in Ukraine as a Catalyst</i>	The war in Ukraine served as an accelerator for processes and decisions	7
<i>Increased Awareness of Threats and Risk Perception</i>	German politicians became more aware of what was necessary and urgent	11
<i>Legal Refinement</i>	The German legislature has already taken recognisable measures to respond to the new geopolitical situation	8
<i>More Explicit and Strategic Communication</i>	Decision-makers are identifying risks and strategies more clearly.	2
<i>Indicators of Hedging</i>	Indicators of Hedging-Strategy	0
<i>Increased Certainty About Primary Threats</i>	The sense of threat has grown stronger	4

<i>Doubts About the Reliability of the Main Ally</i>	When there are doubts about the support of a protective power, hedging is more likely to be chosen in order to maintain strategic flexibility	5
<i>Restraint and Appeasement</i>	German policy remains vague	14
<i>Middle Power Behavior in a Multipolar System</i>	Russia's war of aggression is not the only decisive factor for changes in Germany's space strategy.	5
<i>Orientation Toward Autonomy and Resilience</i>	Other geopolitical developments, such as the new space race between the US and China, uncertainty about the reliability of the alliance with the US, and rivalry with China also play an important role and show that Germany, together with its European partners, has been operating in a geopolitically tense environment for some time now, in which it must assert itself.	7
<i>Diversification of Cooperation</i>	Striving for independence by expanding national capacities (e.g. own launch systems, secure communications or space situational awareness) without completely abandoning cooperation.	3
<i>Indicators of Balancing</i>	All characteristics that speak in favour of a balancing strategy	0
<i>Non-Military Positive</i>	Investments in infrastructure, technology, industry and research with security relevance (e.g. quantum communication, autonomous transport systems).	1
<i>Non-Military Negative</i>	Political and diplomatic strategies for isolation, technological export controls or measures to limit strategic dependencies (e.g. decoupling from Russian technology, diversification of suppliers).	1
<i>Military Positive</i>	Expansion of own military capabilities in space (e.g. satellites for reconnaissance, early warning, defence).	8
<i>Military Negative</i>	Measures to weaken potential adversaries in a targeted manner (e.g. space surveillance to detect enemy activities, protective measures against anti-satellite weapons).	0