



CONVERGENT SCREEN TECHNOLOGIES AND PERFORMANCE IN REALTIME (COSTAR)

CALL INVITATION



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1. Introduction

UK Research and Innovation (UKRI) through the Arts and Humanities Research Council (AHRC) is investing in a new Research, Development and Innovation (RD&I) infrastructure for the Creative Industries. Infrastructure, in the context of this project, refers to the establishment of facilities, resources and expertise which we believe will make the most difference to the future of our target industrial sub-sectors.

The purpose of this particular investment, CoSTAR (Convergent Screen Technologies And performance in Real-time) is to underpin the UK's future competitiveness across the screen and performance industries; to ensure that these subsectors of the Creative Industries are able to identify, contribute to and exploit opportunities arising from current and future waves of technology development; and to build a more resilient creative technology ecosystem in the face of a rapidly changing international market.

The UK is currently benefitting from an unprecedented wave of international investment in screen production; it also currently leads the world in the adoption of new Virtual Production methods. However, the combination of LED volumes, real-time game engines and in camera GFX that comprise what is currently termed 'Virtual Production' is only the initial application of a cluster of technologies that will transform the way creative products, services and experiences are made, from games to live performance and on towards the connected virtual worlds of the Metaverse. CoSTAR's purpose is to ensure that through ongoing investment in a dedicated R&D infrastructure the UK can drive, rather than merely adopt, future waves of innovation.

CoSTAR is intended to be a networked infrastructure supporting a series of facilities operating in close collaboration. This initial call is for proposals to deliver a CoSTAR National Lab and three or more CoSTAR Network Labs which together will comprise the central architecture of the new infrastructure. The Network Labs will work close to the current challenges faced by industry while the National Lab will support research on future waves of technology. Over the coming months AHRC will issue a further call for the provision of a Data Insight and Foresight Unit which will provide the infrastructure with intelligence on research, technology and industry trends relevant to the optimisation of CoSTAR.

This call for CoSTAR sets out a new long-term vision for Creative Research Development and Innovation by establishing the first R&D Infrastructure for the Creative Industries to match those that are seen as essential for other innovation-rich sectors to underpin to their long-term contribution to both economy and society.

Applied R&D for the Creative Industries is a relatively new concept, however CoSTAR benefits from the evidence gathered through previous AHRC and UKRI investments, particularly the [Creative Industries Clusters Programme](#) and the [Audience of the Future Challenge](#). One thing that these applied R&D programmes have demonstrated is that public investment can harness the research excellence of our world-class University sector and the creative innovation and commercial insight of the UK's world-leading creative businesses. Significantly for CoSTAR, AOTF and CICP also demonstrated that these initial public funds can drive significant co-investment from industry and from public partners who see

the ability for R&D and the creative industries to drive local economic benefits. We are therefore looking for similar partnerships between Research Organisations, Industry and Public partners to come together to deliver the CoSTAR infrastructure and to leverage significant co-investment using AHRC's funding. We also believe that access to the CoSTAR infrastructure has the potential to foster the growth of new businesses around each CoSTAR Lab strengthening the local and national creative R&D ecosystem

2. Instructions for Respondents

Please refer to the two reference documents:

- **The Call Invitation** (this document) which provides information about CoSTAR
- **The Attachment Specification** setting out the information which applicants need to provide and the score weighting for each section

You are invited to respond via Je-S by 4pm on **2nd February 2023**

Following the launch of the call on **11th October 2023**, AHRC will host a series of regional briefings which are open to all potential respondents to the call, we welcome attendance from potential project lead organisations, HEI based researchers, industry partners and local or regional economic development agencies. These events will deliver full briefings on the call and offer the opportunity for potential bidders to ask questions as well as provide networking opportunities for the identification of other partners.

The briefing events will be recorded and any questions raised will contribute to an evolving FAQ document that will be regularly updated and available online. Following the briefing events the CoSTAR team will host a number of online surgeries for bidders.

Please submit any questions in advance to CoSTAR@ahrc.ukri.org

No reimbursement of any costs incurred in making submissions, presentations or responses can be entertained. Any information submitted will be retained and used solely for the purposes of this project and will not be used for any other purpose or shared with another organisation.

3. Eligibility

Lot 1: CoSTAR National Lab

HEIs, IROs or RTOs as lead bidder in partnership with at least one commercial studio or industry co-location partner and one Local Enterprise Partnership (LEP), Local or Combined Authority or equivalent economic development body or enterprise agency

Lot 2: CoSTAR Network Labs

HEIs, IROs or RTOs as lead bidder in partnership consortia with at least one commercial or industry co-location partner and one Local Enterprise Partnership (LEP), Local or Combined Authority or equivalent economic development body or enterprise agency.

- AHRC will award a maximum of 4 grants: 1 for Lot 1 and up to 3 for Lot 2
- Bidders may submit for the National Lab (Lot 1) and for ONE or TWO or ALL THREE Network Labs (Lot 2)
- Bidders will not be awarded grants to operate both the National Lab and ANY Networked Labs. Award of the National Lab facility will take precedent in any bid for both facilities
- Other organisations may partner with a maximum of 2 bids for Lot 1 and 3 bids for lot 2.

4. CoSTAR Background

The UK's Creative Industries are world leading. From our film, television and games producers to our publishers, advertising, marketing and communications agencies and theatres, museums and galleries, they are, as HM Government has said, "at the heart of the nation's competitive advantage." However, the Creative Industries' ongoing success and strategic position is at risk from disruption from new waves of technology that will transform the way creative products, services and experiences are produced and consumed. CoSTAR is a national response to these risks in the particular sectors where technology enabled transformation is most immediately apparent through the convergence of screen and performance technologies. Through CoSTAR AHRC is seeking to reinforce and sustain our competitive advantage in these sectors by investing in world-leading R&D and Innovation facilities and programmes (referred to in this document as "infrastructure") that can unlock the immediate and long term economic and creative value of a distinct set of emerging technologies.

The last decade has seen a new convergence of technology and media, with global giants such as Amazon, Netflix and Disney consolidating the technologies, production, and distribution of content together and achieving unprecedented market power. One side effect of this changing environment has been a significant and ongoing wave of new investment into studio facilities in the UK – from multi-billion-dollar inward investments by the world's largest media companies to smaller regional facilities.

However, within this period of global structural change, the last five years has seen another opportunity emerge. A suite of advanced computing technologies, some developed from within the creative industries some from the wider digital technology sector have converged to create new opportunities, methods and workflows with the potential to transform the production process across the whole sector. In film and hi-end TV, where adoption has been rapid this as new creative technology stack has become known as "virtual production" built on real-time software engines from the game industry; but also including in-camera visual FX, performance capture; LED volumes, future networks. Machine learning and more. This set of emerging tools and processes hold the promise to make content production cheaper, greener and better able to meet global market demand.

Virtual Production technologies have already had a significant impact in the screen industries, from initial ground-breaking productions such as Disney's *Star Wars* spin-off [The Mandalorian](#) to recent applications on HBO's [Game of Thrones at Warners UK Leavesden studios](#). The potential for these same technologies to transform the performance sector has also been shown by projects such as The Royal Shakespeare Company's [Dream.online](#). In the screen sector applications of these technologies will

impact production companies; studio operators, performance companies, production technology groups; VFX providers and technology suppliers.

As these technologies become more accessible and develop further through the application of AI and Machine Learning technologies this transformation will extend across the creative industries through advertising, marketing and communication sectors, culture and heritage and far beyond linear experiences into the connected virtual environments that make up the metaverse – the next major phase in the development of the digital and creative economies. As the initial phase of what is intended to be a sustained Research Development and Innovation investment, CoSTAR starting point is today's virtual production environment but its future is in allowing the UK's creative industries a research infrastructure to explore the technologies and commercial opportunities of the metaverse.

Over the last five years, a series of public investments made by UKRI have shown evidence of the impact that can be delivered through applied creative R&D programmes including the *Audience of the Future Challenge* the Digital Catapult/Arts Council England programme *Creative XR* but these programmes have been project-based and time-limited. The extended timeframe and devolved decision making of The Creative Industries Clusters Programme has demonstrated how longer-term HEI/Industry partnerships supported by local, regional (and in the UK Nations) national economic partners can massively amplify the impact of UKRI funding raising more than £3 in co-investment for every £1 invested by UKRI through AHRC. It is because of this evidence that we are calling for similar partnerships to deliver the CoSTAR infrastructure with Ros RTOs or IROs leading consortia delivering the infrastructure.

The facilities delivered through CoSTAR will offer the UK's screen and performance sector a long-term infrastructure to build a new capability for the UK in Creative Technology R&D. Co-siting these facilities with industry, rather than within Universities will ensure that they are always engaged with the cutting edge of industry practice; HEI leadership will ensure that the research and engineering teams within these facilities will conduct new high-quality R&D as well as support the development of innovative solutions; the participation of economic development partners will ensure that each facility in the network can support, sustain and grow a cluster of new high growth creative technology companies exploiting and commercializing the opportunities of this valuable and transformative R&D .

5. CoSTAR Objectives

The Business Case for CoSTAR is to support UK screen and performance sector competitiveness by “equipping UK firms, assets and institutions with the capabilities, supporting environment and market insight necessary to play a leading role in current and future waves of global media and technology convergence.” To do this, a further three sub-objectives were identified:

- To enable the technological participation of UK firms, assets and institutions in current and future waves of global media and technology convergence;
- To build, strengthen and deepen the UK creative technology ecosystem, maximise arising economic opportunities and support the commercialisation of creative industry technology IP; and
- To lead and coordinate the technological development of the UK screen and performance sectors.

Translating this into delivery terms gives the following overarching objective and sub-objectives.

Overarching objective for the Infrastructure

To underpin the long-term competitiveness of the UK screen and performance sector by **providing a highly capable R&D infrastructure** that enables **researchers, companies and institutions** across the UK to access to the **facilities, capabilities and insight** necessary to ensure that they can conduct **world class R&D** in the application of **current and future waves of advanced computing technologies** to transform the means of production across the screen, performance and allied sectors of the Creative Industries

Sub-objectives of the Infrastructure

1. To lead and coordinate the technological development of the UK screen and performance sectors developing new methods, solutions, processes, products and experiences
2. To build, strengthen and deepen the UK creative technology ecosystem including the pipeline for research talent and skills.
3. To maximise arising economic opportunities: to support the commercialisation of creative technology and creative content IP, products and services; and to support the formation and growth of highly capable Creative Technology firms.
4. To make a positive long-term contribution to the development of the UK Screen and performance industries across the the UK

6. CoSTAR Rationale

This current call for CoSTAR is for proposals to deliver the CoSTAR National Lab (Lot 1) and for proposals for up to 3 CoSTAR Network Labs (Lot 2). These 4 facilities will operate in close collaboration as a networked infrastructure (see Governance below). As well as providing its own substantial R&D facilities, the operator of the National Lab will deliver an access programme for demonstrator projects and a commercialisation and KE function on behalf of the network. At a future point in 2022/3 AHRC will issue an invitation for proposals for a further part of the infrastructure, an insight and foresight unit. This will form a separate call.

Our vision for CoSTAR as an infrastructure supporting R&D and Innovation for the screen and performance sectors relies on five essential insights which in turn define the capabilities and facilities the infrastructure will deliver.

- 1) **That there is a convergence of technologies that are, and will continue to, transform methods of production in the screen and performance sectors.** These technologies include the current Virtual Production model of real-time game engines, LED volumes and in Camera GFX but also includes XR technologies (Augmented Reality, Virtual Reality, haptics) Machine Learning and other forms of Artificial Intelligence and future display technologies. *As a developing infrastructure CoSTAR should not focus on specific technologies, which are subject to change, but on capabilities.*
- 2) **That to meet the needs of both researchers and industry CoSTAR needs to operate across a range of Technology Readiness Levels¹.** Rather than operating exclusively at one stage in the innovation lifecycle, for example exclusively near-market, focussing on adoption or diffusion or exclusively in early-stage feasibility studies, the elements of CoSTAR should operate at different levels of applied research beyond the discovery phase. Thus we require proposals for the CoSTAR National Lab and Network Labs that will provide facilities and research and engineering expertise but operate at different Technology Readiness Levels (TRLs) .
 - *Network labs will work closer to the challenges faced by industry today, operating at higher TRLs (6-9), providing innovation solutions in advance of the market and working hard to broaden access to experimental production technologies and facilities to new user groups across industry.*
 - *The National Lab by contrast will be a unique applied research facility, working at lower TRLs (3-6) with a larger research and engineering capability, working with industry on the next wave of technologies to enter the market in 3+ years.*
- 3) **That an essential function of CoSTAR is to support ambitious testbed projects that pump prime use of the facilities.** This will involve supporting ambitious multi-partner R&D collaborations similar to the demonstrator programme operated by the Audience of the Future Challenge. *A funding stream for 'Pilots and Demonstrators' will be established and delivered by the National Lab. This will support access to any of the CoSTAR infrastructure.*
- 4) **That the disruptive transformation of screen and performance production processes has the potential to drive new business models and market sectors.** CoSTAR has the opportunity to support the development of a range of new CreaTech companies developing and exploiting technology IP or process and service innovation. As we move from the current model of Virtual Production for linear content to a creative economy rooted in the Metaverse new business models and economic niches will be enabled. We see the facilities and expertise offered by the National and Network Labs as nodes in the CoSTAR infrastructure around which these new ventures will cluster. *Thus the infrastructure requires a highly capable commercialisation, Knowledge Exchange, Commercialisation and Enterprise function as a single front door to CoSTAR. Again this will be delivered by the National Lab on behalf of the whole network.*
- 5) **Democratising access to these new technologies and processes, reducing cost and widening the adoptive base must be a major driver for CoSTAR.** This will include extending access and adoption more widely across the Creative Industries but the focus must remain rooted in the screen and performance sectors.

¹ Technology Readiness Levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. A technology project is evaluated against the parameters for each technology level and can then be assigned a TRL rating based on the projects progress. There are nine technology readiness levels. TRL 1 is the lowest and TRL 9 is the highest. See Glossary

6.1. Infrastructure Funding

CoSTAR receives most of its funding from UKRI's Infrastructure Fund (IF) which has characteristics which may distinguish it from other research calls bidders may have responded to in the past. This should be born in mind when preparing responses.

- The IF provides funding to establish or upgrade an R&D facility
- It funds design, construction and testing of facilities up to the point where they are deemed fully operational
- CoSTAR IF funding supports the building, commissioning and testing-in-use of the new infrastructure.

6.2. Sustainability and Co-investment

The close involvement of industry and other public partners is essential to CoSTAR. Ultimately, we do not expect CoSTAR and its Labs to be sustained from AHRC and Infrastructure funding alone, but rather through the diversification of revenue streams and the development of new services and activities beyond the current requirement specified by AHRC. The development of these services will be the province of the winning bidders so long as the requirements of the current funding are met throughout the period. We anticipate that a future mixed funding model will be central to the thinking of bidders and their industry (and other) partners.

The business case for CoSTAR has been approved on the basis of minimum levels of co-investment for each of the activities specified within the timescale of the infrastructure funding provided (see table below). These do not reflect the levels of overall co-investment that we believe are achievable over time or may be available to enhance or extend the capabilities or functions of the National Lab or Network Labs. Evidence from the Creative Industries Clusters programme suggests very high levels of co-investment can be leveraged by successful place-based R&D infrastructure investments.

Sustainability of the infrastructure, including the ability of bidders to generate co-investment and plan for the diversification of revenue streams will be an assessment criterion for proposals. We are interested not just in direct partner co-investment that may be achievable at the outset, but as evidence from the CICP has demonstrated, your ability to generate further aligned and follow-on co-investment over time.

6.3. Economic Geography

AHRC is very mindful of the uneven economic geography of the UK's Creative Industries, and within that the distribution and dynamics of the screen and performance sector which are concentrated in South East England and a series of increasingly capable screen clusters.

CoSTAR is designed as a national infrastructure and as such its primary focus must be to provide access to researchers and creative businesses across the UK, not just to serve those where nodes in the infrastructure are placed. Providing a UK wide service is particularly important as regards the CoSTAR National Lab with its focus on earlier-stage applied research (TRLs 3-5/6).

However, as a network that will place major new facilities in (up to) four locations around the UK, we must also be mindful of the potential long-term positive economic impacts CoSTAR will have on the

places and regions in which they are located, and what role a Network or National Lab might have in the future development of a particular region’s creative economy.

Our wish to co-site CoSTAR’s research facilities with industry is fundamental to the vision for the infrastructure. Whilst any location will require significant existing industrial and research activity we do not think this necessarily reinforces the status quo – new investments in screen production facilities are to a degree changing the economic geography - and the strength of the screen cluster in Northern Ireland for example shows how rapidly these transformations can happen.

There is clearly a balance to be found between addressing the unequal development of the UK’s Creative Industries and supporting research and innovation where research and industry capability currently exists. We will be asking bidders to address the impact and contributions they can make both nationally and on the regional local level. This evidence will make a significant contribution to the portfolio decision making process AHRC will undertake as it seeks to identify the optimal architecture for CoSTAR.

6.4. Skills and Economic Development

The infrastructure funding supporting this call may not be used to directly support skills programmes or wider economic development objectives. However, bidders will be aware of the significant skills deficits associated with the transition to new technologies and new production methods, both in terms of developing the research talent pipeline and a highly qualified and skilled workforce. Whilst AHRC funds from this call cannot directly support such programmes nor wider sector and economic development activities, bidders will want to consider how they can leverage the facilities developed through CoSTAR to initiate and support such programmes and how they might be funded from other sources or by other partners. We would be particularly interested in how bidders think the unique industry/HEI partnerships and settings of the National and Network Labs might contribute to the development of new PhD tracks.

The key services to be delivered under the two lots of the current call are set out in the table below. Details for each component, including the intended purpose and anticipated benefits are detailed later.

7. Summary of Lots/Services

Lots	Services to be delivered
1 Services associated with the National R&D Lab	<ul style="list-style-type: none"> • Development, management and maintenance of a national RD&I facility, delivering its own extensive research programme of applied R&D (TRLs 3-6) and accessible to third party industry and research groups • Oversight and delivery of a series of demonstrator/pilots to ensure market driven access to this and other CoSTAR facilities, including operational support and expertise • Knowledge Exchange, Commercialisation and Enterprise
2 Services associated with the three	<ul style="list-style-type: none"> • Development, management and maintenance of smaller, R&D facilities working closely with current industry challenges (TRLs 6-9)

Networked R&D Labs	<ul style="list-style-type: none"> • Network Labs may be specialised by geography, serving particular regions, or by subsector, serving particular industrial and research communities, or both
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7.1. Description of Lots/Services

Lot	Service	Outline description
1	(a) CoSTAR National R&D Lab	<ul style="list-style-type: none"> • Design, build and fit out of one state-of-the art creative R&D facility including relevant technology infrastructure. • Co-sited with a major screen production facility or studio. • This facility could constitute a refurbishment or new build. • Provide 5G private network between the National R&D Lab and the Networked Labs (together with Networked Labs) • Manage the R&D laboratory facility, including staff resourcing (research, engineering, technical, management) for a period of 6 years • Provide space and facilities for visiting researchers/creative teams • National Lab to prioritise medium to long-term technology developments rather than just satisfying immediate industry needs, informed by the Insight and Foresight Unit (to be established through subsequent call), • National Lab will focus on mid TRLs (3-6) with a strong research, engineering and technology development capability sufficient to support its own research programme accounting for up to 70% of its portfolio.
1	(b) Demonstrators & Pilots (responsive)	<ul style="list-style-type: none"> • Provide funding and support for a series of Demonstrator/Pilot projects to pump-prime market-driven access to the facility, including operational support and expertise. • These will be ambitious collaborative R&D projects using any elements of the CoSTAR infrastructure. • Demonstrator/Pilot projects will be selected in responsive mode and will be able to draw on research, engineering and commercialisation resource from the National Lab as well as access the facilities. • Priority will be given to projects with significant SME participation.
1	(c) Knowledge Exchange, Commercialisation and Enterprise	<ul style="list-style-type: none"> • A Team/Unit capable of supporting KE and commercialisation of developments from the national

		<p>Lab including IP, process innovation and new business models</p> <ul style="list-style-type: none"> • Providing dissemination of National Lab insights and knowledge to Network Labs and across creative R&D community • Providing enterprise support for start-up and scale up of Creative Technology firms engaged with CoSTAR facilities. • Working with external partners on additional funding streams, partnerships and programmes providing business support, investment and incubation services that are additional to but aligned with the objectives of CoSTAR
2	3 x CoSTAR Network Labs	<ul style="list-style-type: none"> • Design and fit out of state-of-the art creative R&D facilities including relevant technology infrastructure. • Co-sited with a screen production facility, studio or performance company. • These facilities would most likely constitute a refurbishment or extension of an existing facility. • Focus on near market Research and Innovation (TRLs6-9) • Serve an identified geographic or sectoral community (or possibly both) • Provide 5G private network between the National R&D Lab and the Networked Labs (together with National Lab) • Collaborate with National Lab to identify opportunities/needs for coordinated R&D programmes and disseminate National Lab research outcomes. • Propose and contribute to demonstrator/pilot programmes with National Lab • Provide access to Knowledge Exchange, Commercialisation and Enterprise functions for Network Lab partners • Manage the R&D laboratory facilities, including staff resourcing for a period of 6 years

7.2. Bidding Rules and Preferred Bidder Status

- AHRC will award a maximum of 4 grants: 1 for Lot 1 and up to 3 for Lot 2
- Lead bidders may return bids for the National Lab (Lot 1) and for ONE, TWO or ALL THREE Network Labs (Lot 2). Any bidder wishing to submit for more than one Network Lab should be mindful of the need for CoSTAR to constitute a National infrastructure and explain how their proposal will contribute towards this.

- However, bidders will not be eligible to operate both the National Lab and ANY of the Networked Labs. Award of the National Lab facility will take precedent in any bid for both facilities
- Other organisations may partner with a maximum of 2 bids for Lot 1 and 3 bids for lot 2.
- The Assessment will conclude with the identification of preferred bidders for the provision of the National and Network Labs.
- AHRC will take a portfolio approach at the final award stage to ensure the best fit of bids to deliver the objectives of the CoSTAR infrastructure.
- Subsequent to the identification of preferred bidders, AHRC must submit a Final Business Case (FBC) to BEIS and receive HM Treasury approval before Grants can be awarded
- Preferred bidders should expect to work with AHRC in compilation of this FBC as well as on preparation and planning activities in the time between the submission and approval of the FBC to ensure timely project start.

8. CoSTAR Timetable

Lot 1: The National R&D Lab, Knowledge Exchange & Commercialisation, Responsive Mode Pilots	Timing
Call Opens	11 th October 2022
Call Closes	2 nd February 2023
Call assessment	February – March 2023
Preferred Bidder identified	31 st March 2023
Grant Award	August 2023
Design, build, fit out, detailed service plans and testing	2023/24
National R&D Lab operational	2025/26
Knowledge Exchange and Commercialisation operational	2025/26
Responsive Mode Pilots operational	2025/26
Lot 2: The Networked R&D Labs	Timing
Call	10 th October 2022
Call Closes	2 nd February 2023
Call assessment	February – March 2023
Preferred Bidders identified	31 st March 2023
Grant Award	August 2023
Networked Labs technology procurement and installation	2023/24
Networked R&D Labs operational	2024/25

9. CoSTAR Funding

Funding for CoSTAR covers a period of 6 years. All components are expected to be implemented within this timeframe from 2023/24 to 2028/29.

The funding package is set out in the table below. These tables exclude administrative costs borne by the Government and funding for a Data Insight and Foresight function which will be subject to a further Call to Tender.

Funding Package, £ million

	'23/24 Y1	'24/25 Y2	'25/26 Y3	'26/27 Y4	'27/28 Y5	'28/29 Y6	Total
FUNDED BY:							
Govt: UKRI Infrastructure Fund	5.7	14.4	8.0	10.7	12.1	12.7	63.6
Govt: AHRC World Class Labs	-	-	-	-	-	-	-
Minimum Third Party	1.8	4.8	2.2	3.5	3.8	4.0	20.1
Total	7.5	19.2	10.3	14.2	15.8	16.7	83.7

£ Numbers subject to rounding

Lot	Service	Total Costs over 6 years (Capex and Opex)	Funding	
			Government	Minimum Third Party
1	National R&D Lab	55.9	41.3	14.7
1	Demonstrators & Pilots	4.9	4.9	-
1	KE and Commercialisation	5.9	4.9	1.0
2	Three Networked R&D Labs	17.0	12.5	4.5
	Total	83.7	63.6	20.1

£ Numbers subject to rounding

9.1. Funding projections by Service and Year

These are the proposed indicative figures that should be used as a guide when constructing your responses.

Service	'23/24	'24/25	'25/26	'26/27	'27/28	'28/29	Total
£m	Y1	Y2	Y3	Y4	Y5	Y6	
National R&D Lab	3.4	11.6	3.5	7.4	6.8	8.5	41.3
Demonstrators & pilots	-	0.2	0.8	0.9	1.4	1.5	4.9
Knowledge Exchange and Commercialisation	0.7	0.6	0.9	0.8	1.0	1.0	4.9
Lot 1 – Minimum Third Party	1.2	4.1	1.2	2.9	2.7	3.4	15.6
Lot 1 TOTAL	5.3	16.6	6.5	11.9	11.9	14.4	66.7
Networked Lab 1	0.5	0.6	0.9	0.6	1.0	0.6	4.2
Net Lab 1 – Minimum Third Party	0.2	0.2	0.3	0.2	0.3	0.2	1.5
Total Networked Lab 1	0.7	0.9	1.3	0.7	1.3	0.8	5.7
Networked Lab 2	0.5	0.6	0.9	0.6	1.0	0.6	4.2
Net Lab 2 – Minimum Third Party	0.2	0.2	0.3	0.2	0.3	0.2	1.5
Total Networked Lab 2	0.7	0.9	1.3	0.7	1.3	0.8	5.7
Networked Lab 3	0.5	0.6	0.9	0.6	1.0	0.6	4.2
Net Lab 3 – Minimum Third Party	0.2	0.2	0.3	0.2	0.3	0.2	1.5
Total Networked Lab 3	0.7	0.9	1.3	0.7	1.3	0.8	5.7
Lot 2 TOTAL	2.1	2.6	3.8	2.2	3.9	2.3	17.0
TOTAL Lots 1 & 2	7.5	19.2	10.3	14.2	15.8	16.7	83.7

9.2. Note on Co-investment

- Third Party Funding above the minimum figures indicated MUST be included in your response along with supporting commitment from providers of this funding. However, as the terminology suggests, these are the MINIMUM figures that must be included according to the Outline Business Case.
- As stated above evidence from the Creative Industries Clusters Programme shows that place-based R&D&I programmes can generate co-investment at a multiple of AHRC/UKRI grants (in CICP’s case >£3 co-investment for every £1 of UKRI Grant), from a variety of sources including industry, public partners and further R&D funding.
- We therefore anticipate that bidders will include 3rd party funding significantly above these minimum levels, alongside the necessary evidence and commitment from partners.
- Levels of projected Co-investment and commitments will form part of the assessment of bids as they are essential to the sustainability and diversification of the infrastructure.

9.3. Impact and Performance Monitoring

UKRI/AHRC will monitor and evaluate performance and progress of the project to ensure that the agreed and specified objectives and timeframes are being met, including securing the services of an independent specialist agency, body or such other qualified and experienced organisation and access to information in line with our fiduciary responsibilities.

10.Lot 1: CoSTAR National Lab

10.1. CoSTAR National Lab: R&D Facility

	<ul style="list-style-type: none"> • <i>A Research, Development, and Innovation facility with a core remit to explore the next wave of solutions in the application of advanced computing and creative technologies to the transformation of production processes in the Creative Industries.</i> • <i>Working primarily through applied R&D models at Technology Readiness Levels 3-6. Comprising a single location co-sited with major screen production facility or studio.</i> • <i>Management of facility for a period of 6 years</i>
Who will setup and run it?	<p>HEIs, IROs or RTOs leading partnerships with at least one Commercial Studio partner and one Local Enterprise Partnership (LEP), Local Authority or equivalent regional funding body.</p> <p>Bidders should demonstrate support from a range of key industry partners/customers from screen and performance production and creative technology sectors.</p> <p>Bidders should set out the positive contribution their proposal can make to establishing and delivering a national core facility.</p>
What does it do?	<p>The National R&D Lab will offer the dedicated space, the technologies and the people through whom Creative Industries organisations can solve future challenges in technology-enabled production. We assume the lab will provide access to a full-scale virtual production stage but also dedicated multifunctional research spaces and research/engineering teams across a range of capabilities and technologies.</p>

	<p>The Lab should have its own highly capable research, engineering and technical support staff, working to a CTO and Director of Research, dedicated to pursuing a wide-ranging research, development and innovation programme.</p> <p>The staff and technical facilities should provide capacity across a wide range of creative technologies relevant to future application across screen and performance production.</p> <p>Rather than define its research activities through the specification of technologies the lab should organise its R&D teams and programmes around providing ongoing <u>capabilities and areas of enquiry</u>. <u>These capabilities should include research and engineering teams devoted to addressing future needs in:</u></p> <ul style="list-style-type: none"> • Asset Creation • Realtime Processes & Workflows (incl. distributed and virtual) • Performance and Performers • Worldbuilding • Networks • Automation • Interactivity & Virtual Spaces • Democratisation (expanding user groups, use cases, reduced costs etc) • Standards <p>R&D in new technologies and new processes will inevitably create new IP and know-how but this does not guarantee that such IP is exploited. The National Lab R&D teams will work closely with the KE, Commercialisation and Enterprise Function to ensure that opportunities for commercialisation of knowledge created in the lab is maximised (see 9.3 below)</p> <p>Through its work, the Lab will assume a global leadership position in advanced created production and the evolving areas of Creative R&D and Creative technology. Its catalytic effect should help draw in both inward investment to the UK and help to bolster economic development in the area where it is located as new start-ups and extant businesses in associated areas seek location close to this important new facility.</p>
<p>Operational assumptions</p>	<ul style="list-style-type: none"> • There will be one physical Lab • It will be co-located with an existing or developing facility rather than in a university setting • It will offer a full virtual production stage alongside specialised research and development lab space • It will make capital investments in hardware and software technologies, research and creative technology skills for the Lab. These might include (but not be limited to) <ul style="list-style-type: none"> ○ Real-time software engines ○ Performance Capture – Motion capture and volumetric capture ○ Artificial Intelligence and Machine Learning ○ Future Networks – 5G and 6G ○ Bio-sensors ○ Current and future Display technologies

	<ul style="list-style-type: none"> • It will be used by projects led by Film TV, Games and Performance companies seeking to solve distinct technical, creative or process challenges associated with advanced production methodologies. • It will seek to identify new market niches within the emerging value chain of advanced production and support the formation and/or spin out of new companies to exploit those opportunities. • The lab will provide workspace for its own team and well as accommodation for partner teams using the facilities, visiting researchers and industry fellows
Funding and Governance assumptions	<ul style="list-style-type: none"> • The budget will cover capital, operating and staff costs • A new organisation formed by the private and public partners in the project consortia may be set-up to manage and operate the Lab, subject to continuing eligibility for AHRC funding. • Setup 23/24 • Ramp up 24/25 • Fully Operational 25/26

10.2. CoSTAR National Lab: Demonstrator and Pilots Programme

<p><i>Support for ambitious demonstrator and/or pilot projects giving organisations from target Creative Industry sub-sectors funded access (subject to status) to the National and Networked Labs and facilities. A central objective of this programme will be the participation of SMEs.</i></p>	
Who will setup and run it?	<p>To be included as part of response for Lot 1. Delivered as part of the CoSTAR National Lab infrastructure on behalf of the CoSTAR network.</p>
What does it do?	<p>The Demonstrator and Pilots Programme provides a responsive mode for CoSTAR through which a diverse range of Creative R&D projects can be supported to use infrastructure and pump prime the network.</p> <p>Demonstrators are large scale collaborative trials, pilots are smaller scale proofs of concept. Both will be expected to have practical, demonstrable outcomes.</p> <p>It will look to fund or co-fund projects with significant technical, creative or process challenges that</p> <ul style="list-style-type: none"> • Would prove or test new or experimental processes, creative technologies or workflows at scale • Would support new collaborations, cross-overs between disciplines or application of technologies or processes new to the creative production sector • Have a significant innovation contribution from SME's and/or will be of benefit SMEs <p>The complexity, scope and proximity to market of those challenges will help determine whether are best addressed by work in the National Lab, within the Networked Labs or in combination. Assessment of applications by experts across the</p>

	<p>CoSTAR infrastructure will help match the right facility and set of expertise to the problem to be solved.</p> <p>The programme will be open to all qualifying organisations from across the UK’s screen, performance and CreaTech sectors with opportunities to collaborate and/or trial outputs in other associated Creative Industries sectors e.g. Marketing/Communications & Advertising and GLAM.</p> <p>One key outcome of the Demonstrator/Pilot Programme will be to provide ongoing, tangible, real-world examples of how the CoSTAR infrastructure support the next generation of innovative UK content in Film, TV, Games, Performance and beyond, helping the UK to maintain its position as the best place to make content, and makers of the best content, in the world.</p>
Operational assumptions	<ul style="list-style-type: none"> • The Demonstrator and Pilots Programme will managed and operated by a team within the National Lab • It will establish a responsive funding programme that seeks applications from qualifying organisations to undertake Creative R&D using any of the CoSTAR facilities – both in the National Lab and the in the Networked Labs. • It will match applications for funding with best-fit facilities in terms of capability, capacity and geography. • It will look identify any opportunities to test and optimise innovation outputs from the main R&D Lab through the funded projects. • It will provide access to the CoSTAR facilities and flexible workspace to accommodate the demonstrator/pilot teams
Funding and Governance assumptions	<ul style="list-style-type: none"> • Setup on a parallel timeline to the National Lab and will be co housed. • Setup 23/24 • Ramp up 24/25 • Fully Operational 25/26

10.3. CoSTAR National Lab Knowledge Exchange, Commercialisation and Enterprise Function

<p><i>A dedicated team to lead R&D Knowledge Exchange in the Creative Technology space, drive commercialisation of product, process, and technology IP developments from the CoSTAR National and Networked Labs and provide enterprise support to businesses using the infrastructure.</i></p>	
Who will setup and run it?	<p>To be included as part of response for Lot 1 and to be delivered by a dedicated team within The National Lab on behalf of the whole CoSTAR network</p>
What does it do?	<ul style="list-style-type: none"> • The role of the KE, Commercialisation and Enterprise team to help and encourage commercialisation of outputs from the National and Networked Labs.

	<ul style="list-style-type: none"> • The team will: • Provide expert KE, Commercialisation and Enterprise advice to users of the CoSTAR Network and to the National and Network labs around the potential to commercialise the outputs of R&D they conduct. • Establish a programme of showcase events for researchers, investors and industry using the facilities of the CoSTAR Network and promoting the outputs and activity of the labs. • Establish relationships with investors including regular briefings on the outputs that labs are seeking to commercialise. • Explore the potential for developing and delivering (in partnership) incubation and acceleration programmes for creative technology companies connected with the CoSTAR infrastructure and the National and Network labs • Raise external, partnership and third party funding for KE, commercialisation and enterprise activities of the National Lab
Operational assumptions	<ul style="list-style-type: none"> • It is a small team of specialist managers managing delivering a knowledge exchange and commercialisation function. • It will be co-located in the National Lab facilities owned by members of project consortia • It will set-up and run a knowledge exchange programme focussed on the technology focus areas for CoSTAR • The scale and frequency of this programme is to be determined but should offer meaningful coverage of emerging UK talent in this space • The commercialisation programme will include showcasing to venture capital and other funders and successful integration into the wider UK technology start-up ecosystem is a key factor of success.
Funding and Governance assumptions	<ul style="list-style-type: none"> • The function will be setup on a parallel timeline to the National Lab and will be co-housed. • Setup 23/24 • Ramp up 24/25 • Fully Operational 25/26

11.Lot 2: Three Networked R&D Labs

<p><i>Support to refurbish, upgrade or enhance a maximum of three RD&I Labs working at higher Technology Readiness Levels (6-9) and working closely with industry. Co-sited with a screen production facility, studio or performance company. Management and delivery of the facility for a period of 6 years.</i></p>	
<p>Who will setup and run it?</p>	<p>HEIs, IROs or RTOs in partnership consortia with at least one of a production facility, studio or performance company and a Local Enterprise Partnership (LEP), Local Authority or equivalent regional funding body.</p> <p>Lead organisations can bid for one, two or a maximum of 3 Network Labs. Bidders for Network labs should outline how their proposal is advantageous in its contribution to regional and national ecosystems.</p> <p>The geographical distribution of the Network Labs and the National Lab will form a coordinated CoSTAR national infrastructure providing access to facilities for companies and researchers across the UK.</p>
<p>What does it do?</p>	<ul style="list-style-type: none"> • Each Network Lab will be co-located with an existent or developing production facility used by the screen or performance sector • Each Network Lab should demonstrate how it serves the needs of an identifiable geographic community or a specialised sub-sectoral community (or possibly both) • Each lab should show how it can make a long term impact on its region and/or sector • The facilities and capabilities offered by each Network Lab should reflect this, making capital investments in hardware and software technologies, research and creative technology skills and staff for the Lab to deliver against <u>some</u> of the following R&D capabilities: <ul style="list-style-type: none"> ○ Asset Creation ○ Realtime Processes & Workflows (incl. distributed and virtual) ○ Performance and Performers ○ Worldbuilding ○ Networks ○ Automation ○ Interactivity & Virtual Spaces ○ Democratisation (expanding user groups, use cases, reduced costs etc) ○ Standards • It will focus on the development of solving practical technical, creative or process innovation challenges faced by companies in the screen and performance sector at high Technology Readiness Levels (TRLs 6-9) •
<p>Operational assumptions</p>	<ul style="list-style-type: none"> • It has a small team of specialist researchers and engineers. • These will be co-located on site at the Network Lab or in office facilities owned by members of the Network Lab consortia

	<ul style="list-style-type: none"> • It will set-up and run research and experimental production facilities • It will make capital investments in hardware and software technologies, research and creative technology skills for the Lab appropriate for the needs of its geography or sectoral focus. These might include (but not be limited to) <ul style="list-style-type: none"> ○ Real-time software engines ○ Performance Capture – Motion capture and volumetric capture ○ Artificial Intelligence and Machine Learning ○ Future Networks – 5G and 6G ○ Bio-sensors ○ Current and future Display technologies • It will collaborate with the National Lab in the delivery of the Demonstrator/Pilot programme including hosting projects for which it should be eligible to bid for funding. • It will collaborate with the KE, Commercialisation and Enterprise team hosted at the National lab to test and deploy IP developed across the CoSTAR infrastructure, deliver KE programmes, maximise exploitation of IP and support business growth opportunities. • It should work with partners to support co-location and enterprise support for companies using the Network lab facilities.
<p>Funding and Governance assumptions</p>	<ul style="list-style-type: none"> • That budget will cover capital, operating and staff costs • Setup 23/24 • Fully Operational 24/25 • Funded until 28/29

12. Governance and Management

CoSTAR is a new infrastructure and as the first national infrastructure commissioned and delivered through AHRC requires a new and robust Governance Structure. The Governance arrangements need to be balanced with a clear operating structure with successful bidders being given space to manage the delivery of the elements for which they are responsible and make the necessary agreements with partners (including non-AHRC funding partners) to contribute to, and expand, the capability of the network.

12.1. Governance Model

- AHRC will appoint a Programme Board responsible for the delivery of the CoSTAR Infrastructure against its Business Case, reporting to AHRC senior management, UKRI and BEIS on performance of the programme
- Each of the elements of CoSTAR: CoSTAR National Lab (including Demonstrator and Pilots Programme and Knowledge Exchange, Commercialisation and Enterprise Function); up to 3 Network Labs; and the Data Insight and Foresight Unit (not within this call) will be funded through individual Grant Awards.
- However, it is an overriding objective of CoSTAR that it functions as a national infrastructure and operates through close coordination and collaboration between the elements within the

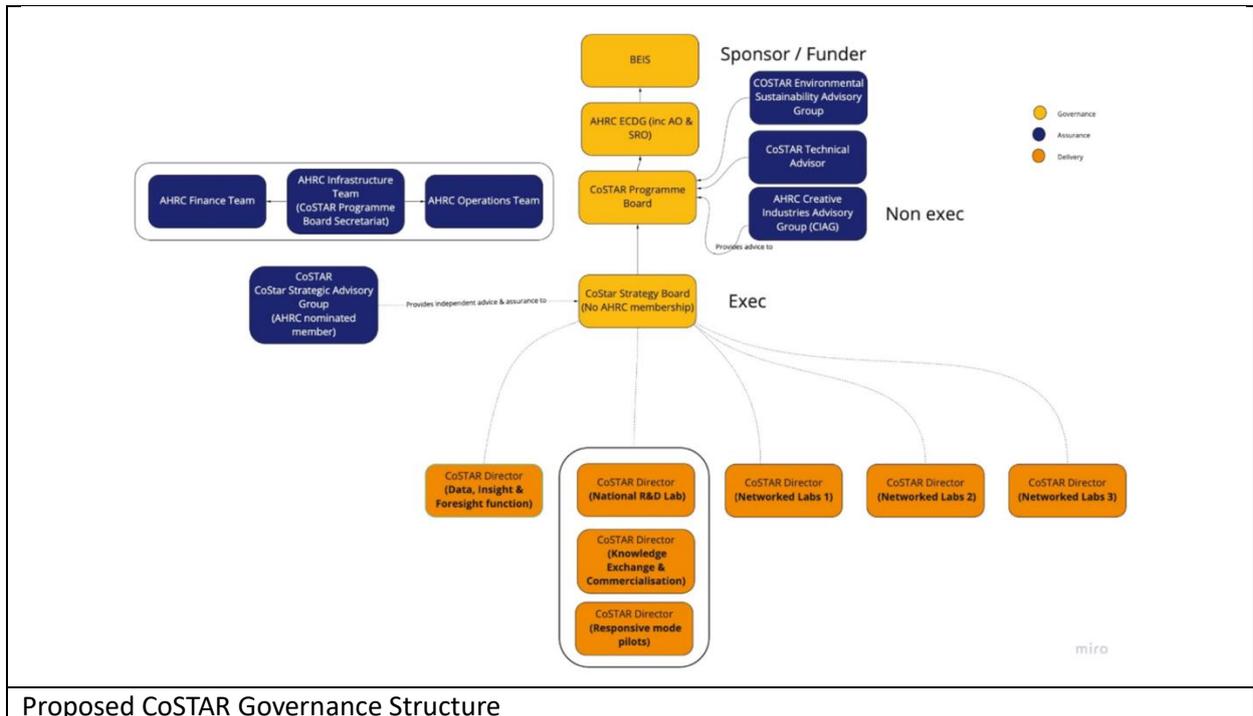
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network. This strategic co-ordination and close co-operation on a day to day basis will be managed by a CoSTAR Strategy Board comprising the Directors of the different Labs and programmes.

- This Strategy Board will be responsible for reporting to the Programme Board within the AHRC governance structure.
- The Strategy Board will appoint its own CoSTAR Advisory Group in consultation with AHRC.
- Whether the Strategy Board would benefit from an independent chair, or a chair elected by the members, is something that will be formalised at the Final Business Case stage.

The governance and management structure for CoSTAR may develop over time, subject to the agreement of Grant Holders and AHRC. During the development of CoSTAR, we have considered the merits of the initial structure evolving into more formal agreements between the operating partners, up to and including the formation of a new organisation, potentially with IRO status, to operate the CoSTAR infrastructure in the long term.

We believe that this model is worthy of investigation with over the initial period of set up and operations funded by this call.



13. About UKRI

Launched in April 2018, UKRI is a non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy (BEIS).

Our organisation brings together the seven disciplinary research councils, Research England, which is responsible for supporting research and knowledge exchange at higher education institutions in England, and the UK's innovation agency, Innovate UK. Our nine councils work together in innovative ways to deliver an ambitious agenda, drawing on our great depth and breadth of expertise and the enormous diversity of our portfolio.

Through our councils we maintain and champion the creativity and vibrancy of disciplines and sector-specific priorities and communities. Our councils shape and deliver both sectoral and domain-specific support.

Whether through research council grants, quality-related block grants from Research England, or grants and wider support for innovative businesses from Innovate UK, we work with our stakeholders to understand the opportunities and requirements of all the different parts of the research and innovation landscape, maintaining the health, breadth and depth of the system.

Our vision is for an outstanding research and innovation system in the UK that gives everyone the opportunity to contribute and to benefit, enriching lives locally, nationally and internationally.

Research and innovation enriches and improves our lives and increases prosperity by creating knowledge that enables us to understand ourselves and the world around us. This also empowers us to focus on the many challenges we face as individuals and as communities, nationally and globally.

We will work with partners to shape a dynamic, diverse and inclusive system of research and innovation in the UK that is an integral part of society, giving everyone the opportunity to participate and to benefit.

Our mission is to convene, catalyse and invest in close collaboration with others to build a thriving, inclusive research and innovation system that connects discovery to prosperity and public good.

We bring together nine organisations with great depth and breadth of expertise, allowing us to connect research communities, institutions, businesses and wider society, in the UK and around the world.

This combination enables us to work across the whole research and innovation system, informed by our networks and expertise.

As the UK's largest public funder of research and innovation it is our responsibility to ensure the health of the system, now and in the future. As a steward of this system, we will work together with many other organisations.

These include our close partners at the heart of the research and innovation system such as higher education institutions and institutes, innovative businesses, investors, not-for-profit organisations and policy makers, and a wider set of partners such as those in the education system and civil society.

We will fulfil our stewardship role through the ways in which we catalyse, convene, incentivise, invest in and conduct research and innovation.

14. The UKRI Infrastructure Fund

The majority of the public sector funding for CoSTAR is from the Infrastructure Fund.

Research and innovation infrastructure is fundamental to delivering the UK's wider ambitions of increasing UK investment in R&D to 2.4% of GDP by 2027. The 2020 Government Research and Development Roadmap highlighted how UKRI will provide a long-term, flexible pipeline of research and innovation infrastructure investment priorities for the next 10 to 20 years. The roadmap builds on the recommendations from UKRI's infrastructure programme published in the UKRI's Opportunity report and Landscape Analysis.

The Infrastructure Fund will support step-changes in infrastructure capability and/or capacity, including:

- new infrastructure;
- major upgrades;
- repurposing;
- transformative developments; and

15. About AHRC

The AHRC is the UK's largest provider of response led and strategic funding, advanced skills training and career development across the whole range of arts and humanities.

Our ambition is to sustain a rich, diverse and powerfully creative research ecosystem, which will engage with other constituents of UKRI and stakeholders across the United Kingdom and the world. The AHRC is committed to UKRI's holistic vision of science, in which humanities and arts research is enriched and emboldened by engagement with technology, medicine and our environment, and informs and enriches those disciplines in turn. We will place our values, creativity and imagination at the heart of the reinvention of public life, successful economies, constructive civil discourse and a rich cultural infrastructure.

The AHRC reflects and supports a hugely diverse research community. We fund world-class research in all regions and nations of the UK, distributing funds without detriment to excellence, and we are deeply committed to international connectivity and to promoting and embodying values of equality, diversity and inclusion. We have spearheaded a successful collaboration of public and private partners in the Creative Industries, drawing on the strength of content and creativity among our researchers and IROs to provide business-facing and innovative outcomes, many of which have proved essential through the COVID-19 pandemic. We will embed this success into a permanent transformation of the AHRC's aims and objectives, to carry forward UKRI's mission to convene, catalyse and invest to build a thriving and inclusive research and innovation system, involving research that connects discovery to prosperity and public good.

16. Glossary of Terms and Abbreviations

AHRC	Arts and Humanities Research Council and is part of UKRI
BEIS	Department for Business, Energy and Industrial Strategy
CoSTAR	The Convergent Screen Technologies and performance in Realtime infrastructure
CoSTAR Infrastructure	The network of facilities, programmes and capabilities funded through this and future calls drawing on UKRI Infrastructure funding
CoSTAR Network	The network of lead organisations managing the delivery of CoSTAR infrastructure components and their partners
Creative Industries	<p>Industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.</p> <p>The creative industries, as defined by Department for Digital, Culture, Media and Sport (DCMS) include all, or part of, the following 9 industry sectors:</p> <ul style="list-style-type: none"> Advertising and Marketing Architecture Crafts Design and designer fashion Film, TV, video, radio and photography IT, software and computer services Publishing Museums, galleries and libraries Music, performance and visual arts
Creative R&D	A broad term used here to describe applied R&D and innovation in the Creative Industries. Whilst this term is recent and still to take on formal definition, we use it here to describe the R&D and innovation processes that act as mid and high technology Readiness Levels (TRLs 3-9) in research Organisations, RTOs and industry, often working in collaboration. The lack of correspondence between academic disciplines and the industrially defined Creative Industries fields makes it more difficult to identify enquiry-lead research that corresponds to Creative R&D.
Creative Technologies/ CreaTech	An intertwined portfolio of advanced computing technologies (XR/VR/AR, realtime software engines and GFX, LED production volumes) which, when brought together with AI, Machine Learning and Distributed Ledger technologies are central to the evolution of the Creative Industries. CreaTech is a term increasingly used to also describe an emerging group of businesses within the Creative Industries

	that develop products, platforms, services and experiences using these technologies.
DCMS	Department for Digital, Culture, Media and Sport
HEI	Higher Education Institution
IRO	Independent Research Organisation
Lots	Packages (or bundles) of work, goods services, etc. for competition purposes
Metaverse	Confluence of technologies from XR to Internet of Things (IoT), 5G, advanced networks, graphics, displays and the cloud used to build persistent online (virtual) spaces used for work, entertainment, play and learning. These spaces will increasingly be interconnected allowing users (or their digital twins/avatars) to move between them. Can also be thought of as the next iteration of the Internet, blending physical and digital worlds.
Middleware	Middleware is a type of computer software that provides services to software applications beyond those available from the operating system. It can be described as “software glue”.
NESTA	A registered charity to support UK Innovation and drive social good
R&D	Research and Development
RD&I/RDI	Research, Development and Innovation
RTO	Research & Technology Organisation
SME	Small and Medium (Business) Enterprises
Technology Readiness Level/TRL	<p>A method for estimating the maturity of technologies and/or technology programmes. Originally developed by NASA in the 1970s. Used internationally by research and innovations projects, the TRL scale has been adopted as ISO 16290 standard. Exact TRLs can be established by a technology readiness assessment (TRA) but are usually measured on a 9 point scale, below adapted from that used in the EU Horizon 2020 programme.</p> <ol style="list-style-type: none"> 1. Basic principles observed/reported 2. Technology concept formulated 3. Experimental proof of concept 4. Technology validated in lab environment 5. Technology validated in relevant (industrial) environment 6. Technology demonstrated in industrial environment 7. System prototype demonstrated in operational environment 8. System complete and demonstrated 9. Operational product in proven operation.
UKRI	UK Research and Innovation is a non-departmental public body bringing together the 7 Research Councils, Research England and InnovateUK.

	UKRI is sponsored by BEIS and its funding represents a significant proportion of the UK Government R&D budget, often referred to as ‘the Science Budget’.
Virtual Production (VP).	Though sometimes used to refer to the broader cluster of advanced computing technologies associated with the Metaverse (see above) VP has become more commonly used to refer to a subset of those technologies (and the processes and workflows that integrate them) in the current transformation of linear film production. Central to this are the use of real-time game engines, LED volumes, in-camera GFX, previsualisation and VR. The presence of ‘brain bars’ on set accommodating new crew roles are distinctive of productions that have incorporated VP methods
XR	Extended Reality technologies – coverall phrase embracing VR (Virtual Reality), AR (Augmented Reality), MR (Mixed Reality) and Haptics

17. Reference Assumptions

Adopted in the preparation of Cost Estimates and Funding of CoSTAR

LOT 1 – National R&D Lab

1. R&D Lab

- Land area 10,000 sqm with a footprint of about 0.25
- Total building area includes R&D stage, R&D labs, demonstration area/auditorium, office space, storage plant utilities, recreation and other
- Technology capital costs include a 5G private network which links the National R&D lab to the networked labs; the cost and funding of this element is split between the National R&D lab and the Networked labs
- Technology capital costs include technology for the R&D stage, R&D laboratories and other. NOTE technology is assumed to be upgraded/partially replaced during the 6 year funding programme
- Design and other construction related fees are included in the capital costs
- Building operational costs include utilities, rates, insurance, IT support, cleaning and maintenance
- A limited showcasing and events programme is included
- Staff teams include management, legal, industry partnerships and research, RD&I, product and stage. On-costs are included. Functions such as HR, financial management are not included
- Research teams include 7 RD&I teams and one product team
- Limited core staff are recruited during the construction phase
- Staff numbers ramp up over the period. A total of about 80 staff are assumed by year 6

2. Knowledge Exchange and Commercialisation

- Includes staff and on-costs, user services portal, limited marketing and events programme and other support costs

- Core staff are recruited just before the National R&D Lab opens
- Staff numbers ramp up over the period. A total of 9 staff are assumed by year 6

3. Demonstrators and Pilots

- Budget amount to cover third party and other costs

LOT 2 – Networked R&D Labs

- Assumption that building already in place, costs included for staff office accommodation
- Technology capital costs include a 5G private network which links the National R&D lab to the networked labs; the cost and funding of this element is split between the National R&D lab and the Networked labs
- Technology capital costs are assumed to be upgraded/partially replaced during the 6 year funding programme
- Core staff are assumed to be recruited immediately and numbers ramp up quickly. A total of 8 staff are assumed per networked lab, by year 6, a total of 24 for the 3 networked labs.