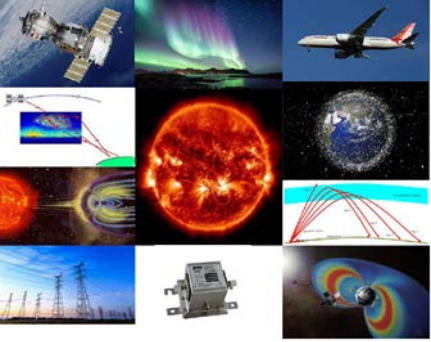


# SWIMMR

Space Weather Innovation, Measurement, Modelling and Risk  
A “Wave 2” programme of the UKRI Strategic Priorities Fund

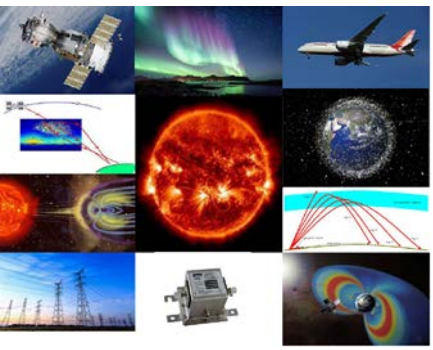
Ian McCrea

STFC Rutherford Appleton Laboratory



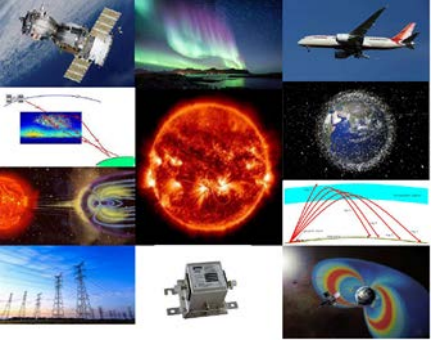
# What is SWIMMR?

- A £19.9M four-year programme in UKRI SPF Wave 2
- To develop and deploy new instruments and models to support the UK space weather community and national capabilities in MOSWOC
- Directly addresses priorities identified by BEIS, MoD and DfT
- Aimed at improving predictions and establishing a legacy of enhanced operational capabilities
- Has to complete in less than four years!



# What SWIMMR is not!

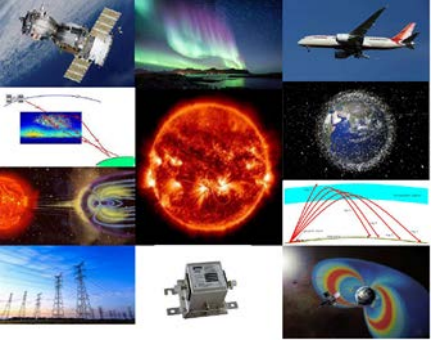
- Not intended as a vehicle for pure blue-skies research
  - This is strategic science, highly directed to government and Met Office priorities
  - Government and ministerial CSA support was crucial to the bid
- SWIMMR cannot be allowed to go off-track
  - Funding is conditional on us delivering against the scope of the proposal
  - There will be significant Monitoring and Evaluation, compared to normal grants
- SWIMMR cannot continue beyond 31/03/2023
  - There is no guarantee of an SPF Wave 3 (requires a political decision)
- Projects need to stick closely to budget and schedule
  - Financial re-profiling of the project will be difficult



# Origins of the Programme (1)

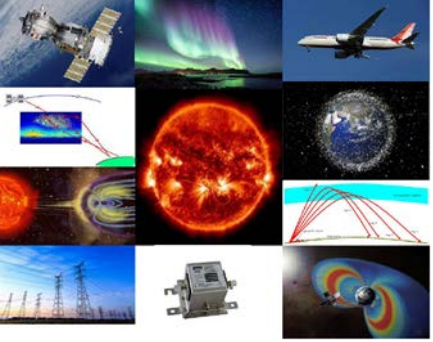


- STFC conducted a “Priority projects” exercise in July 2018
- Submitted three applications, for different combinations of space weather and space surveillance ideas
  - Space weather ideas based on previous discussions with Mark Gibbs
- STFC Director of Strategy asked for the space weather proposal to be turned into a bid to Strategic Priorities Fund Wave 2 (October 2018)
  - Suggested amount £5M



# Origins of the Programme (2)

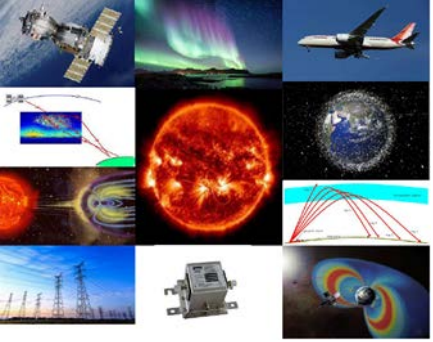
- STFC Executive Board approved SWIMMR as an STFC-led SPF proposal (November 2018)
- Contacts with Wave 1 projects revealed the need for cross-Council and ministerial support
- Initial description, budget and ministerial support letter
  - Submitted to UKRI December 2018
  - Support letter signed by three ministerial CSAs



# Origins of the Programme (3)



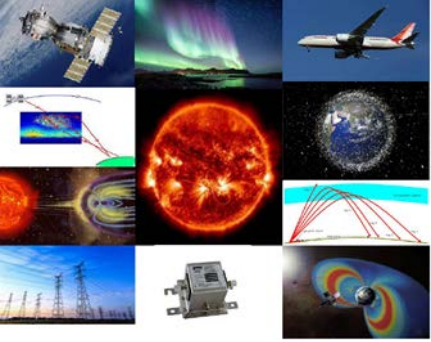
- UKRI asked us to prepare full business and economic case
  - Submitted March 4<sup>th</sup> 2019
- UKRI gave outline approval of business case
  - May 2019
- Treasury approval secured on July 5<sup>th</sup>
  - Conditional on final approval by BEIS
- Signed off by BEIS Project Investment Committee on August 15<sup>th</sup>
- Announced (by the Prime Minister) on September 23<sup>rd</sup>



# The SWIMMR Planning Group



- Met as an informal group to pilot the proposal to where it is now.
- Had its last meeting last week, as programme is handed over for kick-off
- We owe them huge thanks for steering SWIMMR through the various hurdles.
  
- Mark Gibbs and Simon Machin (UKMO)
- Richard Horne (BAS)
- Keith Ryden (Univ. of Surrey)
- Paul Cannon (Univ. of Birmingham)
- Jacky Wood, Gemma Truelove and Stephen Elsby (NERC)
- Jason Green and Justin O'Byrne (STFC)
- Mike Hapgood, Mila de Vere, Toni Cullum (RAL)

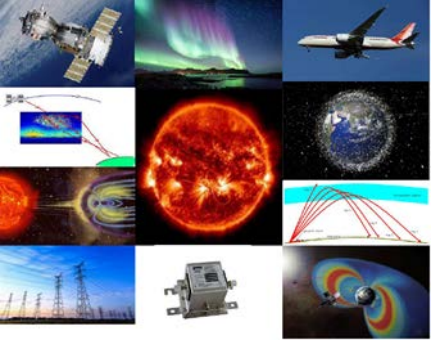


# The SWIMMR Programme



- Eleven projects, divided almost equally between STFC and NERC
- Delivered through STFC:
  - S1: In-situ radiation measurements for space and aviation (budget £5.7M)
  - S2: Support for technology testing and modelling (budget £600k)
  - S3: Support for the transition from research to operations (budget £900k)
  - S4: Forecasting from the Sun to L1 (budget £450k)
  - S5: Support for a ground radiation monitoring network (budget £1.4M)
  - S6: Production of an updated space weather impact study (budget £300K)

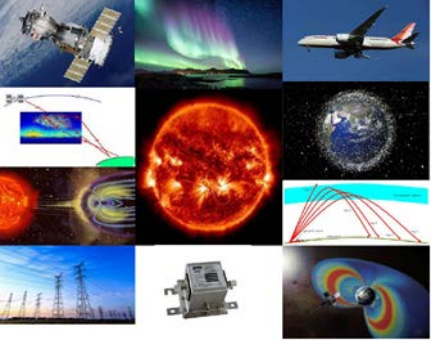




# The SWIMMR Programme

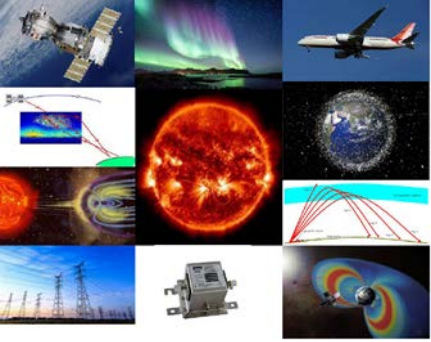


- Delivered through NERC
  - N1: Improvement of satellite risk forecasts (budget £2M)
  - N2: Improvement of aviation risk forecasts (budget £2M)
  - N3: Improved forecasting for GNSS and HF communications (budget £2M)
  - N4: Improved forecasting of ground level current effects (budget £1.7M)
  - N5: Improved forecasts of satellite drag (budget £1M)
- These five NERC topics are covered by a single [Announcement of Opportunity](#), being released TODAY (November 26<sup>th</sup>)



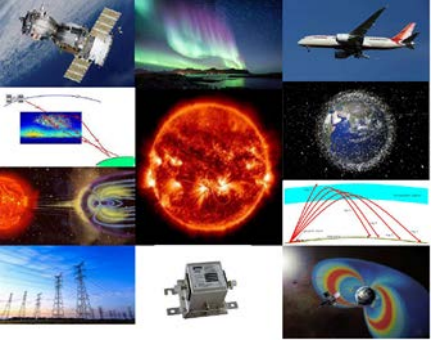
# Delivery Mechanisms

- S1, S2, S3 will be mainly delivered through contracts with STFC
  - Budgets will be held at RAL
  - Some internal work will be done in STFC, using own staff and facilities
  - Reports, instrument builds etc. will be procured using ITTs
  - Met Office not funded directly, will get contracts from STFC
  - May be a grant-like element in S1 to facilitate academic involvement
- S4, S5, S6 will mainly be delivered via open call grants from STFC
  - Budgets will reside at Swindon Office
  - First AOs should appear early next year
  - Grants will be less than three years (to end by 31/03/2023)



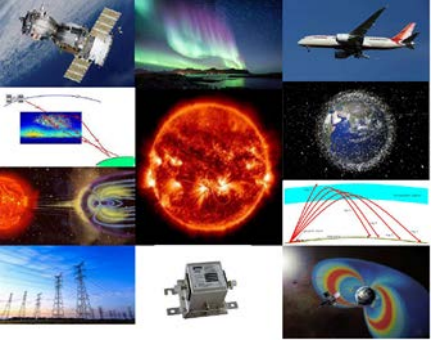
# Delivery Mechanisms

- Projects N1 to N5 will all be delivered through NERC grants
  - Three year grants, ending spring 2023
  - Means that all grants have to start in spring 2020
- We expect one grant to be awarded per project
  - Expectation therefore is, therefore, that projects will be consortium bids
  - Note that no more than two projects can have the same PI
- It is strongly suggested that proposers should discuss with UKMO
  - Met Office are planning to hold a SWIMMR “bidders day” on Dec 19<sup>th</sup>



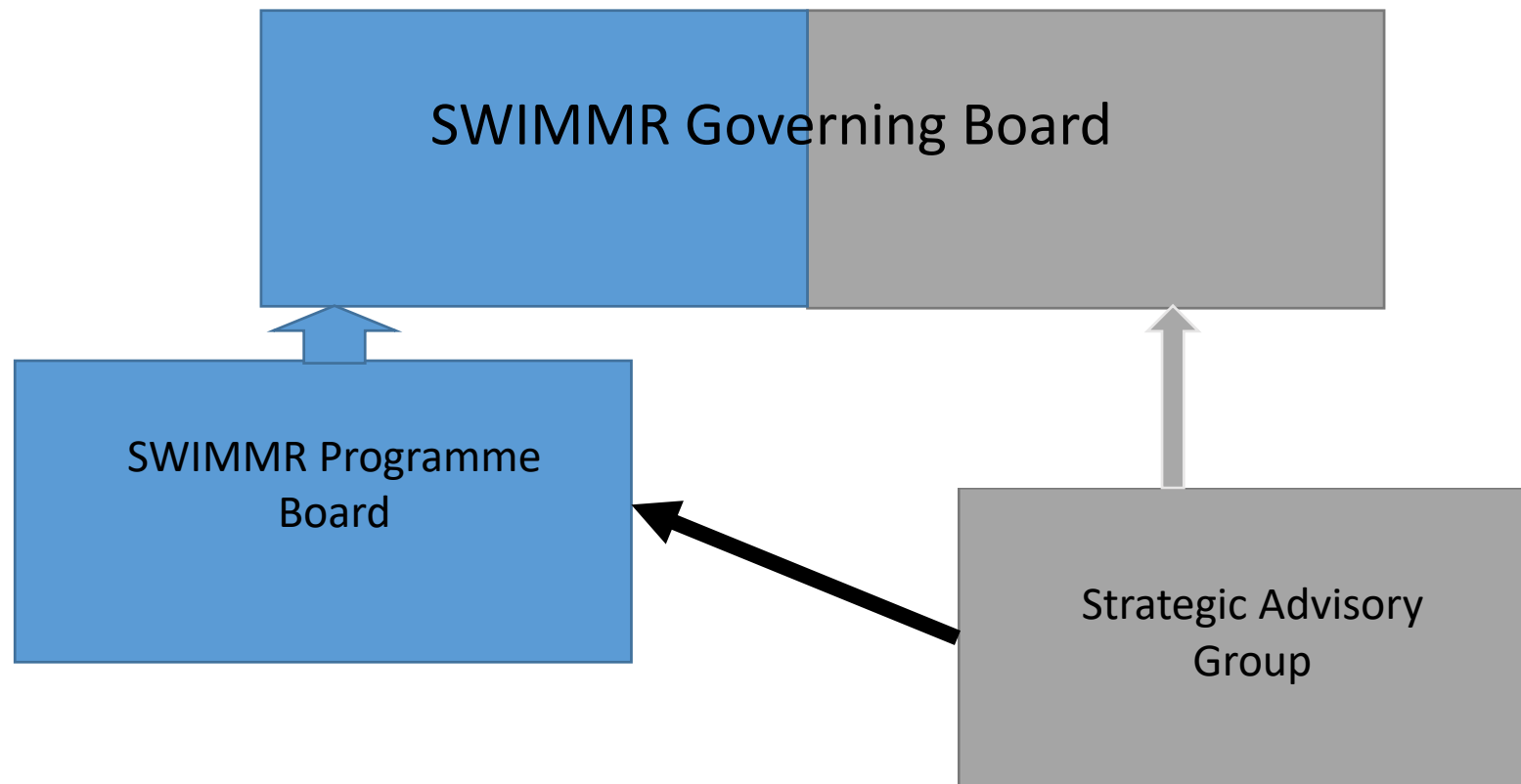
# NERC Announcement of Opportunity

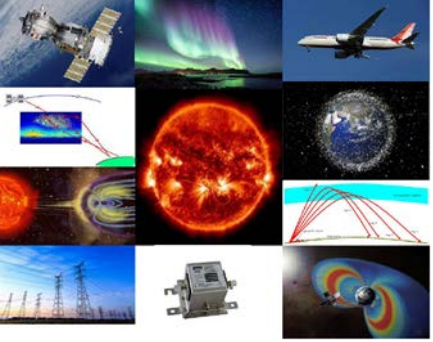
- The timetable for the NERC AO is quite rapid:
  - Announcement published: 26/11/19
  - Call opens in Jes 04/12/19
  - Consultation with UKMO before: 15/01/20
  - Submission of proposals: 30/01/20
  - Peer review assessment: Mid-March 2020
  - Awards notified by: 01/04/20
  - Grants begin by: 01/06/20
  - End date of awards: 31/03/23
- Peer review will be done by expert panel, to which proposers will be invited to present and answer questions.



# Project Governance

- The SWIMMR Governance model comprises three committees:

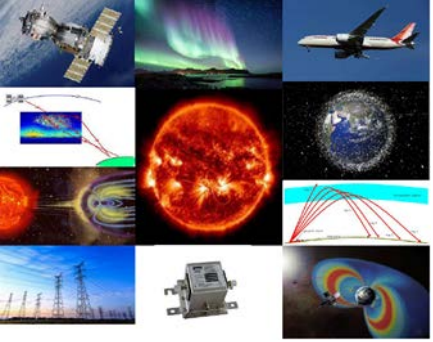




# SWIMMR Programme Board



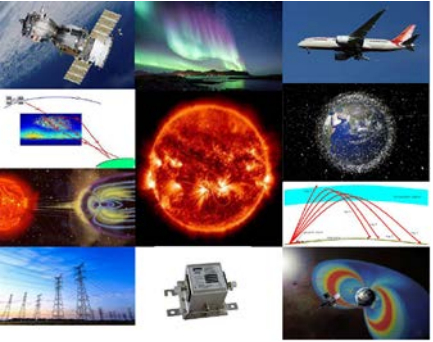
- Provides “hands on” steering of the project through monthly meetings/telecons
- Chaired by the Senior Responsible Owner
  - Officials from STFC, NERC and UKMO
  - Representatives of stakeholder Ministries (BEIS, MoD and DfT)
  - Senior Programme Manager (and Project Managers as required)
  - Chair of Strategic Advisory Group
- Reviews recent activities, approves future plans
- Manages the project risks
- Produces recommendations on spending
- Makes recommendations to the Research Councils
- Provides tasking and recommendations to the Strategic Advisory Group



# SWIMMR Strategic Advisory Group



- Not yet appointed. Will be done once NERC bidders are known.
- Provides scientific, technical and strategic advice to Programme Board
- Liaises with stakeholders (science, industry, policy sectors)
- Ensures the project stays aligned with other space weather initiatives
- Meets at least quarterly
  
- Includes at least one representative from each of academia, government and industry
- Has science expertise covering the three main areas of the bid (radiation, communications and GICs)
- Elects its own chair, who becomes a member of Programme Board
  
- Programme Manager attends, but does not vote
- Project Managers attend as required

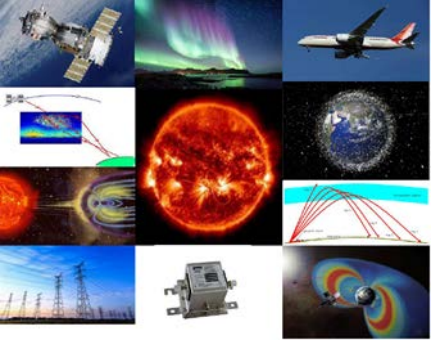


# SWIMMR Governing Board

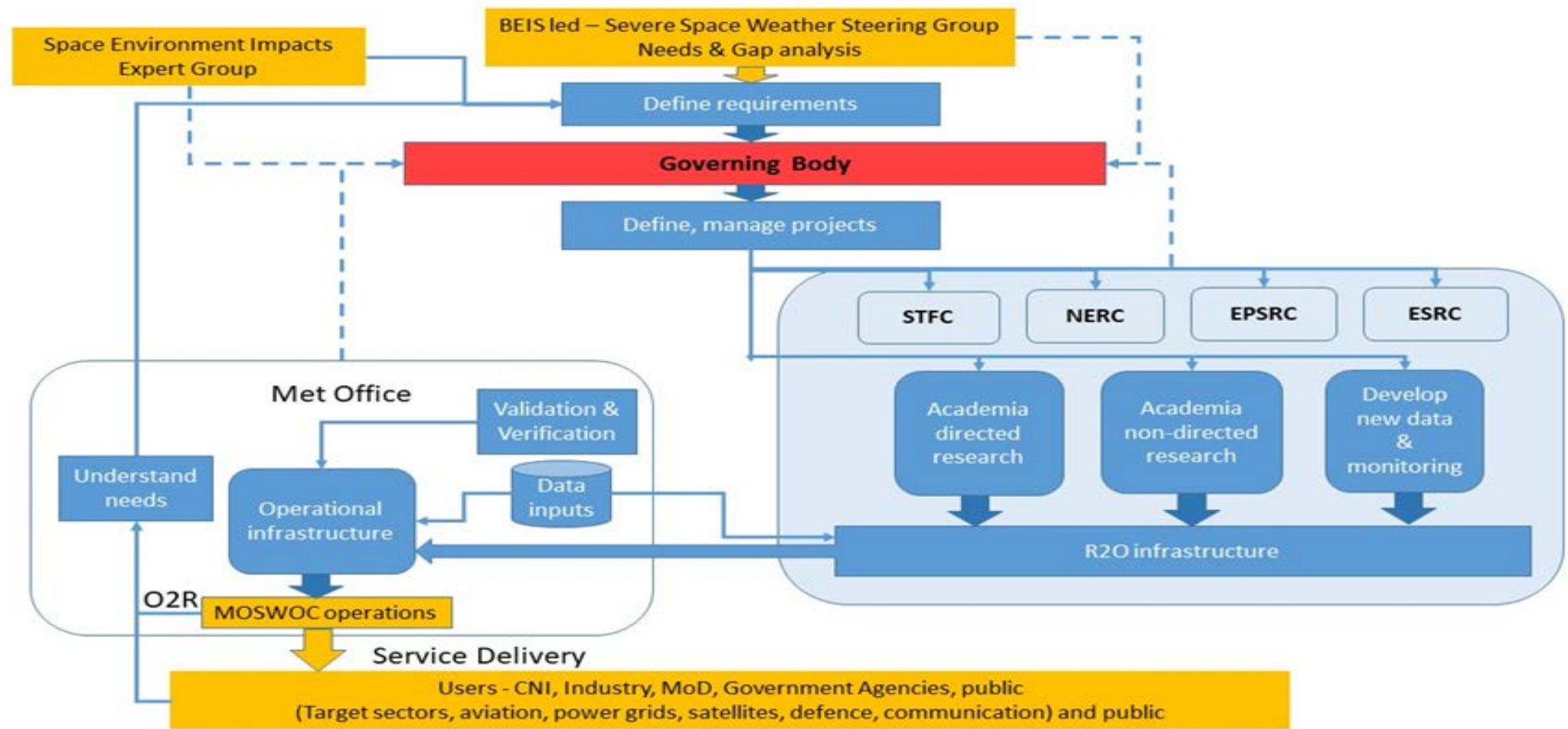


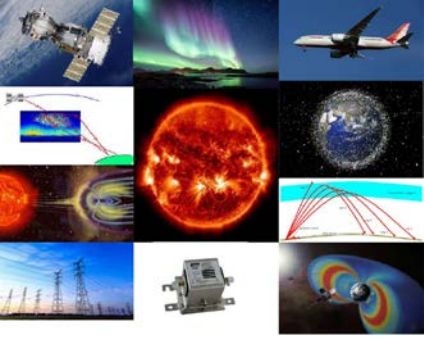
- Chaired by a senior official from BEIS
- Meets at least twice a year
- Combines the memberships of the PB and SAG
- Highest-level governance body, can recommend changes in funding and programmes
- Delegates more frequent decision-making to the Programme Board





# UK Space Weather Relationships

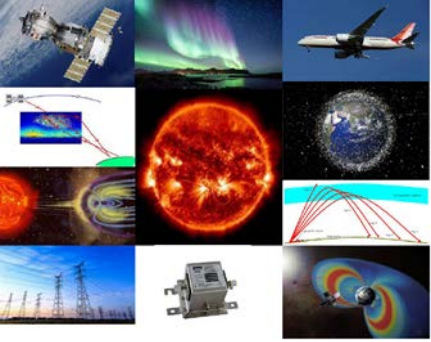




# Key Individuals and Roles

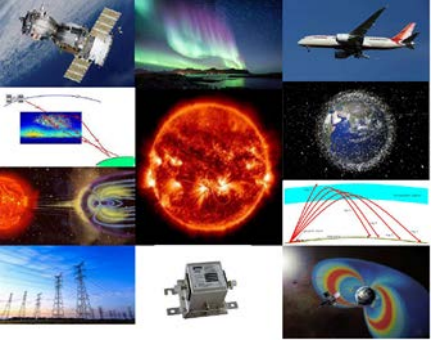


- Prof Chris Mutlow – Senior Responsible Owner
- Jacky Wood – NERC Programme Office Lead
- Justin O’Byrne - STFC Programme Office Lead
- Simon Machin and Mark Gibbs – UKMO members of PB and SAG
- Dr Ian McCrea – Senior Programme Manager
- Mila de Vere, Toni Cullum (+others) – Project Managers in STFC and NERC
  
- Olivia Greenall, Dr Gemma Attrill, Asher Lawrence-Cole – representatives of BEIS, MoD and DfT respectively



For more details of the individual projects, see Mark Gibbs's presentation coming next!



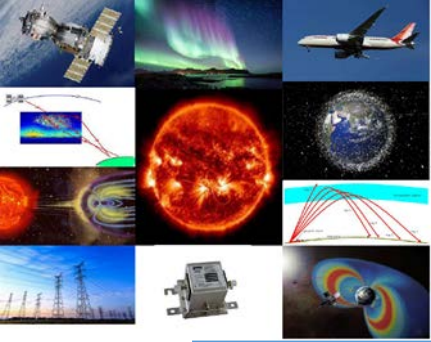


# Top-level SWIMMR budget



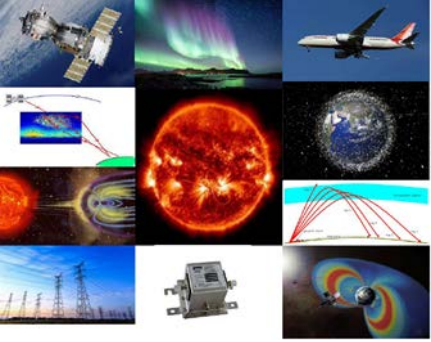
- The programme is budgeted “in year”, in terms of funds transferred by BEIS to UKRI
- This annularity will not be visible in multi-year grant awards!
- Note the slow start in year 1, because we anticipated delayed approval

	FY19/20	FY20/21	FY21/22	FY22/23	Totals £M
STFC Programme	0.35	3.08	3.03	2.89	9.35
STFC Management	0.13	0.13	0.13	0.13	0.52
STFC OpEx	0.06	0.08	0.08	0.07	0.29
NERC Programme		2.92	2.97	3.38	9.27
NERC Management	0.03	0.09	0.08	0.08	0.28
NERC OpEx	0.06	0.07	0.07	0.08	0.28
<b>TOTAL</b>	<b>0.63</b>	<b>6.37</b>	<b>6.36</b>	<b>6.63</b>	<b>19.99</b>



# Budget by STFC project

Project Number and Name	Lead Council	FY 19/20	FY 20/21	FY 21/22	FY 22/23	TOTAL £M
S1: Improved in-situ radiation measurements for space and aviation	STFC	0.20	1.80	1.83	1.87	5.70
S2: Technology testing and modelling	STFC	0.10	0.19	0.20	0.11	0.60
S3: Research to Operations support	STFC	0.05	0.29	0.30	0.26	0.90
S4: Forecasting from Sun to L1	STFC		0.15	0.15	0.15	0.45
S5: Ground radiation monitor network	STFC		0.55	0.45	0.40	1.40
S6: Space weather impact study	STFC		0.10	0.10	0.10	0.30
<b>TOTAL STFC Programme Budget by Year</b>		<b>0.35</b>	<b>3.08</b>	<b>3.03</b>	<b>2.89</b>	<b>9.35</b>



# Budget by NERC project



Project Number and Name	Lead Council	FY 19/20	FY 20/21	FY 21/22	FY 22/23	TOTAL £M
N1: Satellite risk forecast	NERC		0.67	0.70	0.80	2.17
N2: Aviation risk forecast	NERC		0.67	0.70	0.80	2.17
N3: GNSS aviation services forecast	NERC		0.67	0.70	0.80	2.17
N4: Ground effects forecast	NERC		0.55	0.55	0.64	1.74
N5: Satellite drag forecast	NERC		0.34	0.34	0.34	1.02
<b>TOTAL NERC Programme Budget by Year</b>		<b>0</b>	<b>2.90</b>	<b>2.99</b>	<b>3.38</b>	<b>9.27</b>