

NATURAL ENVIRONMENT RESEARCH COUNCIL SCIENTIFIC FACILITIES & TECHNOLOGY

AIRBORNE RESEARCH & SURVEY FACILITY

Guidelines for User Access to the Airborne Research & Survey Facility

1. Introduction

- 1.1 This note provides guidance to users of the ARSF Dornier 228 research aircraft and associated ground-based facilities and outlines the routes and mechanisms controlling such access. Access is normally provided by Direct Application to the ARSF Steering Committee, or via Research/Consortium Grants (R/CG) and Research Programmes (RP). Potential users are advised to consult the NERC Grants and Fellowship Handbooks (www.nerc.ac.uk/funding/application/researchgrants and www.nerc.ac.uk/funding/application/fellowships) for full details regarding their eligibility for such support.
- 1.2 In *all* cases, ARSF *must* be consulted *prior* to any application. Potential users should be aware of the lead-times in achieving access to ARSF. Facility capacity is about 300 flight hours per year, which limits the number of campaigns that can be supported, and the likely lead-time between initial consultation with ARSF and execution of a campaign is normally 6 to 12 months, depending on access route. Users seeking resourcing via NERC research grant mechanisms should be aware that the interval between application by means of Joint electronic Submission (Je-S) and notification of the outcome is a minimum of 6 months.

2. Access

- 2.1 Generally, user access to the ARSF research aircraft is available via three mechanisms:
- (i) Direct Access by means of application to the ARSF Steering Committee: the ARSF Steering Committee assesses the science case and justification of resources required to achieve the scientific outcomes, allocating a science grade (closing date for applications is 10 October each year).
 - (ii) Support by NERC under the terms relating to Research and Consortium Grants and Research Programmes: the appropriate Grant Moderating Panel or RP Steering Committee assesses the quality of science and the levels of resourcing sought, with the aid of technical and feasibility advice from the ARSF Steering Committee, before allocating a science grade and approving access to the Facility (Closing dates for RG/Consortium Applications is 1 July and 1 December each year).
 - (iii) Commissioned, by means of user-payment for flight hours and support services: commercial access is at a minimum of Full Economic Cost (FEC) of providing the services, but where there is a scientific interest on the part of NERC a “science rate” may be negotiated (for example, EUFAR Trans-National Access).
- 2.2 Under 2.1(i), users will need first to apply to the ARSF Operations Manager and/or Science/Operation Coordinator for issue of an Application Form, and advice on availability and feasibility prior to making formal application for NERC support via the ARSF Steering Committee.

- 2.3 Under 2.1(ii), users will need first to apply to the ARSF Operations Manager and/or Science/Operation Coordinator for issue of an Application form and advice on availability and feasibility prior to making formal application for NERC support via standard Research/Consortium Grant or Directed Programme mechanisms – the *full* ARSF Application Form (Summary/technical/science case/diagrams) *must* be appended to the R/CG or RP electronic Je-S application form, or the application will be frozen until the ARSF documentation is provided.
- 2.4 Under 2.1(iii), users already in receipt of funds (i.e. non-NERC) may make direct application to ARSF. The ARSF Operations Manager will contact the Head of Airborne Research Facilities, and a decision will be made on whether to undertake the work. Such commissioned projects will normally be charged at Full Economic Cost (FEC); however depending on the level of NERC interest in the science being undertaken it may be possible to negotiate a “science” rate falling below FEC. This however is subject to agreement between the applicant and NERC.

3. Resourcing

3.1 Resourcing for ARSF operations is as follows:

- (i) Infrastructure (crew, aircraft, offices, laboratories, core scientific instrumentation, data processing and support staff): funded centrally by NERC Swindon Office;
- (ii) Direct Access Flight Hours (300 per annum): funded centrally by Swindon Office via annual allocation;
- (iii) Superstructure costs (additional costs associated with operations away from the base of operations at Gloucester Airport or extended airport operating hours), funded by the user via grant allocations or other mechanisms.

3.2 *Infrastructure* support is free-at-point-of-access for all proposals except commissioned projects. For Direct Access projects, users will need only to secure allocation by the ARSF Steering Committee of the Flight Hours required for a successful campaign (comprising test flights and science flying) and from alternative sources the support of their own T&S and data analysis activities. For campaigns supporting R/CGs and RPs that require significant tranches of Flight Hours, out-of-hours activity, outlandings for fuel, crew T&S and overtime and any other consumables, users will need to secure, as a component of their Grant applications, *Superstructure* costs based on ARSF quotation.

3.3 Users should consult Appendix 1, which defines the elements of Infrastructure and Superstructure.

4. Outline of Procedures (see also Appendix 2)

4.1 Direct Access:

- (i) Discussion with ARSF to establish feasibility, scheduling and levels of required resourcing, and issue of the Application Form. Technical and logistics details must then be approved and signed off by the ARSF Operations Manager and/or Operations Coordinator ;

- (ii) Submission of the **full** ARSF Application form including science case and diagrams as a single Word document for consideration by the ARSF Steering Committee (this must be sent for attention of Mrs S Collins, NERC Scientific Facilities & Technology, Polaris House, Swindon via ARSFHQ@nerc.ac.uk);
- (iii) Scientific and technical review by ARSF Steering Committee in December of each year and recommendation of allocation of resources;
- (iv) Confirmation by Swindon Office in late December of project scheduling in the ARSF flying programme for the coming season
- (v) Issue of a formal Award Letter by Swindon Office.

4.2 NERC Research Grants:

- (i) Discussion with ARSF to establish feasibility, scheduling and levels of resourcing followed by generation, approval and sign-off by ARSF Operations Manager and/or Science/Operations Coordinator of the technical/logistic elements of the application form which must include a fully-costed estimate for support of the campaign;
- (ii) Application to NERC by means of Je-S containing the Superstructure costs (including Flight Hours), via standard Research and Consortium Grants mechanisms (ie under “Other Directly Incurred Costs”), with approved **full** ARSF Application form attached;
- (iii) Technical and programme scrutiny by ARSF Steering Committee and recommendation to the NERC Moderating Panels;
- (iv) Scientific review by Moderating Panels and approval of allocation of resources (Superstructure including Flight Hours, T&S and other consumables);
- (vi) Notification by Swindon Office Research Grants Team of support and allocation of requested resources on the basis of Moderating Panel recommendations.; and
- (vii) Confirmation of project scheduling in FAAM flying programme.

4.3 NERC Research Programmes:

- (i) Discussion with ARSF to establish feasibility, scheduling and levels of resourcing followed by generation, approval and sign-off by ARSF Operations Manager and/or Science/Operations Coordinator of the technical/logistic elements of the application form which must include a fully-costed estimate for support of the campaign;
- (ii) Application to Directed Programme via Je-S, for Superstructure (including Flight Hours) approved ARSF application form and quotation attached;
- (iii) Technical and programme scrutiny by ARSF Steering Committee and recommendation to the RP Programme Manager and Steering Committee;
- (iv) Agreement by Head Airborne Research Facilities and Programme Manager on levels of Superstructure contribution to be made by the RP;
- (v) Scientific and strategic review by Steering Committees and approval of resources (Superstructure including Flight Hours, T&S and other consumables);
- (vi) Notification by Swindon Office Research Grants Team of support and allocation of requested resources on the basis of Steering Committee recommendations; and
- (vii) Confirmation of project scheduling in ARSF flying programme.

4.4 Commissioned Access:

- (i) Discussion with ARSF Operations Manager on project feasibility and requirements;
- (ii) Negotiation between Applicant and Head of Airborne Research Facilities on project costings;

- (iii) Discussion with ARSF and generation of ARSF application and generation of a firm quotation.
- (iv) Technical scrutiny by ARSF Steering Committee and recommendation to the Head of Airborne Research Facilities;
- (v) Confirmation of project scheduling in ARSF flying programme on the basis of the ARSF Steering Committee recommendation.

5. Detailed Application Procedures

5.1 Common Requirements for all Mechanisms

- 5.1.1 Potential users should be aware of the lead-times inherent in making application for access to ARSF. These are a function of (i) aircraft/facility capacity per year and (ii) the various NERC application procedures. In the case of NERC Research/Consortium Grants and Research Programmes, the NERC Grants Handbook should be consulted for details of eligibility and procedures for securing resources.
- 5.1.2 All applicants for access to ARSF facilities must contact the ARSF Operations Manager for initial advice regarding feasibility and potential scheduling of campaigns. The Science /Operations Coordinator will issue an ARSF application form in which the user will summarise the scientific rationale and outline campaign requirements (including quantification of test/transit/science flight hour needs, preferred and acceptable timing of activities, identification of scientific instrumentation, and estimate likely Superstructure costs). On agreement in principle that the science activities can be supported by ARSF, the Operations Manager and/or Science/Operations Coordinator will approve and sign off the application form, and the campaign will be scheduled on a preliminary basis contingent on approval of the science case and agreement of resourcing/funding.

5.2 NERC Research and Consortium Grants

- 5.2.1 For users seeking access via NERC Research/Consortium Grants, Infrastructure facilities are provided free of charge. Funding of Superstructure (including Flight Hours) and consumables must be sought as a component of the standard Research/Consortium Grants and RP mechanisms (under “Other Directly Incurred Costs”), and are contingent on award of science grade by the relevant Moderating Panel.
- 5.2.2 Users seeking access via the Research/Consortium Grant route *must* ensure that the procedure outlined in 5.1 is completed *prior* to submitting to Swindon Office their application for research support: the *full* ARSF application form must be appended to the standard NERC Je-S electronic submission (the grant application will be frozen should the ARSF form be missing). Flight Hour requirements should be clearly stated in the Research Grant application, with a breakdown of flying segments (test and science flying) and a clear identification of the supplementary Superstructure costs listed under “Other Directly Incurred Costs”.
- 5.2.3 In parallel with Research/Consortium Grant mechanisms, the ARSF Steering Committee will, in consultation with the ARSF (and applicant where necessary), technically scrutinise applications for access in order to assess potential for the most efficient and economical support. Criteria include firm commitments made in support of approved campaigns, overall configuration of the aircraft at the preferred time, availability of core science instruments, and potential need for certification and fit of user-provided equipment. Potential users are encouraged by the Steering Committee to discuss with other applicants the potential for sharing of access and resources (including data outputs), in order to maximise efficiency of

deployments and of available resourcing. The Steering Committee will also consider the opportunity for use of alternative NERC airborne facilities and platforms and provide technical comment for the benefit of the Moderating Panels.

- 5.2.4 Applications via the Research/Consortium Grant route will be subject to full scientific and technical scrutiny via international and national peer-review and subsequent discussion by the appropriate NERC Moderating Panel (guided by the technical and operational comment from the ARSF Steering Committee), and awarded an alpha-grade upon which funding/resourcing is contingent.
- 5.2.5 Users supported by Research/Consortium Grants will be notified via an Award Letter from Swindon Office Research Grants Team clearly stating the maximum allocation of resources agreed by the Moderating Panel, and awarding Superstructure costs on a notional basis to be transferred internally to ARSF. On receipt of a copy of the Award Letter, ARSF will confirm the scheduling of the campaign, subject to any overriding technical and/or operational constraints in terms of aircraft configuration and scheduling that may require flexibility on the part of the user.

5.3 NERC Research Programmes

- 5.3.1 For users seeking access via Research Programmes, Infrastructure facilities are provided free of charge. Requested Flight Hours and Superstructure costs require approval and award by the relevant RP Steering Committee.
- 5.3.2 Users seeking access via Research Programmes **must** ensure that the procedure in 5.1 is completed **prior** to submitting to the Programme Steering Committee their application for support: the ARSF application form must be appended to the standard NERC Je-S electronic submission (the grant application will be frozen should the ARSF form be missing). Flight Hour requirements should be clearly stated in the Research Grant application, with a breakdown of flying segments (test and science flying) and a clear identification of the supplementary Superstructure costs listed under “Other Directly Incurred Costs”.
- 5.3.3 Directed Programme Managers must consult and agree with Head Airborne Research Facilities regarding availability of sufficient resources and if necessary budget for the costs prior to committing to support for any RP project. In all cases, the RP must provide Superstructure costs.
- 5.3.4 In parallel with RP mechanisms, the ARSF Steering Committee will, in consultation with the applicant, technically scrutinise applications for access in order to assess potential for the most efficient and economical support. Criteria include commitments made in support of approved campaigns, overall configuration of the aircraft at the preferred time, availability of core science instruments, and potential need for certification and fit of user-provided equipment. Potential users are encouraged by the Steering Committee to discuss with other applicants the potential for sharing of access and resources (including data outputs), in order to maximise efficiency of deployments and of available resourcing. The Steering Committee will also consider any opportunity for use of alternative NERC airborne facilities and platforms, and provide technical comment to the RP Steering Committee.
- 5.3.5 Users supported by Research Programmes will be notified via an Award Letter from Swindon Office Research Grants Team clearly stating the maximum allocation of resources agreed by the RP Steering Committee, and awarding Superstructure costs on a notional basis

to be transferred internally to ARSF. On receipt of a copy of the Award Letter, ARSF will confirm the scheduling of the campaign, subject to any overriding technical and/or operational constraints in terms of aircraft configuration and scheduling that may require flexibility on the part of the user.

5.4 Commissioned Access

- 5.4.1 Users seeking commissioned access will normally be charged at a rate based on Full Economic Cost (FEC) or a partial rate (“science” cost), on the basis of overheads generated through Infrastructure provision and the total aircraft operating costs (Flight Hours/fuel), plus any Superstructure and consumable costs incurred through provision of services or facilities away from Gloucester Airport or outside normal hours. “Science” costs are negotiable prior to confirmation of access.
- 5.4.2 Users seeking commissioned access are required to comply with the procedure detailed in 5.1.
- 5.4.3 In parallel, the ARSF Steering Committee will technically scrutinise all pending applications for access in order to assess potential for the most efficient and economical support (where necessary in consultation with the applicant). Criteria include commitments made in support of approved campaigns, overall configuration of the aircraft at the preferred time, availability of core science instruments, potential need for certification and fit of user-provided equipment, and the likely impact of direct access projects on committed NERC science programmes. The Steering Committee will also consider the levels of NERC scientific interest in the proposal and advise Head of Airborne Research Facilities with a view to determining the level of “science” cost to be negotiated, as well as any potential for use of alternative airborne facilities and platforms.
- 5.4.4 Users seeking commissioned access will be notified by Head of Airborne Research Facilities of their confirmed access to ARSF facilities following consideration by the Steering Committee of the project requirements, and agreement with the user on cost of such access.

6. Award of alpha grades

- 6.1 ARSF Applications are categorised according to the standard NERC procedure, using a scale ranging from Alpha 5 (science of the highest quality) to Reject (flawed, repetitious or technically compromised). In addition, the ARSF Steering Committee may on occasion invite a resubmission (R*) or support a Pilot Project designed to test new remote sensing concepts or methodologies. Definitions of the grades are as follows:
 - 6.1.1 Outstanding: exceptional scientific merit and originality; expected to make a major impact on scientific knowledge; top 5%.
 - 6.1.2 Excellent, at the forefront of the field; will produce significant advances in the understanding of the subject; top 25%.
 - 6.1.3 Alpha 3, high quality science likely to make a significant contribution to the understanding of the subject area.
 - 6.1.4 Alpha 2, very good: generally competitive science; top 60%.
 - 6.1.5 Alpha 1, of some merit but only modest advances in the field.

- 6.1.6 Beta Grades, probably no advance in the field, but may generate some useful data.
- 6.1.7 Reject, flawed in scientific approach, repetitious, or in its present form is judged not to be worth pursuing or which though possibly having sound objectives appears to have serious technical difficulties.
- 6.1.8 R* (invited resubmission); on occasion a proposal may be judged to be of merit by means of seeking to address an important scientific problem but fall short in terms of understanding of remote sensing methodologies and techniques (for example from scientists established in their fields but new to, and inexperienced in, the use of RS applications and technology). The Steering Committee may invite a resubmission based on additional expert technical guidance.
- 6.1.9 Pilot Projects are frequently supported in order to support highly-novel applications of established RS techniques or to develop and test new methodologies and/or instrumentation, in order to improve RS capability for support of environmental issues.

7. General

7.1 Should the Steering Committee be unable to reconcile conflicting demands for access by NERC-supported Grant- and RP-supported users, then priority will be given according to alpha-grade with $\alpha 5$ projects taking precedence over $\alpha 4$ projects. In the case of direct access projects conflicting with Grant/RP projects then the Steering Committee will consider the potential impact on strategic NERC science before confirming direct access projects.

8. Key Contacts

<p>ARSF Operations Manager</p> <p>Capt C Joseph Tel: +44 (0)1452 859 945 Fax: +44 (0)1452 713 219 Email: cjos@nerc.ac.uk</p>	<p>ARSF Science/Operations Coordinator</p> <p>Mr G Llewellyn Tel: +44 (0)1452 859 945 Mobile: +44 (0) 7919 697851 Fax: +44 (0)1452 713 219 Email: gaew@nerc.ac.uk</p>	<p>Head of Airborne Research Facilities</p> <p>Mr P Purcell Tel: +44 (0)1793 411 649 Fax: +44 (0)1793 411 610 Email: ppu@nerc.ac.uk</p>
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Appendix 1: Definitions of ARSF Infrastructure and Superstructure

INFRASTRUCTURE

Infrastructure relates to services and activities that form the fixed level of service that can be expected when a customer uses ARSF. These Infrastructure items include:

- Flying-Hour and Fuel costs (for Direct Access only)
- Normal Working Hours airfield services at the base of operations (Gloucester Airport)
- Operation of core instruments
- Post -processing of data acquired by core instruments (for Direct Access)
- ARSF staff support during Conditioned Working Hours
- Provision of aircraft power and access to the aircraft during Normal Working Hours on potential flying days
- Flight planning, and flight clearance services when operating from Gloucester Airport
- Travel and subsistence for ARSF staff to attend offsite meetings, conferences, training sessions etc that are not specific to a particular science campaign
- Personal development and training expenses for ARSF staff
- Use of allocated accommodation and IT provision at Gloucester Airport
- Ground handling and support facilities when landing-out for fuel due to unforeseen operational constraints
- Navigation and airport charges when landing out for fuel due to unforeseen operational constraints

SUPERSTRUCTURE

Superstructure covers all those activities and services that not included within Infrastructure and which are provided over and above those tasks carried out within Normal Working Hours at Gloucester Airport. It includes all detachment activities and costs that would not have occurred if the aircraft were to be operating from Gloucester, including direct cost of flight hours and specialist data processing. All superstructure costs are attributable to the science campaign or campaigns being conducted, whether they are the result of a single flight or a period on detachment.

Superstructure items include the following, and will be estimated by ARSF in conjunction with the applicants to generate a Campaign Quotation:

- Flight Hours and fuel costs (Research/Consortium Grants, Research Programmes)
- Airfield services at Gloucester outside of Normal Working Hours
- ARSF staff support outside of Conditioned Working Hours, including, where applicable, overtime
- Provision of aircraft power and access to the aircraft outside of Normal Working Hours
- Flight and diplomatic clearance services when operating from locations other than the base of operations
- Travel and subsistence for ARSF staff to attend offsite meetings and conferences etc that are specific to a particular science campaign
- Ground handling and facilities when landing out for refuelling due to specific science campaign requirements
- Navigation and airport charges when landing out for refuelling due to specific science campaign requirements
- Design, engineering and other services relating to the modification, installation and certification of non-core and user-provided instruments
- Services relating to the maintenance and repair of non-core instruments

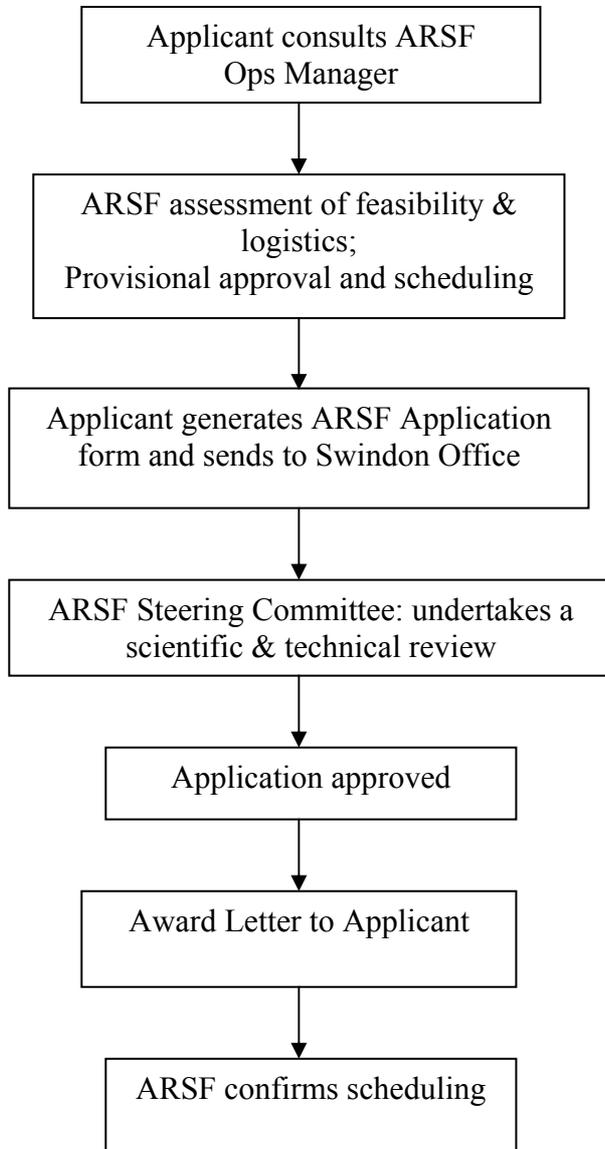
- Aircraft instrument configuration changes to meet the specific needs of a particular science campaign or flight

In particular, Detachment Costs include the following:-

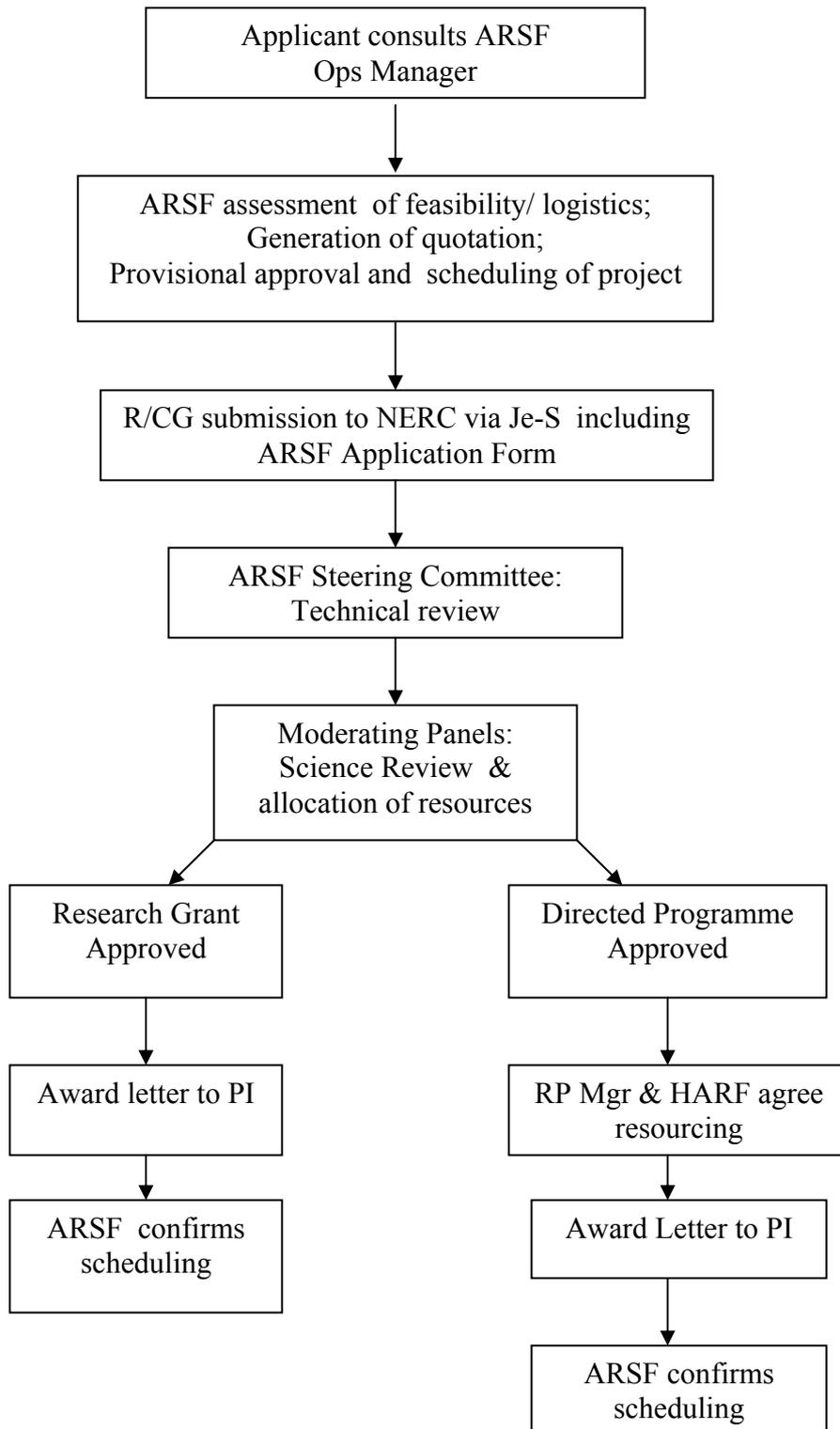
- Specific Health and Safety expenses (e.g. inoculation) for ARSF, related to the location to be visited
- Advance campaign reconnaissance expenses
- Travel to/from detachment location for ARSF staff
- Hotels and subsistence costs for ARSF staff
- Local communication provision and charges
- International communications provision and charges, including internet
- Local transport
- Visas and security clearances
- Shipping costs for ARSF essential equipment, including import/export charges and taxes
- Airport handling, parking, hangarage, and landing charges
- Specific training needs for the tasks to be conducted
- En-route and in-country navigation charges
- Ground facilities, including office and laboratory space and, where appropriate, air conditioning
- Out-of-hours costs for engineering services
- Airport passes
- Currency exchange

Appendix 2: ARSF Access flowcharts

1. Direct Access



2. Research Grants and Research Programmes



3. Commissioned Access

