Scottish Mathematical Sciences Training Centre (SMSTC)

Final Version 27.07.10

Key Information	
Disciplines covered	Pure Maths, Applied Maths, Statistics
Number of Universities	Maths and Statistics departments across 7 universities
Delivery Approach	Video-conference delivery across the Scottish SMSTC Network
EPSRC Funding Period (5 years)	£377,910
Consortium Funding (5 years)	£1,118,747
Number of Users to Date – over 3 years (2007/08 to 2009/10)	274
Number of student training hours* delivered to date – over 3 years	16,440 hours (411 registered courses x 40 hours/course)
Number of projected users - over 4 years (2007/08 to 2010/11)	365 (DTZ straight line projection)
Number of projected student training hours* delivered – over 4 years (2007/08 to 2010/11)	21,920 hours of training (straight-line scaling up of 3 year figure of 16,440 hours)
Unit cost per student user – over 5 years	Total cost divided by number of students projected over 5 years: £1,496,657 / 365 = £4,100
Unit cost per student training hour delivered – over 5 years	Total cost divided by number of training hours delivered over five years: £1,496,657 / 21,920 = £68
Note: * 'Training hours' relates to the provision of lecture time only provided by SMSTC. It excludes the provision of 3 residential days per annum for student symposia, tutorial time and assessment time.	

Background

Rationale – there was already an informal network across the Scottish mathematics and statistics departments in Scotland before the advent of TCCs. The Scottish universities recognised the importance of 2004 International Review findings. In particular, there had been a long standing feeling that there was a gap between a well rounded PhD and the end of undergraduate education. The Scottish mathematical sciences heads therefore endorsed the move to the establishment of a new TCC model for Scotland. They also shared a common view of what 'broadening' mathematical education entailed:

"*It enables the doctoral student to place their research within the context of a wider mathematical knowledge. It enables them to keep up with their subject as knowledge moves on and to identify linkages*. *Finally, it improves the competitiveness of PhD graduates through their wider knowledge and skills base*."

SMSTC Membership – the Scottish TCC model comprises 8 universities:

- seven '*member' universities* across Scotland with mathematics and statistics departments which receive EPSRC DTA funding:
    - University of Aberdeen – Department of Mathematics
    - University of Dundee – Division of Mathematics

- University of St Andrews – School of Mathematics and Statistics
- University of Edinburgh – School of Mathematics
- Heriot-Watt University –Department of Mathematics and Department of Actuarial Mathematics and Statistics (both part of the School of Mathematical and Computer Sciences)
- University of Glasgow – Department of Mathematics and Department of Statistics
- University of Strathclyde – Department of Mathematics and Statistics

- One '*associate'* - the University of Stirling. Associate status is due to the fact that it does not receive EPSRC DTA funding, but its staff contribute to the teaching programme.

Delivery Model – given the geographical distribution of the universities and the relatively small scale of individual departments it was agreed that individual provision would not be viable and that it would be much better to work as a network to deliver a common set of courses via video-conference technology. It was perceived that this would deliver the following benefits:

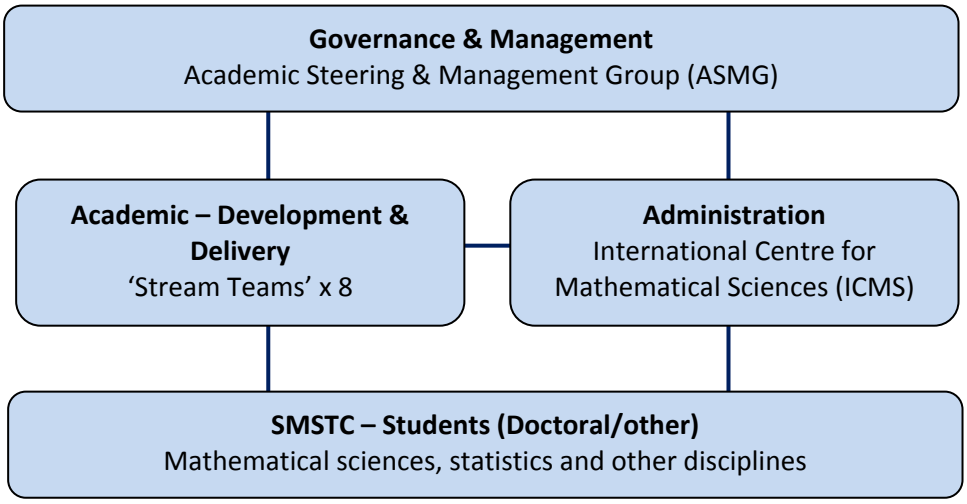
- The pooling of expertise across the Scottish SMSTC network to maximise the range and quality of taught course provision
- Sharing the burden of delivery across members
- Effecting economies of scale; and
- Maximising cost-effectiveness and value-for-money.

Funding - EPSRC provided five year funding to pump-prime the establishment of the SMSTC. The funding began in 2006/07 and will end in 2010/11. Due to mobilisation and set-up time for the procurement and installation of the new technology and the time required for course development, it was decided that the academic session 2007/08 was the appropriate start date for the roll-out of taught courses. To date, therefore, the SMSTC has completed three years of training and has one year remaining before EPSRC funding comes to an end. The total value of the EPSRC grant is £377,910. The estimated additional cost of staff time and direct funding by SMSTC member universities is estimated at £1,118,747. Total resource cost for the development and delivery of the SMSTC courses over the five year period is therefore £1,496,657.

Management and Administration

The Management and administrative structure is illustrated in the diagram below. Each component is now described in turn.

SMSTC – Management & Administration



ASMG - The SMSTC is managed by its Academic Steering and Management Group (ASMG). However, during the early set-up period when the SMSTC organisation was being developed, there were two separate committees covering the academic and management functions, a model which was considered appropriate at that time. However, once SMSTC moved into its operational phase these two committees were merged into a single integrated Group based on efficiency grounds. This model is believed to be more cost-effective and less cumbersome leading to more effective management and delivery. It is structured as follows:

- Director of SMSTC
- Deputy Director of SMSTC
- Up to 9 other members to provide representation across all of the participating institutions and to provide representation across the main subject areas of the mathematical sciences in which training is provided
- Up to 3 external members to provide a broad perspective on pure mathematics, applied mathematics and other areas of mathematical sciences
- EPSRC is invited to have a representative while it continues to provide funding for SMSTC activities.

Terms of office - up to three years, with the option to renew for a further year with mutual agreement. Terms of office run on a calendar year to calendar year basis.

Servicing - The ASMG is serviced by ICMS and relevant ICMS staff are in attendance at its meetings.

Remit – ASMG has the remit to manage SMSTC, with specific responsibility to:

- oversee and review academic activities of the 8 stream teams
- organise consultations with students and other interested parties
- respond to comments by external members
- oversee operation of SMSTC website and decide on necessary changes
- plan symposia
- consider proposals for new streams
- appoint stream leaders as required and provide advice to them
- ensure timeous communication of assessment results to students and participating institutions
- consult with stream leaders prior to May meeting of ASMG
- conduct annual Academic Review in May each year.

Meeting Cycle – the ASMG normally meets twice yearly, in May and November, with the possibility of a third meeting in February if there is sufficient business. The November and February meetings are to consider routine business and external members are not expected to attend. The May meeting is the main annual meeting of SMSTC.

Stream Teams – there are 8 streams offered by SMSTC, each of which has an academic team comprising representatives from across the university network. Team size ranges from 5 to 15 per team. The 8 streams with location of current lead university and team leader in brackets are:

- Algebra (St Andrews)
- Geometry and Topology (Glasgow)
- Pure Analysis (Edinburgh)
- Applied Analysis and PDEs (Heriot-Watt)
- Applied Mathematics Methods (St. Andrews)
- Mathematical Models (Heriot-Watt)
- Probability (Heriot-Watt)
- Statistics (Glasgow)

The Stream Leader responsibilities include:

- Leading the stream structure and framework of lectures
- Ensuring the development of course content to populate this framework with members of the stream team i.e. allocating out the lectures across the team as appropriate
- Overseeing the development of lecture presentations
- Overseeing the development of tutorial style questions/solutions
- Preparing a Stream Overview Document which is attractively presented and placed on the wiki SMSTC website and handed out to students at the first symposium
- Presenting the stream at the first symposium to SMSTC students (to help inform stream choice)
- Be available for informal consultation and discussion with SMSTC students at the second symposium in February or March
- Communicating with students registered for the stream during the course of the academic year
- Ensuring effective assessment of students
- Holding periodic stream team management meetings
- Produce an Annual Stream Report which feeds into the May ASMG meeting

ICMS – The SMSTC is administered by the International Centre for Mathematical Sciences, which is based in Edinburgh and jointly administered by the universities of Edinburgh and Heriot-Watt. It is one of two national centres in the UK – the other being the Isaac Newton Institute for Mathematical Sciences. ICMS has broadened out its remit and has taken on a range of administrative tasks to support SMSTC, including:

- the registration of students
- organising the symposia events in October and February
- providing administrative support to the ASMG and management staff
- operating the wiki website – which is the fulcrum for the organisation and delivery of the SMSTC training programme
- booking the VC lecture sessions through the central JANet switch.

It was stressed by the SMSTC management team that ICMS is highly professional and experienced in delivering this type of administrative function and it has been an asset for the development and on-going operation of the SMSTC service. SMSTC funds c. 35% of the salary of its key administrator, but there are other staff in the ICMS team of 6 – 7 which can be drawn upon for support. The impression is that this service represents excellent value-for-money.

Management Support – it is also important to acknowledge the management and administrative support provided by the Director and Deputy Director in running the ASMG, and other staff overseeing the IT and finance functions. For example, detailed notes are produced each year to act as a Role Profile for the Stream Leaders; there is a detailed time-table for administrative tasks, etc. These are time-intensive tasks which involve senior academic staff.

Course Provision and Delivery

Course Content – SMSTC has developed 8 streams which it believes adequately addresses the breadth and remit required to deliver the ‘broadening’ objective of TCCs. These streams have been ‘fixed’ year-on-year, although there is a process of upgrading and refining which goes on within each stream. All of these materials are accessible via the wiki web site for SMSTC including written lecture notes, presentation slides and assignments.

Course Uptake – the expectation is that all doctoral students at member universities have to participate in the SMSTC programme. Its key parameters are:

- the focus is on 1st year PhD students (79% of registered students during the first three years were 1st year PhD students. By 2009/10 this figure had increased to 94%, which reflects the fact that the backlog in demand from 2nd and 3rd year students has largely been worked off during the period 2007/08 – 2008/09)
- delivery is concentrated in the first six months of the academic year (semesters 1 and 2)
- students are expected to take 3 streams, which the vast majority of British graduates take. There can be exceptions for Masters' graduates, APTS participating students and overseas students, who may take 1 – 2 streams.

A total of 274 students have registered during the first three years taking 411 courses, which gives an average of 1.5 courses per student. This is lower than the expected 3 streams per PhD student due to the significant number of students electing to take one or two streams only:

- Students attending APTS residential courses
- Final year undergraduate students
- 2nd and 3rd year PhD students
- PhD students from other disciplines such as engineering

Students are registered at the start of their stream, but no attendance records are kept. The view is that students have to take ownership for their own education and formal assessment is the key test to ensure they are participating and learning – see description of 'assessment' below. There are no charges for students at consortium departments of member universities for attendance. For non-member students there is a £100 charge/stream. In addition, if non-member students attend at a site which is not one of the member sites, a one-off £250 registration fee is charged for that site to cover the extra admin costs of dealing with an additional VC site.

Course Selection – the students select their streams through consultation with their PhD supervisor and PhD Co-ordinator at the university. They are also informed on course options at the October Symposium. The usual outcome is for students to select a stream linked to their PhD and related subject areas. For example, a pure maths student will often choose from within the pure maths streams. Similarly, an applied maths student will tend to select from within the applied streams. However, course selection from both pure and applied courses does occur linked to the PhD research area (for example a student taking a PhD in pure analysis is likely to take the applied analysis course as well), and the management team would like to see more of this type of cross-over.

Classification	**Stream**
Pure	Algebra Geometry and Topology Pure Analysis
Applied	Applied Analysis & PDEs Applied Mathematical Methods Mathematical Models
Statistics	Probability Statistics

Student Time Commitment – for each stream the following parameters apply:

- 20 lectures per stream, split across 2 x 10 week semesters
- 2 hours per lecture = 40 hours per stream
- 3 streams per student = 120 hours of taught courses per student
- c. 30 hours weekly input per student:
    - lecture time = 3 x 2 hours
    - studying, tutorial and worked examples = 3 x 8 hours
- 10 hours/week for work on their PhD, giving an overall 40 hour week.

This leaves 25% of their time for mobilisation and preparatory work on their PhD with their supervisor during the first six months. This 'twin-tracking' is considered important, especially by supervisors.

Student Assessment – in addition to attending lectures, students are expected to undertake the following:

- They are encouraged to participate in tutorials for their streams (tutorials are there if students wish to participate)
- Undertake worked examples for practice
- 2 – 3 formal assessment exercises per stream, which are graded: A, B, C or U (majority of students do very well and are graded A or B). The U grade is usually linked to non-attendance and /or students dropping out.
- There is a strong incentive to perform at these assessments as the grades can be taken into account at the formal end of year 1 review.

Video-conference Facilities – in 2006/07 the SMSTC team elected to go for the standard H.323-compliant VC system as opposed to the newer INSORS Access Grid (AG) system. The rationale for the H.323 system was based on:

- it was a tried and tested system
- It allows multi-site connection over the UK academic internet
- the portable version allows it to be moved from room to room when required (in practice this facility has not been required in most locations as the kit tends to be fixed in a dedicated teaching room, although there are one or two movable locations in the SMSTC network)
- the equipment is cheaper and more reliable and needs less technical support that the AG
- the main codec unit is 'standards' based and not tied to a single manufacturer, unlike that for AG

The system is based on a "people and content" approach of transmitting (and receiving) a medium resolution real-time image of the lecturer or someone asking questions from another site, along with a higher quality real-time image of printed slides, diagrams, computer output, or handwritten notes from a visualiser.

Heriot-Watt took the lead in equipment/systems procurement. They drew on the expertise of a colleague who had significant experience of using a range of audio and video conferencing teaching technologies and techniques in a degree programme access scheme for students in the Highlands and Islands. The Audio/Visual team at Heriot-Watt were also very helpful. The total fixed cost for 7 'stations' was £100k, working out at about £14k per member university.

VC Performance is very good. Key statistics:

- One or two sites drop out across 20 x 2 hour sessions in the delivery of a stream. Most sessions are 100% perfect

- Only one or two lectures in a year when the lecture has to be abandoned (out of 160 lectures)

The system relies on the JANet Switch, and university firewalls caused some problems in year 1, but these have now been resolved. The system has become more sophisticated over time, with most sites now using two video projectors, and one or two sites have additionally bought 'Smart-boards' which enable lecturers to annotate lecture note PDF files. From next year it should be possible for all remote sites to be visible at one time (like AG).

The SMSTC team has been careful to ensure that all the essential kit (e.g. the codec) is fully protected by warranty throughout the period of the grant, so if there is a breakdown at one site it can be up and running again very quickly (and without the university having to pay for a replacement). This is considered to be a strength of the SMSTC model. (It would be good to compare this with the MAGIC network and the extent to which warranty was possible given the higher capital equipment cost for AG).

Lecturing Performance – it was widely agreed that the style and protocols for lecturing using VC kit is quite different and requires a learning /adjustment process for the lecturers. There is not nearly the same level of interaction with students in remote sites, compared to when all participants are face-to-face.

Recording Lectures – SMSTC has elected not to record lectures, although they have the technology to do this. The rationale is a mixture of:

- wanting to protect IP of the lecturers/university
- providing collateral, should they need to charge in the future i.e. it has not been disseminated free
- lecturers feeling inhibited if they are being recorded i.e. they cannot say exactly what they would normally in a more spontaneous way
- the resolution of legal issues would has not been addressed (linked to personal privacy issues, particularly for students)

Costs and Funding

EPSRC Expenditure – from a budget of £377,910, 78% has been drawn down and claimed:

EPSRC Expenditure – Allocation of Funds (2006/07 – 2009/10)*	
Expenditure Heading	**Amount (£s)**
Conference costs	12,751
Administration costs (ICMS administrator)	31,530
Course Development Costs	115,362
Equipment	134,993
Student travel	517
Expenditure as at Feb 2010	**295,153**
Unclaimed expenditure	10,100
Balance of funds remaining	72,657
Total EPSRC budget	**377,910**

The balance of funds will be used for administrative support, conferences, revisions to course material (20% of the course development money was held back for revisions, which will be allocated in the summer of 2010), and a buffer for IT costs, etc. in 2010/11.

SMSTC Costs – in addition to the allocation of EPSRC funds detailed above, SMSTC has contributed significant staff resource to manage and deliver the taught courses. The universities have also funded at their own expense additional equipment and the provision of lecture room space. The total of this and staff time has been valued at £1,118,747.

The allocation of expenditure by funding source by year is detailed below:

Funding Source	2006/07	2007/08	2008/09	2009/10	2010/11
EPSRC core grant	£167,328	£99,123	£41,998	£32,731	£36,730
University resources	£246,491	£367,069	£201,275	£153,838	£150,074
Fees from students	N/A	negligible	negligible	negligible	negligible
Other	None	None	None	None	None
Total	£413,819	£466,192	£243,273	£186,569	£186,804

Notes on table:

1. All FTEs are translated into FEC costs at the rate commensurate with the top of the lecturer pay scale. It includes NI, pension, estates and indirect costs. Total about £89,000/year at current prices. This underestimates some of the costs since many people involved are more senior than this (and so cost more).
2. University resources include an estimate of the costs of modifications made to rooms to host SMSTC equipment, additional equipment bought (projectors, smart boards etc.), room floor charges (see below), staff time for teaching, staff time for management, staff time for developing materials (over and above the amount paid by EPSRC).
3. Room floor charges vary greatly between universities and some rooms are used only for SMSTC while others are shared with other functions. The minimum usage for 8 streams in a fully occupied shared room is going to be about 20%. We have used a rate of about £2800/year for 20% usage of a typical size room (multiplied by 7 rooms), but this is likely to be an underestimate.
4. Fees from students have so far been of the order of at most a few hundred pounds and so have been ignored.

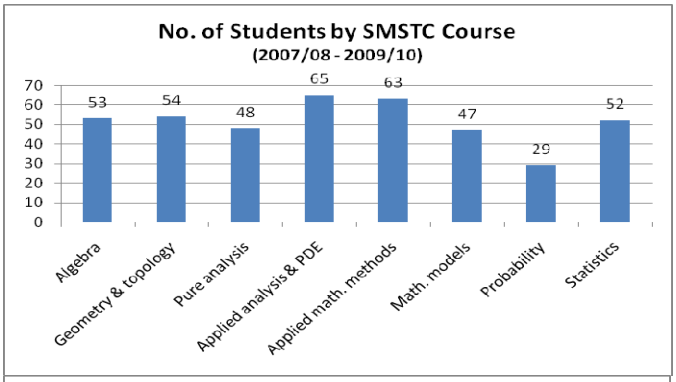
EPSRC funding has generated a leverage ratio of 3 times i.e. for every one Pound of EPSRC funding, the SMSTC Network has contributed an additional £3.

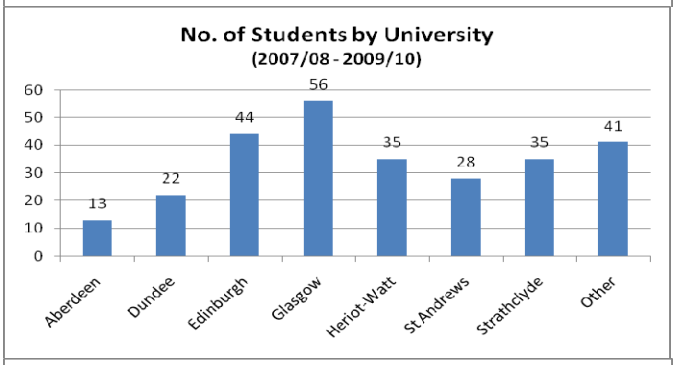
Student Throughput

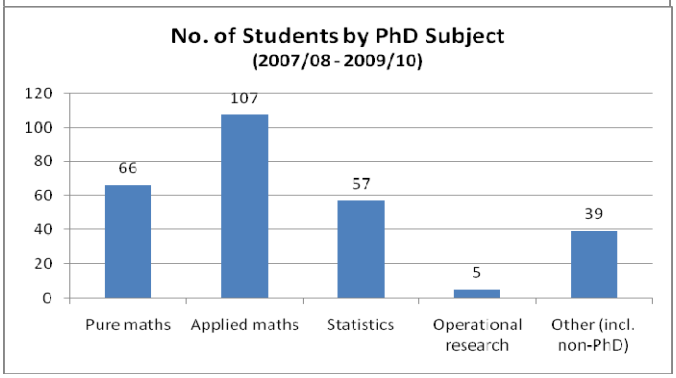
Detailed monitoring information on student throughput is presented in the Appendix. Key headline statistics include:

- 274 students registered during the three year period 2007/08 – 2009/10
- Of these, 254 were PhD students and 20 were from MSc /other degrees
- 101 students were EPSRC funded, representing 37% of the population
- 79% of registrations were 1st year PhD students during the three year period 2007/08 – 2009/10
- There has been an even uptake of SMSTC courses over the three year period:
    - 2007/08 – 85
    - 2008/09 – 95
    - 2009/10 – 94

Other statistics covering the spread in uptake across SMSTC courses, the number of registered students by member university and the subject area of their PhD are presented graphically below.







Future Sustainability of SMSTC

Commitment – There is a genuine commitment to the continuation of the SMSTC Network going forward – irrespective of EPSRC additional transitional funding. There has been too much time and effort invested in the initiative and the benefits are so substantial that the Scottish universities would not be prepared to let the SMSTC fold.

Funding – The SMSTC management team have reviewed the sustainability of their model and its resource requirements from 2011/12 onwards. Two scenarios were discussed:

- *No transitional Funding from EPSRC* – the SMSTC would continue, but its service offer would have to be cut back significantly. Areas where costs could be reduced/eliminated include:
    - cutting out the symposia in October and February each year
    - not reinvesting in the VC equipment in terms of equipment upgrades/replacement
    - reducing the administrative support from ICMS (this is the main ongoing operating cost for SMSTC, as they fund 35% of their Administrator's salary costs)

The effect of these cut-backs would be a reduction in service quality and performance.

- *Transitional Funding from EPSRC* – £100k would enable SMSTC to continue operations at the current standard and range of service provision for another five years or so. The funds would be focused on piece-meal IT upgrades (new projectors cost c. £14-15k each) and the servicing of the ICMS administrative support.

5 Year 'Refresh' – on an on-going basis SMSTC review and fine-tune the content of their 8 streams. However, at the end of 2010/11, SMSTC may consider undertaking a more formal review of their course provision and refresh the streams where necessary. Outside the scope of SMSTC they are also going to consider using the video-conferencing infrastructure to broaden their offer to second and third year PhD students, with academics running seminars that PhD students can attend.

Measuring the Impact of SMSTC

Direct Student Impact – the courses have been well received and the evidence from the assessment is that students are applying themselves, with the majority getting A and B grades. De facto one can deduce that they are broadening their mathematical education and the goal of the TCC initiative is being met.

Indirect Student Impact – it is too early to say how this 'broadening' in their education will assist them in terms of:

- enhancing their doctoral education and their performance
- improving their future career performance, either staying in academia or securing alternative employment in the public or private sectors.

However, there is anecdotal evidence that students are now talking amongst themselves much more, sharing academic problems and working in a more team focused way. This is considered to be an important added value contribution from SMSTC in that it is getting students out of their narrow PhD subject area and mixing with a wider cohort of fellow students and academics than would otherwise be the case.

Wider Impacts – an important indirect impact generated by the formation of the SMSTC has been the improved networking and communication across the Scottish Universities at departmental level. It has helped to 'break down silos' and develop a more collaborative approach towards the furthering of mathematical sciences in Scotland. It has also enhanced university perceptions of ICMS and its contribution to mathematical sciences (perceived as a somewhat Edinburgh based institution).

The future of the TCC Initiative

The Scottish universities are strong supporters of the TCC initiative and would like to see it continued in Scotland via SMSTC. The management team do not believe there is merit in trying out alternative models in Scotland, such as amalgamation with other TCCs or having a single UK national system. They would like to continue with their current model, which they will continue to fine-tune and enhance over time. The rationale for this position is based on the following factors:

- There is a logical coherence to the Scottish geography

- It provides a manageable cohort of 8 universities – which is large enough to generate economies of scale, but not too large that diseconomies arise
- The VC solution based on H.323 has been proven to work, although there will need to be some kit upgrade in due course
- There is now embedded knowledge across the SMSTC Network in terms of the management, development and delivery functions which will guarantee its sustainability
- The course curriculum of 8 streams they believe is comprehensive enough to balance the breadth and depth required to meet the TCC 'broadening' objective.

DTZ Key Observations on SMSTC

Good Practice

The following aspects we believe stand out as specific strengths of SMSTC which should be shared across the UK TCC network:

- **Management** – we like the adoption of a streamlined management system with a single body to cover both academic and management aspects (Academic Steering & Management Group). This reduces bureaucracy, minimises management time and simplifies decision-making.

- **Administration** – the resources, skills and expertise of the International Centre for Mathematical Sciences (ICMS) has been a real asset in areas such as web site development and maintenance, and the organisation of the symposia.

- **Technology** – the H.323 operating system has provided a robust service with minimal down-time. It would be good to compare the cost-effectiveness of this network against the TCCs using AG

- **Learning Culture** – the management team are good at producing clear guidance for students and staff and revising and enhancing this over time. For example, there are detailed role profiles for Stream Leaders; a comprehensive Administrative Timetable for the SMSTC Year; a note on the remit and operation of the ASMG, and guidance on how the symposia are to be delivered. There is evidence of enhancement and improvement over time.

- **'Fixed' Course Curriculum** – fixing on 8 streams and keeping to them over the five year period reduces staff time in the development of new courses and ensures there is consistency from one year to the next. However, the management team recognise that ongoing updating of course material is important, and they are likely to consider a more formal 'refresh' in the next year or so.

- **Assessment** – the grading of course work is important as it fosters a higher student engagement with the SMSTC courses than would otherwise be the case.

- **Symposia** – bringing the students together at the outset of the academic year in October and towards the end of the six month period in February is highly valuable in:

    - briefing students and securing their buy-in to the SMSTC offer
    - enabling students to establish relationships within their own university department and with students from other universities
    - allowing some of the lecturers/supervisors from the member universities to come together and network in the context of postgraduate education.

Development

Areas which have been highlighted through the consultations which could assist with the future development of SMSTC include:

- **Supervisor Engagement** – during the first year or two there was resistance from a number of the supervisors to the SMSTC. They see it as compromising the amount of time which their PhD students can devote to the PhD. This has been addressed through the inclusion of a briefing about SMSTC during the Supervisor Training Sessions (at least in Edinburgh). However, there is still a feeling that more communication is required to share the values and contribution underpinning the SMSTC concept with the population of supervisors across Scotland.

- **Exploiting the Equipment** – given the investment in the H.323 technology and training rooms, there is the potential to exploit this infrastructure for other cross-university communication events such as seminars/lectures, etc. Although this already happens to an extent, there is the potential to ramp up this activity.

- **Wider 'Reach'** – there is the potential to 'scale-up' the SMSTC product to a wider constituency of students in years 2 and 3 of the PhD programme. This would be outside the SMSTC remit and would require the development of material bespoke to the needs of this audience.

- **Recording of Courses** – although the technology exists to record lectures, SMSTC has to date resisted the recording of lectures. The internalisation of the SMSTC benefits to member universities (85% of students registered during 2007/08 – 2009/10 came from the 7 members) should be reviewed to review the pros and cons of wider dissemination.

- **Succession planning** – to date the management, development and delivery of SMSTC streams has been driven by an established team, with minimal churn in staff. Given the high time commitments involved and the goal of 'sharing the pain', there is merit in formalising a more structured approach to succession for key management positions, stream leaders and members. This would also achieve wider engagement across the mathematical sciences academic community in Scotland as those on the 'outside' become part of SMSTC. There is nothing better to secure engagement and commitment than responsibility for management and delivery.

Student Data (approximate)						
	2007/08		2008/09		2009/10	
	EPSRC	Non-EPSRC	EPSRC	Non-EPSRC	EPSRC	Non-EPSRC
No. of PhD students registered	38	47	35	60	28	46
No. of students by year of PhD						
- Year 1	26	32	32	40	27	43
- Higher years	12	15	3	20	1	3
- Other (non-PhD)						20
No. of students by maths/stats dept						
Aberdeen		1	5	3	3	1
Dundee	5	3	1	5	1	7
Edinburgh	9	5	7	8	7	8
Glasgow	9	14	5	15	5	8
Heriot-Watt	9	9	5	5	5	2
St Andrews	2	6	6	9	3	2
Strathclyde	4	6	4	7	4	10
Other		3	2	8		28
No of students by subject of PhD						
- Pure maths	13	7	18	12	11	5
- Applied maths	20	19	8	18	13	29
- Statistics	5	17	5	18	4	8
- Operational research		1	1	1		2
- Other (includes non-PhD)		3	3	11		22
No of students by SMSTC course						
Algebra	14		22		17	
Geometry & Topology	14		23		17	
Pure Analysis	14		19		15	
Applied Analysis & PDE	18		22		25	
Applied Math Methods	16		21		26	
Math Models	13		11		23	
Probability	6		9		14	
Statistics	10		22		20	
Number of hours/days training provided	320 hours VC lectures per year plus 3 days "residential" per year					