

2012



"Nomination for QSEA Award for Community Contribution". Award nomination - An Education Project Built around Observing the Transit of Venus 6th June 2012

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#### **An Education Project**

#### **Built around**

### **Observing the Transit of Venus**

### 6<sup>th</sup> June 2012

#### **Organisational Profile**

#### 1. The organisation, its history and any relevant background

The organisational unit that was initially chosen to drive this project was SSSI (The Surveying and Spatial Science Institute). As it emerged, the organisational unit that delivered the project was a group of SSSI members who were surveyors, and a couple of members of the Astronomic Association of Queensland (AAQ).

The primary objective of the project was to engage with school children by means of Observing the Transit of Venus. The intention was to show school children the relevance of our professions (Spatial Science, Surveying and Astronomy) to our society, past, present and future. It is hoped that this engagement will lead to students actively considering careers in our professions.

It was recognised from the outset that there are a number of groups within our professions that have as their objective, the promotion of our profession as a worthwhile career. The two major such organisations are "Destination Spatial" and "A Life without Limits".

Approaches were made to both of these organisations. In the end it was decided that these organisations would support the "Transit of Venus" project.

The Transit of Venus Project Management Group made the conscious decision NOT to create a new identity for this project, which was always designed to be a "one off", but to actively promote both "A Life without Limits" and "Destination Spatial" throughout the project. Mr Jack de Lange from "Destination Spatial" and Mr. Gerry Shone from "A Life without Limits" and the Surveying Task Force, became members of the Project Management Group.

Funding for the project was the initial major concern, and when the 2011 funding bid to the SSSI Vision Fund was unsuccessful, approaches were made to surveyors, surveying organisations and surveying equipment suppliers nationwide. These approaches were successful and our Sponsors provided us with over \$35,000. Our Sponsors consist of, for the first time a united national Surveying Industry crosssection and are:



The initial steering committee for this project was chaired by Dr Neil Divett, an Honorary Fellow of SSSI, retired Land Court Judge and the last Surveyor General of Queensland. Unfortunately Dr Divett passed away late in 2011. Mr Graeme Rush, a SSSI Fellow, previous Surveyors Board member and retired Director of Surveys in the Queensland State Government, took on the role of "Project Manager" after Dr Divett's untimely death.

2. Organisational structure and operating environment including industry sectors and markets

The Transit of Venus Project consists entirely of volunteers.

The initial Project Structure is shown below and detailed in Section 3 of the Project Management Plan (See Appendix 1)



The Administration of the SolarScopes for Schools Competition saw the establishment of other structures (as detailed in "Administration of the SolarScopes for Schools Competition" see Appendix 6), which included the establishment of sub-committees in NSW and Victoria.

The project volunteers were drawn from both the Surveying and Spatial Sciences Professions and the Astronomical Association of Queensland. Volunteers are from the three sectors, namely Private Sector, Government Sector and Academic Sector. Our target market was school children in Australia, their teachers and parents / carers.

#### 3. How the organisation serves its industry, the marketplace and other stakeholders

This project team was established to conduct one project "An Education Project built around Observing the Transit of Venus on 6<sup>th</sup> June 2012".

The prime objective of the project was to have surveyors engage with school children on this project, so that the school children might consider a career in Surveying or Spatial Science.

The purpose of the project was to assist our professions (Surveying and Spatial Science and Astronomy) to attract students to consider a career in one of our professions.

The other stakeholders in this project are the people who influence the school children, namely their teachers, parents and carers.

There was no "hard sell" at any stage of the project. The strategy was always that of providing encouragement, but each stakeholder had to make a conscious decision to "opt in". This applied not only to volunteer surveyors, but also schools and other organisations that provided various resources throughout the project.

#### 4. The main product or service offerings and their delivery mechanisms

The service that we have offered is the means to enthuse students about Mathematics and Science.

This service has been delivered through a number of delivery mechanisms and in a range of different forms. They include:

4.1 The development of communication mechanisms and content. The mechanisms included:

- a. Posted letters
- b. Emails
- c. Web
- d. Presentations at teacher conferences
- e. (limited) use of social media
- f. Verbal promotion through surveyors to students and schools

4.2 The delivery of a "free SolarScope for Schools" competition. A SolarScope is an instrument for the safe viewing of the Sun by multiple observers. SolarScopes were given to three hundred Schools in 7 States and Territories in Australia.

4.3 The development of teaching materials relevant to both the Transit of Venus and the new National Science Curriculum. These teaching materials were developed by volunteer teachers.

4.4 The delivery of SolarScopes to schools by volunteer professional surveyors, who also provided students with surveying and careers information. The project team provided each volunteer surveyor with a comprehensive range of materials to use, at their discretion, and as the opportunity arose.

4.5 The development of a high quality web site through which all information was made available in attractive ways. This included a web cast of the entire Transit of Venus.

4.6 The development of a "follow on" project (Maths and Surveying in Schools) that is directed towards ensuring the ongoing enthusiasm of students to consider a career in Surveying, Spatial Science or Astronomy.

#### Summary

### **5.** A detailed explanation of the project or initiative/s referred to The Objectives of the Project were:

5.1.1

To positively engage with school children by means of Observing the Transit of Venus. This engagement will be in the areas of geography, mathematics, history and science. The intention is to show to school children the relevance of our professions (Spatial Science, Surveying and Astronomy) to our society, past, present and future.

It is hoped that this engagement will lead to students actively considering careers in our professions.

#### 5.1.2

To develop teaching materials that are aligned with the new National Schools Curriculum and will be useful to both Primary and Secondary School teachers for some years to come. These materials will be "web based" and free to all.

#### 5.1.3

To utilize the phenomenon of the Transit of Venus to promote to the community at large, the relevance and contribution of our professions to our society, past, present and future.

The major elements that were needed to deliver our objectives were:

#### 5.2 Schools Competition

- a. Central to the execution of the project was a schools competition. The intention of the schools competition was to engage schools in the Transit of Venus experience. The incentives for schools to engage with the project were:
  - i. The possibility of winning a SolarScope
  - ii. The availability of teaching resources that aligned with the new National Schools Curriculum
  - iii. Enhanced learning opportunities for students. (e.g. Web resources and visiting surveyor)
- b. After discussions and promotions of the Project with National and State Teachers Associations, the major strategy to inform schools of the competition was a mail out to most schools across the eastern states of Australia, i.e. State Schools, Catholic Schools and other religious Schools. (NSW used a different strategy to inform schools). This was supplemented by notices in the various Education Department newsletters and teacher association's journals and attending their conferences with poster sessions.
- c. The School competition required schools to find the latitude and longitude of their school, and then use the simulation software from our web site <u>www.transitofvenus.com.au</u> to calculate the time of the second contact of the Transit of Venus at their school. This process ensured that the school was properly engaged with the project, having to step through a number of steps before they could submit their entry.
- d. The response from schools was overwhelming. We expected to engage over 100 schools. (We budgeted to supply 100 free SolarScopes) We engaged 300 schools. Through the generosity of individual surveyors and surveying groups throughout the country we managed to give all of the schools that entered the competition a free SolarScope.

#### 5.3 Teaching Materials

The teaching materials that were developed for the project were developed by a dedicated group of Science teachers that the AAQ had established to prepare teaching materials for both the Transit of Venus and the Solar Eclipse that will occur in November 2012.

#### 5.4 Web Site

After the initial mail out, our major delivery mechanisms were email and our web site.

The web site was used for the submission of schools competition entries, the submission of volunteer surveyor details, the web casting of the Transit of Venus and the collection of feedback as well as for the distribution of all the teaching materials, promotional materials, school and surveyor resources, careers information etc. etc.

5.5 Delivery of SolarScopes to schools by surveyors

Almost all SolarScopes were delivered to schools by surveyors. Exceptions were some Western Australian Schools and Norfolk Island.

The task of aligning surveyors with schools was challenging, but the results were worth the effort.

In most instances, the delivery took place well before the Transit of Venus on 6<sup>th</sup> June. A range of resources was supplied to each surveyor (See appendix 14 & 15)

Some surveyors presented the SolarScopes to whole of school assemblies. Some surveyors ran practical surveying exercises for class groups. Some surveyors gave talks using a pre-prepared PowerPoint presentation; some used the "Life without Limits" UTube clip from the web site and answered questions about the Transit of Venus, surveying, space exploration, GPS etc. All surveyors left career information at the school.

Some surveyors also returned to the school on the day of the Transit to assist with the viewing of the Transit.

In some instances, an ongoing relationship between the school and the surveyor has been established.

5.6 Media

In the lead up to the event (6<sup>th</sup> June 2012) several radio interviews were arranged, as well as stories published in many newspapers. (see appendix 20)

Media releases were prepared for each school, as well as contact details for various local media outlets. May schools had local newspapers print stories about the Transit of Venus, the school, the SolarScope and the presenting Surveyor. (See below)

#### Courier Mail 2-3 June 2012

### SCIENCE INSIGHT

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# Venus and skills rise to occasio

#### MICHAEL LUND

RARE astronomical event is being used to get students to think more about science as a career

A students to think more option. Summarity Pullen and Rebecca Keskall, both aged 15 and from Kelving for the second strain of the second strain secon

"It's quite complicated but we have

a couple of science classes which focused on this," Canning says. In the 17th century, astronomers did not know this distance and

did not know this distance and referred to it only as an astronomical unit (AU). The distance from the sun to the other planets was given only clative to the AU, so Venus was 0.69AU from the sun. The sun section of the sun and the sun section of the sun and the sun section of the sun and the sun section of the sun that is of Halley's Comet fame, argued that if accurate observations of the Transit of Venus could be taken from different parts of the planet then the data could be used to call the sun actual length of the AU. That's why James Cook was sent to only differ those observations were make that the was allowed to open new orders which sent thim in search one with so solver the misphere. The Solar Scope equipment the solver of the southern benefisphere. The Solar Scope equipment the solver of the southern band and lenges as part of a national competito.

Congetistion. One of the organisers, Chris Swane from Brisbane-based surveyors Bennett and Bennett, says there is a shortage of surveyors in Australia so the competition was a way of making students aware of an industry that puts science into practice. Surveyors have played their part in previous transit observations by helping define the exact longitude and latitude where an observation was made.

was made Swane says GPS and computer technology now play an increasing role in surveying but the basic skills of mathematics and science are still

role in surveying but the basic skills of mathematics and science are still important. Venus will pass slowly in front of the sun between & Islaam and 2.44pm on Wednesday and observation centres are being set up across Queensland including at the Brisbane Planetarium at the Mt Coot-tha Botanic Gardens. Another will be outside Astro Pete's cafe and telescope shop at Upper Mt Gravatt, which is one of the few places also selling approved darkened glasses - the only safe way people can directly view the sun. That's about the only thing you can see through these glasses, "shop owner Peter Teodorovic says. The Astronomical Association of Queensland's Jonathan Bradshaw says the transit is still of interest to

participate in something rather than just read about it in a textbook

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It's more meaningful if you can

astronomers, who now can make more accurate measurements of it. This helps refine their understanding of what happens to a star's brightness when a planet passes in front of it, which is how they detect planets orbiting stars other than the sun.

Astronomers will also be looking to see if the measurements show any change in the size of the sun itself. "It might seem like that's a given but the sun doesn't have a distinct surface – it's blurry around the edge," he says. "This transit will help us to measure that and you can compare that with observations back in time." Improvements in the accuracy of measurements mean comparison with observations from 2117 and beyond may give better results. with observations from 2117 and beyond may give better results. "Like all good science it doesn't give us results at the time." Bradshaw says. "We might have to wait a century." The hope is for clear skies on Wednesday as some previous observations have been dogged by poor weather.

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#### 5.7 Live Broadcast of the Transit of Venus

The Transit of Venus was broadcast live from a site at the University of Queensland, via our web site using equipment supplied by the Astronomical Association of Queensland.







While most Queensland schools had sunshine almost all day, that was not the case for the Southern States and Western Australia. The live broadcast through our website allowed these schools (and many many others) to view the Transit of Venus even though they could not see the Sun at their location.

#### 5.8 Feedback from Schools and Volunteers

Our plan called for an evaluation of the project outcomes. Feedback was sought from all participants (schools and volunteer surveyors) by way of a structured feedback survey form. The participants provided their feedback through our web site. The results of the feedback are very positive and are presented later in this report. (See Appendix 17)

#### **Objectives, planning, Research and Development**

#### 6. The issue and / or opportunity that inspired the initiative

The idea for the project arose when Nick de Weger attended a FIG conference in Sydney in 2010. At that conference Craig Roberts and Matthew Cooper presented a paper entitled "The scale of the solar system: Re-enacting the Transit of Venus observations 5-6 June 2012 (See Appendix 3) Towards the end of that paper, Cooper calls for observers from around the globe to scientifically observe the 2012 Transit of Venus. Roberts calls on surveyors to use the event to raise the profile of the surveying profession in the wider media.

The Transit of Venus occurs in a cyclic manner repeating every 234 years. Transits occur in pairs separated by eight years with large gaps either side of 112.5 years and 105.5 years which repeat sequentially. The previous Transit of Venus occurred on 8<sup>th</sup> June 2004, and the following will occur in December 2117.

Only after Captain Cook had completed his mission of observing the Transit of Venus in Tahiti, did he open his sealed orders which directed him to go in search of the Great South Land.

Consequently, The Transit of Venus is linked to the British discovery of Australia, it is a rare event, and it was used as part of an international scientific observation program to calculate the distance from Earth to the Sun. The event encompasses history, geography, science and mathematics.

Nick was aware of the lack of people entering the Surveying and Spatial Science professions. This is nothing new to our profession. It is something that various groups within the profession have been addressing for many years. It is still a serious issue as reported in the June/July 2012 edition of POSITION; this was the major topic of discussion May 2012 CRCSI conference in Brisbane and the WASSIC conference in Freemantle.

Recent media reports have confirmed that there are fewer students studying Science and Mathematics at High School. If students don't obtain a firm grasp on Science and Mathematics at Primary School, they naturally won't undertake Science and Maths at High School.

A good Secondary education in Science and Mathematics is a pre-requisite to undertake Tertiary Studies in the area of Surveying and Spatial Science.

Nick de Weger saw the opportunity to use the historic event of the Transit of Venus to encourage school children to see the relevance of maths and science, and hence undertake science and mathematics studies at High School that might lead to a career in the Surveying and Spatial Science Professions.

#### 7 The customer, community, market or environmental need that the initiative addresses

It has been acknowledged for several years that there is a shortfall in the number of students entering into the surveying and spatial science professions. This is an issue that is addressed at most Surveying and Spatial Science conferences.

Our professions have taken many actions in an attempt to address the shortfall, ranging from obtaining additional funding from the Commonwealth to address the training needs within the profession, through the offering of scholarships and prizes to students for academic or professional excellence, to the organisation of groups to promote surveying to school children, such as "Destination Spatial" and "A Life without Limits". Each of these

initiatives has had some impact. However, we are still facing an shortfall in the numbers entering the profession.

The Transit of Venus project was designed to **support** many of the existing initiatives. It was **not** designed to usurp the activities of any other group. It was designed to be another, slightly different initiative, designed to enthuse students, both primary and secondary, to see that Science and Mathematics can be exciting and relevant in today's society. As a result it is hoped that some additional students will consider a career in Surveying, Spatial Science or Astronomy.

#### 8 Any research that has been undertaken

A considerable amount of research was undertaken at the beginning of the project to determine:

- 1. Who was our target audience?
- 2. How to communicate with our target audience (or their influencers....teachers and parents)
- 3. What has worked in the past and what hasn't worked, and why?
- 4. Who else, with like motivation, was working in this area (Astronomers)
- 5. How the new National Curriculum for Schools might interface with our project

At the end of the project we also produced some research in the form of a feedback survey. This survey was sent to all the schools that were involved in the project, and all the volunteer surveyors who were involved in the project. The results of this survey are designed to inform future projects of this nature. The results of the survey are detailed in Appendix 17.

#### 9 The organisation's leadership strategy to meet its objectives

It was recognised from the beginning of the project that, in order for the project to succeed, it was imperative that the project had the following:

- 9.1 A clear focus.
- 9.2 Clearly articulated and understood governance arrangements.
- 9.3 A dedicated group of people to drive the project.
- 9.4 Good communications strategies to ensure all stakeholders were kept informed, and consequently motivated to ensure the success of the project.

These objectives were achieved by the following mechanisms:

#### 9.1 A clear focus.

The clear focus was arrived at through collaboration and documentation of the **Project Objectives** which are described in the Project Management Plan.

The objectives of the project were:

- a. To positively engage with school children by means of Observing the Transit of Venus. This engagement will be in the areas of geography, mathematics, history and science. The intention is to show to school children the relevance of our professions (Spatial Science, Surveying and Astronomy) to our society, past, present and future.
  It is hoped that this engagement will lead to students actively considering careers in our professions.
- b. To develop teaching materials that are aligned with the new National Curriculum and will be useful to both Primary and Secondary School teachers for some years to come. These materials will be "web based" and free to all.
- c. To utilize the phenomenon of the Transit of Venus to promote to the community at large, the relevance and contribution of our professions to our society, past, present and future.

When discussions moved far from these objectives, the project manager advised the group that such matters were outside the scope of this project, and that either we changed the objectives, or we dropped discussion on that matter. We did not change our objectives throughout the project. We did refer some matters to other groups.

9.2 Clearly articulated and understood governance arrangements.

A range of governance documents were generated throughout the project, although most were developed during the early stages of the project. The Governance Documents include:

- a. Project Management Plan (Appendix 1)
- b. Risk Management Strategy (Appendix 2)
- c. The Communication Plan (Appendix 5)
- d. Administration of the SolarScopes for Schools Competition (Appendix 6)
- e. Terms of Reference for each Team, namely; Schools, Media, Communications,
  Participant Engagement, Web, Technical, Administration and Financial (Appendix 4)

These governance documents were used to keep the project on track throughout the project.

9.3 A dedicated group of people to drive the project.

The Project Management Group was the group of people who were dedicated to drive the project. While some members were more active than others, all members contributed to the overall success of the project. There were very few occasions where members of the group did not achieve what they said they would achieve.

All Project Management Group meetings were minuted and clearly indicated what action was to be taken and by whom. (See Appendix 8) A review of the action items from the previous meeting was on the agenda for every meeting. (See Appendix 7) A list of outstanding actions was circulated to members between meetings.

9.4 Good communications strategies to ensure all stakeholders were kept informed, and consequently motivated to ensure the success of the project.

The recognition of the need for good communications in order to ensure the success of the project resulted in a Project team being established to address this issue. A Communications plan was produced and followed throughout the project. Regular reports were produced and circulated to all project stakeholders. The Transit of Venus December Report (Appendix 10) is an example of the type of report produced.

#### 10 The principles that were used in its planning and development

The project was developed using the following principles.

- 10.1 Only proceed if there is Adequate Funding
- 10.2 Use only VOLUNTEERS
- 10.3 Where skills to not exist, buy professional skills using a transparent procurement procedure
- 10.4 Provide all stakeholders with relevant and timely feedback, and do it often.

#### 10.1 Only proceed if there is Adequate Funding

This project was always going to be developed and delivered by volunteers. However, some funds were required in order to achieve its objectives. Funds would be required to pay for SolarScopes for schools, for the development and maintenance of a web site, for the purchase of specialist skills (such as media and promotions) and for postage and administration office supplies. We set a realistic budget for these items of \$30,000 (see section 2.3 of Appendix 1 for a detailed breakdown of costs). We decided that if funds of this magnitude could not be found by the end of 2011, then the project would not proceed. We would **NOT** attempt to deliver this project without adequate funding.

#### 10.2 Use only VOLUNTEERS

In general, we did not have the funds to pay for people to be involved in this project. However, we did need the assistance of many people in order to make the project a success.

Many of us had experienced working on projects where people have been coerced into some level of participation in the project. This usually results in a lack of enthusiasm for the project, and consequential failure to complete tasks in a timely way.

This project had a fixed delivery date (6<sup>th</sup> June 2012) that could not be changed by anyone but God!...and thankfully he didn't change it.

Consequently we chose to use only people who had freely volunteered to be part of the project. Most volunteers confirmed their volunteer status by submitting their details on the volunteer section of our web site. Their status as a volunteer was then confirmed by email from the Project Manager. As a result there was only one case where a surveyor failed to deliver a SolarScope to a school on time and in that case, the school had failed to respond to 3 telephone messages left by the surveyor.

This is a remarkable result for the use of volunteers!

10.3 Where skills do not exist, buy professional skills using a transparent procurement procedure

There were two areas where the project team lacked skills and that was in promotions and marketing, as well as web design and web building.

In these areas, we prepared detailed requirements and requested quotes from a range of known suppliers. Responses were evaluated by the relevant teams and recommendations made to the Project Management Group.

In both cases the suppliers chosen were well known to some group members and had previously supplied services to industry groups or members. Consequently they knew something about our industry, which minimised our need to familiarise them with our industry.

Both suppliers acknowledged our status as a volunteer group and offered us their services at reduced rates. We are very satisfied with the services that these suppliers provided to the project.

10.4 Provide all stakeholders with relevant and timely feedback, and do it often.

Our project plan called for us to provide quarterly reports to our funding bodies who, along with the members of our consultative committee are our major stakeholders. Our initial reports were quarterly reports in November 2011 and February 2012. There was also an urgent progress report in November 2011(See appendix 9 for November 2011 Report)

However, the Project Management Committee considered that, because progress was speeding up, more regular reports would be appropriate. Consequently, reports to all stakeholders were also produced in March, April and June 2012. (See appendix 11 for June Report)

This reporting was in addition to articles that were published in professional journals and papers presented at Teacher and SSSI conferences and workshops.

The above constitutes only part of our communications plan, which called for the following regular communications with various stakeholders.

Stakeholder	Information	Channel	Frequency
Group			
Owners	Summary project status Critical risks and Issues Budget and timeline performance	Written Report	Quarterly
Project Management Committee	Detailed Project Status All risk and Issues Budget and Timeline performance	Email Meeting	Monthly Monthly
Project Team Leaders	Detailed Project Status Interdependencies Risks and Issues	Email	Fortnightly
Project Team Members	Detailed Project Status Interdependencies Risks and Issues	From Team Leader	Fortnightly
Consultative Committee Members	Summary project status Highlights of project Upcoming events	Newsletter	Bi-monthly
Consultants & Contractors	Detailed Project Status Interdependencies Risks and Issues	Email	Fortnightly

#### 11 The key elements of the initiative and the resources required to execute the plan

The Project Management structure was arranged so that a Project Team would be responsible for each of the key elements of the project. The key elements were:

- 1. Schools....preparing resources for schools to use.
- 2. Web....developing and running a web site that met all the project needs.
- 3. Media....ensuring that the project had good media coverage.
- 4. Technical....having available a knowledgeable group of people to answer all the "tricky questions"
- 5. Financial....managing our financial resources legally and transparently.
- 6. Administration.....having a team of people available to do all the routine work.
- 7. Participant Engagement.....having a team to seek out volunteers for the project.
- 8. Communications.....having a team that is responsible for preparing and ensuring the implementation of our communications plan.

Terms of Reference were developed for each of these Project Teams. (See appendix 4)

All the project teams required volunteers, and it was the responsibility of the Participant Engagement team to find them...and they did. The only teams requiring funding were Web, Media and Administration. As reported earlier, the project did not proceed into development until adequate funds had been secured.

#### 12 The steps taken to ensure the initiative was both comprehensive and successful

The major step taken to ensure that the project was successful was the establishment of a Risk Management Strategy (Appendix 2) where all the known risks to the project were identified, assessed, a treatment developed to minimise the risk, and a person allocated to be responsible for managing the risk.

At every meeting, a review of the Risks was on the agenda. (See appendix 7) Where necessary, a revised treatment was developed and responsibility assigned. As new risks were identified, they were added to the Risk Register. (See Appendix 8, minutes of meeting)

#### Execution and / or implementation

#### 13 How the initiative was implemented with specific steps taken

As indicated in Section 11, a project team was allocated to each of the key elements of the project. This ensured that multiple activities could be undertaken concurrently.

All the activities effectively fed into the SolarScopes for Schools competition, which directed our key timelines, and effectively our "critical path".

Before we could promote the Schools Competition, we needed:

- 13.1 Our funding secured
- 13.2 Our Teaching materials prepared
- 13.3 Our web site established and operational
- 13.4 Our source of SolarScopes secured and costings confirmed
- 13.5 Our prime means of communication with schools decided and arranged

Once we commenced our promotion of the Schools Competition, we needed:

- 13.6 An administration system in place to confirm school entries and take orders for additional SolarScopes
- 13.7 A financial system in place to prepare and send invoices
- 13.8 A strategy to encourage volunteer surveyors to engage with the project
- 13.9 Additional information sources for schools and volunteer surveyors

At the end of the Schools Competition we needed:

- 13.10 A process for selecting the winning schools
- 13.11 A notification process to advise schools
- 13.12 A package of materials to assist volunteer surveyors in presenting SolarScopes to schools
- 13.13 A distribution strategy for delivering SolarScopes and hard copy materials.Appendices 15 to 16

On the day of the Transit of Venus, we needed:

- 13.14 The means to provide a live web cast of the Transit of Venus
- 13.15 Public viewing opportunities
- 13.16 Support to viewers experiencing difficulties with viewing the Transit

After 6<sup>th</sup> June we needed:

13.17 A means for participants to provide feedback to us

- 13.18 To collate the feedback
- 13.19 Write the final report
- 13.20 Conclude the project

Throughout the project we needed to keep all the stakeholders informed. Communications have been dealt with elsewhere in this report.

Expanding a little on the above items:

#### 13.1 Our funding secured

Our initial attempt to secure funding from the SSSI Vision Fund was unsuccessful. However our subsequent attempts within the Surveying Industry were successful. (See Appendix 9 for our plea for assistance and Appendix 10 for our words of thanks)

#### 13.2 Our Teaching materials prepared

Our partner in this project, the Astronomical Association of Queensland (AAQ) commenced the preparation of teaching materials for both the Transit of Venus and the Solar Eclipse early in 2011. They had engaged the support of a dedicated group of Science Teachers to prepare appropriate teaching materials based upon the new National Curriculum. This team of teachers, under the leadership of Astronomer Terry Cuttle, was well advanced when we commenced our project.

This group of teachers agreed to give priority to the completion of materials relevant to the Transit of Venus. They also agreed to promote our project at Science teacher conferences and seminars.

We had initially engaged with Geography teachers, but there was a lack of enthusiasm for our project within the Geography teacher group, and we decided to rely only on the Science teachers

#### 13.3 Our web site established and operational

The establishment and development of our web site was the responsibility of our web team that consisted primarily of Tim Pumpa (surveyor) and Jonathan Bradshaw (astronomer) with assistance from our contractor Moss Amor. The site design, layout, functionality and content topics were provided by the web team. The content was provided by other teams.

#### 13.4 Our source of SolarScopes secured and costings confirmed

Our SolarScopes are manufactured in France. There is no Australian distributor. We chose these SolarScopes because they were relatively cheap (retail at about \$150 each) easy to use, provided for multiple people to observe at the same time, provided a large clear image and were safe to use in that they used an indirect projection (no looking directly at the Sun). We managed to achieve a significant saving by purchasing in bulk.

However, to airfreight the instruments to Australia would more than double the cost of the Instruments. Consequently, we had to rely upon sea freight, with an 8 week duration.

We placed our first order early (January 2012) for 120 SolarScopes, based on our estimate of 100 free SolarScopes and 20 to be purchased.

Once the orders started to flow in, we realised that we would need more. Well before the Schools competition closed, we placed an order for many more SolarScopes than we had orders for. We ordered another 120 SolarScopes in March 2012.

After the Schools Competition had closed, and orders from schools were still rolling in, and orders from volunteer surveyors were still rolling in, we placed another order for 240 SolarScopes. This late March order left no margin for delays in the delivery of SolarScopes.

The first shipment arrived 1 week late. The second shipment arrived 2 weeks late. The last shipment arrived one week late, but we were able to shave time off the customs clearance and delivery time, so that final deliveries were made in time (with about a week to spare)

13.5 Our prime means of communication with schools decided and arranged

We purchased the contact details for all schools in Queensland, Victoria, ACT, Tasmania and South Australia. While these contact details included email addresses we were advised that SPAM laws would not allow us to directly email schools. Consequently we chose paper mail as the most appropriate way to contact all these schools. We sent letters to all these schools with the exception of NSW who used a different approach, namely encouraging surveyors to "adopt a school". The letter sent to schools is attachment 12

13.6 An administration system in place to confirm school entries and take orders for additional SolarScopes

The administration of the above system was devolved to 3 sub- committees, one in Victoria, one in NSW, and one in Queensland. Details of this arrangement are spelled out in Attachment 6.

The NSW and Victorian committees arranged for the engagement of their state volunteer surveyors, and the delivery of SolarScopes to schools.

The Queensland committee, which ended up being the Project Manager, dealt with all school entries, volunteers from all states other than NSW and Victoria, all SolarScope purchases, and the delivery of SolarScopes to the committees in NSW and Victoria and all other volunteer surveyors.

This task was effectively a full time task for the Project Manager for 3 months.

#### 13.7 A financial system in place to prepare and send invoices

ISA Queensland provided the project with a "bank account" and SSSI Queensland provided support with the production of invoices and the reconciliation of payments. All outstanding payments were chased up by the Project Manager.

Financial statements were provided for every Project Management Committee meeting.

13.8 A strategy to encourage volunteer surveyors to engage with the project

A range of strategies were used throughout the project to encourage surveyors to volunteer their services. Some strategies were jurisdiction specific.

Requests for volunteers were made at workshops and conferences throughout the nation. Articles were published in the various professional journals. Some jurisdictions made phone calls to individual surveyors. One jurisdiction used email to search for volunteers. NSW used their regional groups to engage with local surveyors

A volunteer registration form was established on the web site.

In the end, about 200 volunteer surveyors across the nation were recruited to present SolarScopes to schools.

13.9 Additional information sources for schools and volunteer surveyors

A lot of work went into the preparation of materials to assist surveyors in their presentations to schools. This work resulted in the following email being sent to all volunteer surveyors (Attachment 14) with a list of attachments (attachment 15)

13.10 A process for selecting the winning schools

The Project allocation of free SolarScopes was:				
NSW (including ACT)	35			
Victoria	30			
Queensland	30			
Other States and Territories	5			
TOTAL	100			

The Project Management Committee wanted, if possible, to make all schools that entered the competition, winners. The NSW and Victorian sub-committees were approached, and agreed that their members / local surveyor organisations would cover the cost of supplying SolarScopes over and above their allocation, to ensure that all schools that entered the competition would receive a SolarScope. The Project Management Committee, with support from Queensland surveyors agreed to cover the cost for Queensland and the remaining States.

Consequently an additional 239 SolarScopes were purchased for schools,NSW153Queensland47Victoria39

### The extremely generous support from surveyors and surveying groups throughout the Eastern States is gratefully acknowledged.

#### 13.11 A notification process to advise schools

All schools that entered the competition (in excess of 300) each received a SolarScope. They were all notified by email (See attachment 13).

## 13.12 A package of materials to assist volunteer surveyors in presenting SolarScopes to schools

It was made clear to volunteer surveyors that the extent of their involvement with the school would be, at their discretion, as little or as much as they were comfortable with, subject to negotiation with the school. However, the Project Team supplied each volunteer surveyor with a full range of materials to use at their discretion. The materials included a brief on how to make contact with the school and negotiate the range of activities to be presented. It also included draft media releases and a list of local media contacts, as well as a PowerPoint speech, and lesson plans for surveying type activities and career promotional materials. (See appendices 14 & 15)

13.13 A distribution strategy for delivering SolarScopes and hard copy materials

The SolarScopes were distributed by the 3 sub-committees, namely Queensland, NSW and Victoria.

As indicated previously, SolarScopes were shipped from France and arrived in 3 separate shipments. The 3<sup>rd</sup> and final shipment was always going to be a relatively late delivery, and consequently each sub-committee was advised to arrange delivery of SolarScopes to distant parts of their jurisdiction from the first 2 shipments. (See appendix 16 for shipment details)

SolarScopes were delivered to individual surveyors. The surveyors were responsible for the delivery of the SolarScopes to the schools.

As a result, Queensland mailed SolarScopes to Western Australia, South Australia, Tasmania and parts of Queensland outside the South East corner from the first 2 shipments. In order to speed up delivery, and save on costs, surveyors in SE Queensland were asked to collect their SolarScopes from 4 collection points, namely a location in North Brisbane, a location in Central Brisbane (SSSI office), a location in Logan City, and a location on the Gold Coast. Surveyors chose the location most convenient for them, and the sub-committee ensured the correct placement of SolarScopes and hard copy materials.

#### 13.14 The means to provide a live web cast of the Transit of Venus

One of the highlights of the project was the live web cast of the Transit. Our astronomy colleagues, Jonathan Bradshaw and Terry Cuttle organised this for us.

The main transmission site was from the University of Queensland site in Brisbane. In case of poor weather, back-up sites were also located at Home Hill in North Queensland (and some of the web cast came from Home Hill) the Blue Mountains in NSW, Melbourne and Perth.

Luckily the whole of Queensland had good weather for the whole of the day, and it was not necessary to use the back-up sites (although some air time was given to the Home Hill site).

The volume of traffic attempting to view the Transit on our web site <u>www.transitofvenus.com.au</u> was such that, on a number of occasions throughout the day, the web servers in 3 different countries could not cope with the traffic and were temporarily closed. However, in excess of 350,000 individual visitors logged onto our site on that day!

#### 13.15 Public viewing opportunities

In Queensland, the Project Management Group manned public viewing sites at the University of Queensland, St Lucia and the Brisbane Planetarium at Mt Coot-

ha. Also at these sites were astronomers who were allowing members of the public to view the transit through their telescopes fitted with appropriate filters.

We had SolarScopes and old theodolites with a projection screen fitted. Thousands of people visited these locations throughout the day (including media contingents).

13.16 Support to viewers experiencing difficulties with viewing the Transit

Support was provided to people who were having difficulties in viewing the Transit. Most queries were about either the inability to access our web site, or the fact that our web site was temporarily down.

All queries were dealt with promptly, and most provided feedback to the effect that they were subsequently able to access the web site.

13.17 A means for participants to provide feedback to us

Schools, volunteer surveyors and users of our web site provided us with feedback via email and our web site. (See appendix 18 for a sample of the unsolicited feedback)

All the feedback received in this way provided us with glowing reports. Some of this feedback was included in our June Report (See appendix 11)

However, the Project Management Committee wanted to capture some structured feedback from the participants. A request to complete a survey instrument was emailed to all schools that had entered the competition, as well as all volunteer surveyors. (See appendix 17).

- 13.18 To collate the feedback
- 13.19 Write the final report
- 13.20 Conclude the project

## 14 Training, educational programs or tools enabling widespread adoption of the initiative/s

The lesson plans for students of various ages have been made available to all schools through our web site.

An initiative that we became aware of during the conduct of the project, is the "Maths and Surveying in Schools" Project run by NSW surveyors. This project allows for students from various schools to participate with surveyors and teachers for one day a year in carrying out practical surveying exercises using modern surveying equipment, surveying software and GIS systems. Lesson plans are developed by qualified mathematics teachers and delivered by a combination of professional surveyors and experienced teachers.

The feedback we received from our structured survey instrument indicated that most schools would like to participate in such a program, and many surveyors would also be willing to be part of such a scheme. (See appendix 17)

It is proposed to attempt to expand the NSW scheme into a National scheme.

# 15 The extent the initiative required new types of collaboration across the organisation or externally

The two major groups offering careers information to students in the area of Surveying and Spatial Science are "Life without Limits" and "Destination Spatial". This project was carried out in a way that supported and promoted both of these groups.

Both of these groups purport to be National in focus, but both tend to have the support of only a few jurisdictions.

This project has hopefully displayed to both groups that it is possible to run National Initiatives that do not conflict with the objectives of either group.

This initiative has shown that collaboration between the surveying groups in various States can occur to provide a service to the community that is both positive for the community (in particular students) and positive in promoting the surveying profession. This project provided volunteer surveyors with the opportunity to interact directly with school students to promote our profession.

#### 16 The most important factors contributing to the initiative's success

The most significant factors contributing to the success of the project were:

- 16.1 A joint project with an allied profession (astronomers)
- 16.2 A cohesive and motivated Project Management Group
- 16.3 The financial support of surveyors and surveying organisations
- 16.4 The involvement of over 200 volunteer surveyors throughout the Nation
- 16.5 Quality teaching materials prepared by experienced teachers
- 16.6 A quality web site
- 16.7 A clear vision for the project

#### 17 The extent the initiative represents a new way of doing business or operations

This initiative confirms that it is possible to mount a National campaign to engage school children in a "surveying type event" if you devote sufficient organisational skills to the project. The "good will" exists within the surveying community to rally to a good cause that will promote the surveying profession.

While many volunteer surveyors were reticent about their ability to speak in public to a (sometimes large) group of students and teachers, most found the experience to be fulfilling, and are willing to be involved again.

#### 18 How the workforce has contributed to the achievements of the initiative

It will be some time (5 to 10 years) before we will know if this initiative has attracted more students into studying surveying or spatial science as a career. It takes that long for the education system to produce such results, as our target audience was primary and secondary students.

The unexpected outcome for the existing surveying workforce is that the volunteer surveyors who participated in the project have improved their communication skills, and are now confident to continue to interact with schools and students. Some surveyors have already developed ongoing relationships with schools.

#### Performance Results, Achievements and Industry Contributions

#### 19The short and long term benefits of the initiative

The prime objective of this project was to positively engage with school children, using the Transit of Venus, to show to them the relevance of our professions to our society, past, present and future. It was hoped that this engagement would lead to students actively considering careers in our professions.

We have positively engaged with over 60,000 school children. (See Appendix 17)

We are convinced of the positive engagement because both the unsolicited feedback and the structured feedback tell us so. (See appendices 17 & 18)

Teachers have advised us (using the feedback survey) that 6% of students are now significantly more interested in a career related to Maths and Science, 37% more interested and 35% only slightly more interested. This is a very promising result.

If we are able to capitalise on this initial positive engagement with a "follow-up" project like a" National Maths and Surveying in Schools" project, we are more likely to achieve our "hoped for" outcome of students considering careers in our professions.

Only time will tell whether this initiative (or others) will result in more students entering our professions.

#### 20 Community acceptance, understanding and uptake of the initiative

The number of schools that engaged in this project far exceeded the expectations of the Project Team. We hoped for a little over 100 Schools. 300 schools were engaged, and more wanted to engage in the period after the close of the competition, but we did not have the SolarScopes to provide them with a safe viewing mechanism.

Many teachers were so impressed with the experience that they sent unsolicited feedback such as:

#### Hi Graeme,

Thanks so much for organising SolarScope for our school. The SolarScope worked a charm although I was worried I had put the mirror in reverse. I managed to include 80% of the school in the viewing of the transit. Kids were totally engaged. Best learning experience for me in 2012. We even have a display up in our school foyer. I will fill in the online feedback for you.

#### Regards

VB (year 4/5 teacher Shailer Park S.S.)

For other examples of unsolicited feedback, (see Appendix 18).

Other evidence of the acceptance and uptake of the initiative is the media coverage of the events at schools throughout the State. (See Appendix 19)

## 21 The extent the organisation's initiative breaks new ground in the spatial industry and the wider community

This project was an educational project designed to interest school children in the practical application of Maths and Science, and possibly develop an interest in a career in Surveying, Spatial Science or Astronomy.

There are lots of initiatives that are designed to interest students in various careers.

What was different about this initiative were the following elements:

21.1 Using a "high profile", rare, natural event (The Transit of Venus) as the delivery mechanism.

21.2 The engagement of a large number (over 200) of professional surveyors to make presentations to schools.

21.3 The use of a "schools competition" to engage with schools and their students.

These elements are rather novel for a "careers" initiative, and contributed significantly to the success of the imitative.

However, the initiative also has "long term" educational components. These components include:

21.4 The teaching materials that is resident on our web site,

21.5 The SolarScope that can be used to observe "sun spots", solar eclipses, etc.,

21.6 For some schools, the ongoing relationship with "their own surveyor", and possibly

21.7 Involvement with the proposed" National Maths and Surveying in Schools" project.

### 22 The organisation's major achievements which demonstrate outstanding contributions to the community and to the Spatial Industry

This project has been successful on many fronts. The major contributions to the community include:

22.1 The sparking of an interest in school children in the practical application of Maths. and Science. There is a nationally recognised shortage of students undertaking further studies in Maths and Science. Teachers reported that 90% of their students were either very interested or extremely interested in the Transit of Venus. (See appendix 17)

The engagement of over 60,000 students nationally in observingthe Transit of Venus as part of their school learning experience. (See appendix17)

22.3 The recognition by the National Library of the historic value of our web site. It is now archived for posterity....a website of National significance!

22.4 Schools are willing to further engage with our professions in educational activities. 90% of schools involved in this project are willing to be involved in a "Maths and Surveying in Schools" project (See appendix 17)

The major contributions to the spatial industry include:

22.5 The development of an interest in a career in surveying, spatial science or Astronomy of significantly more students (See appendix 17)

22.6 The development in professional surveyors of their ability to promote our profession (especially to teachers and students)

22.7 The development of a readiness in professional surveyors to be more involved in promoting careers to students. 60% of surveyors that were engaged in this project are willing to contribute to a "Maths and Surveying in Schools" initiative.