

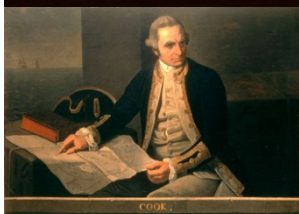
# Appendices

## FOR AN EDUCATIONAL PROJECT BUILT AROUND OBSERVING THE TRANSIT OF VENUS 6TH JUNE 2012

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Project Management Plan  
For  
An Educational Project built around  
Observing the Transit of Venus  
6<sup>th</sup> June 2012



Version 2.0

**Project Management Plan**  
For  
An Educational Project built around

**Observing the Transit of Venus**  
**6<sup>th</sup> June 2012**

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**Version Control**

Version No.	Changes	Date
1.0		3/10/2011
1.1	Numbering Add new 4.2	10/10/2011
2.0	Change to reporting arrangements	26/10/2011
2.1	Additional Members of PMC, Removal of SSSI Logo	7/11/2011

## Summary of Project

This project builds and expands on an existing project by the Astronomical Association of Queensland (AAQ) to promote Astronomy to Queensland school children through the observation of the total solar eclipse on 14 November 2012. The Queensland astronomers have already collaborated with Queensland Science teachers to prepare brochures and teaching materials. The materials already developed include access to the free software package (Stellarium) which calculates and graphically displays the night sky at any location on earth and at any time and date. Consequently, the software can simulate both the transit of Venus and the solar eclipse from various locations on Earth.

This project will use the same web delivery service developed by the AAQ for delivery of its school educational material, and also include additional material developed specific to the Transit of Venus. The materials will be available through both the AAQ website and the Destination Spatial web site.

In order to encourage schools to engage with the project, there will be 100 free Solarscopes available to the schools that “sign up”, and a further number available at a subsidised cost. A Solarscope is an optical device that allows the safe viewing of the sun.

In addition, a number of astronomical observatories throughout the world will observe and time the transit of Venus, so that the calculation of the distance between the Sun and Earth can be calculated. Some of these observatories will also broadcast their viewing in real time via the web. An observatory at Samford near Brisbane has already agreed to broadcast their observations.

Both the Transit of Venus and the Solar Eclipse will be promoted at Astronomical, Spatial and Teacher forums throughout Australia. A professional media consultant will be engaged to attract widespread media coverage of the events.



## 5.0 Project Objectives

### 5.1 *The Project Objectives*

The objectives of the project are:

2.1.1 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.

2.1.2. To develop teaching material that is 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.

2.1.3. 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.

## 2.2 Project Critical Timelines

The Project Critical dates are:

Activity	Date	
Secure Project Funding	November	2011
1 <sup>st</sup> Report to Funding Bodies	November	2011
Development of school teaching materials	January	2012
First release of web presence (School materials)	January	2012
2 <sup>nd</sup> Report to Funding Bodies	February	2012
Second release of web (School engagement)	March	2012
Release of school competition (Solarscopes)	March	2012
Media Releases	May	2012
3 <sup>rd</sup> Report to Funding Bodies	May	2012
Third release of web (Live viewing of Transit of Venus)	June	2012
Project Review	August	2012
Final report to Funding Bodies	August	2012

## 2.3 Project Costs

**2.3.1** The project has been run by volunteers to date, with office accommodation, meeting rooms, telephone conference calls etc. being supplied by the SSSI Queensland Regional Committee. The project will not progress without adequate funding, which it is hoped will be sourced from a variety of Surveying and Spatial Science Organisations.

Funds of the order of \$30,000 are required to progress this National Project. A breakdown of costs is as follows:

### 2.3.2 *Solarscopes for Schools*

The major incentive for schools to become engaged with this project is not only that teaching materials, aligned with the National Curriculum are available, but that a *Solarscope* for the safe viewing of the sun is available for schools. The first 100 schools to engage will receive their *Solarscope* free of charge, while the remainder of schools will be able to purchase *Solarscopes* at discounted prices. Our cost for a *Solarscope* is about \$70.00.

Our budget allows for 100 free <i>Solarscopes</i>	\$7,000 and
100 <i>Solarscopes</i> at a subsidy of \$30.00 each	\$3,000
Sub Total	\$10,000

If more than 200 schools subscribe to the scheme, then this proposal will need to be modified in some way (probably a lower subsidy).

### 2.3.3 Web

A suitable web site will be established to host the project.

The cost of establishing the web site (web design etc.) and hosting the site for 12 months is estimated at	\$5,000
The cost of developing professional student and teacher materials that will be hosted on the web is estimated at	\$3,000
The cost of writing suitable software programs to support the on - line calculation of the various astronomical events is estimated at	\$2,000
Sub TOTAL	\$10,000

#### 2.3.4 Media / Promotions

It is proposed to engage a suitable professional media consultant to maximize our media exposure. Estimated Cost \$5,000

#### 2.3.5 Administration

Funds from this source will be used to assist with presentations at workshops and conferences, as well as providing for “out of pocket” expenses for volunteer contributors. Postage and handling costs for the shipping of Solarscopes to schools will also be paid from this fund.

Presentations and workshops estimated cost	\$2,000
“Out of pocket” expenses for volunteers	\$1,000
Shipping expenses for Solarscopes	\$2,000

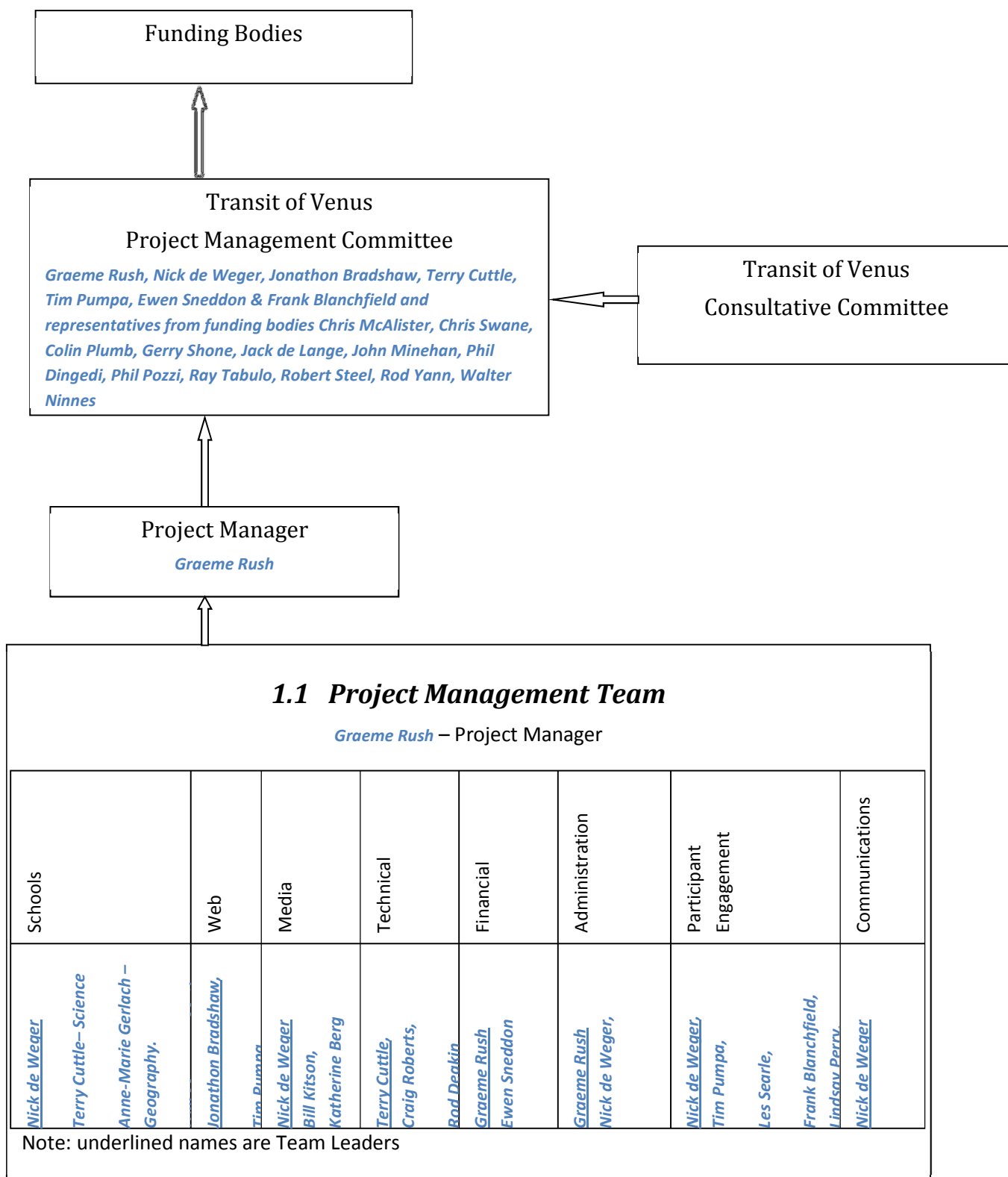
Sub TOTAL \$5,000

**GRAND TOTAL \$30,000**

## 3.0 Project Planning

### 3.1 Project Structures

The project structures are as detailed the diagram below.



The role of the Funding Providers, as funder of the project, is to ensure that the project meets the objectives of the Project. They do this by approving the project, and monitoring the performance of the project through regular (quarterly) reports.

The role of the Project Management Committee is to monitor the progress of the project and ensure that it remains within scope, within budget and on time. The committee also provides overall leadership for the project, and provides supportive advice to the Project Manager. The Project Management Committee also uses the individual and collective expertise of the Consultative Committee to provide advice for the project. The Project Management Team meets at least once per month, and at other times as required.

The Project Manager has the responsibility of driving the project to its successful completion. He ensures that there is good communication between all team members.

The Project Management Team consists of the Project Manager and all the team leaders tasked with the completion of the various tasks necessary to successfully complete the project. The team will consist of a mixture of paid consultants and project volunteers.

### **3.2 Project Communication**

The success of this project will rely largely on how well we communicate with all our stakeholders. There is a long and growing list of stakeholders, many of whom have representatives on the Consultative Committee. However, communication to stakeholders cannot be only through this committee. Consequently a detailed Communications Plan is under development.

The Communications Plan will include at least quarterly reporting to the Funding Bodies.

### **3.3 Project Tasks**

The major tasks are:

#### **3.3.1 Participant Engagement**

This task involves the identification, location and engagement of all stakeholders and participants in the project. It necessarily involves teachers, schools, suppliers, relevant professionals, sponsors and supporters.

Many of the major groups have already been identified, and are represented on the Consultative Committee. We still need to engage with overseas observatories in order to “pair” their observations with those made in Australia in order to calculate the distance between the Earth and the Sun.

The process of continuing to identify participants will continue for the life of the project.

#### **3.3.2 Communication**

As indicated above, a detailed communication plan is under development.

#### **3.3.3 Schools**

Materials prepared for schools will include the following:

- \* Lesson plans for both primary and secondary teachers, in the areas of geography, history, mathematics and astronomy.
- \* A school engagement process that will allow the school to receive a free or subsidized Solarscope.
- \* On line access to a software package that predicts astronomical events, and simulates their occurrence at any time or location on earth.
- \* Materials promoting the spatial professions
- \* Advice on the safe viewing of the sun.

#### 3.3.4 Web

The web will be the main delivery mechanism for materials delivered to schools. It will also be a mechanism for the safe viewing of the Transit of Venus.

The Transit of Venus web site will be directly available through the Destination Spatial web site, as well as the Astronomical Association of Queensland (AAQ) site. It will include appropriate marketing materials for the spatial professions.

#### 3.3.5 Media

A marketing professional will be engaged to ensure the maximum media exposure for both our schools exercise as well as the Transit of Venus observation. The media exposure will focus on the contribution that Surveyors and other Spatial Professionals have on our society, in the past, present and future.

#### 3.3.6 Technical

A technical team will be established. This team will ensure that all necessary on line calculations can be carried out. They will also provide the expertise basis from which a number of “fact sheets” will be developed on topics such as:

- The safe viewing of the Sun
- The safe use of a Solarscope
- The calculation of the distance between the Sun and the Earth
- The use of astronomical observations for the calculation of Latitude.

#### 3.3.7 Financial

The financial team will ensure that spending remains within budget, and that all financial reporting is accurate and timely. They will also be responsible for the financial governance of the project.

#### 3.3.8 Administration

The Administration Team will assist the project wherever administrative support is required.

### **3.4 Project Risk Management Strategy**

A separate document Risk Management Strategy has been prepared and is part of the project governance arrangements.

## **4.0 Project Implementation**

### **4.1 Project Reporting**

Reporting to the Funding Providers will be on a quarterly basis, unless there is a need to report more frequently on a needs basis.

### **4.2 Project Risks and Issues**

A project RISK is something that **may** occur during the term of the project. All project Risks will be identified and managed in accordance with the **Project Risk Management Strategy**.

A project ISSUE is something that has occurred during the term of the project. An ISSUE is something that was not anticipated in the planning of the project and may impact upon the project.

All project ISSUES must be reported to the Project Manager (and the Project Management Committee) as soon as they are identified. The Project Team may recommend a strategy to deal with an issue, however, the final decision as to how to deal with the issue is the responsibility of the Project Management Committee.

### **4.3 Change Management**

Any changes to the scope, cost or timelines of the project will require the approval of the Project Management Group. Such changes will be reported to the Funding Providers.

Any changes that are likely to see the project run significantly over budget require the prior approval of the Funding Providers.

### **4.4 Project Evaluation**

At the completion of the project, an evaluation will be undertaken to document our learning's for future projects.



**An Education Project  
Built around  
Observing the Transit of Venus  
6<sup>th</sup> June 2012**

**RISK MANAGEMENT STRATEGY**



Version 2.0



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## **RISK MANAGEMENT STRATEGY**

1. Context
2. Goals
3. Risk Identification Processes
4. Risk Management Matrix
5. Risk Management Processes

### Version Control

Version No.	Changes	Date
1.0		10/10/2011
1.1	Additions to risk strategies	17/10/2011
2.0	Additional Risks	26/10.2011

### **1. Context**

This project is unique within the SSSI (Surveying and Spatial Sciences Institute) and other funders' environment.

These organizations do not have any experience with working collaboratively with another professional organization on a project with strict timelines. .

The Project Management Team for this project has never worked together before. It is comprised of SSSI, other funders and AAQ (Astronomical Association of Queensland) members.

The project teams that have been assembled for this project have never worked together before. Many members may not have worked in a team environment, and many may not have been involved on a project with so many interdependencies and strict timelines.

The project teams are populated (generally) by enthusiastic volunteers with a wealth of professional experience, who are willingly giving of their time and talent for the betterment of our professions.

We will also be relying on the members of our professional organizations and our Consultative Committee to assist us in the promotion of this project.

These circumstances will add a number of RISKS to this project, in addition to all the risks usually encountered in the undertaking of a significant project.

Consequently it is imperative that we have a structured approach to identifying risks, assessing their significance to the project and where appropriate, addressing them.

## **2. Goals**

The risk management goals for this project are:

- 2.1 To identify all project risks before they become a project issue.
- 2.2 To put in place management strategies to appropriately manage all significant risks to this project.
- 2.3 To regularly review risks in order to:
  - a. identify emerging risks
  - b. reassess risks
  - c. confirm or modify risk management strategy

## **3. Risk Identification Processes**

The Project Management Committee (PMC) has prime responsibility for the identification and management of risks to this project. As a result they will review risks at each of their meetings.

The PMC is assisted in the risk identification process by all stakeholders, particularly the members of each of the 8 Project Teams.

The communication Plan highlights the significance of risk identification and management, and will be a feature of most project communications.

## 4. Risk Management Matrix

### Risk Assessment Matrix

The Risk Management assessment for this project is made using the table below that has been adapted from Standards Australia Risk Management standards. It is based in the subjective assessment of both the likelihood and consequence of a risk occurring.

		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
5	Almost Certain	M	H	H	E	E
4	Likely	M	M	H	H	E
3	Possible	L	M	M	H	E
2	Unlikely	L	M	M	H	H
1	Rare	L	L	M	M	H

*Adapted from Standards Australia Risk Management AS/NZS 4360: 2004*

Once a risk has been identified and assessed, it needs to be dealt with. In general there are 4 options for dealing with risks. They are;

- To avoid the risk
- To reduce the risk
- To transfer the risk, or
- To retain the risk

**Avoiding the risk** - not undertaking the activity that is likely to trigger the risk.

Factors to consider the validity of this option include:

- What will happen if the activity is not undertaken?
- Is the risk level too high to proceed / continue with the activity?
- Is the cost of the required controls higher than the benefit of the activity?
- Will the failure of the activity have critical consequences for other areas of the business?

**Reducing the risk** - controlling the likelihood of the risk occurring, or controlling the impact of the consequences if the risk occurs.

Factors to consider for this risk treatment strategy include:

- Can the likelihood of the risk occurring be reduced? (through preventative maintenance, or quality assurance & management, change in business systems and processes), or
- Can the consequences of the event be reduced? (through contingency planning, minimizing exposure to sources of risk or separation/relocation of an activity and resources).

**Transferring the risk** totally or in part. This strategy may be achievable through moving the responsibility to another party or sharing the risk through a contract, insurance, or partnership/joint venture. Please be aware that a new risk arises in that the party to whom the risk is transferred may not adequately manage the risk!

**Retaining the risk** and managing it. Resource requirements feature heavily in this strategy.

For each risk, the Project Management Committee determines treatment options, and completes the Risk Management Matrix.

### **Transit of Venus Project Risk Management Matrix**

No.	Risk	Likelihood	Consequence	Assessment	Treatment	Responsible Person	Last Modified
1	Funds not available	3	5	E	Detailed submission to SSSI Board	Graeme Rush	5/10/11
2	Tasks not completed on time	3	4	H	Fortnightly monitoring	Graeme Rush	10/10/11
3	Inability to recruit enough Team Members	2	4	H	Team devoted to Participant Engagement	Nick de Weger	10/10/11
4	Team members incapable of completing requested tasks	2	4	H	Fortnightly monitoring to conform capability	Graeme Rush	10/10/11
5	Inability to motivate Team members	2	4	H	Communications Plan designed to promote team achievements	Nick de Weger	10/10/11
6	Cloud cover on 6/6/12 obscuring sun	2	4	H	Observing stations located at different sites	Nick de Weger	10/10/11
7	Incorrect information on web site leading to a loss of credibility or even compensation claims	2	4	H	Disclaimer to be placed on web pages	Jonathan Bradshaw	17/10/11
8	Inability to engage appropriate consultants / contractors	2	4	H	Project Manager to drive engagement process for all contractors/consultants	Graeme Rush	17/10/11

9	Copyright / IP issues arise with information prepared by Team members	2	4	H	Team Members be requested to assign all their copyright to their professional association. Use of other IP materials to be discussed with Team Leader	Graeme Rush  Team Leaders	17/10/11  17/10/11
10	Relationship between SSSI and AAQ breaks down	1	4	M	Project Manager to ensure engagement of SSSI & AAQ through regular reporting	Graeme Rush	17/10.11
12	Website failure	2	3	M			
13	Media Promotions ineffective	3	3	M	Engage media consultant	Nick de Weger	10/10/11
14	Schools do not engage with project	3	3	M	This task has been allocated to the Schools Team	Nick de Weger	10/10/11
15	Lack of interest in project by SSSI members	3	2	M	This task has been allocated to the Participant Engagement Team	Nick de Weger	10/10/11
16	Solarscopes do not arrive on time	1	4	M	Place order for Solarscopes as soon as funding is approved	Nick de Weger	17/10/11
17	Team members do not co-operate with each other	2	3	M			
18	Teachers not able to complete materials on time	2	4	H			
19	State Government does not endorse a set of “safety rules” for the safe viewing of the SUN.	3	4	H			

## **6. Risk Management Processes**

The risk management process is driven by the Project Manager through the Project Management Committee. It is a cyclic process that includes the following steps:

1. Risk Identification
2. Risk Assessment
3. Development of a Risk Treatment
4. Allocating the delivery of the Risk Treatment to an individual (who may have the task undertaken by a team)
5. Monitoring the effectiveness of the risk treatment
6. Cycling through the process again

The Project Manager will regularly call upon Project Team Members and other Project Stakeholders to assist with Risk Identification (and other parts of the process as appropriate). The Communications Plan is designed to assist the Project Manager in this task.

Significant risks and their treatment are included in all reports to the SSSI Board.

Appendix 3	The scale of the solar system: Re-enacting the Transit of Venus observations 5-6 June 2012
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## **The scale of the solar system: Re-enacting the Transit of Venus observations 5 - 6 June 2012**

▣ **Craig ROBERTS, Australia and Matthew COOPER, Australia**

**Key words:** Transit of Venus, timing, history, re-enactment

### **SUMMARY**

The sighting of Australia by Captain Cook in 1770 was preceded by one of the most important scientific expeditions of the time; to measure the distance between the Earth and the Sun (an astronomical unit - AU) and so compute the scale of the solar system. This was achieved by measuring the time taken for Venus to transit across the face of the Sun for different locations on Earth and uses the parallax effect to compute 1 AU. The Transit of Venus is an astronomical event that occurs in a cyclic manner repeating every 243 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 last Transit of Venus occurred on 8 June 2004 and the next will occur on 5-6 June 2012.

A brief historical account of previous measuring campaigns which have occurred in 1761, 1769, 1874 and 1882 will be discussed. Surveyors have traditionally been involved in these measuring campaigns however nowadays modern techniques such as space-probe to planet radar distance measurements are used to compute the Earth- Sun separation.

An overview of the mathematics used to compute the Earth-Sun scale from time measurements of the transit will be presented. The accuracy of timing is a major determinant in the resultant distance measurement. A new method using video linked to a centralized timing system will be presented and it is hoped this will improve the quality of timing to a fraction of a second. Some information about the 2012 transit will be given and FIG delegates from those countries from which the next transit will be visible will be invited to participate in a re-enactment measuring campaign of the Transit of Venus on 5-6 June 2012.

# **The scale of the solar system: Re-enacting the Transit of Venus observations 5 - 6 June 2012**

▣ **Craig ROBERTS, Australia & Matthew COOPER, Australia**

## **1. INTRODUCTION**

On the 5 - 6<sup>th</sup> of June 2012, Venus will pass in front of the Sun in an event known as the transit of Venus. During the event, Venus will appear as a tiny dot on the face of the Sun (ingress), slowly moving across it before finally exiting from the face of the Sun (egress) about 6 hours later.

The transit of Venus is historically important as a method of determining the scale of the solar system. Transit observations allow the distance from Earth to Sun to be calculated – the fundamental unit for determining distances within the solar system. This distance is the Astronomical Unit, or AU. Throughout the 18<sup>th</sup> century many scientists travelled the globe to take observations of the transits of Venus, perhaps most notably explorer James Cook in 1769 who observed the transit in Tahiti, before charting East Coast of Australia and New Zealand.

Although there are far better ways to accurately derive the Astronomical Unit today, such as radar measurements to nearby planets (Sheehan & Westfall, 2004), the transit of Venus is a very rare event and presents a great opportunity to re-enact these original observations and use this as an opportunity to promote the surveying profession to the wider community.

Additionally with modern equipment and processing methods it is anticipated that a more accurate estimate of the Astronomical Unit would result. Digital image and video capture technology is now available, and integration with optical viewing devices such as telescopes and theodolites / total stations could provide a means of accurately timing stages of the transit of Venus, leading to a better quality observation, lasting evidence of the event and a better estimate of the Astronomical Unit.

The transit will not be visible in all parts of the Earth in 2012. Only a select few countries will experience the entire duration of the transit. For an observer in Sydney, ingress will begin at 8:16 AM local time on the 6<sup>th</sup> of June, with the transit lasting 6 hours 44 minutes and ending at 2:44PM local time (van Roode, 2009). Therefore to avoid the possibility of cloudy weather precluding observations, this paper hopes to attract FIG member organisations or institutions to simultaneously observe the transit from the locations around the world shaded white in Figure 1.



## 2012 Transit of Venus

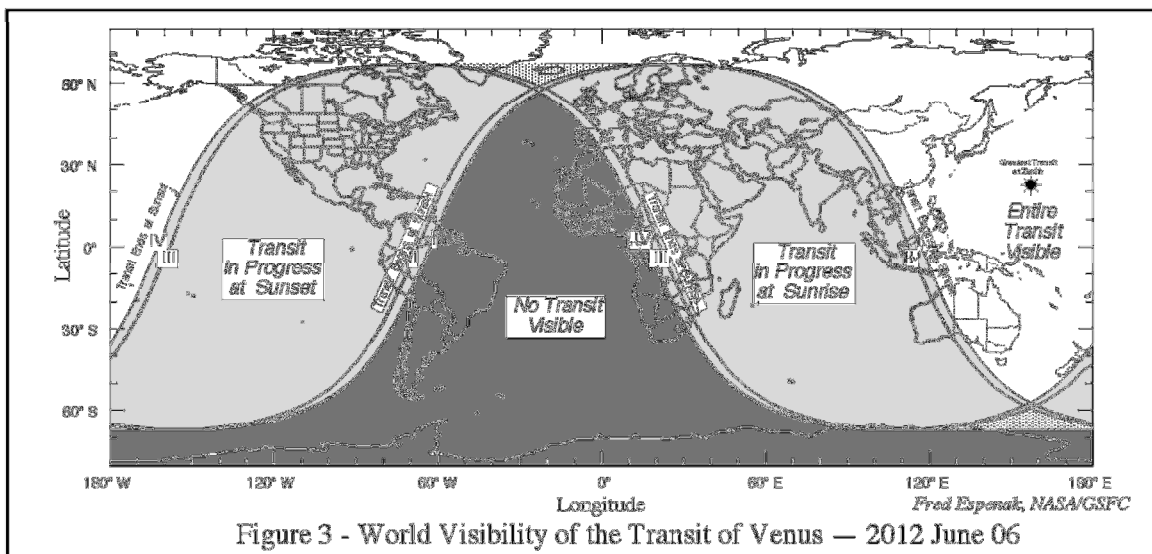


Figure 1 - Visibility of transit (NASA, 2009a)

This paper will seek to explain the transit of Venus and set out the basic computations and geometry for deriving a measure of the Astronomical Unit from timing measurements and make a call for partners in preparation for the event in June 2012.

## 2. THE TRANSIT OF VENUS

### 2.1 The transit of Venus explained

The Earth orbits around the Sun in an ellipse, with the Sun at one of its foci. The orbit of the Earth forms a plane, with the Sun lying in the middle, known as the Earth's orbital plane.

The ecliptic is the apparent path the Sun takes around the Earth in a year, relative to an observer on Earth. The ecliptic is not parallel to the direction of Earth's rotation (equator), but it is inclined by  $23.5^\circ$ , which is the cause of seasons. Figure 2 shows the ecliptic.

The ecliptic plane is the same as the Earth's orbital plane, and is used as a reference plane to compare the orbits of other planets.

Venus' orbit is inclined (by  $3.39^\circ$ ) relative to the ecliptic, resulting in it crossing Earth's ecliptic twice in each complete orbit around the Sun. The two points it crosses are known as the ascending node (Venus moves up) and the descending node (Venus moves back down). These are insignificant events, except when Earth is aligned with one of the nodes and the Sun, at the same moment as Venus. When this happens Venus passes between Earth and the Sun, resulting in a planetary eclipse of the Sun. This event is known as the transit of Venus.

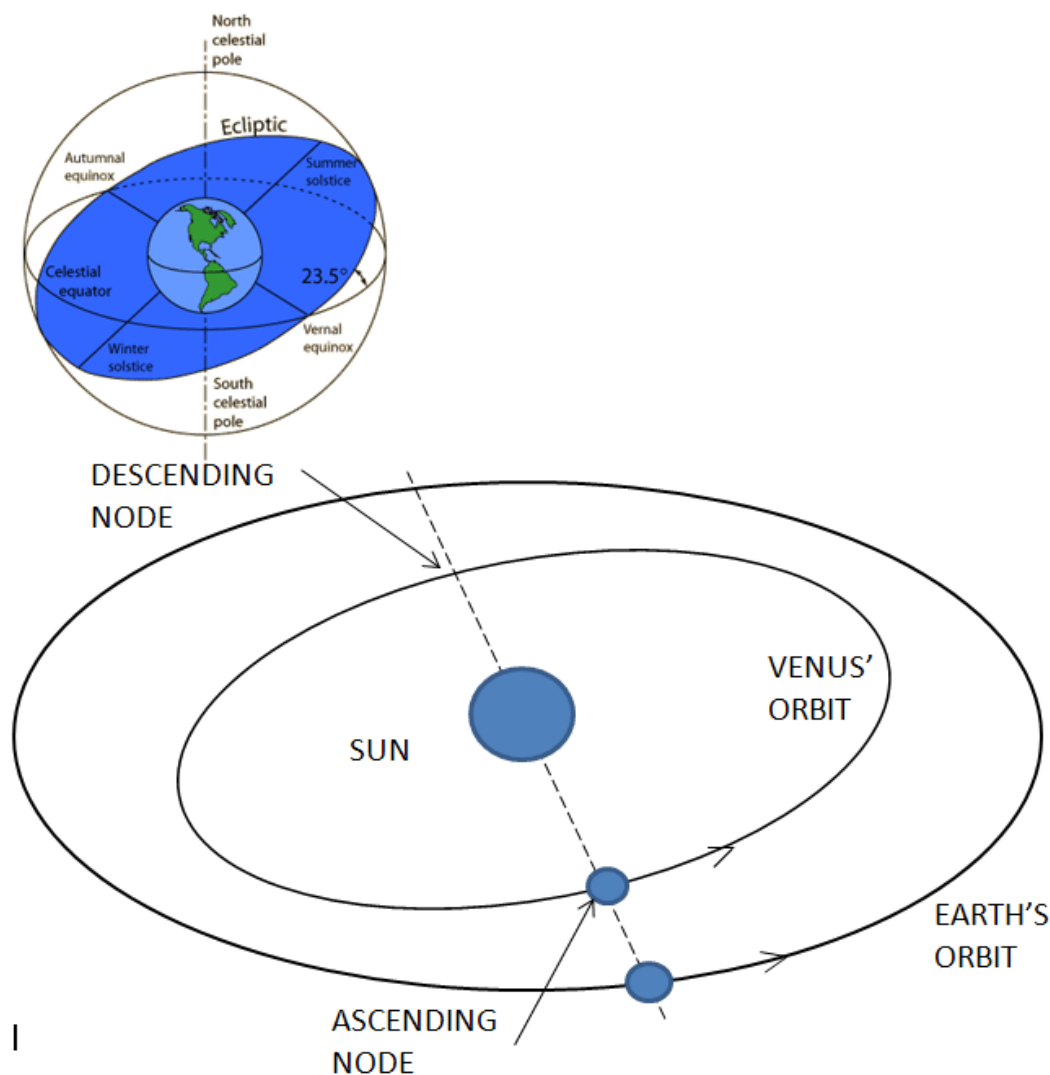


Figure 2 (left) – The Ecliptic (Hyper physics, 2006), & Figure 3 (right) – Ascending and descending nodes of Venus' orbit relative to Earth's orbit

## 2.2 History of the Transit of Venus

Transits of Venus were first predicted by Johannes Kepler in the early 17<sup>th</sup> century, as a result of his revolutionary work on determining the elliptical orbits of the planets about the Sun. The first transit of Venus to be scientifically observed was the transit of 1639, which Jeremiah Horrocks predicted after refining Kepler's work in planetary orbits (Sheehan & Westfall, 2004). Horrocks observed this transit using a telescope to project the image of the Sun onto a piece of paper, outlining the image of the Sun and marking the position of Venus at intervals. He and accomplice William Crabtree were the only people in the world to observe this transit (Ibid, 2004). He made an estimation of the Astronomical Unit from this, but his estimation was based on assumptions on the size of Venus (Ibid, 2004).

Early in the 18<sup>th</sup> century, Edmund Halley proposed a method of calculating the distance from Earth to Sun using transits of Mercury or Venus. His method was to observe a parallax shift of the Sun between two locations on Earth. Halley's method required the duration of a transit be recorded from the moment Venus enters onto the Sun's disk to the moment it leaves. Such

observations were to take place at two locations where the entire transit would be visible, separated by as large a distance as possible to obtain maximum parallax.

Later, Joseph-Nicolas Delisle proposed a variation on this method that didn't require the entire duration of the transit to be timed. Delisle's version required only ingress (entry) or egress (exit) of Venus to be observed at a pair of stations, and recording the absolute time (in Greenwich or Paris time) of the event at each station (Sheehan & Westfall, 2004).

The transits of 1761 and 1769 were observed by many people, in different locations around the world. The 1769 transit is the one observed notably by Captain James Cook in Tahiti (assisted by astronomer Charles Green), which was successfully performed before they proceeded on to chart the East Coast of Australia and New Zealand (Howse, 1990). They used Delisle's method to observe the transit to calculate the AU (Sheehan & Westfall, 2004). Accurate time had to be determined of ingress or egress, plus latitude and longitude of the observing location. A Shelton astronomical regulator clock was used to determine time of the event, and this clock had to be checked daily against local noon (Howse, 1990). Latitude was determined by observing the Sun and stars with the quadrant, while longitude was determined by observing lunar distances with a Hadley sextant.

Cook and Green both noticed a "halo" around the edge of Venus as it made its way onto the Sun. This they called the penumbra, and the result of it was that they both missed the exact timing of the first contact of Venus with the Sun. For the second contact, however, they agreed exactly on its timing. They differed by 6 seconds for the time of the 3<sup>rd</sup> contact, while the fourth contact was difficult to time (because of the penumbra), with no time recorded in Cook's notes. Cook and Green were reportedly disappointed with their results, having undertaken the project with high expectations of accuracy. However, the results have since proven to be much better than they believed, according to Lomb (2004).

The 1874 transit was observed in Australia in various locations around NSW to overcome cloudy conditions or missed observations. However by 1882, transit observations were no longer used to calculate the Earth-Sun distance, since alternative methods had been discovered to calculate the Astronomical Unit (Sheehan & Westfall, 2004).

Table 1 shows the transits of Venus that have occurred since 1631, and those that will occur in the next century.

Date of transit	Ascending (A) or Descending (D) node	Duration since last transit (years and months)
6 December 1631	A	
4 December 1639	A	8 yrs
6 June 1761	D	121 yrs 6 months
3 June 1769	D	8 yrs
9 December 1874	A	105 yrs 6 months
6 December 1882	A	8 yrs
8 June 2004	D	121 yrs 6 months
5 June 2012	D	8 yrs
11 December 2117	A	105 yrs 6 months
8 December 2125	A	8 yrs

Table 1 – List of transits and their intervals (Sellars, 2001)

This table shows a regular pattern (122.5 yrs – 8 yrs – 105.5 yrs – 8 yrs – 122.5 yrs.....), with transits occurring in 8 year pairs, with the transits in each pair occurring upon either an ascending or descending node in Venus’ orbit.

### 3. HALLEY’S METHOD TO DERIVE THE ASTRONOMICAL UNIT

Stern (2004) presents a simplified methodology to calculate the AU using basic geometry based on sample data from the 2004 transit. The last transit occurred on the 8<sup>th</sup> of June 2004, close to the solstice. The “observations” in this calculation are predicted observations only for that transit.

Observing locations:	Lat	Long
Cairo (1)	30° N	32° E
Durban (2)	30° S	31° E

The locations were chosen because they share (approximately) the same longitude, which means that each appears to rotate around the Earth at a similar velocity relative to Venus. Equal and opposite latitudes were chosen so that the distance between the two points, perpendicular to the plane of the ecliptic, remains at all times of the day (Figure 4).

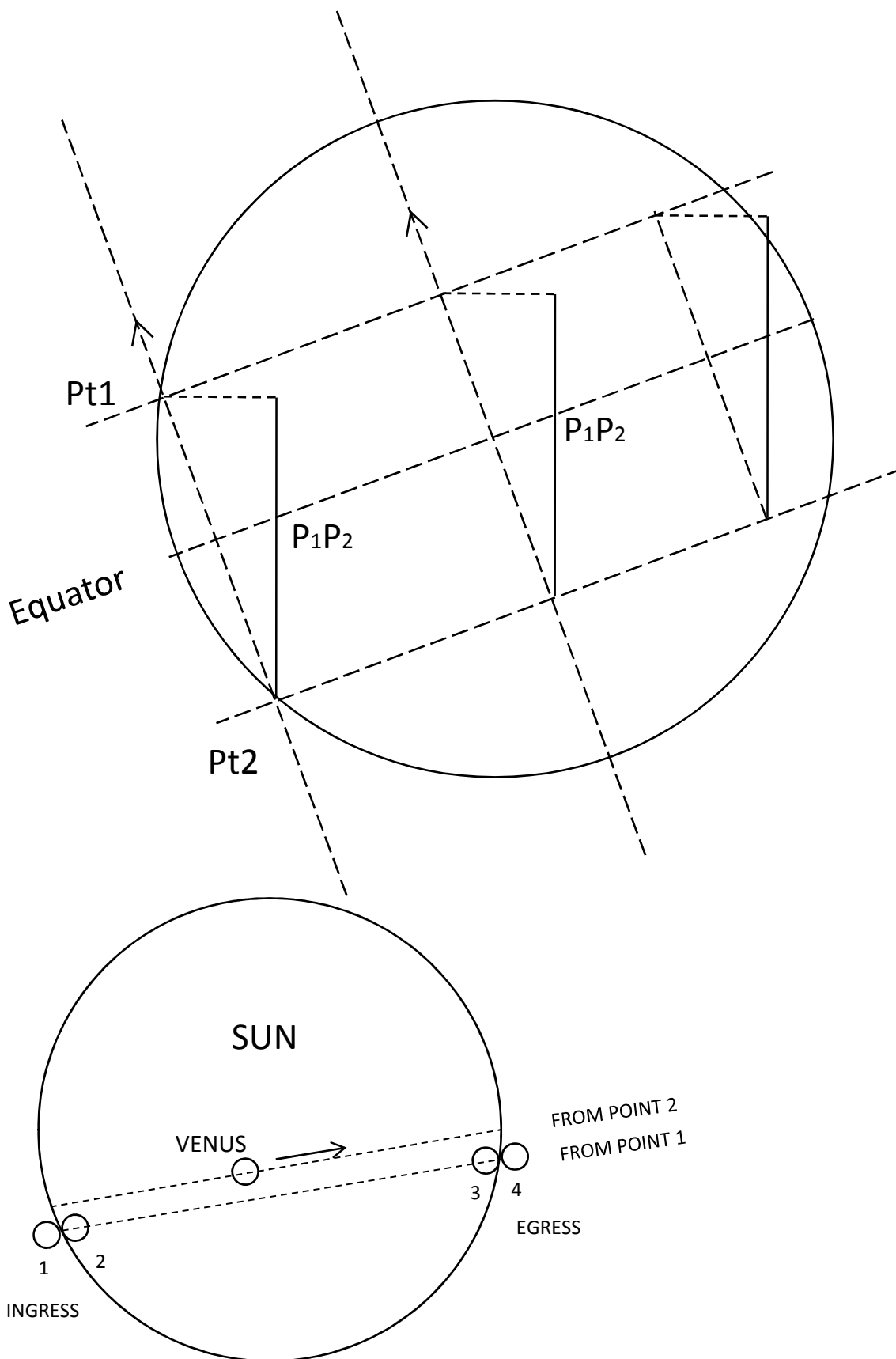


Figure 4 (left) – Distance between points 1 and 2 on the Earth with respect to the plane of the ecliptic & Figure 5 (right) – The path of the transit across the face of the Sun.

Observing the transit of Venus requires recording the times when Venus contacts the Sun. There are 4 contacts: numbered 1 to 4, the first called external ingress (Venus touches the outside of the Sun's disk), the second internal ingress (Venus now fully within the Sun's disk), the third internal egress (Venus touches inside of Sun's disk on the way out), and the fourth external egress (Venus touches outside of Sun's disk on way out) (Figure 5).

The length of time between these two contacts forms the basis of the calculations. This time is represented by an  $L$  value for each location. In this case, from Stern's data,  $L$  measured between the 2 contacts at each location was as follows:

Cairo: 19,526 seconds

Durban: 20,055 seconds

Average  $L (\bar{L}) = 19,790.5$  seconds     $L = 529$  seconds

For the purpose of these calculations, the astronomical unit (AU) is the average distance from the Sun to the Earth. The distance between Earth and Sun varies because the orbit of Earth is elliptical (with the Sun at one of its foci), and the distance from the Sun varies according to the formula:

$$d_{ES} = AU \frac{(1 - e^2)}{1 + e \cos \theta} \quad (\text{Equation 1})$$

Where  $e$  is the eccentricity of the Earth's orbit, and  $\theta$  is the angular position of the Earth in its orbit around the Sun, whereby  $0^\circ$  begins at the perihelion (see Figure 6). The distance from the Earth to the Sun  $d_{ES}$  at any point in its orbit is given by the formula shown in equation 1.

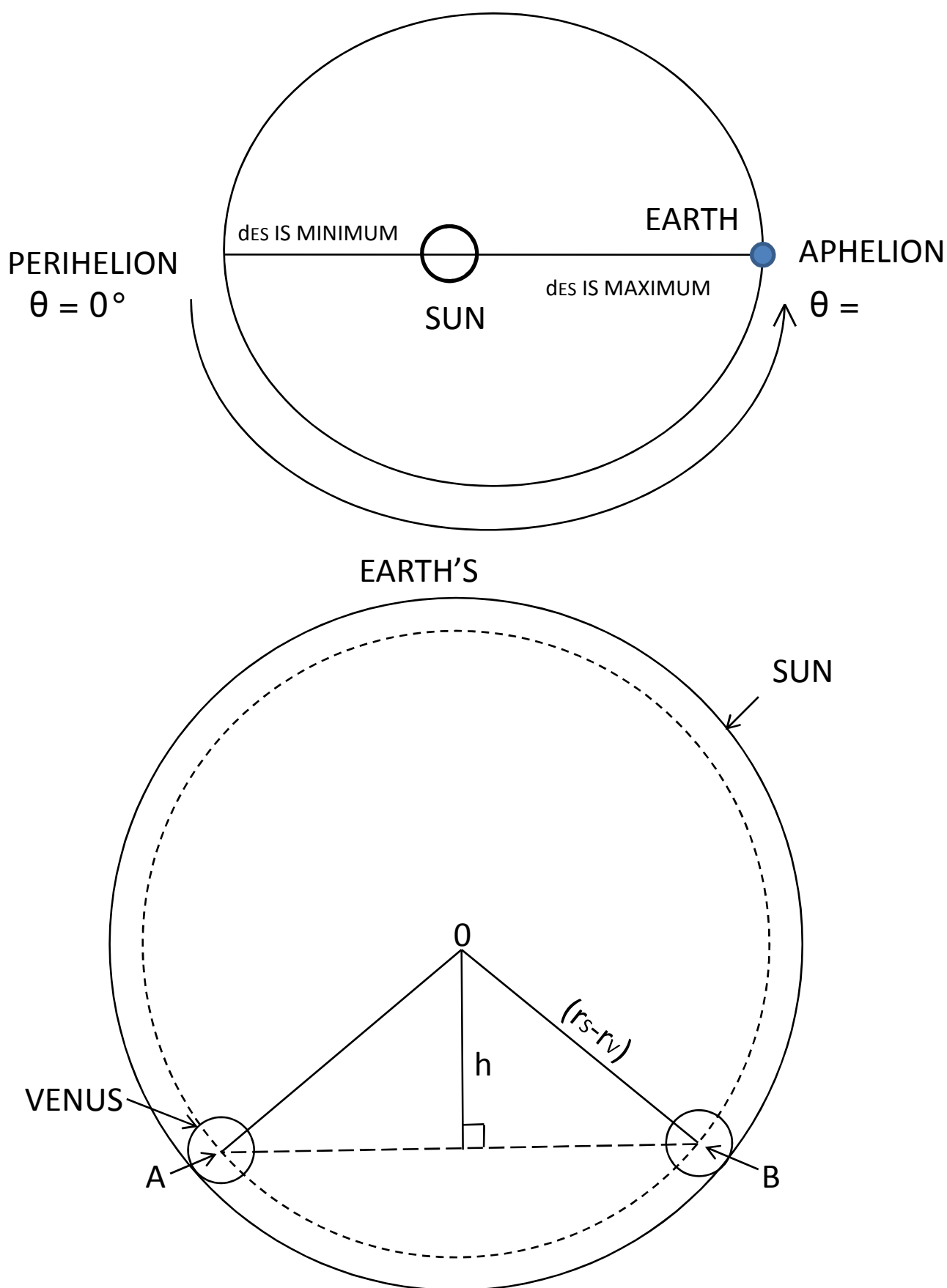


Figure 6 (left) – Elliptical revolution of Earth around the Sun, & Figure 7 (right) - Geometry of transit of Venus on the face of the Sun.

The Sun and Venus, as they appeared in the sky on Earth for this transit, have apparent diameters as follows (Stern, 2004):

Sun: 31.5 arc minutes (The apparent radius of the Sun ( $r_s$ ) is 15.75')

Venus: 1 arc minute (The apparent radius of Venus ( $r_v$ ) is 0.5')

According to Stern (2004), at each location a line can be drawn between the second and third points of contact (AB from figure 7) of the transit of Venus on the Sun. The line AB is a perpendicular distance  $h$  from the centre of the Sun ( $O$ )<sup>1</sup>.

In this example, at Cairo, the transit of Venus follows the line  $A_1B_1$ , while at Durban, the transit follows the line  $A_2B_2$  (see figure 9). At Durban, the distance  $h$  is slightly smaller than  $h$  at Cairo, because Venus, as it appears in the sky relative to the Sun at Durban, is slightly higher up (see figure 8).

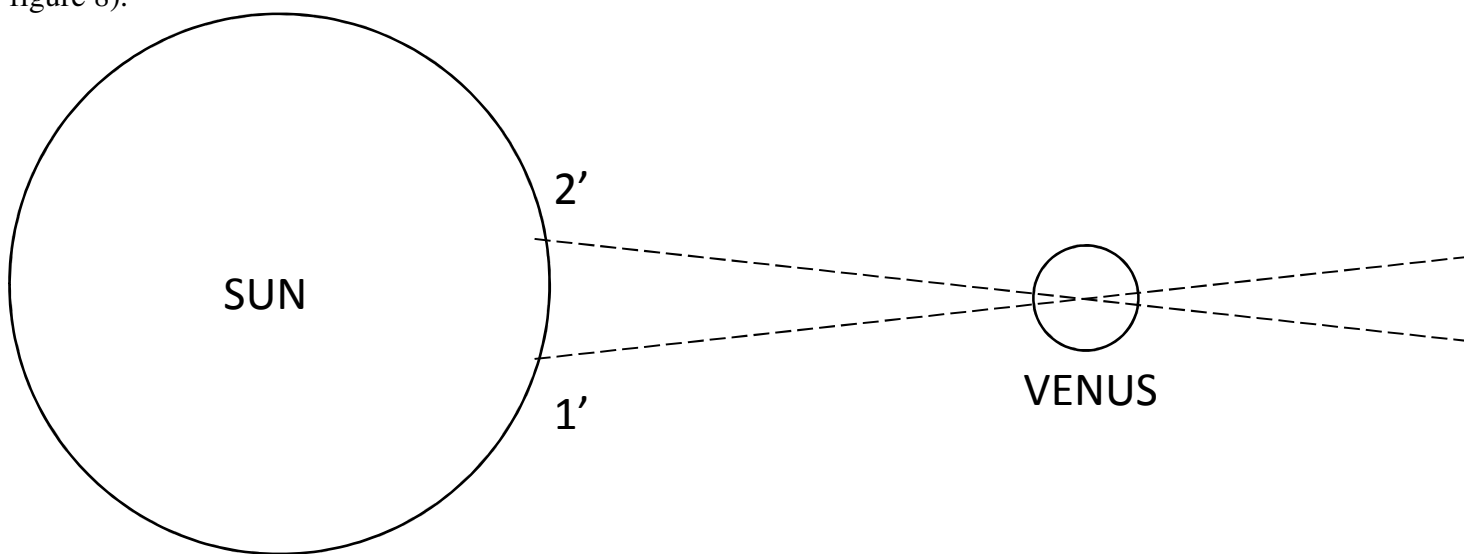


Figure 8 – Apparent line of sight of Venus on the face of the Sun from Earth

Thus there is a difference in  $h$  values ( $\Delta h$ ) between the two locations, represented by  $D$  (Stern, 2004) (Figure 9). This  $D$  is the apparent parallax shift of Venus relative to the Sun between Durban and Cairo, measured in minutes and seconds of arc.

<sup>1</sup> Note: Point A is the centre of Venus at the second point of contact with the Sun (internal ingress, when Venus' exterior just breaks contact with the inner edge of the Sun's disk). Point B is likewise the centre of Venus at the third point of contact with the Sun (internal egress). Hence the lines OA and OB have a length equal to the radius of the Sun minus the radius of Venus.



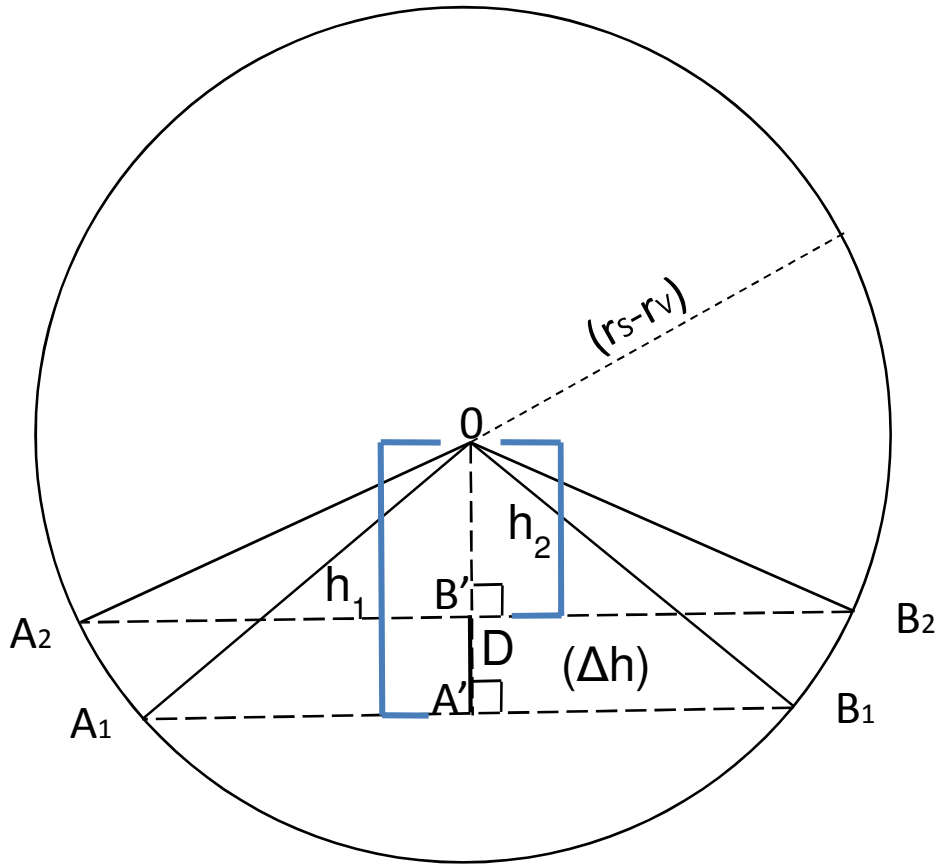


Figure 9 - Geometry of the trajectory of transit of Venus on the face of the Sun. (Note: D = difference between A' and B' in this diagram =  $\Delta h$ )

According to calculations by Heinz Blatter (2003), an approximation for the apparent velocity of Venus ( $\omega_{VS}$ ) relative to the Sun is

$$\omega_{VS} = 0.0672''/s$$

Using this value, and the durations recorded for the transit at each location, the apparent lengths  $A_1B_1$  and  $A_2B_2$  (Figure 9) can be calculated.

According to Blatter (2003), for each location:

$$l_{AB} = \omega_{VS} * L \quad (\text{Equation 2})$$

where  $L$  is the length of the transit (in seconds) at that location.

The perpendicular distance between the two trajectories Venus takes across the Sun is represented by the value  $D$ , the difference between the lengths  $OA'$  and  $OB'$  shown in figure 9. Blatter (2003) provides Equation 3 to compute  $D$  from the information obtained thus far.

$$D = l_{OA'} - l_{OB'} = \sqrt{(r_s - r_v)^2 - \left(\frac{l_{A_1B_1}}{2}\right)^2} - \sqrt{(r_s - r_v)^2 - \left(\frac{l_{A_2B_2}}{2}\right)^2} \quad (\text{Equation 3})$$

For this example  $l_{A_1B_1} = 1312.5'' = 21.869'$ ,  $l_{A_2B_2} = 1347.70'' = 22.461'$ . Substituting the values for  $r_s$  and  $r_v$  into the formula above gives  $D = 0.3132'$

Using some known data (given below) the distance  $P_1P_2$  can be derived relative to the ecliptic.

Average radius of the spherical Earth ( $R_E$ ) = 6371 km,

Venus' orbital period ( $T_V$ ) = 0.616 Earth years,

Eccentricity of Earth's orbit ( $e$ ) = 0.01673,

Eccentricity of Venus' orbit = 0 (Venus' orbit has a very small eccentricity and is ignored).

This distance forms the baseline to compute the parallax of Venus and the Sun (Stern 2004).

The angle subtended between points 1 and 2 (from the centre of the spherical Earth) is equal to, in this case, the latitude of Cairo minus the latitude of Durban (Figure 8). The chord between them is calculated by simple trigonometry:

$$\text{Chord } P_1P_2 = R_E \sin(\text{lat}(1)) - R_E \sin(\text{lat}(2)) \quad (\text{Equation 4})$$

Since the Earth is tilted  $23.5^\circ$  relative to the ecliptic, the chord between the points will be tilted by this angle as well. Since distance between points perpendicular to the ecliptic is required, the chord length is multiplied by  $\cos(23.5^\circ)$  giving:

$$\text{Dist } P_1P_2 = \text{chord } P_1P_2 * \cos(23.5^\circ) \quad (\text{Equation 5})$$

This perpendicular distance stays constant regardless of the rotation angle of the Earth at any time due to the symmetry of the chosen latitudes.

In this case, substituting the values  $\text{lat}(1) = 30^\circ$ ,  $\text{lat}(2) = -30^\circ$ ,  $R_E = 6371$  km resolves

$$\text{Chord } P_1P_2 = 6371 \text{ km}$$

$$\text{Dist } P_1P_2 = 5842.6 \text{ km}$$

The aphelion occurs in early July, so at the time of the last transit (8<sup>th</sup> June 2004)  $\theta$  is nearly equal to  $180^\circ$ . This could be computed accurately but for this purpose  $\theta = 180^\circ$  is assumed.

Thus, substituting this value into equation 1 results in:

$$d_{ES} = 1.01673 \text{ AU} \quad (\text{Equation 6})$$

The orbital period of Venus is 0.616 Earth years (Stern 2004). From Kepler's Laws of planetary orbits, the period and orbital radius are related by the following formula:

$$T_V^2 \propto R_V^3 \quad (\text{Equation 7})$$

Since period is expressed in terms of Earth years and orbital radius in Astronomical Units, it becomes an equation:

$$T_V^2 = R_V^3 \quad (\text{Equation 8})$$

Substituting 0.616 yrs for  $T_V$ :

$$R_V (d_{VS}) = 0.724 \text{ AU} \quad (\text{Equation 9})$$

According to Stern (2004) the distance between Venus and the Earth ( $d_{EV}$ ) is calculated by:

$$d_{EV} = d_{ES} - d_{EV} \quad (\text{Equation 10})$$

This gives:  $d_{EV} = 1.01673 - 0.724 = 0.291 \text{ AU}$

### 3.1 Parallax shift of the Sun

Parallax is a “Difference or change in the apparent position or direction of an object as seen from two different points” (Oxford English Dictionary 2<sup>nd</sup> Ed.). It is the parallax effect that is used to solve the distance of Venus from Earth, and thus calculate the astronomical unit.

Because the Sun is not infinitely far away, the location of its centre will shift slightly (with respect to distant stars) when viewed from two separate locations on Earth. This Solar parallax impacts on the parallax shift of Venus because the parallax of Venus is measured relative to the Sun. Figure 10 represents an exaggerated side-on view of a transit of Venus, at the time when Venus is in the middle of its transit between ingress and egress, and shows how the closeness of the Sun impacts on the observed parallax angle of Venus. (Assume Venus transits across the centre of the Sun relative to the centre of the Earth to simplify the concept).

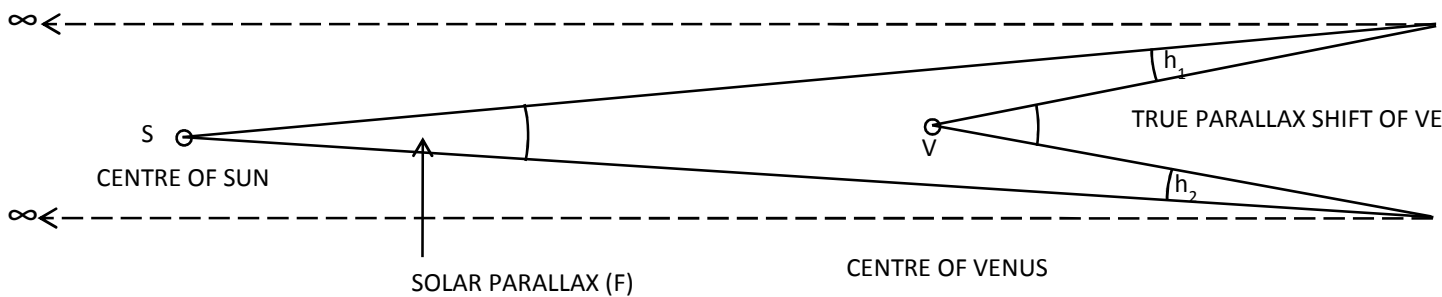


Figure 10 – Solar Parallax

From figure 10, at  $P_1$  the angle  $\alpha$  is equal to the angle  $h_1$ , or the line  $OA'$  as shown in figure 9. Likewise the angle  $\beta$  is equal to the angle  $h_2$  at  $P_2$ . In figure 10, the centres of the Sun, Venus and the Earth all lie on the same plane (not usually the case with transits of Venus), so  $\alpha$  and  $\beta$  are equal and opposite (in magnitude) angles. As shown previously, the parallax shift between the two locations of Venus relative to the Sun is  $D$  ( $\Delta h$ ), which is equal to  $\alpha - \beta$ . In this diagram the angles are opposite magnitudes ( $\beta$  is negative), therefore the angles sum to  $D$ .

At each point, the angle subtended between the centre of the Sun and the centre of Venus is smaller than the angle that would be subtended between some infinitely distant reference point (parallel to the ecliptic plane) and Venus. If the Sun were infinitely large and infinitely far away, it would not shift at all between the two observing locations and we could measure the true parallax shift of Venus between the two locations, relative to the Sun's centre. However, the Sun is actually close enough to Earth that Earth observers will experience a parallax effect when looking at it from two separate locations, just like Venus, only the parallax will be smaller.

To compute the correct parallax angle ( $D'$ ), add the parallax of the Sun ( $F$ ) to the parallax of Venus relative to the Sun ( $D$ ) (Stern 2004). The equation for this is

$$D' = D + F \quad (\text{Equation 11})$$

Stern (2004) relates the value  $F$  to the distance  $P_1P_2$  by looking at each value as a segment of a complete circle. The angle  $F$  can be expressed in minutes of arc, and there are 21,600 minutes in a

full circle. The distance between  $P_1$  and  $P_2$  is a chord of a much larger circle, with a circumference of  $2\pi d_{ES}X$ , where  $d_{ES}$  is the distance between Earth and Sun at the time of the transit (due to elliptical orbit) (in Astronomical Units) and  $X$  is the number of kilometres in one astronomical unit. Since the parallax angle of the Sun is so small, the chord length between the two points is virtually identical to the arc length between them.

So, by observing Figure 11, it can be seen that the following is true:

$$\frac{F(\text{in minutes of arc})}{21,600} = \frac{\text{dist}_{P_1P_2}}{2\pi d_{ES}X} \quad (\text{Equation 12})$$

Where  $d_{ES}$  = Radius of Earth's orbit at the time of transit,  $X$  = No. of km in one AU

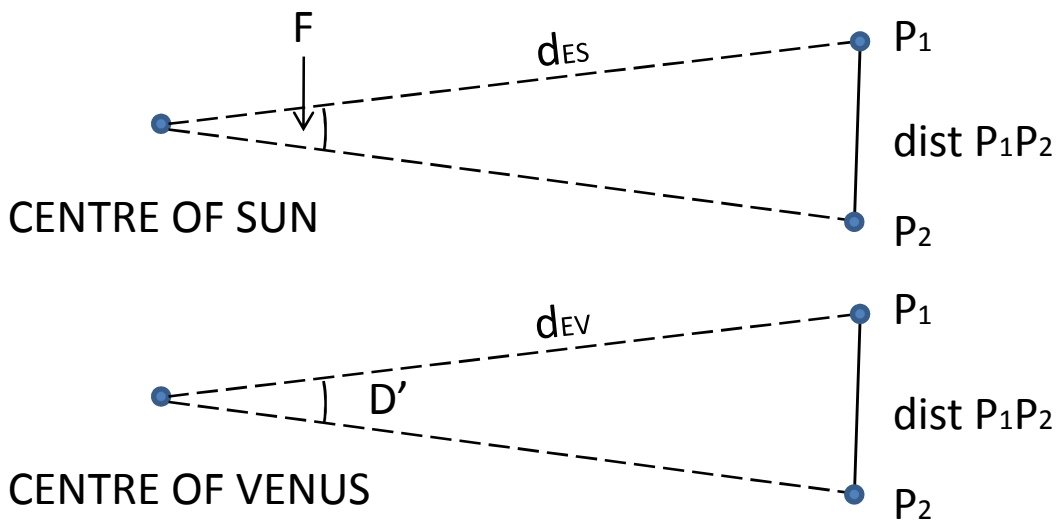


Figure 11(left) – parallax to the Sun & Figure 12 (right) – parallax to Venus

Rearranging equation 12 gives

$$X = \frac{21,600'}{2\pi d_{ES}} * \frac{d_{P_1P_2}}{F} \quad (\text{Equation 13})$$

Given the correct parallax angle of Venus ( $D'$ ), the parallax angle between the two locations  $P_1$  and  $P_2$  can be represented diagrammatically, as shown in Figure 12.

Cooper (2009) details Stern's derivation arriving at an expression for  $X$  as:

$$X = \frac{21,600'}{2\pi d_{ES}} * d_{P_1P_2} \frac{\left( \frac{d_{ES}}{d_{EV}} - 1 \right)}{D} \quad (\text{Equation 14})$$

So far, the following terms have been computed:

$$d_{ES} = 1.01673 \text{ AU}$$

$$d_{P_1P_2} = 5842.6 \text{ km}$$

$$d_{EV} = 0.291 \text{ AU}$$

$$D = 0.3132'$$

Substituting these values into equation (Equation 14) gives  $X = 157,302,177 \text{ km}$ .

The current accepted value for 1 AU is 149,597,870.691 km (NASA, 2009b).

The benefits of Stern's method of computing the AU are its simplicity, in contrast to Blatter's more complex calculations. Blatter's method accounts for pairs of observing locations that do not lie on the same meridian of longitude, or share the same latitude magnitude either side of the equator. Blatter states that for the Astronomical Unit to be determined to 1% accuracy, the duration of the transit must be determined to 0.02% (about 4 seconds). Likewise the apparent diameter of the Sun's disk should be determined to an accuracy of 0.1% for the above result.

#### **4. THE 2012 RE-ENACTMENT OF THE TRANSIT OF VENUS OBSERVATIONS**

Cooper (2009) details some hardware and methodology that would be suitable for a modern re-observation of the Transit of Venus. It is established that a video of the event would leave a lasting record and allow accurate timing of the ingress and egress times. Cooper (2009) details the problems with fitting a video to a total station or theodolite and ultimately recommends partnering with amateur astronomers who use astronomical telescopes with an accurate tracking and timing mechanism. Cooper (2009) gives a detailed explanation of a local amateur astronomers' equipment.

For 2012, it would be ideal to have collaboration between different observers around the world, with a common location to send observation data. This could be achieved by setting up a web site in which all observers of the 2012 transit can deposit videos of the transit, images, and any timing results collected. The web page should include a program to calculate the Astronomical Unit, or link to such a program. One example of an online site where a user can enter transit timing results and calculate a value for the Astronomical Unit is Steven van Roode's Online Parallax Calculator, found at <http://www.transitofvenus.nl/parallax.html>.

## 5. CONCLUDING REMARKS AND A CALL FOR PARTNERS

Observing the transit of Venus in 2012 will be of benefit to any student or professional with an interest in astronomy, as it will serve as a present-day spectacle showing how science has progressed since early astronomers used the transits of Venus to determine the scale of the solar system. It is also a terrific opportunity to raise the profile of the surveying profession to the wider community.

It is proposed to use video image capture through a telescope to provide a means of permanently recording the results of the transit. Post-processing of the event will enable the determination of the astronomical unit more accurately without fear of missing ingress or egress whilst still using the parallax method. Matching time through digital insertion of GPS time will provide timing quality superior to previous observations and hopefully produce a comparable result to the agreed value for the astronomical unit.

It is hoped that readers of this paper who are located in those regions of the world where the 2012 Transit of Venus will be visible, namely eastern Asia, Indonesia, New Zealand, Russia and Alaska as well as Australia, will embrace this project. The first author hopes to use this project in the wider media to raise the profile of the surveying profession.

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<<http://www.transitofvenus.nl/parallax.html>>

## **BIOGRAPHICAL NOTES**

Craig Roberts is a Senior Lecturer in Surveying/ GPS/ Geodesy at the University of New South Wales, Sydney, Australia. He has lectured at RMIT University in Melbourne for two years. He graduated from the University of South Australia with a Bachelor of Surveying in 1988. He began his career as a private surveyor in Adelaide and has since worked as a Geodetic Engineer at UNAVCO, USA involved with GPS for geodynamic studies in Nepal, Ethiopia, Argentina and Indonesia. He worked as a scientific assistant at the GeoForschungsZentrum, Germany where his main focus was orbit determination and prediction for a number of geodetic research satellites. He completed his PhD thesis in March 2002 supervised by Prof. Chris Rizos. His current research interests involve leveraging CORS infrastructure for practical application to surveying and spatial information.

## **CONTACTS**

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Web site: [www.gmat.unsw.edu.au](http://www.gmat.unsw.edu.au)

Appendix 4	Terms of Reference for Project Teams, namely: 4.1 Schools, 4.2 Web, 4.3 Media, , 4.4 Technical, 4.5 Financial, 4.6 Administration, 4.7 Participant Engagement and 4.8 Communications
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## 4.1



### **An Education Project Built around Observing the Transit of Venus 6th June 2012**

### **Terms of Reference For Schools Team**





**An Education Project  
Built around  
Observing the Transit of Venus  
6<sup>th</sup> June 2012**

**Terms of Reference  
For  
Schools Team**

**Team Leader:**        **Nick de Weger**

**Team Members:**    **Anne-Marie Gerlach, Kay Bishop, Will Morony, Mick Law**

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

1. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
2. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
3. Keep team members advised of all significant issues and events occurring within the team and within the Project.
4. Organise meetings if required to discuss issues and progress on the various team tasks.
5. Monitor progress on the various tasks and offer / arrange assistance where necessary.
6. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

1. Ensure the Team Leader is advised of their contact details (phone and email.)
2. Undertake the tasks allocated to them in a timely way.
3. Keep the Team Leader advised of progress on their task(s)
4. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

1. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
2. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
3. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will provide:

Materials prepared for schools will include the following:

- \* Lesson plans for both primary and secondary teachers, in the areas of geography, history, mathematics and astronomy.
- \* A school engagement process that will allow the school to receive a free or subsidized Solarscope.
- \* Use of "on line access" to a software package that predicts astronomical events, and simulates their occurrence at any time or location on earth.
- \* Materials promoting the Spatial professions
- \* Advice on the safe viewing of the sun.

The more detailed requirements for this team include:

1. Development of both Course outlines and lesson plans that align with the new National Curriculum. These materials will cover both Primary and Secondary students in the areas of History, Geography, Science (Astronomy) and Mathematics.
2. Development of a School Engagement Process. This process should include:
  - a. Promotion of the above materials at appropriate conferences and seminars.
  - b. Promotion of the Transit of Venus (and the Solar Eclipse) as appropriate real life learning opportunities.
  - c. Promotion of the use of our web site.
  - d. Promotion of the engagement process to secure for schools *Solarscopes* for the safe viewing of the Sun.

- e. A competition for schools

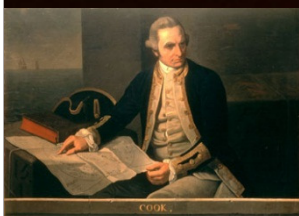
These materials are to be delivered to the WEB Team for publication on the web.

3. Develop and document the *Solarscopes for Schools* campaign that will make available to schools 100 free *Solarscopes* and at least another 100 *Solarscopes* for the subsidized cost of only \$40.00.
4. In conjunction with Web Team, develop easy to use guides for the use of “on line” software, including Stellarium and the software to calculate Astronomical Units.
5. Provide advice to the Web Team on materials that warn about the dangers of looking at the sun, and promote the safe viewing of the sun.
6. Incorporate into all of the above a subtle promotion of the Surveying, Spatial and Astronomy professions.
7. Provide advice to the Media Team as to the most effective way to promote our initiative in schools
8. Develop a competition for schools with a range of prizes.



**An Education Project  
Built around  
Observing the Transit of Venus  
6<sup>th</sup> June 2012**

**Terms of Reference  
For  
Web Team**



**An Education Project**  
**Built around**  
**Observing the Transit of Venus**  
**6<sup>th</sup> June 2012**

**Terms of Reference**  
**For**  
**Web Team**

**Team Leader:**        **Jonathan Bradshaw**

**Team Members:**    **Fred Watson, Astronomers nominee, SSSI Web Person**

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It is the responsibility of the **Team Leader** to:

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9. Keep team members advised of all significant issues and events occurring within the team and within the Project.
10. Organise meetings if required to discuss issues and progress on the various team tasks.
11. Monitor progress on the various tasks and offer / arrange assistance where necessary.
12. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

5. Ensure the Team Leader is advised of their contact details (phone and email.)
6. Undertake the tasks allocated to them in a timely way.
7. Keep the Team Leader advised of progress on their task(s)
8. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

4. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
5. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
6. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will provide:

The web will be the main delivery mechanism for materials delivered to schools. It will also be a mechanism for the safe viewing of the Transit of Venus.

The Transit of Venus web site will be directly available through the Destination Spatial web site, as well as the Astronomical Association of Queensland (AAQ) site. It will include appropriate marketing materials for the Spatial professions.

Web site development and population will be carried out in conjunction with AAQ under terms developed in an MOU between AAQ and SSSI.

The more detailed requirements for this team include:

Major tasks for this team include:

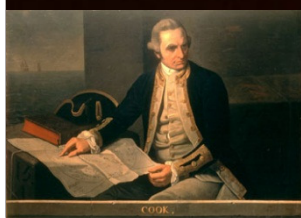
1. Selecting and securing the web delivery mechanism for this project, including ensuring that the site will have adequate capacity to support live viewing of the Transit event by thousands of viewers.
2. Designing the web site so that it is interesting, user friendly and easy to navigate.
3. Organising the design and uplift of all material to the web site. In particular, this will include content from the following teams:
  - Schools
  - Media
  - Technical
  - Communications

4. Ensuring that the site can be directly viewable through both the AAQ site and the Destination Spatial web site.
5. Ensuring that the site adequately promotes both AAQ & SSSI
6. Enabling the site to broadcast “live” the Transit from at least one site.
7. Enabling the site to store the “streaming” of the observations from multiple sites, complete with time tags, for subsequent viewing.
8. Enable the site with the use of Stellarium
9. Publish contact details for all contributing associations and sponsors
10. Publish an “events calendar” for future events.



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

**Terms of Reference  
For  
Media Team**





**Education Project**  
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**Observing the Transit of Venus**  
**6<sup>th</sup> June 2012**

**Terms of Reference**  
**For**  
**Media Team**

**Team Leader:**        **Nick de Weger**

**Team Members:**     **Bill Kitson, Fred Watson, Jonathan Bradshaw**

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

13. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
14. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
15. Keep team members advised of all significant issues and events occurring within the team and within the Project.
16. Organise meetings if required to discuss issues and progress on the various team tasks.
17. Monitor progress on the various tasks and offer / arrange assistance where necessary.
18. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

9. Ensure the Team Leader is advised of their contact details (phone and email.)
10. Undertake the tasks allocated to them in a timely way.
11. Keep the Team Leader advised of progress on their task(s)
12. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

7. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
8. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
9. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

A marketing professional will be engaged to ensure the maximum media exposure for both our schools exercise as well as the Transit of Venus observation. The media exposure will focus on the contribution that Spatial Professionals have on our society, in the past, present and future.

The more detailed requirements for this team include:

1. The development of a briefing document that would form the basis of a contract with an appropriate media consultant.
2. To provide advice to the Project Management Group about appropriate Media Consultants.
3. To manage the Media Consultant in terms of matters such as:
  - a. Suitability of promotion (ie. Not sexist etc.)
  - b. Timeliness of promotions
  - c. Keeping costs within budget
4. To draft appropriate media alerts
5. To facilitate the engagement of high profile personalities of the professions to make appropriate media statements, interviews etc.

Possibilities include:

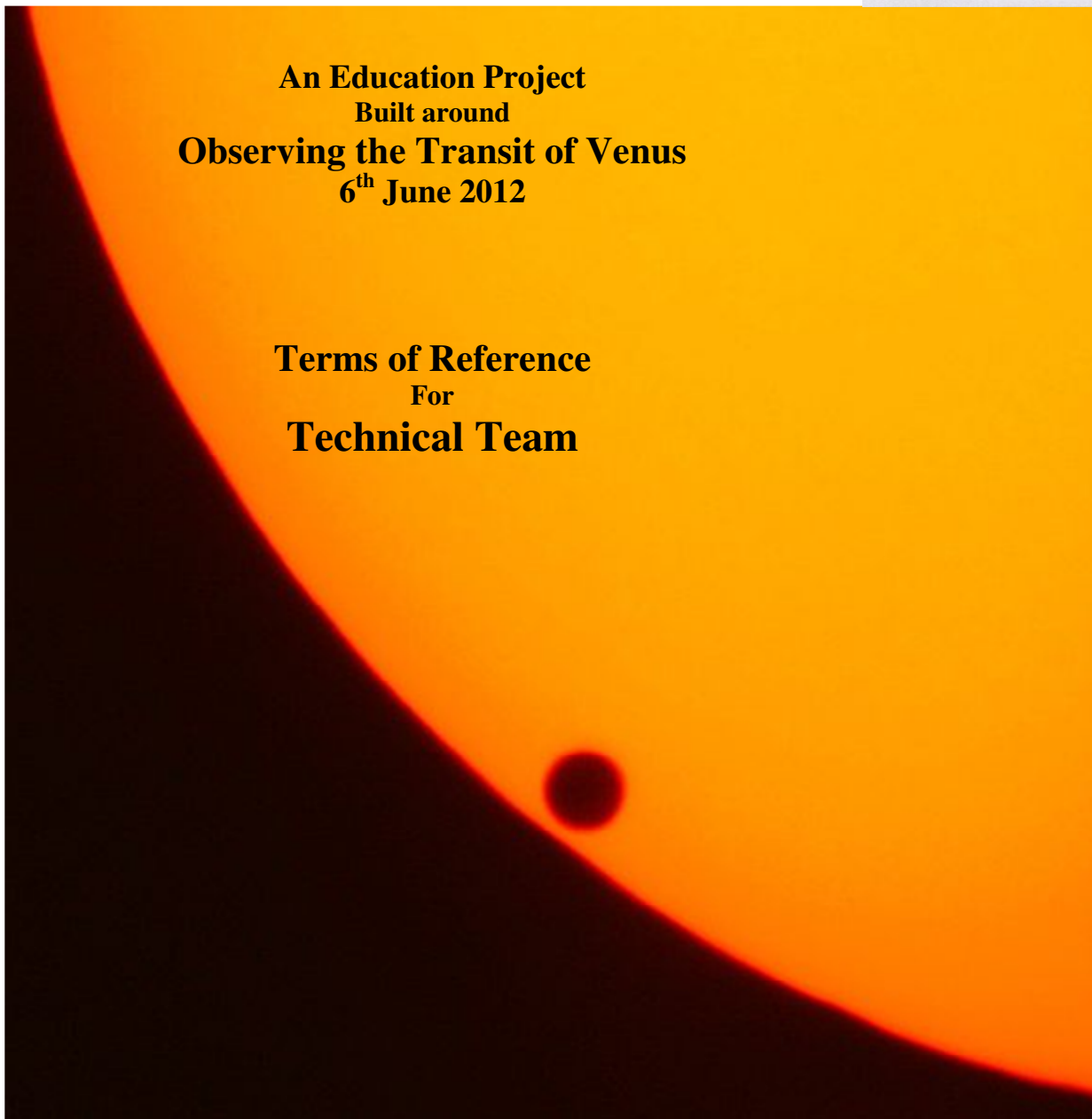
- Dick Smith
- The Bark "Endeavour"
- Alan Jones
- Makka

- Other ABC radio presenters
  -
6. To identify past present and future events that have involved our professions, and the contribution they have made to our society. And then to facilitate the promotion of these events in the media.
  7. To develop promotional materials, such as:
    - a. Stickers for *Solarscopes*
    - b. Handouts for conferences and seminars (perhaps including viewing glasses)
    - c. Logo (if considered appropriate)



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**Terms of Reference  
For  
Technical Team**



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**Terms of Reference  
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Technical Team**

**Team Leader:** Terry Cuttle

**Team Members:** Rod Deakin

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

19. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
20. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
21. Keep team members advised of all significant issues and events occurring within the team and within the Project.
22. Organise meetings if required to discuss issues and progress on the various team tasks.
23. Monitor progress on the various tasks and offer / arrange assistance where necessary.

24. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

13. Ensure the Team Leader is advised of their contact details (phone and email.)
14. Undertake the tasks allocated to them in a timely way.
15. Keep the Team Leader advised of progress on their task(s)
16. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

10. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
11. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
12. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

A technical team will be established. This team will ensure that all necessary on line calculations can be carried out. They will also provide the expertise basis from which a number of "fact sheets" will be developed on topics such as:

- The safe viewing of the Sun
- The safe use of a Solarscope
- The calculation of the distance between the Sun and the Earth
- The use of astronomical observations for the calculation of Latitude.

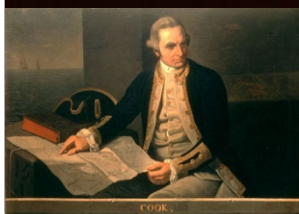
The more detailed requirements for this team include:

11. Preparing content for uplifting to the web by the Web Team, including:
  - a. **SAFETY** warnings about viewing the Transit of Venus incorporating input from the Schools Team
  - b. Methods of safely viewing the Transit of Venus
  - c. A description of the event
  - d. Descriptions of or links to historical accounts of previous events
  - e. The use of a Solarscope for viewing the sun
  - f. Observing techniques to facilitate the calculation of Astronomical Units
  - g. How to use Stellarium to simulate the Transit of Venus at various locations on Earth
  - h. How to use the software to calculate Astronomical Units
12. Have written and published on the web site, software to calculate Astronomical Units



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**Terms of Reference  
For  
Financial Team**



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**Financial Team**

**Team Leader: Graeme Rush**

**Team Members: Ewen Sneddon**

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

1. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
2. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
3. Keep team members advised of all significant issues and events occurring within the team and within the Project.
4. Organise meetings if required to discuss issues and progress on the various team tasks.
5. Monitor progress on the various tasks and offer / arrange assistance where necessary.
6. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

1. Ensure the Team Leader is advised of their contact details (phone and email.)
2. Undertake the tasks allocated to them in a timely way.
3. Keep the Team Leader advised of progress on their task(s)
4. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).



It is the responsibility of the **Project Manager** to:

1. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
2. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
3. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

The financial team will ensure that spending remains within budget, and that all financial reporting is accurate and timely. They will also be responsible for the financial governance of the project.

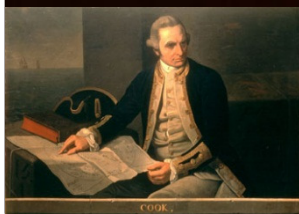
The more detailed requirements for this team include:

1. The development of guidelines for the expenditure of Project Funds, including procurement strategies.
2. The management of all Project accounts in accordance with SSSI policies and practices
3. The production of a Project Budget.
4. The regular reporting of Project expenditure against Budget allocation
5. The preparation of Financial Reports for the various Project Entities including SSSI
6. To monitor the overall Project Governance arrangements.



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**Terms of Reference  
For  
Administration Team**



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**Terms of Reference  
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Administration Team**

**Team Leader:**       **Graeme Rush**

**Team Member:**     **Nick de Weger**

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

25. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
26. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
27. Keep team members advised of all significant issues and events occurring within the team and within the Project.
28. Organise meetings if required to discuss issues and progress on the various team tasks.
29. Monitor progress on the various tasks and offer / arrange assistance where necessary.

30. Advise the Project Manager of progress on the team tasks at least monthly and more often if appropriate.

It is the responsibility of **Team Members** to:

17. Ensure the Team Leader is advised of their contact details (phone and email.)
18. Undertake the tasks allocated to them in a timely way.
19. Keep the Team Leader advised of progress on their task(s)
20. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

13. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
14. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
15. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

The Administration Team will assist the project wherever administrative support is required. The team will also ensure the appropriate negotiation of the MOU between SSSI and AAQ.

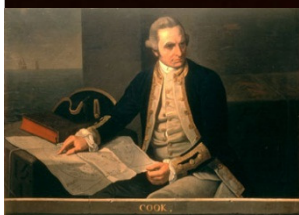
The more detailed requirements for this team include:

1. The negotiation of an appropriate MOU between AAQ and SSSI in order to undertake this joint project.
2. The provision of Administrative support to both the Project Management Team, and any Project Team requiring administrative assistance.



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**Terms of Reference  
For  
Participant Engagement Team**



## Terms of Reference For Participant Engagement Team

**Team Leader:** Nick de Weger  
**Team Members:** Tim Pumpa, Les Searle, Frank Blanchfield, Lindsay Perry, Penny Douglas, Jonathon Bradshaw.

The Project Management Plan for this project provides the overall framework for the activities to be undertaken by this team. The Project Management Plan provides an overview of each task, how the various tasks relate to each other and the overall global timelines. A more detailed list of the tasks of this team is documented below.

Each team will need to “flesh out” the detailed requirements for their tasks, confirm who is going to do what and by when. This will result in the **Team Project Plan**. How the team undertakes the development of the Team Project Plan is a matter for the team to resolve. It may be through “face to face” meeting(s), by telephone conference call(s), or by email to name a few options.

It is the responsibility of the **Team Leader** to:

31. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
32. Provide the Project Manager with a copy of the **Team Project Plan** as soon as possible, who will confirm the content of the Team Project Plan at the next available Project Management Committee Meeting. If funds are required or consultants / contractors need to be engaged, the project manager needs to be advised before completing the Team Project Plan. The overall project costs are detailed in the Project Management Plan are “ball park estimates” only. Each request for funds needs to be justified.
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It is the responsibility of **Team Members** to:

21. Ensure the Team Leader is advised of their contact details (phone and email.)
22. Undertake the tasks allocated to them in a timely way.

23. Keep the Team Leader advised of progress on their task(s)
24. Seek assistance from the Team Leader if / as soon as any difficulty arises with the undertaking of their allocated task(s).

It is the responsibility of the **Project Manager** to:

16. Keep the Team Leader informed of all issues and events occurring within the Project that may impact on the team's activities.
17. Organise the procurement of any equipment, consultants, contracts etc. required by the team in order to undertake their tasks.
18. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

This task involves the identification, location and engagement of all stakeholders and participants in the project. It necessarily involves teachers, schools, suppliers, relevant professionals, sponsors and supporters.

Many of the major groups have already been identified, and are represented on the Consultative Committee. We still need to engage with overseas observatories in order to "pair" their observations with those made in Australia in order to calculate the distance between the Earth and the Sun.

The process of continuing to identify participants will continue for the life of the project.

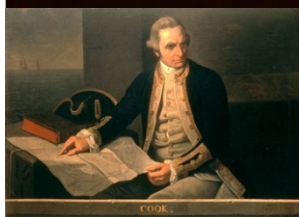
The more detailed requirements for this team include:

1. The identification and engagement of **SPONSORS** for this project.
2. The identification and engagement of potential funders of this project.
3. The identification and engagement of contributors to this project.
4. The identification and engagement of further participants in this project.
5. The identification and engagement of "Transit of Venus" observers in the northern hemisphere, for the purpose of "pairing" with our observations.
6. The encouragement of SSSI members to liaise with local astronomers to promote the project in schools.



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**Terms of Reference  
For  
Communications Team**





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**Terms of Reference  
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**Team Leader:**        **Nick de Weger**

**Team Members:**

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It is the responsibility of the **Team Leader** to:

37. Manage the development of the **Team Project Plan**. This plan will document who is undertaking which tasks and their completion times.
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21. Organise advice / assistance if requested by the Team Leader

The **Project Management Plan** indicates that this team will:

A detailed communication plan is under development.

The more detailed requirements for this team include:

1. To implement the attached Project Communications Plan.
2. To prepare and distribute minutes of all relevant meetings, including the Project Management team meetings.
3. To compile and maintain a database of contacts
4. To maintain a register of all incoming and outgoing correspondence.
5. To maintain a file of all incoming and outgoing correspondence.
6. To maintain a register of Viewing Stations and their contact details.



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**Communications Plan**



**The Communications Plan**  
**For**  
**An Education Project**  
**Built around**  
**Observing the Transit of Venus**  
**6<sup>th</sup> June 2012**

**Index**

- 1.0 Introduction
- 2.0 Communications Objectives
- 3.0 Stakeholders
- 4.0 Information Collection
- 5.0 Feedback

Version Control

Version No.	Changes	Date
1.0		5/10/2011
1.1	Numbering and changes to sections 4&5	10/10/2011
2.0	Change in reporting relationships	26/10/2011

## **1.0 Introduction**

This project is unique within the SSSI (Surveying and Spatial Sciences Institute) and other funders' environment.

These organizations do not have any experience with working collaboratively with another professional organization on a project with strict timelines. .

The Project Management Team for this project has never worked together before. It is comprised of both SSSI, other funders and AAQ (Astronomical Association of Queensland) members.

The project teams that have been assembled for this project have never worked together before. Many members may not have worked in a team environment, and many may not have been involved on a project with so many interdependencies and strict timelines.

The project teams are populated (generally) by enthusiastic volunteers with a wealth of professional experience, who are willingly giving of their time and talent for the betterment of our professions.

We will also be relying on the members of our professional organizations and our Consultative Committee to assist us in the promotion of this project.

Consequently there is a clear need to keep all our team members, contributors, sponsors, supporters and stakeholders fully informed on the progress of this project.

This Communications Plan describes how we will communicate with all the above INTERNAL stakeholders. It does NOT address communication with external stakeholders. The Media Team will address the promotion of this project to Schools and the community in general.

## **2. Communication Objectives**

The communication objectives of this plan are:

- a. To ensure all project internal stakeholders are kept fully aware of progress on this project, so that they may personally promote the project.
- b. To ensure that all Team Members are kept aware of any issues that may impact on the delivery of their component of the project.
- c. To promote a collaborative team ethos within the project, where every team member can recognize the contribution they are making to the project.

Communications will be audience specific, delivered through a channel appropriate to the audience, timely and will encourage feedback from recipients.

## **3 Stakeholders**

Stakeholder groups for this project are:

- a. OWNERS. Funding Providers
- b. Project Management Committee
- c. Project Team Leaders
- d. Project Team Members
- e. Consultative Committee Members
- f. Consultants and contractors to the project

The topics to be communicated to these stakeholder groups and the usual communication channel are detailed below.

<b>Stakeholder Group</b>	<b>Information</b>	<b>Channel</b>	<b>Frequency</b>
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

#### **4. Information Collection**

Information will be gathered from both regular reporting from teams, and from the feedback from all stakeholders.

The Project Manager will contact each Team Leader on a fortnightly basis to elicit details of the progress of each team, as well as the identification of any new risks or issues. Team Leaders may choose to email progress reports to the Project Manager in lieu of the Project Manager contacting them.

The Financial Team will provide monthly reports to the Project Manager that relates present expenditure to budget expenditure.

## **5. Feedback**

All stakeholders will be regularly reminded that their feedback and comments are welcome, and will be treated seriously. It is hoped that this feedback encouragement will provide advice on the timeliness, content, usefulness and relevance of the communications proposed. The identification of any new risks will be appreciated from any source. It is also hoped that advice on matters that are outside the scope of the project that might impact upon the project will be raised in a timely manner.



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**Administration of the  
SolarScopes for Schools Competition**





## **Administration of the SolarScopes for Schools Competition**

Prepared by Graeme Rush 20/02/2012

The general flow of **what** needs to be done to get SolarScopes to schools is set out in Attachment !. The attachment also indicates the **when** or critical dates.

There are 4 major components, namely:

1. The Schools Competition
2. SolarScope Orders
3. Volunteer Surveyors, and
4. Preparation of presentation materials for Volunteer Surveyors.

This document will focus on the **who** and the **how**.

**WHO** The major players are:

1. **The web team** must ensure that the Schools Competition entry page and the Volunteer Surveyors registration pages are operational, and send the appropriate emails about registrations and entries to Graeme Rush. They must also ensure that the spreadsheets of registrations and entries are populated and remain accessible.
2. **The Project Manager / Administrator** Graeme Rush receives an email with the details of every competition entrant.  
If the entry does NOT include a request for purchase of Solarscope, an email is sent encouraging the purchase of a SolarScope and advising that they will be informed of all the winners by early April.  
If the entry does include a request for the purchase of a SolarScope, then an email is sent advising that they will be informed of all the winners by early April, that their purchase price can be refunded if they are a winner, and only want one SolarScope, but they might want more than one, and asking for confirmation of their desire to purchase a SolarScope. Upon receipt of their confirmation, an email request is sent to Admin Qld SSSI to send out an Invoice.  
Where the entry is from a Queensland School, details are entered in the Queensland Competition Register. Where the entry is from NSW, ACT or Victoria, the details are forwarded to the NSW (and ACT) or the Victorian sub-committee.  
Where a SolarScope is ordered, the relevant sub-committee is also advised.  
A register of purchases for SolarScopes is kept.

There are some purchase orders for SolarScopes that are not from schools. (eg. Volunteers, associations etc.) These orders managed by the Project Manager /Administrator.

When a volunteers surveyor registers an email is received. A thank you email is returned, along with an invitation to purchase a SolarScope for a school of their choice.

If the volunteer is from NSW, ACT or Victoria, the relevant sub-committee is advised by email.

### **3. Sub-Committees**

At present there are 2 sub-committees, namely:

- a. NSW and ACT, comprising John Minehan and Michael Lockley, and
- b. Victoria, comprising Gerry Shone and a yet to be named assistant.(Gary White)

These sub-committees (and the Project Manager/Administrator) have the following duties.

1. Keep a register of all schools entering the competition.
2. Decide the winners of the competition in their area. (NSW and ACT 35 winners, Victoria 30 winners, Queensland 30 winners, others 5 winners (Total 100 winners)
3. Keep a register of all Surveyor Volunteers
4. Send interim encouragement messages to volunteers surveyors
5. Allocate volunteers surveyors to present SolarScopes to schools (winners, donated and purchased SolarScopes)
6. Ensure that SolarScopes and presentation materials are forwarded to volunteers surveyors in a timely way.
7. To determine “delivery points” for the delivery of SolarScopes in each jurisdiction.

### **4 .Survey Task Force (and others)**

The Survey Task force is to arrange the preparation of presentation materials for volunteer surveyors. The package of materials should include:

1. Details about how to approach the nominated school
2. Careers Information
3. A PowerPoint presentation or video about surveying
4. Some small field exercises (like the indirect measurement of the height of a flagpole.
5. A short speech for the presentation of the SolarScope to the school

Other suggestions for inclusion in the package are welcome.

6. **Nick deWeger** is to maintain a register of email addresses for contact with schools and volunteers. These databases are are to be sorted by State and

Territory These databases will be used by the sub-committees and the Project Manager / Administrator to contact Schools and Volunteer Surveyors. Nick is also to place the orders for SolarScopes as agreed by the Project Management Committee and husband their delivery to Australia.

- 7. A New sub-group** is to be formed . The role of this sub-group is to:
- a. Design and have produced stickers (of sponsors) to be placed on SolarScopes
  - b. To place stickers on SolarScopes
  - c. To arrange delivery of SolarScopes to jurisdictional delivery points.

### **Addendum added 25<sup>th</sup> April 2012**

This addendum details the Queensland experience, which might provide some useful experiences from which NSW and Victoria might benefit.

The project manager has advised every school that entered the schools competition that they are winners. They were advised by individual email. Where the name of the individual surveyor was known (all were known for Queensland, Tasmania and South Australia, and a few in Victoria) the school was informed of the name of the surveyor, and that the surveyor would contact them in the near future. Where the school had ordered additional SolarScopes, they were advised whether or not the invoice had been paid.

As a result, a small number of schools have been cancelling their order for one SolarScope. (This option was included in the competition entry details)

If a school is not engaged by this time, it is unlikely that they will be able to participate in the observation of the Transit of Venus on 6<sup>th</sup> June, because most teachers have their lessons planned for the whole of the term, and there is little if any flexibility in their ability to schedule additional activities.

Once the school was advised of the name of their allocated surveyor, the surveyor was given the same email with the school contact details added. They were also advised that they would soon be sent an electronic package of materials that would assist them in their interaction with the school. This package will be ready for delivery at the beginning of May.

The presentation of SolarScopes to schools **MUST** occur well before the 6<sup>th</sup> June. Schools **MUST** be familiar with the operation of the SolarScope before the 6<sup>th</sup> June.

The first and second contacts of Venus will occur before 8.30am **BEFORE SCHOOL** normally begins !

Half the SolarScopes will arrive in Australia by early May. There should be no difficulty in getting these SolarScopes to volunteer surveyors in a timely way. However, half the SolarScopes will not

arrive in Australia until the end of May. Consequently a very efficient operation will be necessary to ensure the timely delivery of the last shipment of SolarScopes to volunteer surveyors.

Especially with the late shipment, the volunteers will need to have made contact with their schools, and have everything arranged for the presentation of the SolarScopes in late May or even early June.

In order to ensure that this can occur, the electronic package of information (see attachment below) will be emailed to all (Queensland, Tasmanian, South Australian and Western Australian) volunteer surveyors at the beginning of May so that they can make contact with their schools. They will also be informed whether their SolarScopes will be delivered in early May or late May.

In Queensland, half of our SolarScopes are to be delivered close to Brisbane. The other half are required in some close locations like the Sunshine coast to distant locations like Cooktown, Mt. Isa, Tasmania, South Australia and Western Australia.

The Early May deliveries will be made to locations remote from Brisbane.

The late May deliveries will be made to the Brisbane area.

For those volunteer surveyors remote from Brisbane, they have been requested to confirm the PHYSICAL ADDRESS to which the parcel of SolarScopes can be delivered (not a PO Box). In some locations, surveyors have agreed to collect their SolarScopes from the office of one local surveyor in the town.

In the Brisbane area, it is proposed to request surveyors to pick up their SolarScopes from one of 3 locations (North Brisbane, Central Brisbane and South of Brisbane). This is designed to both minimise cost and speed up delivery.

If a surveyor cannot conveniently pick up his SolarScopes from one of these locations, his will be posted to him.

However, it is not ONLY the SolarScopes that must be delivered to each volunteer surveyor. There are "hard copy" materials as well. These include brochures and stickers. The brochures are for the use of careers officers at the schools. There are also some careers stickers.

Our sponsors sticker needs to be applied to ALL the SolarScopes by the volunteer surveyor. These stickers are also included in the "hard copy" stuff.

Some volunteer surveyors are presenting SolarScopes to multiple schools.

In Queensland we have an envelope for each school, with the name of the school on the envelope. We have then added the name of the volunteer surveyor, and whether he has multiple schools (eg 1 of 3).

Finally we have indicated how many SolarScopes are to go to this school, and whether they have been won, donated or purchased.

Into each envelope we are placing the following:

10 Destination Spatial brochures

10 Destination Spatial stickers

10 Life without Limits brochures

The relevant number of sponsor stickers (one for each SolarScope)

The relevant “presented by” sticker

Where relevant, the “donated by” sticker

And probably the “how to affix the stickers” documentation.

This will ensure that the packaging of SolarScopes and “hard copy” materials can be achieved in a minimum of time.

Also, as the surveyors respond with their PHYSICAL DELIVERY ADDRESS, envelopes will be prepared ready for attaching to the packages.

We will be using Australia Post to deliver packages to our volunteer surveyors.

I hope this information helps.

Extract from the PMC minutes of 23<sup>rd</sup> April, detailing the materials being prepared for volunteer surveyors.

Item	Responsible	Progress
1. Covering letter to volunteer surveyor	M Brooks & G. Rush	Complete
2. Process for making contact with school	M Brooks	Complete
a. School contact details	G. Rush	Complete
b. Script to phone school to make arrangements for presentation (perhaps phone, email and then visit teacher)	M Brooks	Complete
c. Negotiate timelines for visit (date, time, duration, audience etc.)		Complete
d. Suggest possible activities for the day	M Brooks	Complete

including		
i. Presentation of SolarScope		
ii. Demonstration of SolarScope		
iii. Presentation of careers information		
iv. Showing video		
v. Simple surveying activity		
vi. Possible display of surveyors equipment		
vii. Involvement of local media		
viii. Choice of recipient, and whether they will speak		
ix. Discuss what is planned for 6 <sup>th</sup> June and any need for surveyor involvement		
x. Etc		
e. Email template to send to the school with a draft program for the day	M Brooks	complete
f. Email template confirmation and reminder of the visit	M Brooks	complete
3. Manual for use of SolarScope	Terry Cuttle	Draft supplied. To be reviewed by Jonothan and formatted by Michelle Brooks
4. Draft Media Release	M Brooks	Under development
5. Contact details for local media	G. Rush for Queensland, M. Brooks for Victoria	Complete for Queensland
6. Draft speech for presentation, including:	M. Brooks	Under development
a. History (Capt. Cook)		
b. Science behind the Transit of Venus	G. Rush to provide input	provided
c. Past, present and future skills of explorers / surveyors		

d. Career opportunities in surveying		
e. Dangers of looking at the sun		
f. Perhaps a demonstration of how the SolarScope works		
g. Presentation to recipient		
h. Words about any other activity planned for the day		
i. Perhaps touch on what will occur at the school on 6 <sup>th</sup> June		
7. Careers materials		
a. Brochures	Life without limits - Surveying Task Force.  Destination Spatial-ISAQ	Life without Limits brochures being sent by M. Brooks. Destination Spatial brochures to be sent to NSW and Victoria with second shipment of SolarScopes
b. Stickers	Nil	Destination Spatial stickers being delivered with SolarScope shipments
c. Video	Vic (Surveying Task Force)  NSW (Surveying NSW)  QLD to be investigated and published on a web site	Michelle has provided the UTube address for the Task Force Video. A Qld. Video is under production by DERM

d. List of web sites for Careers advisors	M Brooks	As per Destination Spatial and Life without Limits web pages
8. Lesson plans for surveying exercises	Surveying Task Force	Almost complete
9. Checklist for school visit (Including tips on working with students and career advisors)	M Brooks	complete



**An Education Project**  
**Built around**  
**Observing the Transit of Venus**  
**6<sup>th</sup> June 2012**

**Project Management Committee**

**AGENDA**

Spatial Industry Boardroom, South Brisbane,  
 Thursday 15<sup>th</sup> March 2012 @ 5.00pm

1. Welcome.....
2. Minutes of meeting Thursday 1<sup>st</sup> March 2012
3. Actions arising not covered elsewhere in the Agenda.  
     Action 6.1     Nick
4. Correspondence including:         SSSI Board  
   Update from John
5. New Business  
     Publication of historical articles  
     Pairing of observations  
         Action 6.2     Graeme  
     Scouts and Guides  
         Action 6.3     Nick  
         Action 6.4     Nick
6. Team Reports
  - 6.1 Schools (Science)                 Terry Cuttle
  - 6.2 Web Team                         Jonathan Bradshaw & Tim Pampa  
     Action 5.7     Phil  
     Action 6.5     Tim  
     Web Statistics
  - 6.3 Media Team                         Graeme Rush
    - 6.3.1 Schools Engagement  
     \*         Contact with schools
    - 6.3.2 Public Engagement

- 6.4     Technical Team                      Terry Cuttle
  
- 6.5     Financial Team                      Ewen Sneddon
  - Action 6.10     Ewen
  
- 6.6     Administration Team                Graeme Rush
  - Action 6.11     Tim
  - Final SolarScope orders
  - Packages for volunteer surveyors
  
  - Statistics on entries, volunteers and SolarScope orders
  
- 6.7     Participant Engagement
  - Phone calls to Queensland surveyors
  - Action 6.6       Chris
  - Action 6.7       Graeme
  - Action 6.8       Michelle
  - Action 6.9       Graeme
  
- 6.8     Communications Team              Nick de Weger
  
- 7.       Reenactments
  - a.     Jimbour
  
- 8.       Review of Project Management Plan
  
- 9.       Review of the Risk Management Strategy
  
- 10.      Communication with Team members
  
- 11.      General Business
  - Conference presentations
  
- 12       Next Meeting
  
- 13       Close

Conference Phone ring 1800 153 721 participant pin 445423.

**An Education Project  
Built around  
Observing the Transit of Venus  
6<sup>th</sup> June 2012**

**Project Management Committee  
Minutes**

Of meeting held on  
18<sup>th</sup> January 2012 @ 5.00pm

In attendance were Tim Pumpa, Graeme Rush, Nick de Weger, Terry Cuttle, Jonathan Bradshaw, Chris Swane and Phil Pozzi.

Apologies: Chris McAllister (SSSI Qld), John Minehan (IS NSW & SSSI LSC), Jack de Lange (SIBA), and Ewen Sneddon.

Not in attendance were: Veronica Bondarew (CSN), Rob Steel (IS Vic.), Rod Yann (Ultimate Positioning), Walter Nannes (Statewide Survey Group), Colin Plumb (C.R. Kennedy) and Ray Tabulo (SSSI Qld Central Group).

**Action 4.1 Nick de Weger to contact those not in attendance and confirm their desire or otherwise to be members of the Project Management Committee.**

**2. Minutes of meeting 7<sup>th</sup> December 2011.**

These minutes were agreed without amendment.

**3. Actions**

The outstanding actions were:

**2.3** Members to forward to Graeme Rush details of appropriate web sites that contain relevant teaching information about the Transit of Venus. Graeme Rush to prepare compendium.

**Action 4.2 Graeme Rush to confirm that all advised web sites are incorporated in the Transit of Venus web site.**

**2.4** Terry Cuttle to prepare a “flyer” on the Transit of Venus

The first draft was discussed at the meeting. See item 6.1.

**2.8** Terry Cuttle to arrange the rewriting of the manual for the use of a Solarscope.

This task is still in progress.

**Action 4.3 John Minehan to attempt to get the whole T of V article published in the following edition of Position magazine.**

- 3.1 John Minehan to attempt to get the whole T of V article published in the following edition of Position magazine.  
This task is not yet complete.

#### **Action 4.4**

- 3.8 John Minehan to supply Graeme Rush with contact details for the ISNSW Maths committee.

#### **Action 4.5 Graeme Rush to contact John Minehan to obtain contact details for the ISNSW Maths Committee.**

All other actions have been completed.

#### **4. Correspondence.**

The correspondence from the SSSI Board to Chris McAlister and Phil Pozzi was briefly discussed. Phil Pozzi confirmed that his response had been sent to the SSSI Board, and there was no further correspondence or communication to date.

Chris Swane tabled a draft letter that could be sent to the SSSI Board by this committee.

#### **Action 4.6 Chris Swane to distribute draft letter to SSSI Board to members.**

#### **Action 4.7 Members to provide Graeme Rush with their comments on the draft letter to SSSI Board.**

It was noted that the December 2011 Progress Report was circulated to all stakeholders before Christmas.

#### **5. Funding Status.**

Funds that have been promised and invoiced total \$35,650. Funds actually received into the bank account total \$7,650.

It is expected that the balance of the funds promised will arrive over the next month as staff return from holidays.

#### **6. Team Reports.**

##### **6.1 Schools.**

The 4 page flyer prepared by Terry Cuttle was discussed in detail. The overall thrust of the document was agreed, namely:

Page 1 history

Page 2 technical detail

Page 3 school activities...viewing

ToV Project

Schools comp.

Webcast

Page 4 promotions

It was agreed that SSSI was a sponsor, and should be recognized on page 4, along with the other sponsors. The front page should indicate that the project is jointly organized by AAQ and Surveyors.

**Action 4.8        Tim Pumpa to organize a suitable logo for Surveyors, probably based upon Destination Spatial and other surveying careers promotional activities.**

It was agreed that the present content on page 4 about Surveying, Astronomy and the Transit required attention.

**Action 4.9        Chris Swane to brief Peter Swan on the required words, and request that they be supplied by 25/01/2012.**

**Action 4.10       Jonathan Bradshaw to review pages 1 & 2 of flyer.**

**Action 4.11       Graeme Rush to provide words for schools competition for page 3 of flyer.**

The next meeting of the Teachers Group will occur on Saturday 21<sup>st</sup> January at the Chermside library. Most of the 25 documents under construction are presently in final draft. They will all be loaded on the AAQ web site when complete. There are 3 that are relevant to the Transit of Venus, namely:

Transit of Venus - A simulation program (using Stellarium)

Transit of Venus – A simulation program (using Clear)

How to observe the Transit of Venus or an Eclipse of the Sun.

These 3 documents will be jointly badged as AAQ and Surveying documents and loaded onto the project web site.

**Action 4.12    Terry Cuttle to provide Tim Pumpa with documents when completed (hopefully this weekend) and text as to how they are to be promoted on the project web site.**

## **6.2    Web Team.**

Moss Amor has been engaged as our web designer, and has prepared the site as was distributed to members.

Tim Pumpa has purchased [www.transitofvenus.com.au](http://www.transitofvenus.com.au) for the Project. **Many thanks Tim !**

Peter Swan has agreed to compile a consistent set of words about the history of transits, surveying and astronomy, and the transition to modern methods. Input has already been made by Bob Ross (The Transit of Venus and Surveying in Victoria) and Connie Beadell (Len's daughter) Len Beadell: astronomy in surveying.

Michelle Brooks (through the Surveying Task Force) has provided some web page input, with more to come.

As some members had not had the time to properly review the draft web site, and there was considerable more content to be added, it was decided to hold a special meeting to review the web site content and layout.

**Members to meet at Jonathan Bradshaw's house (51 Mt. O'Reilly Rd Samford) at 2.00pm on Sunday 29/01/2012 to review the project web site.**

**In the meantime, members are to email their comments / corrections to Tim Pumpa ASAP.**

The draft web site contains a “count down” for when the live webcast of the Transit of Venus will be shown. Jonathan Bradshaw confirmed that he is arranging for alternate sites to broadcast the webcast in the event of clouds in Brisbane. Alternate sites include: Home Hill, Townsville, West Sydney, Canberra and possibilities in Perth and Melbourne, as well as his Brisbane site. Some overseas sites are still under investigation.

Contact details are required to be published on the site. It was agreed that there should be an AAQ contact and a Surveying contact.

**Action 4.13      Graeme Rush and Terry Cuttle to supply Tim Pumpa with appropriate contact details.**

It was agreed that the computation of the Astronomical Unit (AU) should be included in an application on the project web site.

**Action 4.14      Terry Cuttle to supply Tim Pumpa with a suitable calculator web site for the calculation of AU.**

**6.3      Media.**

Graeme Rush advised that Michelle Brooks had been engaged, and that she had provided some advice about the Schools competition and getting the message out to schools, as well as the packaging of the messages.

Her advice about the Schools competition was to simplify the process, as reading several hundred 1000 word essays was an arduous task. The web team agreed, and suggested a simplified process that ensured engagement with the project, with minimal workload by the Project Team.

The lesson plans prepared by the Schools team includes a simulation of the Transit of Venus using the program *Stellarium*. This program will simulate the times of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> contact times for the transit for any location on earth.

The proposed competition is to calculate the 2<sup>nd</sup> contact time for the Transit of Venus at their school.

Entries would be lodged “on line” on the project web page ([www.transitofvenus.com.au](http://www.transitofvenus.com.au)) and include items such as:

- Name of School
- Latitude and Longitude of School
- Time of second contact for the Transit of Venus (competition answer)
- School address
- Contact teacher name and contact details
- Name of student or class
- Whether the school would be interested in purchasing a *Solarscope* at a reduced cost if they are unsuccessful in winning one of the 100 free *Solarscopes*.

The competition is to close in mid-March in order to (possibly) allow the purchase of additional Solarscopes for schools that did not win Solarscopes.

The competition notice would also include advice that the winners will have the Solarscope delivered to the school in May 2011 by a surveyor who will be able to provide some career advice to students as well as provide a tutorial on some basic surveying skills.

**Action 4.15      Graeme Rush (and Michelle Brooks) to prepare Schools Competition details.**

There was some concern expressed that school computer networks may prohibit the running of Stellarium software.

**Action 4.16      Graeme Rush to arrange testing of running of Stellarium on Education Queensland computer network.**

**6.4      Technical Team**

The Technical team advised that the Office of Fair Trading had still not confirmed the safety message for the safe viewing of the Transit of Venus, although a first draft of the message had been forwarded to Terry Cuttle.

Terry will continue to encourage the Office of Fair Trading to finalize the message as a matter of urgency.

**6.5      Financial Team**

It was confirmed that the monies in the bank at this time total \$7,650. The order for the purchase of the 120 Solarscopes approved for purchase at the December meeting is for Euro 6,530. (This equates to A\$ 8,026 at current exchange rates consequently we are about \$500 short at present.

ISA Qld does have significant funds in its bank account, as well as our \$7,650.

**Phil Pozzi agreed to arrange with Meredith Scott-McMahon for the money transfer of Euro 6,530 to occur from ISA Qld. Funds.**

**Action 4.17      Nick de Weger to arrange with Meredith Scott-McMahon for the transfer of monies to Light Tec (Solarscope provider) so that the order can be filled.**

**Action 4.18      Nick deWeger to contact Customs to advise all import costs, payment details, taxes etc. for this purchase of Solarscopes.**

There was much discussion about the timeline associated with the delivery of Solarscopes in addition to our initial shipment.

**Action 4.19      Nick deWeger to investigate the minimum time delay in order to guarantee the supply of Solarscopes by mid May 2012.**

**6.6      Administration Team.**

There was nothing to report from the Administration team.

## 6.7 **Participant Engagement Team.**

There was nothing to report from the Participant Engagement team.

## 6.8 **Communications Team.**

It was agreed that the next communication with stakeholders would be in early February, and focus on the release of the project web site [www.transitofvenus.com.au](http://www.transitofvenus.com.au)

## 7. **Review of Project Management Plan**

A brief review confirmed that there were no significant variations from the plan.

## 8. **Review of the Risk Management Strategy**

It was agreed that while the funding issues appear to be under control, we need to engage our funding bodies, especially the surveying funding bodies, to help us with the distribution of Solarscopes to schools. There will be a limited number (abt. 33 each for the 3 eastern states) of Free Solarscopes, and some subsidized Solarscopes to be delivered to schools. This is the opportunity to promote our professions to school children (A set of presentations and practical tasks will be prepared for use by the professionals delivering the Solarscopes.)

The deliveries are scheduled to occur in May 2012.

There is also the opportunity for surveyors to purchase Solarscopes for giving to their local school, even if they don't win a Solarscope.

**Action 4.20      Graeme Rush to draft letters to funding bodies seeking their assistance with the delivery of Solarscopes to schools in May 2012.**

It was agreed that we shortly need to commence work on preparing the package of tasks and presentations for use by surveyors when delivering Solarscopes to schools.

Risks 1 to 6 were considered to be relatively unchanged.

Risk 7. Disclaimer.

It was agreed that an appropriate disclaimer for the web site needed to be drafted.

**Action 4.21      Phil Pozzi to arrange the preparation of an appropriate disclaimer for the project web site.**

Risks 8 to 11 were considered relatively unchanged.

Risk 12. Website failure.

Jonathan Bradshaw assured the group that our web site was hosted by a reputable and reliable organization with many large sites already being hosted. However, there is never a guarantee that a server will not fail.

Risks 13 to 19 were considered to be relatively unchanged.



## **9. Communication with Team Members.**

It was agreed that our next major communication would be in February with the release of our web site.

## **10. General Business.**

The major topic discussed was promotion of the project. The promotions were grouped into the following target audience groups:

### **1. Schools.**

It was decided that we should do a mailout to all schools in the Eastern States. This would include the 4 page color flyer (A3 printed both sides), and a covering letter.

**Action 4.22 Chris Swane to price the printing of 5,000 or 10,000 A3 color printed both sides flyer, and a covering A4 letter with color letterhead.**

**Action 4.23 Graeme Rush to draft covering letter to schools.**

It was agreed that these letters should be posted in early February, after the release of the web site.

**Action 4.24 Graeme Rush (and Michelle Brooks) to source mailing lists for school.**

### **2. General Community.**

It was noted that Spencer Howson from the ABC is quite keen on astronomy issues. Perhaps Bill Kitson might agree to be interviewed by Spencer about the Transit of Venus.

**Action 4.25 Graeme Rush to approach Bill Kitson about being interviewed by Spencer Howson on ABC radio.**

### **3. Surveying Community.**

It was agreed that we should attempt to contact surveyors directly by email. The sensitivity of SSSI about the use of their email list probably means that their email list is not available for this purpose. It was considered that it may be possible to use the Surveyors Boards email distribution system.

**Action 4.26 Graeme Rush to approach Peter Sippel (Chair Qld. Surveyors Board) about the possibility of the Boards distributing material to surveyors about the distribution of Solarscopes to schools (and promoting the profession).**

**Action 4.27 Tim Pumpa to contact John Tullock (Victoria Surveyors Board) concerning the use of their email list for contacting surveyors about the distribution of Solarscopes to schools.**

It was also agreed that every opportunity be taken to promote the Transit of Venus Project at CPD events.

**Action 4.28 Chris Swane to attempt to make a short presentation at the Reinstatement Roundtable on the Gold Coast on 2/2/12.**

**Action 4.29 Nick deWeger to prepare PowerPoint presentation for use at CPD workshops.**

There was some discussion about members attending Regional or Town Group meetings in order to promote the project.

**Action 4.30 Nick deWeger to bring to the next Project Management Meeting a costed proposal about attending Regional or Town Group meetings.**

#### **Other General Business.**

Jonathan Bradshaw advised that the 2012 Astronomical Education Conference will be held on 25<sup>th</sup> February at U of Q.

**It was agreed that a Solarscope could be a prize to be given to a teacher at the conference as part of our promotional activities.**

It was also agreed that a reenactment of the Transit of Venus at Jimbour should be planned. This will be discussed in more detail at the next meeting.

**The meeting closed at 7.40 pm.**

Next Meeting 9<sup>th</sup> February 2012 5pm at the SSSI Boardroom

# **The November 2011 Progress Report**

## **On**

### **An Educational Project built around**

## **Observing the Transit of Venus**

### **6th June 2012**

#### **Firstly a reminder of the scope of this project.**

This project builds and expands on an existing project by the Astronomical Association of Queensland (AAQ) to promote Astronomy to Queensland school children through the observation of the total solar eclipse on 14 November 2012. The Queensland astronomers have already collaborated with Queensland Science teachers to prepare brochures and teaching materials. The materials already developed include access to the free software package (Stellarium) which calculates and graphically displays the night sky at any location on earth and at any time and date. Consequently, the software can simulate both the transit of Venus and the solar eclipse from various locations on Earth.

This project will use the same web delivery service developed by the AAQ for delivery of its school educational material, and also include additional material developed specific to the Transit of Venus. The materials will be available through the AAQ website, the Destination Spatial web site and the web sites of the Funding Bodies.

In order to encourage schools to engage with the project, there will be 100 free Solarscopes available to the schools that “sign up”, and a further number available at a subsidised cost. A Solarscope is an optical device that allows the safe viewing of the sun.

In addition, a number of astronomical observatories throughout the world will observe and time the transit of Venus, so that the calculation of the distance between the Sun and Earth can be calculated. Some of these observatories will also broadcast their viewing in real time via the web. An observatory at Samford near Brisbane has already agreed to broadcast their observations.

Both the Transit of Venus and the Solar Eclipse will be promoted at Astronomical, Spatial and Teacher forums throughout Australia. A professional media consultant will be engaged to attract widespread media coverage of the events.

#### **Secondly, a reminder of the Objectives and Critical Timelines for the Project.**

The objectives of the project are:

- 2.1.1 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.

- 2.1.2. 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.
- 2.1.3. 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 Project Critical dates are:

Activity	Date	
Secure Project Funding	November	2011
1st Report to Funding Bodies	November	2011
Development of school teaching materials	January	2012
First release of web presence (School materials)	January	2012
2nd Report to Funding Bodies	February	2012
Second release of web (School engagement)	March	2012
Release of school competition (Solarscopes)	March	2012
Media Releases	May	2012
3rd Report to Funding Bodies	May	2012
Third release of web (Live viewing of Transit of Venus)	June	2012
Project Review	August	2012
Final report to Funding Bodies	August	2012

### What have we achieved so far?

As the scope of the project has crystallized over the past six months, the Project Steering Committee has become, with some changes, the Project Management Committee (PMC). The PMC is now clearly focused upon the delivery of the project.

Eight Project Teams have been established.

### 1. Schools Team

The Science Teachers Team has been working under the leadership of Terry Cuttle for most of 2011. They have developed almost 30 lesson plans covering topics such as:

- Simulating the phases of the moon using balls.
- Using simulation software to predict the timing of the Transit of Venus and the eclipse of the Sun.
- Indirect viewing of the Sun using a Solarscope.

These lesson plans are designed for use by Science Teachers for both the Transit of Venus in June 2012 and the Solar Eclipse in November 2012. It is anticipated that most of these materials will be completed this year.

The team has also arranged to make presentations at various teacher conferences and seminars throughout the year.

A major component of the project will a competition for schools which will see 100 free Solarscopes and a further number of subsidized Solarscopes delivered to schools for the safe viewing of the Sun. These Solarscopes will be delivered to schools by representatives of the Funding Bodies who will use the opportunity to promote not only the project, but the professions.

## **2. Web Team**

The web team have only recently commenced work . This team's tasks include:

1. Selecting and securing the web delivery mechanism for this project, including ensuring that the site will have adequate capacity to support live viewing of the Transit event by thousands of viewers.
2. Designing the web site so that it is interesting, user friendly and easy to navigate.
3. Organising the design and uplift of all material to the web site. In particular, this will include content from the following teams:
  - Schools
  - Media
  - Technical
  - Communications
4. Ensuring that the site can be directly viewable through both the AAQ site and the Destination Spatial web site, as well as the web sites of the various Funding Bodies.
5. Enabling the site to broadcast “live” the Transit from at least one site.
6. Enabling the site to store the “streaming” of the observations from multiple sites, complete with time tags, for subsequent viewing.
7. Enable the site with the use of Stellarium
8. Publish contact details for all contributing associations, sponsors and funding bodies.

## **3. Media Team**

A brief for the employment of a professional Media Consultant has been developed, and sent to selected consultants who have a track record of working with Surveyors, Spatial Scientists, or Teachers. Submissions from these consultants are due to be received by 5/12/2011.

## **4. Technical Team**

The Technical team has been concentrating on developing, with government, a set of guidelines for the safe viewing of the sun. These guidelines will cover both the direct and indirect viewing of the Sun.

This project will be promoting the indirect viewing of the Sun. It will also be promoting the use of Solarscopes as one appropriate mechanism for the indirect viewing of the Sun.

## **5. Administration Team**

The main task undertaken by this team to date has been trying to elicit funding for the project. More about that from the Financial Team.

## **6. Participant Engagement Team**

Like the Administration Team, this team has also been actively seeking out financial support for the project. Surveying and Spatial Science organizations have been our primary targets. Also approaches are being made to high profile personalities to assist with the promotion of the project, as well as provide some financial contribution. Articles have been prepared for publication in professional journals, including Teacher journals.

## **7. Communication Team**

The activities of this team are designed to keep all stakeholders in the project informed about the progress of the project. This progress report is the first major output from this team.

## **8. Financial Team**

This team is designed to manage the project funds. However, as the project presently has no funds, there is not much that the team can do on that front.

Individual members of the Project Management Team are aware that a number of organizations have agreed to commit funds to the Project. In fact, we are aware of possible contributions that collectively add up to about \$15,000. However, the project has no official confirmation in writing of these contributions.

The project will close down if contributions of the order of \$30,000 are not confirmed by early December 2011.

**Please make or confirm your financial support to the project this month by contacting Graeme Rush [graemerush@bigpond.com](mailto:graemerush@bigpond.com)  
Or Nick de Weger [nick@deweger.info](mailto:nick@deweger.info)**

**This Project is reliant upon your support in order for it to proceed.**  
Graeme Rush

Project Manager.

# 2011 Progress Report

## On

### An Educational Project built around

# Observing the Transit of Venus

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

## December 2011

### Firstly an update on our financial position.

We have achieved our minimum funding requirement, and the project will proceed! Below is the text of the letter we sent to our supporters thanking them for their support.

### **RE: FUNDING ADVICE - TRANSIT OF VENUS 2012 EDUCATIONAL PROJECT**

*It is with pleasure that I have the privilege of advising our many supporters and sponsors that the target for progressing the Transit of Venus 2012, education project passed its first great mile stone. The target funding for the project was achieved, literally on the night that we were to either progress it or shelve it.*

*The support and enthusiasm for the project was undoubtedly there, but on Wednesday night we were overwhelmed with the generosity of our most ancient profession.*

*The project has been seen by some as a keystone to launch our profession into a new era, by others an opportunity to educate our youth in whom we are and to entice them to our profession, to others it is purely the love of surveying, our children and our natural world. To many of us it is the nostalgia as we remember doing our Sun observations and those cold nights with a bottle of port on the Astro-Deck doing close polar star obs for azimuth.*

*We on the Project Management Committee (PMC) have seen how this event has managed to break down jurisdictional barriers and prejudices, how it has managed to tweak our heart strings. Mostly, we believe it will show Australia how a true profession cooperates to take advantage of a once in a lifetime opportunity.*

*We commend all of the project supporters, whether that be financial or in principal alone, we are well aware of the difficulties of these times and have appreciated everyone's willingness to even consider funding the project. We know that now this first element in our risk profile has been overcome, the next step will be in acquiring the willing participants for contributions to the education documentation in matters of History, Mathematics, Science (already well down the track) and Geography and attendance in schools on behalf of the project.*

*To all other supporters, your regional association will be contacting you shortly to advise you of your part to be played in promoting our professions at local schools, with materials and PowerPoint from us and additional information to be supplied by your local association.*

*We ask that anyone who has pledged monies to the project to bring forward the invoices supplied by the PMC. If you have any questions, please contact our Treasurer by email, Mr Ewen Sneddon at: [ewensneddon@logan.qld.gov.au](mailto:ewensneddon@logan.qld.gov.au)*

*If you missed the opportunity to contribute, then once the Solarscopes school competition has exhausted our free supply, we would ask individual firms to buy these at discounted price, for presentation at their local school. Please contact us if you wish to consider this yourself.*

*We congratulate you for your interest and participation. Thank you once again. If you have any questions, please don't hesitate to contact Graeme Rush, Nick de Weger or Tim Pumpa at your convenience.*

*Yours faithfully*

*Transit of Venus Project Management Committee*

Other developments since our November 2011 report include:

#### **Web**

- The development of an outline for our web presence
- The gathering of information to populate the web pages
- The engagement of a web designer to assist with the compilation of the web pages
- Financial contributors have been requested to supply their logo's and other information so that they can be acknowledged on our web pages.

#### **Media**

- The engagement of a media consultant
- The development of the outline of how schools will be able to access free or subsidised *Solarscopes* for the safe indirect viewing of the Sun.

#### **Financial**

- The development of procedures to collect donations from contributors.

#### **Administration**

- Financial contributors have been invited to sit on the Project Management Committee.
- Orders have been placed to purchase *Solarscopes*.

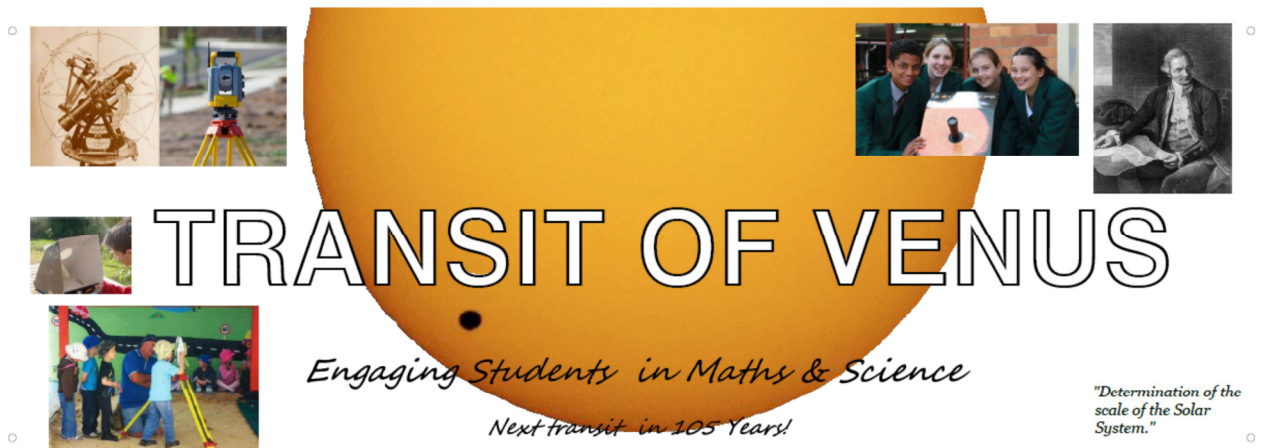
The Project Management Committee has decided that when *Solarscopes* are delivered to schools in the first half of next year, they should be delivered by a surveyor. The surveyor would not only deliver the *Solarscope* to the school, but will also deliver other materials supplied by the Project Team and your local surveying organisation. It is hoped, with enough interest, to run a refresher workshop to assist those with the delivery.

If you would like to volunteer your services to deliver a *Solarscope* to a school in your area, please respond to this email.

The Project Team wish you a very happy Christmas and a prosperous New Year

Graeme Rush  
Project Manager.





## Transit of Venus Project

### June Report

The Transit of Venus occurred “on time” on the 6<sup>th</sup> June 2012. It won’t happen again until December 2117.

The weather in Queensland was terrific, blue skies all day. The weather further south was not as clear, but it sounds like all areas had some good viewing times throughout the day.



As previously reported, the project team delivered 480 SolarScopes to schools all over Australia.....and we have no reason to believe that they were not all in use by schools during the day. The unsolicited reports from schools include this one from North Queensland.

*Picture Tim Pumpa at Mt Coo-tha Planetarium*

*Dear Graeme,*

*What a fantastic day. North Queensland skies were perfectly clear; the winds were light and the weather mild. Our view of the Transit was perfect for the entire day.*

*As an estimate, 400 high school students, 80 primary school students, 50 staff and 40 parents/grand-parents attended the school to view the transit in sessions throughout the day. Two local tradies even pulled up because they had heard we were well set up and thought they should stop for a look! We remained connected to several feeds, including the AU site for most of the day.*

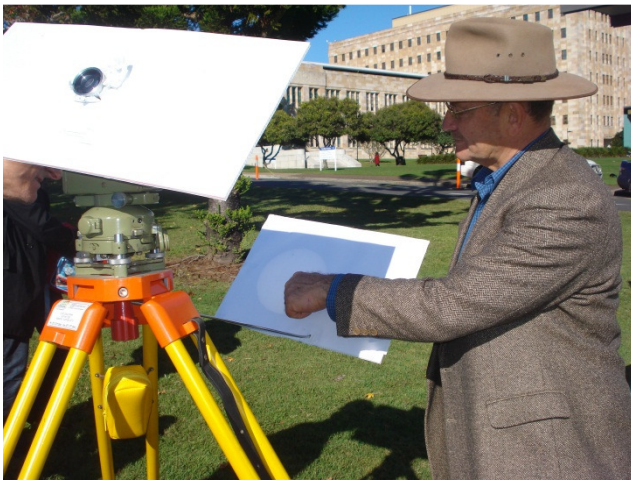
*The Solar Scopes performed perfectly, giving 100's of people the opportunity to view the transit. We also had sets of solar viewing glasses, but so many people returned to the Solar Scopes for the image size, the chance to see sun spots and greater clarity compared to direct viewing. The Solar scopes were managed by a group of Year 11 Physics students who kept them aligned and focused all day from the training provided by Graham Ward, upon delivery.*

*At the risk of a slight immodesty, the day was a brilliant success. This success was, in no small part, attributable to your organisation. Without this support, we would not have access to the Solar Scopes, the live feed or the expertise that has been available. On behalf of the staff and students of BCHS and the wider Burdekin Community, I would like to express my deep and sincere thanks for everything that was organised leading to this day. I trust you can share this thanks with your team, and I wish you well on your next project.*

*I hope everyone involved at your end had the chance to see the transit.*

*Thank you, again.*

*Doug Wright  
Maths Science Coordinator  
Burdekin Catholic High School*



*The best projection was still the Theodolite as shown by Graeme Rush and Ewen Snedden's capture of Venus using a sun filter on the Theodolite.*

On the day, we also broadcast the Transit of Venus live on our web site [www.transitofvenus.com.au](http://www.transitofvenus.com.au) . This broadcast was only possible through the dedicated efforts of our AAQ members Jonathan Bradshaw and Terry Cuttle. There were some disruptions to the transmission throughout the day because of the demand on the servers. (We had servers melt down in three countries trying to meet demand.) For most of the day, in excess of 18,000 sessions were being observed at any one time. In excess of 350,000 individual visitors logged onto our web site during the day!! It is no wonder that the servers had difficulty meeting the demand.





*Left Terry Cuttle AAQ,*



*above Jonathan Bradshaw's Website connection.*

The web site still contains video coverage of the highlights of the Transit.

The web site has been recognised as containing a valuable record of this Transit of Venus. The National Library of Australia has requested approval to archive the contents of the website in PANDORA, Australia's Web Archive. Consequently this web site will be provided with public access to it in perpetuity.

The below unsolicited comment from a member of the public indicates that the public in general were very pleased with the live streaming of the event.

*I logged into your website earlier today with my family (and clearly many, many others) to watch this rare event. Your coverage was excellent. We're fellow Queenslanders; we live in Richlands, Brisbane. I'm an IT consultant and my wife is a librarian. We have 2 sons at university (1 at QUT, the other at USQ), a daughter at college (SBIT) and another son still in senior (at YSHS) - we, and a couple of our close friends all waggled a little work/study to take the time to watch this event (having somehow missed the previous one) and a simple Bing search found your site for us. During the day we did periodically check other sites in other browser tabs to see what sort of coverage they offered but yours was the one we stayed with. We all loved watching your coverage and the contagious enthusiasm of everyone whom took part at your end. I took many screen captures. I hope an accelerated version of the video in various states of zoom becomes available at some stage so we can watch it (quicker) and I sincerely hope that all of you are proud of the service you did so many fellow travellers today (I seem to recall a figure of some 170,000 hits being registered on the player's seek bar at one stage). Thank you very much for your time and effort and please convey our kindest regards to all concerned.*  
*Yours sincerely*

Also

*Thank you for organising this. We even had friends in Chicago watching!*

Media coverage of the event was significant. While there was considerable TV coverage of major public viewings, there was also considerable radio and newspaper coverage of events happening at schools.....school children viewing the Transit of Venus using SolarScopes provided by the generous support of surveyors throughout Australia, as well as all our sponsors.

The final part of the project is now commencing. In this phase of the project we are requesting feedback from all the participants in the project. We will then collate the responses and prepare a report for all stakeholders. Hopefully the feedback from those involved with the project will give us some measure of how well we have achieved our objectives, and provide some learning's for future projects.

I encourage all involved in this project to visit our web site at [http://www.transitofvenus.com.au/Tov\\_Feedback\\_form.html](http://www.transitofvenus.com.au/Tov_Feedback_form.html) and provide us with your feedback.

Graeme Rush  
Transit of Venus Project Manager



Part of the Brisbane Team



L-R Tim Pumpa, Chris Swane, Graeme Rush & Nick de Weger



Surveyors and  
Astronomers  
Combine:  
L-R  
Terry Cuttle, AAQ  
Nick de Weger,  
Jonathan Bradshaw  
AAQ  
and Graeme Rush

**Mission Accomplished**  
Transit of Venus Australia 2012 Committee



**Careers in  
Surveying**  
alifewithoutlimits.com.au



### Transit of Venus Australia 2012 Committee

(insert date)

First Name Last Name

Title

School

Address 1

City State Postcode

Dear First Name (unless there is a Salutation Title, then use Salutation & Last Name),

#### **Do you want your students to experience one of the rarest astronomical events this year?**

On Wednesday 6 June, a small black spot will appear on the Sun, then for about 6 hours move across it and disappear. No, it's not a large sunspot, or a UFO exploring our solar system. The planet Venus will pass across the Sun, appearing like a small black disc. This phenomenon is called a **Transit of Venus** and it is the last time it will occur in our life-time.

**Your students can participate** in this memorable event by:

- Observing the Transit of Venus first hand.
- Undertaking student activities based on maths, science, history and geography principles and referenced to the National Curriculum to understand the event and predict the time and course Venus will take across the Sun as experienced at your school.
- Comparing the predicted results with the actual observation.

Safe viewing of the Transit of Venus can be done with projection devices such as a **SolarScope**. Your School could **win 1 of 100 SolarScopes** to observe the Transit of Venus. All you need to do is undertake a simple activity and enter your details at [www.transitofvenus.com.au](http://www.transitofvenus.com.au).

All entrants will also be invited to **purchase** a SolarScope for the **subsidised price of \$80** (valued at \$150). Should cloud cover affect visibility on the day, it can also be used for observing sunspots and Solar Eclipses.

The Surveying and Spatial Science Industry, and the Astronomical Association of Queensland are bringing this program to all Australian schools, in the interest of educating students about the application of maths and science in understanding Astronomical events.

To help your students experience and learn about the Transit of Venus, we invite you to employ the following resources:

1. A dedicated website about the Transit of Venus – **[www.transitofvenus.com.au](http://www.transitofvenus.com.au)**
2. Stellarium - Free downloadable web-based software to predict the Transit at your school
3. SolarScopes - For viewing the Transit safely
4. Student exercises – Adaptable for a range of student levels about the Transit and Surveying
5. A visit from a Land Surveyor - To run a student exercise and explain how Surveying is used to perform Astronomical calculations (subject to local availability).

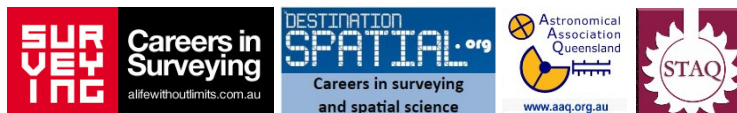
For information about the Transit and how you could win a free SolarScope, see the attached flyer, visit [www.transitofvenus.com.au](http://www.transitofvenus.com.au) or email [info@transitofvenus.com.au](mailto:info@transitofvenus.com.au). **Competition entries close on 15 March 2012** so please give this flyer to the appropriate contact in your school for consideration today.

We look forward to sharing this amazing event with your school community and helping to bring the wonders of the Universe into the classroom.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Graeme Rush'.

Graeme Rush  
Transit of Venus Project Manager



Transit of Venus Australia 2012 Committee

## Transit of Venus

### Schools Competition

### Announcement of winners

The organisers of the Transit of Venus Schools competition have been overwhelmed by the level of interest in the schools competition. Many schools have ordered multiple SolarScopes in order to ensure that they will be able to observe the Transit of Venus on 6<sup>th</sup> June, whether they win a SolarScope or not.

The enthusiasm of the teachers that entered the competition on behalf of their schools was also most impressive. Many schools entered multiple times, to reflect the results simulated by their students. (Only one SolarScope can be won by a school).

The surveying profession has also gotten behind this initiative and decided to donate additional SolarScopes to schools that have entered the competition.

The end result is that we now have the pleasure of announcing that ALL the SCHOOLS that ENTERED the COMPETITION are **WINNERS. EVERY SCHOOL THAT ENTERED THE COMPETITION WILL RECEIVE A FREE SOLARSCOPE, either one from the 100 initially allocated, or one donated by a surveyor.**

Non-competition winners and even some schools that did not make the cutoff date will also receive a FREE SolarScope through the generosity of our surveyors.

Many schools also ordered SolarScopes, and these orders for SolarScopes well in excess of that originally anticipated.

As a result of this extraordinary level of demand for SolarScopes (over 460) the organising committee has had to place a late order for additional SolarScopes to be delivered from France.

The result is that half the SolarScopes will be available for delivery early in May, while the remaining SolarScopes will not be available until late May.

In most instances, SolarScopes will be delivered to schools by volunteer surveyors. These volunteer surveyors will contact each school to arrange the delivery on a mutually acceptable date in May, or very early June before 6<sup>th</sup> June. It is proposed that some form of presentation ceremony be arranged, as well as some other talks, demonstrations, activities etc. that are to be negotiated between the surveyor and the School.

All schools will be emailed during April. This email will contain additional information, confirmation of orders, and in many instances the contact details of the volunteer surveyor who will deliver the SolarScope(s) to your school.

Congratulations to all winning Schools.

If you have any queries, please contact the Transit of Venus Project Manager, Graeme Rush at [graemerush@bigpond.com](mailto:graemerush@bigpond.com)



## Letter to volunteer surveyors

Dear

Thank you again for agreeing to be a volunteer surveyor for the Transit of Venus Project.

The delivery of SolarScopes to schools is the opportunity to explain to students the benefits of choosing a career like surveying that applies what they learn in Science and Maths to real life situations.

You have agreed to deliver SolarScopes to the schools listed in Attachment 1. Details of the contact person, their telephone number and email address, as well as the physical location of the school are included in this attachment.

A suggested process for making contact with the school is detailed in Attachment 2. This attachment explains how to contact the school, and the need to negotiate a time, date and duration for your visit, as well as the audience you will be addressing. The delivery of the SolarScopes needs to occur well before the day of the Transit of Venus on 6<sup>th</sup> June 2012. Attachment 2 also lists a range of activities that could be undertaken at the time of your visit.

It is NOT suggested that ALL activities be undertaken. You should negotiate with the school what activities will be undertaken.

Before you visit the school, it will be necessary for you to assemble the SolarScope(s) and become familiar with how they operate. They come with a manual that has been poorly translated from French to English. Terry Cuttle from the Transit of Venus Project Team has rewritten the manual into “real English”. Hopefully you (and the school) will find this version of the manual more “user friendly”.

While you have the SolarScope assembled, would you please attach the Transit of Venus sponsors sticker to the SolarScope. Attachment 3 details where to attach this sticker. Also if you, or someone else has donated the SolarScope, also attach the donation sticker as per attachment 3.

It is hoped that local media can be encouraged to be present when you present the SolarScope(s) to the school. A draft media release is attached at attachment 4. It is most appropriate that the media release be sent from the school. The school needs to be aware of all visitors to the school. The media release can be modified to best meet local needs.

If you or the school are not aware of local media outlets, attachment 5 lists some of the local media outlets.

Attachment 6 is a draft speech for you to use at the presentation ceremony. Again, it is not necessary for you to use this speech in its totality. You may choose to use some or all of it, or simply invent your own. Please try to include the included major messages in your speech.

Also in this package are a number of brochures, stickers and other career materials. You should leave these materials with the appropriate people at the school.

Also included are lesson plans for some surveying exercises that you may wish to incorporate into your visit.

It is NOT necessary that you return to the school on 6<sup>th</sup> June to observe the Transit of Venus. However, you may wish to offer your services on that day.

It would be helpful if you checked out our Transit of Venus web site [www.transitofvenus.com.au](http://www.transitofvenus.com.au) before your visit, and become aware of the materials that are available on that site.

If you have any concerns or questions, please do not hesitate to contact me on 0414 884876 or email me at [graemerush@bigpond.com](mailto:graemerush@bigpond.com)

I wish you all the best as you venture into schools to promote our great profession through helping students to discover one application of Science and Mathematics through observing the Transit of Venus, as Captain Cook did, before he became the first person to chart the east coast of Australia. He was a great adventurer and navigator, showing many of the skills of modern day surveyors.

Enjoy your time back at school!

Graeme Rush

Transit of Venus

Project Manager

Appendix 15	List of Attachments and Comments
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### **List of Attachments, and comments.**

Attachment No.	Description	Comment
1	School contact details	These details have been previously supplied to you.
2	Brief – School approach	This document is meant to assist you not only in your initial contact with your school, but also in the planning of the activities to be carried out on the day of the presentation.
3	Attaching stickers	This document describes where our sponsor sticker is to be placed on the SolarScope, as well as the presentation, and where appropriate, the donation stickers are to be placed.
4	Draft Media Release	This document needs to be modified to meet your local needs. It needs to have certain fields completed. It is preferable that the school sends the media release to relevant media outlets. You need to negotiate the content of the media release and its distribution with the school.
5	Media Contacts	Lists of media contacts are attached. They cover major regional centres as well as Brisbane and suburban areas. Use the relevant media contact sheets in your discussions with the school to decide which media outlets to contact.
6	Presentation Speech	Your presentation speech has been prepared as a Power-point presentation. You may choose to use this presentation or some variation of it depending on your audience. The presentation contains all the relevant talking notes you should require.
7	Hard Copy materials and SolarScopes	Brochures, stickers and SolarScopes are being sent to you (or picked up by you) in the near future. You will be advised of the delivery arrangements for these materials.
8	SolarScope User Guide Supplement	This supplement explains how to use a SolarScope. You should ensure that you are proficient in the use of the SolarScope before presenting the SolarScope to the school. This SolarScope User Guide should be left with the school.
9	Lesson Plans	These will be made available next week.

Because of the size of a number of these attachments, the attachments will be sent to you in a series of emails

Appendix 16	Shipments of SolarScopes
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### Shipments of SolarScopes

No of SolarScopes in Shipment	Queensland SolarScopes	NSW SolarScopes	Victorian SolarScopes	Estimated delivery date
120	40	40	40	10/4/12
120	52	28	40	13/5/12
240	81	147	12	20/5/12
Total 480	173	23 sold 170 purchased 35 freebies Total 228 Minus 13 sold by me Grand Total 215	92	

## Results of Transit of Venus feedback survey

Prepared by the Project Manager, 25/06/2012.

A summary of the raw data that was received as a result of this survey is attached to the end of this report.

The survey was sent to all schools that entered the Transit of Venus Schools Competition and all volunteer surveyors that delivered SolarScopes to schools. The system that was used in NSW for contacting schools and arranging volunteer surveyors was a decentralised system relying upon regional groups. There was no centralised database of schools and volunteer surveyors. The request for feedback was sent to the NSW sub-committee, and it appears that the on-forwarding of the request to volunteer surveyors may have not been as effective as it might.

There were approx 300 schools, and 200 volunteer surveyors involved in the project

Questions were asked, and a drop down menu of options for answers were supplied.

The questions asked in the survey were:

Q.1 Please select the nature of your participation in the Transit of Venus Schools' project

Q.2 How did you find out about the Transit of Venus project?

Q.3 What motivated you to become involved? (Select all appropriate responses)

Q.4 How many students at your school viewed the Transit of Venus?

Q.5 What was the range of equipment used at your school to view the Transit of Venus

Q.6 How interested do you believe students have been in the Transit of Venus

Q.7 From your interactions with students, do you believe they are more interested in considering careers related to Maths and Science as a result of the Transit of Venus Project?

Q.8 Please rate the quality and effectiveness of communication from the Transit of Venus Committee throughout the project Venus project?

Q.9 How useful were the materials and resources provided to support the Transit of

Q.10 How could the Transit of Venus project have been improved?

Q.11 Would you like to be contacted about participating in a Maths in Surveying day in 2013 where students carry out basic Surveying exercises involving science concepts, maths and logic, using Surveying equipment?

Q.12 What state are you situated in?

### Q.13 Location

By Monday 25<sup>th</sup> June 2012 there were 151 responses to the survey, from a potential number of approx. 500 participants. This represents a 33% response rate which is quite acceptable. 37% of schools responded, and 29% of volunteer surveyors responded. The volunteer surveyor response was affected by a very poor response from NSW surveyors, less than a 10% response.

Most teachers indicated that they entered the competition because of the enhanced learning opportunities offered by participation in the project. The free SolarScope was a secondary consideration. However, for most teachers, the enhanced learning opportunities included not only the SolarScope, but also the teaching materials and other information sources on the web site.

The committee is still of the opinion that the free SolarScopes added significantly to the uptake by schools.

In response to the question about how the teacher found out about the project, 36% indicated that they responded to a letter from the Transit of Venus Committee, 13% were approached by a surveyor, 28% heard about it from another teacher or teacher group, and the remainder (23%) from some other source.

From the information supplied in the survey, and recognising that 300 schools participated in the project, we estimate that in excess of 60,000 students participated in the viewing of the Transit of Venus as a direct result of this project. Many more probably observed the live broadcast on our web site.

Teachers reported that 90% of their students were either very interested or extremely interested in the Transit of Venus.

Teachers were also asked to subjectively assess whether their students were more interested in a career related to Maths or Science as a result of the project. 37% indicated students having more interest, while 35% indicated only slightly more interest. Only 6% indicated significantly more interest.

Both teachers and volunteer surveyors indicated that they thought the communications from the project team throughout the project were of a high quality and effective. 91% of teachers and 75% of surveyors gave a score of 4 or 5 out of 5 for communications.

The participants also thought the resources produced for the project to be useful. 90% of teachers gave a score of 4 or 5, and 95% of surveyors also gave a score of 4 or 5 out of 5.

The concept of participating in a “Maths and Surveying Day” in 2013 was well accepted. 90% of teachers want to be involved. 100% of Queensland teachers want to be involved. Only 60 % of surveyors want to be involved in such a scheme, but this varies from State to State with Queensland registering 70% and NSW 22%.

The committee is very pleased with the results of the survey.

	Teachers Queensland	Teachers NSW	Teachers Victoria	Teachers Other	Teacher Total	Surveyors Queensland	Surveyors NSW	Surveyors Victoria	Surveyors Other	Surveyor Total
Metro	14	18	12	2	46	18	4	10	2	34
Regional	10	12	10	2	34	19	5	10	3	37
<b>Total</b>	<b>24</b>	<b>30</b>	<b>22</b>	<b>4</b>	<b>80</b>	<b>37</b>	<b>9</b>	<b>20</b>	<b>5</b>	<b>71</b>
<b>Why did you enter the competition</b>										
Enhanced learning opportunities	22	24	18	3	67					
Free SolarScope	2	6	4	1	13					
<b>How did you find out about the Project?</b>										
Letter from ToV	12	6	9	2	29					
Approach from surveyor	4	3	3	0	10					
School teacher assoc.	0	13	9	1	23					
Other	8	8	1	1	18					
<b>How many students saw the Transit?</b>										
1-30 students	0	1	3	2	6					
31-50 students	1	0	2	0	3					
51-100 students	0	5	5	0	10					
101-300 students	6	16	10	2	34					
301-500 students	8	2	1	0	11					
501-750 students	6	3	0	0	9					
751-1000 students	1	2	1	0	4					
Over 1000 students	2	1	0	0	3					
<b>Interest in ToV</b>										
Extremely	6	7	9	2	24	10	0	2	2	14
Very	15	30	10	2	47	18	9	8	2	37
Somewhat	1	3	2	0	6	3	0	2	1	6
Interested	2	0	1	0	3	6	0	8	2	14
<b>Interest in SSSI Career</b>										
Significantly more interested	2	3	0	0	5	12	1	6	0	19
More Interested	12	8	10	1	31	14	6	11	3	34
Slightly more	8	13	7	2	30	9	2	3	0	14
No significant change	2	6	5	1	14	2	0	0	2	4
<b>Communications</b>										
<sup>5</sup>	11	11	12	2	36	22	3	7	3	35



4	12	15	8	2	37	15	4	12	2	33
3	1	3	2	0	6	0	2	1	0	3
2	0	1	0	0	1	0	0	0	0	0
<b>Resources</b>										
5	10	13	15	2	40	22	4	10	3	39
4	12	12	6	2	32	15	4	8	2	29
3	2	4	1	0	7	0	1	2	0	3
2	0	1	0	09	1	0	0	0	0	0
<b>Are you interested in a Maths and Surveying project?</b>										
Yes, Metro	14	16	9	2	41	12	0	6	1	19
Yes, Regional	10	9	9	2	30	13	2	6	2	23
No, Metro	0	3	3	0	6	6	4	4	1	15
No, Regional	0	2	1	0	3	6	3	4	1	14

Appendix 18	Selected Unsolicited Feedback
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Appendix 19	Selected Media Coverage
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Media for Transit of Venus This is a list compiled by Craig Robert and are only a few



### Radio

Transit of Venus Bill Kitson interview.mp3

2XL – Eden-Monaro – pre-recorded radio interview – played Wed 30 May morning (James 6456 1555)

2GH – Goulburn – pre-recorded radio interview – played Wed 30 May morning (Mitchell 4821 3377)

LifeFM – Grafton – live interview – Tuesday 5 June – 8:10am – (Andrew)

### TV

Channel 7 – short item on Channel 7 news – Daceyville Public – Wednesday 30 May

Channel 2 – Abbotsleigh Girls – Kate Fairlie – Wednesday June 6

Al Jazeera – Daceyville Public – Wednesday June 6

Channel 10 or 9 – Macarthur Girls High, Parramatta – Narelle Underwood – Wednesday June 6

### Print

Harden Murrumbah Express – media release - 24 May

Western Times Bathurst – media release - 24 May

Narooma News – media release - 23 May

Bingara Advocate – media release - 23 May

News Weekly Merimbula – media release - 30 May

Bombala Times – media release - 30 May

Bay Post Ulladulla – media release - 30 May

Braidwood Times – media release - 30 May

Tumut and Adelong Times – media release - 25 May

Scone Advocate – media release - 31 May

Canberra Times – local school - Steve Beljanski – June 6

Southern Courier – Daceyville Public – Craig Roberts - June 6

Daily Telegraph – link from website – Neil Keene – 0414 911 605 – June 5

Media releases were prepared for each school, as well as contact details for various local media outlets. Many schools had local newspapers print stories about the Transit of Venus, the school, the SolarScope and the presenting surveyor.

# Education

## CHANCE FOR STARGAZING

Students at Good News Lutheran School will get a better view of the Transit of Venus.  
**FULL REPORT BELOW**

➔ **UP NEXT:** Readers have a chance to speak up

➔ **PAGE 24:** Test your crossword

➔ **PAGE 27:** The lowdown on the Western Corridor bus

# Solarscope grand prize

**ALANA SCOTT**  
scotta@qst.news1td.com.au

MIDDLE Park's Good News Lutheran School students will watch the transit of Venus today thanks to a new SolarScope won from The Astronomical Association of Queensland.

Good News was awarded the SolarScope after entering a competition to predict exactly when the transit would occur at the school.

Local retired surveyor Nick de Weger addressed the schools Year 2-5 students last Tuesday to tell them about the scope and demonstrate how it operates.

"We really want schools to encourage their students to take an interest in the transit of Venus as it touches on so many topics, like space, maths, science, geography, engineering and of course surveying," Mr de Weger said.


Principal Adam Richardson said the transit of Venus, where Venus will be seen passing between Earth and the sun, would not occur again until 2117.

He said eastern and central Australia would be one of the few places in the world to see the entire six-hour journey across the sun between 8.30am-2.30pm.

"Good News has also purchased a second SolarScope so as many students as possible can witness this historic event," he said.

The transit of Venus was first recorded in 1639, with early astronomers sailing the globe to make observations, including Lieutenant James Cook who was sent to Tahiti on HMS *Endeavour* to observe and record the transit in 1769.

Mr Richardson said if the weather was cloudy, students would watch it on the internet.



**BRIGHT SPARKS:** Samuel Dedigama, Ella Schubert, Nick de Weger (surveyor) and Riley Prestidge familiarise themselves with the SolarScope.

Picture: ANGIE SIMMS