

Agenda Item No: 10
Report To: Cabinet
Date: 3 December 2015
Report Title: Ashford Dark Sky and International Observatory
Report Author: Mark Carty and Sarah Barber
Portfolio Holder: Cllr Gerry Clarkson and Cllr Clair Bell



Summary:

To update members on the Phase 1 feasibility study (copy placed in the members' room) carried out by the Fourth Street Consultancy to consider deliverable options for the future provision of an international observatory in the borough and the inter-related issue of securing a 'dark sky community designation' from the International Dark Sky Community Association (IDSA).

To assist in securing this international designation it is proposed that Phase 2 of the proposal would be for the Ashford Astronomical Society (AAS) to lead a community consultation on the application and this report details the exciting and innovative way in which this would be undertaken.

If members approve this course of action, an international dark sky community designation would have the status of being the very first such designation in mainland UK.

Key Decision: NO

Affected Wards: Appledore, Hamstreet, Kenardington and Woodchurch

Recommendations: **The Cabinet be asked to:-**

- a) **Welcome and support the approach by the Ashford Astronomical Society (AAS).**
- b) **Approve the proposal to commission the AAS to work closely with the Council to undertake public consultation to enable an 'International Dark Sky Community Designation to be submitted to the International Dark Sky Association (IDSA) on behalf of the Council and the AAS.**
- c) **Approve a capital budget of £25,000 to meet the costs of this proposal as set out in the cabinet report.**
- d) **Authorise the Head of Culture and the Environment in consultation with the Leader of the Council to take any further actions required to give effect to these recommendations.**

Policy Overview:	The proposal supports Priority 1 – ‘Enterprising Ashford – Economic Investment and Growth’ of the Corporate Plan and in particular will help to deliver ‘a thriving rural tourism economy and successful rural enterprise’. It also supports Priority 4 – ‘Attractive Ashford- Environment, Countryside, Tourism & Heritage’ and in particular the action to ‘strengthen tourism and the local heritage offer’.
Financial Implications:	A one off cost of £25,000 funded from the 2016/2017 New Homes Bonus budget.
Risk Assessment	YES
Equalities Impact Assessment	YES
Other Material Implications:	None
Exemption Clauses:	None
Background Papers:	International Observatory Business Plan, Ashford Borough Council, Sept 2015 (report by Fourth Street Consultancy)
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Report Title: Ashford Dark Sky and International Observatory

Purpose of the Report

1. This report addresses the proposals by the Ashford Astronomical Society (AAS) to consider the provision of an astronomical observatory and the closely and inter-related matter of Ashford's Dark Sky and approved Supplementary Planning Document (SPD).
2. The report summarises the detailed findings from the 'Fourth Street' consultancy (phase 1- copies of which have been placed in the members' room) and recommends next steps (phase 2).

Issue to be Decided

3. To welcome and support the approach being taken by the Ashford Astronomical Society (AAS).
4. To approve the proposal to commission the AAS to work with the Council to undertake public consultation to enable an 'International Dark Sky Community Designation to be submitted to the International Dark Sky Association (IDSA) on behalf of the Council and the AAS.
5. To approve a budget of £25,000 to meet the costs of this proposal as set out in the cabinet report.
6. To authorise the Head of Culture and the Environment in consultation with the Leader of the Council to take any further actions required to give effect to these recommendations.

Background

7. The AAS approached the Council in 2013 with a proposal to create a space science centre, planetarium, and observatory.
8. The AAS is a thriving and active amateur astronomy society led by Drew Wager (Chairman) and Jason Hall (Secretary). It has over 200 members and a typical meeting, which includes indoor and outdoor stargazing, regularly attracts between 60 -100 people.
9. As membership of the AAS has grown in recent years, the society has experienced a need for larger and more suitable premises for hosting astronomy meetings and events. At the same time, the society identified the uniqueness of the dark skies, which are particularly good for stargazing, in some areas of the Ashford Borough. Armed with these two premises the society approached the Council for funding for an observatory.

10. The AAS informed the council that what makes this particular proposal so exciting and unique is the fact that the area to the south of Ashford and particularly around Woodchurch has the darkest night skies in the whole of the South East of England.
11. To ensure that Ashford continues to benefit from this unique advantage a Dark Skies SPD (Preserving our skies: Light pollution and the need for darkness) was adopted by the Council in July 2014.
12. With the planning policy in place to safeguard Ashford's dark skies members also agreed at the July 2014 Cabinet that a feasibility study be commissioned and funded which would include a fully costed business plan and delivery options as well as a proposal for achieving International Dark Sky Community Designation status. The Fourth Street consultancy was appointed in November 2014 to carry out this work.
13. Key drivers of the project also include the aim to advance the borough's tourism, education and cultural agendas and also the project's potential ability to communicate key signals about the borough that reinforce its economic, housing and inward investment strategies.

Phase 1 - Findings from the 'Fourth Street' Feasibility Study - Observatory

14. **Consultation**
An extensive range of consultations and site visits took place to inform the Market Analysis, Vision and Concept and Business Plan. This included discussion with the Royal Observatory at Greenwich, the Observatory Centre Herstmonceux and a number of universities, astronomical societies and local stakeholders.
15. **Market analysis**
Market analysis revealed that there is a relevant residential catchment of more than 4 million people and that the unique part of this particular project is the fact that a high quality, dark sky observation site could be so close to major population areas. Most other well-known dark sky areas in the UK are located in more remote areas with much lower population densities than Kent, its surrounding counties and London.
16. Astronomy tourism is also gaining in popularity as urbanisation has led to increased light pollution so that half the world's population can no longer see the stars, while celebrity stargazers such as Brian Cox and Dara O'Brian have helped to popularise astronomy.
17. Potential users and visitors of an observatory would be both the amateur astronomical community as well a wider market of newcomers and first timers, including the local community, schools and colleges. Interestingly, amateur astronomers stated they would be willing to travel to an observatory location if both the dark skies and the facilities were of sufficient quality to make the trip worthwhile.
18. The market analysis has demonstrated that operators are picking up on this trend and are catering to astronomy enthusiasts by providing telescopes and

on site accommodation facilities and proactively marketing dark sky sites as stargazing destinations. Kielder Observatory (owned by the Forestry Commission and leased to Kielder Observatory Astronomical Society) in Northumberland has been particularly successful in this respect.

Strategic Aims

19. The study proposes that the observatory should aim to be ‘the best destination in the South East for celestial observation by amateur astronomers and stargazing by a wider public’. Its core ‘attractor’ being the dark sky itself. It should be an education and learning platform for schools, universities, colleges and other astronomical societies. It should bring the stargazing experience, more commonly associated with remote destinations, within easy reach of London, the South East and continental markets.
20. It should be accessible, but not trivial, providing facilities for seasoned astronomers and a programme that aids the initiation of newcomers and the progression of those that develop an interest in the subject. It should also act as a signal of Ashford’s emerging identity as the ‘smart’ location in the South East.
21. There are four key aims: **Astronomy** – improving awareness about astronomy beyond the academic and amateur astronomical community through the initiation of newcomers; **Education** – providing a platform for the delivery of formal astronomy education in partnership with schools, colleges and universities; **Economy and Marketing** – changing and improving the perception of Ashford that is held by different markets – residents, investors, visitors; **Astro Tourism**- increasing the number of staying and day visits to Ashford by becoming one of the top stargazing sites in the UK.

Business Model and Options

22. The observatory model is based on a moderately sized, but well-equipped observatory serving a dedicated market of amateur astronomers, hobbyists and leisure learning visitors. It would be comparable in size and scope to Kielder Forest in Northumberland and the Scottish Dark Sky Observatory in the Galloway Forest. The focus should be as much on its programming as on product with other academic, cultural and professional organisations providing courses, lectures and special events.
23. A key element would be an accommodation offer allowing for residential courses for enthusiasts as well as a unique experience for stargazers.
24. It is likely that the building in addition to the observatory space would also include a classroom/meeting space, gallery/foyer, café and some element of retail and be in the region of 340 sq metres.
25. The basic business model comprises four main components – land, capital funding, an accommodation operator and observatory operator.
26. **Option 1 - Partnership Approach** - Through the consultation process and subsequent discussions a potential partnership with the Forestry Commission has been put forward. This would be working with the Forestry Commission and Kielder Observatory. In this option the Forestry Commission would be the landowner, Forest Holidays (a trading subsidiary of the Forestry Commission)

would be the accommodation provider and the operator would be Kielder Observatory who have the track record and experience of operating a successful dark skies observatory. In as much as these organisations have some pre-existing relationship, there is a theoretical simplicity to this option, however it is dependent on the decisions of third parties.

27. **Option 2 – ‘Go it alone’**- In this option there would be no agreement with the Forestry Commission and instead the Council could purchase the land and fund all the capital costs. Kielder Observatory could remain as the observatory operator as this is not dependent on a deal with the Forestry Commission, although it would be possible to agree a management contract with another organisation (ie the Royal Observatory) or recruit a new operating company. The accommodation provider may be Forest Holidays or some other leisure operator of similar calibre and pedigree.
28. A comparison of the two options along with detailed costings, both capital and revenue, can be found in the main business plan.

Phase 1 - Findings from the Fourth Street Feasibility Study – Dark Sky Community (DSC) Designation

29. The International Dark Sky Association (IDSA) is a recognised authority on light pollution and works to promote sensitive lighting and to safeguard dark skies around the world. It does this through the International Dark Sky Places Program which grants recognition of certain locations according to the quality of their dark sky and commitment to minimising light pollution.
30. There are three types of designation.
 - 1) International Dark Sky Parks and Reserves are places with exceptionally dark and pristine skies ie Galloway Forest and Exmoor.
 - 2) International Dark Sky Communities (DSC) also have dark skies but they need not be as dark to achieve community status since the designation is more focused on citizens’ commitment to preserving dark skies in the community.
 - 3) Dark Sky Discovery Sites are away from the worst of local light pollution and have two ratings - Orion sites and Milky Way sites, which need to be visible to the naked eye.
31. The IDSA states that a DSC is a ‘town, city or municipality that has shown dedication to the preservation of the night sky through the implementation and enforcement of quality lighting codes, dark sky education and citizen support of dark skies’.
32. Significantly, a DSC in Ashford would have the status of being the very first such designation in mainland UK.
33. The feasibility study emphasised the uniqueness, environmental, social, educational and economic potential of safeguarding and promoting the benefits of Ashford’s dark skies. As part of their work Fourth Street managed a visioning process for a proposed ‘Dark Sky Community Designation’ from the IDSA which demonstrated that this is achievable, potentially beneficial and an important step in its own right.

34. The benefits of achieving DSC status include international prestige and profile, promotion of eco and astro tourism, place marketing and place branding as well as health and well-being and quality of life advantages.
35. The process for securing the designation is set out in a specific draft action plan (see appendix A) prepared as part of the business plan. It includes ensuring partners are supportive of the idea and see the benefits that can be achieved, defining the proposed boundary, aiming for a cluster of parishes around Woodchurch and devising a name that accurately reflects the geographical coverage of the proposed DSC.
36. Once this is in place, the DSC status requires a lighting code for the applicant area with the current SPD being amended and produced as a local guidance document; a series of Dark Sky Discovery Sites would need to be identified and consulted on and a series of local events and activities planned.

Phase 2 (Next Steps) - Community Consultation Proposal

37. To assist in securing the International designation the application requires a community consultation exercise which the AAS has agreed to lead.
38. It is proposed that the AAS do this by using a mobile, inflatable 'planetarium' which comprises a lightproof dome, a projector and a range of teaching and audio visual content (see appendix B). It is also proposed that a dedicated 'Ashford Dark Sky' software app is produced.
39. The mobile 'planetarium' can be easily and quickly erected in most schools, village halls and community centres with space for up to 50 people. The consultation process will also help to provide learning opportunities for local people by exploring science, astronomy and space in an interactive, educational and entertaining way. Importantly, it will also help to promote membership of the AAS and act as a useful barometer to gauge public interest for a possible observatory in future years.
40. The project cost of £25,000 which includes the inflatable 'planetarium', all equipment, the preparation of a bespoke app and the consultation is detailed in the 2016/17 New Homes Bonus Project Bidding Form.

Handling

41. At this stage, however, the international dark sky community designation application should not be viewed as a precursor to an 'observatory' project. The consultation process and the mobile planetarium should be given approximately three years to help to build community involvement and interest in astronomy and in Ashford's Dark Sky before considering embarking on a possible observatory.
42. It is proposed that the Fourth Street Consultancy uses the outcome of local consultation to complete and submit, as per their draft action plan, a 'Dark Sky Community Designation' to the IDSA on behalf of the Council and the AAS.

Consultation

43. The AAS has been consulted and fully supports this measured, but innovative approach to securing a DSC designation and further educating local people about Ashford's dark skies.

Risk Assessment and Equality Impact Assessment

44. The risks for this proposal are minimal. While the community consultation will be delivered by the AAS, the process will be overseen, monitored and evaluated by the Council with support from the Fourth Street Consultancy in preparing and submitting the final DSC designation to the IDSA.
45. In fact the project will also 'test the water' in relation to the establishment of a permanent observatory and will enable the AAS and the council to consult with and receive feedback from a wide range of potential stakeholders. Access to the mobile planetarium consultation sessions will be free and open to all the community.

Conclusion

46. It is therefore proposed that the Council (through the Fourth Street Consultancy) secures a Dark Sky Community designation and that the AAS undertakes community consultation to support the application using a mobile, inflatable planetarium as a means to engage with and consult a range of stakeholders.

Portfolio Holder Views

47. **Leader of the Council, Cllr Gerry Clarkson CBE** – "I welcome the findings of this report and the fact that while an observatory should aim to be the 'best destination in the South East for celestial observation by amateur astronomers and stargazing by the wider public' including schools, colleges, universities and other astronomical societies, its core 'attractor' at all times is the dark sky and in this particular case, the dark skies in and around Woodchurch.

To that effect, I wholeheartedly support the innovative approach being proposed, which will see the Council working closely with the Ashford Astronomical Society to develop an exciting and interactive community consultation programme that will ultimately enable an International Dark Sky Community Designation to be submitted to the prestigious International Dark Sky Association.

Significantly, A Dark Sky Community in Ashford would have the status of being the very first such designation in mainland UK and would well and truly cement Ashford's international credentials.

In addition this paves the way to examine over time, just how popular this is before we encourage any longer term investment.”

48. **Portfolio Holder for Public Interaction and Borough Presentation, Cllr Clair Bell** – “This proposal has a number of key benefits, but of particular note would be the impact of ‘astro tourism’ on the rural economy. A Dark Sky Community Designation would bring the stargazing experience, more commonly associated with remote destinations, within easy reach of London, the South East and continental markets.

This would increase the number of day and staying visits to Ashford and a key element could be the development of an accommodation offer and the ability to work with a range of existing hospitality providers to extend the traditional tourism season.”

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APPENDIX A
DRAFT DARK SKY COMMUNITY DESIGNATION ACTION PLAN

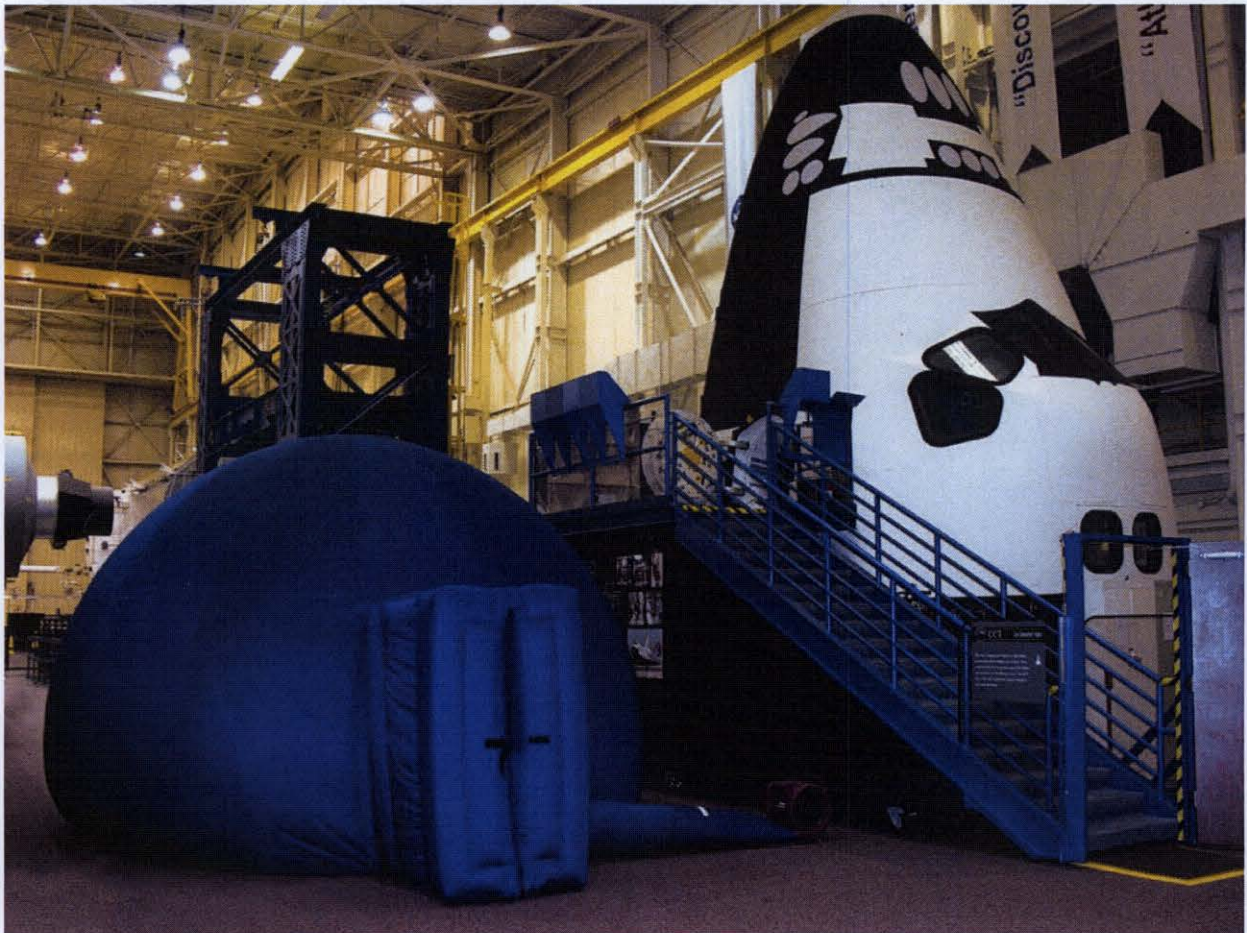
<u>Objective</u>	<u>Actions</u>
1.Ensuring the potential partners are all supportive of the idea and see the benefits that can be achieved	a. Create an outward facing version of the vision and concept document for the DSC
	b. Engage with the Parish Councils and other local stakeholders (e.g. High Weald AONB) to generate support for the proposal
	c. Engage with KCC to ensure that they will operate in the spirit of the revised SPD
2.Define a boundary and establish a working title for the DSC	a. Through the Parish engagement process, define a boundary based on an unbroken series parishes and collectively agree a name for the DSC
3. Fulfilling the obligation to produce an outdoor lighting code	a. Produce a locally tailored draft appendix to the lighting code which meets IDA requirements
	b. Consult on the SPD Appendix
4. Enable people to enjoy dark stars in a way which bolsters the DSC application and increases community awareness of dark skies issues.	a. Establish a programme of events and activities for the coming year, through contact with local astronomy groups
	b. Identify and consult on a network of Dark Sky Discovery Sites to promote stargazing opportunities locally and add value to the DSC application. Engage with astronomy groups on selection
	c. Complete application for DSDS
	d. Identify resources needed to support events and activities (publications, materials, stargazing kits etc.) engaging with astronomy groups.
	e. Establish the extent to which dark skies resources are currently available or desired in a sample of local schools. If desirable, identify how the materials produced under action 4d could be used to support dark skies work in schools.

	f. Create a simple dark sky awareness publication and/or web resource alongside the promotion of star-gazing events and the Dark Skies Discovery Sites, highlighting opportunities to enjoy dark night skies in the DSC area.
5. Establish the support of a broad range of local groups beyond the Parishes, KCC and the astronomy groups	a. Provide an opportunity for local organisations to engage in the process with a view to providing letters of support – this could be a stargazing event targeting potential supporters
	b. Provide guidance on potential letters of support content, without simply producing a template
6. Identify a night-time sky darkness baseline and monitoring programme	a. Provide guidance on undertaking a night sky darkness monitoring programme with local astronomy groups
	b. Meet with the local astronomy groups, as part of the overall engagement process, to seek their support and input to monitoring. Identify repository of the records
	c. Implement programme with local astronomy groups
7. Generate examples of a minimum of 10 projects built under the lighting code, or agreeing an alternative with IDA	a. Initial action action - Confirm with the IDA what might be acceptable in this regard, given the timing of production and the presence of the current SPD
8. Secure the Dar Sky Community Status	a. Ongoing liaison with the IDA to ensure the process is on the right track
	b. Gather the supporting material
	c. Complete the application form

Example of mobile, inflatable planetariums



About Go-Dome



Go-Dome™, a division of the Avela Corp., is the preeminent manufacturer of portable dome theaters and the mirror-projection equipment that these theaters use to bring the night sky into focus at any time, in any place. Thanks to a dedicated team of international distributors, Go-Domes™ are bringing the immersive, full-dome planetarium experience to schools, museums, science centers, and public venues of all kinds, worldwide.

Go-Dome™ theaters range in size from such architectural masterpieces as the Rose Center in New York to compact, lightweight 4- to 10-meter domes. Go-Dome's™ newest offering, the Zodiac line of large domes, features permanently inflated walls and doors. Go-Domes™ of all sizes and styles share the same hemispherical shape and deliver the same immersive, exciting experience. Each Go-Dome™ incorporates state-of-the-art screen quality, interior airflow to maximize viewer comfort, and a full-sized door similar to that of a permanent theater.

Each Go-Dome™ meets international fire-safety standards as well as rigid California flame-retardant standards, and is constructed to exacting U.S. quality-control specifications. Go-Domes™ are shipped in cargo duffel bags for easy transport.

Go-Dome™ also manufactures a convex mirror-projection system called the Newtonian2™. This compact, lightweight projection system is a lower-cost and more convenient alternative to bulkier fish-eye projection systems. In fact, the Newtonian2™ is so compact it can be carried on to some airplanes! Newtonian2™ technology enables small planetariums everywhere to complement their existing mechanical optical star projectors by offering digital movie content. The large, scratch-resistant, coated, convex GO-Vex™ mirror used in Newtonian2™ is housed in an integrated case that protects it during travel and during operation. During use, the case sits on an adjustable stand in the back of the dome, leaving the best seats in the house — the center seats — free for the audience!



The Standard Dome

Go-Dome's first product — the one that put the company on the map and took the astronomy world by storm in 2004 — continues to be its best-selling product.

The Standard Go-Dome remains popular with customers of all kinds due to its extreme versatility and portability, without compromising on comfort or image quality.

As with the complete line of Go-Domes, the Standard dome uses positive air pressure, and is inflated by turning on a simple carpet fan. The dome's door acts as an airlock, keeping the dome fully inflated even as visitors enter and exit at their leisure. The positive-pressure dome provides a constant supply of fresh air, keeping audiences cool and comfortable while they are inside the dome.

Standard domes are available with an exterior color of blue or black, and in sizes ranging from 3 to 9 meters in diameter.



Standard 6 meter blue Go-Dome™

Once inside the dome, audiences first see unique flocked-grey interior “walls.” When the projection system is turned on, those inflatable walls do double duty by acting as a superior projection surface for movies and star fields. The surface displays images impeccably, for a sharp, detailed visual.

Having first been introduced in 2005, Go-Dome has been able to tweak its popular product — making improvements that largely have been driven by their customers’ input. As a result, today’s Standard Go-Dome boasts features that earlier versions didn’t have.

Today’s Standard Go-Dome has input air vents in the door and along the wall to increase the flow of fresh air. It also has front air vents that let air out of the dome to prevent the dome from becoming over-inflated and lifting off the floor. The door has been heightened to create a 6-foot interior clearance so most people can enter and exit without having to duck down.

Though the Standard dome was Go-Dome’s first product, continual enhancements and improvements have helped it retain its position as a top-seller. Its versatility and portability make it attractive to customers of all kinds.



Standard Go-Dome™ Pricing



Go-Dome™ Rings

For customers needing a more traditional planetarium theater experience, Go-Dome™ offers domes with rings. These rings give the dome a vertical wall below the projection surface. The rings are inflated by the same fan that inflates the dome. Each ring has a diameter of 30 cm (1 foot) and up to 5 rings can be provided for the spring line desired by the customer. The primary purpose of the rings is to raise the projected horizon in the dome. By using 3 or more three or more rings standard folding chairs can be used in the dome for seating and the fulldome image is projected above the heads of the seated audience.

One or two Rings hold the dome diameter and adds to stability. Three to five Rings provide a wall against which chairs can be placed. Customers wanting a dome structure with chairs often choose the ring dome.

These domes are heavier and therefore not as portable as the standard dome, but find many applications where a dome is set up for more than one day or even as a temporary theater in museums or other public spaces such as malls, lobbies, and common areas. Ring domes have been made in sizes ranging from 4-meter domes fitting in trade shows or classrooms with tall ceilings to 8-meter portable theaters.

The rings are permanently attached to the dome and are not detachable in any way. Likewise Rings can not be added to a standard dome.

Ring domes are available in blue or black standard cloth.



4 ring 7 meter Go-Dome™



Newtonian™2

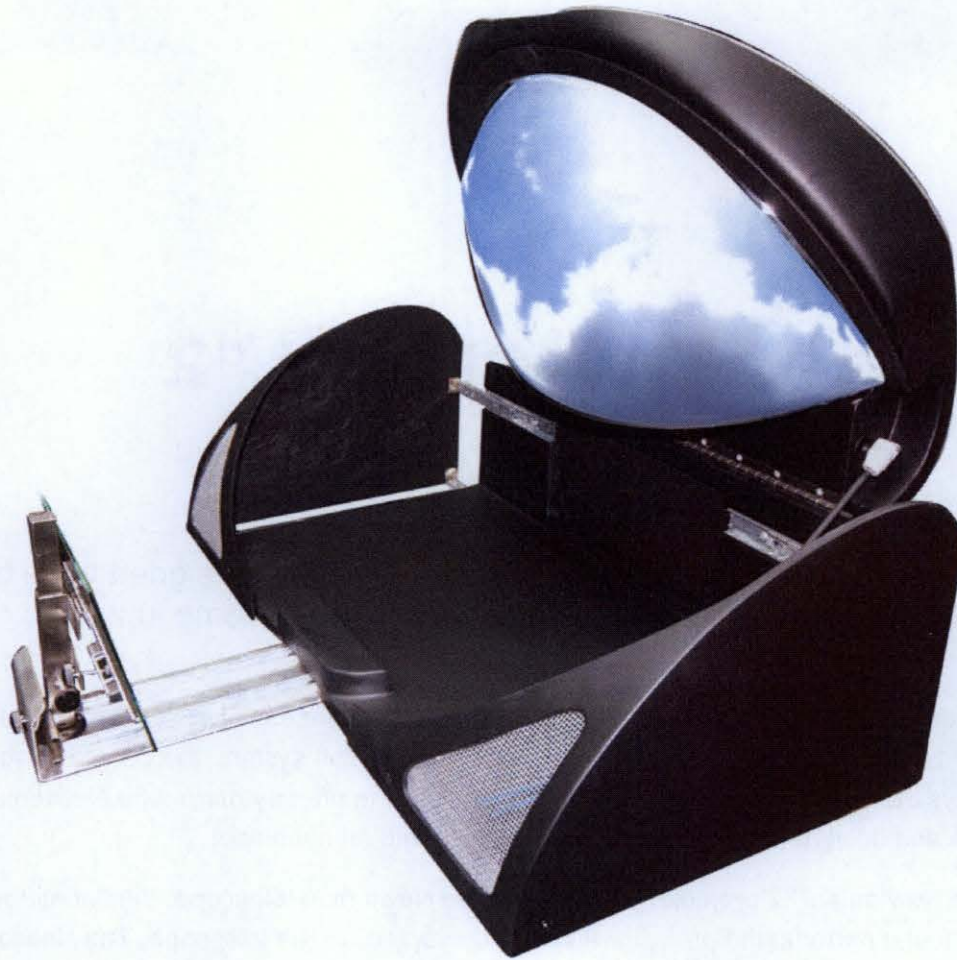
The Newtonian™2 is an optical projection system designed to be both portable and optically accurate in delivering a full-dome image.

Like the Newtonian telescope, the Newtonian projection device uses two first-surface mirrors: a curved mirror and a flat mirror. In the Newtonian™2 projection system, the curved mirror is convex and displays the image from a projector over a dome. (The primary mirror of a Newtonian telescope is concave and designed to gather light and focus it onto an eyepiece).

In both the Newtonian™2 projector system and the Newtonian telescope, the flat mirror transfers the image to the mirror in the projector and to the eyepiece in the telescope. The Newtonian™2 projection system uses the Go-Vex™ first-surface convex mirror. It's most critical design criterion is protection of the primary mirror during transport and while in projection mode.

The Newtonian™2 mirror projection system serves the function of a fisheye lens at a fraction of the cost for the resolution on the dome (similar to the advantages of the reflecting telescope over the refractor). Also the Newtonian™2 has a small footprint -- 60 cm wide and 30-45 cm deep (2 feet by 12-18 inches) -- and is placed along the back wall of the dome, leaving the center of the dome free for visitors. It produces hemispheric coverage with a small area of shading and distortion at the back, directly above the mirror.

The Newtonian™2 is designed to use an HD projector with a resolution of 1920 by 1080 or 1200 although higher resolution projectors for portable systems may become available in the future. Most of the current brands will fit in the Newtonian™2 system, but retail distributors will have complete and current lists of projectors. Brighter projectors usually have superior performance -- especially in larger domes. Unlike the fisheye, which must be installed in a specific projector, the Newtonian™2 takes a range of standard HD projectors found in home theaters and conference rooms. In the HD projection over 84% of the projector's pixels reach the dome with over 95% of the dome covered. When a projector needs repair, a second projector can replace it immediately. The Newtonian™2 rarely needs repair, but customers may change out the primary Go-Vex™ convex mirror after several years of use.



Newtonian 2™ Spherical Projection System

The Newtonian™2 is very portable and normally travels on top of a rolling case containing the projector, laptop and sound system – for easy transport to a school or community setting. An operator with practice can set up a Go-Dome™ and Newtonian™2 system in less than 30 minutes, with similar amount of time required for takedown. The dome, fan, and projection system can all fit on one hand-truck.

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Advantages:

1. The Newtonian™2 is **less expensive** than fisheye solutions. There is no debating this fact.
2. The Newtonian™2 **eliminates chromatic aberration** associated with the horizon of fisheye lenses.
3. Newtonian™2 projection solutions are **resolution independent** with the only limitation to the resolution being the projector you have chosen to use.
4. Newtonian™2 projection solutions are **infinitely upgradable**. You are not stuck with the initial projector you have chosen. As projector technology continues to improve in lumens and resolutions, you are free to change out for a new projector while repurposing the original projector for classroom or other uses without penalty. This makes Newtonian™2 mirror solutions green and better for the environment.
5. **More pixels on the dome!** A fisheye lens coupled with a high definition projector loses over 50% of the available pixels due to the round nature of the dome master that the fisheye lens must project. A warped image, designed for a mirror captures 84% of the available pixels giving you more pixels on the dome and higher resolution regardless of what ever apples to apples projector comparison you choose to make. The image below clearly illustrates this.



[Newtonian™2 Pricing](#)



Honest pixel/ resolution comparison

Missinformation:

Newtonian™2 projection solutions offer so many advantages, competitors are publishing misinformation that we would like to take this opportunity to clear up.

1. The Newtonian™ 2's Go-Vex Mirrors are *criticized for being so delicate that you can not even blow on them*. Not true. We maintain a caucus approach to the care and maintenance of the Go-Vex™ Mirror, but it is the only cleanable first surface mirror available to the market today.
2. *The Newtonian™2 coverage is distorted and not complete at the back of the theater*. We want to point out that with the Newtonian™2 system, when properly aligned in portable domes, cover over 95% of the dome without distortion. And in fixed domes using, Newtonian™2 systems ALL distortion and coverage issues can be eliminated by careful alignment. As evidence, note the photo below provided by Paul Bourke. Using a Newtonian™2 projection system, with a Go-Vex Mirror. Paul is covering 100% of the dome without distortion and is projecting at the cove line allowing for the star ball projector to be used without causing a shadow.



Newtonian 2™ image projection in a 12 meter dome- Image courtesy of Paul Bourke

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Go-Dome® Dome Covers





Dome Covers™ give your Go-Dome® personality, perhaps a space ship or an Earth, and attract attention. They provide a theme to match the experience inside the dome and encourage visitors to come over and investigate. The Dome Cover™ comes to the bottom of the dome and around the entry airlock door.

Available artwork includes an Earth and a space ship, but other treatments, including other planets, can be created with the cost dependant on the complexity of the artwork.

The Dome Cover™ is very light weight and is placed over the dome as it is inflated. The dome cover then stays in place until the dome itself is deflated. It cannot be viewed from inside, but a complementary projection is supplied as a fisheye or warped fisheye for you to use in your projection system, perhaps as visitors enter the dome and take their seats.

The Dome Cover™ can also be customized or commercialized depending on your audience and the availability of photographs or original artwork.

 Go-Dome™ Dome Covers