

News & Analysis

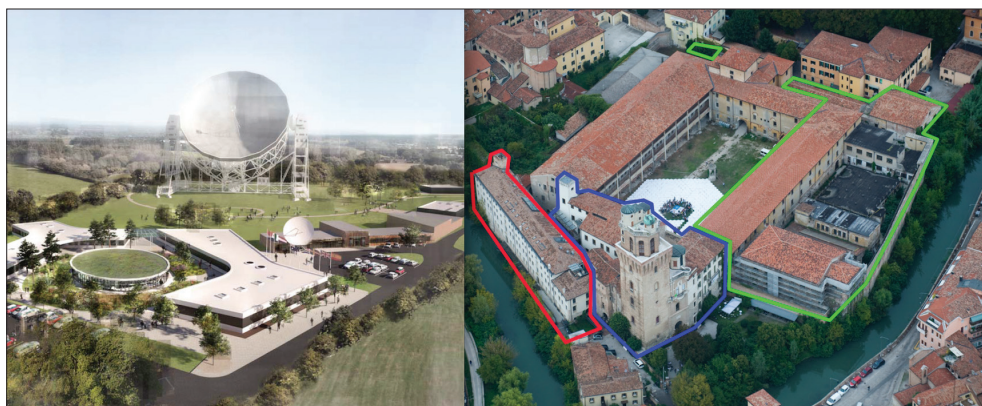
UK and Italy vie over telescope HQ

An Italian bid to host the headquarters of the world's largest radio telescope has been judged superior to a British proposal – yet it has failed to get the green light. **Edwin Cartlidge** reports

To its critics, the contest to host the headquarters of a planned complex of radio antennas known as the Square Kilometre Array (SKA) resembles a boxing match in which the loser gets a second chance to fight. In the red corner is Jodrell Bank, in rural Cheshire, England, which is home to the iconic Lovell Telescope and the project's existing base. And in the blue corner stands Carrara Castle, a 14th-century building in Padua, the Italian city where Galileo Galilei taught mathematics and astronomy. Fighting has been intense, but after nine rounds neither combatant has managed to land a knock-out blow. Italy has been judged the clear winner on points, by a margin of five to zero. However, the board of control has now called for a rematch.

The judges in this case are the members of an advisory panel set up by the SKA's board of directors. In a report submitted to the board in February, the panel clearly found in favour of Italy – judging its bid better than the one from the UK in five out of nine pre-established criteria, and as good in the other four. But at a meeting on 6 March, the SKA member countries – Australia, Canada, China, Germany, India, Italy, New Zealand, South Africa, Sweden, the Netherlands and the UK – decided not to declare a winner. Instead, they asked the two competing teams to supply further information in support of their bids and said they hoped to reach a decision by the end of this month.

In statements made at the March meeting, the British delegation questioned the credibility of the Italian bid and threatened to pull out of the SKA if it did not get the nod. The president of Italy's National Institute of Astrophysics, Giovanni Bignami, says the British team “pushed things” at the meeting, adding, “Inevitably I have the impression they are given a second chance.” Even from across the Atlantic the lack of a decision looks suspect. “It is a question of procedure,” says Abraham Loeb, an



Fighting talk

The UK is bidding to host the headquarters of the Square Kilometre Array in an extension to the Jodrell Bank Observatory (left) near Manchester, while Italy has proposed to house the HQ in the southern wing of Carrara Castle in Padua (highlighted in green).

astrophysicist at Harvard University. “Whatever verdict was reached should be respected.”

However, Philip Diamond, director-general of the SKA Organisation, which is overseeing the project's initial development from Jodrell Bank, dismisses claims of any favouritism and insists that the deferred decision is part of a well-planned, ongoing process. “I was never expecting, and the members were never expecting, to take a decision purely based on this report,” he says. “It is nonsense to say the UK was applying pressure.”

Tough choices

The controversy over where to build the headquarters has parallels with wrangling over the siting of the telescope itself. First proposed in 1993, the SKA is one of the largest and most prestigious scientific projects in the world. As its name implies, its design calls for a total collecting area of one square kilometre, in order, among other things, to detect faint radio signals emanating from the universe's “dark age” a few hundred million years after the Big Bang and to study as-yet-undetected gravitational waves.

Two potential sites – one in southern Africa and the other in Australia and New Zealand, which had been selected from an initial list of four – were scrutinized by an advisory panel set up in 2011. That panel sided with the African bid, mainly because

of the way its antennas were to be laid out and because it could take advantage of lower electricity prices. But Australia was determined not to lose out and after protracted negotiations, member countries agreed in May 2012 to split the project. Several thousand mid-frequency dishes are planned for South Africa and neighbouring countries, while up to a million low-frequency TV-like dipole antennas will be laid out in Australia and New Zealand.

The project's first phase, dubbed SKA1, which will involve building about a tenth of the antennas, is due to start in 2018. At that point the SKA Organisation, which is a private company, will be replaced by the SKA Observatory, an inter-governmental organization to be governed by a treaty along the lines of CERN or the European Southern Observatory (ESO). And it is that body that will operate from the new headquarters.

In October last year the SKA sent out a call for proposals to the UK and Italy, which had previously expressed interest in hosting the new headquarters, and at the same time set up the advisory panel. Consisting of chair Brian Boyle, Australia's SKA board director, as well as Dutch and South African board directors and an ESO representative, the panel reviewed submitted documents, carried out interviews and visited the two sites. In its report, which has not been made public but has been seen by *Physics World*, the panel states

that both bids fulfilled all nine criteria but that “the clear result” was nevertheless an endorsement of the Italian proposal.

Of the five categories in which Italy comes out on top, four are related either to the site itself or to its urban environment. The SKA headquarters would be housed in a wing of Carrara Castle, which is currently being renovated and is about twice as big as the planned expansion of the Jodrell Bank complex. The Padua site would also offer contact with a larger, more varied group of astronomers, given the presence of some 150 researchers from the local university and astrophysics institute in a neighbouring wing of the castle. (There are fewer additional scientists at Jodrell Bank although they are more focused on radio astronomy.) The panel also looked favourably on a promised canteen and kindergarten, not present in the British bid, as well as easy access to restaurants, hotels and other services such as international schooling.

The other category in which the Italian bid was considered superior is finance, and it is here that the panel appears to have ruffled British feathers the most. The panel assumed that whoever hosts the headquarters will, like the instrument hosts, pay 14% of the SKA budget (as opposed to around 12% otherwise). Since construction and operational costs for SKA1 will amount to about €1bn, the “host premium”, as it is known, would be around €140m. The panel acknowledged that the UK has already pledged £100m (about €135m) to cover these costs, but it noted that Italy has committed a similar sum – €142m – and, unlike the UK, has also promised to pay for the first five years of the headquarters’ operations (in addition to the capital costs). In setting out their bid, the panel said, the Italians had produced financial statements with “a greater level of detail and clarity” than the UK had managed.

In a 3 March letter addressed to the SKA board, John Womersley, chair of the board and chief executive of the UK’s Science and Technology Facilities Council, says that the “UK cannot accept [the panel’s] findings in all areas” and maintains that the report “does not appear to properly account for the scale and approval status of our financial

Step by step towards the Square Kilometre Array

1993 The International Union of Radio Science establishes the Large Telescope Working Group to begin an effort to develop a next-generation radio observatory

2000 Eleven countries – Australia, Canada, China, Germany, India, Italy, the Netherlands, Poland, Sweden, the UK and the US – sign a memorandum of understanding to establish the International Square Kilometre Array Steering Committee

2006 Australia and South Africa go head-to-head to host the SKA, beating off competition from China as well as a joint bid from Brazil and Argentina

2007 The University of Manchester is announced as the host for the International SKA Project Office

2011 Jodrell Bank Observatory in Cheshire becomes the site of the SKA Organisation office

2012 The full SKA design is complete, while the SKA Organisation decides to split the project so it is spread over sites in Australia/New Zealand and southern Africa

commitment”. A similar position was expressed in a second, unsigned, letter from the UK’s Department for Business Innovation and Skills, which stated that “it makes no sense to dramatically increase the risk of the project by changing leadership from the UK to Italy”, adding that were the headquarters to move, the UK would need to “radically reassess participation in the project”.

Firm bidding

Michael Garrett, general director of the Netherlands Institute for Radio Astronomy and a member of the SKA’s board of directors, believes there was nothing particularly unusual about the UK letters, which were read out at the March members meeting alongside statements made by the Italian delegation. He says that “the vast majority” of members felt they needed more information beyond that contained within the panel’s report, including more specific details regarding the two countries’ financial commitments and the extent of any potential delay to the project caused by moving the headquarters. “All felt that they needed to think about some of the issues and consult with their communities,” he says.

A statement published by Diamond on the SKA website on 11 March said that the advisory panel was to review a “best and final bid” to be submitted by the two competing countries by 20 March. The note said that the bidders were to explain how they would reduce the project’s risk in three categories: financial; operational and schedule matters; and organizational and reputational matters, but did not explain what

these terms meant. When asked by *Physics World* if he could shed any more light on these criteria, Diamond said only that bidders were expected to provide “firm statements” of their financial commitments.

Bignami, who has co-ordinated the Italian bid, said that he did not fully understand the new criteria and that ahead of the 20 March deadline he and his colleagues were trying their best to second-guess the required details. As to whether Italy might reduce funding or even pull out of the SKA altogether were it not chosen, Bignami said that, as of mid-March, they had “not yet decided how to answer that”. The British team, meanwhile, has declined to comment.

Garrett believes that the withdrawal of either country would be a “major loss to the project”. Italy’s absence, he says, might leave other continental European countries feeling “isolated” – noting that Germany is due to leave the project at the end of June – while the UK, he says, “has in many ways led the project over the last three or four years”.

Loeb says that whichever way the decision goes it could have a major impact on national research funding. He speculates that Italy’s relatively cash-strapped astronomers could get additional support if their country were chosen, while the UK might reconsider its current funding for radio astronomy in the event that it lost. He believes, however, that it is important to pick a winner. “Splitting a headquarters would be like having an animal with two heads,” he says. “If you try to satisfy everyone you can’t move forward as forcefully.”

The panel said the Italians had produced financial statements with “a greater level of clarity” than the UK had managed