

Security Assessment Report

Square Kilometer Array Radio Telescope

November 21, 2011



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I. INTRODUCTION

Kroll Security Group (KSG) was retained by the Square Kilometer Array Program Development Office (SPDO) to conduct threat assessments of candidate sites in Australia and six countries in Southern Africa.

Tasks performed to date include:

- Held a kick-off meeting/teleconference with SPDO representatives to gain an understanding of the objectives and material facts and to review methodology and schedule.
- Reviewed reports, studies, and information of general relevance provided by SKA.
- Reviewed responses to the “Request For Information From The Candidate Sites” (RFI) document issued by the two candidate sites and their responses to questions relating to security measures within the RFI.
- Conducted independent desktop research on the current and projected threat climate at the two candidate sites, which consisted of researching publically available information in general, publically available information from the U.S. government and the applicable country governments, engaging the services of several professional intelligence service providers, and utilizing KSG assets on the ground in South Africa and Australia. KSG also attempted to identify additional concerns, to the extent feasible, regarding the areas surrounding the two proposed sites.
- Developed this report to document findings and recommendations and summarize the results of the desktop research, provide our comments on the RFI responses, and our opinion of the adequacy of the two candidate sites’ proposed security mitigation plan.

This report encompasses an evaluation of the existing security threats and the proposed security measures for the SKA sites in the countries surveyed. This threat assessment is based on information that was available at the time KSG conducted research on the various countries. It should be noted that the threat designations for each area could change at any time and that, while this threat assessment does take into account current conditions that have the potential to create future security concerns, it does not take into account future incidents that could alter risk levels. The objective of the assessment analysis is to identify specific gaps associated with the proposed physical security measures in order to provide information necessary to assist in the site selection process.

II. EXECUTIVE SUMMARY

A. Preface

KSG reviewed the security assessment and proposed security measures documentation provided by SKA South Africa and the Australia-New Zealand SKA Coordination Committee (ANZSCC) to determine each candidate site's assessment of the risk level posed to SKA personnel and assets in the various applicable countries considered within their responses. KSG also conducted independent research of the countries and all identified sites within them, including the areas around remote sites, using the longitude and latitude coordinates provided by SKA in a document entitled "Summary of SKA Remote Station Locations".

During the review process, KSG engaged various intelligence sources, researched publically available information, and utilized KSG security contacts with specific information pertaining to the covered countries. KSG then compared its own analysis of its research to the candidate sites' interpretation of the threat profile associated with each site. The concepts covered in KSG's threat assessment address each country's overall risk rating as it applies to specific issues identified pertaining to political stability, terrorism, and crime and their potential to negatively impact SKA personnel and assets. Threats related to civil unrest were also considered as part of this analysis and were generally linked to their potential impact on political stability.

KSG also reviewed the candidate sites' proposed security measures at the various sites and types of facilities to determine whether the measures appeared to provide enough information to indicate whether a reasonable level of personal and asset security was proposed during the construction and operational phases of this project given the identified threat profile. This review also considered proposed security measures for onsite and near site resident staff.

Although both candidate sites provided information related to indicative costs of insurance related to facility and personal security, analysis of this information was outside the scope of this engagement.

B. SKA South Africa – Security Documentation

KSG understands that SKA South Africa utilized an outside security services firm, Pasco Risk Management Ltd., to provide the majority of its threat profile information and security plan. In its documentation, Pasco covered all relevant areas relating to the risk associated with operating within the applicable countries in Southern Africa and considered a wide variety of security measures that could be deployed to reasonably mitigate those risks. Additionally, Pasco developed a “Safety and Security Plan” which provided an initial outline security plan covering a broad range of security-related policy and procedural topics and standards with the understanding that this document would be further developed, added to, and modified throughout the project lifecycle as more details are provided.

While KSG’s opinion of the risk associated with operating in Southern Africa differed from Pasco’s opinion in some areas, Pasco’s overall response covered pertinent security risks as they pertain to SKA personnel and assets. In general, KSG was impressed with the level of effort and detail reflected in Pasco’s risk analysis which served as the basis of the proposed security measures / plan. It is KSG’s opinion that Pasco provided an acceptable level of research, interviews, and case studies in support of its opinions related to potential security threats and both its analysis and proposed security measures.

KSG identified differences in the interpretation of the risk level associated with political stability and crime as it pertains to some countries, as well as the overall threat profile associated with operating within each country. For example, Pasco determined that the overall threat profile for South Africa is Low while KSG determined the country’s threat profile to be Moderate.

KSG’s interpretation of the risk level posed to SKA in the covered countries was consistent in large part with Pasco’s analysis as it pertains to the remote sites when personnel and assets are present at those locations and with the overall potential for SKA to be impacted by acts of terrorism in the various countries. While KSG believes the risk level specifically associated with the remote sites is either Low (Botswana, Namibia, Zambia) or Moderate (Madagascar and Mozambique), which is reasonable from a risk perspective in all countries due to the sparsely populated nature of those areas, it is KSG’s opinion that the risk level associated with operating in all of the countries is increased when SKA personnel travel to and from the sites and when they are in or near major urban areas. For instance, KSG’s opinion deviated from Pasco’s assessment of the potential for

crime to affect SKA personnel and assets located on a permanent basis in Cape Town, which KSG considers to be Medium and Pasco indicated was Low.

In some cases, Pasco did not provide a specific threat level for a covered threat category. In those cases, KSG has provided information to explain its own risk designation. In all cases where Pasco provided a threat designation with which KSG differed, the threat level assessed by KSG is increased by at least one tier. KSG has not downgraded any Pasco risk designation associated with Southern Africa.

Along with the “SKA Project Security Assessment Report” which provided details and some potential design sketches related to proposed security measures in addition to providing threat profile information, KSG reviewed the “Safety and Security Plan” developed by Pasco and the proposed physical security measures for the sites in Southern Africa. The “SKA Africa Safety and Security Plan” provided a well developed outline for approaching a holistic approach for security from construction through day-to-day operations. The outline plan’s introduction section indicates SKA South Africa will design and operate a Strategic Security Plan (SSP) which will contain a wide variety of security related policies, procedures and standards. The introduction also states that the outline’s headings will be further developed and subject to detailed policy statements, where appropriate. KSG understands the intended approach is to have a designated Security Manager, who reports to the Director, design a security policy for the SKA project which will form the basis for project safety and security operations.

KSG found the outline plan to be consistent with best practices and suitable given the threat profile KSG believes applies to South Africa and the other applicable Southern African countries. This statement applies even where PASCO’s opinion related to threats / risk profile differs to some degree. With the understanding that SKA Africa will likely add to and/or modify the proposed outline sections as project design, operational needs, etc. evolve, KSG does not believe the outline plan contains any major inadequacies

With regard to physical security measures intended to mitigate said risks, Pasco’s proposed physical security posture for the sites appeared largely consistent with recommendations KSG would provide under similar circumstances and provided an adequate level of detail for planning purposes in response to the RFI security requirements. The main question KSG identified through its review of the

documentation provided by SKA South Africa is whether SKA South Africa plans to utilize Pasco or another reputable professional security services firm to assist the candidate site if awarded the project. It is KSG's opinion that based on the proposed security measures and associated training, risk assessment measures, policy and procedure development, security design needs, etc., the assistance of a professional security services firm will be critical to ensure adequate expertise is available and is an active participant with SKA South Africa during construction phase and, to some extent, the operational phase.

C. ANZSCC – Security Documentation

KSG understands ANZSCC developed the threat profile information and proposed security measures internally and with assistance from Aurecon Australia Pty Ltd, under contract to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) which is a senior representative within ANZSCC (information obtained in Attachment 38 of ANZSCC response to RFI). Based on the documentation it also appears ANZSCC relied upon information related to security measures in place at remote sites operated by mining sites in Western Australia for guidance, crime statistics for Australia and Western Australia which provide data from the years 2000 and 2009, and case studies of two of CSIRO's national telescope facilities in Australia. Subject matter associated with security as required by the SKA Siting Group RFI was covered within the ANZSCC documentation KSG reviewed. The focus of the documentation was coverage of risk associated with operating within Australia and proposed security measures that would be deployed to reasonably mitigate those risks.

Although KSG found the information provided by ANZSCC related to the threat profile for Australia was limited in detail and supporting data primarily focused on the potential impact of crime, KSG generally agrees with ANZSCC's major findings related to security risks. For example, while it was KSG's opinion that the overall threat profile for Australia is Moderate and ANZSCC described it as Low, KSG agreed with ANZSCC's opinion that Australia has a Low risk of political instability, a Moderate risk from a crime perspective, and the threat profile associated with the variety of sites which would be based in Western Australia is Low.

ANZSCC did not address the threat related to terrorism beyond indicating that any threats relating to national security or terrorism would be communicated to SKA management either by the Western Australia Police or directly from national intelligence agencies. The report indicated that appropriate authorities, including the Australian Federal Police, would assist if such an issue arises. KSG believes the threat of terrorism in Australia is Moderate but targeting of SKA assets or personnel is unlikely and that the cities of Sydney and Melbourne have greater risk from a terrorist standpoint than Perth, which KSG understands would house SKA facilities and personnel.

With the exception of a case study of the Mopra Telescope facility located in New South Wales, documentation did not directly address risks associated with potential sites located outside of Western Australia; however, KSG found the

threats associated with these locations to also be Low. As such, even though KSG's overall threat profile for Australia differs from the ANZSCC assessment of Low, the difference is not viewed to be a major concern as KSG's analysis of applicable sites within Australia indicates a comparable level of risk as it specifically relates to SKA.

Where ANZSCC did not provide a specific threat level for a covered threat category or location, KSG has provided information to explain its own risk designation. In all cases where ANZSCC provided a threat designation with which KSG differed, the threat level assessed by KSG is increased by at least one tier. KSG has not downgraded any ANZSCC risk designation associated with Australia.

As it relates to proposed security measures, KSG found the ANZSCC security documentation covered topics, operations and facility types required by the RFI but that the level of detail provided created challenges in the evaluation process in some aspects. For example, documentation indicated ANZSCC expects to hold selected construction contractor(s) responsible for the security of construction sites. While the document indicates requirements for contractors responsible for these sites will include reasonable concepts such as site access control, security for plant and machinery, security of material and control of workers, and visitors, along with a specific induction process covering safety and security for personnel working on or visiting the construction sites, no details were provided which indicate specific measures ANZSCC envisions being implemented to support these generalized measures. Although it is recognized that providing in-depth specifics for facilities and operations is challenging at the bid phase, it is KSG's opinion that further details regarding approach and measures for construction sites would be beneficial.

Additional key areas where limited or no detail was provided as far as proposed security measures include, but are not limited to, the following:

- Security related policies and procedures.
- Security related training and education (e.g., situational awareness, guidance related to travel in remote areas, etc.).
- Consideration for security incident reporting and response protocol.
- Designation of a security professional or expert to manage the construction and operational phases.
- Plans for providing a human security presence / capability for sites outside of the vicinity of the proposed Operations Centre (it appears three security officers are planned for the operational phase, who will staff the Operations

Centre (1 per shift) at all times). Occupational health and safety officers were mentioned in regards to oversight of all sites, but not in regards to specific security responsibilities.

- Security for the supercomputing facility (documentation indicated facility would be subject to a ongoing review) which indicates some basic security measures but does not appear to consider an onsite security presence and fulltime monitoring of electronic security measures (e.g., card access system, CCTV system, intrusion detection system) to be necessary.

KSG is of the opinion that, in many aspects the high level security measures covered by ANZSCC could be implemented in a manner which ensures consistency with best practices for the types of environments in which SKA will operate in Australia given the identified threat profile. However, KSG believes that to ensure adequate implementation of the proposed security measures as well as proper development of security plans, policies, procedures, training, monitoring and other necessary components for an effective security program to support an endeavour of this magnitude will require the assistance and management of experts in the field of security. Thus, a critical question KSG identified through its review of the documentation provided by ANZSCC is whether there are plans to utilize an internal security professional / team or a reputable professional security services firm to assist in planning, oversight, and implementation of security measures if awarded the project. It is KSG's opinion based on the valid but limited nature of the threat profile components and general nature of proposed security measures, ANZSCC would benefit from the assistance of personnel with security expertise from project inception and continuing during the operational phase.

III. THREAT PROFILE OVERVIEW

A. General

KSG's threat analysis was based on information received from a variety of intelligence sources, as well as publically available information and the use of KSG assets in South Africa and Australia. Where KSG's threat assessment has differed from that of the proposing parties, an explanation is provided below.

For greater detail regarding country and location threat assessment findings, refer threat assessment tables located in Appendix A.

The probability levels of risk associated with SKA's facilities and personnel that KSG utilizes in this report are as follows:

B. Five Tier Threat Scale

Low: Businesses and individuals face a low likelihood of encountering risks that may affect their operations. Even a low level of effort, safeguards, and security measures is likely to prevent a business or traveler from being adversely affected by the few risks that they may encounter.

Moderate: A slightly elevated level of effort, safeguards, and security measures is likely to prevent a business or traveler from being adversely affected by the risks that they may encounter. Businesses and individuals may be exposed to a number of risks during the course of normal operations.

Medium: Businesses and individuals are likely to encounter several risks during the course of normal operations. A high level of effort, safeguards, and security measures is likely to prevent a business or individual from being adversely affected by these risks.

High: The highest level of effort, safeguards, and security measures may prevent a business or individual from being adversely affected by some of the risks that they will encounter. There is a very high likelihood that businesses or individuals will encounter most risks during the course of normal operations.

Severe: Businesses and individuals are very likely to encounter most risks, and even the highest level of effort, safeguards, and security measures is unlikely to prevent a business or individual from being adversely affected by some of these risks during the course of normal operations.

C. SKA South Africa Sites

1. South Africa

Overall Threat Profile – South Africa

PASCO Assessment:	Low
KSG Assessment:	Moderate

Summary of KSG’s differing opinion regarding the country’s overall threat profile:

- Despite government efforts, South Africa struggles with critically high crime rates, an HIV/AIDS epidemic, significant class disparity, energy shortages, and political instability. Many crimes in South Africa are characterized by a high rate of violence, and the country has some of the highest rates in the world for murder, rape, and car theft. Major cities are considered the country’s crime capitals, with underdeveloped townships on the outskirts being hotspots of theft, assault, and murder. Additionally, corruption in South Africa infiltrates many vital economic and political sectors while perpetrating crime, civil unrest, and infrastructural deficiencies.

Country Profile – Risk Associated with Political Stability

PASCO Assessment:	Low
KSG Assessment:	Moderate

Reasons for KSG’s differing opinion regarding risk associated with political stability:

- Incidents of civil unrest and violence associated with elections.
- Incidents of public utilities and transportation shut down as a result of civil unrest.

Country Profile – Risk Associated with Terrorism

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with PASCO’s risk assessment regarding the threat of terrorism as it relates to the country of South Africa.

Country Profile – Risk Associated with Crime

PASCO Assessment:	Not Specified
KSG Assessment:	Moderate

Reasons for KSG’s risk rating for crime as it pertains to South Africa:

- Critically high rates of murder, rape, robbery, burglary, carjacking, and home invasions.
- Highest incidents of rape in the world.
- Average of 51 home invasions per day in 2010.
- High rates of industrial crime.
- Weak police force that requires supplementation with private security elements.

Cape Town –Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Moderate

Reasons for KSG’s differing opinion regarding risk associated with Cape Town:

- High murder rate (62/100,000).
- High rates of carjacking and home invasions.
- Frequent reports of assaults and muggings by groups of attackers.
- 30% unemployment sometimes results in violent protests and serves to increase rates of theft and burglary.

Area housing Astronomy Complex, SKA Array, Core Site – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with PASCO’s risk assessment regarding the threat associated with the areas housing the Astronomy Complex, SKA Array, and Core Site. Based on the remote nature of these sites and their limited attractiveness as targets, KSG believes limited / basic security measures (i.e., fencing, intrusion detection system, etc.) in addition to

security personnel on site will be sufficient to reasonably mitigate the potential for unauthorized entry and ensure safety of personnel.

Remote Sites – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with PASCO’s risk assessment regarding the threat associated with the remote sites (remote locations reviewed were provided by SKA as longitude / latitude coordinates). Based on the remote nature of these sites, KSG believes limited / basic security measures in addition to ensuring personnel traveling to/from these locations have adequate security training and communication protocols will provide a reasonable level of security given the risk.

Residential / Construction Camps – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with PASCO’s risk assessment regarding the threat associated with the areas housing the Residential / Construction Camp locations. Based on the remote nature of the sites, KSG believes limited security measures, including the use of security personnel on site, will be sufficient to reasonably mitigate the potential for unauthorized entry and ensure the personal safety of personnel.

2. Botswana

Overall Threat Profile – Botswana

PASCO Assessment:	Not Specified
KSG Assessment:	Moderate

KSG’s assessment of Botswana is in large part consistent with information provided by Pasco. The country’s economy has continued to outperform its continental neighbors and has been bolstered by an extensive diamond mining industry. Corruption rates remain significantly lower than those found in other parts of the continent, and human rights are widely respected by authorities. Despite the country’s diverse ethnic makeup, the risk of conflict is low and all groups appear to be committed to maintaining a peaceful democracy.

The serious risk of various types of crime, which is exacerbated by limited police resources and infrastructural deficiencies, is the primary factor underlying KSG's overall rating of risk in Botswana as Moderate. While KSG understands the locations of the SKA remote sites in Botswana will be sparsely populated and this will reduce the likelihood of security incidents taking place, travel to and from the site will likely present the greatest level of risk from a personnel standpoint.

Remote Sites – Threat Profile

PASCO Assessment:	<i>Low to Negligible</i>
KSG Assessment:	<i>Low</i>

KSG agrees with PASCO's risk assessment regarding the threat associated with the locations of the proposed remote sites (remote locations reviewed were provided by SKA as longitude / latitude coordinates). PASCO indicated that the risk to personnel constructing the remote facilities or visiting the remote sites once operational would be low to negligible due to their remoteness. Based on the remote nature of these sites, KSG believes limited / basic security measures in addition to ensuring personnel traveling to/from these locations have adequate security training and communication protocols will provide a reasonable level of security given the risk.

3. Madagascar

Overall Threat Profile - Madagascar

PASCO Assessment:	<i>Low</i>
KSG Assessment:	<i>Medium</i>

Summary of KSG's differing opinion regarding the country's overall threat profile:

- The critical risks of political instability, civil unrest, and corruption are the primary factors underlying KSG's rating of the overall risk associated with Madagascar as Medium. While KSG understands the location of the SKA remote site in Madagascar will be sparsely populated and this may reduce the likelihood of security incidents taking place which affect operations at the remote facilities, travel to and from the site will present an elevated risk level. Poverty is endemic among the general population of Madagascar and the World Bank estimates that approximately 70% of Malagasies live

on less than one U.S. dollar per day. As a corollary, there is fierce competition for forestland and arable tracts of farmland.

Moreover, there is a proclivity for popular discontent toward the government. In March 2009, Andry Rajoelina deposed then-president Marc Ravalomanana in a military-backed coup d'état and was installed as president of Madagascar.

- Political instability in recent years has spurred brutal civil unrest and concomitant escalations in violent crime and small-scale terrorism. In addition, the expanding range of Somali piracy networks threatens both commercial and private seafarers in Malagasy waters. Corruption, poor infrastructure, weak security measures, and natural disasters have prevented the government from tackling these problems. Over the past two years, numerous diplomatic missions in Antananarivo strongly advised against travel to Madagascar due to security dangers. However, it should be noted that in November, 2010 the U.S. Embassy lifted a travel restriction for its U.S. employees.

Country Profile – Risk Associated with Political Stability

PASCO Assessment:	<i>Not Specified</i>
KSG Assessment:	<i>High</i>

Reasons for KSG’s opinion regarding risk associated with political instability:

- Political instability is the greatest security threat in the country and along with poverty, has fueled rapidly increasing crime rates in urban centers.
- Due to intense political conflict and widespread poverty, there is a very high risk of civil unrest in Madagascar which will likely continue in the near future.

Country Profile – Risk Associated with Terrorism

PASCO Assessment:	<i>Low</i>
KSG Assessment:	<i>Low</i>

KSG agrees with PASCO’s risk assessment regarding the threat of terrorism in Madagascar.

Country Profile – Risk Associated with Crime

PASCO Assessment:	<i>Not Specified</i>
KSG Assessment:	<i>Moderate</i>

Reasons for KSG’s risk rating for crime:

- Country’s crime rates are still below the African average but violent crime has risen dramatically since the Malagasy political sphere disintegrated in late 2008 and 2009.
- Security forces are too preoccupied with political violence and civil unrest to effectively respond to violent crimes, let alone investigate non-violent, petty crime.
- Serious crimes in the country nearly quadrupled between 2007 and 2009.
- Corruption is prolific throughout the country in both public and private sectors.

Remote Sites – Threat Profile

PASCO Assessment:	<i>Low</i>
KSG Assessment:	<i>Moderate</i>

KSG generally agrees with PASCO’s risk assessment regarding the threat associated with the locations of the proposed remote sites (remote locations reviewed were provided by SKA as longitude / latitude coordinates). PASCO indicated that the risk to personnel constructing the remote facilities or visiting the remote sites once operational would be very low due to their remoteness but higher than similar proposed sites in Namibia, Zambia, Botswana, and South Africa. It is KSG’s opinion that while the remote nature of the sites provides some insulation from the potential for crime to impact personnel or assets at these locations, the lack of an effective police force in the country and political instability create a more elevated threat profile for the facilities. KSG believes basic but slightly enhanced security measures should be considered in addition to ensuring personnel traveling to/from these locations have adequate security training and communication protocols. It should be noted that PASCO provided additional security measures for these sites which are more robust than those they covered at other remote facilities.

4. Mozambique

Overall Threat Profile - Mozambique

PASCO Assessment:	Low
KSG Assessment:	Medium

Summary of KSG’s differing opinion regarding the country’s overall threat profile:

- Mozambique suffers from critically high levels of political and economic instability, which have fueled high crime rates and violent civil unrest. The ruling Liberation Front of Mozambique (FRELIMO) and opposition Mozambican National Resistance (RENAMO) party have been engaged in a violent political feud since 1978. Despite aggressive anti-poverty measures that have ameliorated economic hardships in Mozambique, the country’s civil war took a toll on the country’s population, which continues to remain in dire socioeconomic straits. Although a civil peace agreement was enacted in 1992, critically high tensions and political deadlock have led to isolated incidents of violence, undermining security and stability in the country.
- The critical risks of political instability, civil unrest, violent crime, and corruption are the primary factors behind KSG’s risk rating of Medium for Mozambique. Mozambique’s dilapidated infrastructure and non-existent emergency response services also adversely affect its rating. While KSG understands the location of the SKA remote site in Mozambique will be sparsely populated and this will reduce the likelihood of security incidents taking place, travel to and from the site will present an elevated risk level.

Country Profile – Risk Associated with Political Stability

PASCO Assessment:	Not Specified
KSG Assessment:	Medium

Reasons for KSG’s opinion regarding risk associated with political instability:

- Potential for civil unrest to erupt in the wake of rapid consumer price inflation.

- Tension and occasional violence between two political parties.
- Corruption and poverty.

Country Profile – Risk Associated with Terrorism

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with PASCO’s risk assessment regarding the threat of terrorism as it pertains to Mozambique.

Risk Associated with Crime

PASCO Assessment:	Not Specified
KSG Assessment:	Medium

Reasons for KSG’s opinion regarding risk associated with crime in Mozambique:

- Violent crime has increased in number of incidents and brutality.
- Weapons are readily available.
- Weak police force.

Remote Sites – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Moderate

KSG generally agrees with PASCO’s risk assessment regarding the threat associated with the locations of the proposed remote sites (remote locations reviewed were provided by SKA as longitude / latitude coordinates). PASCO indicated the threat to personnel during construction and visiting staff once the sites are operational are assessed as low, as is the threat to SKA equipment. It is KSG’s opinion that the threat profile to the remote sites is slightly higher because of the combination of increasing incidents of violent crimes (e.g., carjacking, robberies, home invasions, etc.) and essentially non-existent crime deterrence capabilities associated with rural areas.

5. Namibia

Overall Threat Profile - Namibia

PASCO Assessment:	Low
KSG Assessment:	Moderate

The serious risk of crime, political instability, the potential for civil unrest, and a weak law enforcement infrastructure are the primary factors for KSG's risk assessment rating of Namibia as Moderate.

Despite growth, more than half of Namibia's population lives in dire poverty. In September 2010, the Namibian government announced the results of the 2008 Namibia Labor Force Survey which confirmed a 51% unemployment rate exists among the country's economically active population, a fact that is often blamed for high crime rates. HIV/AIDS has infected a significant percentage of the population, costing an estimated 20% of GDP. Financing infrastructure improvements, combating an increasingly high crime rate, and reducing glaring economic inequalities are just some of the significant challenges faced by the Namibian government.

A number of international firms have invested heavily in Namibia's precious gemstone mining industry, a sector that is an important component of the country's economic development. Global investments appear undisturbed by discriminatory government policies and there have been no reports of international or Western-owned property being expropriated or nationalized, but the risk cannot be discounted entirely.

Risk Associated with Political Stability

PASCO Assessment:	Not Specified
KSG Assessment:	Moderate

Reasons for KSG's opinion regarding risk associated with political instability in Namibia:

- Violence is occasionally reported at demonstrations and political rivalries can spark clashes.
- Labor unions frequently organize strikes that interrupt business operations.

- While the presidential democracy has seen largely free and fair elections, the political situation remains somewhat unstable as leaders continually accuse the country’s electoral commission of voting irregularities and electoral fraud. The risk of a violent response to future election results cannot be discounted due to the country’s volatile political arena.

Country Profile – Risk Associated with Terrorism

<i>PASCO Assessment:</i>	<i>Low</i>
<i>KSG Assessment:</i>	<i>Low</i>

KSG agrees with Pasco’s risk assessment regarding the threat of terrorism in Namibia.

Risk Associated with Crime

<i>PASCO Assessment:</i>	<i>Low</i>
<i>KSG Assessment:</i>	<i>Moderate</i>

Reasons for KSG’s differing opinion regarding risk associated with country crime:

- The risk of crimes of opportunity involving theft is on the increase.
- Incidents of violent crime, including those targeting foreigners, are becoming increasingly common in both urban and rural areas.
- Police are poorly trained, under-staffed and ill-equipped to provide reliable support in emergencies, even in major urban areas.
- Police support may be entirely unavailable in rural districts and response times may be measured in hours due to the long distances between police outposts.

Remote Sites – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with Pasco’s risk assessment regarding the threat associated with the locations of the proposed remote sites (remote locations reviewed were provided by SKA as longitude / latitude coordinates). Pasco indicated that the risk to personnel constructing the remote facilities or visiting the remote sites once operational would be very low due to their remoteness. KSG’s country sources indicated that most of the proposed locations can be accessed by good roads and several are located close to well used tourist areas. Based on the remote nature of these sites, KSG believes limited / basic security measures in addition to ensuring personnel traveling to/from these locations have adequate security training and communication protocols will provide a reasonable level of security given the risk.

6. Zambia

Overall Threat Profile - Zambia

PASCO Assessment:	Low
KSG Assessment:	Moderate

Summary of KSG’s differing opinion regarding the country’s overall threat profile:

- The risks of violent crime and corruption, and the frequency of labor unrest incidents are the primary factors behind the country’s risk profile. While Zambia has largely recovered from the drop in commodity prices affecting copper sector exports, inflation and high food costs along with high unemployment correlate to expectation by both the government and the expatriate community of increasing crime.

Country Profile – Risk Associated with Political Stability

PASCO Assessment:	Not Specified
KSG Assessment:	Low

Reasons for KSG’s opinion regarding risk associated with political instability in Zambia:

- Country enjoyed a peaceful change of executive power after the election in September, 2011.
- There are low risks of nationalization or expropriation in Zambia

Country Profile – Risk Associated with Terrorism

PASCO Assessment:	Low
KSG Assessment:	Low

KSG agrees with Pasco’s risk assessment regarding the threat of terrorism in Zambia.

Risk Associated with Crime

PASCO Assessment:	Low
KSG Assessment:	Medium

Reasons for KSG’s opinion regarding risk associated with crime in Zambia:

- Criminals have demonstrated a propensity for violence and frequently possess weapons.
- Incidents carjacking, mugging, and commercial invasion are common throughout the country.
- Weak police force (underpaid, poorly trained, and ill-equipped) along with reports of widespread corruption within the ranks.
- Police stations often lack adequate communication and transportation equipment.

Remote Site – Threat Profile

PASCO Assessment:	Low
KSG Assessment:	Low

KSG generally agrees with Pasco’s risk assessment regarding the threat associated with the location of the proposed remote site (remote location reviewed was provided by SKA as longitude / latitude coordinates). Pasco indicated the threat to personnel during construction and visiting staff once the sites are operational are assessed as very low, with a slightly increased risk pertaining to equipment at the site because it may be attractive in underdeveloped communities. Based on the remote nature of these sites, KSG believes limited / basic security measures in addition to ensuring personnel

traveling to/from these locations have adequate security training and communication protocols will provide a reasonable level of security given the risk.

D. ANZSCC Sites

Note: Because no sites in New Zealand were listed in SKA's "Summary of Remote Station Locations" document and KSG found no locations proposed within New Zealand in the ANZSCC report except in the Motivated Alternative Configuration (one array-station), which KSG was directed to exclude as part of this analysis, a threat assessment was not developed for the country.

1. Australia

Country Profile – Overall Threat Profile

ANZSCC Assessment:	Low
KSG Assessment:	Moderate

Summary of KSG's differing opinion regarding the country's overall threat profile:

- The moderate risks of crime, natural disasters, and diseases as well as an increasing risk of terrorism are the primary factors behind Australia's moderate threat profile rating. Australia has experienced growing crime rates in recent years as well as a rise in racially-motivated violence. While there is an elevated risk of armed burglary countrywide, specific violent crimes vary by region. Violent assaults are usually carried out near homes in suburban neighborhoods. The country is affected by wildfires and brush fires, cyclones, tropical storms, droughts, and dust storms. Dengue fever, Ross River virus, and Murray Valley encephalitis outbreaks are reported in Australia, while the country reports the world's highest rate of skin cancer. Poisonous snakes, plants, arachnids, and insects other environmental risks in Australia. The country's commitments in Afghanistan, participation in the 2003 U.S.-led invasion of Iraq, and growing multicultural population have fueled greater risk of home-grown terrorism. Organized crime has also grown in recent years and is believed to be active in legal as well as illegal sectors of the economy. However, in spite of the threats posed by natural disasters, such as cyclones,

storms, droughts, and forest fires, Australia has world-class infrastructure and emergency services.

- Although KSG's overall threat profile differs from the ANZSCC assessment of Low, the difference is not viewed to be major as supporting analysis is comparable. Further, KSG's research indicated that the moderate risk of crime and terrorism appears to affect the large urban areas of Sydney and Melbourne to a greater extent than Perth and Western Australia which will house the majority of the SKA personnel, facilities and equipment.

Country Profile – Risk Associated with Political Stability

<i>ANZSCC Assessment:</i>	<i>Politically Stable</i>
<i>KSG Assessment:</i>	<i>Low</i>

KSG agrees with ANZSCC's risk assessment that there is a low threat associated with political instability in Australia.

Country Profile – Risk Associated with Terrorism

<i>ANZSCC Assessment:</i>	<i>Not Specified</i>
<i>KSG Assessment:</i>	<i>Moderate</i>

Reasons for KSG's opinion regarding risk associated with terrorism in Australia:

- Although no successful terrorist attacks have been carried out in Australia, security forces have uncovered several intricate terror plots seeking to maximize civilian casualties in both Melbourne and Sydney.
- Regional and transnational terrorist organizations may target Australia, which is seen as a regional leader in counter-terrorism operations.
- Australia's increasingly multiculturalism has enabled some foreign terrorist organizations to maintain cells in the country, although their emphasis is primarily on fundraising and securing recruits.
- A February 2011 report by the Australian Crime Commission (ACC) indicated that terrorism and organized crime are increasingly linked as both groups rely on crime for funding.

Country Profile – Risk Associated with Crime

ANZSCC Assessment:	Moderate
KSG Assessment:	Moderate

KSG agrees with ANZSCC’s risk assessment for Australia regarding the threat of crime.

Core Area – Threat Profile

ANZSCC Assessment:	Low
KSG Assessment:	Low

KSG agrees with ANZSCC’s risk assessment regarding the threat associated with the site housing the Core Area.

KSG understands the Core Area will be located in a site which currently houses the Murchison Radio-astronomy Observatory (MRO). Based on ANZSCC’s report, the site is located around 100km from the nearest settlement and 320km from the nearest major town in a region that experiences low levels of crime. ANZSCC’s assessment of this area is consistent with publically available information KSG identified through independent research efforts and was supported by ANZSCC’s outline of security measures for the MRO provided in Attachment 20 of their RFI response. The section of Attachment 20 covering MRO security measures indicates no theft or other identified security issues have occurred at the MRO.

Perth – Overall Threat Profile

ANZSCC Assessment:	Not Specified
KSG Assessment:	Low

Reasons for KSG’s opinion regarding overall risk associated with Perth:

- Risk associated with political stability and/or civil unrest is considered low. Protests and demonstrations that occur in the city are generally non-violent.
- There is a low risk of terrorism associated with the city.
- There is a moderate risk of petty theft, pick-pocketing, and purse-snatching in Perth and residential burglaries are frequently reported.
- There is a low risk of violent crime in the city.

Geraldton – Overall Threat Profile

ANZSCC Assessment:	Not Specified
KSG Assessment:	Low

Reasons for KSG’s opinion regarding overall risk associated with Geraldton:

- Recent media reports indicate crime has dropped significantly over the last year based on a proactive police presence.
- Research of public sources indicated the city faces similar challenges associated with crime as other comparably sized Western communities.
- Crime statistics provided by the Western Australia Police indicate relatively low levels of criminal activity given the population estimates (approximately 37,000).

Remote Facilities – Threat Profile

ANZSCC Assessment:	Low
KSG Assessment:	Low

KSG agrees with ANZSCC’s risk assessment regarding the threat associated with the areas housing the remote facilities located in Western Australia and various other states and territories. A review of the remote site locations provided by SKA indicated these facilities will be situated in truly remote locations throughout the country. They will benefit from having low visibility as they are not located in highly travelled or densely populated areas. Further, KSG’s country resources provided additional input based on experience and contacts within the remote areas and their analysis is consistent with the opinion of a low threat environment for the remote sites.

IV. PROPOSED SECURITY MEASURES OVERVIEW

A. General

As described in the Executive Summary section of this report, there were some aspects of the candidate sites' proposed security measures that KSG believes could be enhanced to provide a better understanding of the intended approach to security, provide greater detail related to covered subjects, or ensure adequate consideration is given to implementing a more robust security posture to mitigate potential risks to SKA personnel and assets. As such, KSG has provided, in tabular form in Appendix B, a list of the security measures proposed by the two candidate sites along with KSG's recommendations associated with considerations for enhancement of those measures where such enhancements are believed to be necessary.

In the tables listed under Appendix B, KSG attempted to address the proposed measures for every category of facility or subject covered by the candidate sites. Immediately following a summary of the measures proposed by the candidate sites for a given concept or topic, KSG provided remarks as deemed necessary for follow up or consideration.

B. SKA Africa

Overall, the two documents developed by Pasco provide a reasonable and well defined plan for implementing effective security measures designed to mitigate potential threats based on the threat profile. Based on the limited knowledge of specifics related to the design of facilities, operations, and in some cases preliminary information provided as far as location, KSG believes SKA Africa provided an excellent foundation for implementing an effective and efficient security posture. The main question KSG has regarding the documentation reviewed involves the capability of SKA Africa to implement the measures proposed in the Pasco documents, particularly as it relates to development of the wide variety of security concepts covered in the Pasco produced document entitled, "SKA Safety and Security Plan".

C. ANZSCC

The security measures covered by ANZSCC provide some reasonable and effective approaches to developing an effective security posture for SKA sites and personnel. Many of the measures covered are consistent with approaches KSG would recommend based on the threat profile developed and would serve SKA

well if ANZSCC is chosen as the site for development. However, there were areas of the documentation that were brief in nature or which did not address measures which KSG believes should be considered as part of the selection process. For example, the apparent lack of a defined security professional (KSG does not believe plans for three security officers meets this criteria) tasked with overall development, oversight and day-to-day management of a security program is a concern. KSG also identified that very little information was provided in terms of proposed security training for personnel and expectations associated with the development of security-related policies, procedures, and standards.

Appendix A

Threat Assessment Tables

South Africa – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Low <ul style="list-style-type: none"> - Stable politically - Second top percentile of countries for government effectiveness and 'voice and accountability' but ranks slightly lower for 'political stability' 	Low <ul style="list-style-type: none"> - Considered 'safe haven' terrorists than a 'target' - No significant anti-Western attacks have occurred in South Africa since 2001 	Not Specified <ul style="list-style-type: none"> - Reported crimes nearly double the Rate of the EU - Most crimes occur in large urban centres associated with low income locations - Crime is positively correlated with substance abuse and poverty - Organized crime threat is negligible while petty and violent crime is low - Crime levels in the Northern Cape are low 	Low
SKA Head Office Complex Cape Town	Not Specified	Not Specified	Not Specified <ul style="list-style-type: none"> - Crime trends in Northern Cape are Low - Crime in the Pinelands, located close to Cape Town, is moderately low and compares favorably to those reported in Carnarvon 	Low
Astronomy Complex Junction PO2996 Road and Van Wyksvlei Road	Not Specified	Not Specified	Not Specified	Low
SKA Array PO2337 Road somewhere NE/NW of Losberg / Meysdam (95km north-west of	Not Specified	Not Specified	Low <ul style="list-style-type: none"> - The area's isolation is considered to decrease the potential for targeting by criminals 	Low

Carnarvon)				
Remote Facilities South Africa Sites associated with National Research Foundation (NRF)	Not Specified	Low	Low	Low
SKA Core Sites Three Adjacent to current MeerKAT site 95km north-west of Carnarvon	Not Specified	Low	Low	Low
Residential Complexes / Construction Camps Carnarvon & possibly Kimberley	Not Specified	Low	<p>Carnarvon – Low / Very Low</p> <ul style="list-style-type: none"> - Crime is of opportunistic nature with alcohol related issues contributing towards the incidence of reported crimes which include assault, burglaries, drug abuse, stock theft, and theft of copper cables - Police have not detected any form of organized crime in area - Food is most common item stolen in local burglaries - 45% of crimes occur in midtown and 50% occur in the township of Bonteheuwel <p>Kimberly – Not Specified</p> <ul style="list-style-type: none"> - Higher than Carnarvon - Crimes include drug smuggling / possession, theft, assaults and burglaries - Crimes restricted to low income residential areas located on outskirts of city - Risks to SKA personnel are not significant and can be mitigated by common sense measures 	<p>Low</p> <p>Low</p>

South Africa - KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Moderate <ul style="list-style-type: none"> - In the first three months of 2009, approximately 40 incidents of threats, disrupted meetings, and five killings associated with the April elections were recorded - In August, 2010, civil unrest paralyzed South Africa and shut down public services and private production for three weeks - The African National Congress (ANC), which celebrates its 100th Anniversary this year, has been the ruling party since the first fully free elections in 1994. This is now leading to an increase in corruption and poor service delivery, which in turn is focusing efforts to develop an effective 	Low <ul style="list-style-type: none"> - Country has a small Muslim population mainly based in the Cape provinces. Muslim population is considered tolerant and well integrated into society. - Internal security is viewed to be effective as it is run by a hybrid of former state security staff and ANC MK operators. - No recent incidents, but there were plots discovered leading up to the 2010 FIFA World Cup Games - The South African Government allegedly foiled 	Medium <ul style="list-style-type: none"> - Critically high rates of murder, rape, robbery, burglary, carjacking, and home invasions - Highest incidents of rape in the world (150 per day) with one if four South African males admitting they have raped someone in the past - Most incidents of violent crime are attributed to township areas with middle class suburbs described as experiencing a level of crime not much greater than comparable areas in most large Western cities - An average of 51 home invasions per day occurred in 2010 - High rates of industrial crime (i.e., copper wire, equipment) - A weak police force allows criminals to commit crimes with impunity - South Africa Police Services (SAPS) suffers from low self-esteem greatly impacted by large amount of low grade staff who receive poor remuneration, which encourages corruption - Country has a well-developed and largely effective private security industry 	Moderate <ul style="list-style-type: none"> - South Africa is considered a top tourist destination by many agencies. - The 2010 World Cup was a very successfully run event with lower rates of crime than many had forecast and no terrorist related incidents.

	opposition based around the Democratic Alliance (DA).	plots by Al-Qaida in the Islamic Maghreb (AQIM) plans to attack the games in 2009		
SKA Head Office Complex Cape Town	Moderate <ul style="list-style-type: none"> - There is a higher potential for civil unrest in Cape Town that in the rest of South Africa, as it is the legislative hub of the country - Due to a high unemployment rate (30%), many of the protests are associated with labor disputes - Politicians risk the potential for violent riots when trying to demolish shanty towns in and around Cape Town - In March of this year, taxi protests turned violent, prompting police to use rubber bullets to against stone throwing protesters 	Low <ul style="list-style-type: none"> - The threat of terrorism in Cape Town mirrors that of all of South Africa 	Medium <ul style="list-style-type: none"> - Cape Town has the highest murder rate in South Africa at 62 per 100,000 people - Cape Town is South Africa's "sharp force" murder capital, with more people knifed to death there than in any other metropolitan area in the country - Crimes against utilities and infrastructural assets are common, forcing officials to keep street lights on 24 hours per day to deter thieves - Carjacking, home invasions, and burglaries are a concern 	Moderate <ul style="list-style-type: none"> - Cosmopolitan city with good infrastructure and communications, and a well educated workforce. - Crime has not been viewed as cause to discourage visitors - The Pinelands area is considered a sound location for a Head Office as crime levels are considered to be low
Astronomy Complex Junction PO2996	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat 	Low <ul style="list-style-type: none"> - Research and country resources indicate low 	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat 	Low <ul style="list-style-type: none"> - Security-related threats appear to be low at this location

Road and Van Wyksvlei Road		threat		
SKA Array PO2337 Road somewhere NE/NW of Losberg / Meysdam (95km north-west of Carnarvon)	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Security-related threats appear to be low at this location
Remote Facilities South Africa Multiple Locations – Western Cape, Free State, Northern Cape, Limpopo, Eastern Cape, KwaZulu-Natal	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Remoteness of sites will assist with their overall profile from a security standpoint	Low - Security-related threats appear to be low by these locations
SKA Core Site Adjacent to current MeerKAT site	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Security-related threats appear to be low around this location
Residential Complexes / Construction	Low - Research and country resources indicate low threat	Low - Research and country resources	Low - The small farming town of Carnarvon experiences typical issues associated with rural crime such as petty theft, alcohol related	Low - Security-related threats appear to be low around

<p>Camps Carnarvon / Kimberley</p>		<p>indicate low threat</p>	<p>offenses, etc. - Kimberly is in a period of decline with the reduction in diamond mining; however, there remains a low level of crime associated with the community, including some organized crime associated with illegal diamond trade; however, organizations associated with illegal diamond trade attempt to maintain a low profile in the community</p>	<p>these locations</p>
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Botswana – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Not Specified <ul style="list-style-type: none"> - One of Africa’s most politically stable countries - Has continent’s longest standing democracy - Free and fair elections 	Low <ul style="list-style-type: none"> - National Counter Terrorism Committee to address issues relating to terrorism 	Moderate <ul style="list-style-type: none"> - Moderate for industrialized nations - Low to Negligible in area in area proposed for SKA sites - Per U.S. Dept. of State, majority of crimes in country involve petty theft, robbery, and alcohol related crime that occur predominantly in metropolitan areas. 	Not Specified <ul style="list-style-type: none"> - Most likely security consideration for the remote sites would be to secure and prevent loss of the equipment at the sites as these items could be extremely attractive in underdeveloped communities
Botswana – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Low <ul style="list-style-type: none"> - One of Africa’s most politically stable countries - Political continuity rivals that of many high-income, developed nations - Governmental transitions of power have always been conducted peacefully - Low risk of civil unrest, where demonstrations and protests are very 	Low <ul style="list-style-type: none"> - Anti-Western sentiment is generally low - Extremist groups do not have an extensive operating infrastructure within the country - Strong central government and counter-terrorism agents serve as strong deterrents to any emerging militant presence 	Moderate <ul style="list-style-type: none"> - Compared with most of its neighbors, Botswana has a moderate crime rate - Pick pocketing, petty theft and burglary are increasing in urban areas - Historically lower crime rate than African neighbors but this trend no longer applies - Police data show rising rates of violent crime - Government and police force attribute most instances of violent crime and large-scale theft to 	Moderate <ul style="list-style-type: none"> - Great efforts have been made to project Botswana’s image as a safe and corruption free country - The country is large and non densely populated and time and space will always be factors in managing and administering remote sites

	<p>infrequent</p> <ul style="list-style-type: none"> - Incidents of violence are rare 		<p>South African and Zimbabwean gangs</p> <ul style="list-style-type: none"> - Long been the least corrupt country in Africa - Low risk of kidnapping - Police in urban areas are generally well-equipped; however, police in rural areas are unable to provide prompt services because officers lack transportation 	<ul style="list-style-type: none"> - The provision of an effective security posture should be straightforward based on threat profile
<p>Remote Site 1</p> <p>Kgalagadi District GPS S25 43 29.8 / E21 50 56.2</p>	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Remote site is located within a National Park which are typically well connected by a variety of means of transport - Because National Parks are critical to the up market tourism business, country sources indicated they are believed to be well covered from a security perspective
<p>Remote Site 2</p> <p>Kgalagadi District GPS S24 00 / E23 00</p>	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Remote site is located within a National Park which are typically well connected by a variety of means of transport - Because National Parks are critical to the up market tourism business,

				country sources indicated they are believed to be well covered from a security perspective
Remote Site 3 Chobe District (GPS S18 21 16.4 / E25 03.8)	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - Remote site is located within a National Park and Forest Reserve which are typically well connected by a variety of means of transport - Because National Parks are critical to the up market tourism business, country sources indicated they are believed to be well covered from a security perspective

Madagascar – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Not Specified - Politically unstable - A political stalemate has arisen due to the High Transitional Authority's failure to gain international recognition as a legitimate transitional government	Low - No reported terrorist activity in the country - Anti-Western sentiments are not commonly expressed	Not Specified - Madagascar remains, by and large, safer than many other African countries and certain U.S. cities - Majority of crimes were in Malagasy and did not involve foreigners - Crime in Madagascar as a whole is moderately high but due to sparse population at SKA sites likely incidence of crime is very low	Low - Likely incidence of crime is estimated to be very low, but higher than similar proposed sites in Namibia, Zambia, Botswana, and South Africa
Madagascar – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	High - Political instability is the greatest security threat in Madagascar - Political instability in recent years has spurred brutal civil unrest and accompanying escalations in violent crime and small-scale terrorism - Corruption, poor infrastructure, weak security measures, and	Low - Low risk of transnational terrorism throughout the country, but politically-inspired bombings and minor insurgency among the country's 18 ethnic groups are occasionally reported - Bombers frequently target government buildings, gas stations, and crowded public areas	Moderate - Crime rates remain below the African average - Most incidents that involve foreigners are crimes of opportunity including pick pocketing, theft from vehicles, or other forms of petty thievery - Most foreign nationals are easily distinguishable from Malagasy citizens and may become criminal targets due to their perceived wealth	Medium - Madagascar is very much a third world country - The country is not considered to be politically stable and the general population subsists on little income

	natural disasters have prevent the government from tackling these problems		<ul style="list-style-type: none"> - Security forces are too preoccupied with political violence and civil unrest to respond to violent crimes, let alone investigate non-violent, petty crime - Serious crimes in the country nearly quadrupled between 2007 to 2009 - Carjacking incidents are commonly reported nationwide, and four-wheel drive vehicles are preferred targets - Traveling after dark in both urban and rural areas is not recommended due to threat posed by bandits, with armed gangs known to set up impromptu road blocks - Kidnapping is not a high risk for foreign nationals - Corruption is a critical risk for businesses in Madagascar, both foreign and domestic - World Bank ranked Madagascar 140th out 183 countries in its 2011 Doing Business report 	<ul style="list-style-type: none"> - Attempts are being made to develop tourism industry but is it very much in its infancy and roads and other infrastructure are considered to be poor - Guides are necessary to effectively move around within the country - Elevated situational awareness should be employed at all times
Remote Site 1 Betroka District, Toliara Province GPS S23 14 44.4 / E46 05 20.5	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat associated with this remote site 	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat associated with this remote site 	Moderate <ul style="list-style-type: none"> - Heightened precautions required - Like governance, law and order throughout the country is not considered to be effective 	Moderate <ul style="list-style-type: none"> - Poor infrastructure will make administration and logistics a challenge
Remote Site 2 Mandrintsara District,	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat associated with this remote site 	Low <ul style="list-style-type: none"> - Research and country resources indicate low threat associated with this remote site 	Moderate <ul style="list-style-type: none"> - Heightened precautions required - Like governance, law and order throughout the country is not considered to be effective 	Moderate <ul style="list-style-type: none"> - Poor infrastructure will make administration

Mahajanga Province GPS S16 41 28.0 / E48 39 53.1				and logistics a challenge
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Mozambique – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Not Specified - Politically stable since 1990 peace accords - Main risk to political stability is rapid consumer price inflation	Not Specified - There are no reported threats from terrorism	Low - Main crime threats tend to be generic threats in urban centers and include bag snatching, mugging and pick-pocketing	Low - Risks to personnel during construction phase and to visiting staff once remote sites are operational are assessed to be low, as is the threat to SKA equipment
Mozambique – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Medium - Tensions between the two primary parties routinely conjure politically motivated violence - The weak bureaucracy has failed to curb corruption and poverty - Although the risk of a successful military coup remains low, the risk of political violence remains high	Low - There are no known terror threats to Mozambique at this time - There are no known indigenous militant networks capable of launching a sophisticated campaign targeting Mozambican government or Western interests	Medium - There is a significant risk of violent crime in Mozambique due in part to the large availability of weapons and an ineffective police force - Carjacking, home invasions, and armed robberies and assaults are increasing in frequency and brutality and have become commonplace - Deterrence capabilities are weak and investigative training and equipment is limited in large urban centers while being non-existent in suburban and rural areas - The majority of foreign nationals employ private security in order to guarantee protection and deter criminals	Medium - Country suffers from critically high levels of political and economic instability, which have fueled high crime rates and violent civil unrest, largely deterring foreign direct investment in the state

Remote Site 1 Tsangano District, Tete Province GPS S15 05 39.2 / E34 17 17.6	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Moderate - There is a high risk of highway banditry along Mozambique's rural motorways and on primary highways linking major cities	Moderate - Medium threat level associated with crime and poor police posture in rural areas impact threat profile to personnel and assets
Remote Site 2 Border of Manica and Sofala Provinces GPS S20 00 / E33 30	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Moderate - There is a high risk of highway banditry along Mozambique's rural motorways and on primary highways linking major cities	Moderate - Medium threat level associated with crime and poor police posture in rural areas impact threat profile to personnel and assets

Namibia – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Not Specified - Politically stable since independence in 1990	Low - There is no reported terrorist activity in the country or site locations	Low - Incidents of violent crime directed specifically against foreigners are rare - This designation was determined due to the sites' rural and isolated areas	Low - The incidence of crime in rural areas is low and the risk of crime impacting the SKA project and SKA employees is assessed as very low
Namibia – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Moderate - Government is generally considered stable and power transitions have been smooth, but politically-motivated violence is reported on occasion - Moderate risk of widespread civil unrest - The most recent elections saw minor outbreaks when the Rally for Democracy and Progress (RDP) clashed with the Southwest Africa's People's Organization (SWAPO), requiring anti-riot police to restore order - Labor strikes are also	Low - Militant groups are not known to operate in the country and no known terrorist threats have been made	Moderate - Crime is a concern, but expatriates who use caution and maintain personal awareness can avoid most criminal encounters - While violent crimes against foreigners do occur on occasion, street crimes, such as pick pocketing, theft, and vehicle break-ins, as well as burglary pose the largest criminal threat in Namibia	Moderate - Incidents of violent crime, including those targeting foreigners, are becoming increasingly common in both urban and rural areas - Effort is taken by police and private security to ensure that Namibia remains a destination for upper end tourism as well as mining companies which support the country's economy

	common and can adversely affect business operations			
Remote Site 1 Erongo Region GPS S22 11 00.5 / E16 02 35.8	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - While violent crime is still above average in the Erongo Region, the region is relatively prosperous and public media outlets report that crime there has dropped significantly since 2002	Low - Security-related threats appear to be low around this location
Remote Site 2 Karas Region GPS S25 47 04.7 / E18 38 53.7	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - Violent crime is above average in the Karas Region; However, an additional police presence has forced a drop in crimes of opportunity and alcohol and drug related crimes	Low - Security-related threats appear to be low around this location
Remote Site 3 Grootfontein District GPS S19 36 00 / E17 48 00	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - Security-related threats appear to be low around this location
Remote Site 4 Kunene Region GPS S17 01 19.3 / E13 11 08.1	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - Research and country resources indicate low threat associated with this remote site	Low - Security-related threats appear to be low around this location

Zambia – Pasco Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Not Specified - One of Africa's most politically stable countries	Low - Limited or no terrorist activity has been reported in the region - No threats reported as being directed against the SKA project	Low - Crime consists mainly of petty crimes closely associated with populated areas - Proposed rural location for SKA site likely to have very low incidence of crime or associated risks	Low - As the proposed location of SKA site is in a rural location, incidence of crime and associated risks are estimated to be very low
Zambia – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Low - Fairly weak legislative and judicial branches, but the government was stabilized in 2001 and has been relatively stable since	Low - International terrorist organizations are not known to operate or plan attacks in Zambia	Medium - There is a higher risk of violent crime, especially in large urban and tourism areas, due to the availability of high caliber automatic weapons, low police effectiveness, and poverty - Carjacking, mugging, and commercial and home invasions are common throughout the country, especially in large urban areas, and foreigners have been specifically targeted - Levels of crime are higher in Lusaka than in the provinces due to the greater concentration of population and wealth	Moderate - Up market tourism is a major earner for the country and nothing has occurred recently to negatively impact the country's appeal
Remote Site 1 North Western Province	Low - Research and country resources indicate low threat associated with this	Low - Research and country resources indicate low threat associated with this	Low - Research and country resources indicate low threat associated with this remote site	Low - The major challenge will be oversight and administration due to remote location

GPS S13 14 06.8 / E25 50 44.1	remote site	remote site		
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Australia – ANZSCC Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Politically Stable <ul style="list-style-type: none"> - Democracy - Well governed - High level of insulation from sovereign risk 	Not Specified <ul style="list-style-type: none"> - Any threats to national security or terrorism would be communicated either by Western Australia Police or directly from national intelligence agencies - Assistance with such threats would be made available by appropriate authorities 	Moderate <ul style="list-style-type: none"> - Major identified threats to SKA's facilities include theft of material or intellectual property, physical damage resulting from vandalism, theft or attempted theft and attacks on personnel - Consistent level of crime compared to other Organisation for Economic Co-operation and Development (OECD) countries 	Low <ul style="list-style-type: none"> - In general Australia provides a safe and hospitable living and working environment with moderate levels of crime
Core Area Inside MRO w/in boundaries of Boolardy Station, Western Australia	Not Specified	Not Specified	Low <ul style="list-style-type: none"> - Remoteness affords natural level of security 	Low <ul style="list-style-type: none"> - Region experiences low levels of crime
Offices & Technical Facilities Perth, Australia	Not Specified	Not Specified	Not Specified <ul style="list-style-type: none"> - Typical for cities / towns in developed countries - Vast majority of areas safe to walk around at any time of the day / night - Characterized as safe, healthy, cohesive and highly 'livable' communities 	Low

Offices & Technical Facilities Geraldton, Australia	Not Specified	Not Specified	Not Specified - Typical for cities / towns in developed countries - Vast majority of areas safe to walk around at any time of the day / night - Characterized as safe, healthy, cohesive and highly 'livable' communities	Low
Remote Facilities Western Australia	Not Specified	Not Specified	Low	Low - Remoteness affords natural level of security
Australia – KSG Threat Analysis				
Site / Location	Political Stability	Terrorism	Crime	Overall Score
Country Profile	Low - There is a low risk of civil unrest in Australia which is politically stable - Country has strong democratic traditions with unwavering commitment to constitutional rule of law - There has been no violence in recent elections and smooth political transitions are the norm	Moderate - No successful terrorist attacks have been carried out in Australia - Regional and transnational terrorist organizations may target Australia, which is seen as a regional leader in counter-terrorism operations - There is no known indigenous terrorist threat in Australia - Main emphasis of terrorist cells in Australia appears to be fundraising and securing recruits	Moderate - Crime rates vary significantly based on geographic location - Crime rate is gradually increasing, especially in certain areas of larger cities - There has been a rise in racially motivated violence - Property crimes (e.g., robbery, burglary, breaking and entering, theft) are common throughout Australia and are among the crimes most likely to be encountered by Australians and foreign residents alike - Petty theft rarely reported in rural districts	Moderate - The moderate risks of crime, natural disasters, and elevated risk of terrorism are the primary factors for the Moderate risk rating

			<ul style="list-style-type: none"> - Generally low risk of violent crime; specific violent crimes vary by region and territory and urban centers have experienced increasing rates - Urban crime rates increasingly resemble those in large North American and European cities - Although police organizations are well trained and professional, some Australian police organizations in rural areas may have limited resources and personnel - Kidnapping for ransom is relatively rare with the majority of abductions related to carjacking or underground economic activities - Intelligence providers recommend that commonsense security precautions similar to those observed in any major Western countries be followed 	
<p>Core Area</p> <p>Inside MRO w/in boundaries of Boolardy Station, Western Australia</p>	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Research and country resources indicate low threat 	<p>Low</p> <ul style="list-style-type: none"> - Numbers of reported offences were very small for most Local Government Areas (LGAs) in Murchison 	<p>Low</p> <ul style="list-style-type: none"> - Security-related threats appear to be low for the location planned to house the core area
<p>Offices & Technical</p>	<p>Low</p> <ul style="list-style-type: none"> - Civil unrest not uncommon but is unlikely 	<p>Low</p> <ul style="list-style-type: none"> - No significant terror attacks by transnational or 	<p>Moderate</p> <ul style="list-style-type: none"> - Crime rates in Perth are lower than in other major Australian 	<p>Low</p> <ul style="list-style-type: none"> - Security-related threats appear to be

<p>Facilities Perth, Australia</p>	<p>to harm foreign national operations because protests and demonstrations are non-violent in the city</p> <ul style="list-style-type: none"> - The two major types of civil disorder are ethnic unrest and labor / political unrest - Protests involving Aborigines, animal rights, anti-war, environmental-protection, and trade unions occur most often 	<p>homegrown terrorists have taken place in recent years</p> <ul style="list-style-type: none"> - Terrorists are believed to pose a greater risk to higher profile cities such as Sidney and Melbourne - Despite previously thwarted terrorist plans to carry out attacks on targets mainly in eastern Australia as well as Alice Springs, there have been no similar reports in Perth 	<p>cities and comparable to medium-sized cities Western Europe or North America</p> <ul style="list-style-type: none"> - Moderate risk of petty theft, pick-pocketing and purse snatching - Carjacking remains unusual in Perth - Low risk of violent crime, with robbery identified as one of the leading forms of violent crime reported - Residential burglary is frequently reported in Perth, with police reporting some 10,000 cases in the city in the last six months of 2010 - Burglaries are particularly common in the Northbridge and Medina suburbs, as well as in areas near construction sites - Violent robberies and home invasions have been reported in Mandurah, Mt. Nasura, Crawley, Kenwick train station, Nollarama, Cannington, Beldon, Beeliar Drive, Manning, Hilbert, St. George Terrance, and in the city's Central Business District - Excessive alcohol consumption is linked to violent crime in Perth - Biker gangs are known to be active in-and-around Perth (e.g., Edgewater and Kwinana suburbs) and are heavily armed - Kidnapping risk is low 	<p>low based on the size of the city and compared with some of the security-related challenges facing other major cities in the country</p>
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Offices & Technical Facilities Geraldton, Australia	Low - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - March, 2011 - Criminal matters in the Geraldton court have dropped by a staggering 1403 cases compared to the same nine-month period a year previous; the 18% drop comes along with a 22% reduction in selected criminal offences such as assaults, burglary and property damage - Youth cases going before the court have decreased by 24% over the same period - Estimated population at June 2010 of 36,958; Reported Crime Jan. 2011 – Sept. 2011 162 Assaults, 133 Burglaries dwelling, 68 Burglaries other, 7 Robberies, 22 Auto Thefts - Reported Crime Jan. 2010 – Dec. 2010: 187 Assaults, 120 Burglaries dwelling, 55 Burglaries other, 13 Robberies, 35 Auto Thefts	Low - Security-related threats appear to be low
Remote Facilities Western Australia and Other States / Territories	Low - Rioting can occur at refugee camps in northern Australia, but these incidents have little effect on foreigners or business operations - Research and country resources indicate low threat	Low - Research and country resources indicate low threat	Low - The outback used to be comparatively safe from a security standpoint, but robberies, carjacking, and kidnappings have started occurring in certain parts of the vast uninhabited wilderness; the problem is not severe, but caution is necessary if you are operating in these areas	Low - Research and country resources indicate low threat for each of the listed remote site locations

Appendix B

Proposed Security Measures Tables

Pasco – Proposed Security Measures			
Site / Location	Perimeter Security	Interior Security	Operational Security
SKA Head Office Complex Cape Town	<ul style="list-style-type: none"> - Palisade 2m fence around complex - CCTV at key points on fencing and buildings linked to digital video monitoring - Vehicle access control gates 	<ul style="list-style-type: none"> - Intrusion detection system - CCTV linked to digital video recording - Area designations <ul style="list-style-type: none"> o Restricted areas: Server room, remote operation room o Controlled access areas o Unrestricted areas: Visitor Reception 	<ul style="list-style-type: none"> - Security checkpoints at all entrances staffed by security guards - Identification, Admittance, and Interior Movement Control - Employee Entry and Monitoring - Visitor Entry and Monitoring: Visitor ID Accountability System
	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Ensure gates consistent height / material as fence line - Recommend fence line signage indicating private property / prohibiting unauthorized access - Recommend gates be equipped with card reader controls - Recommend active building entrances be equipped with card reader controls - Minimum CCTV coverage include <ul style="list-style-type: none"> o vehicle and pedestrian gates along fence line o exterior entrances along building perimeters - Recommend pan-tilt-zoom cameras for general 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors - Recommend entrances to restricted / controlled access areas be considered for card reader controls - CCTV coverage - include all active entrances, visitor processing area, and entrances to restricted areas which will be equipped with card reader controls 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Onsite guard force should monitor electronic security systems for facility (e.g., at reception area post) - If card reader controls utilized, intrusion detection sensors can be tied to access control system for onsite monitoring of designated intrusion sensors (e.g., door / window contacts, glass breaks, etc.) - Security staffing needs will impact operational costs and should be considered during site design

	<i>surveillance coverage / fixed cameras at vehicle and pedestrian entrances</i> <ul style="list-style-type: none"> - Recommend exterior lighting for vehicle and pedestrian entrances to site and buildings and parking areas and walkways 		
Hotels / Residences Cape Town	Hotels: <ul style="list-style-type: none"> - Pasco indicated adequate security provided by hotels Residences: <ul style="list-style-type: none"> - Security Gates 	Hotels: <ul style="list-style-type: none"> - Pasco indicated adequate security provided by hotels Residences: Intrusion Detection Systems	N/A
	<u>KSG Remarks:</u> <i>Adequate measures overall</i> <ul style="list-style-type: none"> - Recommend where feasible properties housing residences be fenced or within secure subdivision / neighborhood 	<u>KSG Remarks:</u> <i>Adequate measures overall</i> <ul style="list-style-type: none"> - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows), motion detection sensors, panic alarms 	<u>KSG Remarks:</u> <ul style="list-style-type: none"> - Personnel should receive security awareness training related to use of hotel rooms (e.g., securing personal / project related items, locking doors, verifying identity of visitors to room prior to opening door, etc. - Provide residential personnel training in proper use of intrusion detection system and reporting of issues to security representative
Astronomy Complex Junction PO2996 Road and Van Wyksvlei Road	<ul style="list-style-type: none"> - Palisade 2m fence around complex or, alternatively, a wire mesh fence - CCTV (pan/tilt) at key points on fencing and buildings linked to a digital video recorder - Vehicle control gates 	<ul style="list-style-type: none"> - Intrusion detection system in all buildings - CCTV (pan/tilt) linked to digital video recording - Area designations <ul style="list-style-type: none"> o Restricted areas: Super computer; Transformers; Rotary UPS o Controlled access area: Mechanical workshop - Unrestricted areas: Visitor Reception 	<ul style="list-style-type: none"> - Security checkpoints at all entrances staffed by security guards

		- Identification, Admittance, and Interior Movement Control possibly through the use of biometrics	
	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Ensure gates consistent height / material as fence line</i> - <i>Recommend gates be equipped with card reader controls</i> - <i>Recommend fence line signage indicating private property / prohibiting unauthorized access</i> - <i>Recommend active building entrances be equipped with card reader controls</i> - <i>Minimum CCTV coverage include</i> <ul style="list-style-type: none"> o <i>vehicle and pedestrian gates along fence line</i> o <i>exterior entrances along building perimeters</i> - <i>Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances</i> - <i>Recommend exterior lighting for vehicle and pedestrian entrances to site and buildings and parking areas and walkways</i> 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors</i> - <i>Recommend entrances to restricted access areas be considered for card reader controls (e.g., dual verification card reader / PIN pad or biometric reader)</i> - <i>Recommend entrances to controlled access areas be equipped with card reader controls</i> - <i>CCTV coverage - include all active entrances, visitor processing area, and entrances to restricted areas which will be equipped with card reader controls</i> 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Onsite guard force should monitor electronic security systems for facility (e.g., at reception area post)</i> - <i>If card reader controls utilized, intrusion detection sensors can be tied to access control system for onsite monitoring of designated intrusion sensors (e.g., door / window contacts, glass breaks, etc.)</i> - <i>Security staffing needs will impact operational costs and should be considered during site design</i>
SKA Array	- Palisade/wire mesh fencing with a minimum height of 2m	- CCTV (pan/tilt) linked to digital video recording	- Security checkpoint at entrance staffed by no less than two guards

<p>Construction Camp / Residential Site PO2337 Road somewhere NE/NW of Losberg / Meysdam (95km north-west of Carnarvon)</p>	<ul style="list-style-type: none"> - CCTV (pan/tilt) at key points on the perimeter fence and buildings linked to a digital video recorder (position dependent upon type of lens, elevation, surroundings, and desired field of vision) - Additional gate for emergency exit from the site - Vehicle control 	<ul style="list-style-type: none"> - Lighting in all public areas - Alarms on certain buildings including storage and administrative offices 	<ul style="list-style-type: none"> - Authentication of visitors through electronic means - Perimeter patrols to detect intrusion - A combination of foot and mobile security patrols operating on an irregular patrol program to detect and deter security breaches or other, on-site threats to SKA personnel - Incident reporting procedures - Monthly Interaction with the South African Police Service and community based organizations
	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Ensure gates consistent height / material as fence line</i> - <i>Recommend active gates be equipped with card reader controls / emergency gate may be manually secured with padlock</i> - <i>Recommend fence line signage indicating private property / prohibiting unauthorized access</i> - <i>Recommend active building entrances be equipped with card reader controls</i> - <i>Minimum CCTV coverage include</i> <ul style="list-style-type: none"> o <i>vehicle and pedestrian gates along fence line</i> o <i>exterior entrances along building perimeters</i> 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Recommend residences be equipped with intrusion detection systems</i> - <i>Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors</i> 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - <i>Onsite guard force should monitor electronic security systems for facility (e.g., security checkpoint location)</i> - <i>Implement recurring security liaison outreach with building and residential populations to ensure issues / concerns are communicated and addressed</i> - <i>Security staffing needs will impact operational costs and should be considered during site design</i>

	<ul style="list-style-type: none"> - Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances - Recommend exterior lighting for vehicle and pedestrian entrances to site and buildings and parking areas and walkways 		
<p>SKA</p> <p>Administrative Site</p> <p>Located next to the residential site</p>	<ul style="list-style-type: none"> - Palisade/wire mesh fencing with a minimum height of 2m - CCTV (pan/tilt) at key points on the perimeter fence and buildings linked to a digital video recorder 	<ul style="list-style-type: none"> - CCTV (pan/tilt) linked to digital video recording - Lighting - Alarms on certain buildings 	<ul style="list-style-type: none"> - Security checkpoint at entrance staffed by no less than two guards - Movement control of persons and vehicles
	<p><u>KSG Remarks:</u></p> <p>Adequate measures overall</p> <ul style="list-style-type: none"> - Ensure gates consistent height / material as fence line - Recommend fence line signage indicating private property / prohibiting unauthorized access - Recommend gates be equipped with card reader controls - Recommend consider active building entrances be equipped with card reader controls - Minimum CCTV coverage include <ul style="list-style-type: none"> o vehicle and pedestrian gates along fence line o exterior entrances along building 	<p><u>KSG Remarks:</u></p> <p>Adequate measures overall</p> <ul style="list-style-type: none"> - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors - CCTV coverage - include all active entrances, visitor processing area, and entrances equipped with card reader controls 	<p><u>KSG Remarks:</u></p> <p>Adequate measures overall</p> <ul style="list-style-type: none"> - Onsite guard force should monitor electronic security systems for applicable facilities (e.g., at security checkpoint guardhouse) - If card reader controls utilized, intrusion detection sensors can be tied to access control system for onsite monitoring of designated intrusion sensors (e.g., door / window contacts, glass breaks, etc.) - Security staffing needs will impact operational costs and should be considered during site design

	<p style="text-align: center;"><i>perimeters</i></p> <ul style="list-style-type: none"> - Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances 		
Airstrip	N/A	N/A	<ul style="list-style-type: none"> - Regular inspections of runways for obstructions and serviceability - SKA Africa currently has contract with charter company to transport SKA personnel between Cape Town and Carnarvon
	<p><u>KSG Remarks:</u></p> <ul style="list-style-type: none"> - If equipment / aircraft will be stored / grounded at airstrip while site is unattended, consider installation of fence line (e.g., 2m wire mesh fence with barbed wire topper) along site perimeter with manually operated gates (secure with mechanical lock) and suitable lighting (e.g., motion based lighting) and CCTV camera coverage of gate(s) and storage / aircraft areas 	<p><u>KSG Remarks:</u></p> <p>N/A</p>	<p><u>KSG Remarks:</u></p> <ul style="list-style-type: none"> - If airstrip unattended during flight arrival, consider policy requirement that aircraft conduct fly over of airstrip prior to landing to ensure airstrip is not obstructed by wildlife, vehicles, unexpected individuals, etc.
Remote Sites in South Africa	<ul style="list-style-type: none"> - Wire mesh 2m fence with barbed wire - Gate with tamper proof locks equipped with alarms that are linked to the SKA head office, the Astronomy Complex, and an appointed local representative - CCTV camera (shielded) 	<ul style="list-style-type: none"> - Fire suppression system - Remote operation of generators - Alarm system 	<ul style="list-style-type: none"> - Appoint a local representative to be responsible for site management - Visiting personnel should check before each visit whether any crimes have occurred in the area against people in vehicles - Planned routes and notifications of approximate times of departure and arrival
	<u>KSG Remarks:</u>	<u>KSG Remarks:</u>	<u>KSG Remarks:</u>

	<p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Hatches to any housings enclosing external equipment should be equipped with tamper resistant locking mechanisms 	<p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Recommend buildings be equipped with solid core metal doors and if feasible, no windows to limit available access portals - Intrusion detection system should include door alarm sensors (glass break sensors if buildings have exterior windows along perimeter) 	<p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Personnel traveling to remote sites should receive basic situational security awareness training and briefing on response to potential security incidents (e.g., carjacking, robbery, kidnapping, etc.) - Recommend training for personnel traveling to sites include basic First Aid, basic wilderness survival techniques - Require all personnel traveling to sites to carry operational means of communication (e.g., vehicle radio and cell phone) - Prohibit nighttime road travel to remote sites unless specific authorization granted by management level personnel
<p>Madagascar - Remote Sites</p>	<ul style="list-style-type: none"> - 2m mesh fence with razor or barbed wire - Gate secured with tamper proof lock with an alarm connected to the Astronomy Complex, the head office and SKA's local representative or to law enforcement officers in the towns of Betroka and Antanimenabaka - CCTV camera (shielded) 		<ul style="list-style-type: none"> - Partnering with local law enforcement and community organizations - Consider use of a resident (area) security officer
	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Hatches to any housings enclosing external equipment should be equipped with tamper resistant locking mechanisms - Consider CCTV camera coverage (shielded) to provide general surveillance coverage 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Recommend any buildings be equipped with solid core metal doors and if feasible, no windows to limit available access portals - Intrusion detection system should include door alarm 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Personnel traveling to remote sites should receive basic situational security awareness training and briefing on response to potential security incidents (e.g., carjacking, robbery, kidnapping, etc.) - Recommend training for personnel traveling to sites include basic First Aid, basic wilderness

	<i>of equipment</i>	<i>sensors (glass break sensors if buildings have exterior windows along perimeter)</i>	<i>survival techniques</i> <ul style="list-style-type: none"> - Require all personnel traveling to sites to carry operational means of communication (e.g., vehicle radio and cell phone) - Prohibit nighttime road travel to remote sites unless specific authorization granted by management level personnel
Namibia, Mozambique, Zambia, and Botswana - Remote Sites	<ul style="list-style-type: none"> - 2m wire mesh fence with remote sensors monitored at the SKA head office 	N/A	<ul style="list-style-type: none"> - Partner with local law enforcement and community groups - Consider use of a resident (area) security officer
	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Hatches to any housings enclosing external equipment should be equipped with tamper resistant locking mechanisms - Consider CCTV camera coverage (shielded) to provide general surveillance coverage of equipment 	<p><u>KSG Remarks:</u></p> <ul style="list-style-type: none"> - Recommend any buildings be equipped with solid core metal doors and if feasible, no windows to limit available access portals - Intrusion detection system should include door alarm sensors (glass break sensors if buildings have exterior windows along perimeter) 	<p><u>KSG Remarks:</u></p> <p><i>Adequate measures overall</i></p> <ul style="list-style-type: none"> - Personnel traveling to remote sites should receive basic situational security awareness training and briefing on response to potential security incidents (e.g., carjacking, robbery, kidnapping, etc.) - Recommend training for personnel traveling to sites include basic First Aid, basic wilderness survival techniques - Require all personnel traveling to sites to carry operational means of communication (e.g., vehicle radio and cell phone) - Prohibit nighttime road travel to remote sites unless specific authorization granted by management level personnel - Based on KSG's higher threat rating for Mozambique remote site locations, it is recommended that physical security measures consistent with those proposed for Madagascar be implemented

ANZSCC – Proposed Security Measures			
Site / Location	Perimeter Security	Interior Security	Operational Security
Offices and Technical Facilities Perth / Geraldton	<ul style="list-style-type: none"> - Commercial security alarm systems and CCTV where determined appropriate via a risk assessment - Lighting levels in office car parking and building surroundings will be set at a level 	<ul style="list-style-type: none"> - Electronic access control for critical areas and computer server rooms - Security for the supercomputing facility will be subject to ongoing review and access to restricted areas will be controlled through electronic access control - Security alarm system will be monitored by a third party vendor 	<ul style="list-style-type: none"> - Access to the supercomputing area will be restricted to only those personnel with a need for access
	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures reasonable, but KSG recommends additional measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Consider fencing / gates along site perimeter of office facilities - Install fence line / gates (min. 2m in height) to delineate property housing supercomputing facility and restrict access - Recommend fence line signage indicating private property / prohibiting unauthorized access - Recommend gates be equipped with card reader controls at property housing supercomputing facility - Recommend active building entrances be equipped with 	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures reasonable, but KSG recommends additional measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Recommend interior CCTV coverage with digital video recording / monitoring capability - include all active entrances, visitor processing area, and entrances to restricted areas which will be equipped with card reader controls - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors - Consider onsite security monitoring post at supercomputing facility through 	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures minimal in nature</i></p> <ul style="list-style-type: none"> - Recommend main entrance of office facilities be staffed by security officer or receptionist tasked with visitor processing and management - Consider security officer staffing for property housing supercomputing facility. Minimum recommended is two officers (one to monitor systems, access, etc. and one to patrol and respond to issues) - Security staffing will impact operational costs and should be considered during site design

	<p><i>card reader controls</i></p> <ul style="list-style-type: none"> - <i>Minimum CCTV coverage include</i> <ul style="list-style-type: none"> o <i>vehicle and pedestrian gates along fence line</i> o <i>exterior entrances along building perimeters</i> - <i>Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances</i> 	<p><i>integration of electronic security systems (access control system, intrusion detection system & CCTV system). Security post would be equipped with appropriate monitoring and administration equipment</i></p>	
Remote Facilities	<ul style="list-style-type: none"> - Individual antenna structures are to be fitted minimal locking entry points and will be unfenced - Local power generators will be fenced - CCTV images will be recorded and used for ensuing analysis should a security incident take place 	<ul style="list-style-type: none"> - Installation of a security system is not warranted due to the remote nature of the sites - Consideration should be given to burying the diesel tanks and locating associated pumps in locked housings 	<ul style="list-style-type: none"> - Maintenance personnel would be expected to check for signs of attempted unauthorized access
	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures reasonable, but KSG recommends additional measures be considered / discussed</i></p> <ul style="list-style-type: none"> - <i>Consider installation of fencing around remote site (e.g., 2m wire mesh fence). Provides greater protection than afforded by using fence only for power generators.</i> - <i>If fencing is installed, for</i> 	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures reasonable, but KSG recommends additional measures be considered / discussed</i></p> <ul style="list-style-type: none"> - <i>Recommend any buildings be equipped with solid core metal doors and if feasible, no windows to limit available access portals</i> - <i>Intrusion detection system should be considered for any</i> 	<p><u>KSG Remarks:</u></p> <p><i>Proposed measures reasonable, but KSG recommends additional measures be considered / discussed</i></p> <ul style="list-style-type: none"> - <i>Partner with local law enforcement and community groups</i> - <i>Consider use of a resident (area) personnel to serve as security responder for remote sites</i> - <i>Personnel traveling to remote sites should receive basic situational security awareness training and briefing on response to potential security incidents (e.g., carjacking, robbery,</i>

	<p><i>enhanced security posture, consider intrusion detection sensors for fence line which could be monitored by internal security control center or external third party service</i></p> <ul style="list-style-type: none"> - Hatches to any housings enclosing external equipment should be equipped with tamper resistant locking mechanisms - Consider CCTV camera coverage (shielded) to provide general surveillance coverage of equipment 	<p><i>buildings at location and would include door alarm sensors (glass break sensors if buildings have exterior windows along perimeter). If implemented, system could be monitored by internal security control center or external third party service</i></p>	<p><i>kidnapping, etc.)</i></p> <ul style="list-style-type: none"> - Recommend training for personnel traveling to sites include basic First Aid, basic wilderness survival techniques - Require all personnel traveling to sites to carry operational means of communication (e.g., vehicle radio and cell phone) - Prohibit nighttime road travel to remote sites unless specific authorization granted by management level personnel
SKA Central Core	<ul style="list-style-type: none"> - A stock fence around the remote areas should be considered to prevent wildlife encroachment 	<ul style="list-style-type: none"> - Important areas of the buildings, including equipment storage areas, control rooms and computer rooms, will be equipped with electronic access - CCTV will be installed where deemed appropriate 	<ul style="list-style-type: none"> - CCTV images will be recorded and used for ensuing analysis should a security incident take place
	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Consider palisade/wire mesh fencing with a minimum height of 2m - CCTV (pan/tilt) at key points on the perimeter fence and buildings linked to a digital video recorder (position dependent upon type of lens, elevation, surroundings, and desired field of vision) 	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Intrusion detection system in all buildings - CCTV coverage linked to digital video recording - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors - Recommend entrances to 	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Consider staffing dedicated security officer at Central Core on 24x7 basis. Officer would be tasked with conducting patrols, monitoring CCTV camera coverage, ensuring only authorized visitors access site, etc.

	<ul style="list-style-type: none"> - Vehicle control gates consistent height / material as fence line - Recommend gates be equipped with card reader controls - Recommend fence line signage indicating private property / prohibiting unauthorized access - Recommend active building entrances be equipped with card reader controls - Minimum CCTV coverage include <ul style="list-style-type: none"> o vehicle and pedestrian gates along fence line o exterior entrances along building perimeters - Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances - Recommend exterior lighting for vehicle and pedestrian entrances to site and buildings and parking areas and walkways 	<p><i>restricted access areas be considered for card reader controls</i></p> <ul style="list-style-type: none"> - CCTV coverage - include all active entrances, visitor processing area, and entrances to restricted areas which will be equipped with card reader controls 	
Airstrip	N/A	N/A	- Pilots will be instructed to conduct a low level assessment before landing
	<p><u>KSG Remarks:</u></p> <ul style="list-style-type: none"> - If equipment / aircraft will be stored / grounded at airstrip while site is unattended, consider installation of fence 	<p><u>KSG Remarks:</u></p> <p>N/A</p>	<p><u>KSG Remarks:</u></p> <p>Adequate measure</p>

	<p><i>line (e.g., 2m wire mesh fence with barbed wire topper) along site perimeter with manually operated gates (secure with mechanical lock) and suitable lighting (e.g., motion based lighting) and CCTV camera coverage of gate(s) and storage / aircraft areas</i></p>		
<p>Onsite and Near Site Resident Staff</p>	<ul style="list-style-type: none"> - Signage indicating access rights and arrangements will be located at major entry points to the site - All buildings will be lockable - CCTV coverage of the areas surrounding the buildings will be provided but not monitored live - Electronic access controls will be used for entry to personal accommodation - External lighting will provide sufficient illumination - CCTV cameras will be installed around accommodation and recreational areas to provide general surveillance and video will be recorded for post-event analysis 		<ul style="list-style-type: none"> - CCTV images will be recorded and used for ensuing analysis should a security incident take place
	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Consider installation of palisade/wire mesh fencing with a minimum height of 2m along 	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Recommend residences be equipped with intrusion detection systems 	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - Consider staffing dedicated security officer at main residential location on 24x7 basis. Officer would be tasked with conducting patrols, monitoring CCTV camera coverage,

	<p>site perimeter and gates at entrances.</p> <ul style="list-style-type: none"> - Minimum CCTV coverage for site perimeter and buildings, include <ul style="list-style-type: none"> o vehicle and pedestrian gates along fence line o exterior entrances along building perimeters - Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances - Recommend exterior lighting for vehicle and pedestrian entrances to site and buildings and parking areas and walkways 	<ul style="list-style-type: none"> - Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors 	<p>ensuring only authorized visitors access site, etc.</p> <ul style="list-style-type: none"> - Incident reporting procedures - Monthly Interaction with the local police and community based organizations
Construction Sites	<ul style="list-style-type: none"> - Security of site, materials, workers and visitors are responsibility of selected construction contractors - Site Access Control - Security of plant and machinery - Security of material and control of personnel, contractors, and visitors 	N/A	<ul style="list-style-type: none"> - All personnel working on or visiting sites will be required to undergo site specific induction process covering safety and security
	<p><u>KSG Remarks:</u></p> <p>Recommend additional security measures be considered / discussed</p> <ul style="list-style-type: none"> - Further discussion related to specifics of security plan for 	<p><u>KSG Remarks:</u></p> <p>Recommend additional security measures be considered / discussed</p> <ul style="list-style-type: none"> - Intrusion detection system in all buildings 	<p><u>KSG Remarks:</u></p> <p>Recommend additional security measures be considered / discussed</p> <ul style="list-style-type: none"> - Incident reporting procedures - Monthly Interaction with the local police and community based organizations

	<p><i>construction phase. Information provided lacks specific details of planned measures.</i></p> <ul style="list-style-type: none"> - <i>Consider palisade/wire mesh fencing with a minimum height of 2m</i> - <i>CCTV (pan/tilt) at key points on the perimeter fence and buildings linked to a digital video recorder (position dependent upon type of lens, elevation, surroundings, and desired field of vision)</i> - <i>Vehicle control gates consistent height / material as fence line</i> - <i>Recommend gates be equipped with card reader controls</i> - <i>Recommend fence line signage indicating private property / prohibiting unauthorized access</i> - <i>Recommend active building entrances be equipped with card reader controls</i> - <i>Minimum CCTV coverage include</i> <ul style="list-style-type: none"> o <i>vehicle and pedestrian gates along fence line</i> o <i>exterior entrances along building perimeters</i> - <i>Recommend pan-tilt-zoom cameras for general surveillance coverage / fixed cameras at vehicle and pedestrian entrances</i> - <i>Recommend exterior lighting for vehicle and pedestrian</i> 	<ul style="list-style-type: none"> - <i>CCTV coverage linked to digital video recording</i> - <i>Intrusion detection coverage – consider door / window contacts, glass break sensors (ground floor windows) and motion detection sensors</i> - <i>Recommend entrances to restricted access areas be considered for card reader controls</i> - <i>CCTV coverage - include all active entrances, visitor processing area, and entrances to restricted areas which will be equipped with card reader controls</i> 	<ul style="list-style-type: none"> - <i>Consider staffing dedicated security officers at construction sites on 24x7 basis. Officer would be tasked with conducting patrols, monitoring CCTV camera coverage, ensuring only authorized visitors access site, etc.</i> <ul style="list-style-type: none"> o <i>Perimeter patrols to detect intrusion</i> o <i>A combination of foot and mobile security patrols operating on an irregular patrol program to detect and deter security breaches or other, on-site threats to SKA personnel</i>
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	<i>entrances to site and buildings and parking areas and walkways</i>		
Ongoing Operations	N/A	N/A	<ul style="list-style-type: none"> - Allocated three staff to site security, for at least one security officer present at Operations Centre near the Centre of the Array (OCCA) at all times - Security officers tasked with preparation and maintenance of individual site security management plans and specific requirements for site security, access control, CCTV, visitor management and control - Security officer reachable 24-hour basis with suitable vehicle for access around OCCA and core sites at their disposal
	<p><u>KSG Remarks:</u></p> <p>N/A</p>	<p><u>KSG Remarks:</u></p> <p>N/A</p>	<p><u>KSG Remarks:</u></p> <p><i>Recommend additional security measures be considered / discussed</i></p> <ul style="list-style-type: none"> - <i>Consider designation of security professional to manage all security related operations for ANZSCC</i> - <i>Consider identifying security resources for remote sites located outside of Western Australia to serve as response capability if a security incident effects personnel or an asset</i> - <i>Consider two staff onsite at OCCA on 24x7 basis. This would enable one security officer to monitor security systems and handle calls for assistance, etc. while a second officer would be positioned to conduct mobile patrols of the Core and other facilities located within a reasonable distance</i> - <i>Recommend discussion with ANZSCC regarding lack of apparent inclusion of</i>

			<p><i>security-related policies / procedures and standards and development. Although the section covering security provides basic concepts for implementing security measures, the level of detail provided was limited</i></p> <ul style="list-style-type: none">- <i>Discuss security awareness training program plans and situational awareness education to ensure measures are planned and can effectively be implemented</i>
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