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CHAIRPERSON: Good morning. General, can you confirm that you are still under oath?

BRIG GEN BAYNE: I do.

CHAIRPERSON: Thank you. Advocate Mphaga.

5 ADV MPHAGA: Thank you Chairperson. General, we are now on page 6 of your statement on bundle H, we are now starting to deal with the roles and capabilities of both the Gripen and the Hawk. Noting that General you would be speaking to lay people and you will be dealing with the Gripen and about its
10 technical capabilities amongst others, can you please take us slowly so that we may be able to follow? In paragraph 36 deals with the Roles and Capabilities of the Gripen, could you take us through that paragraph and explain to us in detail the roles and capabilities of the Gripen.

15 BRIG GEN BAYNE: Chairperson, the Gripen is a supersonic single-engine dual and single seat multirole combat aircraft and it is able as was referred to earlier, can perform air defence surface attack which includes both air-to-ground and air-to-sea attack, as well as what we term surveillance which is
20 both reconnaissance and electronic gathering of information in the same mission and is also then globally interoperable, so this again comes back to what is then termed a multi or swing-role aircraft and it has proven itself to be able to do all of these.

25 It also includes a modern defensive and offensive

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air defence features and equipment such as airborne radar, it's a very sophisticated air-to-air radar to guide its air-to-air missiles and also to do air interdiction and intercept. The RSA version of the Gripen was the first to receive a helmet mounted display. Very briefly a helmet mounted display means that the pilot is projected on a helmet, a screen in his visor that he uses when he flies, it's the information that is also required to fly the aircraft in the cockpit

So, this is a further advancement of again meaning that he can spend more and more time in high complex missions not even having to look down into the cockpit, he can fly the aircraft whilst looking outside of the cockpit doing the task at hand and he has all the essential information that he can do that task without referring inside the cockpit. Most importantly, however, it means that he can aim with his head his missiles and his weapons not only in the direction that the aircraft is flying as in the past, but with this capability for example if an enemy aircraft is in his rear sector and he picks that aircraft up he can turn, designate through his helmet mounted display that aircraft and fire his missile without looking back down in his cockpit.

So, you can imagine that this means that he can engage targets in a much wider field of view than before, so this is quite a considerable achievement of the programme and as I said we were the first to receive, even before the Swedish

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Air Force this capability, it is also fully integrated with all the other systems on the aircraft and so I think the Air Force is very proud to have this capability and I think it was a very fine feather in the cap of the project to achieve that, it's a highly
5 technological step for the Air Force.

Then again stand off and precision guiding munitions, I did mention previously and it can also carry the suite of what is termed non-precision bombs or in some stages is referred to as "dumb-bombs" because it has no guidance, but
10 nowadays modern munitions and bombs can be guided with laser or can be guided by radar and the Gripen has the capability to also deliver these weapons.

This comes back to the role primarily for peace enforcement and peace keeping methods where modern law and modern requirements are to absolutely minimise collateral
15 damage and so this is why you need to have a capability to with high precision deliver these weapons which are very powerful but need to be targeted on the specific target. Also in the past I think an example was used by General Malinga about
20 bridges and such targets, and airfields, these are extremely difficult targets to utilise or destroy with what was termed non-precision weapons, so you will use these type of weapons for high strategic value targets where you want to make an impact in your interdiction and your airstrike to pave the way for your
25 forces.

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5 Additionally sometimes of course you don't want to destroy a target. The Army might say to you we don't want to destroy the bridge, we just want to prevent the enemy from using the bridge, because we want to rebuild it and use it ourselves, or for as an example and these precision weapons can do exactly that, the weapon can then be guided and used to achieve the military objective and not just you know destroy the target, so that is an important capability to have in your inventory in modern warfare.

10 And then it also carries a cannon, a 27mm cannon in the single seater, not in the dual, generally in air-to-air combat nowadays most of the engagements would be with missiles, long range missiles and short range missiles but from time to time you can never assure that that will not end up in what we term close combat and when you are below about 15 2 000 metres from the enemy aircraft then the missile is not effective and then you will go over to your canons and you need to use your canons, so it's also good to retain the cannon capability on your aircraft.

20 And then lastly, or second lastly sorry, surveillance and targeting pods, these were delivered with the aircraft as well and this gives the aircraft a day and night surveillance capability, it is, it also records that information and through the data link on the aircraft that information in real time can be 25 passed down to the ground forces or naval forces or to the

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headquarters from the aircraft, so this is the first time that the Air Force has had this level of capability.

And in terms of the surveillance capability it has a digital reconnaissance pod, so instead of this being what was
5 termed in the past "wet form" where the aircraft would photograph land, then the photographs would have to be processed through quite a long sequence of processing as your happy snaps do and only then would the intelligence people be able to analyse that for intelligence purposes. Now in the
10 Gripen this can be done real-time straight down to the analysts, they can do the analysis and you have then this real-time capability.

Alternatively if you don't want to expose that then the aircraft would land but you can imagine as your digital
15 photographs it goes a lot faster and this is also a new technology that was introduced on the Gripen, the Cheetah only had a photo capability, it did not have for example the digital capability, so another enhancement.

And then lastly just to talk a little bit about the
20 limited maritime role, the Gripen was not designed like the Buccaneer for dedicated long range maritime strike but it does have what we term a limited maritime capability. Just to put that in perspective it is cleared for and can carry anti-shipping missiles, the one that it's cleared for currently is the RBM-15,
25 it is a Swedish missile in a consortium, so it could be fitted at

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fairly short notice to the aircraft if required and then delivered.
The aircraft itself therefore does give us that capability.

Then also on the aircraft it has an active electronic warfare suite and this is carried internally as opposed
5 previously to our very early aircraft where it was external, the Cheetah also had an internal suite, and this gives the aircraft self-protection in a high threat domain, it can carry the flares and Chaff which I did explain earlier to defeat missiles and cannon fire, radar guided cannon fire from the ground but the
10 active capability digitally then is also able to protect the aircraft and give some protection to other air assets that fly with the Gripen, be it other aircraft of our own or any other aircraft that would be flying in the facility as well.

Then it can carry three long range fuel tanks under
15 the wings and under the belly, this gives the aircraft extended range and also would be able then to be sent into an area with long range with those tanks on. Once in field of operation if there are operations closer by then those tanks can be removed and of course more bombs or more missiles can be loaded on
20 the aircraft, so you have a large flexibility of configurations which you can put on this aircraft to suit the operational commander's intent in the area and yet you can fly there with the three tanks to get the range to go far to employ the aircraft. I will talk a little bit more about that a little bit later.

25 And then of course additional to that the aircraft

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can be refueled in the air as I showed you with the photographs the other day and of course this just gives enormous range then to these aircraft should they be required to carry out roles at that distance in national interest.

5 A very important feature of the Gripen is also the ability to do what we call hot refueling on the ground Chairman. This means that the aircraft can land off a typical air policing or air defence type of role having been in the air for approximately between one hour 40 minutes and two hours and
10 taxi in with the air crew in the cockpit, the ground crew can then refuel the aircraft on the ground through the air-to-air refueling probe while the engine is still running, all the systems are on, it is an extremely quick turnaround time and so that asset can get back in the air at very short notice.

15 Previously our aircraft would have to shut down and the pilots would have to climb out the aircraft, the refueling would have to take place and then the air crew would climb back in again, start up and leave, and so you can imagine what a force multiplier that would be in a high intensity situation or
20 where you have fewer aircraft but you can put them on station so much quicker, quite a large growth path that we've had in the aircraft compared to our previous fighter aircraft which we have had.

25 And then the last part is nowadays of course fighting at night is a very important capability to have and the

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Gripen is fully, what we call night-vision goggle compatible, the cockpit is designed to be able to operate with night-vision goggles, this gives the air crew the ability to see at night through these night vision goggles. This technology is well-

5 established in the Air Force in our helicopter line and has been used extensively, but this is the first time that we will have this capability on our fighter aircraft. It was not delivered as part of the project, the aircraft was delivered to be compatible but it will be the Air Force then that will deliver the actual goggles

10 and that is in process of being investigated, so very shortly we will also have this capability then on Gripen and be able to utilise that which will expand quite largely the night capability of this platform.

The system consisted then of 26 aircraft, 17 single

15 seater and nine dual seater aircraft, the reason for that mix was a balance between the fact that as I said earlier some training does still need to take place even though we have the lead-in fighter trainer on the Gripen so that the instructor can just train the new pilot on Gripen in all of these systems that

20 are in the aircraft and give him his initial flying conversion, but a much more important role of this dual aircraft is in the command and control domain because when you start to work with radars and mission controllers you've got your full suite of multirole aircraft requirement then for some missions we're find

25 now as like other air forces that the limitation actually then

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becomes the ability of a single crew member to carry all of this out and so we found that the dual is ideal by putting two pilots in the cockpit or a pilot and what we term a strike navigator who would be able to split the responsibilities and so use the platform even more efficiently, particularly where you can use the dual as a type of airborne command and control aircraft, so you would have this aircraft as your type of mission control and then other Hawk's and, ag sorry, other Gripen's but possibly even then Hawk's or helicopters or other aircraft in a very complex mission where the commander can actually be in the air in a very sophisticated aircraft monitoring what is going on electronically and I know this is very technical but I can assure you that in our domain this is a major step forward of this new equipment and I'll talk a little bit how we used it during when I get to the exercises and operations that we have been in so far.

Also as I explained it's not only the aircraft, this aircraft also came with a very modern and very sophisticated simulator which is placed at the squadron, there are two stations or two simulators, they're called Squadron Level Trainers and this is both for air and ground crews who can train on this equipment at a centralised training school. Because we got the Hawk and Gripen at the same time we could actually have one centralised training school to do all the ground training, it's computer-based, there is also virtual aircraft

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training where the technicians can virtually on the aircraft practice skills on a computer. This has been centralised, so instead of now duplicating, because we're on the same base we could have a large cost-saving by having this centralised training centre and it is fully computerised and this is, as I

5 said, situated on the base for both of the crews.

In terms of the simulators these were then split and the reason for that is that on the lead-in fighter trainer the simulator is mainly used to teach him to fly the aeroplane and do skills training. On the Gripen, however, we acquired what

10 was termed Squadron Level Trainers, two of them, the reason being that flying the aircraft is not as difficult and by now he is already a skilled and trained fighter pilot, so these were then aimed at teaching him the complex systems in the aeroplane.

The other advantage is that these two aircraft on the ground can be linked with aircraft in the air, so you only have to put up for example if you want to have or practice an air combat scenario with four aircraft you only have to put two in the air, the other two can be flown against digitally and electronically from the ground in these simulators, this is an

15 enormous saving on training.

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And so again this has been a step forward. The Cheetah also had a very good simulator, it had what was termed a Full Dome Simulator because in those days the jump in flying the aircraft was much larger because of the older

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airframe technology but it did have a very good simulator as well but not to the level where we could do what we can do with this, with the Gripen now with this type of new simulator.

5 We have also found out that we can, and again this is what I referred to earlier, you only really get to know the full magnitude of this equipment when you start to use it and in my words I say you give it to these youngsters, they know this stuff, how to use this new modern equipment. We've now actually go the pilots and the engineers on the base to find a
10 way to also link the Hawk simulator into this scenario, so now we can have Gripen's, Hawk's, Gripen simulators, Hawk simulators in quite a complex training scenario all linked and also have mission controllers involved, this has just put a new world into training and into capability.

15 And again because it is interoperable we've also been able to include a lot of modeling and simulation into these systems which means that you can model and simulate tactics and doctrine through these mechanisms without even flying, so by the time the air crew go out to fly, in the past, I don't want
20 to say when I was young or when I was there, but I mean we had to go and do all this in the air at great cost to learn tactics and to learn doctrine, there was no modeling and simulation and that, you learnt it by error or by trial and error in your training.

25 Now a lot of that can be done through these

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systems with the pilots actually flying first on computers and other mechanisms and by the time that the pilot climbs into the cockpit of this aircraft he is already very well-rehearsed and practiced, it's almost, the term I would use is he's going to the
5 opera, the opera now plays. Yes, he still has to apply his mind, he still has to be, take it to the final job in the air but that gap has been largely narrowed.

And to allude to that as well, often we hear the critics about flying hours per year and I will come to that later,
10 this is the reason why you can still have a safe combat pilot flying much less hours. I don't say no hours and I don't say too little, but a lot less hours are required now to actually be flown in the aircraft than on systems in the past. So, from a national economic point of view these are expensive, you heard
15 the Navy say navies are expensive, fighters are expensive, but I can assure the Commission that we do all we can to make sure that when that air crew member climbs in that cockpit to fly that hour he has made maximum use of all other training aids and methods. The average price or cost of a simulator
20 hour is around about 6% of an aircraft hour and yet you can achieve a lot.

This is not to say that you can achieve that level by not flying and only using simulators and some air forces have made the error of over-emphasising that, but a good balance,
25 which I believe we will find as we go along, will be found, but

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an enormous step forward in saving that we have on these modern systems.

Also to add to this then of course delivered is all of the ground support equipment for the aircraft, this includes test
5 equipment and here in terms of the Gripen a large part of the test equipment and logistic support required was placed on the base onsite, so this means that a large part of the servicing and maintenance can also be done onsite and again where in the past the technicians had to spend quite a lot of time
10 faultfinding if there was something wrong with the aircraft, the modern systems now can be plugged into modern computer systems and the analysis is done quickly and efficiently.

It's very much the same as your motorcar now, if you drive a, probably an early 2000 model Volkswagen as I do,
15 but if I had to get a modern Jetta CC and take it in for a service I know that it gets plugged into quite a sophisticated piece of equipment and the fault found very accurately and so the same principle applies here that it is a very much more modern system and able to reduce the time and get accurate to
20 the point at which repairs and other such matters need to be carried out.

And then logistics package which was also delivered, this included spares for the aircraft. In the sanctions days when we had to acquire aircraft we had to
25 acquire what was termed lifelong spares, that meant that

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because we were getting the aircraft under those conditions we bought enormous stocks of spares with the aircraft and I think the Navy also alluded to this, that was necessary because of sanctions but that would not, is not cost effective, so now you will have a, you will try to minimise the level of spares and stock depending on threat levels, availability, you will manage that, and that was a large part of the project was to make sure that we did not unnecessarily expend funds on logistics that we could expend elsewhere, that's why again I'll come back to why you need your teams to be very much involved and the Air Force to be involved through the project process.

And so it's all a matter of balance between what you put the funds into the aircraft, into test equipment, into logistics *et cetera* and there is a very, very efficient and complex process which gets done during the project and then the Air Force once it gets these initial spares it will learn the aircraft and also correct that in the second round. During the sanctions when we phased for example the Mirage F1's out there were still many Mirage F1 spares that were never used because that was the situation of the day, so I can assure that in this case when the aircraft were delivered the spares package was carefully monitored and as accurately as possible predicted for the initial delivery and from now on it's open market and the spares would then be ordered as required from that point on. Again I just wanted to show that this capability

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does not only lie in the aircraft, it lies in the air crew, the aircraft and all the associated equipment as well.

And lastly in the Gripen we also delivered one aircraft which we termed the flight test instrumented aircraft, this is one of the two seater aircraft number 3901, this aircraft was acquired for the specific purpose of being a test platform, this means that the aircraft can accommodate highly accurate and sophisticated flight test instrumentation, if you see the aircraft and open it up you will see a whole lot of orange boxes and orange wires inside, that tells you it's unique, it's only flown by test pilots and test engineers, we use this aircraft Chair to do continual test flying on our fleet with our own test pilots and our own test flight centre and this again was a technology improvement for us as well, and if we want to now for example make small changes or make a configuration change on this aircraft we can do it locally in South Africa with our own capabilities and then the SAAB in this case would be given all of the data, they will check it for us to make sure that we have not impacted on the highly complex part of the aircraft, the fly-by-wire or something like that, but they would then endorse this change and then it means that this could be done locally instead of the whole programme having to be done in Sweden with one of their aircraft at a very high cost, and we have already done such work not only then for ourselves but this also gives the ability to our local industry to make use of

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these aircraft to help them in some of their campaigns as well and this has happened already on Gripen, so I thought that that was also an added point in terms of the capability of the Gripen. Then Chair, I would like to go to the Hawk.

5 ADV MPHAGA: Before you go to the Hawk General, does the fact that other countries have also got the Gripen also assist us in terms of the maintenance issues?

BRIG GEN BAYNE: Yes, sorry, I'll allude to that a little bit later at the User Group but I can cover the question now.
10 Certainly, the other countries that have the Gripen currently is the Swedish Air Force who was obviously the initial air force home country to fly the aircraft and they acquired roughly 250 aircraft of the AB-type, this was not of the export baseline version, they have since converted a lot of these to the export
15 baseline for their own use.

We were then the first launch customer for the export version and we acquired the 26. Then the Czech Republic and Hungary more or less at the same time found that they had quite a lot of eastern aircraft of the SU Sukhoi and
20 MIG-type of aircraft and they also as you know have the L159 which is their lead-in fighter trainer which we also evaluated under the LIFT, but these aircraft were not NATO compatible and when they became part of the European Union then the air-policing role in NATO is shared between many countries and
25 they then found that these aircraft were not as multirole and

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also able to carry out this air-policing role to the satisfaction that would be required, and so they then for this purpose and also to give them an interim period before they would acquire their new fighters, they then went and engaged in a lease
5 option through the Swedish Government with SAAB and they have leased Gripen aircraft for their two countries with an option to then go over to a buy, and as I referred to earlier this is probably, is a good way to go when one is in a transit or in an interim period or you need a new requirement for a limited
10 period of time, a number of European countries have done this.

And then the next country to acquire the Gripen Chair was Thailand, they acquired 12 aircraft in two tranches of six and interestingly enough they also acquired an airborne command post and aircraft that can do command and control in
15 the air which is called the SAAB Erieye Aircraft and this was a package that they have acquired. Their first six aircraft have been delivered, their next six aircraft will be delivered shortly, and this airborne capability, our Gripen's can also operate with this airborne capability and it forms a total system.

20 This, in other words where I referred to the radar control currently that we do from the ground you can also put that capability in the air in what's termed and airborne platform for this task and Thailand acquired that as well. This of course could be a future growth for our Gripen's in the event that the
25 need was for us to go to that, this again just expands the area

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of operations and the capability of this system as well. And then the Gripen is currently being bid in Brazil, this, they are also busy replacing their fighter but during this period of the bid in Switzerland and also in India the Swedish Government and SAAB, or entered into a contract with SAAB to go for the next version of Gripen which is termed the Gripen-NG, New Generation Gripen, this is an upgrade of the current Gripen that we have.

And so I think one can allude to the fact that therefore it proves that the Gripen has a large growth capability. This aircraft will then still be a light fighter but will move closer towards the medium fighter range and it is now competing with the French Rafale as the final two down selections, the American aircraft as well as the Typhoon has fallen out of that competition and it's down to a two-way race at the moment in Brazil between the Rafale which is a medium fighter, and the Gripen, again showing in my view, my personal opinion the fact that medium fighters are becoming extremely expensive aircraft and assets to acquire and to maintain, even if a country like Brazil, which we know is very large, is considering also going for a light fighter.

And then the other bid that the Gripen has been successful, also the NG version is in Switzerland which is very interesting, in Switzerland the selection of the type of aircraft is completed first *in toto* and the Gripen has been selected in

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Switzerland. It was also in competition with the Rafale and the Eurofighter, so the Swiss have also decided to go for a light fighter aircraft and not a medium fighter, and I think I explained yesterday that Switzerland has a strong defence force although they are neutral.

However, in Switzerland what happens is once that decision has been made as their military choice, then it has to go through the political process and even to a referendum in Switzerland which decides whether to replace the capability or not and that is in process at the moment and that is the last step. So, we will, we could possibly have even more aircraft joining the Gripen user group which we belong to as South Africa as well.

So, to come back then to your question yes, the more Gripen's that are acquired is good for us because it means that your economy of scale on your spares, on your ability to then have pooling of armament when you acquire armament, there are a lot of advantages when there are more and more aircraft of that type that are acquired by various air forces and also of course through the user group which we belong to and have been very active in being the launch customer you learn a lot from the other users and of course having Thailand, a very humid part of the world, very different part of the world, we have South Africa, hot and high Africa, you have two European countries, one Baltic country and

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possibly a South American country, so in terms of learning about operating of this aircraft from a technical and engineering operational is very advantageous for any air force to have other users of the aircraft, if that answers the question
5 Chair.

ADV MPHAGA: And these capabilities that you've alluded to in paragraph 36 and 37 were they standard in the sense that did we have to pay any extra for these capabilities?

BRIG GEN BAYNE: No Chair, the SDP's as you know were
10 given a ceiling amount, that ceiling amount was a fixed amount from the time that the approvals were done by Cabinet and therefore on those, those funds were then ring-fenced by Treasury, so there could be no funding on the capital account outside. The challenge of the project team there and out of
15 this process where I again yesterday said we want the project team to be involved right through, one of the main roles then once the decision is taken, in this case we were going to acquire the Gripen, then the project team goes into a different approach, now we know the product, we know the aircraft fairly
20 well, we know the financial baseline, we know the delivery and the job of the project team is then to ensure that we get the very best we can for the amount that is spent on that aircraft to meet the requirement of the Air Force. That is an important role that the project team continually is monitored, it's audited
25 on and that is why you report back regularly to the various

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boards on a regular basis and is audited throughout the process to ensure that that occurs, so I can then confirm that whatever was delivered had to be delivered within the ring-fenced amount.

5 If you remember, and obviously this will come out much more from the financials and the Treasury side but there were certain aspects of the programme that were not, call it funded by the additional amount because the Government had come in to supplement the long-term master plan of the
10 Department, so there was some funding that was additionally added for programme management and other matters that came yes, from the end user as well, but in terms of the deliverables it was ring-fenced and again like in all projects you have to balance the resources.

15 And perhaps I should say it now, I had it a bit later but if you remember during the period of the negotiations under the International Offers Negotiating Team there was ongoing debate to contractually find this balance already, ROG [sic], number of aircraft *et cetera* and it went through a number of
20 iterations which in my personal view was an excellent process to go through.

I can assure you as the project team we were questioned on each and every by that team to make sure that this balance and resource balancing occurred already at that
25 point, and one of the affordability measures that was taken was

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the IONT came back via the project team to the Air Force to say look, we need to review some of the functionality or the logistics or the numbers and this was done in debate between the parties and then back through the IONT to the contractor in this case, and certainly functionalities were then limited and stated as such.

The Air Force accepted that and then said we must try to meet those requirements and I can again compliment the project team that towards the end of the programme the decision was taken to reduce the aircraft from 28 to 26, but to rather deliver the full capability on the aircraft, this meant that the aircraft that we have received then did deliver the requirements that the Air Force said were mandatory at that point in time and recently when we used the aircraft for an operation it was very interesting that the officer commanding of that squadron said to me: "You know, it's very good that we delivered that last bit of capability", I can't elaborate in total on it but it actually meant that they could carry out the mission a lot more effectively and efficiently.

So again I think I want to give the assurance that this is an ongoing challenge, you have a limited resource but you try to make it the best at the end of the day for the end user and of course for the country and this is a classic example where in my opinion that worked very well. Thank you.

ADV MPHAGA: Thanks General. We acquired about nine dual

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seat Gripen's. Now the critics have indicated that the dual seater Gripen were not considered to be fully combat compliant with the South African circumstances, can you comment on that?

5 BRIG GEN BAYNE: The only difference between a single and a dual seater is that you need more space to put the second cockpit and the ejection seat, so it carries less fuel than the single seater but not by a large amount, and the other difference is due to that the cannon is not on the dual seater
10 aircraft and I explained earlier that the only time the cannon is of importance is in close-in combat okay, which will not happen very often and secondly would be then in a type of close air support situation close to the ground where in all likelihood you would not risk using a dual seater, you would rather use
15 the single seater in that type of operation.

That is a balance that you have to make, you cannot have a light fighter and then want it all, then you must buy a medium fighter and we've already been to that debate, so my answer would be, and flying the aircraft and we've flown the
20 dual's and the solo's and found that in normal operations there is not a large difference in range and performance, I cannot give the exact numbers in percentage but I would tell you that it is not a major issue for us to operate the two aircraft, and because we have 17 singles and only nine dual we have
25 adequate aircraft to make sure that the mission requirement

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will be met with the mix of the aircraft, and I've already alluded to the advantages of having the more dual seater aircraft, so to say that it is only a training aircraft is not correct at all, it is a fully operational platform, but with some restrictions relative to the single seater Chair, if that answers your question Sir.

ADV MPHAGA: Thanks General. Now during the presentation you also took us through some capabilities of the Gripen's, amongst others was the range that the Gripen has a 1.200 km range, what is the advantage of that?

10 BRIG GEN BAYNE: Yes, I think there was a number of people who also had some criticism regarding the Gripen. Again being a light fighter and it was the same with the Mirage III and the Cheetah you will find that the under-wing centre line tank, fuel tank you can almost consider as being part of internal fuel, you will virtually always see a Gripen other than in an airshow or for a very short sort of type of operation where you want minimum drag on the aircraft, then you will carry the external tank.

20 The big advantage of the Gripen over the previous aircraft is because it has the fly-by-wire and is digitally controlled, this means that the aircraft is flown in what we call a super economic role at all times, controlled by this computer. So it is much less of a factor now of carrying this centre line tank in terms of the performance of the aircraft. Also on previous aircraft this tank limited the performance of the

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aircraft in terms of G-maneuvering and also in terms of certain maneuvers and this is also overcome by having a modern fly-by-wire system.

5 If you had to look at most of the medium fighters around this is common to all the aircraft. If you want to have long range with internal fuel only then you must acquire a medium fighter with the same implications, however, on the Gripen again you can also fit under-wing tanks as I alluded to if required to go further than just with the belly tank. So, 10 range is a difficult one because you've got what I term ferry range in which case the aircraft can deploy very far, an example was that to go for the, again I'm going a bit early here but during the recent operation in CAR the aircraft were able to go into that scenario with only one landing, and I can assure 15 you that would not have occurred with previous aircraft, so we have proven that the Gripen has legs and it can go, that's on ferry.

Obviously when you now have to carry a full weapon load then you will not be able to go as far but again you will 20 carry your centre-line tank and you will then plan the mission accordingly to how much fuel is required, so in the presentation you will remember I said that that range is in a combat area range, it is not the ferry range of the aircraft, the ferry range of the aircraft where it purely puts tanks on and gets into the 25 area is a lot greater than the other aircraft.

The new engine which is also digitally controlled has what it is termed an eco-cruise mode which previous engines did not have and most modern light fighters have them now. That means that the aircraft can what is termed super-cruise, similar to airlines which are in the same bracket where they can fly at high speed, around about Mach 0.8, which is approximately 16 kilometres per minute but they are flying in a highly efficient engine mode where you get minimum fuel usage, so these are again the advantages of modern equipment, modern engine technology which we have in the aircraft.

So, I can again assure the Commission and the nation that these aircraft have a longer range that we've tested than what we expected when we did the evaluations on the aircraft, they have certainly met the range expectations. Thank you Chair.

ADV MPHAGA: General this new Gripen, the new generation, can we be able to upgrade the current Gripen's to that?

BRIG GEN BAYNE: I think yes, you would be able to upgrade our Gripen's to the new generation. What we have not done though is ask SAAB to give us the cost. My personal view is it could be more expensive than just acquiring the NG as either additional to or to replace some of at any future point in the process, but I cannot, I cannot sit here and say to you ... Anything is possible, an engineer will tell you he can do

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anything, he will redesign anything but at a cost and at time, but having been through the project and understood this process my personal opinion is it would be a close tradeoff as to whether you would upgrade or rather then even maybe
5 acquire because then you would, you would get the aircraft as designed by the OEM as is and delivered.

The Swedish Air Force are going to continue to fly both types and they have committed, the Government has committed to the New Generation aircraft yes, so it is the best
10 answer I can give on that one but it is not a confirmed answer in terms of engaging with SAAB on this subject. What I can confirm, however, is that the upgrade to the current Gripen in terms of its mission capability is now done mainly through software, so what I'm trying to say is in the past when you
15 wanted to of course change your aircraft to upgrade it you virtually had to do a major change as was on the Cheetah, nowadays the update to the capability is done much more regularly because it's mainly a software upgrade similar to what your home computer would be updated, not as simple, but
20 already there is regular updates which SAAB put out which you have, can either accept or not at cost and you can upgrade and choose to upgrade to a higher level of computerisation and therefore capability and because we are part of this user group we have access to this with the other users as well, so I would
25 say that is also an advantage which previous systems, of

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course analogue systems could not do. Thank you Chair.

ADV MPHAGA: General, critics have also raised issues about whether this equipment including the Gripen's are women or gender friendly, what's your comment on that?

5 BRIG GEN BAYNE: The, both aircraft and modern aircraft that were delivered were not necessarily designed for all, what one would, what we term in aviation anthropometrical data or anthrometrical models, the most extensive work done on this was by the Royal Air Force and they talk about a 2% to 97% in
10 this domain, this is done by aviation medicine, doctors and specialists, but the bottom line is what they say is they will design an aircraft that anybody in the demographics of that country that they either use their own or a worldwide one and the RAF is the standard.

15 Our aircraft were delivered to that standard, 3% to 97%, meaning that within 3% to 97%, it goes about the ejection seat, not necessarily only the cockpit, a large part is the ejection seat because it is obviously a very critical component and also the cockpit layout. These measure in other words arm
20 length, leg length, mass, head size *et cetera* because of the fact that the cockpit is then designed to accommodate that size of person *et cetera*.

25 So, when we do our flying medical as pilots you get measured, in fact you get measured electronically nowadays as well, everything is going digital and so this would then decide

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whether or not you pass your medical to become first of all a pilot and then you have also when you fly, you have restrictions on the ejection seat. Fortunately for us in the combat line to fly the PC7 it's got an ejection seat, so this is done early.

So, but should any gender or race fit that profile then it is no problem, they can fly the aircraft. So, what we found then is we have so far managed to train, we have three female fighter pilots currently, one is fully qualified on Gripen and operational and has flown in exercises, and we had no problems, we have proven that from a gender perspective there is no restriction on women in South Africa to become fighter pilots and we're very proud of that.

Then we have a strike navigator on Hawk who is, who fly in the rear seat and they navigate and they operate many of the systems and they also train on the Hawk and is about to go and do her navigator instructors course at the moment, and then we have just selected a female pilot off the Astra course, she is currently preparing for the course and she will start her training on Hawk shortly, so we have then trained three.

I will show the representivity of the current strength but we have trained members of all of the groups in South Africa and we have not had any problem to train them either on the Hawk or on the Gripen. What we did find is that with the

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females being lighter also some of the candidates we could not accept onto the aircraft not for the ejection seat but for some of the other limitations of mass in the cockpit for ejection, we could not accept into the combat line or for selection and this now has then become a gap and this gap is being filled currently by a project which will lower the bottom end mass for entry onto these seats on the aircraft as well as increase the upper end, and the upper end of our problem was actually our middle-aged fighter pilots which started to not be able to contain their mass and did not attend their Weight Watchers and physical training as regularly as they should have but now have got themselves where you have some of our air crew who still have years left in the cockpit but can no longer fly the Gripen for example which has a lower mass top end than the Hawk but a lower bottom end than the Gripen.

These are being corrected now through a project and we are addressing this, so in the future we will make sure then that even a wider group of members, it's not a lot that can't but we want to make sure that we do not stand in the way of anyone going into this career and achieving that, but I can say today that we have trained Hawk and on Gripen members of both genders and all groups in the country, we do not foresee a problem of that in the future Chair.

ADV MPHAGA: So you are assuring our South African women not to be worried by that?

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BRIG GEN BAYNE: Not at all please, they can come, I can assure you that when the, when our lady flew in this exercise with some other countries there eyes went very wide when they saw that she does not stand back for any of her male counterparts when it comes to combat or to doing the job and she's a great ambassador for us as well. She's now gone for an instructors course, she will be an instructor in a year's time on the, back on the Astra, she will then go to Hawk as a pilot attack instructor and I see no reason why she couldn't become a future officer commanding of 2 Squadron.

Currently our officer commanding of 2 Squadron is Lieutenant Colonel Musa Mbhokota who is a one of our pilots who first joined the Air Force, he flew Impala's and Cheetah's, he then went through Hawk's and Gripen's, last year he completed the test pilots course in the USA and he came second on that international test pilots course and he is currently our OC of 2 Squadron of which we are enormously proud, so there are no barriers we believe from any side in the Air Force's fighter line, thank you Chair.

ADV MPHAGA: General you also mentioned that the service ceiling on the Gripen is 15 000, is it Mach?

BRIG GEN BAYNE: The service ceiling on the Gripen is 50 000 feet, sorry 50 000 feet.

ADV MPHAGA: What is the advantage of that?

BRIG GEN BAYNE: Most fighters operate in the band of what

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we call the, just in the stratosphere actually for those that are geographical of mind. That is the highest level at which airliners and most high performance aircraft fly and hence I explained the Mach number. Above 50 000 feet again if you want to operate up to the 60 000, 65 000 then you need to acquire a medium fighter, but the performance of aircraft above 50 000 feet, even super aircraft, unless they are specifically designed to fly in that domain starts to reduce quite considerably, so you would therefore again drive your cost up very high if you designed and tried to make an aircraft operate highly efficiently above that ceiling.

There are aircraft such as the reconnaissance aircraft, you might have heard of the SR71 or U2 which are specific stealth type aircraft for high, very high altitude surveillance, these aircraft however perform well at that altitude and on design but they don't want to be caught below about 40 000 feet because then they are not designed for that, so in terms of 50 000 feet the Cheetah's could operate up to about the same and the Hawk can operate up to 48 000 feet, so this is normal envelope in terms of altitude for typical light or trainer type of fighter aircraft Chair.

ADV MPHAGA: In terms of armaments which the Gripen's can carry you indicated that it can carry one 27mm Mauser BK27 cannon, am I correct?

BRIG GEN BAYNE: The single seater, that is correct Chair.

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ADV MPHAGA: Now do we buy these armaments separately or they come with the Gripen's?

BRIG GEN BAYNE: The cannon, all the cannons, the pylons, the drop-tanks all were part of the deliverable of the aircraft, it's what's called ancillary equipment, it comes with the aircraft. However, the rounds that fire in the cannon and the bombs that are dropped are not part of the project deliverable, those are bought on an ongoing basis by the Department or the Air Force under the operating budget, so the 27mm rounds currently are acquired from, we use the German Air Force stock because this cannon is very common, it's also on many, it's in the Eurofighter, it was in many other of the older generation aircraft, so it is a very well proven cannon and the ammunition is made in a number of parts of the world and obviously this will be done through the normal contracting and the most cost effective solution found to acquire the rounds on this aircraft.

ADV MPHAGA: And another capability is that the Gripen single seater can carry six short range infrared AA-missiles, they also came with the, as a package?

BRIG GEN BAYNE: No. These short range missiles were acquired under a separate project. Currently we are using a, what we term an interim missile solution for Gripen, it's the RST missile which was cleared already on the aircraft and then a project which has been running for a while now, Project Assegai is a collaborative project with Brazil and Denel

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Dynamics in South Africa supported by the DOD and the Brazilian industry as well as ours, and this will deliver a South African, Brazilian combined missile for the Gripen, it's called the A-Data and this will be our permanent missile on our new
5 Gripen aircraft.

This again starts to show, and I don't want to go into all the detail of direct industrial participation because many of my colleagues will talk about that, but this is one of again the advantages of buying a, or acquiring a modern
10 aircraft such as this because it also then creates opportunity for other technologies and call it indirect participation and industrial activity for such a platform and that missile is currently scheduled to be delivered onto Gripen in 2015, and that will then replace our interim solution which is the one that
15 we imported under a project namely the RST.

So, this also very importantly gives us a second option because as you know on a strategic asset such as these aircraft and the same on Navy ships, if at all possible you don't only want to have one source because if you have one source
20 and you in the modern world then need to carry out certain activities in national interest you could be limited, restricted or even in the worst case prevented from doing so, so wherever possible you try to make sure that you also then maximise your local capability in order to support you in this case and of
25 course it will be more, once acquired it will then be more cost

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effective for us because we will be able to maintain that capability in the country, and I think that this programme has so far been very successful Chair as far as I know.

5 We only bought a limited number, I won't say how many but we built a limited number again because it was an interim solution to see us until now, we could test the aircraft and we also of course needed it for some of the operations that we've been involved in. Thank you Chair.

ADV MPHAGA: And there's also provision for the Gripen to 10 carry about four medium range electromagnetic AA-missiles, can you speak on that?

BRIG GEN BAYNE: Yes, currently the aircraft is fully capable of carrying a medium range aircraft, a medium range missile termed beyond visual range missile. Currently the ... This was 15 not part of the programme, the supply of those missiles and similarly this is a requirement that is registered and is going through the process within the Department Chair.

ADV MPHAGA: And what is the difference between the short range and medium range missiles?

20 BRIG GEN BAYNE: Short range missiles are for what we call within visual range, in other words you see the aircraft and with modern short range missiles they've again like all capabilities and technologies they've actually also now have a, call it outside of visual range, but a true beyond visual range 25 missile is a very long range missile which is fired by the

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aircraft either once radar lock-on is gained at long range and then you also get a version of modern BVR missiles that actually launch off the aircraft and lock onto the aircraft after launch, so it's controlled by the aircraft that launches this
5 missile for a certain period of time after which the missile itself engages the target and then tracks the target itself, very highly complex. So these are the capabilities that are out there and are available on certain aircraft medium fighters as well as light fighters in the world currently. So, I don't know if
10 that, I hope that puts that into perspective.

Basically it goes about the capability of tracking, the radar and then the of course much extended range that this missile can be fired at and that is the term beyond visual range
15 *versus* within visual range missile or short range and long range Chair.

ADV MPHAGA: Thank you Chair, I see it's almost about 11h10, General Bayne has pleaded with me that we should maybe adjourn at around this time having reached the age of beyond
40.

20 CHAIRPERSON: Advocate Mphaga, I've missed your proposal?

ADV MPHAGA: My proposal is to adjourn for tea, I was requested by General Bayne to at least push him until this time as he has other needs that he needs to address.

CHAIRPERSON: Okay. I (indistinct) the age of over 40, I hope
25 you are not referring to me. You are not referring to me when

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you said over 40?

ADV MPHAGA: I am Chair.

CHAIRPERSON: Okay, then let's adjourn for 15 to 20 minutes, thank you.

5 (Commission adjourns)

(Commission resumes)

CHAIRPERSON: Thank you. General, you confirm that you are still under oath?

BRIG GEN BAYNE: I do.

10 CHAIRPERSON: Thank you. Advocate Mphaga.

ADV MPHAGA: Thanks Chairperson. General, the provision is also made that the Gripen can load an MK81/MK82 free-fall bombs and laser guided bombs, can you just expand on that?

BRIG GEN BAYNE: Yes, the Mk81 and Mk82 class bombs were
15 also bombs used on all our previous aircraft, they are locally produced bombs, they are non-guided bombs, what we term area bombs or "dumb-bombs", the advantage however we found with the new systems both on Hawk and Gripen is what we term the accuracy of these bombs, Circular Area Probability called
20 CEP is how you measure the accuracy of these bombs, which is also related to the system on the aircraft.

In the past the pilot would have to be trained to a very high level to deliver accurately because there was no system in the aircraft to assist him other than a very simple
25 sight and these modern systems we found that even these non-

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precision weapons can be delivered very accurately or let's say far more accurately than in the past due to the modern systems on the aircraft itself, which while the aircraft is running into deliver the weapon is digitally controlling and measuring all the
5 wind speeds, the wind at different levels and also the characteristics of the aircraft on release which was not possible on previous systems. However, they still do remain non-precision because you don't have a guidance system to put it down you know on a pinpoint, that's the only difference, but
10 the Gripen can carry and has been cleared with these suite of bombs.

ADV MPHAGA: During your presentation you also mentioned that the Gripen is also cleared for various air-to-surface missiles. Can you explain that?

15 BRIG GEN BAYNE: Similarly to the anti-shiping missile for the maritime role the aircraft can carry air-to-ground guided munitions as well, types of higher caliber but currently are not delivered and we don't have those in our inventory but the aircraft is cleared to carry them. Thank you.

20 ADV MPHAGA: Can the Gripen carry all these armaments, the cannon and the six short range missiles, the four medium range missiles and the bombs at the same time?

BRIG GEN BAYNE: It can carry it in favour configurations but not all the numbers at the time, so a typical, it will virtually
25 always carry short range missiles because it can in any time be

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engaged by enemy aircraft and it might need to do that task generally and that's why the, on most light fighters and medium fighters you will find that these are on the wingtip of the aircraft as on the model which we have up on the counter.

5 Then the long range missiles would be under the wings on those stations for a typical air defence role, obviously with the surveillance part and the necessary digital pods on the other stations.

In an air-to-surface role you would then carry in all
10 likelihood your short range missiles but put your bombs or your guided bombs under the wings and maybe if it's long range then you will carry two tanks with a combination of missiles, bombs and your electronic sensors, so yes, it can carry a vast range of weapons on the aircraft, but obviously you limit it by the
15 number of stations on the aircraft to do that and that's what's called the weapons effort planning that I spoke about, this is the science of those on the squadron that are trained, all our combat pilots are trained and then you also have our operational planners who will be able to work that out to meet
20 the objective of that mission, will mix and match the configuration as is required to achieve the objective. Thank you Chair.

ADV MPHAGA: Just pardon me, what is the difference between the bombs and the missiles?

25 BRIG GEN BAYNE: A non-guided bomb basically from being

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on the station, when it is released it is released with the aircraft pointing at the target, at a certain range or height and speed and the bomb freely falls from the station and then has no guidance, it falls from there to the ground and in the vicinity of the target. A laser guided bomb is then designated by the aircraft using a laser pod which the Gripen has and it will then lase the target, that lasing of the target sends back a signal to the bomb which has a tracking mechanism inside the bomb, so basically you release the bomb into what is termed a basket and as long as it falls in that basket while the aircraft is designating the target the bomb will track towards that target, so it will actually maneuver with fins on the bomb to achieve the exact position that it needs to strike.

A missile on the other hand would do the same but between the aircraft and another aircraft, so an air-to-air missile is designed to shoot down another aircraft, this is also in the terms of missile would be guided missile towards the aircraft in the terms of long range, in short range the radar will track the target and then the missile will fire and pick up the heat source of the engine of the opposing aircraft and it will track towards that source and engage the aircraft. So that is the, I would say the difference between bombs and missiles Chair.

ADV MPHAGA: And when do you decide to employ [sic] a bomb and a missile air-to-ground?

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BRIG GEN BAYNE: Yes Sir, the bombs are for the air-to-surface role of the aircraft, this is when you either can be autonomous, in other words the Air Force might be asked to go and do what is termed long range interdiction, this is where you would attack the rear end of the enemy supply lines, large concentrations of forces, strategic bridges, airfields *et cetera* to deny his aircraft the capability to take off. These are typical long range air-to-surface strikes that the air force would carry out autonomously and then also as I explained later in a campaign or in a smaller campaign in support of the Army or the Navy, would deliver that same armament but this would be then in support of other forces and that is generally for us termed close air support, in other words support to close-by your own troops who are actually then fighting the battle at the time as compared to deeper strike and hitting the enemy behind the enemy lines.

ADV MPHAGA: Thanks General, that concludes the role and capabilities of the Gripen. Can you just move ahead then and deal with the role and capabilities of the Hawk, take us through those paragraphs.

BRIG GEN BAYNE: Chair the Hawk then, our version of the Hawk is termed the Hawk Mk120, BAe Systems for each country that acquires the Hawk, and there's been 18 of them, have a different designation, so Australia was 127, we for some reason fell back to 120, there is no particular reason for that, the RAF

is 128 and so these numbers purely assist a large company like BAe Systems who have Hawk aircraft in many countries for your particular baseline control and configuration control, that's the reason where the Mk120 for example comes from.

5 The aircraft is a transonic aircraft as the deputy chief explained, it can operate in the range between 0.8, Mach 0.8 and in a dive up to 1.2 but generally operates in what we term the Mach 0.8 area at high level and low level in the sort of 350 to 550 knots, which is around 1 100 kilometres per hour
10 range. So it is a, it has considerable performance in this area. They are all dual seat aircraft, all the Hawk versions of 100's are two seater aircraft and they are required then to perform all of the required fighter training missions.

 It's utilised to ensure then safe and seamless
15 fighter training, bridging the gap between the Pilatus PC7 on which the graduate attains his wings and that then bridges the gap between that and the advanced light fighter aircraft, the Gripen. It can also be utilised for certain collateral South African National Defence Force air support tasks and also in
20 support collaterally of other various Government departments.

 They're limited to the inherent capability of the aircraft, this in other words means that the aircraft, when it was acquired the decision was taken this aircraft will be accepted as a training aircraft but the type of aircraft acquired
25 would have a degree of collateral capability, there was not

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additional cost or of given to the programme to make any changes, similarly to what we had with the Impala it was received but then found out that it could be used in collateral roles and obviously the higher the performance of this type of aircraft in it class the more you would be able to utilise it for more collateral tasks and of course more importantly in a higher threat situation, the reason being that in general the best way to defeat most anti-aircraft fire and ground fired missiles is speed.

10 If you speak to a fighter pilot worldwide he will tell you speed is health, meaning the faster you can fly, the better your chance to come home as a ground rule, then will come tactics and will come your electronic warfare measures. You cannot guarantee by electronic warfare measures alone that you will survive, it's a combination of tactics, or surprise, of your onboard systems, the capability then of the aircraft and then the situational awareness in which you find yourself, so just to put that into some perspective.

20 The system consists of 24 aircraft which are all delivered to the Air Force currently, they're all, also the same, I did already allude to the centralised training centre where the combined training is done and then the, what's termed an operational flight trainer is the simulator on the Hawk, this means that it can be, it exactly replicates the cockpit and it also can be flown very similar to the characteristics of the

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aircraft and a lot of effort is put in to make sure that it can do that, so that you can train as much as you can on the ground in the simulator before the trainee climbs into the actual aeroplane and this was achieved and the operational flight
5 trainer is being utilised extensively at the bases.

In fact my ground crew and engineers will know I am less interested in how many aircraft are serviceable every day but what I am very interested in is if the operational flight trainer and the simulators are serviceable and up and running
10 because that is where, although there's, because there's only one and two of them these are absolute key elements of the training system of those, of the two types of aircraft, so it is very important that they are number one, upgraded and kept in peak condition for that reason as well, not that the aircraft are
15 any less important but these are really very important parts of the training system.

And then similar to the Gripen the Hawk was also acquired, one aircraft was acquired as a flight test instrumented aircraft, it also operates at the test flight centre
20 at Air Force Base Overberg and similarly to the Gripen can do testing on the Hawk aircraft in South Africa. I can already allude to the fact that a number of local industries and overseas industries and other clients for our local industry have already made use of this aircraft at the DFDC [sic] which
25 is not only to the benefit of the Air Force in exposure and to

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industry but of course that the funds that are generated through this go to the B7 account and this also then becomes an important element of our national interests of this capability.

5 ADV MPHAGA: General, before you lose us what is a B7 account?

BRIG GEN BAYNE: Sorry, if you're in a government department you will know that's the central Treasury account and if there's, if there is revenue earned it first goes into that
10 account for then other redistribution. So, there are advantages to having had these two aircraft and acquired them not only for our own purposes but also for local industry and to expose the world to our capabilities in the test flying domain as well of which we have a very good capability. Thank you Chair.

15 Some of the mission and role equipment, similarly to, in some stages to the Gripen, so there is commonality in the non-precision bombs, the Hawk also carries those same category of bombs, it has a, what is termed a passive electronic warfare suite Chair which means it carries Chaff and
20 flare to look after itself and each aircraft can have that self-protection, it does not have the active system obviously because it's not in the class of the full fighter which can actively take part and protect other aircraft, the Hawk will look after itself with its each individual aircraft with the electronic
25 suite that it has but it is a modern suite and it is, has been

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tested in the aircraft.

It does have a laser range finder, this is to make the bombs which it throws, because it has non-precision it doesn't yet have a laser guided bomb capability, the laser then also as I explained gives a laser shot but doesn't then track the bomb, but it updates the computer in the aircraft Chair before the bomb is released and that's what I mean with previous aircraft that did not have that capability, we now can deliver non-precision weapons more accurately even with the Hawk.

It also has a forward looking infrared radar, this allows the pilot to see at night, the Gripen also has this capability in the (indistinct) part that I alluded to, but this is limited to about 20 degrees of his line of sight that he can see in front of the aircraft, so this combined with night-vision goggles where he can turn his head with the goggles, this combination gives both aircraft a full night capability, both for training then and operationally and clearly you can fight 24 hours a day, it's obviously more effective than you can only fight in daylight hours, so yes, I think that is quite a large enhancement that we have with both our systems.

It also has an inflight refueling probe but unlike the Gripen which has an imbedded inflight refueling probe which can be, is inside the aircraft and is extracted, this one you can fit it or elect not to fit it, but once you fit it, it sits on the side

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of the cockpit of the aircraft and is part of the aircraft when it flies. If you don't need it then you take it off because obviously the aircraft will have slightly more drag and be less efficient with the probe on because obviously at very high speed you can imagine, it's like you sticking your arm out of your car at a 140 knots or a 150 knots, there's quite a lot of resistance, so that's the reason why it can be put on or put off, but your modern fighter you never know when you need that role, so therefore in most aircraft now it is imbedded inside the aircraft, so the inflight refueling on the Gripen is always available, not so on the Hawk.

The Hawk carries a 30mm cannon under the belly of the aircraft, this cannon is used for close air support particularly and also then for the air-to-air role, similarly to the Gripen. Interestingly that the ammunition for this aircraft is the, was originally supplied to us by Royal Ordnance in the United Kingdom, in the past a Denel company by the name of Pretoria Precision Munitions Plant supplied us with all our rounds in the sanctions days and one of again a very successful part of the defence industrial participation is that under license through the programme PPMP no make this 30mm ammunition for our own Hawk's under license from Royal Ordnance and not only that I can assure you it is at a large, largely reduced cost that many other Hawk users now order their ammunition from South Africa from PPMP, so this is world

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class capability that our local industry gained through the acquisition then of this cannon on the Hawk.

It's also fitted with two NOD3, it doesn't have a tank under the belly, it carries two tanks under the wing, but with the aircraft having a less, how can I say the fuel consumption being less on the engine it is exactly half that of the Gripen, therefore you don't need as many tanks because by virtue of the lower performance and the lower engine thrust it is more economical as is the case in all other aircraft of those two classes, but just to mention that it does have drop-tanks for long range ferry and for missions that require the aircraft to fly for longer.

And then again part of the programme was also to supply the Hawk with a helmet mounted sight which is similar to the Gripen's helmet mounted display, the only difference that on the Hawk it's only a sight, so Chair on the Gripen the pilot will get the instrumentation reflected in his helmet, on the Hawk he will only get aiming cues for air-to-ground and air-to-air weapons, so again being a training aircraft to lead the pilot and train him to go to the helmet mounted display, call it the all song and dance on the Gripen, this capability is being delivered still onto the Hawk at the tail end of the project and also will mean that together with the air-to-air missile which will be delivered to both the Gripen and the Hawk and integrated under a separate project this, the Hawk will also

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then get an air-to-air missile and a helmet mounted site.

And I go back again to the Staff Requirement, one of the requirements in the Staff Requirement was that the aircraft should have a-what we call a radar sensing radar at least. The Gripen has a full airborne radar as I explained, very highly sophisticated but one of the shortcomings we found on the Impala and previous trainers was we did not have a ranging mechanism which meant we had to spend quite a lot of time training the air crew on the trainer in terms of range estimation and doing quite the complex task of air-to-air firing, it is one of the higher skill levels required in fighter flying and so this was a requirement and when we came to the evaluations it was determined that neither the 339, the Aermacchi nor the Hawk had provision for this capability, the L159 was not bidden with but could be fitted with such a radar sensing radar and when we flew it we realised that there were some advantages to this as well.

And so we did look at then when the Hawk was chosen to see how can we solve this problem and overcome this problem and the decision taken by the Air Force at the time then was to make these two requirements mandatory for the Hawk so that we could cover that gap in terms of this capability, and although not on our Hawk yet today both are currently funded and both will be delivered at the tail-end, remember I said to you the other day although we've taken

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ownership and handover Chair and are satisfied with all the requirements there are one or two elements of the programme which is typical on such a project which will come at the tail end, and obviously with the missile we're waiting for the new
5 missile, we're not going to now go and spend money on an interim training missile, we will wait and make other plans in the meantime so that we wait for the missile to be delivered on the Gripen and the Hawk, the same missile again to cut costs and be as cost effective as possible.

10 So, once we receive our air-to-air missile and our helmet sight on the Hawk aircraft then we will have overcome that problem and the project would have, I believe again done very well to deliver that capability within the cost constraints and also of course this will again advance the collateral
15 capability of the Hawk because now it will be able to better look after itself which means that it could be employed with that growth in a more higher threat environment than it would have been had it not had those capabilities, so I just wanted to add that at the end of the weapons suite of the Hawk Mk120
20 aircraft Chair. Then in general both Hawk and Gripen are capable of assisting other services and ... Oh sorry, sorry.

ADV MPHAGA: Just before dealing with the general aspects I see that the range of the Hawk is more than that of the Gripen at about 2 594 kilometres, can you explain that?

25 BRIG GEN BAYNE: Chair yes, remember I said in terms of

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range you must match that to the configuration of the aircraft. In the Gripen we gave the operational role with the aircraft in a typical combat situation where carrying a single tank and a mix of weapons, so that is the only reason why that is low. The Hawk figures we quoted here is for a typical ferry of the aircraft with all its tanks and not weapons onboard, and there are, there's a myriad of comparisons that one can do in this domain, so if you talk ferry range the Gripen can fly a bit further if it's got it's three tanks and ferry range it will fly a little bit further than the Hawk here, again considering the fact as I said earlier that the fuel consumption is about half on the Hawk than on the Gripen in a typical scenario. Thank you Chair.

ADV MPHAGA: And you further mentioned during the presentation that the Hawk can carry 12.5 kilogram practice bomb and a 4.5 practice bomb, what kind of bombs are those?

BRIG GEN BAYNE: Yes sorry, because it is a training aircraft Chair when you train the student in the beginning and he's learning you obviously don't want to be throwing expensive live ammunition, nor ... We do have training bombs as well that we use, we only, we'll only use live bombs on both aircraft either in operations and then at certain times if there has not been an operation in order for our armorers to also handle and practice and be aware they are handling a live we will at time to time have demonstrations or then do something practice, also that

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your pilots learn that is now flying with a live bomb, but in general you want to cut your cost when you're first training, so what we have is we have much smaller bombs that we clear on the Hawk, we clear them on a carrier which is a light series 5 bomb carrier, it can carry four of these bombs per carrier, so you can carry 16 bombs on the aircraft in one training sortie and you can go around and around and throw 16 bombs, whereas had we to load large bombs we could only carry four, so you'd fly a whole sortie to throw four bombs, now you can 10 throw 16 bombs and these bombs have no explosives and they cost probably about, I would say a 100% for a bomb you'd probably pay about 15% of that for the smaller practice bomb, so it's a very economical way in which to train the people on the aircraft.

15 The reason why the Gripen doesn't carry it is by the time it gets to Gripen he's fully trained in this aspect, so again by having the training aircraft before the time you also have the saving then on your full fighter capability where you don't need to buy that capability onto that because he's trained 20 already, there he can go straight over to the large bombs and the live bombs. Thank you Chair.

ADV MPHAGA: So there are no practice or any missiles and bombs on the Gripen?

BRIG GEN BAYNE: No. What we do-do is if we initially throw 25 the bombs then we will just not arm them, so we won't the

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warhead on, you put a type of trainer war on, but the bomb itself is the same bomb as what would be used operationally, yes. Thank you Chair.

5 ADV MPHAGA: And you mentioned something about the fragmentation bomb which is carried by the Hawk, can you expand there?

BRIG GEN BAYNE: Yes, this is more in the domain of bomb technology, you get various kinds of bombs, you get bombs that are designed for different targets back to the weapons effort
10 planning, so some bombs are designed iron bombs, they will make a hole through concrete and only then you know explode and do their job, others you want to actually have a type of what we call an airburst where you want the bomb to burst in the air for certain effect and others you would want to, like on
15 a bridge you want it to do it on contact, and this is not controlled by the bomb, it's controlled by the fuse on the bomb just like you would have a fuse in mining and all others and the fuse then can be set to various different settings, it's quite a complex art and that's why you have, specifically you have
20 some of your members on the squadrons trained to a higher level in this and of course planners as well and they will sit with the operational planners for a mission and decide on which bombs, what fuse setting, what timings and also when you deliver operational bombs you don't deliver one bomb at a time,
25 you deliver what's termed a stick and of course the system will

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calculate and you set the interval you want the aircraft to drop the various bombs at in the run because it doesn't help you deliver five bombs on the same point, that's wastage, so you will get the right effect again by varying the number of bombs

5 and the fuses mix on the aircraft, so fragmentation is one of the versions of bomb and fuse combination that will create a certain effect is where that term comes from Chair. Thank you.

ADV MPHAGA: And you also mentioned something about, is it the VICON 18601E? What is it?

10 BRIG GEN BAYNE: This was the reconnaissance part Chair that was fitted to the Cheetah, it was a photo pod, not a digital pod as is on the Gripen now, and what we did on the programme when this pod was taken on the aircraft a decision had to be taken on Hawk whether or not, one of the

15 requirements of the Air Force and also we used to have photo pods on the Impala, so it was a bit of a carry-over to the Hawk was to have a photo capability (a); to train the member and also in a collateral role such an aircraft, especially the with the Hawk with a bit more performance could be a very effective

20 reconnaissance platform as well.

So, in order to cut costs we determined that to take the same pod that was on the Cheetah, this Vicon and integrate it onto the Hawk as a photo reconnaissance capability in the interim until the Gripen came with its digital camera pod meant

25 that we would not sit with a gap in the event of the Cheetah

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having to be phased out early and that's exactly what happened in reality, the Cheetah was phased out a bit earlier than was expected and for that reason we were able to retain at least then a photo reconnaissance capability on the Hawk at very low cost because all we had to then expend some funds on was to integrate it onto the Hawk, it fitted on the centre-line station exactly like on the Cheetah and we fitted it where the gun pod was, so we didn't need any extra design, much design work or anything, we just needed a test clearance, so I believe it was a very effective, cost effective way of retaining that capability.

Unfortunately in a way photo reconnaissance now is almost at its end worldwide and the limitation has become the film, I think you all aware of the hazards of materials that are required to process photographs and they are not very environmentally friendly and so we found then that the film has actually become the limit but we did as part of the, we knew this was coming, so when the Hawk's were delivered we did a bit of a long term buy of, for the Hawk's, so currently we can still operate Hawk's for about another year or so on the photo recce, but we know already know that that capability is already proven on the Gripen, so we did not end up with a gap and I think that that was prudent planning that we did on the project with the Air Force to just cover that gap then until the digital era had arrived.

The other advantage is that same pod on the Hawk

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can quite easily be changed from photo to digital without acquiring a new pod and that would again be a typical product improvement on the Hawk to go also to digital should that be a requirement for the Department from time to time, so I think
5 this also strengthens what the Navy also, my Navy colleagues and what General Malinga alluded to, we never stop in the Military to look to improve our products and make sure because they have to operate and fly over these long periods, 30 to 40 years, so you will find from time to time and then we put in this
10 requirement and then it's up to the senior decision makers to decide is this necessary and is it cost effective and are we going to do it now, or is it going to be done later depending on other requirements, but the task of the squadron all the time is they will continually through the life of an aircraft come back
15 and say there's a possible gap coming here because they operate, so these requirements can come from any level and then they get drawn up into all of the whole departmental planning process to continually look at cost effective ways.

Now again his is important to look at when you talk
20 about growth capability on a platform and so one of the factors that you would look at in acquiring aircraft again is does it have growth, and I think what we've seen here, we've already seen how Gripen has gone to the NG in Sweden, there's a future, they are not stopping now, they've already gone to
25 another which is also good for the users of the old system

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because it means the company is going ahead and there's development. Similarly on Hawk it is still being you know out there and has this growth capability that we are able to apply on the platform, so I think that's also a positive that one, thank
5 you Chair.

ADV MPHAGA: So, in other words the capabilities of the Hawk are more than just for training?

BRIG GEN BAYNE: Yes, the capabilities are more than just for training in that it has collateral roles that I've alluded to
10 yes, definitely.

ADV MPHAGA: The type of engines that you acquired for the Gripen and the Hawk, are there any advantages that we gained from them?

BRIG GEN BAYNE: Yes, I think I've mentioned before, let's
15 start with the Gripen, the Gripen engine that was in the bid was the RM12, this is a Swedish Volvo derivative of a General Electric 404 engine, it's the single engine from the American F18 programme, a very, very reliable engine and I must say I'm not sure about the motorcars, I've never driven one but I do
20 believe that Volvo engines run well and we've seen that this is so as well, this is a very proven engine worldwide and it also has this eco-cruise capability so you find that in many cases of the design of the aircraft it accelerates very quickly in the supersonic domain due to this very efficient engine combined
25 with the aerodynamics of the aircraft and also it has a, the

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mode that I spoke about, the training mode and war mode, so that you are not unnecessary overstressing the engine if you don't need all of the features, this is also new that we have not had on our aircraft before and lastly probably one of the big advantages of modern engines is how quickly you can change an engine because they are modular, so on these engines in the past our engines you had to send the whole engine back to the manufacturer if it needed deeper level or got very bad damage, or you had to take the whole engine out of the aircraft and repair it, now you only have to take one of the modules out of the engine.

The other major advantage is that the modules are interchangeable, so if I take a module out of aircraft A's engine I can immediately put another module in and carry flying while I fix this module. In the past that aircraft stood because the whole engine had to come out and you either then had to have a whole engine to put into the aircraft or not, so in the case of the Hawk we actually did not buy any additional engines, in the past we would always have bought additional engines with the older technology engine for that reason, so that is a large cost saving and logistically you know advantaged type of engine. I think that's a summary of the engine in the Gripen.

What happened on the Hawk was interesting in that the aircraft was bidden with at the time the Rolls-Royce Adour 871 engine and during the bid when we flew the L159 in Czech

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Republic it had a modern F124 engine fitted to it, it's a Honeywell, an American engine, and this engine had digital control, it had very similar features to the RM12 engine as well, an excellent engine, and we also then found out that the
5 Australians had also when they got their Hawk's looked at possibly fitting this engine to a Hawk and so once the evaluations were over and the Hawk was chosen during the negotiations of the IONT we did a, "we", the project team with BAe, we had a tradeoff study done between the 871 and this
10 F124 and the outcome was that Rolls-Royce then decided to also bid their 951 engine which was just coming out of its developmental phase which had digital control very similar to the F124 engine and so this tradeoff was done, I can say that it came out very close in terms of performance and the advantage
15 was that the 951 engine because it was an upgrade of the fitted engine did not require any airframe change.

The F124 would have required some changes to the airframe and that is why it ended up being, the only reason why it ended up being more costly, so clearly the lower cost option
20 was then followed and that tradeoff was then accepted by Rolls-Royce. This meant that we got an engine with an additional, the 871 engine produced 5 700 pounds of thrust, the 951, 6 500, and although that might not seem a lot but in that bracket on the upper end of performance it's large for an
25 engine.

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The other advantages it had what's called full authority digital engine control, in other words free handling as the engine in the 124 and it's specific fuel consumption was actually better than the 871 despite the fact that the thrust was higher, so the bottom line is that for no additional cost to the programme we got a far better engine in our Hawk today than that which was bidden initially on the bid and again I think that that is the advantage of taking that year and negotiating in detail with the manufacturer and that was of course done by the IONT in conjunction with the technical teams which we were involved in and we were then able to, which is the job of a project team to deliver a better engine at the same price on the aircraft and I allude to this later.

One of the weaknesses that the Air Force had all along, and you can go back to any, I'm sure any fighter pilot at all our reunions, everyone will tell you the same, South Africa is harsh, our airfields and our military bases are all at fairly high altitudes, many of other air forces operate their high performance aircraft a sea level, our operate at Waterkloof here at 6 000 feet compared to say Durban or the coast.

Now an engine like you're motorcar you can imagine in a fighter aircraft at that high power setting performs a lot higher at the coast than it does at 6 000 feet, so we've always had what we termed problems with hot and high and when it is very hot in South Africa and you operate at a high altitude

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obviously the performance of the engine is largely reduced relative to the coast. This extra thrust that we got overcame that problem and the same on the Gripen again because the match of the thrust to the weight of the aircraft and the design
5 has meant that we can now operate off much shorter strips, much shorter runways and also more efficiently at hot and high, which is probably going to constitute 90% of our operations in this country other than if we'd go to the coast and it's very cold but generally we're in hot and high conditions, so the engines
10 also helped with that.

The other advantage is now of course again in terms of training the air crew have been operating on an engine similar to the one in terms of technology and usage as the Gripen, so again it cut the training gap even further between
15 the two aircraft, so I think that that was one of the big plusses of the programme was the improvement in the engine on the Hawk, as I said at no extra cost. Thank you Chair.

ADV MPHAGA: And the avionics you have alluded to that, are there any differences between the avionics in the Hawk and in
20 the Gripen?

BRIG GEN BAYNE: Yes Chair, the avionics of the Gripen was a given, so when we, when the bid was done on the export baseline those avionics were accepted as such, we did have ...
When one acquires a fighter aircraft and you, part of the initial
25 project is what is termed, excuse me Manned Machine Interface

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Committee, this is chaired by your test pilot and your operational pilots together and they sit with the contractor's test pilots as well as any other experts, engineers and they look at all of the what we term manned machine interface, you can't impact on the actual displays or change the design but you can choose for example if I may be very simple on a particular screen or page like on your computer you can make changes to colour, types of symbols, so if you want an arrow or show the heading that you are going to go in a direction you might want to use a different symbol, you have a certain amount of flexibility with the contractor and this is normally put to cost, man hour cost and then you make sure that you best meet your training requirements between your various platforms.

And if you look at American aircraft you will see they like doing something from history or for good reason that suits them, the Eastern aircraft when we flew sometimes there then they are in kilometres, they're not in knots and they put their height in feet and not in, or sorry in metres and not in feet, so this would be a major change for you, so in all aircraft that I think this happens, and so this was done.

On the Gripen this is what occurred, we had a limited capability to say well, although the export baseline that you've designed but we would prefer to have, and that was agreed upfront, and that's what you got, so again it comes back

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to this involvement throughout the project is very important, so that's the avionics on the Gripen they were given, they are a Swedish company that supplied the avionics suite to the aircraft.

5 What happened on the Hawk again was BAe in bidding the Hawk as part of the defence industrial participation elected to look for a South African local company who could supply the avionics. The general rationale with the lead-in fighter trainer was to see if work could be generated as well for
10 South African industry at, because it was the trainer at that level of air, of capability and so again another tradeoff was done with three companies and the company that turned out top was ATE in Midrand, Advanced Technology Engineering, this was a company that had already in South Africa done work on
15 the Mirage F1 for Spain, they actually got a contract to upgrade the, some Spanish aircraft and make some changes, they were also heavily involved with the Department and on technology programmes previously, so this was an excellent opportunity to bring to fruition technology money that the DOD and the
20 country had invested in-in local industry to actually bring it to a product to our own advantage, and this was agreed to, and this was the first time ever that BAe Systems which is a, as you know a major aerospace company, it's the first time ever on any of their 18 variants that they were prepared to fully
25 subcontract the design and development of an avionic system

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on Hawk to a subcontractor, so this was a first for South Africa and for this company, so this was big, this was a development from scratch of all the software and all the equipment for our Hawk and this programme was launched and ran successfully.

5 And the biggest advantage here is we could now have full say on the avionics manned machine interface, so what we did is we made it exactly the same as the Gripen, so in the Hawk cockpit today you have a Gripenised Hawk cockpit. So when the pilot starts his training throughout his training on
10 Hawk and he wants to select the radar and he presses a button on the stick it might not have the same what we term tactile feel but it's the same button in the same place and the screen will change the same as it does on the Gripen.

 When he wants to select a weapon, fire a weapon
15 it's the same button or control in the cockpit in the same place as it is on the Gripen and I don't think I need to allude to what an enormous difference this is going to make because when he gets to the Gripen one of the biggest challenges in many other air forces that did not have this opportunity of the two together
20 is they have to now retrain that pilot on different controls and different symbology and a different avionic system, we could then tailor this to minimise the gap in this regard, not on every instrument because the Hawk still has also some analogue dials and others that the Gripen doesn't have but in terms of the
25 avionic system this really became a major achievement I

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believe, and also has had impact and of course gave our local industry 1/3 of the aeroplane almost because generally these type of aircraft is made up of 1/3 airframe, 1/3 engine and more or less 1/3 avionics in terms of cost, in terms of effect, so that also means that we also have a local company now that can support our Hawk avionic system to a large extent, so I think that that was a very positive part of the programme as well Chair.

ADV MPHAGA: Thanks General for that. Could you then go to General paragraph 41.

BRIG GEN BAYNE: Yes, I just allude here that both the Hawk and Gripen Chair are capable of assisting other services and Government departments, not to the same degree of course than our helicopter and transport counterparts because of the nature of the game but that doesn't mean that because you have fighter aircraft that they cannot serve the Police, the Army, or the Navy or Special Forces and of course Defence Intelligence in terms of that part of the capability, as well as take part in multinational exercise and operations and I will, during the utilisation I will allude to these a little bit a more, but when it is required and whenever we can we are positioned to support these other services and typically this will be for command and control purposes, surveillance as I've mentioned before, so while our aircraft are training and flying they are doing tasks of normal reconnaissance, either be it for

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intelligence gathering, for information, for maps, upgrading power line positions, upgrading how populations can move *et cetera* because the aircraft can of course do certain survey work as well at high altitude and high speed and so therefore
5 we contribute to many areas which are relatively hidden in the domain but they are out there and so while these aircraft are doing force preparation *et cetera* they are also carrying out support to other Government departments in these domains.

Border patrol of course which as was alluded to was
10 given back to the South African National Defence Force a few years ago and the Gripen has played a role particularly at night as well as the Hawk in this role, both from a visual, photo and digital reconnaissance capability and if any of you were at the, or go the Aerospace Show that is held every two years, last
15 year we had some footage from the Gripen flying at very high altitude and you will see there that this is no less than what very, very sophisticated air forces in the world can do in terms of capability and in terms of what we call resolution and the equipment, this is really a world class capability that we have
20 on the aircraft.

It is, however, again not for area surveillance, this is for shall I say specific task surveillance, this is not do what satellites do and what other platforms do, it can't be replaced but it can do it at high speed and it can do it quickly and it can
25 cover a large area quickly which from time to time is necessary

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because very often the slower aircraft or the satellite, if someone wants to do something they will know when the satellites are overhead, they are not going to it when the satellite's there, the satellite, and they know those times, they don't know when we are coming, we will come fast and high and quick, they don't know that the aircraft are there, so I think that is also a, call it niche capability that we can carry out.

Search and rescue, very often in search and rescue one of the problems is it happens as Murphy has it, it doesn't always happen in the nicest of places, it can happen in areas where the communications are very poor, ground communication is not good, line of sight is not available, we can put an aircraft such as the Gripen or the Hawk very high, sit at 48 000, 50 000 feet and you can imagine the range at which you can communicate, so we become like an airborne post office then for a search and rescue or a, we can sit on the coast but talk to a ship very deep in to the sea from that height due to the capabilities of the aircraft, very useful collateral capability for in particular one would use the Hawk because it's more economical but if you need it, the extra digital part, then you use the Gripen. And then that is basically what this communication support or what we term in operations would be the Telstar [sic].

Before I go over to utilisation I did mention earlier about the two aircraft that can fly together and again because

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the avionics was tailored towards the Gripen we could also look at for example common radios, so some of the radios in Hawk and Gripen are compatible and can talk to each other and for that reason it gained the capability, this was something you find out like I said later, you don't see this necessarily upfront when you evaluate, you only pick it up later in that particular platform, not to say the other, some other aircraft couldn't have done it but we know that this can be done by these platform which is an enhancing feature on the two aircraft, thank you Chair.

ADV MPHAGA: General, the fact that there was a reduction of the Gripen's from 28 to 26 did it in anyway affect the mandates and/or the capabilities?

BRIG GEN BAYNE: Obviously having two less aircraft means you know you don't have as many aircraft in an all-out capability, however, when one looks at the reduction of the aircraft and what it then delivered in all of the aircraft in terms of those capabilities. I'm sure if you speak to any and certainly any squadron commander or pilot he will tell you rather give me a few less aircraft but with a full capability and this was quite interesting in that the Swedish Air Force also did not have all of these capabilities in their earlier version of aircraft and when they went over to the upgrade Chair to the EBS model they elected, I can't be in detail but they elected also not to take a certain mode.

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We ended up having that mode delivered due to this reduction interesting enough and when they had to operate in certain areas they found this to be a problem whereas in our operations recently we found with this capability we were then able to complete that task and it was very interesting after that how quickly the communication happened and now again I'm coming back to the importance of user groups and having other users of the aircraft in this domain out of sanctions where one can talk easily and gain, it just adds to the ability to grow your aircraft and your capability without of course compromising in any way, but I'm just saying it is very important that you have capability on these platforms as full as you can, if that answers your question Chair.

ADV MPHAGA: Thanks General. It may be relevant to utilisation but the there were critics, critics were saying that at the time when we acquired the Gripen's there were only nine fighter pilots on the Cheetah and they are of the view that there were capacity constraints to fly these Gripen's, that's why at some stage there were talks of deferring the acquisition of the Gripen. Can you speak about that?

BRIG GEN BAYNE: I am not aware ever that the, I'm not aware of any rationale or decision to delay the acquisition of the Gripen's due to the fact that regarding pilots, what I am aware of is during the year of the negotiating when the IONT and the Department had the task to fit all of these programmes

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into a fixed ceiling a lot of considerations were given to aircraft numbers, go ahead, don't go ahead, and as you know during that period on the fighter programmes the tranche approach was introduced, tranches 1, 2 and 3, which would deliver the aircraft in tranches with a, call it an opt-out clause for the aircraft in the deeper tranches, and so yes, there was a lot of debate around this which should happen in your negotiating phase and which was again done, so in that debate certain iterations would have been discussed but I must say that from my level and where I was involved I never heard the reason of not enough pilots being a reason to delay or to tranche, it came from other factors that was of course discussed, some at my level but many others above my level as project officer, so I cannot give a definitive answer on that, all I can say is where I operated I never picked up that this was a factor why one would want to either delay or go to that mode of delivery Chair. Thank you.

ADV MPHAGA: In the event that you wanted to add the two Gripen's was there an offer that could have been provided at the same price within a certain period?

BRIG GEN BAYNE: My experience as a project officer tells me at any time you want more aircraft there will be a very willing response from any contractor yes. The advantage of that of course is that your development or your sunken cost in your initial buy has been done, so obviously if you wanted to add to

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a fleet, this is worldwide, then obviously your cost to value is far better in terms of your initial buy because you don't have all the other factors involved in that, so I would believe that if one wanted to look at expansion, if that was ever becoming a requirement for the department, then that would be the first port of call is to see what would the cost be of acquiring the same baseline and the same type of aircraft Chair.

ADV MPHAGA: Thanks General. I think we can now proceed to deal with utilisation. I think in paragraph 4 it is quite apparent that the utilisation of these aircraft was as provided in the White Paper, the Defence Review and the Staff Targets, am I correct?

BRIG GEN BAYNE: Yes Chair, I think one can say that in the performance of the Hawk's and the Gripen's in the SAAF since delivery commenced we can measure, we have a measure or a baseline to go back to. That is then as you correctly said those documents and I refer again, not going to go back to it, but to the Staff Requirements, because in the Staff Requirement the Air Force will give the best estimated average flying hours per year and the Air Force very much works on flying hours per year as a baseline per type of aircraft to predict all its costing, funding resource planning.

We obviously manage and control every hour you know in detail but in general in a planning and budgeting cycle to compare apples with apples you give a number, because the,

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also in your Staff Requirement that will be converted by ARMSCOR into many other factors that the contractors have to reply to both throughout the contracting and RFO phase.

5 So, and again this is a best estimate of the average over normally the 30 years, we use a 30 year cycle, we know in the Air Force, however, that we virtually always fly our fighter aircraft a lot longer for a longer period and so this will start off at a conservative number, conservative number normally being much higher initially because you don't know when the aircraft
10 is going to be in conflict only in training, ramping up, in a low (indistinct) of times and so it can be very variable over the years but it is stated in the Staff Requirement and the final number that was amended and came to on the project was that the Hawk then finally was designed to fly 4 000 hours a year
15 and the Gripen 3 000 hours a year, that is what you will find in the final user requirement statement, it won't be in the Staff Requirement because the Staff Requirement stays the same, the user requirement specification, the real detailed document is a living document so you may find during a project Chair that
20 the URS undergoes a change, if that change is minor there's a set process it goes through, it goes back normally to the arm of service for approval, if however it impacts on the Force Design then it has to go back to the highest authority and this happens in your normal project domain through the process. And so the
25 final decided amount then for the two aircraft types was the

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ones I gave, 4 000 hours for the Hawk and 3 600 for the Gripen.

The current fleet then of, sorry and I'll say the Gripen and Hawk systems are an integral part of the South African National Defence Force and SAAF capability to meet its
5 air defence and other mandates as in the White Paper and the Defence Review. The current fleet of 26 Gripen's and 24 Hawk's currently are adequate numbers to meet the above mandate as currently required by the South African National
10 Defence Force.

As we alluded to it is not yet at the numbers of the 1998 approved Force Design, the current Force Design 2013 is underway and it may come to these numbers, it may come to something slightly different, we don't know, once it is approved
15 by the correct authorities, exactly your point you mentioned earlier, if it is decided that more are required then at a point in time when the department applies or the need is there, then the decision will be taken, so I cannot, I cannot expand on that other than to say as I did yesterday that a force design is an
20 ongoing and we've seen this in our country now, but currently we believe that the current numbers are correct and meet the requirements that we have to carry out our mandate.

Fighter air and ground crews have been well trained and developed and are capable of operating and maintaining
25 these aircraft types, this we have shown that we have, with the

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training that was put in place by the project and our ongoing training our instructors have trained our own crews without the original, without the contractor on their own and those people service our aircraft and work on our aircraft and we have made good use of the training system and we have also then developed our own what we call standard operating procedures on the unit to expand on this capability and we can do all the necessary logistical services as was per the requirement on the base. We've also delivered the nec... Sorry.

5
10 ADV MPHAGA: General, the training of the air crew, is it local or did they have to go to the manufacturers?

BRIG GEN BAYNE: I think I alluded earlier ... Sorry. I ... Chair, is that better? Thank you. I alluded to earlier the air crew for the Hawk were all trained in South Africa at Air Force Base Makhado, there were six air crew initially trained, all instructors, experienced instructors, either having previously flown Cheetah or Impala's and they were what was called the initial cadre, you normally have an initial, which is termed the initial cadre trained by the company.

15
20 Once they are trained they then continue training your own air crew but under the auspices, so in the case of Hawk BAe Systems sent out two instructors, these are normally military instructors that they employ, ex-experienced military instructors and test pilot mixture, so you are getting both and they train your first six pilots, then they stay, one of them

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stayed on for a year to help with this development of our syllabi and our curricular and also to be there just to say well you know, because I mean now we start to expand the training, our pilots will now start to do things our way, they must say
5 you might have done that on the Impala but you can't do that on the Hawk, so you don't just leave your own air crew, there is a controlled process because of the safety aspects and need for that and so you find that you keep onsite for about a year one of those instructors which the project leaves for you, and
10 he then helps and when you're satisfied then he's relieved of his duties and he returns and then you call it a go on your own, and we, this was well done on the programme, from the Air Force side we had no problems and we now fully train our own, we don't have any instructors from the manufacturer.

15 In the case of the Hawk with our close ties with the Royal Air Force a very wise thing was done by my predecessor or predecessors at Combat and that in about 2003 the South African Air Force entered into an instructor exchange programme with the Royal Air Force, they have been operating
20 the Hawk's the longest, they are very experienced on the aircraft, so we sent one of our instructors over to do a three year tour at RAF Valley in Wales where they train all their Hawk pilots, you can imagine the advantage of gaining all of that prior to our initial training.

25 He then came back and added to that information

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and that experience that we had and they then also sent us in exchange an instructor, so we had an RAF instructor, the advantage for them is their instructors were still flying on the analogue Hawk because the RAF had not yet got a digital war cockpit and so, or this version of Hawk, so they gained the advantage that they could send one of their early instructors who knew the airframe well but now he could fly with our modern engine and our modern avionics and that I must again applaud my predecessors, it was an excellent move and to this day we have continued that exchange, we have a Royal Air Force exchange pilot and we have our third exchange pilot in the UK on a continual basis and this is also, I must say, one of the advantages of being in the new South Africa and out of sanctions is we have these wonderful opportunities to do these things and to learn more from others and broaden the scope, so that was the case.

The ground crew exactly the same, they came, they trained our ground crew on the computer base system on the aircraft and then they leave behind what is termed a field service representative, the bigger companies do this, similarly to the instructor that stayed this is a very highly experienced engineer, logistician from the company and the project then keeps him on for the Air Force for about two to three years and his role is exactly the same, he helps to fault-find and to do the deeper level and to carry on that initial training that is

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done by the contractor until such time as we are comfortable, we also had an engine, because it was a new engine we also had someone from Rolls-Royce which the project put onsite, also a field service representative and the same from ATE, so
5 for each of the three areas of the aircraft we had an experienced engineer from the company onsite for about two to three years, now we of course take over handover and now it's time for us to be on our own.

Again should we find a problem we will always have
10 the umbilical cord back to the company to call again if we need help, but obviously it's a cost consideration as well and of course you know your own ground crew want to carry on-on their own, they don't always want someone from looking over their shoulder, they take ownership.

15 The wonderful thing about delivering as a project officer is when you give that system and you see your men and women out there in blue, they just want to take this and they become proud of that system and then they don't want the contractor there, "No, don't come and tell us how to do this, we
20 know, we've been operating jet aeroplanes and fighters since way back". It's wonderful because it's called the pull of the end user, the project you must push them now and they pull to take ownership of the system and that's where we are, we've completed with Hawk and Gripen the same.

25 I assure you my Gripen technicians, they were very

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thankful and the training is excellent, we can get to that but
the same, they want to operate the aeroplane on their own and
take responsibility which is very healthy in the military and in
the environment. So I can say that that is how the training
5 worked and we trained adequate and of course the ground crew
now train our own ground crew to carry on.

ADV MPHAGA: General before you proceed these ground, the
fighter and ground crews, are they part of a squadron?

BRIG GEN BAYNE: Yes, a squadron is a unit and an entity
10 that can operate the aircraft and carry out what is termed
operational and essential intermediate support on the aircraft,
it basically means that they can turn the aircraft around on the
flight line, they can service it on the flight line, refuel it, do
the checks before, after flight, do the ejection seat service
15 between each flight, check basics on the aircraft.

When the aircraft then returns from a mission and is
reported as unserviceable it could be a repair, it could be a
fault in the system that needs to be reset or a tyre might need
to be changed which they will pick up after the flight, then the
20 aircraft is removed from the flight line and taken to the
servicing section at the unit, at in this case 85 or 2 Squadron
for a Gripen and there you have now your more experienced
technician, he knows how to find this fault, he knows how to
repair the aircraft, as long as it can be done normally this
25 would be done in about at least one to two days maximum on

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the squadron.

So, there are adequate ground crew at the right competency level trained to do that on your squadron, the pilots of course all operate at the squadron and then each squadron also has intelligence officers, they have personnel officers, they also have engineers on the squadron to assist them and they also have other staff, support staff that are on the squadron and everybody that walks through the doors of the squadron in the morning puts on the squadron badge, they have the *Esprit De Corps* of that squadron, they belong to that squadron, which is very important in the Military and it's the same on a ship or on a core in the Army, this must be fostered and kept that way and it is in the Air Force.

Then you have what is termed deeper level maintenance, this is where you're starting to need a higher level of maintenance and also possibly this is where your company representative initially or your local industry could become involved and that is at the Air Servicing Unit in the Air Force, this is the deeper level maintenance on the base and then the aircraft is taken or towed from the unit to this entity on the base and they carry out what is termed then the intermediate or deeper intermediate type of servicing.

All aircraft have to be serviced either after a number of flying hours or after a calendar, the Hawk is on calendar, the Gripen is on flying hours, more modern aircraft,

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the airframe on the Hawk is still calendar based but the engine and the avionics being more modern is time-based which of course is much better because often if you don't have calendar service it means you don't have to service if you don't fly the aircraft, another big saving and advantage of modern aircraft *versus* aircraft of the past.

So then it will go to this unit and it will be repaired there until it is fully serviceable and brought back. Normally if an aircraft goes to the servicing centre it can go straight back to the flight line and fly and any pilot can fly, but if it goes for deeper level servicing when it comes back then we have on squadrons a certain number of what we call maintenance test pilots, these are pilots who are not experimental, not full test pilots who can new aircraft that are designed but they are there to do maintenance test flying which means if the aircraft has for example removed parts and put them together then this maintenance test flying will fly the aircraft for one sortie first just to make sure because he's trained, before you put it back on the squadron, that's another sort of specialist job on the squadron itself but yes, all the people, and when I referred just now to 2 Squadron or 85 to the numbers of people *et cetera* that on average are at the squadron you will see there that that is then the capability at the squadron, that excludes then the people who are at the servicing unit.

And then of course Chair on the base is things like

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base armory, on the unit you don't leave ammunition on the unit, the ammunition has to be obviously stored in certain positions, protected and safeguarded, so that is a base responsibility, so the base support will also need certain amount of training when you get a new aircraft because the aircraft you know will use the bomb or configure it slightly differently, so there is a large amount of training on the base as well that takes place and some of the people involved in this system are also then, would fall under the base commander and not under the unit commander, I hope that answers your question Chair.

ADV MPHAGA: You may proceed then to take us through.

BRIG GEN BAYNE: Thank you. So, we've spoken about the training and the ground crew and the air crew in terms of their development, then all necessary logistic support elements including facilities at the units and the base and the deeper level SAAF agencies, that's the ASU's I referred to for the maintenance have been or are being delivered. In the case of the Hawk it's all delivered at Air Force Base Makhado and I alluded yesterday to the auxiliary power unit which is being delivered here at Waterkloof, the reason for that is we put it at Waterkloof because this APU capability for Hawk can also do work for other aircraft in our fleet, so we've put it centrally, so you always look on projects where else can this equipment be used in your air force and in some cases in your defence force,

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there's some test equipment that we actually acquired for our aircraft that the Army or Navy can or could make use of in the future, so then you will rather centralise that equipment at the place and then send that equipment into there, but the big
5 thing is it's in the Air Force and it's local which is good.

And I think the other point I want to make here is that again due to us acquiring both aircraft there are certain of the test benches that we felt was better to acquire from either BAe Systems or SAAB and adapt them for the other aircraft, so
10 instead of buying two sets of ground support or test equipment we were able to buy one set and just add the other requirements to do that test.

An example that we have is what we call the hydraulic rig which is for the Hawk and the Gripen and it can
15 test something like a 168 components on Hawk and Gripen on a single bench placed on the base at Makhado. Now this might not impact on everybody but I can assure you that in the game of aircraft maintenance and logistics this is an enormous cost saving, to have one piece of equipment for two different sets of
20 equipment or aircraft of different classes bought from two different companies and yet you can combine it and again it's because mainly it's computerised and it's digital, and so the two projects, not only did they look in their own domain but the two projects worked very closely together.

25 When we were in the UK we had regular meetings

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with our counterparts in Sweden and they would come over to us to look at all of these aspects to try to maximise the commonality not only on the aircraft but logistically test equipment and training and all those areas which I think is
5 important to mention.

Then the local industry has always been empowered to supply equipment test and maintain and repair, we term it M&R, is the maintenance and repair, the system is a deeper level where this was not cost effective in the Air Force. For
10 every single component on the aircraft that is not what we call a consumable, a tyre is a consumable, a seal is a consumable, similar to a brake pad, but when you talk about a hydraulic pump or you talk about a gearing on an aircraft engine, this sort of stuff, or equipment, we took each one and we did what's
15 called a maintenance policy study and on each of these maintenance policies we did a tradeoff between in the Air Force, in local industry sent back to the vendor.

Remember not everything goes back to BAe Systems, BAe Systems have many vendors who make their
20 equipment as well and so you can either send it back to BAe to the vendor, you can of course also alternatively send it straight to the vendor, this is very much in the ARMSCOR domain and they make very sure for us as our contracting, even in service they will make sure that the most cost effective route is also
25 followed in terms of the financial part, but the military look at

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what we call a maintenance policy because there is also a strategic matter to this.

5 It's fine to say it's more cost effective to send a piece of equipment offshore but if it is critical to the serviceability of your frontline fighter you may elect to invest some additional money in that capability because it could keep your aircraft on the ground, so it is then strategic. Now each of every, and I almost want to say on every component this tradeoff study is done as part of what is called the Logistics Support Analysis which comes up with a logistics support plan, 10 which the project does and delivers to the Air Force or to the end user.

And this was done to, I believe to a much deeper degree on these programmes than ever before, and we can see 15 it now. So, we are continually reviewing those maintenance policies. In the beginning around about 80% of the Hawk today and 60% of the Gripen maintenance repair is either done on the base or in local industry and again I say here is a credit to the project work done during the phase. This implies that currently 20 only 40% on Gripen and 20% on Hawk of that equipment has to be sent offshore for major repair if it has something.

And of course you can understand with rate of exchange, import, export duties, shipping, statutory costs this is again something that you strive to do as best you can. 25 However, in order to do it on the base Chair or in local industry

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of course you have to put down that capability as an initial acquisition and again I'll come back to that process of IONT continual logistics looking at the costs and the tradeoffs this is how the job is done.

5 But I don't stop there as Director Combat Systems, we continually go back and review those same (indistinct) with our local industry, with ARMSCOR looking maybe has things not changed, they may change over years, they may become less expensive offshore, they may become more expensive offshore
10 and so then we could have cases where we will change those, but I want to give the assurance that this is not done lightly and a lot of work goes into ensuring this and this was done to quite a large extent for the country.

 You will hear more about this in the presentations
15 I'm sure from ARMSCOR and from DTI on the, I can't speak at all on NIP but I can speak for the direct industrial participation because that impacts on my product, I can see it, I can see that deliverable and I want to say that on, particularly on the Hawk programme for which it was intended the LIFT
20 irrespective, that quite a large degree of capability and work, in fact a very large degree was delivered through that direct industrial participation programme as well. I'm not *au fait* Chair with the details thereof but we see it as the end user.

 To give some other examples I mentioned the
25 assembly line at Denel, so by assembling the aircraft means

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that Denel Aviation know that aircraft very well, you cannot assemble a sophisticated aircraft and also not grow your capabilities, so should we ever need Denel Aviation to assist us at a very deep level it could be that they could do some work that possibly in the future we would have maybe had to send overseas, we haven't got there necessarily yet on all but there is work and contracts on Denel Aviation as well.

I mentioned the, some of the weapons that are made locally, all the fuses for our bombs are made locally at Rooitech and this is also a lot of good work being done there, and many of the other aspects that are still supported by our local industry, again not necessarily directly on the aircraft but on the surround of the aircraft as well. You know there are things like covers for aircraft, there's a myriad of smaller equipment, vehicles that have to support these equipment that are specific to type, these are all then gained through local industry wherever possible and in our case most of it is.

So we also were able to of course take some of the equipment from our old systems and adapt them cost effectively the bomb loading carrier is a typical example, these would have been very expensive to buy from a company like BAe Systems or SAAB. We then took our old Mirage ones or Cheetah equipment and through local industry adapted them to be able to do this job at minimal cost, so really the project, what I'm trying to say is looks across the board to ensure that we are

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cost effective and use our local industry to maximum effect.

Thank you Chair.

ADV MPHAGA: I see in paragraph 44 you would deal with the composition of the air and ground crew, can you take us
5 through that?

BRIG GEN BAYNE: Yes Chair, I can say that the total air and ground crew of the two combat units on average, I unfortunately cannot allude to the exact numbers, that is sensitive, but I can say on average over the period that the
10 aircraft have been in operation the number has been 232 members total and as I said this is for the total at 2 Squadron and 85, not on the base or at the Air Servicing Unit but these are the two core capability areas and units and I refer to my, the reference is at page 108 of "JWB7" where it shows a table
15 of the breakdown of the representativity of those members and the details of that is then from the date of delivery to the date of the attachment for the two aircraft and you can see there that approximately 41% of the members are white and the other 59% are what we would term non-white male. The females are
20 also included in "other" as per the representativity as we presented to our department.

The two figures Sir are for 85 Combat Flying School on the Hawk and 2 Squadron from the Gripen and then the total and the graphs unfortunately I'm not sure Sir, Chair if you also
25 are in colour but the higher bar is at 85 and the lower bar is,

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for all three is at 2 Squadron, that's purely because the Hawk is fully accepted and is in a more advanced stage of delivery, so there are more people currently, as more, as 2 Squadron grow their numbers will also increase a little bit and the advantage again is in many areas we can move our ground crew from the one to the other aircraft with very little (indistinct), particularly on the engine and on the avionics because it's (indistinct).

On the airframe clearly you can already see there is a vast difference, so it would take longer to convert an airframe fitter from a Hawk onto a Gripen because of the complexity of the airframe but in general those are the figures as we were requested to supply to the Commission to give an idea of the size and shape and I think also to show that we're not there yet in terms of our representivity but we have been working very hard to get us there, it is a continual imperative from Government and our Department and I can say that since receiving the aircraft and tackling this since 2009 there has been a steady improvement in our figures and they in fact at the last visit of the Parliamentary Committee the units and the directorate were assured that cognisance was taken that we are on the right path and we will achieve this in the years ahead. And this is an approach across the board of air crew, ground crew and other support staff, so we are fairly proud that it's shown that again these two systems do not have any limitations

in any way of representivity or gender Chair. Thank you.

ADV MPHAGA: Thanks Chair, I see it's about 13h00.

CHAIRPERSON: We'll adjourn for an hour and we'll come back at 14h00. Thank you.

5 (Commission adjourns)

(Commission resumes)

CHAIRPERSON: Does the witness confirm that he is still under oath?

BRIG GEN BAYNE: I do.

10 CHAIRPERSON: Thank you. Advocate Mphaga.

ADV MPHAGA: Thanks General. May we then proceed to in paragraph 44 you referred to the details in respect of the training of the air and ground crew and you are referring to "JWB14" and 15, can you take us through those annexures?

15 BRIG GEN BAYNE: Yes Chair, we were requested to supply information regarding the number of air crew and ground crew rained since we started the training that I referred to before lunch and so we have done that, the information has been declassified and amended slightly from page 119 through to
20 page 123 and this then had the personal part thereof taken out for security reasons but does, I think, show adequately that we have trained around 50 Hawk air crew so far *in toto* since the arrival of the Hawk's and around 18 Gripen air crew *in toto* as a number of total that has been trained and in this documentation
25 pack which I do not intend to go through in detail of each line

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but it is giving each of those members hours and capabilities which were achieved, the same goes for the ground crew and just to say then on the ground crew side as with air crew you have an initial training period where you are trained formally
5 for the first time on the system and then as in all of aviation you get a competency which has either a number of flying hours or in the case of ground crew number of actions or maintenance actions or a calendar time, so you might find that an aircraft
10 fitter has a competency time of X-amount of months or weeks and then he had to do refresher training, so what we call then continuation training and the same for air crew, so you actually never stop training, you continue to be refreshed and retrained and every time you have to pass your training again to keep your competency and your, and it's also tied to allowances and
15 of course like in all of these high-tech types of jobs the *onus* is on the individual to make sure that he keeps that competency and does not work on any part or fly a sortie if he is not medically fit and is not trained and is not ready for the task, he has that responsibility.

20 Obviously the organisation similarly has that and so that is why these are tracked and kept in logbooks and on file to make sure that all this training is carried out and monitored and it is done at various levels in the organisation, and I think this adequately shows then that we have trained a large number
25 of members of the Air Force, these are members, as I said that

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were trained initially by the contractor and then also our own training that we have done since that time. Thank you Chair.

ADV MPHAGA: Paragraph 45 deals with the hours flown by the Gripen and the Hawk, can you elaborate on that paragraph with
5 reference to the Annexures "JWB8" and "JWB9".

BRIG GEN BAYNE: Yes Chair, to date the Hawk's since delivery have flown over 10 000 major accident free flying hours since 2005 and the Gripen's have flown 3 500 since 2008. And we do refer then to the annexures on pages 109 and
10 110, 119 for the, 109 for the Hawk's sorry, and 110 for the Gripen. We've given this as requested per tail number, so those will then all add up to the fleet total which is a measure then of the hours utilised by the fleet to date.

I must say just to mention in terms of the accident
15 free part we're quite proud of because compared with previous new aircraft that were introduced into our systems it is not abnormal in worldwide to know that during introduction of new aircraft types with higher capability, more sensors *et cetera*, it is no uncommon to have major accidents or losses in your first
20 three years and this is normally termed the high risk period while you are still learning the aeroplane, developing it, training your new pilots on it and starting up and so far we have managed, as I said, to avoid any major accident free flying hours so far on both types.

25 These hours include about 95% of the Hawk and

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80% of the Gripen operational test and evaluation which I spoke about yesterday during which the aircraft is also tested and this is done at the units by our own air crew and ground crews and we should finish the remaining part of that before
5 final system handover once we have all the capabilities on the aircraft.

A question could be asked if one looks at these figures, you could say but some of the airframes have flown very little, others have flown quite a lot, this is not abnormal
10 when you initially deliver a fleet. Most air forces try to get, and airlines try in a new aircraft type to get what we term fleet leaders, these are aircraft that you deliberately fly more than others so that you can get your aircraft into a lot of its fault finding, you get it operating so that you then can get a better
15 idea as I referred to earlier of the spares you are going to need for life and also are there any areas of the aircraft that you will pick up during this period, and because they are built to such high specification in all likelihood if it happens on your two or three flight leaders you can fairly accurately interpret that it's
20 going to happen to the rest of the fleet at a point in time.

Also it maximises again the warrantee on those early deliverable aircraft and also what you don't want is in particular in the case of the Hawk where we mentioned that the aircraft were delivered quite rapidly, two per month over a
25 year, you can imagine if all of a sudden now as we have now

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the canopies are into their first servicing now which have to go back to the UK for their servicing, one of the components we do send back. Now if we had to send back 24 canopies all virtually at the same time or even in the same financial year that would be a massive drain on our operating budget, the same for a major service, so with the new fleet you try to stagger the fleet and this is what the logisticians and the engineers will look at very carefully so that you don't have these massive peaks in a particular year or if you can't avoid them on the one aircraft type in my case where I'm responsible for Hawk and Gripen you would want to avoid the similar happening on the other aircraft at the same time.

So, fleet management is very important when you have fairly largish numbers to not only look at hours and getting this fleet leaders but also to spread out the cost, the operating costs of what we call the non-recurring servicing, so in other words that servicing that only happens every few years, not something that happens every month or within the same financial years, so I just wanted to point that out in these tables in page 109 and 110.

The other aspect that can happen of course is you do on aircraft have minor incidents and accidents which occur on all aircraft fleets but so far in our case fortunately all of those have been repairable in South Africa but you also find that if an aircraft has a quite a serious damage to it for

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example in its early life then it will take time to repair, the reason being that first of all you don't plan for that, so you would have to then adjust your budget and that might have to move to the following financial year or on the other hand the damage might be such that you need to bring out a team first to assess the damage to find out what is the magnitude of this damage, can you repair it locally, will it need to be sent back to the OEM for repair, so generally on aircraft of this kind it can take time and then that aircraft of course is out of service and not available and I mentioned again yesterday on average you find about 65% of your aircraft on the line and the other 35% in general of a fleet of this size are either in one of the cycles of servicing, major servicing, repair or damage repair from incidents or not yet but it could also be an accident where aircraft can stand for a while, so just to allude to some of the detail that was submitted on page 109 and 110 regarding these incidents.

And then the other term which I refer to in my statement being the meantime between failure on both aircraft systems, this is a measure which logisticians and engineers will use to measure against a norm of how often a component fails and the meantime between failure obviously gives you an indication then of how much repairs are you going to have to do on this component over its life and what will your spares level be for that component, for example if a radio may have a much

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higher or a meantime between failure than a component that is physically working all the time, rotating, for example a gearbox, a hydraulic pump on a gearbox for example which is working at very high RPM, it's being used very harshly, a radio has basically got a heat aspect to it, so you find this meantime between failure is a measure as a baseline across all your components and I can report at the moment that given the flying hours that we have flown so far this is normally measured over quite a number of flying hours, so obviously on the Hawk we have a better idea of the MTBF, meantime between failure, than on the Gripen because it is still young in service but later on it will start to play an important role also in monitoring.

If suddenly your MTBF has been seven hours and it suddenly in 10 years' time starts to move to 15, sorry meantime between failure of about five hours, say half, that could be an indication that that component is starting to reach obsolescence or may need replacement, so just to give the Commission an understand of the term, and it is a very important measurement and so far I can report that the MTBF rates on both aircraft have met expectations considering the lower than predicted rates that have been achieved on the fleet to date.

Then not all good news, you will always I believe on aircraft fleets have challenges and on the Hawk a component

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called the electronic unit which controls certain engine functions was found to warrant being replaced in the fleet and this is being done currently by BAe Systems at their cost. I say this because this happens on aircraft and because we are able to monitor this we could go back and say but this MTBF on this component is higher than you told us, much higher, and there could be a problem and they've agreed to that without conditions, it may not be the same in the UK because of temperature or conditions but ours is not acceptable and they are busy now doing a complete fleet replacement with an upgraded or new component at their cost.

Just to show as well that the fact that you have acquired the aircraft you can, even after the warranty period if you can prove with an engineering report that this is a component that's not meeting the MTBF you put your case and then you either agree that it will be done by the contractor and in this case it has been done, just to show that it's not a matter of you know you are left with a system and you have no recourse in the event of your environment being perhaps different to what was expected when the aircraft was designed and built.

A second challenge we've had on the Hawk is the drag-shoot, I haven't mentioned that before but the Hawk with its braking system and its makeup of brakes and tyres, if it is at quite high all-up mass, in other words it's heavy and it

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lands, it could be that the brakes could be under quite a lot of heat and pressure and so the aircraft has a parachute that when you land in this condition you put out the parachute when you are on the ground and the parachute acts as an air brake
5 in the air to slow the aircraft down in these conditions.

Now the Hawk has this, this Gripen for example which was designed to land and take off-off very short strips, in fact off roads if required in Sweden if they're strengthened, has not got a drag-shoot, so now here's another anomaly where
10 you have a lower performance aircraft but requiring a drag-shoot due to design and brake type. And so this system has given a much higher failure rate in the South African Air Force than in the Royal Air Force for example and the Australians also had a similar problem, so through the user group which we
15 belong to two or three air forces we contacted each other, we went to BAe and said look, this is not acceptable, there is a modification now that the Australians have completed, we've also checked one and we have with BAe, we've now together solved this problem.

20 The reason for that is if you go to the specification the drag-shoot meets the specification, so I'm using this example as a second part where here the manufacturer doesn't necessarily walk away but says look, I meet my spec but it's not acceptable to us, so we jointly with them have a programme
25 where we are going to fix this problem jointly and then this is

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being done part at their cost, we will do some of the test flying and we are busy doing that and fixing the aircraft. So, you don't buy it and it's perfect what I'm saying because it will have these certain challenges and we have recourse to do that and so far it has, we've been able to solve those problems.

And then lastly on the Hawk as well which has also been, I think, reported is that we did find due to some of the changes in the EW System for the Air Force, because I said the Australians didn't take the EW System initially, we found that the rear of the aircraft, the slight change to the, where the rear of the aircraft is, that is where the fuel, all jet aircraft vent fuel because it's under pressure and at times depending on the altitude and the conditions some of the fuel vapour is vented and fuel is vented through the rear of the aircraft, and this was causing some contamination in the area of the vent pipe and what has happened is BAe Systems have acknowledged this and they have now redesigned that pipe for our Hawk to move the pipe slightly longer and that will be fitted by the end of the year and this will then again solve that problem.

So, I was just trying to allude to that these are part, this is part of the OT&E and implementation process that is ongoing at any point in time and we've had so far had good cooperation in terms of solving those. Sorry Chair?

ADV MPHAGA: Alright General these problems that you've

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alluded to did affect all the fleet of the Hawk's?

BRIG GEN BAYNE: In this case all the fleet of the Hawk's were affected on these, sometimes you do find points or areas where only some aircraft are impacted, well then obviously it's not a design, then it could be you sometimes get a batch of equipment, you buy a batch of spares, it could be a batch of rotor balls [sic] or you buy a fuel pump, let's say and you replaced a fuel pump and you find but this fuel pump all of a sudden doesn't have the meantime between failure that you are used to, it's much lower, what would happen is you then query, we have a query service immediately straight back to the OEM, he will check with that batch which is monitored all over and then with other users they will come back and say no, there's a problem with this batch, they will then go to the vendor and get it repaired for you at their cost if that is the case.

It could also mean that you have not handled that equipment correctly, you may have fitted the, you know because again you've got technicians, you've got new people on the aircraft, so sometimes you might not be using or testing the equipment one hundred percent and so you find then it's a one-off now and again and there is proper technical committee that will sit with the contractor, ARMSCOR and the Air Force and these are agreed with specialist engineers whether it's now warrantee fix, is it a batch or not, so this happens on all aircraft types worldwide, it's not abnormal and it happens on

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these aircraft as well. What I'm trying to show I think is that so far we've had some issues, we've had some challenges but when we've gone back to the contractor we've resolved that through the process. Thank you Chair.

5 ADV MPHAGA: And now were these, were the Hawk's grounded as a result of these problems?

BRIG GEN BAYNE: There's a term stop-fly that we use, this is when you stop flying the aircraft for cautionary, you could have an incident on an aircraft and I'm sure you've heard that many
10 times on airliners as well and Military aircraft, so the first thing you do is you stop flying while you then investigate and you go back to the OEM, let him check, he will then advise you to say he advises that you carry on flying but may put some restrictions in place which happened with the EU, they said we
15 will check it but just in case do some extra checks on the engine before you take off and monitor in the air and then it will be safe, we will then give that to our test pilots who will agree and they say fine, we'll carry on flying with restrictions, or they may say no, this could be more serious, stop flying
20 until we come back to you.

But when you come to grounding a fleet that is quite a serious decision and that would only be taken either by the OEM's airworthiness chief engineer Airworthiness Section, they will let you know, it could also be that they find out another
25 fleet, for example the minute that happens by contract and by

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Airworthiness they have to inform all users, so you could find that they'll stop the Australian Hawk's flying for something on our aircraft if it's the same as the one on theirs and you may then find that both will be impacted, it could be the other way
5 around and we've had some examples of that, it happens on fleets yes, so this could happen.

But the other grounding could then be the Chief of the Air Force saying although the OEM says to continue we would advise him with our Military Airworthiness Board, so the
10 Air Force also has a Military Airworthiness Board which is chaired by our chief engineer and our chief engineer would then with this board of which I would be part, we would make a recommendation to the chief to say look, although the OEM says carry on we want you to stop rather and ground the
15 aircraft for any safety reasons.

So, because, and this is how it happens I would imagine in, certainly the air forces I've been exposed to it's very much the same in all of them, so just to explain that is the process that you would follow. So, on the EU we took
20 precautions and we stopped flying and then this restriction came out, we eventually learned to live with the restriction and with the restriction the new fitment will come, as soon as the new fitment comes we lift the restrictions and we carry on, typical things that happen on aircraft fleets from time to time.

25 ADV MPHAGA: Thank you General. You may proceed then to

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paragraph 47 and take us through.

BRIG GEN BAYNE: Yes, sorry if I may just answer, if you are unsure then as I said you will go and possibly, yes so at time the Hawk's have been grounded for short periods while the investigation confirms and then that's a decision even though
5 maybe the OEM said yes, we said no, we'll rather go to the second step of grounding for a while, make sure it's training aircraft, look at the situation, but in that case again if it was really urgent then one could always lift that grounding and
10 that's a call you have to make with professional people who know about this matter, so yes to answer the question, sorry, I didn't finish with that Chair, thank you.

ADV MPHAGA: You may now proceed to paragraph 47 General and take us through the problems with the Gripen.

BRIG GEN BAYNE: Yes, on the Gripen we've had the ACR500 radios were also found to be a higher than normal failure component on the aircraft so far but a solution has been developed and a modification to rectify the problem is underway at SAAB's cost, it was able to be said that it was not
15 meeting the contractual requirement on this one component.
20

To be fair though I must say this component was a supplied radio and the first time that it's flown in the aircraft, so it came probably from the fitment and the position and some of the aspects around the placement of the radio and so that
25 has been now, a modification is underway and this will be

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corrected shortly, so this did not impact on the aircraft stop-fly
or being grounded but is something that we want to prevent
because otherwise later then it could become a higher cost
driver on the aircraft just to give an example, but we, so and
5 this is the only case we've had on the Gripen so far but again
we must say that the fleet hours are still quite low, so it would
not be abnormal if similar to the Hawk we also find some new
with the aircraft operating in our environment there could be
some areas of redesign or modifications or high MTBF's that
10 are still coming but we don't know yet at this stage.

We are confident, however, taking this case and so
far the workings that we have had with SAAB as the contractor
for Gripen we are confident that they will similarly act
responsibly should other cases arise Chair, thank you.

15 ADV MPHAGA: This defect on this radio, did it affect the
utilisation of the Gripen at all?

BRIG GEN BAYNE: No it did not impact at all, as I said it was
quite a minor matter, more, it goes more about improving the
meantime between failure than, there was nothing wrong with
20 the capability of the aircraft, it just had a high failure rate that
we were concerned about and wanted to fix as soon as possible
Chair, thank you.

ADV MPHAGA: Now let's proceed to paragraph 48 on page 10
and deal with the participation and the actual utilisation of this
25 equipment.

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BRIG GEN BAYNE: Thank you Chair, I think I have covered the exchange that we have with the Royal Air Force pilot and currently we are also members of the Hawk User Group, we are about 18 air forces attend, this is a user group that happens
5 about every 18 months to two years, we've hosted one in Cape Town in South Africa which was also very successful and this gives an opportunity for our logisticians and our air crew and engineers to come together at a conference, they talk about the aircraft, they share experiences, they share common issues,
10 they table these to the contractor and to the subcontractors and obviously then also discuss possible common and product improvements and upgrades, this is typically what happens and most aircraft types in the Military have these user groups just to show that again we are fully part of them, we're active
15 partners in them and in fact our crews have done very well at them so far, and similarly on the Gripen where we have around six air forces operating the Gripen currently and hopefully that will grow shortly and exactly the same happens on this user group.

20 There is also a Volvo Engine User Group that we send our engineers to and our logistician, about two of them, and this happens every year or so and that is a specific user group for all the people that operate Volvo engines worldwide, so again an opportunity to share and to be part of the
25 international community as part of the development and

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training for us for our new aircraft Chair. Thank you.

ADV MPHAGA: Now this exchange programme with the Royal Air Force, does it occur in the UK or does it also occur in South Africa?

5 BRIG GEN BAYNE: It occurs both ways, so we send an instructor to the United Kingdom and they send one to us in South Africa on a swap. The tour varies between, it's generally been three years or around about two years depending on the member himself you know, domestic's and his career plan at
10 the time, but it's a meaningful tour, it's a long term tour, he takes his family with and moves over and operates in that air force, which is excellent exposure not only from a flying perspective but just from a you know, being in another air force, operating in a different part of the world and learning
15 and feeding all that back, and of course he sends reports back regularly on, and he of course also educates them in this case on the utilisation of our Hawk which in fact up until about a year ago they were still flying an analogue Hawk and now they have got their first digital Hawk, so he's been able to assist
20 them, he was actually the ex-officer commanding of 85 Combat Flying School, so yes that exchange programme is up and running and is both ways. Thank you Chair.

ADV MPHAGA: Is it the same with the user group?

BRIG GEN BAYNE: Sorry?

25 ADV MPHAGA: The user group, where does that occur in terms

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of the exchange?

BRIG GEN BAYNE: It rotates around the various countries, so we've had one for the Gripen and we've had one for the Hawk since we got the aircraft and then it's been, on the Hawk it's
5 been going since about 1990 I think or 1992 and the Gripen has been going now, I think we'll have our second one here not next but the one after that, so it's basically on a rotation. I can also add that on the Gripen interestingly enough I think the Swedish Air Force Chief also introduced an Air Chiefs User
10 Group on the Gripen and what happens is generally chiefs of air forces go to the two large western international airshows every year or at least alternate year and that is the Farnborough Airshow in London and the other one is the Paris Airshow, they are the two big, other than America and the
15 eastern countries.

But at these two there is a meeting of the chiefs of air forces of all the Gripen users as well and that is for the chiefs only and they discuss higher level strategic user group matters and bilaterals and a higher level than this user group
20 that the pilots and the engineers go to, this does not occur on Hawk but it occurs on Gripen and I don't know how many other aircraft types do that but it has been also very a meaningful engagement for the chief and to obviously not to have it separate most of them attend these airshows, at least one of
25 them in every second year, so this user group they use that

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opportunity to have a specific meeting to discuss Gripen operations within their air forces at that level. I think that's also been a positive, thank you Chair.

ADV MPHAGA: Thanks General. Let's now deal with the exercises on page 49 and also the use of the two flight test instrumented aircraft.

BRIG GEN BAYNE: Yes, thank you Chair. We have tabled pages 111 through to 115 which is a summary from our Air Force Command Post who task our aircraft on our units and our bases and I will only handle the Gripen and the Hawk, my helicopter colleague will later will handle the helicopter flying but I think the purpose hereof is to show you when I referred to the Hawk and Gripen taking part as part of the training and force preparation in exercises, multinational as well as joint with the other arms of services and then our own air force exercises and operations.

I'm not going to go through each and every one because many of them happened, have happened three or four times over the period, but I think what we are trying to say is the concern that we have not utilised the aircraft, I think this hopefully shows that we have actually utilised them quite extensively in exercising and our exercise and our exercises are done, we train like we fight, in other words you must train in the same way with the same doctrine, procedures and environment as close as you can as you would in actual

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operations and this is how the SANDF have done it since way back and continue to do so and it's a very important element of training, why, because it takes the pilots and the ground crew and the whole unit together away from home base, so now they are not operating in their comfort zone, they are operating in another part of the country, different environment, they are operating from an airfield that they are not used to going into, they have to operate from there, they have to live there, they have to put down all the services, so everybody on the squadron goes and these are also excellent *Esprit De Corps* and building opportunities to mould the fighting team and also for the unit to compete against other units or to challenge themselves to meet deadlines to be on the exercise because now they are being monitored and seen by the Navy, the Air Force, other countries, it ups the bar of your training largely and in the Military this is very important and really is something that we need to do on a regular basis and we do so.

In terms of the operations that the Gripen has been involved in so far probably the main one so far was the Soccer World Cup in 2010, this tasking started to be realised in 2008 when the Government was informed by FIFA that the Government would have to sign a contract with FIFA to guarantee security of the Soccer World Cup in South Africa, this was the first time in my knowledge that FIFA actually insisted that the Government, the President sign the contract

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with FIFA to guarantee the security of the 2010 World Cup and that was a new part of the contract and will be ongoing, and so obviously this was a large undertaking for the country to have to take and so Defence Force was tasked to make sure that this happens and the Air Force was tasked to ensure then that the air protection of the Soccer World Cup was secured, and so we started in 2008 with a number of exercises starting with a single point or a single stadium, building up to a number of stadiums in a single province and then in two or three provinces and finally in all the provinces at all the stadiums where we had to secure the World Cup from an air safety point of view.

We were not alone in this as the fighters, we obviously were an important component thereof, all of the assets of the Air Force, ground, air and the whole of the Air Force took part in this as part of the South African National Defence Force effort and I think Admiral Schoultz alluded to this as well in his testimony, the role that the Navy played. It was in this exercise during the practice already and in the buildup and then during the exercise that I think we really started to understand, as I said, the capabilities of these new platforms that had the sensors, had command and control capability and that the Hawk and the Gripen worked very well together as a combination to do the task because you can just imagine that we had to be in the air over all the games for an

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hour before, an hour during and an hour after the game.

Now to do that in nine provinces at about, I think there were 13 stadiums if I'm correct, day and night, at the early stages if you remember there was a game, I think at
5 lunchtime, early evening and late evening and all of those had to be covered in a network of cover in the air. I can assure you it's the largest air campaign this country in my 43 years ever had to muster, it was massive in terms of on-station flying and doing and bear in mind at that stage the Gripen was only
10 two years into its delivery, we did not even have all the aircraft yet, but we had adequate aircraft but we didn't have them all, so the Hawk's also then which had the aircraft delivered also played an important role and again we saw the collateral role where the Hawk could come in and for example do what we
15 would call the point defence of the stadiums closer in and your Gripen was your more area outer boundary type of patrol aircraft.

And I can say that during the whole of the World Cup there was not a single game throughout the whole of the
20 World Cup where there were not Hawk's and Gripen's in the air doing their job to make sure that the Air Force and in my case the combat line did their part and as I said we were only part of this massive effort, but they delivered and they did the task.

The deployability of the aircraft was proven because
25 it had to move from one game, land, move, fly to another

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province in some cases and be at the night game and ready to go, the ground crew were transported in aircraft between all there to support the aircraft. Now if you needed a large component of ground crew to cover such a wide area this would not have been possible, but again this brings in the much reduced number of ground crew that you require on these modern aircraft because they were designed with deployability and logistics in mind from the start and so the, what I call the tail to this system we saw and we proved is a lot smaller than we were used to before and so the task could be done. And it was a very good exercise quite early because we could all of those hours as well to tick off our operational test and evaluation in very, very realistic situations.

Another very interesting aspect is for the first time these aircraft were safe enough, we actually were able to prove that they were safe enough to carry armament on civilian airfields, we were never able to do this before. Modern aircraft can do this. We also proved in the past if you armed an aircraft you had to de-arm it when you put it in the hangar overnight, these aircraft have so many safety mechanisms built in that you didn't have to do that, reduce the air crew, you reduce the effort, you reduce usage of the weapon-on, weapon-off, this is what often in the past caused the aircraft to not get airborne because you overused the loading of it, now the weapons can be put on the aircraft and it can be stored with

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those weapons, really large, large improvements that were proven during the exercise, and the other important one coming to one of the modes, the weather mode on the radar which was delivered, there was one night I remember the aircraft
5 operating out of our base in Overberg, the Hawk's also couldn't fly, the weather was really bad, no aircraft were able to land, no civilian aircraft were able to land at Cape Town Airport, the Gripen's were able to fly and I think that was a very big boost for the air crew as well, the fact that we were able with the
10 correct equipment onboard to still be able to do the job and prove that we can do it in all-weather as I mentioned earlier, because very often one would get the impression perhaps that we would only be able to operate in good weather because generally we have it, but we were able to prove there that even
15 in the worst of Cape Storms we were able to fly, so I think that was good. Thank you.

ADV MPHAGA: General, are you saying that without this equipment and capabilities our eligibility to host the World Cup could have been compromised?

20 BRIG GEN BAYNE: Yes, I think it could have been. It would have been, I think it would have been done but I think we may have had to get assistance in some areas and it would have been difficult to have done it without this level of, and type of equipment, and I'm sure the Soccer World Cup is not the only
25 world event South Africa will be hosting, we've already seen

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the demand and the success that the country made of it and so I think also in a small way we've proven for the country, and we played our part therein, that South Africa is a country that can be relied on and reckoned with to host such an event and make
5 sure that it is secured as a guarantee and yes, so I think we are well positioned for the future to do similar. Thank you Chair.

ADV MPHAGA: You may proceed General.

BRIG GEN BAYNE: Thank you. Then Corona, Corona is the
10 ongoing border patrol work that we do, and this we do not as a continual Chair, obviously because the assets are high value, but from time to time if the intelligence or the request from the land forces or intelligence or wherever require then we do from time to time fly for these sort of operations when they need
15 more high-tech capability and the Gripen and the Hawk have partaken quite on a number of occasions in border patrol exercises and in this case operations, and then the others were a bit smaller.

And then of course the recent one I think that is
20 worthy of note is Vimbizela which was the CAR deployment, I think we all know well the status which was arrived at there and it was found prudent when the talks needed to take place and there could have been further escalation, then assets were deployed by the South African Air Force in terms of the
25 helicopters as well as the fighters, of course the transport is

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ongoing in support, they are always involved as well, and we deployed Gripen's to an airfield in the theater, those aircraft were able to fly there with only stop for landing, we did not use inflight refueling because that would have had to be you know, an allied-in, but it was not necessary and the aircraft reacted very quickly and we were able to place the aircraft in theater at short notice over very long range and although not utilised they returned fairly shortly there afterwards but the fact remains is this is why I believe you have such a capability, when it is required by the country or in national interest at any time I think this proved again that the system could deploy rapidly and at short notice and over a long distance without a very large logistics tail because that in the past would have been a tall order, or you would have to preplace the logistics in which case what I'm trying to say is that these aircraft are more deployable at shorter notice than we have at previous, I think that is what we proved in that exercise. Then if we ... Sorry, in that operation, not exercise, that was an operation.

ADV MPHAGA: Sorry General, you referred to a theater, what is a theater?

BRIG GEN BAYNE: Sorry, in military terms the theater is then the area in which the operations or the conflict or the enforcement or the peacekeeping is taking place, DRC would be a theater, Afghanistan would be a theater in a NATO-type. Yes, we refer to that geographical area in which operations are

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taking place Chair. Now if we then move to the exercises we, twice a year we have a weapons demonstration and display at our weapons range up at Roodewal near Makhado where the aircraft throw live weapons and with the Army we type of have a mini-war. We also have our executive national programme which is our senior course for staff officers and also other security cluster, they attend, our colleges attend and then the Chief of the Air Force invites influence groups as does the base OC and we have a practice day and an actual day where we give the air crew also importantly the opportunity to fire live weapons close to, call it own troops, although they're friendly and they are there for that purpose but we have Army on the ground and firing mortars and it gives that opportunity at least regularly for the air crew, ground crews and everybody to practice in between these other exercises that we do and we then are able to exercise but also to show the capabilities of the Air Force to our stakeholders.

The field exercises were the buildup for the World Cup that I mentioned. Good Hope is an exercise with the German Air Force, they come down here and they use TFDC for some of their weapon releases, so they contract TFDC, it's much cheaper to do in South Africa and we then take the opportunity Chair while they're here to send some of our Gripen's and Hawk's and we will do some exercises with the German Air Force, excellent opportunity to work with a

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European Air Force again and be part of operations and they do this every two years. There's also the navies involved with this Good Hope exercise as well, so it's not only multinational, it's also joint for us with our other partners in the South African National Defence Force, both aircraft have taken part.

Blue Cluster was an exercise which we held in 2011, this was a SADC exercise, there were seven SADC countries that came and did the exercise with us, we did it in the low veld area at Makhado and at Hoedspruit and this was an exercise for the SADC forces, multinational and we had transport aircraft, we had command and control radar, we had helicopters and we had the Hawk's and Gripen's take part as well, so they had an opportunity.

The Zimbabweans brought their K9's down and all the other countries brought helicopters and transport aircraft and we had that exercise in 2011, very successful and we developed a joint doctrine for airpower with the SADC countries and this was an excellent exercise and very gladly that my combat assets could also take part and my crews could take part. As we sit here there's a similar exercise which Angola is hosting in Angola currently and we have also sent some of our assets and our people there, not this time the combat aircraft, this is a transport heavy one and a helicopter heavy one that is taking place in Angola but just to show that this was not a once-off, this will take place every two years in a different

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SADC country, again another excellent opportunity for us to operate in the region with our colleagues and our partners in SADC and in various parts of Southern Africa.

5 Ipsum-wise with the Brazilian and Indian Navy, again it's a Navy-heavy exercise but we take the opportunity with our assets and we also partake with Hawk and Gripen. The next three Siboka and Ndlovu, these are mainly Army land force exercises at Lohathla or at Potchefstroom with Artillery and here we get the opportunity to exercise with mainly the
10 land forces, close air support, dropping bombs-live, working with the Army to keep us ready for any joint operations that we may be called upon to carry out.

 And then a very special one for us was Lion Effort Chair, this was a Gripen exercise hosted by the Swedish Air
15 Force in Sweden, the Czech and Hungary Air Force as well as Norwegian Air Force also brought their Gripen's, the Czech's also brought the L159 and so this was an exercise held in Sweden in February 2012. We were fortunate that the last four Gripen's were just due to be delivered, so we delayed the
20 delivery of the previous two to have four aircraft remain behind and take part in this exercise because it was a golden one-off opportunity which we'll probably never get again because to get Gripen's back you can imagine all the way to an exercise like that in Europe or Northern Europe would be extremely costly
25 and a challenge.

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5 So, we took that opportunity and our ground crew
from 2 Squadron, our air crew then went over and the aircraft
then were delivered straight from the factory into the exercise,
flew the exercise, we did not miss a sortie, we flew all the
missions that we were expected to fly, we had a few snags on
the aircraft that our ground crew were able to repair and one or
two we got some help from SAAB because some were under
warrantee which they then fixed for us and we managed to then
do that exercise in Sweden with the other air forces with our
10 own squadron who went over and placed them there, I think it
was an enormous opportunity and we learned a lot because
here you had previously eastern air forces who had experiences
flying the MIG and Sukhoi-type of aircraft, you had the Swedes
who had flown their previous aircraft and now the Gripen, the
15 Thailand flies F16's as well as Gripen, so you had air crews
there who had flown F16's and sort of western-American, you
had, many of them had flown Mirage before, so this was an
opportunity of comparative, although those aircraft weren't
there, but in terms of tactics and doctrine and I believe that
20 our air crew and our ground crews did very well in the exercise
and they learnt a lot and a lot of the other air forces learnt
from us, so that was an excellent opportunity that was taken
and flown in Sweden.

25 Then we took part in the Aerospace and Africa
Aerospace Defence Symposiums, that we take part in, the air-

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to-air camps, this is what I mentioned from time to time the squadron will deploy because to do air-to-air firing it has to take place over the sea, you can't shoot live weapons or rounds over the land, so we have two air ranges, one at Langebaan on the West Coast and one at TFDC and every year your frontline squadron will go down for about two weeks, deploy and they will hone and train their air-to-air firing skills both in high, in various performance envelopes and the Hawk's do the same from time to time, so this is ongoing, same with close air support with the Army and the Special Forces, these are exercises that we do on our own.

Various flight paths showing the flat and doing our part for various events and they then follow, we were also part of the Presidential Inauguration flight path with the flight craft of Alexandria, also again, also again part of our outreach to our stakeholders and then various other, and Easter Show as well at the bottom is where we also take part with the various aircraft. I'm not going to repeat the same for the Hawk's Sir, it's exactly the same, the Hawk would then take part in its role in the same exercises and you will these spread throughout, there's nothing that stands out different between the Hawk and the Gripen, both of them make use of these opportunities for these exercises, again to show that we have then utilised the aircraft in these various areas since delivery Chair, thank you.

25 ADV MPHAGA: General, in respect of hosting of international

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events like the African Nations Cup and other similar events the security issue, does it become important?

BRIG GEN BAYNE: Yes, I believe depending on the size and shape and stature of such events then the decision will be
5 taken by Government that this is declared a high profile or a requirement that has to be met and then the tasking will come down to the department and the SANDF and if the Air Force is then needed to be part of that then we will do the task. Perhaps I can just add Chair, I think we've referred to Joint
10 Ops before and I'll come to the explanation of that, but all, whenever the aircraft are put into operations it is, then the Air Force gives those assets over to Joint Operations and they utilise the aircraft and they then fund those operations whereas if it is our own exercise that we are doing for the Air Force
15 training then it is part of our, we then utilise and task the aircraft and fund it.

If it is joint then sometimes Joint Ops will also assist or we will then carry it out just to explain the difference between that part, but if it's full operations utilisation then this
20 is under the command and control of Joint Operations which I think the deputy chief explained in his testimony fully, thank you Chair.

ADV MPHAGA: In exercises that occur overseas, do you take the ground crew along?

25 BRIG GEN BAYNE: Yes, you deploy the squadron, you are one

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team, there is no "I" in team in an air force unit or squadron. You may not, you won't take everyone but you will take the required members but at least members from each mustering because as I said this is not just an aircraft, it is always a
5 system, so you will always need someone from each of the components and joining them from Command and Control will be the mission controllers and other Air Force experts that will come to assist them.

The base for example will give certain people, they
10 will give safety officer and a quality control officer who will be detached to deploy with the squadron, there will be a media person. When we went to Sweden we sent a lawyer from headquarters because there could be international issues with Legal and this is all part of normal operations in an air force
15 and army and navy, it's all the same, you take your unit and you get assisted by then additional staff from the organisation Chair.

ADV MPHAGA: And the utilisation from the two flight test instrumented aircraft, can you deal with that?

20 BRIG GEN BAYNE: Yes, I think I covered that fully before mentioning that we use it, our local industry use it, sometimes overseas companies want to use it and it's all done through formal contracting via either ARMSCOR or our Chief of Finance division and we will then support it and it's obviously then, the
25 costs are covered by the entity that wants to use that, we of

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course get the spinoff from it by having our people involved and flying the aircraft. Thank you.

ADV MPHAGA: We also get a spinoff in that we can generate capital from it?

5 BRIG GEN BAYNE: Yes, I mentioned it. So, we in other words, our pilots fly in some of these and it's paid for by someone else, so I get more flying hour from my air crew, the ground crew get more practice and also the important thing is that our test pilots and engineers, because ordinary, as I
10 mentioned to you ordinary line pilots do not utilise those aircraft, so it gives our test pilots exposure to a wider global test flying environment than they would have had had that not occurred. Thank you Chair.

ADV MPHAGA: Thank you General. Can you take us through
15 paragraph 50 on the ratio of force preparation *versus* force employment.

BRIG GEN BAYNE: Yes Chair, the ratio for the aircraft utilised so far, which were requested to submit gives the Hawk at 95% force preparation and 5% force employment or ..., and
20 then the Gripen is 94% and 6%. The bulk of the 5% and the 6% so far was during the World Cup where they flew extensively in operations. As I alluded to many of the missions that are flown under force preparation, however, are also in serving our clients and doing actual work for either our own purposes, the
25 Defence Force, the Department or other departments as well.

And just to explain the difference between the two concepts if I may, force preparation is all-continuation training flights of qualified air crew at flying units, this is on page 116 of the evidence, "JWB11" page 116 Chair, and force employment is all-tasking except flights as stated in paragraph 1 and 2, hours flown for SAAF participation in joint exercises are recorded by the SAAF as force employment unless otherwise specified, as I said just now. So sometimes it will be with Joint Ops and sometimes ourselves will be force employment.

10 Training is the basic flying training that you first do on the aircraft and so you could see that training and force preparation is basically the same, the only difference is during training he's not yet qualified on the aircraft, he's under instruction all the time. As soon as he qualifies what we call a type-certificate qualification he goes over to the force preparation part of the flying. Thank you Chair.

15 ADV MPHAGA: Thank you General. Can you then take us through paragraph 52 and refer to "JWB16" and 17.

BRIG GEN BAYNE: Chair, here in the table on page 124 and 20 125 we were asked to submit the hours budgeted for each financial year between 2005 for the Hawk and current and then for the Gripen from 2008 to current which is on pages 124 and 125. On page 124 it can be seen then the hours that were budgeted for in the first column comes from the allocation to 25 the system group which comes down from the fiscus to the

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department every year and then gets allocated to the Air Force, the Air Force then allocates it within its capability areas and as Director Combat Systems I am informed around about the previous year for the first time in May of the previous financial year and again in November before that financial year what is my estimated allocation. The final allocation is then done after the Treasury does their final government work and I'm sure that my colleague from Chief Finance will be talking in more detail about this matter and the process, but to say that certainly by the end of the calendar, or the end of December before the next financial year starts in that April I have my final allocation.

That is the allocated funding for myself to go away and plan then to do the very best I can to utilise the system within that allocation and obviously in the beginning when you first deliver the system you are still under warrantee, you are also just getting going, the flying is covered by the contract with the contractor doing that flying and so you found that earlier the budget allocation will be less and would then normally either grow or it would follow as would be normal in Government budgets up and down depending on the departmental allocation and in my case the allocation to my system group.

But what I can show from here is that the progression of hours that increased between 2005 from 125

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when we first got the first one or two aircraft, very low obviously, then it grew exponentially to around about 2 000 hours in 2010 which was in line with the planning that we had done on the project or very close to that and then the rest of the buildup would have been dependent on the threat or the requirement at the time when we of course did these predictions in early 2000 starting to prepare the Air Force for the first few years of flying from the project side.

What happens is the full requirement, we table our full requirement during the Treasury and the departmental budget, so I don't want to go into great detail because as I said my colleague from Finance will be doing that, the bottom line is we put in our requirements, they are then looked at by fiscus and according to the decisions at Government level and then departmental level I get my allocation and I then know that I can achieve a certain amount of flying hours which is the baseline of our whole budgeting and planning system to deliver those hours because if we're flying aeroplanes and we're flying hours we can then gage the level, the number of pilots we can operate flying at those levels, how many ground crew we need *et cetera, et cetera*.

As you can notice what I've tried to point out that over the years we have in general exceeded our hours for which we started our planning against that allocation. What that implies is that in here my requirement would have been

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higher but my allocation allowed me then to say well, if that's my allocation I can plan to fly these hours. What happens in here, and again it will be explained, there are iterations in year where the Treasury and the own department reallocate funds between departments and in the department with between the arms of service or divisions and even in the Air Force the chief of Air Force with his counsel reallocate money in year either for reasons of problems with expenditure or other issues which I think is well-known in the Government and in departments.

10 Now I have every year despite not getting my allocation requested in my full requirement, I have in every year been given some additional funding and you can see this reflecting in the fact that in year then my situation has been looked at and said okay, Combat will be given an extra amount of money at a point in time, hence the reason why I have said there in some years with additional funding I've either been able to meet the requirement or be very close to the requirement, obviously this is not only flying hours, sometimes in year you get a, as you mentioned the aircraft might have some damage that you need to repair, there could be other repairs that you have more aircraft that need repairs than you anticipated, well then you have to move some funds from flying hours into those repairs because they are important to be done, but in general I can say that relative to the beginning of the financial year so far I have been given additional funding in

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that year throughout.

One of the anomalies is in 2006 on the Hawk you will see that we planned to fly 1 480 hours as part of the buildup to our capability, I only flew 681, the reason for that is that due to the development on the Hawk of the avionic system there were some of the deliverables that could not be delivered with the first set of aircraft and so we had an avionics baseline at delivery and the later aircraft came with the upgraded baseline and we had to, the other aircraft needed to have this avionics upgrade and it involved taking some of the aircraft, what we call line replaceable units or black boxes out, sending them down to ATE to be upgraded and sent back, nothing abnormal for a newly developed avionic system but that was the reason, and we said that there why we flew less in that year than what we had planned to fly.

In 2007 again the upgrade was completed, in 2008 the reason there was we did not get additional funding in that particular year, so although we were hoping and planned to fly 1 950 hours, we flew 1 481, still higher, however, than the year before, so important that we were still able to be ramping up at this point in time.

The World Cup of course in 2011 gave us, sorry in 2010, that large increase was because of the World Cup and as I said earlier that additional flying we did was funded by Joint Ops, so that came as funding from Joint Ops, so the more that

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the aircraft can be utilised by Joint Ops is actually to the advantage of my training in year just to put that into perspective because then I get hours paid for by Joint Operations to augment my hours and my flying.

5 In 2010 and 2011 we had some additional funding allocated and in 2012 again we flew more hours and this was through some other savings that we were managed to generate within the directorate as well as some additional funding from the Air Force, so in general funding-wise again given what I
10 was allocated we have managed to exceed that allocation and fly more in most years on Hawk so far, but as you have seen, and I think this was alluded to by all my colleagues that we know that after 2008 and the impact of the economy hit the country, it hit the fiscus and we understand this in the Military,
15 and so we will have to take our fair share then of reduced budgets and funding challenges and so we would have had to plan for that but it's not like it's done at the last moment, we are given warning by Treasury and our department and in my case I get warning, I get a fair good idea a year before the
20 time and then close to the time of the allocation and that gives you time then to plan to fit within your budget and cut your cloth to do your task and that is the task that we have as directors in the various system groups.

25 If we then go to page 125 Chair you then see for the Gripen a fairly similar pattern starting in 2008, obviously the

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aircraft again have just arrived, the contractor is doing the training, aircraft are being brought onto the line and you start your initial training fairly low. We then were able to build up in the second year to just below the plan of 950, this was a little bit of getting used to the aircraft and we mentioned there about some spares that went in-in warrantee and because the spares are in warrantee they all go back to the OEM, so there is a bit of longer lead time in turnaround but of course they are repaired by SAAB at that point in time and so this is where we were still settling in and getting the aircraft settled in its environment.

The next year, the Soccer World Cup, you can see again a large increase to our planned hours due to the Soccer World Cup and again we received that funding for employment from Joint Ops. In the second, in 2011 we may point it out that it was important because our hours that we were able to afford as you can see we took quite a knock in terms of allocation to combat systems in 2011, but we had an unexpected year in terms of aircraft serviceability, it was just one of those years that went well and also we were able to spend more money on fuel than replacing spares in that year because we had a very good serviceability rate at that stage of the aircraft and thus the higher output, but also we did receive some additional funding for operational test and evaluation, the reason being that we were concerned that if we did not fly these extra hours

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we would not achieve the operational test and evaluation adequately to take back to the contractor to address and so the Department and the Air Force found some extra funding for us to achieve that.

5 So, I'm trying to allude to this is a continual balancing of resources, it will always be scarce, we understand that and so we have to live with the fact that some years I will get additional funding, in another year the helicopters might be higher priority or transport in the Air Force or in the arms of
10 service and this is an ongoing process that is a reality that we live within our domain.

 For last year in 2012 we came very close, I got funding and I planned on the hours and we flew those hours as you can see and normally we use a ballpark of around 10% for
15 our reporting on our annual reporting plan into the system is acceptable, so I didn't give a reason there for the additional hours on that, but one can see that with the Hawk that was building up, it built up quite quickly to the 2 000 hours in call it the good years, but since then like all departments and funding
20 has got tighter the Hawk started to slow down that ramp up and had to then reduce, the Gripen did not hit that point because as the Gripen was delivered in 2008 is when the pressure came on the budget and you find then that we were fortunate to have the operations which helped us to at least keep a fairly steady
25 increase in hours but at the moment again we know that we are

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in fairly tight times, so that is just to put in perspective also to show that the aircraft have all flown, there's no aircraft that haven't flown at all, some more than others and the reasons why and how the difference between what is reported in the beginning of the year and then at the end of the year in the actual flown and the deltas and the reason for that Chair as requested. Thank you.

ADV MPHAGA: Thanks General. So, it appears that the number of hours that you fly will depend mostly on what Treasury allocates to you per annum?

BRIG GEN BAYNE: Yes, that is correct.

ADV MPHAGA: Can you take us to paragraph 53 where you are dealing with the average cost per flying hour over the last three years as approved by National Treasury? That's on page 10 and 11 paragraph 53 and 54.

BRIG GEN BAYNE: Chair I just request a moment here to have my papers, I'll be with you in a second Chair, sorry. You said page 15 hey?

ADV MPHAGA: Page 10 and page 11 paragraphs 53 and 54.

BRIG GEN BAYNE: Yes Chair we were asked to give the cost per flying hour and an explanation for that in our submission and here I've shown then the flying hours that were carried out on average over the last three years in the table on page 10, in the table at paragraph 53. Just to say that the cost of our flying per hour is submitted and approved by Treasury and then

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this is a standardised rate that is used for all departments and for our own purposes, so on the average of the flying hours over a period of three years the dry cost, which is without fuel, you got a dry cost on an aircraft and wet cost, the only
5 difference is the wet cost is with fuel and the dry cost, and that is normally how Treasury wants it to be submitted and that then gives the total flying cost per hour for the aircraft over those hours average for the last three years.

If one would go then to paragraph 54 on page 11 I
10 allude to the fact that the aircraft earlier were in the URS designed to fly an average of 4 000 and then 3 600 hours once reaching steady state. For the Hawk that should have been in around about this time and for the Gripen in around about 2016 and the ramp up would normally be fairly even. This, however,
15 remember, is for an average over 40 to 50 years of flying and would then obviously vary between times of conflict, times of peace, times of ramp up training, times when you have to perhaps slow down as we do at the moment due to constraints and often flying hour or cost per flying hour becomes an issue
20 for many causes and cases, it's no different in all air forces, I'm just trying to show though that you will have many people say but the aircraft is very expensive to fly because it costs the costs it does. As we said these assets are expensive, however, the more you fly them the lower the cost per flight
25 hour becomes because your fixed cost stays more or less the

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same, what varies then are your variable costs, which is normally your repairs will be higher but your fuel usage is also higher, but you amortises it of course over many more flying hours, so your fixed costs in this sort of game of high tech military equipment, your fixed costs are normally higher or a lot higher as you can see than your fuel costs in the case of the Hawk 22 *versus* 15 and then Gripen your dry *versus* your wet cost is higher. So the more you fly, the less the cost per flight hour I think is all that we are trying to illustrate in these two tables to you.

This also impacts then as I said on the lower *versus* higher flying rate and so therefore the ratio of Hawk to Gripen cost, if you take that ratio is roughly around about 37% of my budget towards Hawk and 63% towards Gripen. This then again gives some idea of the cost difference between a lead-in fighter trainer or call it aircraft of that category *versus* a Gripen which sits at around about 63% of my budget that I need to expend then for the Gripen to reach its flying system.

We believe that once we have fully handed over this ratio will be around about 30% to 70% and by comparison of other air forces and other similar types of aircraft this is a normal ratio, this is not an abnormal ratio, it doesn't mean that one is largely more expensive than the other in terms of operating if we benchmark with the other Gripen and Hawk users that are currently flying the aircraft.

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An interesting point I'd like to point out is we need to add to this challenge for the Air Force and of course the Navy as well the challenge of aviation inflation Chair, aviation inflation last year was 14%, this is against a CPI of 6%, and this is a challenge because you do not always get compensated for that delta in terms of allocations and so this is also not only prevalent in the Military, I'm sure if you go to see our airlines and local aviation and international aviation they will tell you the same, that aviation inflation is considerably higher than CPI inflation or most other industries mainly driven again the fuel which as you can see is a large consumer of cost on aircraft and so I just thought I would like to point that out to the Commission to gain some better understanding of some of the challenges which we live with.

And then I did also submit "JWB12" which just shows a graph of the change in the fuel price since the 1990's through to present to show that large increase in that cost factor which makes up roughly close to half of the cost of us flying our aircraft each hour by way of clarification Chair. Thank you.

ADV MPHAGA: You said "JWB12" on page 117?

BRIG GEN BAYNE: That is correct.

ADV MPHAGA: Now you are saying that the fact that we are not flying our designed-to hours for the two aircraft has an impact on the amount per hour that we spend?

BRIG GEN BAYNE: Yes, as I said because of that ratio that I've explained the more you fly the lower the cost per flying hour, it doesn't mean the aircraft is cheaper because you still have fixed costs, it's still a cost to the system but if you then, 5 if you turn that around and ask the question if you need to maintain these systems, the integrity of the system, you need contracts with your contractors *et cetera*, your fixed costs is a given, you have to then expend your funds first to secure that.

The remaining of your funds goes into flying hours, 10 so if your funding and your budget comes under pressure in our case of the Air Force then normally the tail end of the costing will be your amount for fuel which is then your amount generated into your flying hours, so then you will find that your flying hours will have to be limited and then you have to then 15 package your training for that year and your utilisation for that year to be in line with that and hence at the moment with the lower allocations that we are all aware of I'm sure, then the flying hours are less than what the system can fly and certainly what we would be capable of flying had that been greater, but 20 again we understand that and we need to plan for it and we need to do it professionally and make a plan in order to live with that situation Chair. Thank you.

ADV MPHAGA: Thanks General. Can you just take us to the authority measures that you have implemented in the 2013/14 25 financial year.

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BRIG GEN BAYNE: Chair as I said we know before the time if it is going to be, and we were warned that this would be a particularly tough financial year, 2013/14 financial year, and so we were all asked by the Air Force and by the Chief of Defence
5 Force to look at austerity measures. In the combat line the first austerity measure that I realised was that I would not be able to retain all of my air crew on the two platforms that I had trained so far and so that was one aspect.

The other one was the need to find a way of
10 reducing the amount of aircraft that we would put on the line every day in order for us to live within that allocation and thirdly to manage the risk of doing these actions and so we did planning before the time during last year to prepare for this. I can say on the air crew side what we did is we made sure that
15 all the air crew who were still under conversion training in the various levels that I've explained, we first secured that we would complete those training courses, the reason for that being that if you don't complete that course then you will have to repeat the full basic training if you stop that course which is
20 one option, we did not do that, we made sure that we first finished that course.

That means that the pilot is what we term type-qualified on that aircraft, he can safely fly in the aircraft in the air in all its basic modes, he may not yet be able to do all of
25 the operational roles but he is converted. To then bring him

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back later if he's being, and he could be ill for a long time, he could have to go on instructors course, he may be given a ground tour, we also send our air crew on ground tours up to the operational areas *et cetera*, when he comes back to that platform he only has to do what we call a refresher course which is much shorter than a, as you can imagine, an operational conversion course, probably around about 25%, 20% to 25% of the hours required. So we made sure that everyone that had commenced a course we plan to finish their course and I can say sitting here today in the year we managed to achieve that.

Then we took some of our qualified more senior air crew and what we did is we moved them down back on an instructors tour on the Pilatus PC7 with some of our younger air crew who were qualified but did not carry on flying on Hawk and we've placed them at a flight doing advanced flying on the Astra so that we keep our young pilots airborne, flying and active. This will even further reduce the jump back when they come back to the Hawk because they are already prepared, but that is a fact, it was prepared for and we have done that, and we've kept the core of pilots then on Hawk that were required to do so.

We have adequate pilots on Hawk currently to feed the Gripen and so this has not impacted on a feed-through onto Gripen and in fact we qualified another pilot from Hawk onto

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Gripen in the last year as well as a navigator because the navigator and the pilot go onto the course, they do the same course as well, so we did not totally stop throughput onto Gripen to ensure that we also did not impact on our frontline operational capability, what we did do is we also then sent air crew who were eligible for instructors course because as I said to you earlier all air crew, fighter air crew go and do instructors course at a point in time because you need to start to prepare them to become pilot attack instructors, so we took some of our Gripen air crew and we moved them onto instructors course, one, two members from there and two from the Hawk, slightly earlier on to instructors course so that they would also then get going with that course, keep flying on Astra, gain a qualification and they could then come back earlier to become (indistinct) on Hawk and back to Gripen.

So without going into great detail Chair I want to assure you, and the country, that this was not done without a lot of planning and a lot of sensibility taking into cognisance the realities of what we need to achieve but not impacting on our frontline capability with in line of the current requirements from Joint Ops and the Department, but slowing down a little bit the training but not stopping young pilots from flying, allowing them to continue flying on another platform and bring them back, then the remainder of the reduced Hawk pilots continue on Hawk and fly at the hours as allocated and

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continue to operate. That was the air crew austerity measures that we took.

The second measure that we took and has probably been reported on a lot, and is probably quite a difficult one to understand and I hope to clarify this today at the Commission, and this goes about the aircraft management of the fleet in these times, what we realised as I said is, and I think we have alluded to that, the Navy and the Deputy Chief, that you operate fleets of aircraft at levels that are required to do a task given a scenario, it's not that you don't get warning from Joint Ops and everywhere else, so you will tailor your assets and your requirements so that the Air Force also doesn't allocate money to combat when there are other urgent needs to be met that need to fly every day and currently I accept as combat that my helicopter compatriots and my transport colleagues, they are out there doing jobs every day which I am not doing every day, so therefore they will get a bigger slice of whatever cake, this is normal, it's no different, I can assure you to many of colleagues I've spoken to worldwide, east, west, everywhere there have been massive cutbacks in defence and similar measures and we have shared some of these ideas with our other air force colleagues as one does and we are not alone in doing what we are doing at the moment.

So, I would like to refer then to a document that I have submitted on page 118 and I would just like to read it and

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if it could be noted as such by all that this is the status that we call it, and it is the same for Hawk, Gripen and Hawk aircraft preventative maintenance cycle and to give some background that during the first quarter of 2013 Director Combat Systems
5 investigated a possibility of inhibiting or putting into long term storage as the term is, certain of the Gripen aircraft, at the time was number was 12 that we identified and that has been reported in the media and the Minister did report on it in March in Parliament, but during engagement thereafter with the
10 original manufacturer being SAAB, with them we worked on a more effective and less costly process was agreed to, reducing the number of maintenance activities required for storage and making the aircraft more readily available for flying.

We found out being new aircraft and modern
15 aircraft, and we have looked previously on fleets at long term storage that both these aircraft it would be far more costly and require much more maintenance putting them into long term storage than determining the minimum time, days in fact, and we know the exact days now of how often if you just fly that
20 aircraft, get it airborne, generate the systems you reduce largely the maintenance and the cost of that storage. This was not known to us before and with older generation aircraft this was not necessarily so and endorsed by the manufacturer.

So, starting with the Gripen's we then supported a
25 statement by the operator from SAAB and then embarked on

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what we called a rotational preventative maintenance programme to better retain the fleet system integrity, because what is very important is not to lose your integrity on any aircraft, your airworthiness and if you can fly it every now and again means that your ground crew are practicing on it, the air crew are flying it and one is able to continue.

We also placed the aircraft that was identified in tents inside (indistinct) to prevent corrosions, these are tents that are dehumidified to ensure that you prevent any corrosion, external damage to aircraft and you strictly control the environment in which the aircraft are secured. I know it's easy and I've seen many diagrams and statements about aircraft standing and in various states of status, I can assure you this is not done without engineering and logistic professionalism and properly, and so as this extra measure ensures because when aircraft do stand it can be that they can have damage, we have before as many air forces you have often sometimes rodents that can get into an aircraft, they can eat wires and they cause havoc on aircraft, this happens, so by doing this we have taken measures to ensure that this does not occur, and so all 26 aircraft will therefore continue to be flown and managed in accordance with this procedure and the same if necessary for Hawks.

The other advantage is now serviceable aircraft can be removed from the RPM maintenance programme and be

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available on the flight line within two days as opposed to going into long term storage where it would take a long time to get this aircraft out and hence the reason why in recently, I'm not sure if it was last month or in June we got another enquiry as to how many aircraft are in long term storage and the answer was none, so there are no Gripen's in long term storage, there are, Gripen fleet is in this process that I've tried to explain now which is, I don't think one needs to debate it, is clearly a much more cost effective and efficient way of maintaining the fleet in times when you do not require all your aircraft for utilisation and training. Thank you Chair.

ADV MPHAGA: General, you are referring to a letter dated 16 August 2013 which was addressed to the Chief of the South African Air Force which has been signed by yourself, am I correct?

BRIG GEN BAYNE: That is correct.

ADV MPHAGA: There is also terminology called mothballed, what does it mean?

BRIG GEN BAYNE: Mothballing is basically long term storage, another word. What happens is if you, I'm sure most people have seen pictures in America of the Nevada Desert, they have conditions there where the United States Air Force in its, when it had thousands and thousands of aircraft standing in disposal or that they could not fly they just parked them in the desert and because of the conditions they can be stored there, those

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type of aircraft taken back but then the cost to get them back into flying is very high. Many air forces have gone into long term storage, on the older aircraft it was necessary, we also stored the F1's when we phased them out for quite a long period while they were in the marketing phase and they also had to go into this long term storage and then be brought out, however, in this case due to the type of aircraft and engagement we believe we found a much more cost effective and efficient way of doing the same, but through this rotational process Chair, and also I think to add to that, the fact is that we, it is so that funding can also change at any time because the situation can change at any time and as we've shown here should that be the case then we can rapidly take those aircraft back out and put the number of aircraft required on to the flight line Chair.

ADV MPHAGA: What about the Hawk's, are you using the same process in respect of the Hawk's?

BRIG GEN BAYNE: We will use the same process for the Hawk's, yes.

ADV MPHAGA: Now these underutilisation of the Gripen's, does it affect the intake of new recruits for the Astra?

BRIG GEN BAYNE: Similarly to where the combat line will have, call it slowed down, similarly the other lines also have challenges and therefore naturally you will train less pilots, but the big thing is not to stop, if you stop as I explained yesterday

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which would be, which happened to us in 2003 to 2005 when we phased the Impala's out and had to live through, fortunately we still had the pilots flying the Cheetah at that time, but that took about four years to recover from that, so this is something you really don't want to get to, so we will not stop, we will continue to train but at lower levels in line with the allocations just like many other air forces adapt to this situation. Yes, that is so.

5
10 ADV MPHAGA: And does this also have any effect to the strength of technical personnel, SAAF personnel and the morale?

BRIG GEN BAYNE: In terms of technical personnel so far no, there is a turnover of technical personnel but again the personnel, remember I said can also move to be trained on other aircraft types or between the two or also go back to the ASU and in general again in these times you will never be fully manned, so it's not like you are having excess ground crew, you have adequate ground crew and like I said in this process fortunately we still require, and those ground crew will still be doing the tasks, getting the aircraft ready to fly, servicing the aircraft in the hangar while it is you know in this rotation, the maintenance continues on the aircraft at a normal rate on the ground, so your technicians keep practicing so we do still need them.

25 Also bear in mind that squadrons and units Chair do not just fly, there is an enormous amount of work that has to be

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done and tends to get behind when you have periods of high flying and that is the writing of doctrine, SOP's, further training, we can now get our young air crew to do certain of their developmental courses, this is what you do in times when
5 your flying rates are lower, you train them, you send them on their other courses that they need to do so that when your flying hours need to increase again or are able to increase then they have done that training and you can put them back again and ramp up and train faster, and this is not the first time in
10 this Air Force in my 43 years that we have been through this, we have been through it there times, as I alluded to the cuts in 1990 and in 1997 similar actions had to be taken, so this is not an abnormal thing to happen in the longer life cycle of a system in my view Chair, thank you.

15 ADV MPHAGA: Now is it, what will be the effect if we would have disposed of these 12 Gripen's other than to put them through this rotation process?

BRIG GEN BAYNE: Sir sorry, I don't understand the question, could you repeat the question?

20 ADV MPHAGA: I'm saying in terms, could we permanently dispose of these 12 Gripen's other than putting them through this rotational process?

BRIG GEN BAYNE: You used the word "could" and anything is possible, however, I think again we come back to the question
25 of do you have a need for a capability or not. Over 40 or 50

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years of operating the aircraft, those numbers were determined, they were below the Force Design of 1998, should the current Force Design process currently underway perhaps come to the conclusion that a different number is required it could be the same, it could be more, it could also be maybe slightly less, then that I imagine would be considered only at that point in time. I don't believe that the Military is in the game of reacting rapidly to such changes, we know these changes, we know conditions will change, conflict will change over time and therefore we believe and strongly believe then that these are the right and correct numbers to meet the requirement over the life cycle of the aircraft, but that is not a decision for myself, that would be a decision that (indistinct) would be done through formal review and certainly be taken at governmental level and would not be a decision, certainly not at my level but much higher. Chair, that's all I can answer to Chair. Thank you.

ADV MPHAGA: Thank you General. Can you just take us through paragraph 57 where you are indicating that:

20 *"The South African Air Force has an excellent well-balanced and well-equipped fighter system capability within the ideal three tier system".*

BRIG GEN BAYNE: Yes Chair, I see this more as a concluding statement where I allude to the fact that I think we have been delivered by the Government and by the project an excellent,

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well-balanced and well-equipped fighter system, it's capable within the chosen three tier system, it's ideal I say because the gap between the first and second tier aircraft, sorry, between the first and second tier aircraft is large and the tier between the second, in other words between the Hawk and Gripen is a smaller gap. This is ideal in any three tier training system and this is what was delivered to the Air Force.

The Hawk was also proven to have a cost-effective collateral operational capability as I alluded to in many of the operations and exercises that we've seen and can be packaged with the Gripen which is in our term a force multiplier with the two aircraft. The training success rate has also been very high for air crew, we have had very few air crew that have not passed the Hawk course to go on to the Gripen and we've also proven that this is from various backgrounds and from both genders.

The Gripen has exceeded, I would say the SAAF and SANDF's expectations, especially in a domain of modern fourth generation integrated systems, deployability, logistic support and reach, the Hawk and Gripen aircraft has also solved many of the past problems experienced with hot and high operations mainly thrust, also cooling and communications, perhaps I should expand on the cooling.

Again due to these modern engines which can bleed off more air to feed the aircraft systems than previous engines

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you can cool the aircraft avionic systems and the pilot in the cockpit to a far greater degree and we have always in the past struggled with these two elements and as you know electronics don't like heat, they have to be controlled, and these aircraft have large avionic systems in and therefore the cooling demand on the aircraft is very high for the systems as well as for the air crew and these have been overcome with these two aircraft by having the engines that they do have, and it is quite a factor because if you are flying in certain operations as happened in the World Cup where the aircraft were airborne for up to three hours at times in the air in sometimes fairly hot conditions although it was winter, but some of the games were in Durban with high humidity you can imagine the fatigue that would then be on the air crew over those three hours in the air if the cooling was not efficient, so it is quite an important aspect that has improved, so I'm sure if I had to ask any of my pilots who flew the previous aircraft these three come up.

And lastly clearly the Hawk and Gripen systems have, I believe been well utilised since delivery, in line with the current security requirements and the funding allocations which have been allocated to the Air Force. Should the security environment change, however, to one of conflict then the utilisation of the systems will change as and when required to defend and protect the Republic in line with our constitutional mandate, and so in these times of requirement

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and security situation this situation is managed, I believe as best as possible to meet those requirements Chair. Thank you.

ADV MPHAGA: So would you say also that this under "Finding Challenges", they have not affected the capability of the South African Air Force to meet the constitutional mandate?

BRIG GEN BAYNE: Well, the current requirements given to us by Joint Operations as to their requirement currently, those can still be met by the Air Force, however, if we sustain these lower levels of funding there will come a time when training and renewal will become a problem but perhaps I can, at the moment the allocations which I currently have and will receive in year will allow the aircraft to be operated at a higher utilisation rate over the next three years, my allocations currently, remember I said they are estimated, there could be other cuts that come through the process until next year but currently as predicted by the Department all the way down to me in combat was that this was going to be a tough year.

And if I look at my allocations over the next three years they are higher each year than I have had this year, so in terms, and I say again these are current estimations according to normal process in the Department, this could change. Should that be the case then I believe with the austerity measures that we have taken the next three years will see a gradual recovery from the situation that we currently find ourselves in to add to that, that is the current status as we

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have it Chair. Thank you.

Perhaps I can just add, it wasn't asked directly but has also been reported on regarding contracting, just to confirm that the Hawk system is fully contracted for what we call steady-state support, the Gripen system was on contract 5 until March of this year, we did have a challenge in year because when you go from the what's called the interim support contracts to steady-state contracts there will be an increase in those contracts because you no longer are supported by the 10 project and warranty and all of those matters, we have had a challenge in year with SAAB not only financial but some other contracting, but we are confident that we will be on contract by the end of this year fully, have a fully, be on contract on support contracts on Gripen in line with the expected improved 15 funding so that we will not only be on contract but we can start to increase flying hours as of the following financial year. Those are the facts as I have them at the moment Chair in terms of utilisation and funding. Thank you.

ADV MPHAGA: Now General in the event that the Commission 20 recommends the cancellation of these contracts what will be the impact on you as a Director Combat Systems?

BRIG GEN BAYNE: I think the impact, first if I can start on the impact on the country and the impact on the Department and Defence Force, because it will not be able to meet its 25 constitutional mandate and the requirement which is there for

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the Air Force to meet its air space protection and defence capabilities without a fighter capability. Secondly I believe as alluded to before that a fighter system is a national asset, it is not only there for conventional conflict and to defend and protect but it's also part of the country's national powerbase which the whole Defence Force forms part of and therefore you will lose again an element of that national power in terms of insurance policy, in terms of deterrence and in the projection of stability in the region, and as alluded to by my colleagues I think we have a view in the South African National Defence Force that South Africa is a regional, even continental and if I may even proudly say global player in its own small way with alliances, then I believe to have a balance of national power and Defence Force capabilities it's essential to have a fighter capability.

The other challenge would be that if you did not have this capability then you would lose the very key tenant or tenet of airpower in terms of precision firepower and high munition firepower and you would therefore lose a key element of an air force and of a national defence force and create an imbalance in that environment relative to the other capabilities of the country and the Defence Force, so I believe it would be an extremely seriously decision that would have to be taken regarding this matter.

And then lastly to say that if you lose such a

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capability as I've referred to earlier you will have a long period in order to replace it, should you replace it, if you do not replace it very soon and even if you had to try to replace it now the costs would be extremely high I believe, and you will also
5 lose that capability and have to retrain and ramp up that whole capability again and I have given examples of where even at short times what the impact was, you can virtually double the time that you don't operate as the time it will take you to ramp up as I would imagine in this specialist area that is how long it
10 would take. So, in terms of the recovery of the capability this will not happen easily in terms of time and cost.

And lastly obviously it would, I think it would be a major impact on the people and the *Esprit De Corps* of the Air Force as a whole to not have these capabilities throughout and
15 equally in any of the other arms of service as well Chair, thank you.

ADV MPHAGA: What about the local industry General?

BRIG GEN BAYNE: Yes, you alluded to that. Outside of that of course the local industry as you heard on Hawk is heavily
20 involved and on Gripen the same, and so you found find that if those capabilities were then not retained, then the local industry likewise would certainly be impacted and if your own air force is not there to support you and operate systems and that which you produce and support then we've seen in the
25 military game that it is quite difficult then to also stay in

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business and sell those capabilities to other clients worldwide, so believe that there would definitely in the defence industry be an impact as well Chair.

ADV MPHAGA: What about hosting major international events?

5 BRIG GEN BAYNE: Yes, I think again you will ... If there is certainly a guarantee required and a concern around security which I think there always would be at such events then the role that was played typically in the World Cup would not be available and therefore it could be that such events may then
10 not be able to be hosted in South Africa or would have to be, some other form of security would have to be then co-opted in to supported that capability for such events Chair.

ADV MPHAGA: Does the visits by imminent international leaders also require security in the sense of your capabilities,
15 Air Force capabilities?

BRIG GEN BAYNE: That's probably more a question for the security cluster level and I would not answer to that, but in my opinion, I can't give a definitive answer but in my opinion if this was the case for such an event as the World Cup Soccer
20 then there will be other events similarly and normally when heads of state travel, if it's for example, I can give an example of a G5 or a G20 I think is maybe a prudent example worldwide and South Africa are part of that, if that had to take place in South Africa then yes, not to the degree of the World Cup but
25 you would certainly need to ensure safety in the air space and

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in the Defence Force to cover that and that would not be possible then because you would have a gap if you did not have a fighter capability in my opinion Chair.

ADV MPHAGA: Thanks Chair, that concludes the evidence of
5 General Bayne.

CHAIRPERSON: Is there anybody who wants to cross-examine General Bayne? Thank you. Dr Madima, do you ...

DR MADIMA: Thank you Chair. There are several issues that were raised during General Bayne's evidence in chief and we
10 would request that we be afforded the opportunity to consult with him before we re-examine him. We are just a little bit ...

CHAIRPERSON: Dr Madima, General Bayne is not your witness, he's the witness for the Commission, he was called by the Evidence Leaders. I'm not quite sure if that is the position
15 whether you can consult with him before you re-examine if he is not your witness. It's just something which came to my mind you know just after you requested that you know probably we should wait until tomorrow morning, but then the question which I'm asking is can you consult with him if he's not your
20 witness?

DR MADIMA: Thank you Chair. General Bayne is our client and we just want to make sure that whatever we re-examine him on is not classified, it's not something that he shouldn't be saying, so if indeed it is, if it is classified for example we will
25 not re-examine him on that even if we seek clarity or we want

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him to expand on what he said in chief. I don't think that there is any problem with us consulting with him or "consulting" with him in that regard as long as the Evidence Leaders are not opposed to that, and I don't think they would be opposed to that because even during the currency of his evidence we were able to talk to him during breaks.

CHAIRPERSON: Dr Madima they are here, I'm sure they can talk for themselves, let me find out from them if they will object or not. Advocate Mphaga?

10 ADV MPHAGA: Chairperson we don't have any objection, we may be present during the consultation just to make sure as to what are the issues raised.

CHAIRPERSON: Okay thank you, then in that case that can be done tomorrow morning and General Bayne you are excused for the time being and we'll start with you again tomorrow morning at 09h30.

(COMMISSION ADJOURNS)