

# ADM

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ADM EXCLUSIVE



**FROM THE SOURCE**  
CEO of EOS  
Dr Ben Greene  
speaks to ADM  
this month

## STEM in Defence

**Naval Shipbuilding  
College ramps up**

**Space: an inspiring  
STEM driver**

**STEM program  
success in the  
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## Underwater Technology

Examining the pump jet  
debate for Sea 1000

Unmanned and  
underwater for RAN

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KATHERINE ZIESING | CANBERRA

EOS has been beavering away in the Canberra/Queanbeyan region for the better of 30 years, both in space and remote weapons stations (RWS). In the coming 12 months they are set to become Australia's largest Defence exporter thanks to huge RWS contracts in the Middle East. *ADM* Managing Editor Katherine Ziesing spoke to founder and CEO Dr Ben Green about their remarkable journey.

# Dr Ben Greene

Group Chief Executive Officer,  
Electro Optic Systems



## PROFILE

1972	Bachelor of Engineering Hons from University of Queensland
1980	PhD (Physics) from University of Hull
1971 - 1986	Director of national programs for space tracking and national Standards, Department of Industry
1986	NASA Achievement Award
1983	Founded EOS
2003	USAF Space Battlelab Honourable Member
2009	Warren Centre Innovation Medal
2014 - 2017	Chief Executive Officer, CRC for Space Environment Management (SERC)
2017	Director, Australian Research Council Centre of Excellence for Engineered Quantum Systems

**ADM:** Can you give us an overview of EOS business?

**GREENE:** EOS currently has two active divisions. One in space and the other in land warfare where we're most commonly known for Remote Weapons Systems (RWS). They are quite separate businesses.

The company is achieving significant success with its latest product ranges. The \$250 million worth of exports we will make in 2019 will likely see EOS become Australia's largest defence exporter.

The space business is growing at a similar pace as the defence business. So there's significant growth on all fronts, which is really not surprising if you look at the global tensions at the moment.

**ADM:** At first glance remote weapons stations and space tracking aren't logical technologies to partner. Where are the synergies?

**GREENE:** EOS was founded in 1983 as a space company, our expertise being within ground based technologies and space based sensors. In the 1980s there was a requirement to mount special sensors on weapons to create the next generation of smart weapons. This involved putting cameras, laser

range finders, and thermal cameras directly on to weapons to do real time fire control for land warfare. There was no company in the world that could do this at the time, and many still struggle.

The only company that had sensors that were robust enough to place directly on to weapons was EOS. Our sensors were developed for space launch which has very high shock and vibration requirements, so they were space qualified sensors for use in space sensor applications.

Tracking something in space requires precision that translated well into the land warfare business. We were approached by one of the major defence corporations to develop sensors to put on weapons and that evolved into what is now the weapons systems business.

**ADM:** How has the space business evolved alongside the weapons business?

**GREENE:** They're still very much in sync, we still have laser technologies going backwards and forwards between the business. The other core competency integral to both businesses is real time control software.

For example, in our more advanced turrets we have close to a million lines of fully qualified software that's been operational for at least 20 years and evolving rapidly as demands increase.

Similarly in space, our space software suite has around a million lines of very well proven code that's been in service in military applications for over 20 years.

**ADM:** Historically, most of your big contracts have been overseas militaries for RWS (Middle East customers, US, Singapore). Do you see that changing any time soon?

**GREENE:** No, it's never going to change. In EOS in 35 years, we've never drawn more than five per cent of our revenue from the Australian market and I don't think we ever will.

**ADM:** Why?

**GREENE:** Well the Australian market is quite small. Australia is spending \$200 billion over the decade in capital programs for defence equipment, for example. That's a very small percentage of what is spent by countries that we normally would compare ourselves with or be allied with.

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An EOS turret on a US JLTV contender.



EOS

**“Tracking something in space requires precision that translated well into the land warfare business.”**

So the market pool is much, much bigger overseas and the view that EOS has always taken, and it's not universally true but it's often true, is that you can't have a competitive product if you're only servicing the Australian market. You have to have something which is globally competitive and then you've got something world class for the Australian customer.

We therefore have a range of technologies that are having a benefit to an array of international customers. For example, next month we are bringing a new light weight RWS to market that has been developed for the international market but with a 'weather eye' on possible future ADF requirements.

The R150 is a 100 per cent Australian solution and was developed utilising defence innovation funding under the Priority Industry Capability Program.

australian business, to four or five per cent which is very positive.

Secondly, more importantly, we see the infrastructure of defence companies and capabilities around Australia improving and that improves the quality of our supply chain. It's a virtuous circle.

**ADM:** Has industry becoming the ninth Fundamental Input to Capability (FIC) changed your Defence operations in any way?

**GREENE:** Not really but I see it transforming other businesses and the overall infrastructure for defence. It goes way past defence companies; it goes through to the way that the defence industry operates and, in fact, the entire quality of the supply chain for the wider economy.

**ADM:** Do you think Defence is a sophisticated user when it comes to space based services and technologies?

**GREENE:** Look it's rapidly accelerating in that direction. We've been active in space for 35 years and for, 25 of those years our only customer was outside Australia and I think there's a very real prospect that within the next 10 years significant revenue for the space systems will come from Australia and they will be very advanced products.

**ADM:** What are they going to look like then? In 10 years' time, what does your space business look like?

**GREENE:** EOS' space business is really an intelligence business; we provide data. We develop very sophisticated and sometimes extremely large sensing systems. Sometimes they're as big as five storey buildings. The role of these systems is to find, detect, track, and classify objects in space which are otherwise not trackable, not findable. That is not going to change as space gets more congested. It will expand as more players become active.

**ADM:** A couple of years ago you signed a space situational awareness agreement with Lockheed Martin. What has that done for your business?

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**GREENE:** The agreement with Lockheed was basically a collaboration model for us to explore a certain type of sensor. The co-invested program has been used to deploy a particular type of sensor and test it for its usefulness and utility in a military environment.

date from the government, in supporting and enhancing space militarily is very prominent; given that most of the money that an embryonic space industry will require is going to come from government.

I think the agency will have a very strong role in shaping those space programs so that Australian industry can participate and achieve the building blocks necessary to compete internationally.

The space agency will also become a central coordinating agency for all the international obligations and relationships which Australia

**GREENE:** Australia's always been a world leader in exploitation of space technologies at the coalface; in other words at user level. We've actually been very good (and I'm not talking about EOS, I'm talking about the country as a whole), at leveraging space based technologies for commercial application on the ground, whether it's GPS or remote sensing data or crop management or law enforcement, you name it.

There's been a significant number of very strong Australian developments utilising the space technology for real applications. I think that will get a significant impetus through the space agency and will be better able to coordinate their activities in the international market and perhaps match them up to opportunities.

At the other end of the spectrum, there may be opportunities in space launch, space equipment, and space hardware. EOS designs and builds payloads for spacecraft. We've never coordinated that externally before but we're quite happy to put that in the mix with the Australian space agency as well.

**“The space agency will also become a central coordinating agency for all the international obligations and relationships which Australia has.”**

**ADM:** The new national space agency is now open and there's been a lot of buzz around that. What role do you see that agency playing in the space community, nationally and internationally?

**GREENE:** It will have a very important role. I think it's significant that in its man-

has. So I expect it will also enhance collaborations internationally for what are otherwise very small start up space companies.

**ADM:** Where do you see the growth coming in the Australian space market? Where are the opportunities?



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**ADM:** Do you think we'll see an Australian launch site, either for larger satellites or the low earth orbit NanoSat/CubeSat market in Australia?

**GREENE:** I don't know. But I wouldn't be surprised. I don't think it's a critical element in the building of a space industry but it certainly would be a welcome element if it comes. What's really positive today is that launch is a commodity, a service. There are a significant number of launch sites and launch companies around the world.

What we can know for sure is that if there's an Australian launch capability, it will be commercially sound because the competition is so strong at the moment. Any company that can grow up through that level of competitive environment is going to be, I think, commercially quite strong.

**ADM:** What role do you think universities and academia have in the space community?

**GREENE:** I think they have a very strong role. I don't see anywhere in the world that has a strong space industry where universities and academia haven't played a strong role in terms of generating a lot of the technologies and ideas.

EOS has relationships with a number of universities in Australia and, of course, quite a few overseas.

For example EOS had a leadership role in the Space Environment Research Centre (SERC). SERC is a consortium of three companies, two universities and two Government entities form under the Cooperative Research Centre (CRC) scheme. EOS is contributing around \$19 million to the SERC, almost a dollar for dollar co-investment with government. SERC is developing technologies to help mitigate the growing threat to the space environment caused by the proliferation of space debris. It is growing the pool of space and astrodynamics expertise in Australia as

well as developing systems to help predict and then avoid collisions between objects in space.

**ADM:** How have you found getting people given the high technology nature of what you do, both on the weapons and the space side of the business? Are you able to find the right people?

**GREENE:** I guess my answer there is a bit mixed. Yes, we do find the right people but there is definitely a very shortage of skilled technical people in Australia. You've only got to look at the employment figures for people with technical degrees and those figures are very, very low in terms of unemployment. We can't fill all the vacancies but we are able to grow just about at the right rate, in our space business in particular. We have had some international workers, under what were 457 visas because we simply didn't have access to those skills and experience locally. But, again, the pool that you can draw from for defence based programs, for example, is quite limited.

**ADM:** Is that an issue of clearances or experience?

**GREENE:** Both. \*

**“EOS is contributing around \$19 million to the SERC, almost a dollar for dollar co-investment with government.”**



**EOS' space tracking facility finds the indfindable.**

EOS