

# **Conny Kullman**

An interview with Martin Emanuel

15 November 2017 and 25 January 2018

## **50 years in space**

This interview has been conducted as part of the project "50 years in space", which is carried out within the Division of the History of Science, Technology and Environment, KTH, financed by the Swedish Space Board and Vinnova. The original recording is accessible at the Swedish National Museum of Science and Technology in Stockholm. The interview should be referenced as follows:

Conny Kullman, interview from 2017/2018 with Martin Emanuel, KTH.

Key words: 603 Reboost, British Telecom, Comsat, Intelsat, Loral, on board computer, PanAmSat, Saab Space, satellite telecommunication, TDMA, Telenor

## **Abstract**

The interview treats Conny Kullman's experiences from space-related work, first at Saab Space in Gothenburg and later from his career within Intelsat. Kullman describes the Gothenburg department of Saab Space—where he worked as a system design engineer, designing and testing on board computer models for the Ariane launcher and a number of European satellites—as relatively independent from the Linköping main office. Coming to Intelsat as a systems engineer in 1986, during the 1990s Kullman advanced within the organization and held management positions with responsibility for Systems Operation, Systems Planning, as Chief Information Officer, and as Vice President for all operation as well as Engineering. In 1998 he became CEO of Intelsat and embarked on a three-tiered program: to privatize Intelsat, to make an IPO, and to have Intelsat develop a ground infrastructure for satellite communication. In the interview, Kullman elaborates on the organizational structure of Intelsat, an “intergovernmental cooperative” as he calls it, and how this structure, having been a strength in the early days, in his view became a major weakness. As fibre optics began to provide a cheap alternative to satellite telecommunication, and with the development of competing satellite communication systems, the treaty-based regulations as well as the interests of the largest Signatories (owners) of Intelsat, not least American Comsat and British Telecom, impeded sound operation from a business point of view. The interview treats in detail Kullman's role in and insights from the privatization process, the transition in ownership in 2005, when Intelsat was bought by private equity firms, as well as Intelsat's acquisition of Loral (2003) and PanAmSat (2006).

Interviewee: Conny Kullman

Interviewer: Martin Emanuel

Time: 15 November 2017 and 25 January 2018

Place: Kullman's home in Gothenburg (15 Nov 2017) and Hotel Story, Stockholm (25 Jan 2018)

**Martin Emanuel:** I am sitting here with Conny Kullman in his home in Gothenburg to talk about his space-related experiences. These interviews usually begin with the childhood and upbringing to get a sense of the person that is being interviewed. Would you please start by telling me a bit about your background, where you come from and so forth?

**Conny Kullman:** I was born and grew up in Norrköping. My father worked at the Swedish railroad, SJ. He was repairing engines in a workshop at the outskirts of Norrköping. My mother at the time was working in a laundry and dry cleaning shop, receiving customers' clothing in the store. I was born in 1950 and we lived initially, until I was 8 years old, in a small one room apartment. No bedroom, just living room and a kitchen. I slept in a sofa in the kitchen and my parents slept in the living room. The residential buildings in Sweden were, I guess, in decay during and after the war and there was a big need for new buildings. There was a new area called Hageby outside of Norrköping that was being constructed and my parents got this two room apartment with bedroom, living room and a kitchen, in this area. It was actually one of the first new buildings that were constructed in Hageby. So we moved there when I was eight. I had started school and was in second grade when we moved.

I have recollections of things that you wouldn't do to your children today, I think. My first home was in the north side of Norrköping and Hageby was in the south. It sounds unbelievable, but I had a pretty good singing voice at the time, it got destroyed in puberty, but I was part of a choir and we had practices at night, and I remember, I walked from our new house on my own to the tram station, and then the tram ride. Norrköping is not that big but it probably took me about 25 minutes to get to the school where I had been, and then again to get back, like eight o'clock at night, which is something that you probably wouldn't do with your kids these days. There was a different level of trust, I think, at the time.

I stayed throughout my childhood in Hageby and I quickly found new friends there and liked going to school, and did pretty well from the beginning. I have memories from third grade when I made my first mistake in a math test, that's a dark memory of my childhood. I lived there with my parents and we moved because my parents wanted to have something bigger. But they never had any other children, so I was their only child. But in 1961, roughly two years after we moved to the new apartment we moved to another, larger, in a taller building with very nice views and a large balcony. That's the apartment where I lived until I eventually moved to Gothenburg to study here at Chalmers.

I started to play basketball when I was around 15.

**Martin Emanuel:** You're a tall man.

**Conny Kullman:** Yes. I'm still relatively close to 197 centimetres tall. There was a guy, Åke Björck, from the Jönköping-Huskvarna area, he had moved to Norrköping, and he really wanted to develop a basketball team so he worked with young people and he was also good at spotting foreigners moving into Sweden. When I joined he already had some, one of the players on the team was a tall American guy and he had some basketball

experience, of course, from growing up in the US, and we also had a guy from what was Yugoslavia at the time. Åke worked as a Physical Education teacher so he spotted young kids who had some possible talent and so I started to play with some of my classmates and we became a decent team. It was lots of practice. We practiced at least five days a week and played at least one or normally two games per week, so it took up a lot of my time.

**Martin Emanuel:** This is when you are still in Norrköping.

**Conny Kullman:** Yes. Just on that side-track, we eventually made it up to the national league and had a pretty good team at the time. A key player was a fellow called Mats Åström, who eventually moved up to one of the clubs in Stockholm, played for Alvik and played the national team for about 10 years as an adult. So he was in my class, actually, at the gymnasium and we played in the Hageby team in Norrköping together. We were promptly demoted from the national league, we only did one year there, but it was a fun experience, obviously. At the time, the main team in Sweden was Helsingborg. They had a really colourful coach and club leader. So they took the national title a couple of times. I did my best game ever against them, and they tried to recruit my friend Mats and myself. So they had just won the title that year and they invited us to their celebration party which was on a ship leaving Helsingborg. Now, I had decided to come to Chalmers and study here. I was 18 at the time and I also knew my limitations playing basketball. I would have needed to work very hard to become better than what I was. I made one Swedish National junior team roster, the first roster. But I didn't make it into the final team as player. I was probably at my peak then and I realized that, so I, kind of, was not that interested in going and my friend decided not to go to Helsingborg either. But, one year later he moved on to Alvik in Stockholm and played with them for many years.

After the first nine years of basic studies I started to go to technical gymnasium in Norrköping in 1966, and sometimes I reflect on that time period as a peak of capacity, when I had this basketball going on pretty much six or seven days a week. I worked after the gymnasium every day, I went to an electronics and radio and television store and worked in their repair shop, and also mounted antennas on the roofs of buildings. So at three o'clock, after school, I would start to work and worked until seven at night, then I went to basketball practice for two hours and then I took my moped or later the scooter and drove up to my girlfriend and spent an hour or two with her, and then after that probably I went home and did my homework or whatever. I felt, probably, that I could do anything.

I also did quite well in school. My basketball friend Mats and I, we were also friends and went to parties together. He has subsequently told my wife that he always knew who was the best on every test, it was always Conny. It was more a question who was number two. At that time they changed the Swedish gymnasium, it changed form from an old structure to a new structure and the course programs were not that well laid out. Sometimes central tests were given to all students in Sweden and those constructing the tests didn't necessarily understand or read what the students had studied in that particular time so the testing was a little misaligned. And I remember especially my last year, I did three years and then moved on to university, we had a test in chemistry and I was really disappointed because I felt I had done extremely poorly. You could have 24 points on the test and I had 17, which was sort of a disaster result. But it was very difficult and I felt pretty good when I realized that number two at the school had eleven. So they had totally misaligned the test with what we were supposed to know at the time. But chemistry was something that came very naturally for me and I probably figured it

out without literature. That's one memory I have from the school years, the capacity that a young person has, if you really put your mind to it you can do a lot of things. And, the studies are of course important but I certainly didn't spend a lot of time on the studies, but I must have spent enough time to do these results.

**Martin Emanuel:** This interest in technology and maybe also science, did it come early on?

**Conny Kullman:** Yes, I went to the technical gymnasium, the electrical and electronics program. But I had already decided early what I wanted to do, this is also perhaps a little unusual, I'm tall as you said so when I was in sixth grade I was 188 centimetres tall. So I was a 12-, 13-year old of 188 centimetres, so in all the school photos I am the tallest one. But I probably also was reasonably mature at that age. I was more mature, I've heard, than the others. In sixth grade we had a very good, young teacher. I don't remember how she looked or her name but I remember she encouraged me. At that time if you had good results, grade seven through nine, you went to what was the German "Realschule" type of system, Realskolan. She probably talked with me and tried to guide me where I should do those three next years. It seems that I actually decided when I was 13 that I wanted to go to Chalmers. I had a keen interest in electronics. I remember, I found some design drawings when I was at that age, and I put a small FM transmitter together and hooked it up to a tape player, so I played pop music over that transmitter. So we went with our transistor radio, and we bicycled away and made many tests to find out how far away we could listen to that music that was playing in our apartment. It was probably illegal to do something like that but it was a fun experiment. We found that it actually had a reach of roughly 1500 metres, or so. It was a small thing that I'd built inside a container for a personal bar of soap. So, like you said, the interest for technology started early.

My father was a repair man for engines on the railroad. He grew up before the Second World War and then decided to go to the railroad because it was considered a safe employment and it could also give you some advantages during the war, if Sweden had come into the war. You might do your service at the railroad rather than to be in the military frontline somewhere. So he had a keen technical interest also, primarily in mechanical things, and liked to do the repair work. And my grandfather, his profession was probably blacksmith, but he was a handyman. He could make anything and I still have a very nice armchair that he built from wood. He has made laundry baskets from wood that we have used as first year beds for our children, very nicely done where he has turned the round pieces from different types of wood himself. He died when I was around ten years old but I remember we would visit him approximately once a week, I would say, and he still, at that age when he was around 80, had a workshop. An old style workshop with a central electrical engine and all these leather bands getting the power out to the different tools that he had, and he did all sorts of work for people and companies even at high age, a fair amount of work at this workshop.

**Martin Emanuel:** Practically minded.

**Conny Kullman:** Interest for technical things. My father, my parents, didn't make much money with the type of work they were doing, but he was always keen on having the latest televisions and he would buy Bang & Olufsen, those kind of things, also in terms of stereo and Hi-Fi he wanted the best. He would do things at home after work. Nothing planned or nothing arranged but if there was something to do around the house, needing repair, he could fix a lot of things. I learned from him and I probably was coloured by

that, I got my own interest and I had this interest because of growing up with him.

**Martin Emanuel:** Was Chalmers and obvious choice for you?

**Conny Kullman:** Like I said, when I was in sixth grade and this younger teacher, energetic and quite helpful, she pointed me, I believe, in that direction. I have some memory of wanting to come to Chalmers already when I was 13 and then obviously through Realskolan and gymnasium. Those wishes formed firmer and firmer and, no offence, but I would never have gone to KTH, the Royal Technical University in Stockholm. My father working on the railroad, we got free railroad tickets for the family and so he would take me as I was growing up perhaps five six times per year up to Stockholm. It's only a short train ride from Norrköping, it probably took at the time about an hour and 40 minutes or so. We would go there and he liked to walk around to the technical stores, radio and television and other technology outlets. We would have lunch somewhere and almost always had wienerschnitzel because he had a favourite place for this. So, I obviously liked coming up to Stockholm for those visits, but I never felt comfortable as I was getting older to live in Stockholm. It felt very foreign to Stockholm whereas Gothenburg is a more friendly city, I think, than Stockholm. At least when I was young. I don't feel like that today, we have lots of friends in Stockholm, but at the time I wouldn't even consider it. I guess at the time you had Lund, Stockholm, Gothenburg. They just started the university of technology in Linköping when I came to Chalmers, I think that was the first year of the Linköping University, but it was an unknown entity. Obviously Linköping is close to Norrköping, so it could have been a natural choice for that reason, but I was kind of set on coming here to Gothenburg and I was set on getting an education around electronics and obviously computer science, it was then growing in importance in the late 60's, early 70's.

**Martin Emanuel:** But it still didn't have its own program, it was part of the electrical engineering?

**Conny Kullman:** Yes it was. It was part of the E-section. Electronics, electrical section at Chalmers. A four year program, and during the first two years you study a lot of common basics in math and so on. But as I specialized, year three and four, I selected almost exclusively electronics and computer type of courses, especially the fourth year, computer science type of programs. I moved to Gothenburg in September 1969 and started at Chalmers. After about a year and a half I met Lena who is now my wife. I was supposed to do my military service between year two and three at Chalmers, and initially I was supposed to be in the infantry in Linköping, but we had managed to get pregnant so Lena was pregnant with our first child when I was in the second year at university. We lived together and she became pregnant when I had actually started my military service. I was supposed to do a 15 month program to become a lower level of officer, like a sergeant, so I was supposed to be at the infantry but I managed to convince them that since I was going to Chalmers, it would make more sense to have me in Gothenburg somewhere. So I managed to get them to put me at the coast artillery here in Gothenburg, at KA4 as it was called. During that time, after getting to know Lena, two, three weeks later we basically lived together. She had an apartment. It was a very practical arrangement for me also since I had one year military service and I didn't really have a room to put my stuff in. We liked each other and then she became pregnant with Victoria, our first child. I did my military service here during the pregnancy period and then for the last three months, I think, I was supposed to be in Karlskrona in the south of Sweden, which was about the same time as she was going to be born, and I managed

to get discharged from the military. So I managed to find my way out after 11 months, I was actually demoted at the end.

Military service was fun in the beginning, we were out in the archipelago here around Gothenburg learning to drive boats and working at this fortress north of Gothenburg called Marstrand. The coast artillery had an installation there and I worked with the radar systems, as a radar system operator, not as a technician but as an operator. So we did some of our practices inside that fortress, which is probably from the 17th century. It was quite interesting. I started the military service I think in June, the whole summer we were basically out in the archipelago, and in early fall we did those kind of exercises at that fortress and at other places along the coastline. But we had, in the platoon where I was placed, we had an officer that was doing his last year in the military and he was somewhat of an alcoholic and would become drunk at work on Thursdays and Fridays. I remember, on Fridays after lunch when he kind of got a little bit intoxicated, he couldn't rise out of the chair. So if he was going to write something on the blackboard he would pull himself up. I found that kind of meaningless so the wish to be with Lena when the baby was born and being near her, and the displeasure with the education I was getting in the military... I managed to find a way out and left after eleven months. So the baby arrived during that summer before I started in the third year and actually, since I got out of the military then in May of 1972, shortly before the baby was born, I took a job at Volvo. I needed the money obviously and I went and applied as a regular employee and, of course, I was honest with them and said I work here over the summer, but it's going to be six, seven months so it's not the normal summertime job. I basically wanted a regular job and they agreed and said you have to promise to be here for six months and it turned out I stayed there for eight months before I quit, so I was there almost until the end of '72, or around the end. And then, obviously, I started to do the study work, both shift work and studying at Chalmers. So during that time period, with the child and living with Lena, you have duties and responsibilities, and I remember I was nine tests behind. You had three tests per quarter, this is what you have, so 12 per year, 24 after two years of studies, and when I went to the military service I was nine tests behind, and I didn't take any tests during the military service time period. I started to study more in earnest, so I think I took something like 19 or 20 of the tests during the third year, the 12 new ones plus the majority of what I had left behind, and my grades also improved, I did well both because of the responsibility, I guess, but also because of the last two years what I studied were applied science courses. I found some of the math and so on boring, they didn't do a good job, I think, of explaining why it was needed. I learned from my son it was still the same when he was doing his Master's Degree. The connection in the first couple of years between the math and the basic subjects you study and how you're going to apply them is not really made clear to the students, so I wasn't that motivated, just to learn math. I was interested in the applied, the application of the tools themselves. But obviously later, year three and four the pieces started to fall into place and you get a better understanding why you first studied all those things, it is a good base for analytical thinking and problem solving. So, I eventually got my degree after a little more than four years, in the fall of 1974. I did my thesis work at Saab Space in Gothenburg. They were obviously working on some of their space oriented programs or contracts at the time and I designed a DC-to-DC converter for satellite use on the space program.

**Martin Emanuel:** How did you end up working with Saab Space?

**Conny Kullman:** I wanted to do my thesis work in the industry so I looked at what was available, and one of the projects was at Saab Space, and that's how I ended up working

on this converter for them. I liked the place, and working after graduating in the same physical location as where I studied. Or, rather, I started to work with Saab before I had graduated, but as soon as my thesis was finished, I just had written the documentation and just had gotten it approved, then I was employed by Saab Space. I think it was from September through November until I had my paperwork from the university and got my final certificates, and had passed the education.

**Martin Emanuel:** At this point, how would you describe the Saab Space company?

**Conny Kullman:** It was obviously a small company within the large corporate group. The main activity for Saab at the time was the aerospace activity in Linköping. We, here in Gothenburg, also did some designs for the Scania Truck division and some for the Saab Car Company in the corporate group. Here in Gothenburg we did some electronics for the truck division. Some staff here was working on anti-lock braking systems for Scania. But those were only small jobs really, otherwise the organizational link was with Saab Aerospace in Linköping. But I never really experienced, in the nine years I worked at Saab Space, any management or supervision from Linköping. We were an independent unit down here, although organizationally we were part of Aerospace. We were roughly 200 people. There was also one division within Saab Aerospace in Jönköping, that eventually was named Combitech. We used some of their environmental test facilities. I can't remember that we had any electronic design related activities with either Linköping or Jönköping, it was just for some aspects of mechanical design and testing. But of course for this space related equipment... My group, the onboard computer group, as well as the other groups, we used the test facilities in Linköping. The thermal vacuum chamber and vibration testing, and those kinds of things, they were up in Linköping, because they needed them for the testing of components to the airplanes. And, we did mechanical shock testing in Jönköping. We had some basic facilities down here for environmental testing but the more serious equipment was in Linköping. They also did the multilayer circuit boards for us, they helped us with design work for those. In terms of the electronics design and so on, dealing with the customers, putting proposals together, designing and building and testing the gear, we did it all ourselves here in Gothenburg. It's just the environmental aspects and some of the mechanical aspects, like that multilayered boards, for instance, that they helped us with.

I found Saab Space to be a very good working environment. I worked the whole time within the On Board Computer group for nine years, when I worked at Saab Space. I found the mentality in the group, the interactions between the different players, it was very good. We from the On Board Computer group are actually having a party here in our apartment building's common facilities on Saturday. We'll be ten people meeting. We've done this every three, every four years or so, we try to get together.

**Martin Emanuel:** With this onboard computer group?

**Conny Kullman:** Yes. So, Jan Torin and Mats Steinert will be there, for instance, and a couple of the other guys also. Some have died away from us, the two project managers, John Hanje and Lars Sandberg are not with us anymore, but obviously the three key technical guys Mats Steinert, Jan Torin and Lars-Ove Krook will all be here on Saturday. We lost another key guy, Erik Mattson, he died from cancer, must be 20 years ago. But otherwise we try to get together so it's going to be fun seeing them all again.

**Martin Emanuel:** What was your role in this onboard computer group?

**Conny Kullman:** When I came on-board they had already gone through the first phases of development of an onboard computer systems and the three keys guys on the technical side was at the time Jan Torin, Mats Steinert, and Lars-Ove Krook. They had already gotten the first designs put together for an Engineering Model. They had been over in the US to learn more about how to design these types of systems and spent time at TRW, and then came back roughly a year before I joined. They did their work in -73 and I started in the fall of -74. So I came in when we the engineering model was being built and was assigned to do testing of this unit. I did some of the environmental testing. I was the technical person locally here in Gothenburg working with the European Space Agency, their technical centre. They had a program project manager on their side, so I travelled with him to the different test facilities and we made sure that this thing survived different environments that we exposed it to. I spent time with this British guy. We spent quite a lot of time together in Linköping and also in Jönköping.

**Martin Emanuel:** He came over from...

**Conny Kullman:** He was at the European Space Agency's technical centre in Noordwijk, in the Netherlands. It is called ESTEC. I found that work to be quite an interesting experience, to be in a small project group. We were less than ten people together with one assistant, a lady called Laila who helped us with documents and so on. And, then a bunch of engineers, mostly Master of Science degreed engineers, a couple of guys with PhD's, and Lars-Ove and one other guy who joined later had basic engineering degrees, so we were all engineers pretty much, and we worked very well together. There was a very high level of freedom as long as we delivered results, and I guess we did. We were quite successful in getting contracts for on board computers developed. The work on the first Ariane launcher computer system had started at that time in -74 and Saab Space here in Gothenburg had gotten a contract to build the onboard navigation computer for the first Ariane, so that's what I also worked on, really in parallel to finishing off this Engineering Model for ESA, feeding back to the design guys if I found some difficulties. They would do whatever changes were necessary and in parallel we were designing the functional boards for the Ariane computer. We used a lot of the existing design from the Engineering Model, but the external interfaces to the rocket were different than what the Engineering Model had, so I was tasked with the design of that interface.

**Martin Emanuel:** What were the main challenges?

**Conny Kullman:** I would say there were two things. The core design team, the three guys that I mentioned working with TRW, had put together a system where you had a bus system where you could add modules and connect them to a common bus, so it was relatively easy then to use some of the same functional modules that were developed for the ESA Engineering Model in the Ariane model. So the functional modules were just versions of what was done for the Engineering Model, then this interface module was specific for the Ariane onboard computer. To get that bus system to work we had this flexibility, what was clearly one of the key features, and it was important to get that working properly. We used those integrated circuits that connected to the bus in a way that was not really specified by the parts manufacturer, because we needed to switch these integrated circuits off and there was no specifications for leakage current and other potential problems if you had unpowered gates facing the bus at the same time as you have active signals passing by between two other modules. But we put together a screening method for the integrated circuits that added tests to the parts that were not

done by the manufacturer. We devised our own screening methods. So that was one challenge that I think was a key thing to the success of the OBC, the onboard computer systems that we made, that we had that flexibility.

The other was the environment when the rocket takes off from the launch pad and the satellite was at the front of the rocket with our computer sitting at the rocket's vehicle equipment bay, VEB, it was a ring on top of the rocket, on top of the rocket just below the satellite. You get quite large vibrations at this point up there in the rocket, and obviously before you had flown the rockets it's all calculated levels of vibration and so on and levels that they have been determined through tests of the structures, but we have to test our computer to make sure it survives in those environments, vibration being the most important. So we had on the different boards, I don't remember how many boards, let's say there was five, six individual boards in the computer, and the size of a computer board is such that you get resonance frequencies, that you get close to the vibration frequency of the rocket, so these boards will move violently unless you find a way of damping out that vibration. So our mechanical engineers, they had devised a friction point arrangement at the edge of the multilayer circuit board, so there was, in the case of the computer, a spring mounted and that spring made surface contact with the friction material mounted on the circuit board. So then when the circuit board started to vibrate you had a friction point between the spring and the board and that took away the vibration energy from the circuit board and of course that didn't work properly the first times we tested it. I remember, on the first vibration test we did on a full size mock-up model, we had a mechanical engineering model for the onboard computer that we did the tests on, and the first time a whole bunch of the capacitors that were mounted on several of the circuit boards basically broke loose and were flying around inside the box making a very unpleasant noise, sort of like popcorn at high speed. But we tuned that system and redesigned the contact points for the friction springs. It was like a spring steel material that looked a little bit like a question mark but about a centimetre wide gliding against that friction material, and for the testing, just to make sure everything was mounted properly, I remember we did tension tests on those springs to make sure they were putting the right pressure against the friction material mounted on the edge of the circuit boards before we put them on the vibration table. So the vibration levels on the rocket certainly were a challenge.

If I was to add a third thing. The inner parts of a computer works with something that's called a micro program, which basically says that the content of register A should now come out of the integrated circuit on the CPU board and it should go down to the arithmetic logic unit, and then be added with the content of register B and so on. And all of that is controlled with control signals, obviously. Those signals are generated by micro programs inside the computer. That's at the very rudimentary level of how a computer works deep inside. For me as an engineer getting the knowledge how a computer works from the basic inner parts, how you tie the integrating circuits together and so on, was very good knowledge to have. Then you appreciate it as you also work with the software, the assembly language that we used for these computers and eventually in the later years' more advanced compiler type of software design. I still feel that I have an advantage having that background as I basically understand what happens inside the computers, all the way to the deepest level inside the computer, and that I found to be a good knowledge to have, that full understanding. So coming back then to the third somewhat cryptic challenge, it was to get that micro program right. Lars-Ove Krook, one of the three guys in the core team, he was the guy writing most of that micro programming which was stored in Read Only Memories inside the CPU board. Then I remember, for the Ariane computer we put together floating point instructions, assembly level, low level instruction programming for floating point multiplication, division, and so on. We had a

sixteen-bit basic word length in the computer and the floating point number word was 32 bit, 24 bit mantissa and 8 bit exponent.

I was also then, in the later phases of the Ariane computer development, I was responsible for the testing. I guess they felt I did a good job on the ESA Engineering Model and no one else wanted to do it, so I got to do that for the Ariane computer as well. I wrote the test programs, the software that was running on the computers, to test it and to make sure all the pieces were hanging together. Part of that was to make tests on the floating point instructions to make sure they produced the right results. As it turned out I would occasionally get an error result from the floating point test and it turned out that when the eight lower bits of the mantissa all were 0, the micro program inside the computer did not work properly, so it produced an error result. The construction of that internal micro program that did the execution of the floating point instruction had an error in it, so that when the eight lower bits of the mantissa's 24 bits were set to 0, it produced an erroneous result. So that internal micro programming is a very intricate job for the designer. He has to have absolute knowledge of how the system works internally to put that together right.

**Martin Emanuel:** Later on, similar or the same kind of onboard computers were used for other kind of missions. What kind of modifications was necessary, for example, to use it in SPOT or Tele-X?

**Conny Kullman:** I was part of the team for nine years, so from -74 until -83, and so I worked on the engineering model of the first computer, I worked on the Ariane model, I worked on some of the revisions of the Ariane model as it developed over time. I worked some on the Tele-X communication satellite's computer and there was also a satellite called EXOSAT, for exploring X-ray radiation in space, that I worked on. But all of those programs were really based on the original Engineering Model design. When it came to the later programs, like Spot, I had already left the company. Most of Tele-X was also after I had left. As a side note I was supposed to work on the Tele-X program and be stationed in Cannes, so I went back to Chalmers and took six months of technical French in spring time, the third and fourth quarters of the study year. Then we were supposed to move to Cannes in late summer of 1983. They'd also arranged for me to go down early and spend time with a host family, so I would learn some French in place in France before I would be stationed down there to work on the program. So we were a handful of guys from Saab who would have our workplace for two years down in Cannes, at Aérospatiale. But what happened was that the Swedes delayed final contract signature. Aérospatiale down in Cannes were supposed to be the main contractors for building the satellite. They had subcontractors for delivering pieces to the satellite and we were going to do the TT&C equipment as well as the onboard computer, and some other bits and pieces. Our job would be to be an interface between the main contractor Aérospatiale and the Swedish subcontractor's responsibilities on the program. But then the requirements that the Swedish client put on the satellite were severe. Especially the transmit power capabilities on the satellite were difficult. So the Swedes were basically trying to push technology to its limits, as I understood it at the time. Anyway, the French were resisting, and final signature of contract was delayed.

**Martin Emanuel:** Who were setting the requirements, the Swedish Space Corporation?

**Conny Kullman:** Yes. It would have been the Swedish Space Corporation putting them together. I mean, working with the Swedish industry I'm sure... That specification work I had little insight into. We were not really involved. The signature of the contract was

delayed and in the meantime Jan Torin, one of the three core guys on the on board computer team had been over on a study trip in the US and meeting with some companies, satellite manufacturers as well as with the operator Intelsat in Washington. He met with Intelsat because he had a bit of an interest himself to work in the US for some time. And we were personal friends, Jan and I, we both lived in Kungsbacka south of Gothenburg at the time, and so when he came back he said that they didn't really have any job openings for him but here are two job descriptions that I might find interesting. This was in March 1983. I had already been selected to go to Cannes to work on this Tele-X program. I'd done half of my French studies, but then I was called in early April for an interview in Washington and I found that to be quite interesting, so I put an application in for both the jobs that were open and after a month or so they told me I got one of the jobs. Since the delay was happening on Tele-X, I felt that the only thing for me to do was to go to the US. So we packed up everything we had in the house in Kungsbacka and put it in a container and early August the container was picked up from in front of our house. That was a very emotional moment. I really loved my work at Saab Space, we really loved living in Kungsbacka. So when everything was in the container, we had three kids at the time—one and a half years old, eight years and eleven—the container goes on the truck and it's all sort of irreversible. All the neighbours are out on the street watching, and you wonder, "What the hell are we doing?" That's sort of when my career at Saab Space ended. So Tele-X was just starting and then there had been some studies of the SPOT computer but I never really worked on those.

Like I said, I was on the ESA Engineering Model, on the first Ariane models, the EXOSAT and also on the first phases of the Tele-X. The modular capabilities of the design made it reasonably easy to put together the different systems. We also had done a breadboard model for SPOT before I left. We had redundancy requirements for the SPOT computer, whereas the ESA Engineering Model and the Ariane models were single unit, without redundancy. Rocket launch navigation phases are only around 20 minutes long so there was no redundancy built into the Ariane systems. I think then, when we started to look at using our design in a redundancy setup, that bus design that I mentioned before was a key feature also for the active redundancy configurations to be put together. Jan Torin was telling about this in the seminar you had earlier. When testing redundancy in the SPOT breadboard system, we took card by card, function by function, and we would physically go in and remove integrated circuits or cut wires in the breadboard. And we had the machine doing calculations, so it was running a test program internally as well playing the Marseillaise for the French customers making sure, obviously then, that the test program ran properly and that there were only such and such long outages while the system changed over from one redundant module to the other. For the SPOT breadboard I built and designed a slightly more intricate test equipment. It turned out to be a way of testing that the French agreed with and accepted as proof that the concept worked. I don't think any final SPOT contracts for flying hardware had been signed when I left in -83. I'm a bit fuzzy on that timing.

Looking back, especially at the first period in the US, starting in August of -83, I got to work on new things and travel to new places and I got more content and change in my life. Life then gets longer, but not in a boring way, but in a positive way. Already after having been in the US for two years, I could look back and say I'd done this, I did this at that time and so on. And it was all kind of amazing things. I had nine very good years at Saab Space and I really enjoyed that work. I did apply for a couple of other jobs while living in Sweden, went for interviews, and I got a couple of offers, but never found a place that I liked or really wanted to go to, compared with Saab Space. And if you look at this core team that I worked in at Saab Space, they pretty much all worked there for life. They had their whole careers working with the on-board computers. So it was a

small group, lots of contacts outside of Saab, very interesting technical work and obviously good business success also. Looking at the Saab team and the continuation, if there were ten requests for proposals for On-Board Computers, we at Saab would get nine of those ten contracts. We had a very high success rate. So it was fun from that perspective also.

**Martin Emanuel:** So life had something else for you. What was it like for a Swede to come to the States and to this multinational organization? At this time it was not a corporation.

**Conny Kullman:** Intelsat was started in the 60's on an initiative by the Kennedy administration. They had realised the potential of using satellites for communication... Arthur C Clarke wrote an article in *Popular Mechanics*, I think it was in 1947 or -48, where he basically showed that with three satellites above the equator, 120 degrees apart, you could connect all points on earth by having those satellites in geostationary orbit 36,000 kilometres roughly above the surface of the earth. At that altitude the satellite will rotate, do one rotation around the earth in a 24 hour period, but at the same time the earth turns, so from the ground it looks like the satellite is physically standing still in the sky. That's what Arthur had tinkered with and basically wrote an article about. So then in the 50's when satellites started to be launched and more so in the 60's both the technical community and telecom operators, as well as the political community, realised that this was something that could be made into a business and it would also provide a satellite-based communication capability between all corners of the world. So Arthur C Clarke actually regarded Intelsat as "his" company. I met him several times, he would come to Intelsat at anniversaries and other events. I also had some personal contact with him. Once I was supposed to hold a speech here in Sweden and I wrote him a message and asked him, if you Arthur were to ask the engineers and the companies in the audience, what would you ask them to focus on and to consider for the future? And he answered back that they should work on the Space Elevator, which is basically having a thin, very strong, and very long wire and getting the satellites up in space with elevator technology rather than with fireworks. He postulated that the main cost of getting a satellite into orbit would be for the food and the entertainment for the people onboard the vehicle, while getting the satellite up, and not the expenses for all the fireworks used by rockets.

**Martin Emanuel:** I read a chapter written by you in a book entitled *Success stories in satellite systems* from 2000. You write about the early history of the organisation and also what happened from the time that you became CEO. In the period before that, what were your tasks within Intelsat before you came in that high position?

**Conny Kullman:** In Sweden I didn't really have any thoughts about being a manager or making a career. I was very happy working as an engineer and again, we talked about all the interesting work I had done at Saab, I really liked that technical work. My first job at Intelsat was as a system design engineer. I started out working on a Time Division Multiple Access, or TDMA system that Intelsat was putting together. Now Intelsat does not build anything themselves. Intelsat is a satellite operator. But they still have, and certainly did have also when I worked there, a very strong engineering team, PhD and Master of Science degreed engineers, and we wrote all the specifications for our hardware and software. We came up with what type of satellites we needed and what type of services we needed, what control equipment we needed, TT&C stations for tracking and telemetry and commanding of the satellites. We would specify the ground systems as well as the space based systems and then we would submit those requirements as requests for

proposals, RFP's, and get proposals in from industry, and then we would of course select what we thought was the best combination of performance and price and start to work with that contractor. And, we always had our own staff involved in the programs as a monitoring function, so typically for the new series of satellite we would have somewhere between 10 and 20 staff working at the factory where the satellite was being designed and built and tested. For the Time Division Multiple Access system all the specification work, the approvals and contract award had been done when I joined. We worked with a couple of outfits in Japan, NEC in Yokohama and also KDD in Tokyo had a design group that was involved with us, and then we also had Comsat in the US as a contractor. I became then a system engineer, monitoring development and building of the Reference Terminal Equipment on the ground for the TDMA system. What that terminal does is basically telling all the traffic terminals what their time slot for transmission is, then they should send up their communication bit stream burst and then give the same transponder on the satellite to another terminal. So basically you synchronize the time that you transmit to the satellite, you share the satellite transponder among many different terminals on the ground and this reference terminal equipment is sort of the conductor for this orchestra. To be able to play, the reference terminal tells all the participants when it's their time to transmit, making sure that traffic terminals never transmit at the same time.

**Martin Emanuel:** Was this a purely technical task? The way time is allocated, since Intelsat is such a complicated structure, was there also politics involved in the design of the system?

**Conny Kullman:** I would say that there is, or there was, a complicated structure. Now Intelsat is a regular corporation... At the time when I joined in '83 it was an intergovernmental cooperative, and there was an involvement by governments in the sense that from the beginning they had a commitment to act as a backstop. This means that if there had been any financial problems, there was a certain undertaking from the governments to still build the system and make it work. But they never put any money into the system because it was a financial success from the beginning and the revenue that it got from the users was more than enough to build and run the system. But there was a structure of the cooperative with an Assembly of Parties with government representatives who met every other year, every two years. Then within each of the member countries there was a commercial organization that had the investment obligation and it received a return on its investment. During the early days it might have been a national fully or partially state-owned telecommunications outfit like Televerket here in Sweden or British Telecom in the UK, for instance. Those organizations were sort of the operational interface with us and their management interfaced with us. So if British Telecom had, for instance, a need to communicate with their counterparts in Kenya, they would approach us and describe their requirements.

The work with the owners was done at three different levels if you want. The first was the Board of Intelsat where the owners had director type of representatives of the operating companies like British Telecom or Televerket. At the board level the investment decisions were taken and it was structured in a way... As an example, if British Telecom was using five percent of the overall traffic on the system, if we were building a new series of satellites, then BT had a five percent investment responsibility. So they had to chip in five percent of the money for building the satellites. Then if there was a surplus or profit at the end of the year and BT had this five percent investment responsibility, they also had the right to five percent of the profit. Briefly, to go back to the time when I became the CEO of the company in 1998, we had a profit margin of 50

percent, so 50 percent of our revenues were profits that were paid back to the investors, to the entities like British Telecom and so on. So whatever they had as an investment responsibility, this was also their return or the piece of the pie of the return at the end of the year. So that's how it worked. So, there was the board level where the formal decisions, investment decisions were taken, and that could take a bit of a political flavour or turn if you want. But as I got more involved with the financial side of the business, before I became the CEO and when I was selected to be the CEO, the business worked surprisingly well despite the government involvement and the structure. You could have some political arguing over whether a satellite contract should go to a French manufacturer or to an American manufacturer, but that never really, I would say, interfered with the business performance of the organization. The decision process could get slowed down by some of this, if some part of the world did not like the direction a decision was taking, they might ask for additional studies. So three months later we would present those studies and a decision would be taken. There was really no situation that I can remember where we actually took an operational or business or design decision or made the selection of a contractor on political grounds. In the end, common sense and practicality prevailed over political positioning.

**Martin Emanuel:** I think somewhere in this chapter you also describe the consensus culture within Intelsat.

**Conny Kullman:** At the board level there was certainly a consensus culture and if there was some discussion between two of these owner entities they would normally deal with that offline. It might, like I said, be discussed at board level and we might be asked to run another study. From a bureaucratic standpoint it became a burden, but again, it didn't stand in the way of the business. Here we slipped into talking about my later years at Intelsat, I'll briefly go back to my first time period in the US I was on this TDMA project and I probably made 25 trips to Japan during those 4-5 years, spending anything from a few days to three or four weeks. I think I calculated once, I spent like nine months during those years in Japan. So I worked first on TDMA as an engineer, then on the world's first Satellite Switched TDMA, or SS-TDMA project a few years later. In between, after about two years at Intelsat, I switched to work with TTC&M.

I should say we deployed TDMA and SS-TDMA and it all worked. It was a very interesting period to work with the Japanese and also being out in different parts of the world where we had the reference terminals. We had one reference terminal in a place called Jatiluhur in Indonesia in the countryside. We had one up in Eaton in West Virginia. We had another at Tanum in Bohuslän here in Sweden. So they were all over the place, I got to travel a lot working with a lot of interesting people locally, because we always hired a local operating crew for these reference terminals. They were normally part of a larger earth station where there was already an infrastructure of basic staff. But we would have our own teams, hired locally. We might have one person from the US or Europe within our organisation that worked with the local team as our resident representative. So initially, that was about a two year period. Then, in around 1985, we were starting work on getting the ground equipment together for the monitoring control of a new satellite series called Intelsat 6. Since my background was in computer science and programming and so on, I had a system engineering function also there.

That was the first time where I got some inkling that I might have a management talent, which was otherwise not really of interest to me. But I got more and more responsibilities first on the TDMA program, for larger portions of the program, on the technical side, then for this so called TTC&M (Telemetry, Tracking, Commanding and Monitoring) project for Intelsat 6. We were a very diverse project group. There were four

key guys that had leadership roles on the project and they were socially and culturally totally incompatible. The project manager was an older Indian guy, quite funny, very smart person. And the four guys would always fight. There were always problems and they just didn't work well together. So one day the project manager, the older Indian guy, called me in and he started by saying, "You know, I don't know what bloody reason God had for putting these four guys together ... and then making me their boss." He had problems with these guys, but he said it seems like you can work with all of them. So he gave me the task to be the go-between guy, and I did my best to work with them on their same level, and tried to smooth over the difficulties they had in communicating. I think that's when some of the higher-ups in the company started to get their eyes on me that I could get results. At the time we had a Chief Operating Officer, an Australian, John Hampton. He became an unofficial mentor to me. He followed my work from a distance, we got the very complex TTC&M project done on time and on budget. Obviously you need to put all the ground based control systems in place before the satellites are launched so you can control and operate them, and we went through the rigorous testing period for that.

Then there was an upgrade of the TDMA system to a Satellite Switched TDMA system. The Intelsat 6 satellites had a switch onboard for the communication traffic. The original TDMA system traffic was controlled through this reference terminal on the ground, which I talked about earlier, and the satellite was just a bent pipe, the signals were just going through the satellite and back down. While on Intelsat 6 there was a satellite switch involved that did the switching between the different transmission beams from the satellite. Then we needed the former team to build that new system on the ground, or to modify the existing reference terminal control equipment so that it could handle the satellite switch services. That's when I really got my first management style job at the company. This was in late -86.

So I became the project manager for Satellite Switched TDMA and we worked under extreme time pressure. We had this new SS-TDMA service on the satellite, using part of the satellite, and we needed time to test the new reference terminal's functionality with a real satellite. These were very expensive, large satellites. They were launched in the late 80's, and cost \$500 million dollars apiece roughly, we needed basically to hold one of those satellites from going into operation and do our ground equipment testing over the satellites. Obviously we needed to be ready when the first satellite was launched and we needed to get our testing out of the way very quickly because of the expense of waiting with putting traffic on the satellite. So we had a quite critical timeline to work on and really no margin for delays. We worked extremely hard and got equipment ready, we did the testing. We needed, which was part of the plan, we needed on the order four or five months, if I remember correctly, because we knew that we are going to need some revisions of the ground equipment after testing. So we had a schedule put together for how much test time we needed and it would not have been popular to say that we need another two months, three months or whatever. With my team, I got the work done, I got the equipment there on time and we did the testing successfully and the service was turned on when it was supposed to be turned on. We managed to keep everything both within cost and on time, so the satellite could go into service with all the other services on the satellite plus this new Satellite Switched TDMA. This was a management responsibility from schedule, financing, people, and also from technical point of view. I still was quite close to the technology at the time, so I was very deep into all aspects of that program. Which again, of course, was extremely good for me as a development period.

That project was finished, or rather it was coming towards an end, and I would read the internal job postings. This must have been late -89 or something, the first SS-

TDMA service had been launched and much of that was out of the way. I read a posting for a director job in systems operations. This was basically to be responsible for all the real-time operations within the company, the flying of the satellites, the satellite control centre, and the operating centre which was the coordination function for all the traffic. When a new traffic terminal needed to come on satellite it would go through testing with the so called IOC, Intelsat Operations Center. Then, if the customers during operations had any difficulties, that's where they would refer their problems to get help. I had probably 70–80 guys or something like that reporting to me with core operational functions as responsibility. Quite different from the work that I would have handled as an engineer if I had continued as before. I saw that posting and I said, "I could do this". But I didn't apply because, I don't know, a Director job, it obviously was a management job, that was a little different than what I might be comfortable with. But still, I said to myself "I can do it." Then came the last application day for this job and in the afternoon on that day, HR, the Human Resources director, she called me and said, "We want you to apply for this job". So I said, "Yeah, I'll do that!" So I sent my papers in and they gave me the job. So that was my first real management job. Now I reported to a senior director.

We were flying the satellites, basically, in my organization, and having all the operational level contacts with the customers, so obviously I learned a new aspect of the satellite business, a bit away from the pure technical side even though there's obviously a lot of technical type of responsibilities in that area. It was getting me closer to the customers and learning about how to deal with the customers and making sure you have a smooth interface there, to keep them happy. I did that for about two years and seemingly did it well, because I got positive feedback during that period. I was reporting to this senior director. This was an older guy that was close to retirement and the company had sort of had parked him in this senior director position. He would very carefully read the morning newspapers and he would always also play bridge with three other guys during the lunch hour. He was very experienced and you could always go to him and get good advice, good direction. But he didn't do a lot of managing and he didn't quite frankly do a lot of work himself. He was kind of getting on his final round, I guess. We were then two directors reporting to him, so it was me as responsible for Systems Operations and there was a Brazilian guy responsible for Systems Planning, Louis Perrone.

The System Planning function, as the name says, it had all the elements of planning the system, starting with the Intelsat systems coordination. As you know, when two satellites systems are being deployed, if they're too close to each other there's risk for harmful interference between the two, and under the ITU (International Telecommunication Union) rules and regulations you have an obligation to try to work together and achieve transmission plans and so on that works for both the satellite systems. If you happen to have filed an orbital location with the ITU a little bit earlier than the other satellite system, you had a certain advantage but you don't have an absolute advantage, you don't have an absolute right to the frequencies. You have an obligation to try to accommodate the other system so they also can do their services. So that was part of Systems Planning. All the long term plans of the customers came into The Systems Planning function. This would drive the design of new satellites, as well as the redeployments of satellites from one orbital location to another. Also, it's just like when we launched a new satellite it might go into a location where we already had a satellite and that older satellite would need to go somewhere, then the planning function had responsibility to work all of this out for the company in close cooperation with all the customers. Intelsat is a global system and at the time we had customers in every country around the world except two or three, so it is a truly global responsibility to look

after the system and the frequencies.

Those were the two main functions in system planning. One day, the Chief Operating Officer, who I mentioned earlier, came to me and also to the Brazilian guy who was running Systems Planning, and he said: “We want you two guys to switch jobs. I want you Louis to do the Systems Operation and I want you Conny to do the System Planning. That was totally unexpected. I was not prepared for that.

**Martin Emanuel:** How come?

**Conny Kullman:** What they were doing is something which I think some companies don't do enough of. They were mentoring and challenging both of us, bringing us up as potentials for higher positions in the company.

**Martin Emanuel:** To understand the bigger picture.

**Conny Kullman:** Of course I understood that quite quickly. They were not saying if you do this you might get a Vice President job later on, but that was sort of the name of the game. So I pretty much immediately said, “Yeah, okay, I will do that.” But Louis was extremely reluctant to take my Systems Operations job. The system planning function had a higher status than the Systems Operations function, and for him it was going to feel like a demotion. It was more technically oriented in Systems Planning, and it even has some political overtones. If we were planning our system in a way that another operator had difficulty with, that operator might turn to their Government, so you could get some interference there of a slightly political nature. The Intersystem Coordination involved very intricate discussions with operators in different countries. Every operator has a license to operate from its country agency or regulator, like Telestyrelsen here in Sweden, for instance. It is not uncommon that Government entities get involved with this type of activity.

**Martin Emanuel:** Do you have any examples of that, so I can understand what kind of conflicts it could be?

**Conny Kullman:** Personally, I went with my team doing the Intersystem Coordination negotiations. I went with them a couple of times. For instance I went to Moscow with them. We needed to coordinate our satellites with some of the Soviet satellites at the time. And if you understand the rules of the game, so to speak, and what possibility you have to arrange your own traffic in a sensible way that allows also the Soviet satellite operators to do what they needed. There you sometimes need to strike a balance and have proper diplomatic skills to negotiate. It's a matter of having good negotiation skills, but you also have to understand, then, that if you take a hard position, it could have repercussions... We could have argued that we filed before the Soviets did, we might have an orbital location that was two, three degrees away from where the Soviet satellite was going to go. If you try to use your earlier filing advantage as a leverage to get more out of the negotiations you can do that with some success, but if you push too hard there is risk that you get political intervention. As an intergovernmental organisation, we did not have to go through any national agency with our filings. So we didn't have to go through the FCC application process in the US, we basically only used the FCC as a mailbox to get our filings to the ITU. We would submit our filings and any paperwork associated with that through the FCC, but they just passed it on the ITU, whereas an American operator would work with the FCC and it would be an active interface where FCC also put some limitations on what the American operator can do. So you're at the

position in those negotiations where if you can't arrive at a well-balanced agreement between the two parties, there is a higher risk that there will be political intervention and that's not good for anyone.

**Martin Emanuel:** The Soviet Union was not part of Intelsat, right?

**Conny Kullman:** They had their own system but it doesn't matter, we had to directly interface to the ITU and obviously to the Soviet Union. The Soviet Union was a member of the ITU so if we had messed around with them, I'm sure that there would have been contacts from the Soviet authorities with the American authorities, with the British authorities, with all our large owners, the members in the cooperative. The Americans had through Comsat a 20 percent ownership in the Intelsat cooperative, British Telecom around five percent as I think I mentioned earlier. Telenor in Norway owned roughly four, five percent also. So, from the countries where larger owners were located, there could very well have been political interventions. And some smaller countries like Argentina, for instance, they had their own satellite system and they are very protective with that system so they would always make political noise. That could actually come through our board also, there could be an interference at board level, so you always tried to arrive at a good cooperation in these discussions.

**Martin Emanuel:** If I understand it correctly, in the beginning Intelsat had more or less monopoly situation on global satellite communication?

**Conny Kullman:** Monopoly is an ugly word... As we started talking today, Intelsat was created in the 60's, with this initiative by the Kennedy administration, and the organisation was formed by eleven countries. Just before privatisation there were 147 member countries. If a state signed the Intelsat agreement they also made some commitments to protect the Intelsat system ... In the beginning there was just Intelsat and no one really knew that this could be developed into a viable business. When we had shown that that was possible, which really didn't happen until in the 70's, other competing satellite systems were started to be discussed in the late 70's and early 80's. The big development you had in the 80's for systems competing with Intelsat. Initially in that period I was still down in "the basement" doing my technical stuff. At the beginning of those years, Intelsat took a negative view, basically that any other satellite system could potentially disturb a satellite from Intelsat so the Intersystem Coordination aspects were driven in a negative way. There was no good cooperation and at that time there was political intervention, especially from the larger countries like the US and the UK, that were putting their own satellites, other operators putting their own satellite systems together. When I moved up in the ranks... I became the System Operations Director, I think, in early 1990, and did that for two years, and probably late '91 Louis and I traded roles. At that time Intelsat was much better behaved in the intersystem coordination discussions. Also, all operators became a community that needed to try to coexist. But I mean, you're right, initially there was a de facto monopoly because there was no one else. No one else really had the guts to put another system together. Say, after 10–15 years, in the 70's, the thoughts started to form and then development of competing systems flourished in the 80's.

**Martin Emanuel:** There were also other international organisations like Eutelsat that managed to build their own systems. But they had the same owners in the background?

**Conny Kullman:** Yes. Eutelsat was a "sister" company or "brother" company to

Intelsat, same organisational structure, an intergovernmental cooperative, creating a Europe-based satellite communications system with satellites only covering the European continent at the time.

**Martin Emanuel:** Was there resistance from the American players, for example, to their establishment?

**Conny Kullman:** Not to my knowledge really. I don't remember that being on the radar screen, not for me anyway. Inmarsat was another global organisation with Safety-at-Sea being the core driver for that system. Inmarsat was also an intergovernmental organisation. Over time, as I advanced in the ranks of Intelsat, there was pressure to limit the influence of Intelsat or the importance of Intelsat, and there were discussions to break it in three pieces to make competition easier. Since we had a large fleet and had satellites all over the place, we could compete with a new entrant in some aspects. There were a lot of arguments against Intelsat, it should be broken into pieces and so on. But something people forgot at the time, there are two key points that were really negative for Intelsat. We did not have the right to have any equipment on the ground. We could not own earth stations. That was something that was written into the statutes of the organization, that we could not have a ground infrastructure for communications. Of course we could control and have monitoring equipment for the satellites, but we could not have traffic equipment on the ground, and that was in the agreement that the operators... The so called Signatories, players like those I mentioned, Televerket in Sweden and British Telecom were two examples, those were Signatories of Intelsat and they were buying satellite transmission capacity from Intelsat. They were having that investment responsibility that we discussed earlier, and they also had the right of the returns from the organisation if there was a surplus generated. They were also then having the responsibility for putting the traffic terminals in place on the ground. We couldn't do that.

The other thing is that we were not supposed to get into connectivity for video business. Our core mission was to provide connections for telecommunications, which at the beginning meant telephony. That was the original intent with the Intelsat system, to allow any nation around the world to have their own telephony services over satellite to any other country in the world. That was something that was very important in the 60's, e.g. because a lot of the colonies, primarily British and French colonies, were given their independence in this time period, 50's and 60's. But their whole communications infrastructure was still tied to the UK and to France. If you placed a telephone call from Eastern Africa to Western Africa, it would have to go through London or Paris. By putting the Intelsat system together those two countries could communicate with each other directly without any interference of the old colonial powers. So that was also one of the driving political reasons behind the system, to give that freedom to countries around the world, and obviously that was something that the Americans through Kennedy were championing. That was our core mission, to build a point to point connection, basically, for telephone calls. Whereas when satellites started to be used for video distribution, such as direct to home video, and also for other video applications, it was something that Intelsat shouldn't do. We started to do some video transmission because our customers wanted us to do it. But for instance in the US, we, as an intergovernmental organization, we were never allowed to do video in the US. So these things started to be a strong negative for the business. The board structure, the committee structure, technical committee, planning committee, they became bureaucratic burdens on the company. The limitations in services that we could provide, as well as this political burden of having this reputation for being monopolistic type of operator, all of

those things became a hindrance to run the business like we needed to do.

There were political forces to break up or to change Intelsat. But for me, working inside the company and eventually becoming the CEO, it was absolutely necessary for business reasons to change the structure. The cooperative structure was a good and protective structure that allowed this line of business to come into existence, but it had played out its role. We should have made that change probably in the early 80's or late 80's. Not in 2001 as we eventually did. In advocating my position becoming the CEO, talking with the owners, that was the number one point on my agenda: we need to privatise the place quickly and, secondly, to come out in the stock market a year later and, thirdly, to get into the terrestrial elements of the satellite communication services. Those were the three core points for me of the largest strategic importance. Privatisation, doing an IPO and getting going on providing video services and having a more complete structure in place also on the ground.

**Martin Emanuel:** Was that necessary for Intelsat to be able to compete with other businesses?

**Conny Kullman:** Yeah. What happened was, in the 90's the world was being paved with fiber optic cable, terrestrial and submarine cables. And especially in the late 90's, as Internet was gaining in popularity and importance, you had the whole IT, dot-com and also communications ecstasy, say from '98 through to 2001, until the crash happened in the stock markets. Money was poured into information technology and communications and a lot of fibre was being put down, and it stayed dark, unused, for a long time. Several of those fiber cable companies went bankrupt. And some of the entrepreneurial and also traditional companies that had invested in these ventures got into financial difficulties. What happened there was that all of that fibre becoming available, it became much more cost-effective to do point-to-point communications over fibre rather than to do it on a satellite. So we saw a very quick erosion of our business in the 90's. For the second half of the 90's we lost ten percent every year of our core business, it just withered away. And of course we needed to find replacement services for our satellite capacity, and video was the obvious place to go. But then, with our structure at the time, it would have been difficult for us to do that. At the same time there was a political movement to break up Intelsat and privatise the parts anyway, for whatever reason, not just for political reason. Take away the tie to the Governments. I would use the words perceived tie, because in reality at that time there was very little interventions or participation from the governments. It was a proven technology, there were other operators out there, and our owners were buying satellite capacity from our competitors left and right, so there was no protection really for us. If our owners needed a service that we didn't have, or got a better price from another operator they wouldn't come to us. So it was a period of change, and it was a period of necessary change.

**Martin Emanuel:** I can see that I need to go in a short while. I suggest we continue at a later occasion.

[The interview was taken up again on 28 January, 2018]

**Martin Emanuel:** We met last time on November 5 and now it is January 28. If I remember correctly, last time when we approached the end, we were more or less at the stage in your career that you had become CEO of Intelsat.

**Conny Kullman:** I think we touched on that part of my life when I made the career

move, so to speak. I think I talked about two of the positions, perhaps a little bit too much in detail, the first two director positions that I was in. Having looked back at my fondest memories, there is one thing that I should have told you about: the 603 Reboost. When I was the director of Systems Operations, which was around 1990, we launched a satellite on an American Titan 3 rocket, and the manufacturer managed to miss-wire that rocket. You can wire it to have two payloads or to have one payload. We had large satellites, so there was only one payload and they had wired it for two, which meant that our satellite did not separate from the upper stage of the rocket. When you launch a satellite that's going to one of these locations that we used in the geostationary orbit, you have, at the bottom of the satellite, you have like a booster engine, an apogee engine that you fire up once you have separated from the launcher and are at the highest point in the orbit. With that engine you make the orbit circular. Normally a rocket leaves the satellite on a highly elliptical orbit so you need that to make it circular. But now, since we had not been separated from the upper stage, that apogee engine was in the middle of the package, so of course we couldn't fire it. The only way for us to get away from the rocket was to separate where we had control, which is between our satellite and our own apogee rocket, which means we didn't have the engine to take us to the final orbit. This was a big dilemma, but initially, because of the launcher problem we had the satellite in a very low orbit. I think it was around 140, 150 kilometres, and at that altitude you have a lot of atomic oxygen, I think it is, that bombards the solar panels of the satellite, and the fine connections between the solar cells would have been eroded if we had stayed in that orbit. So we had to fly it up to around 500 kilometres. For this we used the small thrusters, the control thrusters on the satellite, to take it up to that level, to safeguard it. And then we thought, "What the hell do we do now?" Of course, the only choice we had was to try to work something out with NASA, to do a specific shuttle mission to fly up a new engine and attach that to our satellite and then get it up in a proper orbit. So at the time...

**Martin Emanuel:** NASA was happy to do that?

**Conny Kullman:** This was when they were just preparing for the space station work, so they saw this as an opportunity to prove that they could handle complex mechanical tasks in orbit. So that was one thing that helped to convince them to do the job for us. The other was that we had at that time a CEO, or Director General as it was called at that time, Dean Burch, who had worked in the American administration. He had been at the FCC. He was the chairman of the FCC for some time, so he had good connections. You also need to do a job like this fairly quickly because the low orbit is still not good for the satellite even if it's at 500 kilometres. So the whole technical staff of our organisation went into high gear and worked long days to prepare for this mission, and obviously NASA has a lot of safety requirements for a manned mission like this. We had a lot of preparatory sessions with them. At the time I was responsible for satellite operations so I had all the control station around the earth as my responsibility. And one thing that NASA required was that we had constant contact with the satellite. When it flies at the low orbit it would disappear below the horizon, disappear from the coverage of our normal stations for certain parts of the day, so we had like eight, nine months to deploy new TT&C stations in some remote locations in Africa and so on. So it was a big logistic exercise on our part to get ready for the recovery mission. And then, of course, you also need to rehearse the whole mission with NASA. Part of what they do is to use a huge water tank in Houston where they could simulate weightlessness by being underwater and they could do the work in the simulated cargo bay that they would need to do during the mission. We had joint session with them where we went through the timeline and, of

course, failures happen, problems happen, so they had a team of independent guys that ran around giving you little cards saying you got food poisoning at lunch today, you can't work today. This was to show that you had redundancy in your staffing setup. Failure of hardware on the ground, all sorts of problems were simulated and you kind of had to prove that you were ready for all of this and still could manage to complete the mission.

Eventually, then the day came and we were using the Endeavour shuttle on its maiden mission, launched on 7 May 1992. It went up and, now... A satellite like this, it's not built to be able to handle in orbit, so there are no fixtures and handles or whatever for this type of situation. So what NASA did was to manufacture a Capture Bar, a tool, to grab the satellite. This satellite, I should say, it kind of looked like an old coffee can. It's a cylinder, it was a spinning satellite, it was stabilised in orbit that way. At the bottom of it there was a rim and this capture bar, and the diameter of the satellite was somewhere around 3.5, or 3.6 metres. So the astronaut had like a handle, looking like a steering wheel, in the middle of this capture bar and he was supposed to approach the satellite, push this onto the satellite, and then it would lock on the rim. Then they would attach the capture bar with the satellite on the end of the robotic arm and drag it down into the shuttle cargo bay, and screw it onto this new apogee engine that they had flown up to the satellite. This astronaut then, he was standing at the end of the robotic arm and we flew down the satellite to him. The shuttle doesn't go as high as 500 kilometres, so once they had launched we had to fly our satellite down and meet them in what's called a Control Box where you have the right parameters so you can navigate and approach. Anyway, the captain Dan Brandenstein flew the shuttle in under the satellite with Pierre Thuot standing on the end of the robotic arm with this capture bar. Pierre got them in the right position, he pushed it against the satellite, but the Capture Bar would not lock. The devices at the end of the capture bar would not lock on the rim, so we saw the satellite tumble away on the video. Obviously, that was a big disappointment. Then of course we had to fly the satellite away from the shuttle so we had a safe separation distance.

It was decided to try again the following day. And this time Pierre was much more careful and gentle, but still this thing didn't lock on to the rim and the satellite, it was kind of pushed away by him. It was truly extremely fascinating to see this, and to be part of this... The guy, with a very light touch he moves a satellite that weighs five tons by just pushing it lightly and it goes off. Of course, this was a crisis scenario and during the night after that second attempt we sat at our control centre and the mission management team on our side, we said, "The only way for this to work, is for them to put three astronauts out in the cargo bay," And grab it with their hands. But the airlock only allows for two. So normally when they do space walks only two guys are out, but we said, "if we can get these guys to grab the satellite with their hands, we can make this work." So we presented this to the NASA control team in Houston and of course they said, "No, no, no, we can't do that..." They have this thick rule book which says that these things are allowed and these things are not allowed and obviously taking three guys in the airlock shouldn't be physically and technically possible, so we can't do it.

But then during the same earth night, the astronauts onboard, they were also talking among themselves, and they... The way it works, we as a customer, we cannot talk directly with the astronauts, so all of that communication goes via Houston. When they came out of their sleep session in their morning they started to talk with Houston and to our surprise and satisfaction they presented exactly the same solution as we had done. And of course, the mission control guys also told the astronauts that, "We don't think this can be done", and they talked about rule such and such. You can't do these things. The astronauts had thought about it and...

This obviously also was a high stakes situation for NASA because of the start of

the space station program. If they failed on this mission it could impact the whole space station program and the assembly of the space station could be questioned if they couldn't handle our situation. So the astronauts were motivated, and as it turned out it was possible to get the mission control guys motivated also. Eventually they worked out a way where we would get three astronauts in the airlock at the same time, and what they do as they go in there and get down to vacuum, they do the final charging of the space suits and the loading of their breathing, the oxygen material they're using and so on. All of that happens in the airlock. So they had to charge one guy up and then put the other two guys in after him, so they were like sardines in this airlock. Two guys with head in one direction and the other guy with the head in another direction in the middle. They pumped them down to vacuum and they eventually got out, the three of them. Again we flew in our satellite close to the shuttle and the captain navigated so he had the cargo bay up against the satellite. Then we had one guy standing on the end of the robotic arm and the other two standing on fixtures down in the cargo bay. They were placed so they were spaced in on the same radius as the diameter of the bottom of the satellite. Before we got to this point, of course, this whole situation had been simulated in the water tank in Houston that we talked about. I think there were two rest days, at least one, but possibly, two rest days. Then it happened for real. One thing with these spinner satellites, they spin roughly at 30 revolutions per minute to keep them stable when they are operational, but that's much too fast for the astronauts to grab it with their gloved hands. So we had to spin it down to somewhere of around a half RPM, and of course at that point the satellite will slowly start to build up wobble, because it will not be stable around its axis, so we had to do this reasonably fast. Anyways, they were standing there and kind of thinking about it and waiting for the right position of the shuttle and the satellite, and eventually, on command, one guy said let's grab it and they took it. So the three of them, with six hands, they held on to this bottom rim of the satellite and stopped it from rotating, but then you have a lot of fuel inside the satellite which is used for the duration of the life of the satellite. You use the fuel to make small manoeuvres to keep it in place during operations. When you stop the rotation you will have that fuel slosh around and move around, so even though it's weightless you have a momentum and there's a movement inside the satellite. So they stood holding it for one to two hours, they held it to calm it down and then Pierre on the robotic arm got this Capture Bar device and this time, with two guys holding it and it being in a stable position, they could actually then eventually attach the Capture Bar. The two locks worked and then from that point on it was according to plan, they grabbed it with the robotic arm and they pulled it down and put it on top of the apogee engine. All of that went normal. And then of course they went inside to do the final stage, the release of the satellite.

There were a number of records broken during this spacewalk. They had done these kinds of operations before, but then it had been a satellite that was in a stable orbit so they could fly up and approach it. This time we had two bodies that had to move at the same time and meet in space, and of course you have very small tolerances because there is a lot of energy required to move these bodies around because of their speed. So you have to do very intricate planning for these two things to come to the right spot. It was the first time... I actually think it was the only time that they had done a dual active rendezvous manoeuvre. It was the longest ever spacewalk. They were out for eight hours and 29 minutes. It was the first EVA, or extravehicular activity, with three astronauts out, and it was the first shuttle mission where there in total was four EVA's. So there were a number of firsts with this mission, where they were really pushing against what they physically could do, or practically and physically could do.

All went well during that phase so now all the astronauts were inside and there was a woman called Cathy Thornton. She had the task of doing the final stages of sending the

satellite out. You don't fire up any engines, obviously, when you're in the cargo bay, but a spring system is supposed to get activated in the fixture at the bottom of the engine. These springs give the satellite a light spin and it is then supposed to slowly leave the cargo bay. Kathy pushed the button and the damned thing would not move. It was sitting still in the cargo bay. There are some words that you will remember forever... She slowly said, when it didn't work, "No joy on deploy." So the damned thing was sitting there and we said, "Oh, shit, we have to go out there and take the satellite off..." We didn't feel too good. But, then the NASA team on the ground in Houston, they went through Kathy's process, the procedure as written, and they found that there was an error in their procedure. They have a number of safety switches and all the switches had to be in the right position, and when she pushed the last one the satellite was supposed to be pushed out. After a quick rewrite of the procedure, then when she set the switches again the bloody satellite actually, eventually left the cargo bay. There was, "Joy on deploy," eventually.

For us this was also special because eventually we sent the satellite up to super synchronous orbit. Normally you don't go above your stationary orbit when you correct the orbit of a satellite, but with this new engine that we'd flown up we could send the satellite further out before we made the final orbit corrections, and that's, from an energy perspective, a more optimal solution. This orbit saved the satellite fuel for us. Eventually everything was fine and it turned out that this was one of the best behaved satellites we ever had in the fleet. This was 1992. I think it's only three or four years ago since that satellite actually was decommissioned, so it worked for quite a long time.

Sometimes I've been asked, "What are your two, three most interesting experiences", and I have to say that this was the most challenging in terms of technical performance of the whole company, really. It required a lot of new thinking and thinking outside the box and getting the job done, and it was obviously extremely interesting to be part of this. This happened when I was on the operational side, in Systems Operations.

**Martin Emanuel:** It makes me think. Now, I don't know the cost of all of this, but was it cheaper to get NASA to do this mission and rescue the satellite instead of building a new?

**Conny Kullman:** It's obviously a valid question and for us as a company the alternative is to build a new satellite because you have customers expecting that the satellite becomes available. By using the Shuttle, we could then get the satellite to its right position within a year and half. If we had built a new satellite it would have taken around four years probably to get that satellite built and launched and brought into its proper orbit. So we got a couple of years of early service time and there were customers waiting for the capacity. We paid on the order of \$140 million for the new engine and the ride with NASA. I think the engine part was around \$50 and we paid around \$100 million to NASA. I should say that once they had gotten our satellite deployed, they had experimental parts for the space station to test. They did practice sessions also with the special "space tools" they needed to build the Space Station, so there was another purpose for this mission, it was not only for our satellite. But a mission like this at that time probably cost them on the order of \$500 million, but we got the ride for \$100 million plus the engine for 50, so 150 in total. For us it was a good deal and obviously for our customers to be able to get that capacity. To "only" have a 1.5 years delay was a better proposition than to wait for four years. So from a financial perspective it was a worthwhile exercise for us to do.

Now we have talked about those two positions: the Operations Planning and Systems Operations. I don't think I talked about my year and a half or so as the Chief

Information Officer at the company. I was at the director level in the company then. For whatever reason, Upper Management had trust in me to take on difficult tasks and one of the tasks that I was sent into, which was totally unexpected... India has a space organisation similar to NASA called ISRO, and the head guy from ISRO, Dr. Rao, was in town, in Washington, and we were at the private house of one of Intelsat's senior management. I remember, it was a warm summer day, late on a summer day, and we were out on the deck in the back of the house discussing and the Chief Operating Officer came up to me and took me aside and said... As a backdrop I should say we had hired a woman by the name of Edith Martin, who had been the Chief Information Officer at Boeing. She came to work for us, but she, in the year or so that she had been in the role, never really got up to speed. She had problems with staff, she had problem with the Board and her situation was not great. She was not liked by her staff. It just didn't work out. Anyhow, the COO came up to me during that party and said, "We want you to go in and help Edith", as a kind of special assistant to her. I sort of felt like I was going to sink through the floor, because it was a job that I absolutely didn't want. I didn't have any clue that they were considering putting someone into her organisation trying to help her out. But then I said, "Let me think about it overnight." One thing I guess I had learnt already at that point was that if Management believes in you, if they think you can do it, then you sort of have half an insurance against failure. You can always blame them for putting you into that tough job. If you make a career in another way, by fighting your way up the ladder, with sharp elbows, then you're in a much tougher position, I think. As a side note, throughout my career all my job changes has been on the initiative of someone else, really, and that has given me confidence to take that step, take that new job. This time, he basically said we want you tomorrow to go in and do this. I slept on it and said, "What the hell, I'll do it." It was supposed to be a six month assignment and it turned out to be eight months in the end. I more and more became the person running that office and we managed to get the unit functioning again, we managed to get the Board to have more confidence in what the IT departments were doing, so eventually, then, they checked me out of this role.

Next, I became director of Space Segment Engineering and Research and Development, which was a very interesting role to have. I remember on the first day, I sat down with the person responsible for R&D, and he said, "It's the first time I have a manager who is younger than I am." I was really welcomed by all staff when I got this job. Over your career, you do different jobs and you always have a sensation of whether you're popular with staff or you're not popular with staff, and obviously it depends on which phase you're in in the company's life also. If the company is doing well or if there is difficulty. But I felt really good about going into that job and really enjoyed it. It turned out to be quite short, though. I think it only took on the order of three to four months and the Chief Information Officer, she again had difficulties after I had left my job as her assistant. Edith left the company and they gave me her job. So in 1994, I became the Chief Information Officer, which again... I have an IT background and that's what I had worked with, but with small, complex real-time computer systems for the Ariane rocket and other computers for satellites. So, I had an IT background and also had a decent understanding of the different IT systems that the organisation needed. It really ranged all the way from the business IT type of functionality that any company needs, to the specific software tools and equipment you need to fly the satellites, and obviously that's a real-time type of computer application, so it was fairly a wide spectrum and quite an interesting role.

After that, in 1996, I became the Vice President for all of Operations. Then in 1997 the Vice President of Engineering was retiring. They felt I had more capacity so they gave me that Department as well, so I became Vice President of Operations *and*

Engineering which obviously, in a company like this, the most important investments you make are in the satellites. Typically at this time, in the late 90's, a satellite would cost from between \$300 to \$350 million and up to \$500 million. In this time period the company had on the order of 25, or 27 satellites, so it's important investments that you need to make to have a fleet of that size, so obviously the Engineering function is quite important. But of course, Operations is equally important. Most of the money is spent in those departments of the company. So it was a big responsibility. I talked about popularity. Staff held a significant celebration when I got that job, which is still something of my most cherished memories. It was a good period. But it ended fairly soon because the current CEO at that time was going to retire. I was surprised, honestly, I was quite surprised that I had made it as far as I had in the organization, reaching the VP of Operations and Engineering, and I had no ambitions to reach further. The only thing that remained was to become the CEO of the company.

One thing to be aware of is that Intelsat at that time was an international cooperative type of organization. We had at the top of the organisation a treaty between 145 nations, and there would be, once every other year, an Assembly of Parties of those 145 nations and they would come to Washington and discuss a bit and have a couple of good lunches and dinners, but they never really tinkered or made any changes to our operations. Intelsat was a highly successful and also profitable operations. Then you had, at the operating level you had investors that were the different Telecoms around the world, so when we needed a new satellite they would chip in the corresponding funding. So if they were using three percent of the system capacity or were generating three percent of the revenue on the system, they also had, through the statutes of the cooperative, the responsibility to invest three percent to the new satellites we were building. That was the structure. But that meant that there had never been a CEO appointed from inside the company. All CEO's had come from the outside. In the early days they were semi-political appointments and I mentioned Dean Burch, for instance, who came out of the American administration working for the FCC. The person in the CEO job at the time was Irving Goldstein, who was also an American. When he became the CEO, the US State Department had a couple of guys fly around the whole world with him, supposedly on a half a million dollar budget, to get him introduced to the different owner entities in order to get him elected to be the next CEO. So there were lots of politics at the earlier times.

It was now 1997 and Intelsat should have changed structure probably 10 years earlier than that, at least five, seven years earlier, in the early 90's we should have changed structure. The whole satellite business area had changed nature. There were real competitors around and there was also a strong development towards using geostationary satellites for video distribution, and direct to home type of distribution had grown to become a really big business, so there was good money to be made and a number of competing satellite companies were formed. That meant that our owner base, the different Telcos around the world and the customer base we had, they now had choices. The political interest in the organisation disappeared. So these were new times...

**Martin Emanuel:** This is background for you being able to become the CEO although you were internal.

**Conny Kullman:** It still was an extremely interesting process. I talked a couple of times in this interview about the Chief Operating Officer, John Hampton, an Australian. He came to Intelsat about the same time as I did, I think he came one year after me, I came in -83 and he came in -84. He went straight into the Chief Operating Officer position. He came out of a senior position in what became Telstra, the Australian operator. In

1997 he came to me one day and said, “Conny I think you should go for the CEO job”, and I looked at him and I said “Hey John, what the hell have you been smoking today.” To me, that was sort of an impossible proposition to make, even though the environment had changed. I still saw it as a difficult proposition. I went away and I said to myself, who would my competitors for the job be? Then I said to myself, okay, I’ll throw my hat in the ring. We were still a cooperative and you couldn’t really just throw your hat in the ring for a job like this. You had to either be found by the company in some formal search process or you had to be recommended by one of the owners, one of the Signatories. At the time the largest user and owner in the Nordic region of the Intelsat system was the Norwegian Telenor organization. We had a large board in the cooperative, and there was one Nordic director, which represented the ownership shares of the Nordic Signatories: Norway, Denmark, Sweden, Finland and Iceland. There was only one director job available for the Nordics and Telenor had around 5 percent use of the Intelsat system, whereas Sweden had around 0.5 percent. The Norwegians used ten times more capacity and thereby they also had a ten times larger ownership in the organisation. To get the support from one of these owner entities, or Signatories, it was natural for me to go to the Norwegians and say, “I’m interested in this job. Would you be interested in nominating me?” Which they agreed to do. And of course, I also got Telia’s support for going after the job. I hesitate to say this while you’re recording me, but I was about to say, “Never trust a Norwegian...” After a month or two they withdrew their support for me because they had found a candidate of their own who they wanted to support.

**Martin Emanuel:** I heard this also through Johan Martin-Löf.

**Conny Kullman:** Okay. Obviously this was a big disappointment for me, but I sort of was “pregnant” already in a sense. I’d started the process, I still had the backing of the Swedes, so I stayed in the competition, I could not really withdraw. At this time the largest owner in Intelsat was the Comsat organisation. Comsat was a public company which owned 25 percent of Intelsat at the time. They were the American signatory, they were a publicly traded company. They owned roughly 25 percent of the company and had 25 percent voting rights. The second largest was British Telecom and they had at this time around 10 percent ownership, so that was 25 plus 10, 35 percent of the votes. Then Teleglobe, Canada, had a little more than the Norwegians, but in the neighbourhood of five percent, and the Norwegians five percent. All of these four, the largest owners of Intelsat, with 45 percent of the vote, they supported the Norwegian. So, I had an uphill battle, to say the least. But one advantage I had was that I was not supported by Comsat. Because Comsat as a 25 percent owner could be fairly heavy-footed in trying to push the company around. Of course, Comsat was not a passive owner, their whole business was to resell the Intelsat capacity. So they had an interest in influencing Intelsat, so that we built the satellites to fit them, around their customers and services, and set our pricing to fit them. This was one of the problems of the cooperative, that you had owners that also were operators. They would not always think of the best for Intelsat as a company. Their actions were tainted by the needs of their own businesses, obviously. The other large owners were similar in nature. All the little guys, the smaller owners, they still represented 55 percent of the vote, and voting is by a simple majority, it was enough for me to get 50.1 percent of the votes. But I had pretty bad odds and obviously I knew that all of these four entities, especially the Americans and the Brits, can influence other countries and other companies to vote their way, those were the parameters going into this “election.”

A couple of other candidates came into the race and in the end I think we were

five candidates. So, there was someone who was the favourite of the South Americans. There was an Indian, Mr. Gupta, and India, I forgot the name of the Signatory there, but they also had a reasonably large stake, and a corresponding vote, they were just below Norway. They had in Mr. Gupta a man who they thought should become the next CEO. And then came the first vote in the Board, and of course those four large owners voted for the Norwegian, a 45 percent vote. But I got the second highest vote, around 25 percent if I remember correctly.

I should say, I told you that the previous CEO had the support of the American State Department and a budget of half a million dollars for his campaign to convince the owners to vote for him. I had taken contact with Telia and got a \$6,000 contribution towards one trip.

**Martin Emanuel:** And where did you travel?

**Conny Kullman:** Obviously at this stage, when it was about to do the campaigning, I knew where I had support and I knew where I didn't have support, and then there was a grey mass, primarily in Asia where it was not clear where their sympathies were. So I did visit on that trip on the order of seven, eight Asian countries. I put some of my own money into the travel budget as well. My wife and my father helped lick the envelopes with the material that I distributed. I didn't have anyone at the Swedish State Department doing that for me. I went out to Asia and got pretty good support there. I felt that they were behind me. So, in the first vote, the Norwegian got his 45 percent and I got, and again these figures are probably not exactly correct, but I got on the order of 20 to 25 percent of the vote and the other three guys got less. So fairly quickly then two of the guys dropped out and then there was another voting round, and all the votes that had gone to the people dropping out went to me in the next voting round, so I increased whereas the Norwegian guy didn't get any new votes. Of course then I started to feel more confident that this might still be possible. Obviously you know exactly what the number of votes or the percentage of the total votes each shareholder has, and you can put that into a spreadsheet to figure out who is voting for who.

In the third voting round, there were still the four guys, there was the Indian guy, myself, the Norwegian guy, and then a fourth guy. The Indian still got a fairly low vote. But we couldn't kind of work out who was voting for who, and it actually turned out that the Indians were voting not for their own candidate, and not for the Norwegian candidate and not for me, so it was very difficult to work out how the numbers came together. It's almost funny. At that time mobile phones were starting to become common. My wife and I had each a phone, but we had the same phone number, so I was at work and my phone was not switched on. She picks up the phone, she sat with the kids somewhere. A guy starts to talk with her in an Indian accent and she realized, "Oh, that's not a call for me." And then the Indian guy started to try to negotiate that, "If you give me a Vice President job I will drop my candidacy and I will tell the Indian owner to vote for you." I was not keen on making any of those types of deals or commitments. It then came to the final vote, and I basically said, "No I'm not going to make any promises." Then it came to the fourth and final voting round and the group of the four largest owners were feeling that they had no momentum, and they then came to me, the Americans, their representative came to me and said, "We want you to take the Norwegian as a Vice President on your staff." I said, "No." Then in the final round I basically got the necessary 50 percent-plus vote and the job was mine. I don't remember all the facets of this or exactly how the numbers worked out, but it was an extremely tense day and a half, and again one of the more exciting periods of my whole life. A very interesting process to go through.

**Martin Emanuel:** And the Norwegian and the Indian guys, were they also within Intelsat at this point?

**Conny Kullman:** No. On the Norwegians side, obviously, the satellite business for Norway has always been important. As you know, they've had their own satellite business for a long time, and the landscape in Norway is such that within their coastal region and the mountainous regions it's difficult for them to build terrestrial networks, so therefore satellites were important to get communication coverage for the whole country. So they've always been basing a significant part of their business on satellite solutions, and obviously they still have their own satellites. So organisationally within Telenor there was a separate business department, and I actually think the Norwegian candidate had a CEO title, of Satellite Network Services or something like that. So, he was within the Telenor organisation, and the Indian had a similar role within his organisation. The Norwegian did not come to our Board meetings on a regular basis, so he was not a director of the Board, whereas the Indian was their designated director, we had seen more of him at the interactions of the Board. But, none of them had a job within Intelsat at the time.

**Martin Emanuel:** Could it have been a reason for Comsat and British Telecom to vote for the Norwegian, that they wanted somebody new that they could steer more than they could do with you?

**Conny Kullman:** I don't know for sure. You can only speculate, but as I said I believe my advantage was two things, really. First, that these four owners together did not have 50.1 percent of the vote, and secondly that Comsat and British Telecom supported the Norwegian. The smaller countries and their Signatories were in particular opposed to Comsat. There was a feeling among all the other shareholders, except the Norwegians at Telenor and the Canadians at Teleglobe, they had a little bit an "in between role," but the two big ones were seen as a quite negative influence on the company, so the rest of the shareholders wanted an independent candidate to become the CEO. In the end, I had been clear both first with the Indian and then with the largest owner Comsat, saying that I am not going to take your candidates as vice presidents, I won't make that kind of promise. I got the CEO job being truly independent and it felt very good for me, and I would say it was a necessity for me. I would not take this type of job feeling I had to pay back, to owe something to someone. That would have tainted my way of running the company. So that was a big victory for me in the sense that I got the job without having made any promises to anyone.

**Martin Emanuel:** Once you were there, did you already have a clear agenda about the way forward?

**Conny Kullman:** Yes, obviously, I had gotten a good schooling in how the company worked. I pretty much have had jobs in all areas except in Legal and Finance, and HR, but I worked in all the important parts of the organisation except finance. So, I had a good understanding about the dynamics and the needs of the company. And I had, in being out talking to the shareholders and at the presentations to the board, I had a three-point program. The first point was to privatise the company, which, like I said before, really was something that really was overdue...

**Martin Emanuel:** What was the reason that it hadn't been done earlier? You said it should had been done ten years earlier.

**Conny Kullman:** One of the major aspects that over time got the company to be criticised was that, through its treaty base, it had certain protections. This basically was that if a country signed the treaty that country had a responsibility or made an undertaking to approve of the Intelsat business and to protect the Intelsat business. In the early days, when competing satellites systems were coming to the market, I'm talking now about the early 80's, when systems like PanAmSat came into existence, there was heavy handed resistance from Intelsat to let those operators start their business. One major tool that Intelsat used at the time to resist other operators or prevent other operators from getting into operation was that when you have these satellites in geostationary orbit, they are all in the equatorial plane. Again, I think we talked about this last time, when the earth rotates, makes one revolution around its axis, if the satellite is 36.000 kilometres above the surface of the earth, above the equator, it will also make one revolution so it looks like the satellite is standing still in the sky, and obviously that makes the antenna configurations much easier for the users on the ground. But that means that the geostationary orbit is a limited natural resource, and if you place two satellites in that orbit too close they will cause interference to each other. It will be more difficult for the receiving antennas on the ground to distinguish between the two satellites the closer they are. With frequency planning and spacial separation of the beams and so on for the coverage on earth you can overcome a lot of that interference risk. But, in the early days Intelsat basically kept, tried to keep operators very far away from our satellites, which in many cases then would make their business plans null and void. Intelsat used that right we had through the treaty organization, the right for protection, to keep others away from using that natural resource. But over time the political pressures became such that, at this time, 1997, when I became the CEO, protection was not there anymore, because there was no political support for it.

On the other side, by being a cooperative and treaty based, nations could also have influence on what type of business we were allowed to do. And historically, when we started in the 60's we were basically wiring the sky for telephony traffic rather than having terrestrial wires. You had the satellite as a relay station that would allow you to connect to remote locations. But then, in late 80's, 90's, the video business increased and became over time the most important business for satellite operators. We did not have the right to do video traffic in North America, for instance. So we didn't have any satellites over North America for that reason, because we wouldn't get landing rights for video in North America, because that was not part of what the treaty defined as our task. To me there were very strong political reasons to get out of this cooperative structure. The most important reason was really the business, that we were not allowed to serve to market in the best possible way. We couldn't address the customers' needs really. So we absolutely needed to change, and like I said, we should probably have changed around 1990, if not earlier.

**Martin Emanuel:** What was the resistance during that 10-year period, when it didn't happen?

**Conny Kullman:** What happened was that there was, and this is part of the reason for the conflicts in the organization, you had the Americans and the Brits starting to talk about a breakup of Intelsat. Of course, the newer companies, they started with one or two satellites, and we had 25. So there started to build an agenda in the 90's when privatisation was not happening, an agenda driven mainly by the US and the UK. There was talk of privatization, but there was also talk about breaking the company up in perhaps three different portions, making three regional companies of Intelsat and just

divide the fleet by three and create three companies out of it. So there was a big fight, not so much actively by the governments, but the owner companies ended up having that fight on how privatization was to happen. And again, like I said, the whole situation just was bad for the company, so the right thing was to privatise.

At this point you had some operators which had grown to a size similar to ours, like PanAmSat in the US, like SES in Luxembourg for instance. What happened, actually, also in 1997, there was a political initiative by primarily the Americans, supported by some of the other member countries and the Signatories or the owners in those countries, to spin off a portion of Intelsat, and that led to the creation of a company called New Skies. I think we spun off five or six satellites in orbit and one under construction. The political pressure in that time period was to keep us out of video, because the Americans, primarily with our competitor PanAmSat and the Canadians with Telesat, they wanted to protect those businesses, which were strong on the video side. They wanted to reduce or limit our powers on the video side. We had built a small video business then that largely was on these five, six satellites that were spun off into the new, independent company New Skies, which was another reason why we needed to privatize. To get the growth opportunity stripped away from the company was just not right. The whole structure, the ownership and the member countries that had signed the treaty, they were all ready for a change. And I clearly saw the need for us to do it from a business perspective, so that was my first program point, to get this done. It might sound easy, but it was a very demanding process...

On the other side of this you have the developing countries. America, UK, Norway, they had other ways to serve their markets, whereas developing countries were relying on us for a lot of their communication needs. There was a universal service obligation that we had, and there was an argument made that this obligation needed to be protected. Because of this, there were some forces still wanting to have an intergovernmental structure, but the large pressure was to privatise. That was agenda point number one.

The second was that I had as an objective to do an IPO to get us out on the stock market within one year after privatization, and the third was to build, what we really needed to build, an infrastructure for our customers also on the ground. As a cooperative we did not have the right to own antennas on the ground, so we could not help a customer by providing an end to end solution. We could only sell the space segment. And with the new customers coming online... The Telcos historically had the knowledge and experience inside their own organisations to build ground stations, but the new customers didn't want to bother with that. They just wanted an end-to-end solution enabling them to connect.

Those were the three major points that I had in my program. And as soon as I took office I basically got the management team together and I said, "We have to get this done in two years." I had no clue how long it would take, it was impossible to plan out without really starting the process. So, anyway, I put together a management team that worked really well together, a lot of different mindsets and complementary skills, and we had many heated discussions but we all enjoyed what we were doing and we really had a very nice team spirit. In the end we got the final decision of the governments as well as the owners, pretty much exactly two years after I took office. We had the decision we wanted, this was now in late 2000. To get to the final decision took two years.

Then we had to implement the decision, and again, in a treaty based structure all the contracts were put in place under that treaty. And if a Government signed the treaty we had automatic landing rights, so we had then the right to send our signals into that territory. As a privatised company we didn't have those rights anymore. We had to negotiate with customers in close to 200 countries to change the terms of our contract

and to get the landing rights, so it was a big negotiation effort to implement the decision and then to rewrite and re-establish all the contracts. There was also an element of protection for the developing countries in the final decision that we had to commit to, and we managed to do it in a way that really didn't impact the business negatively. We always saw the developing countries as an asset because they had natural requirements for our services, so we managed to find a solution with them that worked for them and also worked for the privatised company.

The privatisation happened in July 2001, that's roughly half a year after we had gotten the final decision. One critical point was also the structure of the organization, where should the headquarters be, which also became a process where there were some political negotiations. The Americans wanted it in the US and the French wanted it in France, the Norwegians wanted it, so we basically went through the jurisdictions where we should have the headquarters. It turned out that the best jurisdiction for the company was Bermuda. With assets in the sky, you don't have factories in individual countries, you have all your significant production in the sky. Several other satellite operators were actually at the time organised in Bermuda. Of course, the holdouts against this were the French. "We can't accept Bermuda." You know, it is a tax haven and whatever. But what helped us in the end, was that the OECD came out with a general report at the time which gave Bermuda a cleaner bill of health when it came to their tax and financial behaviour than France. Because the French had then, it seems, a policy to make special arrangements left and right with different companies and not have a very clear structure in how they behaved as a nation when it comes to running businesses and providing tax benefits to one and not the other. In that final meeting, in late 2000 we got the governments to accept Bermuda as the future jurisdiction and also the owners to accept this. We ended up with our Headquarters' offices in Bermuda whereas the main system operational facilities still were in the Washington area in the US.

Then we started operating as a regular private company, and the owners of the cooperative became shareholders in the new company in the same proportions as they had held ownership in the cooperative. This was during the IT and communications crisis around the years 2000 to 2002. Many if not most of these operators had their own problems, they needed to focus on their core business. There were also now other satellite service providers, so the operators' interest in keeping an ownership in Intelsat, it was not a strategic holding for them anymore. They were interested in liquidity, or they were more interested in liquidity now than when we started the process. So doing the IPO obviously became an important milestone.

**Martin Emanuel:** But it didn't happen, did it?

**Conny Kullman:** It didn't happen on my watch. We were registered with the SEC in the US and we were supposed to go out on a roadshow to sell the shares a little less than one year after our privatisation, in mid-2002. Two weeks before we were supposed to go out on the roadshow, two of our five largest customers went bankrupt. MCI Worldcom in the US was one and the other was Teleglobe in Canada. It was already a very difficult climate to do an IPO in, but we were really motivated to do it. With those two bankruptcies our possibilities for doing an IPO were basically closed down. Pretty much immediately we started to talk with private equity firms. Private equity was looking at these businesses. They looked at Intelsat, they looked at Inmarsat, they looked at Eutelsat, all having been treaty based cooperatives and now privatized. They first bought up Inmarsat and Eutelsat and they had a keen interest also in us. At first there were two separate consortia with two entities in each. Two in the US: Madison Dearborn and Apollo, and two in the UK: Apax and Permira. Eventually the four firms joined forces,

because it was a large investment for them. They put a joint bid in for the company.

It was an interesting journey to get that deal over the finishing line. We were out doing the roadshow to raise the financing for the deal. As you know, the private equity firms generally buy into companies that they can leverage. So they put in some of their own money, but then they leverage the company, and we were out selling bonds to finance the purchase. We had done one week of what was a week and a half roadshow, and in the weekend in between those two weeks we lost one of our satellites. Of course, we thought they would want to renegotiate, but we managed to convince them during that weekend that the value of the company did not really change because we had redundancy within the system, so we could put the customers on the lost satellite on other parts of the system. So they retained their price level and they went through with the bid. We had continued to be registered with the SEC for an IPO and were working with the investment bankers, so at the time we could have gone and done an IPO at any moment really. But we had an evaluation then, based on the feedback from the investment bankers, that they could sell the shares for between \$11 and \$13. In the end we got \$18.75 from the private equity group, we got a 50 percent premium over a likely IPO price. The owners were quite happy with the result even though it took longer time.

We didn't have the contract with the private equity group until mid-2004, so it took a couple of years extra to get liquidity. Once you sign a deal like this to change the ownership of a large company you need to go through a process to get all the regulators to approve of the new ownership. That took us a little more than half a year. It's fairly typical that it takes that amount of time to get them to approve of something like this. In the beginning of 2005 the private equity group became the new owners and the old ones were cashed out.

I didn't talk much about the period from privatisation until we sold to private equity. For me personally, it was a very stressful period. The business climate was lousy, the customers had difficulties, and as I said several of them went bankrupt. During the build up to the IT crisis a lot of operators had bought too many satellites so there was overcapacity and price pressure also in our business. You also had these new constellations such as Iridium, Teledesic, Globalstar and Astrolink, mobile systems and systems that were supposed to pave the sky with internet connectivity. And they all failed and crashed into bankruptcy. It was a period in great stress, not only for Intelsat but for our whole industry, really. Of course, the private equity firms saw in this an opportunity. There was still a slow growth of the business behind all this noise, there was still a growth of the overall business for the industry.

It takes three to four years to get a satellite into orbit after you have decided to buy one. You started to see that no new orders came in for satellites, and at the same time the demand goes up and you see that, somewhere around 2005–2006, there's going to be undersupply. Then prices would again go up. We saw that and the private equity firms saw that, they saw this as an important investment opportunity.

What had happened just before we privatised was that Comsat, with their share in Intelsat, was sold to Lockheed Martin. Lockheed Martin had at that time, around the year 2000, a strategy of branching out into telecommunications and not only work with defence material, military material. So they bought Comsat and became a 25 percent owner of us, and they clearly had the strategy to try to get us to buy more satellites and launch services from them. They were a satellite and a rocket manufacturer, and we had some quite nasty discussions with them at Board level why we did not buy more from them. They had a couple of guys on the board in the privatised company, and they leaned on management quite heavily. Again, that was a moment where I felt really good about being independent. Lockheed Martin was negotiating with Comsat to buy them when we were in the middle of the privatisation process, and they were part of supporting the

Norwegian candidate for CEO. I had no debt to pay to Lockheed Martin and my focus was on what was right for the company, to get the best possible solution for the best possible price. At a couple of board meetings, they took me and my Chief Operating Officer down to the basement to tell us what we needed to do. I remember one occasion especially. We were recommending to the Board to buy an Ariane launch service rather than to buy a Lockheed Launcher. They took us down into the basement of the hotel and (orally) beat us up, “How could we be so bloody stupid? What is best for the company...” That was a period for me that was extremely stressful. The business was under pressure and we had a board composition that was not good for the company, so that was a tough time to navigate through.

When the private equity firms took over, I told them that I really would like to retire when I'm 58. I was 55 in 2005, so I would commit to work with them for up to three years. At that point they decided to get a new CEO and keep me on as the Chairman for two years. They gave me a decent share of the equity in the new company and this arrangement turned out to be a very good way for me to retire. I was the Chairman for a two year period. I talked with the new CEO, I wanted to get out of the US if possible. My wife and I had discussed that we didn't really want to retire in the US. The new CEO and I decided that I would be at the Corporate Headquarters in Bermuda full time, and he would be in Washington. This meant that we could extract ourselves from the US both practically and financially for tax reason and so on. For my wife Lena and I, it was a good solution. Still, obviously, there was a real operations in Bermuda, and in addition to being the Chairman, I was formally responsible for the company's business in Bermuda. On the order of ten different companies in the company structure were Bermuda-based, so there was quite a lot of work to do in Bermuda. But not on the same executive level as I had worked before, dealing with the day to day satellite operations business. It was more of an administrative position. I still had close contact with the core business through the Board work, but in the office, during the day, it was not about dealing with satellite deployments or such business. This was dealt with by the CEO in the Washington office. In the end they might have decided to replace me anyway with a new CEO, but the final solution turned out to be a good one for my wife and me. You can wind down from a busy CEO job in worse places than Bermuda...

**Martin Emanuel:** During this time of privatisation, the IPO and selling to Private Equity, did you manage to also look out for the running of the company? Because focus must have been on those strategic issues.

**Conny Kullman:** It's a valid question. You could argue that going through the privatisation process took a lot of energy of the senior management, but the business still ran very well through this period. This was in -98 to 2000, before the real crisis hit, the IT and communications crisis. We actually had a couple of our best years then. This is almost obscene, in those two years we had a net profit margin of around 50 percent, so those were financially very good years for the company. The operational “engine” still worked well even though management wasn't there full time. You could have argued that it works better when management is not there interfering.

I felt that I was at a high in terms of popularity with staff when I became the VP of Operations and Engineering. When the business is under pressure it's obviously difficult for management to be popular because you have to take actions on the cost side, as well as pushing as much as you can on the revenue side. As a cooperative we had a benefit structure that was quite rich and while we tried from the management side to make changes our owners were against those benefit changes. There was not a climate in the Board to make those changes. We had a large Board and many Directors had

personal friends working in the company.

One of the problems with the organization was that there were too many ties between our ownership companies as operators and the staff we had in the company. Staff could influence the views of the Board, including on warranted reductions of benefits. Just as an example: we had a health insurance program, as we were headed for privatization, when we analysed costs, the cost and benefits in our program was roughly three times as expensive as a normal corporate health benefit plan. When we privatised we had to address this and make sure we were in line with market, which meant taking benefits away from staff. When you do that it's difficult to maintain your popularity among staff. I normally say to people, that I can write what I know about management on the backside of a business card. One of those points would say that management is not a popularity contest, you have to keep in mind what's right for the company. You have to keep staff motivated to the best of your ability, obviously, but if something is wrong you have to deal with it otherwise you create distortions. That's true for all aspects of the business. Your prices have to be right, your service levels, your quality of service. You cannot keep a quality that's too high, you got to keep what's right and efficient for the customers so you can price the product properly, all of the elements of a business you need to look at that way.

I ended up doing my final years with the company in Bermuda and that was a great experience. You can obviously spend your time in worse places than Bermuda. It was a very nice way to wind down and eventually phase out of the company.

**Martin Emanuel:** As I understand it, this process of privatization, there was a want of competition in the sector somehow, new companies coming in and you need to relate to the new situation and so on. At the same time, a few years after 2000, there seems to be also a consolidation phase, where Intelsat buys PanAmSat and so forth.

**Conny Kullman:** Briefly addressing that issue, it was also one of the highlights of my career or work at Intelsat, to be at the Board level and still be involved with the business at the board level in Bermuda. In early 2005 when I still was the CEO, we went for the roadshow to sell the bonds so the equity firms could buy Intelsat. They bought the company for on the order of 5.5 billion dollars. They put in \$500 million, roughly 10 percent of their own money, the rest we went out and borrowed for them, \$5 billion. There was a company in the US called RJR Nabisco. They manufactured and sold food products and tobacco. They were taken private by a private equity firm in 1988. At the time, it was the largest ever private equity buy-out. The private equity buyout of Intelsat was the largest private equity business since Nabisco, so it was a sizeable deal, which made it interesting in itself, but then, within the first week of ownership the new owners sent us out on a small road trip and we raised another \$500 million. Of course they immediately made a distribution to themselves so basically within one week of buying the company they had none of their own money in the company anymore. It was all bond money. These guys have a very strong recognition in the marketplace, and these four outfits were the top of the crop in terms of private equity firms. The bond investors have a lot of confidence if a group of companies like that, private equity investment firms, have bought an outfit like Intelsat. It's a stamp of approval, this means that if they believe in the business then people will be willing to invest by buying the bonds of the company. And during the roadshow we would have like 20 minute presentations and immediately afterwards we'd get an order for \$100 million of bonds to a pension fund or whatever. So it was a bit of an unreal experience to see the ease with which they could finance their business.

You talked about consolidation. PanAmSat had been taken private also and there

was an opportunity for Intelsat to buy PanAmSat. I am digressing a bit... I mentioned that the video business was developing in the late 90's, or throughout the 90's really, becoming the most important line of business for satellite operators. That's obviously something that we saw. We actually sat down already in the year 2000, before privatization, and had discussions about acquiring PanAmSat, and those discussions went on also after privatization, but we could not convince our new Board that our valuation of PanAmSat was correct, so they were not willing to buy it. Otherwise, we could have bought it already in connection with privatisation. And PanAmSat was a video only company, a perfect fit for us. The acquisition would have done two things. We would get the video business, and, in addition the majority of their satellites were over North America. As I mentioned earlier we had a hole in our coverage over North America as we couldn't do a lot of business with Canada and the US markets directly because of regulation. We could do traffic from America to Africa and to Europe and so on, but they would not let us do domestic US and Canadian business. So this would be a very good investment for the company. But then the private equity firms, they think about these things differently, and they saw the same synergies that we had seen five, six years earlier. And, PanAmSat was still up for sale.

I haven't thrown names around, but it's also during these years that I was in senior management and as CEO of the company that I came across many interesting personalities. In early privatization, I was talking with Rupert Murdoch about buying PanAmSat, so I got to interface with interesting people throughout my journey with the company. I've been at a dinner with president Clinton with six, seven people around the table, and I was giving testimony at Senate hearings... When we privatised we needed to get some legislation changes in the US. For instance, all the US based staff was in the US on a special type of visa that were similar to the visas for the World Bank staff, because we were a treaty based organization. As a private company we couldn't have those visas anymore, so we needed to get US Congress to agree to a legislation change. And there were a couple of other legislation changes we needed to get through, so I spent a lot of time up on Capitol Hill in Washington. I met with 20 to 30 Congressmen and Senators. I was testifying in the Communications Committee in the Senate which at the time was chaired by John McCain. As a side note, talking about meeting interesting people, they say that you don't want to see how sausage is made because then you would never eat the sausage, and it's the same thing with the legislation process. You might accept the end product, but you don't want to see what goes into the making of that end legislation. Most of these Senators and Congressmen were... We met with them, we had half an hour to 45 minutes. It was not unusual, that they would talk about their state and they would talk about the golf tournament they were sponsoring, and then you had five minutes to talk about the subject of the meeting and then you had two minutes for the farewell and goodbye. So these meetings were necessary but kind of useless events. The only exception to that were my interactions with John McCain. He impressed me even though I would say I'm more of a Democrat than a Republican, and obviously he's a Republican. But, he really was well read up or briefed on our issues, he understood our company and he had valid questions. I met with him in preparation for those Senate hearings in a room that's like one third of this room where he and I sat for half an hour to an hour talking about the issues. He had real questions, and valid conclusions and recommendations which were helpful for me to hear. Whereas, with the majority of all the others, it was basically meetings like you probably would suspect they would be. There was not a lot of content and they were poorly read up on the issues and so on. But with McCain it was different, and I still hold him in high regard for that. He later made some stupid decisions when he ran for President. But he's a solid guy and I think recently also, in the Trump era, he has shown that he's a different Senator with solid principles.

He still has that in him even though he made some mistakes as a candidate for the Presidency.

**Martin Emanuel:** What about the Loral company? Was there a similar logic of filling a gap in that case?

**Conny Kullman:** No, no. The first choice was PanAmSat and the second choice was Eutelsat, which I didn't talk about that either. Eutelsat was also at this point in around 2002–2003 owned by Private Equity. It was after privatization, but we were still owned by our traditional owners as regular shareholders, not private equity. So we had negotiations, and also due diligence sessions with Eutelsat, but there was an enormous political opposition in France against a “US company” buying Eutelsat. Eutelsat was a privately held company. It was a regular company it was no longer an intergovernmental organization, but it... I was in one meeting, not at minister level, I forgot what title they have in France but just below the minister level on the communications side. My French is not that great but I still understand a bit. Intelsat at the time was the largest customer buying Ariane rockets. As you probably know the strongest interest and ownership in Arianespace is French. It's not a 100 percent French owned company, there are other interests as well from other countries, but obviously it's an important company for the French. So I was sitting in this meeting and I was trying to tell the ten guys in the group that the European business is really important to us, the manufacturers of satellites and rockets in Europe are important to us, and we're the largest customer of Arianespace. And this senior French guy leans over to his advisor, saying, “This guy is lying, isn't he?”

**Martin Emanuel:** In French.

**Conny Kullman:** In French. Because he was not well informed. But that's the kind of attitude that we met and we couldn't... We got further in due diligence and discussion with PanAmSat around 2000, 2001, than what we did with Eutelsat. What happened then... Loral obviously is a satellite manufacturer but at this time they also had a satellite operations business, they had a small fleet with around ten or eleven satellites and the majority of those were over North America. This satellite operations, especially the piece over North America, was important, or could be an important asset for us. We talked quite a lot about the IT and communication crisis. What had happened was that Bernard Schwarz, the CEO of Loral, was building a mobile telephone communication satellite system, which was called Globalstar. He put this system together but it was a commercial failure. I would say technical and commercial failure. He had basically leveraged both the satellite operations and satellite manufacturing businesses to be able to invest and build Globalstar, but it was not developing into the revenue generating business he had planned, so he was bordering on bankruptcy. The market was aware of this, so we... Bernard always had a strong responsibility for his shareholders and he really was struggling at this time. We analysed the situation and we came to a conclusion on what we really wanted. He tried to sell the whole company to us, the satellite manufacturing and his whole satellite operations, but when we looked at it, the liabilities and the cross liabilities because of his Globalstar investments, we just didn't want to buy into all of that and inherit all of his financial problems. So we said we really only want his North American satellites. We don't even want the full satellite operations, we only wanted the five, six best satellites over North America. The bankruptcy legislation in the US says that if you buy less than half of the value of the bankrupt company you can basically isolate yourself from the liabilities of the company that you are buying assets from. It becomes an asset purchase, rather than buying a company. I flew up to him in New York and I

told him, “We want you to formally declare bankruptcy.” He’s a smart guy and I’m sure his advisors had told him, “That’s probably the way out for you.” He resisted and resisted but eventually he went bankrupt.

The US has a process, it’s under a certain part of their bankruptcy legislation, where there is a first bidder, a so called stalking horse bidder. That one company can put a first bid in for these assets, define the assets, have the first negotiations, and that becomes a package. If a company is in bankruptcy it cannot sell the assets to you outright. Instead, they have to go into an auction process. So our bid became the stalking bid or a stalking horse type of bid, and that’s the starting point for the auction. This also was a very interesting experience. We came into this large conference room in New York and at the end of the table, the auctioneer is sitting, it’s a U-shaped table and you have probably around 25 people in the room, at least, sitting by this table. All people who have some interest in buying either some parts of the company, as we want, or to somehow negotiate or navigate around this part of the company. So, we had bid slightly north of one billion dollars for those satellites. That was our “stalking” bid. We sit down and at the end of this U-shaped table sits the auctioneer, a well-known bankruptcy lawyer with the biggest gavel that I’d ever seen. The process starts, there’s a bid higher than ours, which comes from Charlie Ergen of EchoStar. This is a large Direct To Home operator in the US. He puts down that opposing bid and we quickly bid over him and then his team asked for a recess, so that they could go back and think about this. They came back after four or five hours and said that they would not put the bid higher than our second bid. No one else was bidding. So we got those assets and we took part of the Loral operations, and we took the satellites and quickly integrated their North American operations with ours. That was a first step of filling the gap we had, the video traffic and North America gap. We got a good start with those five, six satellites. We would have preferred the 20 satellites of PanAmSat or the 20 satellites of Eutelsat. Eutelsat didn’t have North America but they had a business that was largely complementary to ours, a business that would have expanded our reach.

In 2006, the second round of discussions with PanAmSat started. I was the Chairman during that period so that basically was the last transaction that I was part of, for Intelsat to buy PanAmSat, which is a somewhat symbolic event. It was symbolic because the creator of PanAmSat, his name was Rene Anselmo, he had been extremely aggressive towards Intelsat, attacking Intelsat because some of these protective behaviours that we talked about earlier. He rightfully did what he did, he did it very forcefully and then got political support from the US Government for his business. He was no longer alive when we had the discussion in 2000, 2001. When we eventually bought PanAmSat, Rene was probably rotating in his grave. His worst enemy was eventually buying his life’s creation. But those were different times. We bought PanAmSat at a price that was on the same order as when we sold Intelsat to private equity. We paid roughly six, six and a half billion dollars. This was again totally financed by debt. So the private equity firms had put 11 billion dollars of debt on the company, and now they were coming up towards two, two and a half years of ownership. They started to shop the company, and managed to find another private equity firm who was willing to buy, BC Partners... How the buyers did their numbers I still don’t understand, how they could justify buying Intelsat, the combined Intelsat-PanAmSat. They bought it for 16 billion and when that deal closed... Three years after they had bought Intelsat, the first four Private Equity firms collected \$5 billion in profit in selling Intelsat to the next private equity firm. When that deal closed I was no longer with the company, I left just after the PanAmSat deal had closed in 2006. The owners wanted me to stay but then of course you also had the CEO of PanAmSat as part of the new constellation and they wanted to retain him also. The new CEO would be managing the two outfits, and the

previous PanAmSat CEO would become the Chairman and I would become the Vice Chairman. At that point I said, “Enough of this chess game now.” My two year commitment was basically coming to its end and I said, “Now, let me retire, and retire for real.” Time to do something else.

**Martin Emanuel:** You started out in Sweden but then you had a long international career. But maybe you still had some sort of contacts back in Sweden. Do you have any reflections about what has happened in Swedish space activities since you left Sweden in the 80’s?

**Conny Kullman:** When I left I really changed what I was working with... It was still space related, but when I lived and I worked with Saab Space it was all equipment, building electronics for satellites and rockets, whereas Intelsat is a service business. We of course bought satellites and specified satellites but never manufactured, and occasionally we would specify that we want that component on the satellite because we might have funded some research and development activities and we want that to be on our satellite. But generally we would let the satellite manufacturers do their own internal specifications, or rather do their own designs based on our specifications, so we left that detailed work to industry. My contact was more with the operators in the different countries.

Talking about Sweden, Televerket, or Telia never was big on satellites. They had roughly half of a percent of the Intelsat business when I became the CEO, and it was a non-exciting business in a sense. Telia was not a major customer for us so I didn’t really have a strong connection there. There were more interactions obviously, from a business perspective, with Telenor in Norway. Among other things, returning to the privatisation process, we had ordered a satellite to be at 359 degrees east, one degree west, which is also the location where Telenor had one of their own satellites. So they wanted some of this new capacity, they wanted largely half of our satellite, but they wanted to buy it outright rather than to lease the capacity from us. We would much rather lease to them than to sell the hardware. They held the privatisation process a little bit hostage, so we had very difficult negotiations with Telenor where they tried to hold aspects of privatisation hostage, depending on what outcome they got on negotiating the satellite deal, which was not a pleasant experience for us. For me, most of the interaction with the Nordics was related to Telenor, some positive and some not so positive.

**Martin Emanuel:** So you didn’t ever have anything to do with Scandinavians?

**Conny Kullman:** No. It sounds a little strange perhaps. Somehow, apart from our business with the Norwegians, the satellite operations in the other Nordic countries is relatively insignificant. Occasionally a country even with a small customer base could be an interesting market, if they are doing new services or the like, but much of what was done in Sweden was a bit defensive, a business that actually was eroding, and I guess we didn’t see a lot of prospects for pushing for our services here. And, places like the Tanum Earth Station in Bohuslän, for instance, we saw that station getting less and less attention, doing less business with us, and eventually the station was closed down. The Swedes were extracting themselves from the satellite business, so we didn’t spend time on them.

**Martin Emanuel:** What about on the European level. ECMT, for example, or ESA, did you have any relations with?

**Conny Kullman:** Obviously we did. Ariane's launcher business is still important to Intelsat and it was the launcher of choice for us, when I worked there, really. Obviously ESA has done a lot of work leading to the creation of Arianespace and it still has a lot of influence on what has happened there. While I was at Intelsat, we did not buy many European satellites, rather the opposite. Unfortunately, once as CEO, I had to go to Astrium in Toulouse... I have forgotten the Astrium CEO's name, but we bought two satellites from them and they had very severe schedule problems. This was in connection with the IT and communication crisis. They were not fulfilling the terms of the contract. Because of the crisis we did not really need the satellite. So we had an opportunity to cancel the contract, we cancelled one of those two satellites. The one we bought was a good satellite. That was not the point. But the combination of them being late, giving us an opportunity to cancel half of that contract. It's very tough, obviously, to have to step into a CEO's office and tell him what was a big blow to his business. But, you got to do what's right for your own business and unfortunately, if they don't fulfil the contract...

**Martin Emanuel:** How come was Ariane your first choice?

**Conny Kullman:** Let me put it this way. I wouldn't say that Loral was the satellite manufacturer of choice for us, even if we bought more satellites from them than from any other manufacturer. We occasionally bought satellites from Lockheed or Astrium, for instance. But, the culture within Intelsat and the culture within Loral were compatible. There was a good cooperation between our teams and their teams, and I would say the same happened on Ariane's business side. We had a good and open relationship with the Ariane team, and when they designed new launcher models... At the early days with Ariane 5, they had a string of failures, but there was an open relationship and we understood what they were doing and we had confidence that they would come out of their difficulties delivering services that we wanted. It's the day-to-day work at technical and operational level that is most important. I think that's true for all businesses, the combination of our own people and their people has to be the right one, as well as obviously the services and the prices, all of this has to work. But the chemistry between the operating level groups and the understanding between the groups is quite important.

**Martin Emanuel:** What about the chemistry among the top level guys?

**Conny Kullman:** That's also important. It's always important. But perhaps when you're in front of a large purchase, when you feel that you get a good deal and obviously you want to end up with a win-win where both sides are happy with the outcome. It does not benefit us trying to buy something from someone and push their prices down so that they lose money and they can't deliver the product because of that, so you have to have a balance there. I would say that the lower levels are more important over time, it is important that your engineers and your operating people work well together with others. When you're tried and tested, if you have a satellite problem or there is a launcher problem or whatever, it is important that you can do an open and fair analysis of the situation and quickly find good remedies and corrections. That's not going to happen at CEO level. It's very important that your engineers can do that and come up with a solution that works for them and works for us. During my years at Intelsat it generally worked well with Ariane's business, more so than with the other launch service providers, and it generally worked better with Loral than with the other satellite manufacturers. That's the way things develop in many businesses, I think.

**Martin Emanuel:** I would like to thank you very much for this interview and your time. It's been really interesting.