

Description of photos in the Phobos commemorative photo book given to Wit at the celebratory collaboration meeting on Oct 11-12, 2008.

A full list of names is at the end.

Photos are described left column first and top to bottom in a column with the photos separated by ; and a period at the end of each column. Within photos, people are usually listed left to right.

Page 1 is blank.

Page 2:

Empty parking lot before counting house; empty tunnel. Phobos logo and mug graphic; very early draft of the proposal.

Page 3:

Counting house was delivered in two halves which needed to be connected together; inside of CH before being sealed; the console was a surplus item from Rochester. Bolek W; Heinz P, Pradeep S (through window), and an unidentified person work in the counting house. The ports from the outside were made by pushing pipes through the berm using a huge hydraulic ram; when they hit the inside wall, a hole was cut; holes were then patched around the pipes; finally, the pipes were cut off on the inside and outside.

Page 4:

Lead plus fiber calorimeter modules salvaged from AGS experiment E864 for use in the PCal and SpeCal. They had been stored on pallets outside for several years. The magnet power supply was borrowed from the AGS and refurbished. A Type 1 Spectrometer Si module. The magnet was custom designed and made by Danfysik in Denmark.

Page 5:

The magnet coils had a complex shape because of the desire to have very small field in the first few spectrometer layers. The coils were made of square Cu pipes with cooling water on the inside and epoxy insulation on the outside. The coils were made in multiple layers which were fed power and water in parallel. I never understood the funny "step" near the top layer. Note that the straps holding the coils to the yoke cut into the epoxy, requiring kapton tape and shims for protection. Photos are: Top view of Cu pipes feeding into coil; clamp (note tape and shim protection) and strap securing coil. View of coils from negative Z side; view of coils from positive X side. Side view of Cu pipes feeding into coil; perspective view of same.

Page 6:

The magnet was disassembled at Danfysik for shipping and needed to be reassembled. There was no crane at RHIC so this needed to be done at the AGS. Photos: Partly assembled magnet; our liaison engineer Joe Scaduto (partly obscured) with Patrick D, Leslie R, and AGS technicians; AGS technicians install the cooling and power connections. The cooling tower for the magnet at RHIC was located in the parking lot outside the counting house; Leslie R and Patrick D watch AGS technicians and riggers putting the magnet on its stand. The power supply is shown when the magnet was first energized at RHIC, note the current gauge at lower right of the power supply reading about 3600 amps; a magnetic field probe inside the gap (meter held by Patrick D) reading about 2 Tesla.

Page 7:

Riggers moving the magnet using a fork lift and large capacity rollers, one of which could be turned by hand; George S and Nigel G moving PCal modules by hand; Marek S plays Rambo with the Octagon frame. The concrete detector stands were moved with a fork lift; the largest crane at BNL was needed to lift the magnet; metal plates were used to smooth the driveway leading to the RHIC door, there was a problem with the fork lift wheels slipping after it rained on the plates. Riggers push a partly assembled PCal on its stand; George S, Corey R, and Nigel G rigging PCal modules using a crane installed for to move RHIC kicker power supplies over the beam pipe. Note protective measures (not used in earlier photo) to avoid exposure to lead.

Page 8:

The magnet just barely made it through the door into the tunnel (note rigging supervisor's hand at the left checking clearance); the Spectrometer was moved to RHIC in an MIT van with BNL police escort. The magnet just barely made it around the corner from the access hall into the tunnel; the Spectrometer arm was carried into the tunnel by 4 people, George S (obscured at left), Heinz P, Gerrit vN, Kris G, with 2 others, Carla V (obscured at left) and Patrick D, ready to catch it if dropped and Bolek W running interference. The concrete support blocks needed to be aligned with surveyed marks on the floor; the PCal modules were not particularly square or straight and often needed to be banged into place, here by George S.

Page 9:

Rachid N and others mounting the Octagon on its sliding base; Edmundo G doing magnet mapping; Jerzy M, Jan G, and Marek S pondering the Octagon frame design. The module assembly machine built at MIT by Krakow engineers; Alan W?, ?, Birger B?, Bolek W, and Rachid N removing the lucite cover from the Octagon carrying frame. Heinz P working on the Spectrometer arm (note the lifting fixture for installing it); Markus F working on the trigger in the counting house.

Page 10:

Jerzy M and Marek S working on the manifold for the cooling system; Eric J, Robert P, and Frank W assembling TOF. Birger B, Rachid N, and Russell B putting top half on Octagon; Zdzislaw B and Waclaw N making enclosure windows. Unidentified person working beneath the Spectrometer arm; Carla V and Wojciech K installing a temporary Octagon cover for testing.

Page 11:

Krzysztof O, Marek S, and Jan G working on the cooling system pump unit; Matt Ceglia (BNL tech assigned to Phobos), Patrick D, Gerrit vN, Kris G, Nigel G, Carla V, and Heinz P contemplate moving the Spectrometer arm. Edmundo G and Robert P install the Cherenkov counter; BNL technicians install the beryllium beam pipe. The console starts to fill with computers with Kris G at work.

Page 12:

Krakow crew with Robert P: Standing: Marek S, Robert P, Waclaw N, middle row: Krzysztof O, Jerzy K, Zdzislaw B, Kazimierz G, front right: Jerzy H; Wojtek B with the cooling system pump unit; Birger B, Mike R, Rachid N, and Alan W pose with assembled Octagon. Note very close clearance (actually interleaving) between Spectrometer modules and the Octagon; Marek S and Jerzy M explain some mechanical aspects to Roman H (in middle). An early test of the Octagon and Spectrometer frames without Si to verify design clearances; Front: Carla V, George S, Gerrit vN, Nigel G, Back: Heinz P, Patrick D, Peter S, Kris G, Bolek W celebrate a Spectrometer move.

Page 13:

A ring module and the wire assembly holding the beam pipe; the paddle counter. The Ring counter on the +Z side of the magnet and the outer Spectrometer arm modules; a ZDC counter located in the gap between the two RHIC beam pipes behind the D0 magnet; the Cherenkov counter with the T0 counter (at left). Valves and meters of the detector cooling system; the interior of the Octagon detector; a temperature and humidity monitor inside the enclosure.

Page 14:

The inner Spectrometer Trigger array; one of the protective covers for the beam pipe, they slid up and down on Unistrut frames; the outer TOF array. The trigger in the counting house in its later, very chaotic state; the Cherenkov detector, modules could move in and out to adjust timing. The back of the PCal detector; Si detector readout electronics in the tunnel.

Page 15:

A cable pulling (and unrolling) crew: front: Markus F, 1st row: Lou R, Don McL, Alan W, Mark B, 2nd row: Pradeep S, Wojtek K, Steve M, 3rd row: Andrzej S, George H, Patrick D, Jerzy H, Alan C, Inkyu P, 4th row: Marian D, Jerzy M, Andrei S, Jerzy K, far back: Nigel G?; Matt Ceglia the technician assigned to Phobos, untangling a cable mess. The Teflon cone and ropes used to pull cables through the berm, note the extensive use of duct tape; Spectrometer flex cables routed to the FECs; George S and Corey R pulling PCAL cables. Unspooling cables down the tunnel prior to pulling them, also a person on a ladder putting cables in the tray; the mass of TOF cables converging on the detector.

Page 16:

Insulated helium feed pipes into the accelerator with the cryostat covers removed; the RHIC accelerator tunnel. BNL and the RHIC ring from the air; sign warning RHIC people to walk their bikes through the narrow corridor passing through Phobos; posters for the RHIC open house. Installation of survey markers in the tunnel floor; a temporary enclosure for testing the Spectrometer arm.

Page 17:

Emergency exit corridor and beam pipe protection made from cardboard tubes normally used as concrete forms; the cooling water input on the top of the magnet frequently leaked. The entry gate to the RHIC tunnel with multiple danger warning signs; the RHIC control room; a “chipmunk” radiation monitor. The “Magnet on” warning light and emergency crash button; Angelika Drees in another part of the RHIC control room; liquid nitrogen tanks were used to supply dry nitrogen to the detector enclosures, they frequently iced up especially in winter.

Page 18:

Everyone enjoyed inspecting the magnet gap; Heinz P, Alan W, Birger B, Bolek W, Rachid N, Jerzy M, Marguerite T, and Gerrit vN.

Page 19:

Sunset outside the counting house; there was a very small and recessed reset button on one of the trigger modules which needed to be pushed often. The door into the counting house electronics room collected lots of memorabilia; BNL is overrun with wild deer, the opening at the right is the other entrance to the tunnel which we tried (unsuccessfully) to get RHIC to use so they would not need to pass through our detector as often (see pg 16 middle). And wild turkeys who seem to have little regard for safety as they often cross the roads with no fear of cars; the counting house white board was full of some useful and a lot of obsolete information.

Page 20:

A Type 1 Spectrometer module; Type 1, 4, and 5 modules; the mess of flex cables and cooling tubes coming off the end of a Spectrometer arm. Top view of the three front Spectrometer modules; a Type 4 Si wafer and its test remnant. A rear Spectrometer frame on the jig used for mounting modules; front view of the three front Spectrometer modules mounted on the carbon fiber support plate; inner wing Spectrometer arm modules inside the magnet gap.

Page 21:

Left to right, top row to bottom row (chronological order): “Sacrificial setup” used for the first beam; one-arm setup used for the first 200 GeV beam; full two-arm setup; addition of the Spectrometer Trigger, T0, and PCal (mini one on the deuteron side) for the d+Au run, note that the TOF walls were also moved out; full PCal and SpecCAL added, the T0 moved from in front of the Paddles for d+Au to in front of the Cherenkov for later Au+Au; and back to the empty tunnel.

Page 22:

Joe Scaduto, Jim Mills, and George S at an installation planning meeting; the large auditorium in Chemistry at BNL with Wit B giving a talk; the smaller meeting room in Chemistry with Bernie W giving a talk, left wall (back to front): Patrick D, ? and ?, front row: Bolek W, Wit B, Andrzej O, Roman H, Barbara W, Andrei S, 2nd row: Robert P and George S, 3rd row: Heinz P, Gerrit vN, and Alan W, right wall (back to front): Leslie R, Steve S, and Mike R. Russell B, Bolek W, Willis L?, Alice M, Gunther R, and Mark B? (obscured) at the Taiwan collaboration meeting; one of the many, many daily counting house meeting, L to R starting at back: Robert P, Andrei S, Ed W, Ian H, Sergei V, Ming K, and Zhengwei C. Audience for Wit's talk at the first beam celebration, at the back left are Peter Yamin and Nick Samios visible on either side of Piotr K who is in the front followed by Mike R and Judy K, Shoji Nagamiya (in coat and tie), Rachid N and Willis L, Tom Ludlam is in the middle back between Peter S and Bolek W, Lou R, Patrick D, and Nigel G are in the 2nd row on the right, Mark B is just by the railing, Don B is at lower right; another counting house meeting with Kris G, Gunther R, Wit B, and Patrick D; Patrick D standing above the Chesapeake River at the Donaldson Brown Center in Maryland.

Page 23:

Edmundo G and Judy K at the DB Center; white board in the Chemistry meeting room; dinner in the Chemistry meeting room: back left: Don B and Joe S, clockwise at table: Oana C, Frank W, Conor H, Abby B, Lois C, Gabor V, Gerrit vN, Christof R, ?(obscured), Barbara W, Steve M, Russell B?, and Rachid N. The Taiwan collaboration meeting: ?, Alice M, Wit B, ?, Willis L, Russell B, Bolek W, Gunther R, George H, Rachid N, Heinz P, Mark B, Alan W, Roman H, Eric J, Hilary C, ?, Barbara W, Peter S; Gerrit vN, Piotr K; the back lawn of the DB Center; lunch at the Chemistry meeting room: back L to R: Leslie R, ?, Robin V, George H, David H, at table F to B: Edmundo G, Patrick D, Rachid N, ?, and Alan W. Upstream and downstream river views from the DB Center; audience for Wit's talk at BNL announcing the first RHIC physics result.

Page 24:

Alice M's house in Greenport, outside: ?, ?, Gerrit vN, Wit B, and Bolek W; old map above fireplace inside; and beach. Abby B won the thesis award and Carla V won the poster award at the 2005 RHIC User meeting; Corey R won the thesis award at the 2007 meeting; Vasu C, Dave H, Josh H, and Joe S play poker at the DB Center while Aneta I watches.

Page 25:

2000: Front row: Gerrit vN, Willis L, George S, Conor H, Robin V, Judy K, Abby B, Eric J, 1st standing row: Wojtek S, Wit B, Don McL, Josh H, Edmundo G, Kris G, Nazim K, Andrei S, Nigel G, Carla V, Alice M, Roman H, 3rd row: Christof R, Don B, Rachid N, Lou R, Gunther R, George H, Alan W, Steve M, Russell B, Frank W, Mike R, Patrick D, Corey R, Richard H, Jay K, Bolek W, back row: Richard B?, Peter S, Andrzej O, Pradeep S

2002: Front right: Wit B, Lois C, 1st row: Andrei S, Aneta I, Conor H, Rachid N, Oana C, Mark B, Alice M, Barbara W, 2nd row: Don B, Nazim K, Josh H, Richard H, 3rd row: Wojtek S, George S, Gunther R, Christof R, Kris G, Abby B, Joe S, Steve M, Dave H, back row: Gerrit vN, Frank W, Jay K, Nigel G, Gabor V, Alan C, Pradeep S

2003: Front row: Gerrit vN, Andrei S, Mark B, Conor H, Edmundo G, Sergei V, George S, Alice M, Wojtek S, standing: Zhengwei C, Burt H, Ming K, Iouri S, Abby B, Corey R, Joe S, Jay K, Gabor V, Carla V, Steve M, Gunther R, Dave H, Birger B, Adam T, Inkyu P, Josh H, Peter S

2005: front: Birger B, Burak A, Sergei V, Ed W, George S, Standing: Peter S, Chadd S, Vasu C, Marguerite T, Wei L, Russell B, Joe S, Gerrit vN, Dave H, Aneta I, Josh H, Alice M, Corey R, Wit B, Richard H, Gunther R, Constantine L, Steve M, Pete W, Steve's son David, Bolek W

Page 26:

Wit B, Rachid N, and Gerrit vN carry a Spectrometer arm out of RHIC; Richard B taking away the Paddle counter. Dale R, George S, Rachid N, Gerrit vN, and Wit B taking the Si detectors away from BNL in 2008; Wit B and Rachid N pose with the Octagon. Gerrit vN and George S put the Spectrometer arm in an MIT van; the forlorn empty Phobos area with heat blankets installed to bake out parts of the beam line.

Page 27:

Front pages of the most widely cited Phobos publications. In the center are the covers of the Physical Review Letters volume with the first four experimental papers from the d+Au run and the BNL publication of the Whitepapers, also published in Nuclear Physics A (top left).

Page 28:

Assorted figures from Phobos papers: $dN/d\eta$ per participant pair versus beam energy from the first physics paper; centrality dependence of particle yields at 130 and 200 GeV (by mistake the same figure was initially also at the bottom right); comparison of 200 GeV/130 GeV particle yield ratios to models. Factorization of centrality and transverse momentum dependence of spectra; Au+Au $dN/d\eta$ at many centralities; pseudorapidity dependence of elliptic flow. Extended longitudinal scaling of particle yields; extended longitudinal scaling of elliptic flow; antiparticle to particle ratios versus centrality in d+Au. R_{dAu} showing no jet suppression, the famous “null” experiment; particle yields comparing nuclear and elementary collisions; (added later) total particle yield per participant pair versus centrality for d+Au, Cu+Cu, and Au+Au.

Page 29:

Wit in intense discussion; and playing soccer at the DB Center; giving a talk at the first beam celebration; touring the experiment under assembly with Don B and George S; and giving the talk announcing the first RHIC physics result.

Page 30:

Phobos celebration at the DB Center in October, 2008, complete with cake and champagne. Group photo front row: George S, Richard H (with Evan), Aneta I, 2nd row: Sergei V, Wei L, Burak A, Gunther R, Krzysztof W, Wit B, Wit's wife Wanda, Barbara W, Roman H, Marguerite T, Alice M, Rachid N, Pradeeps' wife Sahana Murthy, Pradeep S, back row: Peter S, Bolek W, Andrei S, Richard B, Don B, Dave H, Gabor V, Steve S, Bernie W. Sergie V and Alice M watch Wit open the champagne. George S presents the commemorative book to Wit.

Page 31:

Gabor V, Wei L, Burak A, Dave H, and Andrei S watch the toasts; Pradeep S gives a talk; George S and Wit look at the book. Wit's wife Wanda, Alice M, and Sergei V watch the toasts. Wit cuts the cake; Peter S, Gunther R, Steve S, Wit, and Roman H celebrate.

Page 32:

Greeting from Krakow; and Roman H, Barbara W, and Krzysztof W at the 2008 meeting; Andrzej O admires the cooling system with Edmundo G in the background.

Page 33:

Greeting from Maryland and the Paddle counter with and without Edmundo G.

Page 34:

More greetings from Maryland as well as greetings from Conor H and Robin V.

Page 35:

Greeting from Gabor V and Don McL with photos of the frame for the Spectrometer Trigger built by Gabor and Steve G admiring the Cherenkov Counter.

Page 36:

Greeting from Russell B with photos of Rachid N poking at the Spectrometer arm. Josh H, Joe S, and Vasu C playing poker. A single Octagon module; the endplate of the Octagon enclosure with cable access; and a highly stylized view of an early Phobos design done at Rochester.

Page 37:

Greeting from Patrick D along with photos of the magnet being moved to RHIC. Pumps and plumbing for the magnet cooling system. More flex cables and cooling tubes on Spectrometer modules; the SpeCal detector; and a Ring counter enclosure.

Page 38:

Many early suggestions for the Phobos logo along with the final versions and the two sides of the Phobos mug.

Page 39:

Greetings from George S along with photos of Wit and Russell B at the DB Center; the magnet with all detector enclosures in place; Wit in Taiwan. A demonstration of how shiny the cooling plates inside the magnet gap were; and the rest of the photo from the top left of page 29. Wit with Gunther R and Lazlo Csernai.

Page 40:

Greetings from the BNL group.

Names in red were graduate or undergraduate students on Phobos.

Burak Alver, Birger Back, Mark Baker, Maarten Ballintijn, Donald Barton, Russell Betts, **Abigail Bickley**, **Richard Bindel**, Zdzislaw Blaszcak, Wojtek Boguki, Wit Busza, Lois Caliguri, Alan Carroll, **Oana Catu**, Zhengwei Chai, Hilary Chang, **Vasundhara Chetluru**, Patrick Decowski, Marian Despet, **Markus Friedl**, Kazimierz Galuszka, Edmundo Garcia, **Tomasz Gburek**, Nigel George, Jan Godlewski, **Kris Gulbrandsen**, Stephen Gushue, Jerzy Halik, Clive Halliwell, **Josh Hamblen**, **Ian Harnarine**, **Adam Harrington**, **Michael Hauer**, George Heintzelman, **Conor Henderson**, David Hofman, **Richard Hollis**, Roman Hołyński, Burt Holzman, **Aneta Iordanova**, **Jay Kane**, **Nazim Khan**, Judith Katzy, Jerzy Kotula, Wojtek Kucewicz, Piotr Kulinich, **Chia Ming Kuo**, **Jang Woo Lee**, **Wei Li**, **Erik Johnson**, Willis Lin, Steven Manly, Don McLeod, Jerzy Michałowski, Alice Mignerey, Waclaw Nedza, Gerrit van Nieuwenhuizen, Rachid Nouicer, Krzysztof Oliwa, Andrzej Olszewski, Robert Pak, Inkyu Park, Heinz Pernegger, **Corey Reed**, Louis Remsberg, **Michael Reuter**, **Eric Richardson**, Christof Roland, Gunther Roland, Leslie Rosenberg, Dale Ross, **Joe Sagerer**, **Pradeep Sarin**, Pawel Sawicki, **Helen Seals**, Iouri Sedykh, Wojtek Skulski, Chadd Smith, **Maciej Stankiewicz**, Stephen Steadman, Peter Steinberg, George Stephans, Marek Stodulski, Andrzej Straczek, Andrei Sukhanov, **Artur Szostak**, **Jaw-Luen Tang**, Ray Teng, Marguerite Belt Tonjes, Adam Trzupek, **Carla Vale**, **Sergei Vaurynovich**, Robin Verdier, Gábor Veres, Bernard Wadsworth, **Peter Walters**, **Edward Wenger**, **Donald Willhelm**, Frank Wolfs, Barbara Wosiek, Krzysztof Woźniak, Alan Wuosmaa, **Shaun Wyngaardt**, Bolek Wysłouch